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Transforming Maine’s Economy: Innovation and Entrepreneurship Policy

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Transforming Maine's Economy:

Innovation and Entrepreneurship Policy

by Catherine Searle Renault

Innovation and entrepreneurship are major drivers of economic growth. Catherine Renault suggests that support for them is a primary role of state government in order to increase the well-being of citizens through the provision of well-paying jobs that cannot be easily exported. Today, the state's role is described as "enhancing the innovation ecosystem," with the goal of increased productivity, innovation, and competitiveness. Renault outlines policies that can build this ecosystem, each of which is part of an overall policy environment that will support innovation and entrepreneurship.

INNOVATION AND ECONOMIC GROWTH

In 1987, Robert M. Solow was awarded the Nobel Prize in Economics for his work on the theory of economic growth. Using computers newly available for economic research in the 1950s, Solow looked at the growth of various economies in the world, expecting to confirm the Keynesian theory that growth was related to the labor and capital in a given country. Much to his surprise, labor and capital explained only a small portion of the observed growth. Researchers (Romer 1986, 1990) eventually concluded, and subsequent research has confirmed, that as much as 80 percent of economic growth is due to new knowledge, specifically new knowledge that has been brought to the market—innovation.

We each have our own experiences of this phenomenon. Think about the impact of Google on our everyday lives and our country's economy. Fifteen years ago, Google was just an idea in the mind of two graduate students, Sergey Brins and Larry Page. Today, it is a $50 million revenue company with over 42,000 employees. Its products are so ubiquitous that we regularly use their company name as a verb, as in, "Did you Google that?"

The Internet is another illustration of the impact of innovation on economic growth. The Boston Consulting Group calculates the Internet contributes more than 4.7 percent of our nation's economy, more than the federal government (Dean et al. 2012). Twenty-five years ago, the technology that became the Internet was the backbone of ARPANET, a Department of Defense network for the sharing of research findings. It wasn't until it was turned loose as a commercial network in the mid-1990s that the Internet exploded into the phenomenon that we have today.

This pattern has been repeated many times and not just with technologies, although the application of new scientific and technical knowledge has enabled many improvements in productivity that have accelerated growth. Remember when it took days to send packages to each other, and important documents were mailed or faxed? FedEx exploited the opportunity by marrying advanced logistics with a consumer focus and promising prompt delivery "when it absolutely, positively has to be there overnight." A business model innovation as much as a technical innovation, FedEx changed the way we do business.

Innovations in medicine, in energy, in the consumer space, all drive our economy. And to a large extent, these innovations come out of entrepreneurial companies. It is estimated that firms that went public in the 1980s and 1990s accounted for 40 percent of employment in publicly traded companies in 2000 (Davis et al. 2007; Davis and Kahn 2008).

INDUSTRIAL POLICY

While it may seem obvious that supporting innovation and entrepreneurship is essential to driving economic growth, many in the United States have derided policies to do just that as industrial policy. Often framed as "picking winners and losers," industrial policy is considered as unwarranted involvement by government in a free market. Since the free market is perfect, this theory goes, government should not get involved.

There are three problems with this argument. First, most governments around the world are managing their innovation economies to a far greater level than would ever be contemplated here. In China, entire cities have been built around new universities and industrial complexes. The European Union is explicitly supporting "industrial policy that will put the EU economy on a dynamic growth path strengthening EU competitiveness, providing growth and jobs, and enabling the transition to a low-carbon and resource-efficient economy" (European Commission 2010: 4).

The second problem with the free-market, anti-industrial policy position is that there are numerous instances where the free market is not in fact fully efficient. There are substantial information asymmetries, meaning that not all entrepreneurs or innovators have the same information. And most importantly, innovation, and the basic research that underlies it, is a public good, shared by all citizens. Left to themselves, single firms and individuals will underinvest in research and development (R&D). Free markets will not produce the correct amount of innovation and growth.

The third problem with the industrial policy red herring is that the U.S. government has in fact been doing industrial policy for years. It is government funding that produced the Internet, radar, lasers, shale oil drilling methods, and numerous other technologies that are the underpinnings of today's economy.

Therefore, there is a role for government in investing in R&D at a level that increases innovation, productivity, and growth for all. Furthermore, there is a role for government in providing training and information so that all entrepreneurs and innovators have the opportunity to compete on a level playing field.

