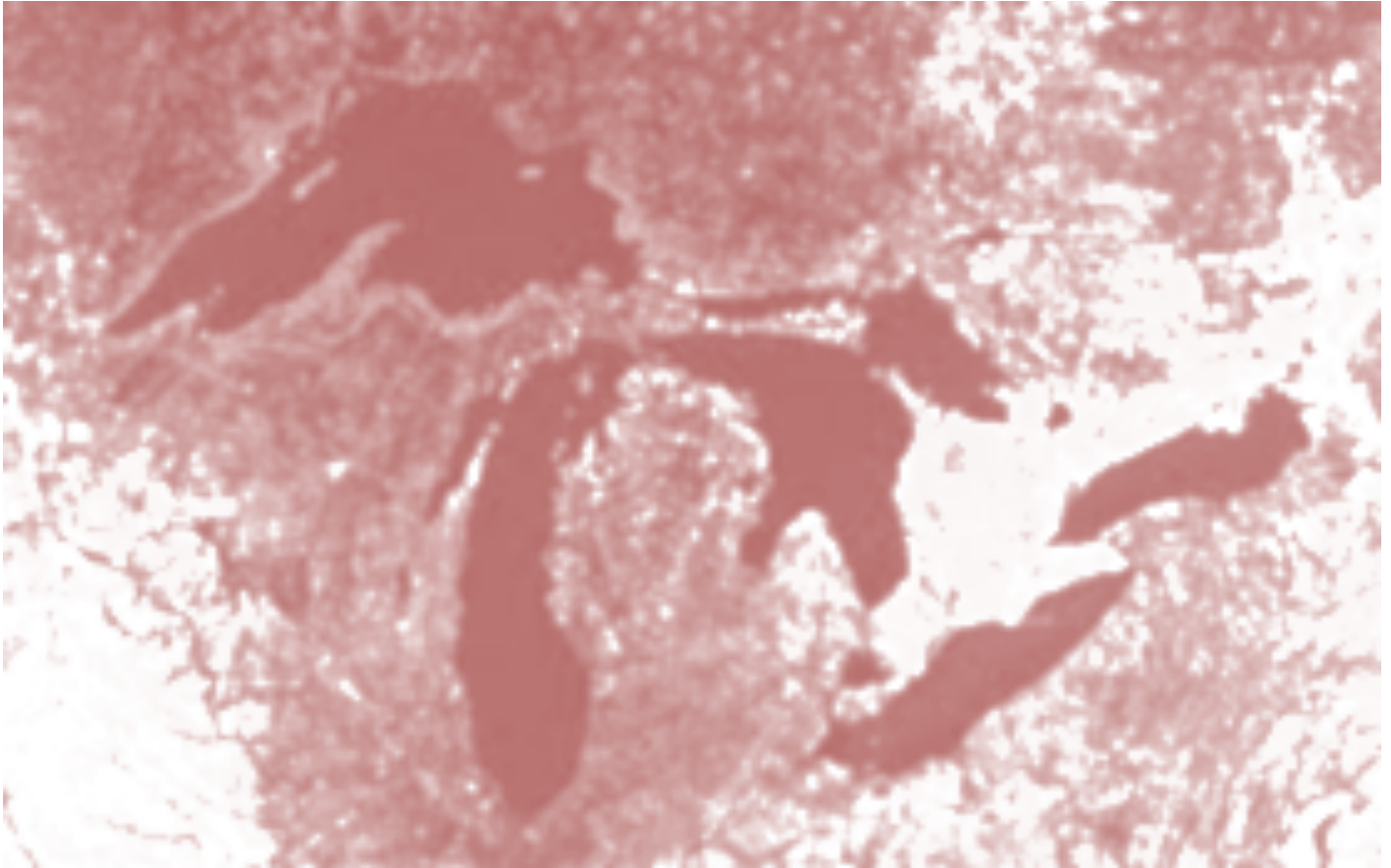# 15 Lessons Learned
from a State's Investments
in Its Tech Economy

10 years & $1 Billion Later

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Introduction

For the past 17 years I've been actively involved in Michigan's early stage technology ecosystem. There have been many incredible, dedicated people involved in the state's progress: mentors, researchers, investors, economic developers, and most importantly, the tech entrepreneurs who have the courage and fortitude to build a company. I was fortunate to have a perspective from several vantage points, most recently as Vice President of Entrepreneurship, Innovation, & Venture Capital at the Michigan Economic Development Corporation (MEDC) before returning to private sector consulting earlier this year.

