Growing the New Michigan –
Life Sciences Hub

BUSINESS LEADERS FOR MICHIGAN

December, 2011

Developed by McKinsey & Company with support from Business Leaders for Michigan staff

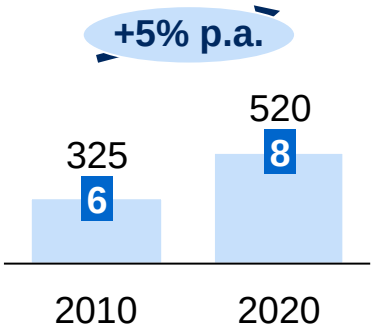
McKinsey&Company

Michigan can leverage health and medical expertise to grow the life sciences economy

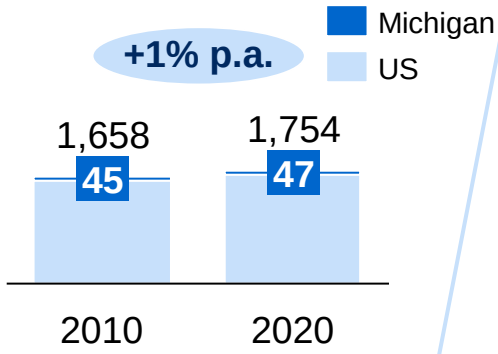
The asset

- Ranks 15th in employment even though it produced the 8th highest number of higher education degrees awarded in biosciences, indicating high degree of brain drain
- Ranks 10th in total biosciences R&D expenditure (~$1B), however, biosciences spend from 2004-2008 grew at ~12% which is significantly less than the US average of 22% growth
- Life science is one of Michigan's few sectors outperforming the nation with high multiplier effects

Life science
$ Billions



Life science employment
Thousands



Potential ways to leverage the asset

- Aspire to be hub of bio-pharmaceutical research and production, attracting both top talents and leading bio-pharma players
- Become the center of research, testing and medical labs in life science, and fuel the pipeline of future innovation and game-changing discoveries
- Michigan can be the preferred location for medical tourism both for international and domestic out of state patients
- The above opportunities will in turn develop an ecosystem and related clusters, driving secondary effects in the economy

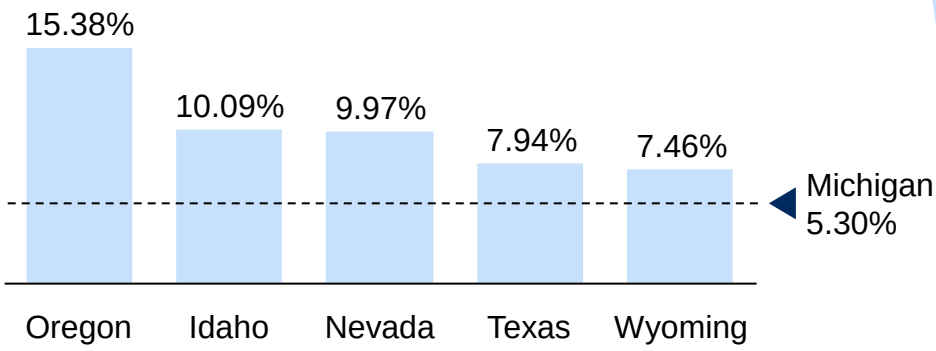
Source: McKinsey Global Institute analysis, Moody's, Archstone MI Fact Sheet 2011, Michigan Bioscience Action Plan

2020 Goal: Michigan should be a Top Five state in life sciences

Today, top US states outperform Michigan in growing life sciences

Projected GDP growth in life science (US Top 1 - 5)

2010 - 2020



Projected employment growth in life science (US Top 1 - 5)