THE ROLE OF STATES

In this discussion about the role of government, there is a distinction between the role of federal and state governments. As a general rule, the federal government cedes to the states programs that deal directly with individual firms and with regional initiatives, citing the states' abilities to directly respond to local conditions. In turn, the states leave to the federal government the support of basic research and research that supports national priorities such as defense, health, and agriculture. In practice, these national needs are met by partnerships between the federal government and universities, including many state institutions, so the lines of responsibility are blurred.

But, since World War II, when Vannevar Bush (Hart 1998) articulated the importance of continued federal support of research, and the National Science Foundation was created, government has funded a large portion of basic research in this country. Since the early 1980s, however, the states have taken an increasingly active position in science- and technology-based economic development, filling in the blanks left by the federal government's avoidance of industrial policy and trying to produce increased economic growth for their citizens.

Today, the state's role is described as "enhancing the innovation ecosystem," with the goal of increased productivity, innovation, and competitiveness. The ecosystem model is relatively recent, having been articulated less than 10 years ago by Iansiti and Levien who postulated: "There are certainly strong parallels between business networks and biological ecosystems. Both are characterized by a large number of loosely interconnected participants that depend on one another for their effectiveness and survival" (2004: 5). Supporting this ecosystem has come to mean four things: (1) building and supporting a state's research and development capacity; (2) encouraging a state's entrepreneurial community; (3) increasing the productivity of a state's economy though the commercialization of new products, services, processes, business models and marketing strategies; and (4) supporting sectors and/or clusters. Each of these is part of an overall policy environment that will support innovation and entrepreneurship, leading to economic growth.

RESEARCH AND DEVELOPMENT CAPACITY

While not all innovation is based on technology, many new ideas have come from R&D in science, technology, engineering, and mathematics (STEM) disciplines. And it is now better understood that innovation and creativity flourish in open, collaborative environments such as universities, R&D laboratories, and research-oriented companies like Apple and Google

(Johnson 2010). Therefore, states support and build their R&D capacity. There is a distinction, however, between public and private research and development capacity. It takes different methods to encourage the two.

R&D Tax Credit: An Incentive for Private Research and Development

Since it is clear that companies that do R&D are far more likely to innovate than others, best practice in supporting private R&D is the use of the R&D tax credit. Atkinson (2010) models the impact of increases in federal and state R&D tax credits and found that the increased economic activity from a 6 percent increase in the federal credit would exceed the loss of tax revenues in 15 years. Atkinson and Andes (2008) suggest that states should link their tax credits to the federal credit, allowing firms to take the higher amount. While the federal government R&D tax credit has been in statute for more than 30 years, it is still not permanent.

In addition, most of the states have an R&D tax credit (Miller and Richard 2010). The state tax credit has been widely studied by economists and has been found to be effective in increasing R&D spending. For instance, Wu (2008) found that the existence of a state R&D tax credit has a positive and significant effect on the number of high-technology establishments in a state. However, it also appears that corporations decide where to conduct their R&D based on the size of the credit, so the credit affects location decisions (Wilson 2007).

Maine has three R&D tax credits. Taken together, they are used by a small number of companies, and according to the Maine Revenue Service, cost Maine taxpayers $5.5 million in lost revenue in FY13. The research expenditure tax credit was used by 85 taxpayers; the super credit by 70; and the high-technology credit by 60. However, it is not known how many companies use more than one credit. A study conducted ten years ago on the Maine R&D tax credit concluded that the legislature should consider whether Maine's small firms are able to use the credits as well as large firms and whether changes should be made to expand their applicability and therefore their effectiveness (Luger, Feller, and Renault 2004). Other states allow transferability of credits, meaning that small companies performing R&D that is pre-revenue, and therefore without a tax liability, can sell their credits to others, thereby monetizing the credit. Another concept is having credits that are refundable, meaning that firm can get cash refunds if the credits exceed their tax liability.

Building Public Research and Development Capacity

In addition to funding R&D activities directly in the states through competitive grant programs, federal agencies, such as the National Science Foundation, National Institutes of Health, the Department of Energy, and Department of Defense, fund capacity building in the states through grants for new laboratories and equipment. The rationale is actually a national security argument—that it is important that the country's R&D capacity be broad-based and not too geographically centralized. One program that has been important to Maine is EPSCoR (Experimental Program to Stimulate Competitive Research), which supports R&D capacity expansion in the states that receive smaller amounts of competitive federal funds. Through the EPSCoR program, Maine has built its Advanced Structures and Composites Laboratory, the Laboratory for Surface Science and Technology, and the Forest Bioproducts Research Institute (all at the University of Maine). EPSCoR requires state support in the form of a match, as well as a strategic plan for science and technology and an EPSCoR committee. Maine statute gives these responsibilities to the Maine Innovation Economy Advisory Board.