During the 15 years spanning 2000 to 2015 I have
- held senior management roles in tech start-ups
- received state funds to provide business assistance to tech companies
- evaluated distribution of 21st Century Jobs Fund (21CJF) to companies as a peer reviewer
- advised/assessed companies who received 21CJF loans and grants
- trained/educated commercialization for tech incubator companies
- consulted for tech incubators
- tracked and distributed 21CJF investments to non-profits
- assessed and developed new programs
- oversaw company portfolio investments
- marketed the tech ecosystem nationally
- served on the board of venture fund-of-fund boards, and 13 non-profits serving the tech economy

Background

The story of the evolution of the state of Michigan is not broadly known, but its success is indisputable. That said, there were many lessons—some of them hard—learned along the way.

In 2004 Michigan was in the midst of what turned out to be a 10-year downward economic spiral. A bright light was the influx of tobacco settlement funds that the governor and legislature decided to invest in developing the state's technology economy. That became the 21st Century Jobs Fund: an estimated $1 billion was invested in venture capital funds, tech incubators, technology supporting non-profit organizations, tech company direct investment, and university projects. Michigan's universities had done fairly well securing federal research funding over the years (over $1 billion per year), but the flow of capital into start-up companies was light and the follow-on funding for new companies was meager.

The key takeaways can be summarized into 15 "lessons learned." These lessons are not to be taken as criticisms; on the contrary, they are to provide perspective on what has been a very successful decade-plus endeavor of building a tech-based ecosystem and diversifying a state's economy that is so heavily dependent on one very

cyclical industry. Also, the lessons serve as a guide to some of the adjustments that had to be made in the past four years to increase the state's return on its investment. For context, let's look at the outcomes during this period of time, comparing 2004 to 2014 in Michigan.

2004	2014
4 venture capital firms in Michigan	37 venture capital firms with Michigan offices, 20 "home-grown"
$200 million in venture capital under management	$4.7 billion in venture capital under management
Approximately 50 early stage tech companies tracked	Almost 3,000 early tech companies tracked
3 active angel investment groups	9 active angel investment groups

The 15 Lessons Learned

1) *The best help is experienced help*. Engaging people who have lived through start-ups and built successful tech companies will save inexperienced entrepreneurs years of floundering and avoid wasting precious financial resources.   They will also help prevent entrepreneurs from squandering critical funding or sales opportunities. There are a lot of people who like to give advice… but not all are actually qualified to do so. Two particularly successful Michigan programs are
    a. The SBDC Tech Team. Michigan has a strong Small Business Development Center (a U. S. Small Business Administration partner program), and in 2002 the state director decided to add a specialized tech team with former successful tech entrepreneurs with business backgrounds. Today that team provides strategic advice and connections to tech companies in the state, assisting them in raising $60 million each year. I was fortunate to have been a part of the tech team early in its inception and stayed on for four and a half years. It is now in its 13th year.
    b. Mentors in Residence (MIRs) at Michigan universities. This program places experienced CEOs who are willing to work part-time at a university for 6 to 18 months. While there, they work with innovators with the ultimate goal of joining and leading a new company. The MIRs are a key success factor in moving technologies forward in a university setting.

2) *There are many best practices available*. It may not be necessary to develop a new program from scratch. Take the time to study existing best practices and determine if you can make them work for you. The Michigan Translational Research and Commercialization (MTRAC) program is a great example. The Wallace H. Coulter Foundation distributed and carefully monitored funds in universities and leveraged industry and investment partners to make funding decisions. As a result they achieved a 20X return* through translational research in biomedical engineering. With the advisory assistance of the Foundation, MTRAC launched a program based on their model on a regional level and extended its focus beyond biomedical engineering. Five Michigan schools now have MTRAC programs in multiple disciplines to speed up research with commercialization potential. More than 40 projects have been funded that are on track to leave the university setting and form new companies in the state.