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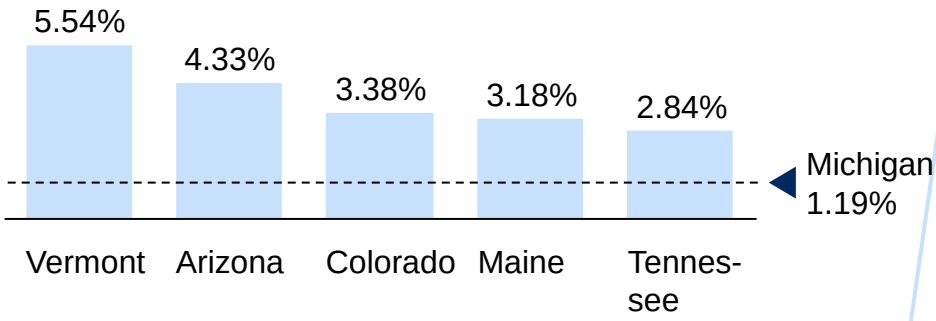
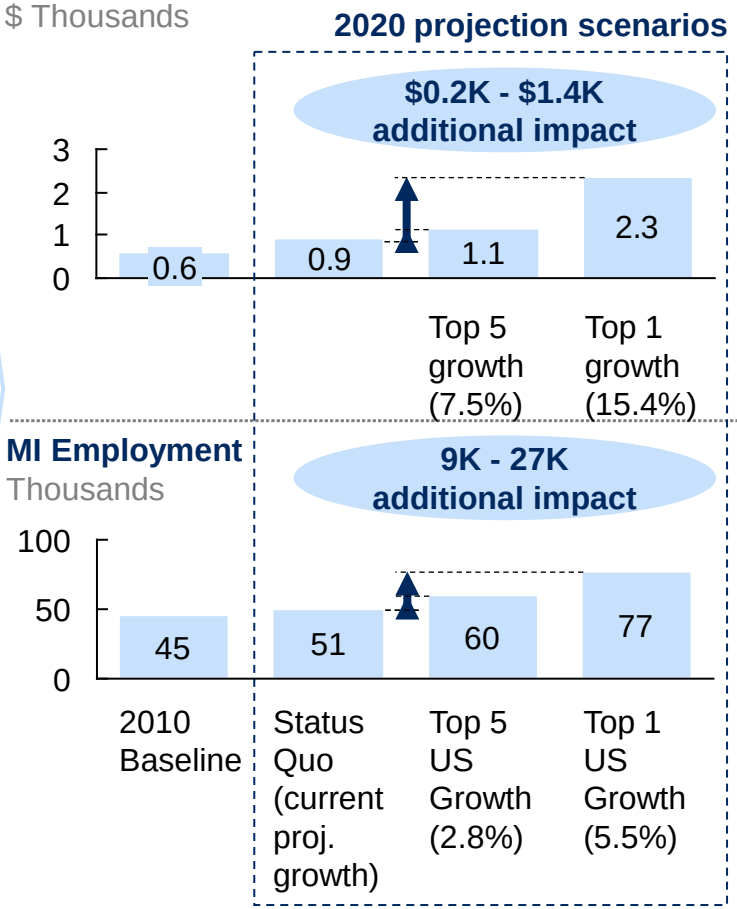


Michigan should aspire to reach top US state growth in life science

MI GDP per capita

$ Thousands



MI Employment

Thousands

Source: AEG analysis, MGI analysis

Key considerations for growing the life sciences hub

A Opportunity & aspiration	▪ Few industries can match the projected long-term sustained growth as bioscience, making it a very attractive opportunity ▪ As other industries are facing pressure from globalization, the life science sector offers a more shielded pocket of opportunity which diversifies Michigan's industry portfolio ▪ Michigan should aspire to become a top-5 bio science state (currently 16, with MA strongly in the lead) measured, for example, as no. of successful startups from university, no. of bio-science graduates retained
B Feasibility & case for action	▪ Michigan has top life science talents that will be a solid foundation for developing the life science and related clusters ▪ Large graduating student class of ~5.5K with higher education degrees in bioscience ▪ Strong existing IP base (1,871 patents) ▪ "Angel Investor Tax Credit" provides strong incentives for potential investors in bioscience companies to consider Michigan ▪ However, Michigan needs a clear roadmap where to take the biosector, with a long-term vision coupled with long-term investments and commitment from all key stakeholders (market is sizable, with R&D investment for bio-pharmaceuticals at $50B+ in 2008)
C Potential Enablers	▪ Include policy leaders and elected officials to lay out a long-term road map for how to take MI's biosector to the next level, and commit to long-term investments and low corporate tax structure ▪ Improve immigration process to access global talent pool ▪ Include university leaders and researchers since they supply the most important input – talent. Make sure curriculum and STEM education is robust. ▪ Develop the entrepreneurial climate in MI, by increasing the support for startups (all phases of the business life cycle)
D Potential Stakeholders	▪ Life sciences industry (1.100 bio firms on MI to leverage) ▪ Universities, students, entrepreneurs, government