Since the 1980s, many states have also been investing heavily in building their R&D capacity.

Since the 1980s, many states have also been investing heavily in building their R&D capacity. Popular programs include funding for new laboratories and equipment and attracting "star" scientists. The latter, exemplified by the Georgia Research Alliance Eminent Scholars program, endows chairs for new professors in fields deemed critical for a state's economy. Since its inception in 1990, Georgia has invested in more than 65 eminent scholars, resulting in over 6,000 new jobs, 300 new companies, and thousands of new scientific discoveries.

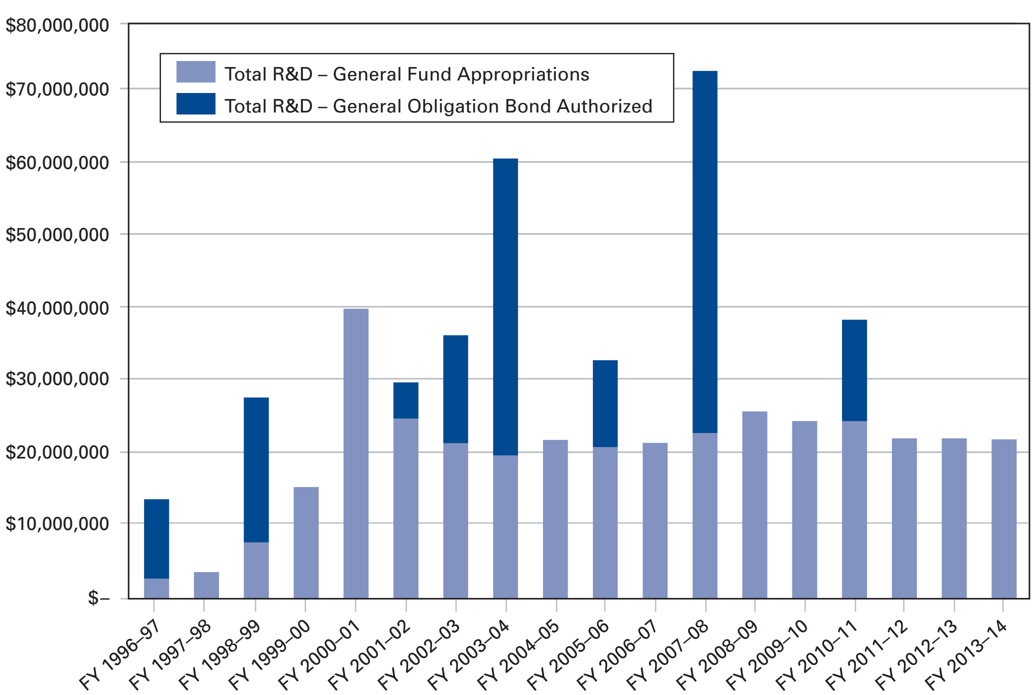
While Maine has not gone in the direction of attracting this type of talent, the state's colleges, universities, and nonprofit laboratories all report difficulties with the recruitment and support of senior faculty due to lack of funds. In response, Maine's 2010 Science and Technology Plan called for investments to "attract and keep high-quality researchers and graduate students who can win competitive federal research grants" (MIEACB 2009: 13). However, the trend to cut investments in R&D over the past decade has curtailed the development of new programs such as this one.

Maine's strategy since the mid-1990s has been to invest in laboratories and equipment. A series of bonds, initiated by Governors King and Baldacci, approved by the legislature, and supported by the public, have been used to build new research facilities at the University of Maine, the University of New England, and at nonprofit research organizations in the state. These investments have been episodic and uneven (Figure 1), however, despite more than ten years of evidence that they have paid off for Maine taxpayers. Many commentators, from the 2006 Brookings report to the annual R&D evaluations, have called for a planned, level, and sustained investment in this type of funding.[1]

Since bond funding is only appropriate for building long-term assets such as laboratories and equipment, other annual General Fund appropriations are also needed to support basic research by providing the matching funds needed by the research institutions to win competitive and EPSCoR federal funding. Since the late 1990s, this has come through a line item in the budget called the Maine Economic Improvement Fund (MEIF). While this budget item has stayed relatively stable at around $14,700,000 for the last five years, an increase in MEIF funding would have direct effects on an influx of further federal research funding and subsequent spillover effects.