3) *Manufacturing technologies are not a slam-dunk*. For those technologies in the auto product sector, introduction into the vehicle market is often 4-5 years out. For a tech company that means it will likely need to find another customer/market to survive unless an Original Equipment Manufacturer (OEM) or Tier 1 or 2 supplier is willing to fund them. Venture capital is sparse in this space, but some of the OEMs have stepped up and either funded venture firms or created venture arms.

   For manufacturing technologies (those used in the process such as advanced materials), it can be an even longer run. These technologies are often so far down the development food chain that survival is difficult and again – private funding is not readily available. Manufacturing process-related software has also struggled, but there are a few success stories. Bright spots in the industrial sector have been former executives and manufacturing entrepreneurs angel investing or forming their own venture funds.

4) *Early capital funding is a necessity.* If you want to attract entrepreneurs, have some capital to offer them. It should be a meaningful amount, it should be tranched, and it should require milestones. People don't go to the desert to plant trees, and they won't relocate to an area without support funding. A Pre-Seed fund

that is structured with required private matching funds does work. Microloans can work, but they are high risk and will take a long time to pay back at this stage of investing. A public Pre-Seed fund shouldn't be expected to have huge returns, but it should have some, and the diligence of the fund manager should be impeccable. When 40% of deals in the ecosystem receive Pre-Seed funding, that appears to be right-sized. There was significant debate about setting funds up as evergreen vs. not, and based on my experiences, I recommend trying to get as close to an evergreen model as possible, though at this stage of investing a new flow of funds will almost always be necessary. People who assess companies for investment potential and distribute public funds are a special breed who should have four qualities: 1) understand the path of a tech start-up, 2) be able to recognize potential and identify holes in a plan or a pitch, 3) have the right personality to deal with difficult people, challenging situations, political environments, and also play the role of "teacher," and 4) have nothing to personally gain from making each investment.

5) *Entrepreneurial training is difficult to standardize.* Although there are many training programs available, a lot of "wheel reinvention" takes place. I've provided a quick overview of the programs that Michigan has used most effectively–although with varying degrees of success:

   a. Kauffman Foundation FastTrac training was great in the beginning because we could recruit people to classes using the Kauffman name; however, Kauffman spun out the program into a for-profit, raised their rates so that a class could only run with government or other support, and we had to customize so much of the content that we eventually abandoned it.

   b. Technology Roadmapping is one of the most effective tools available to help companies strategically plan their development, business model, funding strategy, and market launch. SBDC was fortunate in recruiting the former head of Global Technology Development for General Motors, who ran their technology roadmapping activities. High quality labor requirements and scheduling are the toughest barriers with this approach, but it is extremely effective and ultimately saved time for both the tech team and the entrepreneurs by creating the shortest distance between two points.

   c. I-Corps (funded through the National Science Foundation) appears to be promising. The University of Michigan was selected as an initial I-Corps hub. The initial structure was onerous because it required too much time on the part of the mentor. Additionally, I-Corps required the technologist to do 100 interviews regardless of the size of the market of the technology, and in a B2B model that requirement doesn't always make sense. However, I'm a huge advocate for early customer discovery and there was a marked improvement in pre-spin-out university companies who participated. It helped avoid the most difficult marketing activity: working with a researcher that has developed a technology, and the next task is to find a market for it. A train-the-trainer program was also adopted by the state to expand I-Corps to other universities.

   d. Business Model Canvas has become the most widely adopted format among the incubators for walking companies through their business model development; it is fairly clean and straightforward. Prior to using Business Model Canvas, most training focused on "how to secure venture capital," which turned out to be too advanced for most start-ups, and it was realized that developing the basic building blocks of a business were more critical in creating successful businesses. Most (more than 90%) of companies do not receive venture capital.

