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economic development

BATTELLE REPORT SUMMARY

INTRODUCTION

The 2014 Battelle report presents the results of a year-long effort to set a future strategic direction for economic development in Iowa. The report was initiated and led by the Iowa Partnership for Economic Progress (IPEP), an industry-led, CEO-level advisory board established by Governor Branstad in 2011. The mandate of IPEP is to continuously identify and study economic growth issues facing Iowa and recommend solutions and policy alternatives.

In initiating this statewide strategic planning effort, IPEP set out three guidelines for approaching the re-envisioning of Iowa's economic development roadmap.

1st Engage a broad range of economic development stakeholders from private industry, economic development and higher education to ensure broad-based input.

2nd Complete a comprehensive analysis of Iowa's industry clusters, development resources and economic assets.

3rd Review and recommend the programs necessary for Iowa to strengthen its existing industry clusters and capitalize on opportunities for growth.

The full report is a comprehensive resource containing a wealth of useful data about Iowa's economy and a set of recommendations for future action intended to preserve and improve Iowa's position in a globally competitive economy. Key guiding principles emerged from the analysis, including:

- Appropriate measures of economic success must go beyond traditional measures of jobs and economic activity and should include the quality of jobs and improvements in the standard of living.
- The state's 12 major industry clusters are driving its top-line economic performance and will remain critical to economic growth in the future.
- A balanced and integrated economic development plan must focus on innovation, retention and attraction for the state to keep pace with the challenges of a global economy.
- Providing sufficient resources is necessary if the state is to impact key areas such as workforce, innovation, entrepreneurism, broadband, transportation infrastructure and business climate.

IOWA'S CURRENT POSITION: AREAS OF STRENGTH

Because a complete understanding of our current position is necessary before future direction can be charted, the report discusses in detail the state's areas of economic strength. These strengths represent the foundation upon which future growth can be built.

The Big Picture: Measuring Recent Economic Gains

Iowa has made substantial economic progress over the last decade, resulting in positive trends in Iowa's top-line measures of success:

- Economic growth is high. As of 2013, Iowa's economic output, in real, inflation-adjusted terms, was 5.9% higher than the pre-recession levels of 2007, outpacing the national growth of 4.7% during the same period.
- Quality job growth is strong. Iowa outperformed the nation in the growth of both middle and high-skilled jobs. At the same time, the number of low-skill jobs has actually declined as both employers and employees transition to a more skilled workforce.
- Wages are rising. Iowa substantially outpaced national gains in private sector average wages. This is consistent with the rising workforce skill levels in Iowa and an increase in the number of higher quality jobs.
- Per capita income is growing. While record farm incomes have driven a substantial increase in per capita income during the last decade, from 2007 to 2013, Iowa's nonfarm personal income also grew 20%, eclipsing national growth of 14% over the same period.

Drilling Down: Iowa's Leading Industry Clusters are driving Economic Gains

The big picture economic gains of the last decade indicate that the major industry clusters driving Iowa's economy are robust, diverse and have statewide impacts. The report identifies 12 major industry clusters in Iowa that are outperforming national growth in their sectors. Taken together, these clusters establish a diverse regional economy, and their broad distribution supports growth in every part of the state. Nearly all of Iowa's top 50 employers fall within these major industry clusters. *(See Table I on page 3)*

Economic growth in Iowa is driven by these industries because they serve customers and markets outside the state. In addition, having strong local economies means goods and services don't have to be imported from elsewhere, further retaining wealth locally. These industry clusters do not stand alone within the state or its regional economies. Rather, they are part of complex, interconnected networks of related industries and the supply chains that service them.

The report examined the connections among Iowa's traded sector industries by analyzing supply chain relationships, shared markets, and shared technology areas. This examination revealed four factors contributing to the strength of Iowa's leading industry clusters:

- Advanced industry specialization. Nine of the 12 industry clusters have a significantly higher concentration of employment relative to the national average. The more specialized an industry cluster is relative to the nation, the greater its competitive advantage. This level of specialization is represented by an industry cluster's "location quotient" which measures an industry cluster's share of employment in Iowa relative to its share of that industry cluster nationally. A quotient greater than 1.0 indicates a level of specialization greater than the national average. Iowa's location quotients for insurance and finance, agriculture and food production, heavy machinery, biosciences, and renewable energy, among others, stand out among peer industry clusters nationally.