One important caveat is that appropriate technology-transfer policies and procedures at the colleges, universities, and nonprofit laboratories in the state is also critical, so that discoveries made in these laboratories can be protected, licensed, and commercialized. Without this critical link, the state's investment in R&D will be considerably less effective. The Maine Technology Asset Fund, for instance, the program operated by the Maine Technology Institute (MTI) that dispersed the last two bond investments, has required recipients to work hard to develop technology-transfer policies that encourage commercialization of new discoveries here in Maine.

FIGURE 1: **Maine's Investments in Innovation, 1996 to 2013**



Source: Biennial budget data, compiled by PolicyOne Associates and Innovation Policyworks LLC.

BUILD ENTREPRENEURIAL CAPACITY

Most countries and states have programs and policies designed to support small businesses and entrepreneurs. These programs are ubiquitous because all places have dramatically more small businesses than large businesses and because small businesses create jobs.

The latter assertion turns out to be somewhat misleading, and economists have been trying to sort out the data for years. Starting with David Birch's research in the 1980s into *gazelles* or rapidly growing companies, there has been substantial interest in the type of firms that create the most economic growth. For instance, the Small Business Administration sponsored research in 2007 that found that increasing small business births by 5 percent would result in a small increase on Gross State Product (Bruce et al. 2007). Acs, Parsons, and Tracy (2008) found that high-impact firms are relatively old, rare, and contribute to the majority of economic growth. These authors suggest that the best economic development strategy is to focus scarce resources on cultivating high-growth firms, rather than entrepreneurship overall. In contrast, Breitzman and Hicks (2008) found that small firms were a significant source of innovation and patent activity, developing more patents per employee than larger businesses, with more significant patents as measured by citations and originality.

More recently, economists have parsed the data further to discover that the real issue is not the size of the firm, but its age that matters. Stangler and Litan (2009) looked at 2007 Census data to discover that firms that are between one and five years old account for roughly two-thirds of job creation. But, the picture is actually more nuanced than that. Haltwinger, Jarmin, and Miranda (2010) have done the most careful statistical study of the issue and conclude that startups are critical to economic growth, but also that they are the most volatile. That is, startups are responsible for the majority of job growth and job destruction. However, if a young firm survives, it will tend to grow faster than its more mature small counterparts. So, while public policies should support rapidly growing young firms, policymakers should also understand that many will fail.

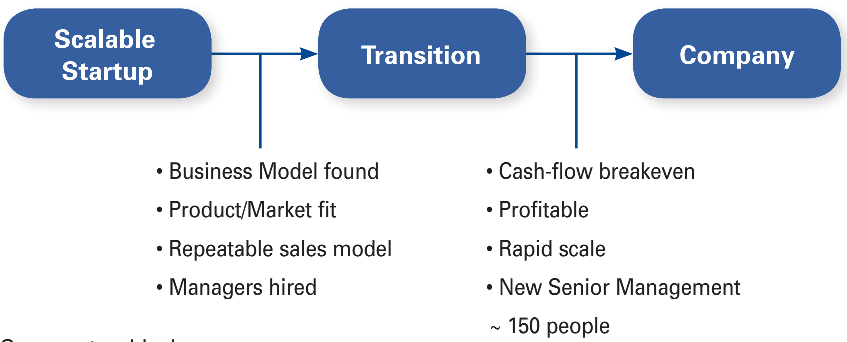
Another piece of this dynamic is that there are many types of entrepreneurs, and not all require the same, or perhaps any, public interventions. Steve Blank, a Stanford professor widely known for his work in entrepreneurship, says there are six types of entrepreneurs.[2] Blank describes lifestyle startups, small business startups, scalable startups, buyable startups, large company startups, and social startups. Entrepreneurs start all of these, but they are quite different. Lifestyle entrepreneurs work to live their passion, while small business entrepreneurs work to feed their families. Scalable startups are born to be big, and like Google, Skype, Facebook, and Twitter, are built on visions of changing the world and growing rapidly (Figure 2). Buyable startups are born to flip according to Blank, meaning that they are built completely with the intention of being sold to larger companies. This structure is popular in the Internet and biosciences sectors. Large company startups are usually new divisions designed to facilitate entry into a new product or business while social entrepreneurs are focused on making the world a better place, rather than creating wealth.