6) *The incubators were a critical component to the ecosystem, if executed well.* The most active, highest tech company-producing incubator in Michigan is also the smallest by square footage, showing that the real value of an incubator is in the services, the network, the energy, the funding opportunities, and the availability of a pipeline – not in the physical building. Our most prolific public incubators are located near universities. One in three have a good pipeline of technologies coming in, but will always need outside financial support. There has been moderate success with privately funded incubators who take equity in companies, though I have seen some of those struggle as well. These incubators are often only serve software companies, leaving out support for some of the most valuable university intellectual property. Also, many incubator managers complain that the real estate demands of running an incubator prevent them from focusing attention on the companies and the services.

7) ***The service providers are critical to a successful tech ecosystem.*** Service providers are the people who give advice to start-ups, help review federal Small Business Innovative Research Grants (SBIRs), provide investor pitch coaching, and connect start-ups to customers. They are some of the smartest people in the ecosystem with the highest return on investment. Over the years they have evolved their support to be more efficient, and they have honed their skills as advisors. Service providers are passionate about helping tech companies succeed, and I relied on them to help me with strategic planning each year; they know how everything works and help identify the gaps and flaws. They have been flexible and agile, moving with the market as it has evolved. Service providers include the SBDC Tech Team (mentioned earlier), and the people who provide training on and write SBIRs/STTRs, business plan competitions, sales training and introductions, prototype and manufacturing support (NMI), and marketing/creative support.

8) ***Early stage tech companies need help securing customers.*** Every company needs revenue to survive, and most of the time they need a demonstration of proof of paying customers to secure follow-on capital as well. The best support a company can receive besides connecting with the right management team is help getting a customer. Securing customers can be difficult for tech companies for two reasons: 1) the scientist/engineer who typically heads up a start-up company rarely has sales or marketing experience, and 2) to get a large company's interest by cold calling is extremely difficult. The program developed to help address this important issue is the First Customer Program, and it was designed to connect an early stage tech company with a professional consultant. This consultant would have ideally 6 to 8 years of deep experience in an industry vertical and could provide advice on product introduction strategy.

9) ***Universities can be difficult to navigate and motivate, but they are the best source of intellectual property in the ecosystem.*** I was fortunate to find a few champions within the university system that share the mission of creating companies. Post-doctoral and graduate students with an entrepreneurial bent are also key to getting start-ups to advance quickly. Encouraging researchers to be serial innovators rather than CEOs turned out to be the best way to leverage assets. Like anything, there are a few exceptions. Also, the MTRAC model, mentioned above was the best way to engage because it bridged the (engineering/science) school with the tech transfer office with a single employee whose focus was to find commercializable technologies and support.

10) ***Everyone has a "talent problem."*** Every city, state, and country will tell you that they don't have enough tech talent, and most will tell you about their "brain drain." The majority of success in pulling experienced C-suite members from other states came from people recruiting past colleagues, or those who grew up or went to school in Michigan and wanted to return. Offering incentives to draw C-suite members to companies was unsuccessful. However, there was success in growing and developing C-suite members, and, most of the time, keeping them in the state. National marketing efforts about the opportunities and success stories of early tech companies helped attract people to Michigan, but that could only be measured anecdotally. There wasn't enough funding for a full campaign, but engaging with national tech media enough to secure coverage paid off – 33 national stories ran over the course of two years (I also attribute the campaign to drawing in outside capital – the largest growth area for VC dollars).

11) ***Communicating the importance and the impact of the entrepreneurial ecosystem to outsiders is difficult.*** I spent as much time educating, defending, and promoting the tech ecosystem as I did managing its state-funded components. People understand life saving drugs or the importance of an energy efficiency device, but explaining the inter-relationships of the moving parts of the tech ecosystem was difficult. I was told once that the entrepreneurship, innovation, and venture capital division (my department) at the state had the highest return on investment (ROI) in economic development, but was unpopular because no one really understood how it worked and it appeared to be "giving money to universities and the wealthy." In reality, the outcomes were 1) investing for a profitable return and 2) building the state's diversified tech economy. Every $1 invested in the tech economy brought in $35 in funding to start-ups the last year. An independent study showed that every public dollar spent on the tech economy from 2004 to 2014 brought in $21. Helping people understand that the funding spent on entrepreneurship is an investment with returns -NOT an expense line item- takes effort and patience.