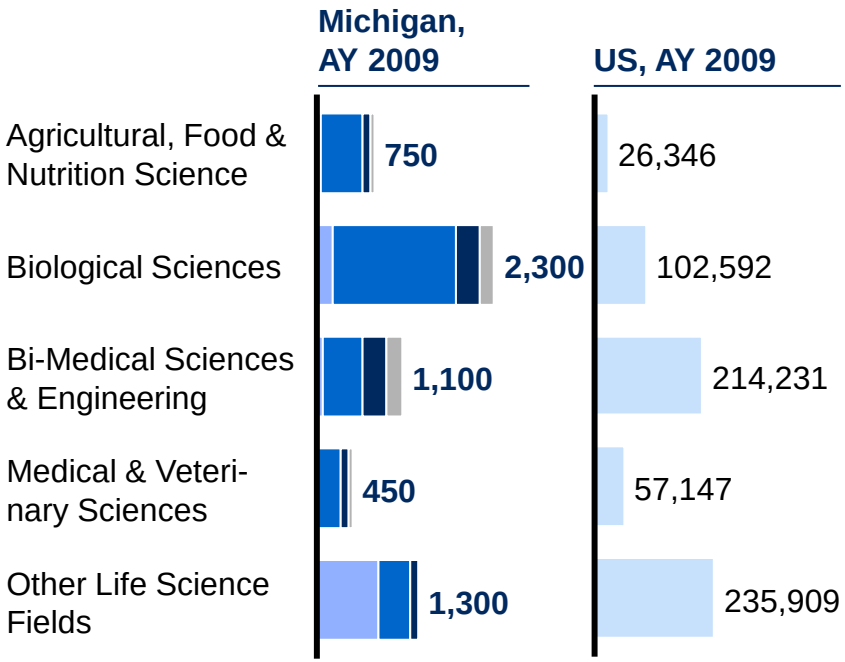
SOURCE: Archstone MI Fact Sheet 2011, MI Bioscience Action Plan March 2011, McKinsey Global Institute analysis

Talent base and innovation in life sciences provide the basis for expanding current life science cluster

Associate's (AA/AS) Bachelor's (BS/BA) Master's (MS/MA) Doctorate (PhD)

Strong talent base in life science

Life science-related Degrees/Awards Conferred

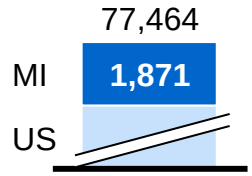


- Michigan has strong talent base in life sciences
- However, increasing brain drain due to lack of opportunities locally

Thriving innovation activities

Patent activities

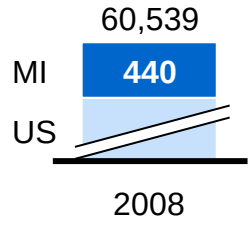
Bioscience and Related Patents, 2004–09



Rank 10

Venture capital investments

Bioscience Venture Capital Investments, 2004–09 ($ millions)



Rank 18

- Michigan ranks #10 in bio-science related patent activity in the country
- However, lags behind high performance states such as Massachusetts in driving economic impact

Source: Archstone MI fact sheet, State Bioscience Michigan report, NSF

A Leveraging existing human capital, there are significant opportunities in high value life science products and advanced services

Higher education ecosystem

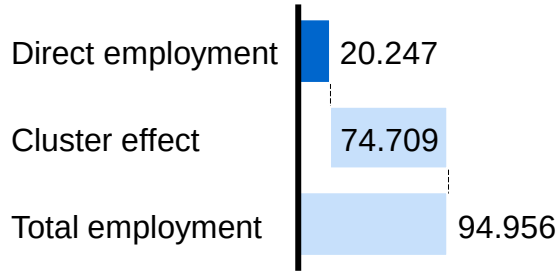
Opportunities	Aspiration
1 Create incubation hub for bio-pharma products	▪ Leverage existing strong talent base to build an ecosystem around the develop and production of bio-pharmaceutical products that will drive economic impact across the value chain ▪ Drive startup activities through incubation and partnership with entrepreneurial community
2 Center of excellence for advanced bioscience services	▪ Develop research, testing and medical lab services for the life science industry, which is a high growing high productivity sector ▪ Aspire to be the center of bio science services, driving both local economic development and knowledge expertise ▪ Develop reputation of excellence nationally and internationally to attract further talents
3 Promote high-end medical tourism through collaboration with premier institutions	▪ New business models in healthcare such as medical tourism attract high complexity cases and customers that seek high quality service rather than cost ▪ Collaborate with premier health care systems (e.g., UofM) and employers and insurance companies ▪ Potential to support patients that need long term care by utilizing under-utilized hospital bed capacity