Aulet and Murray found that there are different types of entrepreneurs, those who are innovation-driven vs those small and medium enterprises that serve local markets with "traditional, well-understood business ideas and limited competitive advantage" (2013: 4). They point out that the small and medium enterprises can be important in their local communities and form the majority of employment. But, like Blanks' small business entrepreneurs, their intention is primarily to stay small. So, in a world where public investments are by necessity limited, small and medium enterprises have less leverage on the economy than do innovation-driven entrepreneurs. The authors conclude: "If job creation and economic prosperity are the goals for a government, [innovation-driven] entrepreneurship must be a major element of government strategy and policymaking" (Aulet and Murray 2013: 9).

To what extent is this direction appropriate for a rural state such as Maine? Do we have innovation-driven entrepreneurs? The answer is emphatically "yes." Experts in rural economic development say (Markley and Stark 2009: 1),

> Entrepreneurship development can be a Triple Bottom Line development strategy. By helping entrepreneurs… to recognize opportunities and build new ventures, communities can experience improvements in the economy, the environment, and the diversity of residents actively participating in civic life.

FIGURE 2: **Scalable Entrepreneurs**



Source: steveblank.com

Another controversy in the entrepreneurship literature is whether entrepreneurs are born or made, that is, can you train someone to be an entrepreneur? The answer seems to be that entrepreneurship is quite opportunistic; people respond to opportunities that they see and become entrepreneurs without really planning on it (e.g., Aldrich and Martinez 2001). On the other hand, a Babson College study found that students who took two electives on entrepreneurship in college were significantly more likely to start a company upon graduation (Lange et al. 2011).

MAINE'S SUPPORT FOR ENTREPRENEURS

In Maine the commitment to entrepreneurship support, especially scalable entrepreneurs or innovation-driven entrepreneurs, has been limited. The Applied Technology Development Centers program was started in 1999 with the legislature creating seven incubators focused on the seven technology sectors, also legislatively defined. The legislature also defined where each of the incubators would be located, without any data about actual concentrations of firms in the sectors. For instance, the biotechnology incubator, now closed, was located in Fairfield, far from either the Jackson Laboratory or the resources at the University of Maine in Orono or the southern Maine bioscience assets at the University of New England or the IDEXX-based group of bioscience companies around Portland. The legislature has also cut the funds to this line item time and time again. In this fiscal year, the total is down to only $178,838.

However, both the MTI and the Blackstone Foundation have recognized the importance of investing in Maine's scalable entrepreneurs, and their grants have recently supported the remaining incubator/accelerator programs in the state: the Maine Center for Entrepreneurial Development, the Target Technology Center at Orono, and the Maine Aquaculture Innovation Center. These three programs have banded together to provide substantially improved services statewide to train scalable entrepreneurs through programs such as Top Gun and Top Gun Prep.

At the same time, a number of private events have emerged across the country such as Start-up Weekend and various business plan competitions that continue to prime the pump by encouraging and challenging entrepreneurs, young and old, to think big.

Across the country, many colleges and universities now teach entrepreneurship and some K–12 programs have been created to introduce entrepreneurial concepts early on. In Maine, these programs are few and far between, with the primary example being the Foster Center for Student Innovation at the University of Maine and its Innovation Engineering curriculum that has been rolled out to some of the other campuses of the University of Maine System.

POLICIES TO SUPPORT PRODUCTIVITY AND COMPETIVENESS IMPROVEMENTS

There are only three ways to increase economic growth: increase the number of workers, increase productivity, or growth in high-productivity industries. Productivity means economic output per unit of input. The unit of input can be an hour of labor or some combination of labor, equipment, and energy. So, increasing the number of workers increases the size of an economy, but doesn't necessarily increase the average wage of a worker in that economy. On the other hand, when all sectors become more productive, prosperity is more evenly shared. The third way to increase growth is called the "shift effect." When an economy loses low-productivity jobs and gains high-productivity jobs, the overall economy grows, but there are clearly winners and losers.

According to Atkinson (2013: 5), "the lion's share of productivity growth…comes…from all industries, even low-productivity ones, boosting their productivity." But, he also describes the competitiveness of an economy as "the ability of a region to export more in value added terms that it imports" (Atkinson 2013: 2). So, innovation can increase competitiveness by increasing the ability of firms to export (outside the region) and increase productivity through the application of better processes, increased use of equipment, and energy efficiency.