Table I:

Middle- and High-skilled Occupational Groups and Job Growth Relative to the U.S., 2004-13

Industry Cluster	Specialization (Location Quotient; 1.0 = U.S. average)	Productivity Level Relative to the U.S. (100% = U.S. Level)	Economic Multipliers: Effects of a $1M Increase in Direct Output (Sales)	Employment Trend Relative to the U.S., 2007-12 (IA change minus U.S. change)
Agriculture & Food Production	2.02	127%	$650,215	6.0%
Automation & Industrial Machinery	1.59	102%	$390,944	-4.4%
Avionics & Communications Electronics	0.85	105%	$599,887	21.6%
Biosciences	1.29	107%	$518,478	0.3%
Building & Construction Products	1.77	105%	$529,840	1.1%
Health Services	0.95	79%	$632,049	-5.8%
Heavy Machinery	4.10	179%	$377,980	15.8%
Information Services, Digital Media & Technology	0.76	72%	$615,322	-10.7%
Insurance & Finance	1.42	112%	$503,259	6.8%
Primary Metals Manufacturing	1.81	72%	$483,770	7.9%
Renewable Energy	5.90	101%	$305,379	79.1%
Transportation, Distribution, & Logistics	1.18	81%	$574,019	6.8%

- High productivity. Eight of the 12 industry clusters have a higher level of output per worker compared to the same clusters nationally. A more productive workforce offers employers added value and represents another competitive advantage for the state. While average productivity across all private industries does not outperform national productivity, productivity within Iowa's leading industry clusters substantially outperforms peer industry clusters nationally.
- Strong economic multipliers. Eight of the 12 industry clusters generate substantial economic multiplier effects. Led by agriculture and food production, which has an extensive footprint across Iowa, and avionics and electronics, which boasts the state's highest average annual wages, Iowa's leading industry clusters create ripple effects in retail, health care, housing, and other local markets that support the state's diversified economy.

- Competitive job growth. Nine of the 12 industry clusters performed better than the U.S. average from 2007 to 2012. While some of Iowa's leading clusters saw declines from pre-recession job levels, in general those declines were less than peer industry clusters nationally, and six of Iowa's leading industry clusters saw real growth over that time.

Without these 12 leading industry clusters, Iowa's recent economic gains would not have been achievable.

Drilling Down: Job Growth and Workforce are Strong

The number of middle-skill and high-skill occupations being created in Iowa is growing faster than the national average, and this growth is happening across a number of skill sets.

Table II:

Middle- and High-skilled Occupational Groups and Job Growth Relative to the U.S., 2004-13

High-Skilled Occupational Groups		Middle-Skilled Occupational Groups	
Occupations	IA Growth Exceeding U.S., 2004-13	Occupations	IA Growth Exceeding U.S., 2004-13
Physical Scientists	✓	Legal Support	✓
Life Scientists	✓	Healthcare Support	✓
Postsecondary Teachers	✓	Other Education, Training, & Library	✓
Health Diagnosing & Treating	✓	Sales	✓
Life Science Technicians	✓	Transportation & Material Moving	✓
Computer-Related	✓	Installation, Maintenance, & Repair	✓
Engineering Technicians	✓	Arts, Design, & Entertainment	✓
Management	✓	Personal Care & Service	
Arts, Design, & Entertainment	✓	Health Technologists & Technicians	
Community & Social Services	✓	Health Diagnosing & Treating	
Engineers	✓	Production	
Other Health Related		Drafters & Mapping Technicians	
K-12 Teachers		Protective Service	
Business & Financial Operations		Office & Administrative Support	
Social Scientists		Construction & Extraction	
Medical & Clinical Lab Technicians			
Math Science			
Personal Care & Service			
Sales			
Other Education, Training, & Library			

Source: Battelle analysis of Bureau of Labor Statistics, Occupational Employment Statistics Data; data shown for skilled groups with at least 1000 jobs.
*Note: Battelle takes a more refined or focused approach to identifying middle-skilled workers by requiring that those jobs requiring a High School diploma only have at least a requirement for an apprenticeship and/or moderate or long-term on the job training; those jobs requiring a High School diploma and short-term training only have been designated as low-skilled. This is a more stringent requirement than that used in many analyses of the middle-skilled workforce.

Table III:

STEM-related Postsecondary Degree Graduates from Iowa Institutions, 2009-12

Institution Type	STEM-related Degrees, 2009		STEM-related Degrees, 2012		Change in Number of STEM-related Degrees, 2009-12	Change in STEM Share of All Degrees, 2009-12 (%Points)
	# of Degrees	Share of all Degrees	# of Degrees	Share of all Degrees		
Iowa Total	**6,172**	**100%**	**8,057**	**100%**	**31%**	**-2.2 % pts.**
Community Colleges	802	13%	872	11%	9%	-1.0 % pts.
Private Colleges	2,212	36%	3,278	41%	48%	-2.3 % pts.
Public Universities	3,158	51%	3,907	48%	24%	1.3 % pts.