1 Develop cluster around bio-pharmaceutical products

A Opportunity & aspiration

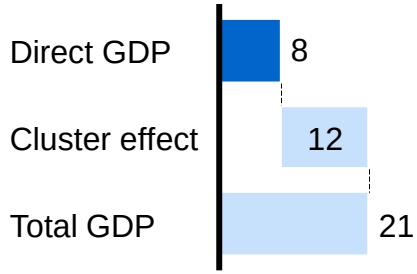
Employment

Types of Indirect and Induced Jobs in MI, 2008



GDP

Total 2008 GDP in Bio-pharma
$ Billion

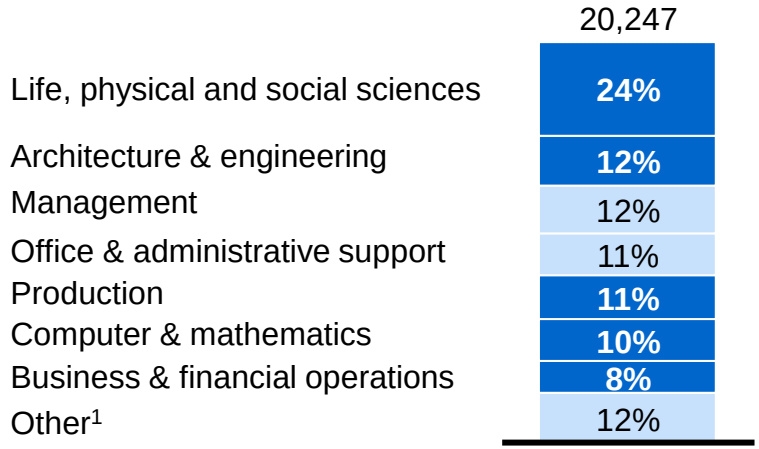


Although bio-pharma industry is still small in Michigan, it has strong cluster effect and significant growth potential

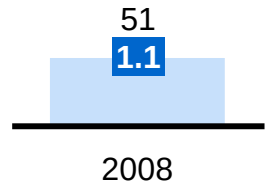
B Feasibility for Michigan

Michigan competitive advantage

Types of Direct Biopharmaceutical Jobs in U.S., 2008



Bio-pharmaceutical R&D investment 2008
$ Billions



Michigan is competitive nationally in producing top talents for key sectors within the bio-pharmaceutical industry

1 Other includes 15 other occupation(s), each representing less than 3.0% of the total. These occupations include, for example, Installation, Maintenance & Repair (2.5%) and Sales & Related Occupations (1.9%)

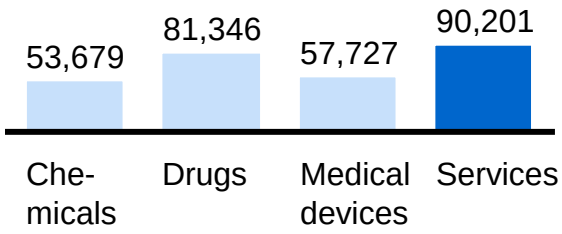
SOURCE: Archstone MI fact sheet, McKinsey Global Institute analysis, team analysis

2 Provide advanced bioscience services[1]

A Opportunity & aspiration

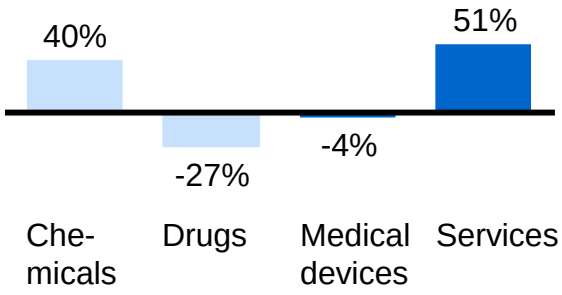
Wage opportunity

Types of Direct Biopharmaceutical Jobs in U.S., 2008



Current growth rate

Employment growth rate 2001-2008

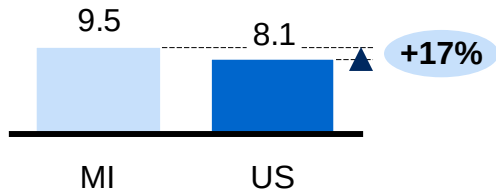


- Bioscience service is the top opportunities in the life science sector in terms of wage and employment growth

B Feasibility for Michigan

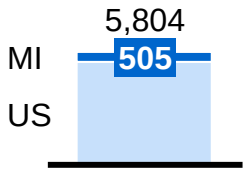
Talent

Bachelor's Degrees in Biosciences and Engineering Conferred per 1,000 Individuals 18–24 Years Old, 2007