State-level policies designed to support innovation in firms enable access to new technologies, or support innovation, adoption, and commercialization. Scarce state resources, however, should be focused primarily on firms that are exporting, or plan to export, products outside the region or the country, the traded sector. These firms bring new money into the economy, rather than recirculating monies that are already there.

Increasing Access to New Innovations

One of the most imperfect markets is the market for information, especially information about new innovations. While thousands of new patents are issued each year, it is difficult to access to those patents and other innovations that are never publicly revealed. Not only are the numbers overwhelming, but much competitive advantage is maintained through secrecy, so even with the Internet, it is difficult to discover what technologies and innovations might be available to improve the productivity of a particular firm.

This problem is especially acute when it comes to technologies created at our nation's colleges and universities. The transfer of technologies from research institutions into organizations capable of commercializing them is challenging, overly bureaucratic, and legalistic, but incredibly necessary. Reforms have been suggested (Renault et al. 2008; Litan, Mitchell, and Reedy 2007) and some universities have recently instituted radical changes. For instance, the University of New Hampshire has created UNH Innovation, which "comprises licensing; services such as the InterOperability Lab and equipment or facilities rentals; and ventures and economic development" (UNH press release October 29, 2013). There are plans to create a mentorship program and increased opportunities for students to work directly with businesses. In a press release announcing the new organization), Jan Nisbet, senior vice provost for research at UNH, said, "This creates a clear path into the university if you're interested in our technology, our equipment, and our expertise. Centralizing our efforts to commercialize the university's intellectual assets will allow us to promote and participate in local economic development as well as diversify revenue streams beyond just licensing income."

In some states, there has been a concerted attempt to deal with the problem that technologies created in universities and other research organizations require a great of additional work before they are ready to be licensed and commercialized. This work is often referred to as translational research, and new centers are appearing at leading universities to bridge the gaps between the laboratory bench and the factory floor. A leading example is the Despande Center at MIT. The center awards research grants and provides other types of assistance to MIT faculty whose work shows the potential to benefit society, transform markets and industries, and improve the quality of life for people across the globe.

A related issue is the appropriate protection, through patenting, trademarks or copyrights, or intellectual property developed by companies. In Maine, a program called the Patent Program, located at the University of Maine School of Law, has been operating since 1999. The mission of the program is to support economic development by helping Maine inventors and small businesses to understand how to identify and protect their intellectual property. The program, however, suffers from the issues discussed earlier, in that it does not discriminate between companies with the ability to scale their innovations and people for whom invention is a hobby. In addition, funding for this program has also been declining for over a decade, and it does not have the resources to meet the demand for its services. In March 2014, the law school announced that the program is being cut, due to budget constraints,

There are two big hurdles to the adoption and commercialization of new innovations by companies, startups, or existing firms: capital and know-how.

TECHNOLOGY ADOPTION AND COMMERCIALIZATION: ACCESS TO CAPITAL

There are two big hurdles to the adoption and commercialization of new innovations by companies, startups, or existing firms: capital and know-how. Most states now offer a variety of programs to deal with access to capital; a few, such as Maine, also encourage and teach the process of commercialization.

Access to capital for technology adoption is primarily access to equity capital. Sources of debt, like banks, are typically uneasy with the process of adoption of new technology because there is by definition no track record to go on. Therefore, the high-risk profile of technology adoption and commercialization is more suited to the high-return profile of equity capital. The type of capital required depends entirely on where the innovation is in its product life cycle. Figure 3 shows a typical product life cycle and the types of capital that are appropriate at various stages of development.

Early, prerevenue, funding, often referred to as the "valley of death," is not easily obtained in private markets.

Therefore, many states have instituted public programs that support projects at this stage of development, essentially betting that some of the projects will be successful and yield increased follow-on investment and successful, growing companies. In Maine, the programs are administered by the MTI, and funded annually through a General Fund appropriation. Since its inception in 1999, MTI has invested over $105 million in 1,300 technology projects and has documented a return to Maine taxpayers of 14:1.