Source: Battelle analysis of National Center for Education Statistics, IPEDS database.
Note: Includes Associate's degrees and above. Degree fields include: computer and information sciences; engineering and engineering technology; biological sciences; physical sciences; agricultural sciences; math and statistics.

Iowa is producing many more graduates in the fields of science, technology, engineering, and math (STEM) than it has in the past. From 2009 to 2012, Iowa saw a 31% increase in the number of STEM-related post-secondary degrees granted in the state. Of particular note here is the success of Iowa's private colleges which increased the number of STEM graduates by 48% during that time period.

Drilling Down: Innovation and Entrepreneurship will drive Future Gains

In recent years, Iowa has seen strong gains in both industry and university research and development. From 2009 to 2012, Iowa substantially outpaced the nation and its peer states in the growth of such research and development.

Table IV:

Iowa's Standing in Growth and Relative Level of Industry and University R&D Activities vs. U.S. and Key Comparison States

Measure	Definition	Iowa	U.S.	IA Ranking vs. 14 Comparison States (1st to 15th)
Industrial R&D	Industry R&D Expenditures per $10M GSP, 2011	$151,801	$188,932	8th
	Percent Change, 2009-11	52%	31%	1st
University R&D	University R&D Expenditures per $10M GSP, 2012	$45,828	$40,075	5th
	Percent Change, 2009-12	24%	14%	1st

Benchmark States Include: IL, IN, MI, MN, MO, NE, NC, ND, OH, OK, SC, SD, TX, WI.
Source: Industrial R&D – National Science Foundation (NSF) Business R&D and Innovation Survey. University R&D – NSF Survey of R&D Expenditures at Universities and Colleges.

Iowa's 24% increase in university-based research led its group of comparison states and outpaced the national increase of 14%. Even more impressive, Iowa's industrial research and development during the period 2009 to 2011 increased by 52%, also first among the comparison states during that period and substantially outpacing national growth of 31%. The intellectual property, technological advances, and prototypes developed from this research will launch the next generation of businesses and products for existing businesses – ensuring the competitiveness of Iowa's industry clusters that drive its economic performance.

The commercialization of such products and technologies is critical to creating new growth both within and outside of existing industry clusters.

IOWA'S CURRENT POSITION: AREAS OF WEAKNESS

Any analysis of Iowa's current position is incomplete without addressing areas of weakness, which the report also identifies in detail. These areas of weakness represent points of emphasis for stakeholders and opportunities for policymakers to effect positive change. They are where future actions, both tactical and strategic, must be directed if Iowa is to remain globally competitive.

Challenges and Solutions: Business Climate

Despite its strong recent performance, Iowa still needs additional gains if it is to be ranked among the most economically successful states in the nation. As of 2013, even after the strong gains of recent years, Iowa ranked only 23rd in the nation in per capita income – perhaps the most meaningful measure of how a state's economy is doing in generating a high standard of living for its residents. In terms of the share of high-skilled jobs, while Iowa has grown faster than the nation in recent years, it remains below the U.S. average in the overall number of such jobs, with 23% of Iowa's workforce employed in high-skilled jobs compared to 26% for the nation in 2013. In terms of average wages, which is in part reflecting this lower level of high-skilled workers, Iowa's average earnings for private sector workers stood at just $40,489 in 2013, a full 23% below the national average of $49,700.

Of particular concern for Iowa is that its leading industry clusters are not expected to be strong job generators at the national level over the next 10 years. For example, 10 of the 12 industry clusters in Iowa are expected to see job growth nationally of less than 1% per year from 2012 to 2022. This means that for Iowa to continue to outpace the rate of national growth in the state's leading industry clusters, it must continue to raise productivity within those clusters while also pursuing any high growth opportunities presented by Iowa's existing and emerging core competencies and specific strengths.

The implications for Iowa are significant. **A strategic priority for Iowa must be to build on the competitiveness and growth of Iowa's industry clusters through innovation, retention and attraction.** By pursuing two specific objectives in advancing the competitiveness of its industry clusters, Iowa can exceed the growth levels expected nationally. First, Iowa can achieve higher growth and competitiveness of its existing industry clusters through maintaining and growing higher productivity within these industries. This will not be easy as each of the existing industry clusters is expected to generate higher output per employee by 2022 in the national Bureau of Labor Statistics (BLS) forecasts –further forcing Iowa to increase its own pace of growth in productivity to outperform national levels. Secondly, Iowa can realize higher potential by focusing on growing and emerging markets within each of its leading industry clusters. This requires a forward-looking assessment that considers Iowa's current and emerging strengths across detailed product markets, as well as an assessment of core technology competencies identified in Iowa, and how that aligns with potential growth markets in each industry cluster. It is these opportunities that differentiate Iowa and establish a platform from which Iowa can compete on a national and even global scale.