Clinical trials

Clinical trials, initiated 2009



Rank 13

- Michigan is nationally competitive in bio-science research (e.g., clinical trials)

1 Service defined as research, testing & medical labs

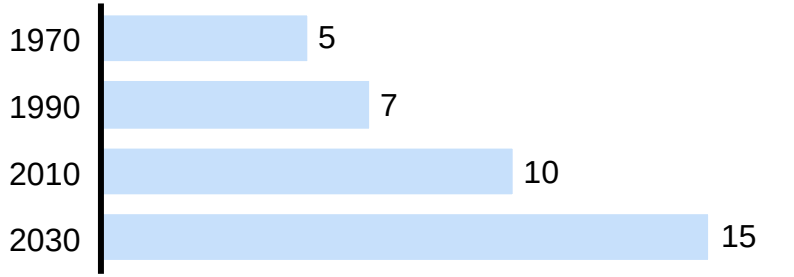
Source: Archstone MI fact sheet, team analysis

3 Promote high-end medical tourism through collaboration with premier health care institutions

A Opportunity & aspiration

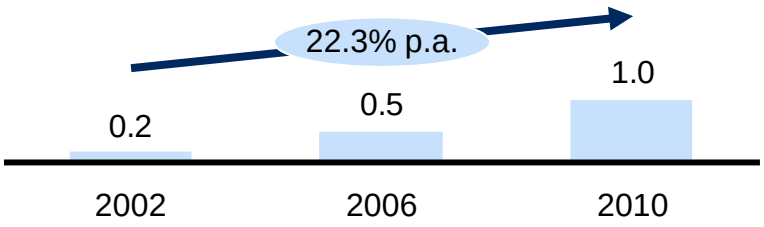
OECD median healthcare expenditure as percentage of real GDP (estimates)

Percent



US Wellness Industry

$ Trillion

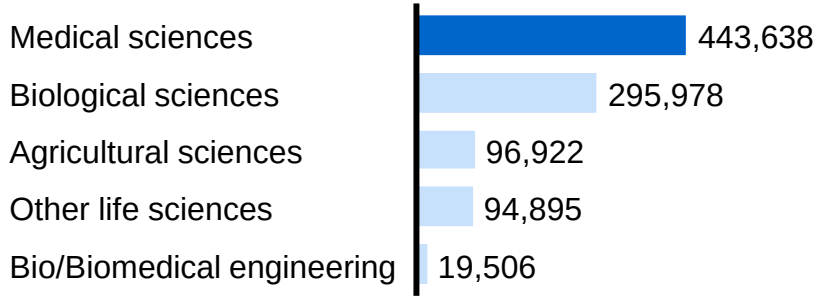


- Healthcare expenditure in the developed world is expected to significantly outpace GDP growth (will be a ~US$ 12.2 trillion industry by 2030)
- This will create significant pressure for cost reductions at the same time ensuring greater access and higher care quality

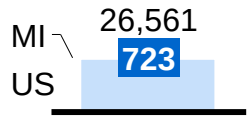
B Feasibility for Michigan

Academic R&D expenditures in Michigan

$ thousands



NIH funding 2009



Rank 11

- Michigan has more than 150 hospitals in the state with more than 50 large acute care facilities and average occupancy less than 70%
- Top hospitals like University of Michigan hospital can provide cutting edge care to patients

Source: McKinsey report – mapping the market in medical tourism

C Potential enablers – What needs to happen to successfully pursue the opportunity?

	Role	Requirements	Key enablers	Case examples
Government	▪ Key source of research funding	▪ Strong partnership with the other stakeholders	▪ Pro-growth culture across stakeholders ▪ A “productive” public sector	▪ Estonia
Life science businesses	▪ Backbone of the emerging cluster	▪ Resource and infrastructure ▪ Commercial opportunities	▪ Modernized infrastructure ▪ Competitive business climate ▪ Business friendly regulations	▪ Ireland
Entrepreneurs	▪ Driver of next generation of innovation and economic opportunities	▪ Availability of resources ▪ Availability of talent ▪ Ease of starting up and operating business	▪ Capital availability ▪ Business friendly regulations ▪ Development of entrepreneurs	▪ Massachusetts
Universities/ Research labs	▪ Talent education, research and mentoring	▪ Availability of raw talent ▪ Availability of funding and resources	▪ Innovative K-12 education – pipeline of raw STEM talent ▪ Capital availability	▪ Finland

C Potential enablers – What needs to happen to successfully pursue the opportunity?