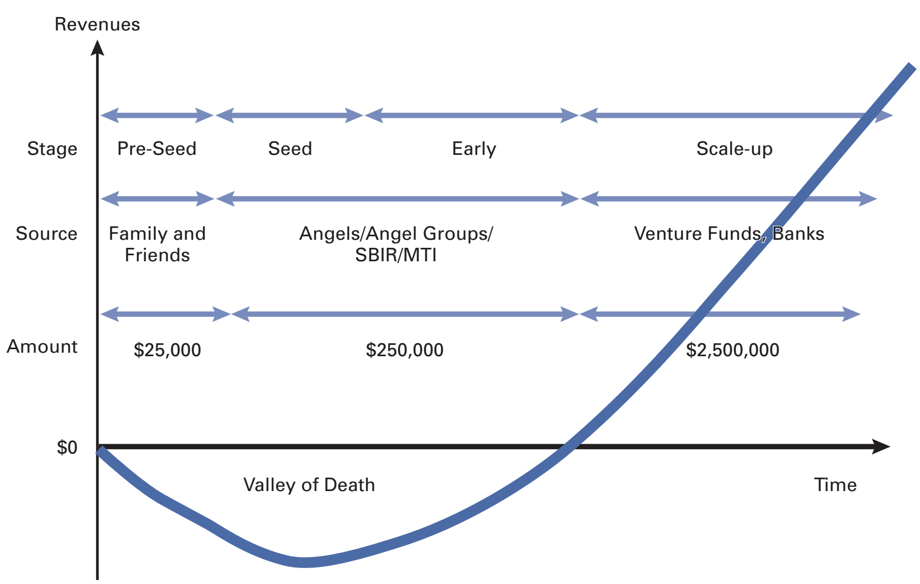
Following prerevenue grant programs, many states also support matching funds for federal programs aimed at translational research and commercialization, notably Small Business Innovation Research funds. Again, Maine's version of this program is housed at MTI, and has been demonstrated to be successful in increasing the win-rate of Maine companies who apply to this extremely competitive program. Matching funds for Small Business Innovation Research awards increases the amount of federal funds flowing to small, innovative firms in the state and increases their likelihood of finding follow-on capital and ultimately commercializing their products.[3]

Often angels, private investors with a high net worth who invest in early-stage firms, are active in states supporting innovative companies. In Maine, a group called Maine Angels, made up of individual investors, meets regularly to review investment opportunities. Generally, angel groups are private, although in many ecosystems like Maine's, the angels are an integral part of the fabric that supports entrepreneurs with innovative ideas. Some states organize angel groups, but their operation is generally privately led.

Many states, however, see a public purpose in encouraging angel investment. Therefore, they have tax credits aimed at lowering the risk associated with these early-stage investments. Like the R&D tax credits previously discussed, so-called seed-stage tax credits have been shown to be effective in increasing angel investments, leading to greater sustainability and growth of innovation-based companies.

Maine's Seed Capital Tax Credit is one of the oldest in the country, dating back to 1990. Since 2002, the credit has been helped create 1,800 jobs and maintain another 5,000. It has recently been extensively reviewed by the legislature and extended past its original $30 million statutory cap. Unfortunately, the bill to extend the credit ran into the budgetary realities in the 2012–13 legislative session, and as a result, there was no credit in 2013, and the amounts available will be limited in the years thereafter.

FIGURE 3: **Types of Capital Appropriate for Stages of a Company's Development**



Source: steveblank.com

This is in stark contrast to other states that have more broadly supported similar programs. For instance, in New Jersey in 2013 Gov. Chris Christie (R) signed into law a $25 million angel investor tax credit program to encourage early investment in emerging businesses. The program provides tax credits for up to 10 percent of a qualified investment in businesses with fewer than 225 employees that conduct research, manufacturing, or technology commercialization.

Following angel funding, the next step closer to commercialization for innovation-driven and/or scalable companies is venture funding. For that reason, most states have some form of a state venture capital fund that invests in relatively high-risk, high-reward firms. In the past year, the U.S. Department of Treasury has added significant funding to these state venture funds through a

$1.5 billion program called the State Small Business Credit Initiative. Venture capital is a highly effective method for accelerating scalable enterprises and is credited with producing 21 percent of the nation's current economy, 11.9 million jobs (IHS Global Insight 2011).

Maine's fund, Maine Venture Fund (formerly known as the Small Enterprise Growth Fund) was formed in the mid-1990s with a state investment in the form of a bond. It received additional funding in 2010. The fund, a nonprofit, is operated as an evergreen fund, which means that profits from investments are put back into the fund to invest in other companies. Since its inception, the Maine Venture Fund has invested $13.4 million in 45 Maine companies.