12) ***Funds require constant, detailed attention.*** Without an overarching body to provide oversight, hold to performance metrics, provide advice and connections, and define how to work with other organizations, many parts of the tech ecosystem would flounder. Most organizations would probably disagree with that assessment, and they may believe they function completely fine on their own. However, the results that have played out from our grant management strategies that required reporting, competition, collaboration, a strategic sustainability plan, and metrics achievement over the past almost 4 years show otherwise. Some programs were needed for a period in time and then were retired, some were built up with a long-term strategy, but all needed to evolve with the needs of the market and changing external forces.

13) ***You are what you measure.*** In my role at the MEDC my decision to require monthly reporting of performance metrics by the incubators, service providers, and universities was very unpopular. All of the grantees met in the state office to share information and best practices and receive information quarterly. In the end, the data collected was used to support and defend the state's investment in the tech economy. The state later began requiring monthly reporting anyway, and these outcomes were posted in the governor's monthly scorecard.

14) ***Government's role shouldn't be to directly invest in early stage technology companies.*** From 2004 to 2011 I was involved with tech start-ups that received direct funding, and I saw nine state portfolio managers come and go. From 2013 to 2015 I was responsible for overseeing that same portfolio of direct investments. Qualified portfolio managers are difficult to attract and retain at the state level, and the attorneys who specialize in equity funding are mainly in the private sector. The "teeth" put into contracts are weak when a government wants to appear to be supporting economic growth vs. shutting down a company. Though the direct investments in companies did eventually pay off, the amount of patience and tolerance the state was expected to exhibit in the name of economic development wasn't ideal for managing a portfolio of tech investments, nor for maximizing returns.

15) ***Consistent funding is the key to keeping talent, keeping pace, and building on returns*** (and lessons learned). The importance of consistent funding cannot be overstated. It was difficult to recruit good tech consultants when the SBDC, for example, only had a year of funding at a time. Each year the SBDC tech consultants receive a letter saying their jobs are not guaranteed and funding may not be continued.

Additionally, it takes at least two years to educate an ecosystem about a new program and how it works, and to work out the bugs in that program. If you want investors and entrepreneurs to take you seriously, show serious funding. Every year we have improved the efficiency of the ecosystem, increased the return on investment, continued to build more companies with stronger IP that are focused on solving real world problems and attracting capital.

Conclusion

By 2014, the state's annual investment in the tech industry was leveraged 35X (from private and federal funding sources). In 2015 Battelle conducted a study showing (preliminary results) a 21X return to Michigan from 10 years of investment in the tech economy. This indicates both long-term and short-term financial returns to the state while building a technology base and diversifying its economy.

The venture capital firms raised ten times more than what the state contributed, using the public funding as leverage. After the past three record years in venture capital investment in the state, it was demonstrated that Michigan could be more than just a "flyover state."

Investment in the tech economy grew more than 20 times and the number of tech start-ups increased by a factor of 50. There were many activities funded that worked well, some that didn't work at all, and others that gave the state a needed lift as a short-term solution. While this paper limits the lessons learned to 15, the education for many of us has been broad and deep. It is my hope that this information encourages support for the tech economy—in this geography and beyond.

From 1997 – 2011 Paula ran marketing for tech start-ups, mostly in Michigan. From 2002 – 2006 she contracted with the SBDC Tech Team to provide business advisory and strategic planning sessions for early stage tech companies in Michigan. From 2011 – 2015 she oversaw

entrepreneurship, innovation, and venture capital for the Michigan Economic Development Corporation. Today she is an independent consultant working with universities, economic development organizations, and investors to build out technology economies and create an environment where companies can succeed. She is based in Ann Arbor, Michigan.

*"return" and "ROI" refer to the amount of capital companies were able to raise, leveraging dollars invested in programs or companies.

Data referenced in this report came from:
1) self-reported data from universities, incubators, service providers , fund managers– verified by MEDC grant managers
2) The Michigan Venture Capital Association's 2015 annual report
3) Battelle's 2015 Michigan Entrepreneurial Ecosystem study