Potential enabler	Potential actions	Case examples
1 Building urban core for attracting entrepreneurs	Develop an urban agenda that includes incentives, policies and funding that attract people to live near research centers Renovate transportation infrastructure to improve easy of commute for research professionals	▪ Singapore ▪ Estonia
	Ensure commitment and funding from the public sector to invest in life science developments	▪ Finland
2 Immigration reform	Streamline the visa process to enable global talent to work; attracting locals to stay Incentivize small businesses with offices elsewhere in MW to move to Michigan	
3 Business incubators and accelerators	Leverage incubator model in other states to reduce the risk of failing for new ventures Expand business incubation and acceleration services Track state regulations to reduce overall cost of doing business and prohibit unnecessary regulatory burden	▪ Massachusetts ▪ California ▪ Ireland
4 Improved capital availability	Encourage capital investment by life science industry, private sector VC/ angels by showcasing success stories Reduce the MBT to move Michigan significantly towards becoming a “Top Ten” state in low tax burden	

Case examples

NOT EXHAUSTIVE

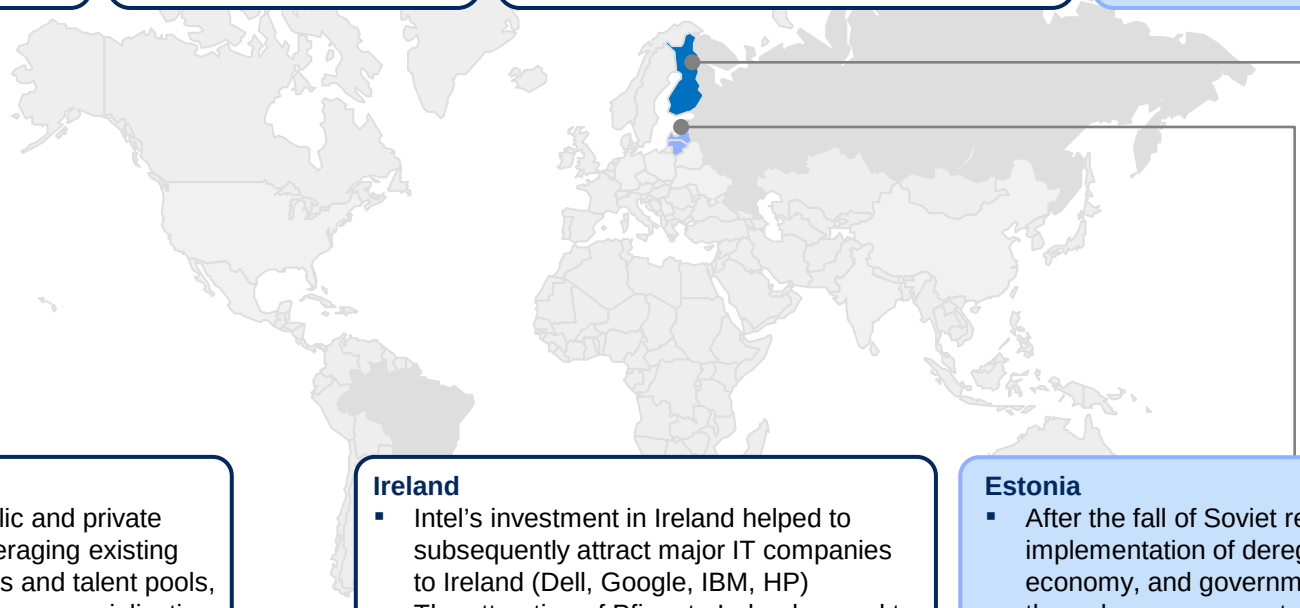
Case examples parallel to Michigan

Massachusetts
- Massachusetts has successfully built a community of entrepreneurs and business startups around capabilities of MIT labs and Harvard research facilities

Singapore
- Prime Minister Lee supported Singapore's FDI focus by personally meeting with groups of CEOs to show his commitment to serving their businesses needs and to reassure potential investors

Sweden
- Following the financial crisis of 1989-91, there was widespread agreement that the old Swedish social welfare model had failed
- Political parties aligned around a new national strategy of maintaining labor protection, while pushing through a series of policies aimed at deregulating product markets

Finland
- Early recognition of country's world-class education system led to a policy of concentrating R&D around universities
- Clear understanding of potential of telecom industry in the 1980s encouraged government R&D funding agency Tekes to focus on Nokia, which received 30% of its total funding during 1981-83