Recommended tactics proposed in the report include:

- Create an initiative to assist Iowa manufacturers to stay on the cutting edge of their industry, positioning them to be globally competitive.
- Increase resources in the Strategic Infrastructure Fund to address competitive industry cluster development needs in a collective and collaborative way and target growth opportunities led by industry consortium.

- Address Iowa's non-competitive tax environment to reduce the complexity of the system and simplify the structure and rates.

Challenges and Solutions: Workforce

In today's global, knowledge-based economy, from a competitive standpoint, states and local communities are increasingly differentiated based on their ability to educate, train and recruit a qualified workforce that meets the needs of industry. Even as middle and high-skilled jobs grow in Iowa, the availability of a skilled workforce is a major area of concern to Iowa businesses. Combined with Iowa's weak population growth, this workforce problem is likely to plague Iowa for many years to come. While positive trends have been identified in attracting skilled workers to Iowa and in generating more STEM-related graduates at the post-secondary level, the resources and efforts devoted to these positive trends must be significantly increased before substantial improvement is noticed in labor markets across Iowa.

Against the comparison states, Iowa's gains in STEM-related graduates stand out. Still, there is room for improvement since despite this strong growth in STEM-related degree generation across Iowa's post-secondary institutions, Iowa is well below the national average in the share of total degrees awarded in STEM-related fields. Iowa had only 10.1% of its post-secondary degrees awarded in these STEM-related fields compared to the national average of 14.8%. This level ranked Iowa last among the benchmark states.

The most troubling issue for the Iowa workforce is its low population growth. From 2000 to 2012, Iowa grew just 5.1% in population compared with 11.5% for the U.S. Iowa's population growth has been lower across all age groups, but the nearly flat growth among Iowa's youngest population group (24 and younger) stands out as a long-term threat to Iowa's future competitiveness.

To achieve the level of economic success desired, Iowa must generate and attract the skilled workforce demanded by Iowa's businesses. While the state can work toward attraction of workers from elsewhere, its future lies in the current and future generations of Iowa students. Improvements to Iowa's education system, development of career awareness and training, and additional marketing of the viable career paths offered in Iowa will create a robust and predictable pipeline of talent ensuring the state's businesses can compete at the highest levels.

The strategic roadmap recommends the following tactics to drive the availability of skilled workers:

- Create incentives for recent graduates, veterans and high-skilled workers to take positions in Iowa in specific industry clusters with critical worker shortages.
- Advance workplace learning through colleges, continuing education and retraining involving small- and mid-sized employers, including further development of internship programs and apprenticeship opportunities.

Challenges and Solutions: Entrepreneurial Eco-system

In recent years, Iowa has made strong gains in industry and university research growth. Currently, Iowa's university technology transfer and commercialization activities are sizable, but there is room for improvement, even compared to other Midwestern states. One limitation facing university technology commercialization is the lagging performance of Iowa's overall entrepreneurial culture.
Iowa remains well off the national pace and compares poorly to benchmark states in measures of entrepreneurial activity in the population, new company birth rates, job creation by new businesses and

the presence of fast-growing small companies. Iowa is also well behind the nation in Small Business Innovation Research (SBIR) awards. Over the 2009-2012 period, on a per 10,000 population basis, Iowa averaged $18,885 annually in SBIR awards compared to $72,343 for the nation.

Table V:
Iowa's Standing in Statewide Entrepreneurial and New Company Formation and Growth Measures vs. U.S. and Key Comparison States

Measure	Definition	Iowa	U.S.	IA Ranking vs. 14 Comparison States (1st to 15th)
Entrepreneurial Activity	Kauffman Foundation's Index of Entrepreneurial Activity, Entrepreneurs Per 100,000 Population, 2013	110	280	15th
New Company Birth Rate	Average Annual Rate of New Business Establishment Formation as a Percent of All Establishments, 2007-2011	8.4%	10.4%	13th
Job Creation by New Company Births	Average Annual Job Creation from New Business Establishments, 2007-2011	3.6 jobs	5 jobs	14th
Presence of Fast-Growth Companies	Number of Companies on the Inc. 5000 List of Fastest Growing Private Companies, 2013	28	n/a	12th

Benchmark States Include: IL, IN, MI, MN, MO, NE, NC, ND, OH, OK, SC, SD, TX, WI.
Sources: Entrepreneurial Activity – Kauffman Foundation; New Company Birth Rate and Job Creation by New Births – U.S. Census of Business Dynamics; High-Growth Companies – Inc. Magazine.