California
- Successful public and private partnership leveraging existing R&D capabilities and talent pools, aimed towards commercialization of new ideas
- An ecosystem built on new business models that focus on long term growth

Ireland
- Intel's investment in Ireland helped to subsequently attract major IT companies to Ireland (Dell, Google, IBM, HP)
- The attraction of Pfizer to Ireland served to rapidly expand Ireland's presence in the pharmaceutical industry
- Large companies facilitate setting up collaborations with local institutions

Estonia
- After the fall of Soviet regime, rapid implementation of deregulation, opening economy, and government transparency through e-government created a business-friendly environment
- Policy focus on infrastructure upgrades for fixed communication and creation of a mobile telecommunication network

SOURCE: McKinsey Automotive R&D offshoring initiative, McKinsey Global Institute. team analysis

New healthcare models that open up new opportunities are emerging

	Description	Why it is happening
 **Cruise ship model of healthcare**	▪ All patients receive high-quality care but have option to pay for different levels of luxury amenities ▪ Hospitals may offer all levels of luxury or focus on only one	▪ Rising healthcare costs are being transferred to the consumer ▪ The largest population segment (24% of the total population) – "Amenity Seekers" – are willing to pay for hospital amenities ▪ The second largest (22%) – "Just the Basics" – would rather not pay for extras
 **Web 2.0 meets healthcare**	▪ Integrated and comprehensive medical Web portal ▪ Links with provider systems (e.g., appointment scheduling)	▪ 77% of patients would switch providers to be kept more informed about their treatment ▪ 17% of the population falls into the "Control Seekers" category, desiring more transparency of and information about healthcare
 **Home Depot of healthcare**	▪ Inexpensive, do-it-yourself wellness and treatment options ▪ Limited basic care from RN or physician ▪ No insurance necessary ▪ Located in convenient shopping areas	▪ Hospital bad debt is rising ▪ Individuals are assuming responsibility for more healthcare costs and not all of them can pay for insurance ▪ Society needs an option that provides common care at a lower price ▪ Majority of the population is interested in more information and control over care

SOURCE: McKinsey healthcare Practice

Lowe's employees needing heart surgery fly to Cleveland for treatment

In early 2009, Lowe's approached Cleveland Clinic to provide heart surgery for its 240,000 employees and dependents. They reached an agreement and since March 2010, Lowe's has been flying employees and dependants who need heart surgery to Ohio, where the Cleveland Clinic treats them in exchange for a bundled payment.

Agreement details	▪ Lowe's pays Cleveland Clinic a flat, "bundled" rate for all services for the entire treatment ▪ In the event of a complication, the patient is treated locally and not flown back to Cleveland for follow-up
Employer value proposition	▪ Lower long term cost: Cleveland Clinic's value proposition is higher quality of care - better outcomes for the patients, fewer re-operations, fewer complications which lead to lower, long-term costs, even though the upfront costs might be higher ▪ Predictable treatment costs: Ability to aggregate the physician payments and the hospital payments into a package price and make a single fixed payment
Member value proposition	▪ Lowe's waives employees' usual $500 deductible and other out-of-pocket costs and pays for the airfare, hotel and living expenses while in Cleveland. The program is optional and employees have to meet certain minimum criteria, such as being up to traveling to Cleveland to qualify ▪ Member's receive quality care through highly qualified physicians and surgeons and have fewer complications post surgery
Provider value proposition	▪ The agreement gives Cleveland clinic the opportunity to compete more aggressively nationally ▪ Reinforces brand's quality care value proposition
Performance	▪ Till date ~17 Lowe's patients have gone through the program. Lowe's initial estimates for the year was 10 employees ▪ In the last 6 months 33% of Lowe's employees or dependents in need of "serious cardiac surgery" have chosen Cleveland Clinic

SOURCE: "7 Points About Cleveland Clinic's Bundled Payment Program for Lowe's Employees", 10/11/2010, Becker's Hospital Review; "Lowe's alliance with Cleveland Clinic likely first of many", 3/16/2010, MedCity news "Lowe's: early returns on Cleveland Clinic heart deal a 'home run'", 10/19/2010, MedCity News

Singapore: Building sectors from scratch

Idea	▪ Built a life science sector from scratch through careful planning of a knowledge oriented economy
Key Lessons	▪ **Talent acquisition:** Focus on attraction of foreign talent to Singapore and positioning of Singapore as destination for R&D research facilities and regional headquarters of multinationals
	▪ **Leadership:** Creation of A*STAR, the Agency of Science, Technology, and Research, focusing on biomedical sciences and engineering/ science, promoting research and public-private collaboration
	▪ **Public policy:** Long-term analysis and planning for direction of economic policy