Much work has been done to advance Iowa's innovation and entrepreneurial culture across the state over the past decade. Results from individual programs have been promising, however, there is a clear imperative to advance Iowa's entrepreneurial culture and support system. A strategic priority for Iowa must include accelerating the development of Iowa's emerging entrepreneurial eco-system.

Specific tactics recommended to achieve results include:

- Expand entrepreneurial services offered through Innovation Iowa (IIC/IEDA) to include mentoring services and access to business resources, as well as programming to entrepreneurs to promote better utilization of SBIR programs.
- Create an effective angel investor tax credit that eliminates the waiting period, increases the tax credit percentage and makes the credits transferrable to attract broader investor interest.
- Reassess public-private research partnerships to promote strategic collaboration among academia, government and industry, including the creation of post-doctoral and graduate entrepreneurial education tracks.
- Expand the state's economic gardening program, Advance Iowa, for mid-sized growth companies.

Challenges and Solutions: Physical Infrastructure

Physical infrastructure remains a prerequisite for economic development. In fact, in Site Selection magazine's 2014 Survey of corporate real estate executives, "Transportation Infrastructure" ranks first on site selectors' list of the most important location criteria. The declining condition of Iowa's highways and reduced availability of highway improvement funding through the existing gas tax is now among the top concerns of industry executives across the state.

At the same time, significant concerns about the speed and reliability of Iowa's broadband infrastructure that directly impact industry have been identified. Nearly one-third (13,000) of Iowa businesses surveyed by Connect Iowa want higher broadband speeds that cannot be supported at their current locations. Even more disconcerting is that only 21% of Iowa businesses have redundant broadband services, making their business operations vulnerable to stoppages due to downtime in service.

Finally, a third physical infrastructure concern relates to the need for more livable communities to retain and to attract young families. This is a frequently noted concern by regional economic development stakeholders across Iowa's smaller communities.

For all these reasons, it's clear that advancing Iowa's physical infrastructure is imperative to realizing the state's economic potential. Recommended tactics proposed in the report include:

- Address highway improvement funding by advancing a hybrid approach that balances the need for stable and predictable revenue by retaining a fixed per gallon fee but at a lower rate, and adding a sales tax component that provides a means to allow for revenue growth as the price of fuel increases.
- Support Iowa Department of Transportation's (IDOT) targeting of high-value transportation improvements using information gleaned through the Freight Optimization Study. The study, by applying supply chain network design and optimization techniques used in the private sector, will allow Iowa to advance a comprehensive approach to prioritize investment for advancing the state's freight transportation capacities.
- Develop incentives for broadband investment that creates a comprehensive approach to spur broadband development that can be depended upon over time.

CONCLUSION: STRATEGIC DIRECTIONS

The report also proposes “strategic directions” which are intended to orient policy makers toward the most promising long-term goals, so they can align future policies accordingly. These are in addition to “tactics” which represent specific actions that can be taken in the short-term.

The strategic directions recommended in the report include the following:

For growth in leading industry clusters:
- Develop focused policy initiatives that capture the most promising emerging growth opportunities.
- Promote regions that are economically connected in order to facilitate collaborative initiatives.

For attracting a skilled workforce:
- Create a K-20 industry-driven career development partnership with the education community.
- Scale-up ongoing efforts demonstrating success in technical education for advanced manufacturing workforce development of new and incumbent workers.

For supporting innovation and entrepreneurism:
- Facilitate the transfer of university research and development to industry startups.
- Increase the amount of venture capital and seed-stage funding available to allow startups to grow locally.

For maintaining and improving physical infrastructure:
- Explore innovative methods of financing infrastructure improvements, including the use of public-private partnerships.
- Focus on intermodal transportation infrastructure and other infrastructure improvements to support export economy and livable communities.

Together, the tactics and strategies recommended in this report hold the potential for transformative economic growth in Iowa. This report serves as a reminder that Iowa has the resources to attract, retain and expand the businesses of tomorrow and the know-how to increase the level of innovation that is the driver of economic growth. By reinforcing Iowa’s strengths and addressing the state’s weaknesses as outlined in this report through a comprehensive and connected economic development strategy, Iowa is positioned to take its place as a global leader.