Case facts

- Self-governed since 1959, independent from Malaysia since 1965
- Parliamentary Republic
- Single Party (People's Action Party) dominates political process
- Limited natural resources (no freshwater)
- Recovered from Asian crisis starting in 1999 by reorientation of economic policy with more focus on knowledge economy

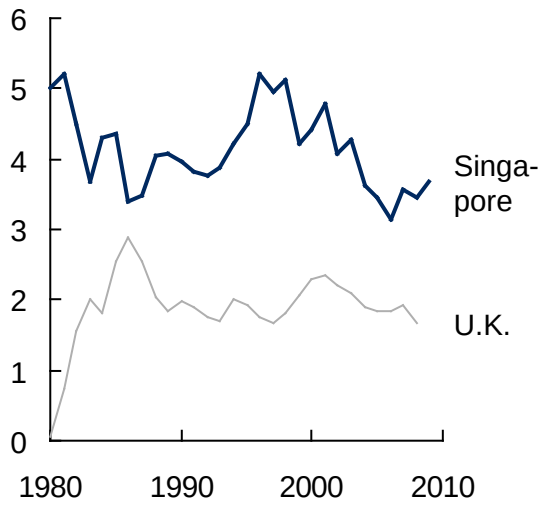
Similarities to Michigan

- Strong R&D base
- Excellent educational institutions

Economic impact

Productivity growth Singapore vs UK

Change in real GDP per employed worker % pa[1]



- Productivity grew by 4% during 1980-2008, more than three times OECD
- Attracted more than 7,000 major international investors such as Merck
- Succeeded in building sectors from scratch such as healthcare
- Rated No.1 in ease of doing business by World Bank in 2008

SOURCE: McKinsey Global Institute analysis, team analysis

Israel: A growing life sciences hub

Idea

- An integrated mobility cluster is key to success of the high speed rail project

Key Lessons

- **Education:** Israel's education system is key in creating a pool of relevant talent for high-tech industry
- **Re-invent existing corporations:** In addition, existing companies in Israel have been acting as sources for spin-offs, based on experienced managerial talent
- **Capital availability:** Israeli business environment allows relatively easy access to VC

Case facts

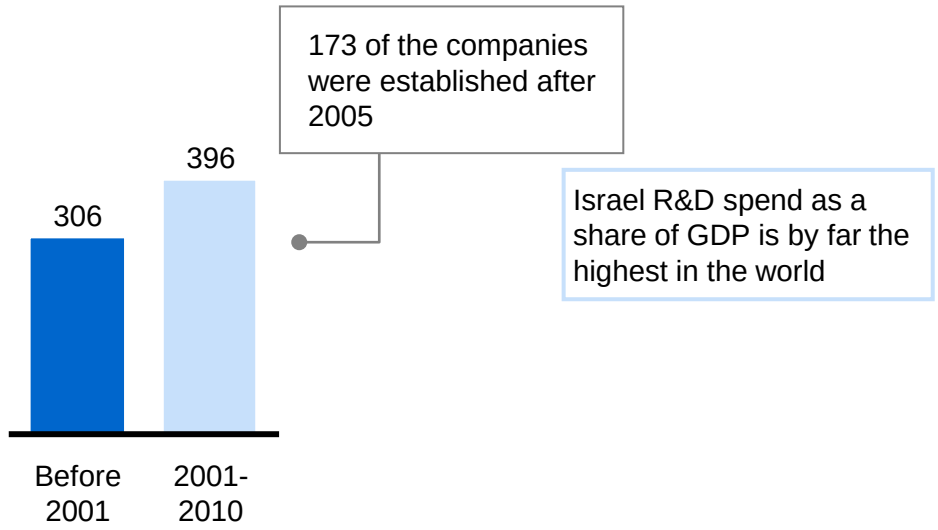
- Israel enjoys a diverse life science ecosystem with pharmaceutical firms, medical device companies and biotechnology innovators
- A young industry: around a quarter of Life Science companies were established in the last 5 years
- Israel is an emerging leader in life sciences innovations, with majority of PR generated through leadership in medical devices IP
- Israel boasts fast-growing venture capital activity in life sciences

Similarities to Michigan

- Strong R&D base
- Excellent educational institutions
- Existing industry ecosystem

Economic impact

Number of new life sciences companies founded[1]



SOURCE: McKinsey Global Institute analysis, team analysis