A final type of access to capital is less glamorous, but nevertheless critical to supporting the adoption of new technology, especially by more mature firms. This comes in the form of tax credits for the purchase of new equipment and training of workers. Many states allow companies to deduct these expenses and/or give explicit tax credits against property taxes. The latter is used in Maine, as part of the BETR/BETE system of business equipment tax relief. However, the program is regularly raided by the legislature to balance the budget, and often companies will only be able to claim a percentage of the credit: in 2013, the amount was only 60 percent. The credit for business equipment purchases is extremely controversial in Maine, largely because many large national companies take advantage of it and are widely believed not to require such assistance from Maine taxpayers. A solution more closely aligned with innovation policies would be to have business equipment tax credits associated with companies that have patents or exports, or no property taxes on companies that invest more than 15 percent of their revenues in research and development.

Innovation Engineering

Last, the know-how associated with the process of technology commercialization is another information asymmetry—some firms know how to do it and others do not. Therefore, providing technical assistance to firms to increase the likelihood of commercialization is consistent with supporting an innovation-based economic growth strategy. For most companies, innovation is a luxury, something to be attended to when all other activities are complete. But, to benefit from the strategy of never-ending innovation, companies need to have a system for innovation. In Maine, many companies are implementing Innovation Engineering, a system for innovation developed by University of Maine alumnus Doug Hall. The University of Maine's Foster Center, the Maine Manufacturing Extension Partnership, Maine Center for Entrepreneurial Development, and MTI are all supporting the rollout of Innovation Engineering as a replicable system for increasing the speed of innovation, while reducing the risk.[4]

SUPPORTING CLUSTERS

For 15 years, clusters have been the buzzword in economic development. Popularized by Harvard professor Michael Porter, cluster theory suggests that regions have strengths not just in a single sector, but also in the intersection of a number of sectors that share workforce, educational, and research assets, as well as support services. Examples frequently cited are the wine making cluster in California's Napa Valley or the biotechnology cluster in Research Triangle Park, North Carolina. In the latter, there are medical schools and research laboratories, pharmaceutical companies, biotechnology startups, as well as manufacturing companies that specialize in packaging for drugs, testing firms that do FDA-compliant protocols for drugs under development, venture capitalists, attorneys, and advertising agencies, all with particular expertise in biotechnology.

From a political point of view, supporting the development of a cluster is more palatable than working with a single company, as it avoids the appearance of picking winners and losers and spreads the risk substantially. From a policy point of view, cluster programs have suffered a bad reputation nationally because practically every state has declared that it has a biotechnology cluster, thus making the distinction meaningless.

In Maine, the MTI has invested from time to time in cluster-development activities. This program is currently under review amid concerns that MTI has spread its funds too thin and invested in some sectors that are too small to become sustainable.

FINAL THOUGHTS

Outside Maine, the state is considered to be a leader in innovation-based economic development, and the MTI in particular has been recognized for some of its programs. This leadership comes from Maine's broad array of programs, even though the total funding from the state is modest compared to that of other states, whether in actual dollars or on a per capita basis.

This leadership position is also due to the long-standing evaluation of Maine's R&D investment, started in 1999, and until recently, performed annually. Evaluations such as the one done in Maine inform the legislature about the effectiveness of state investments in meeting strategic economic development goals and the efficiency of the programs in leveraging state monies to gain new private investment. Ongoing evaluation is critical not only to transparency and accountability of state investment, but is also essential to improving the delivery of the programs themselves.

Innovation is a primary role of state government. It is a major driver of economic growth and the ability of the state to increase the well-being of its citizens through the provision of well-paying, nonexportable jobs. Innovation, like economic development and education, is so essential that many states are now housing their innovation policy advisors in the governor's office, rather than in an agency or department. In Maine, the Office of Innovation is in the Department of Economic and Community Development and is currently staffed by a long-time traditional economic developer, rather than by an expert in technology-based economic development. In the future, innovation policy needs to be elevated to a level that is consistent with its importance to the state's future.

ENDNOTES

1. For further discussion of Maine's R&D funding, see this issue's article by Evan Richert. 2014. "R&D: Cornerstone of the Knowledge Economy." Maine Policy Review 23(1): 48–56
2. http://steveblank.com/2011/09/01/why-governments-don't-get-startups.
3. Details on the Small Business Innovation Research Program are available in the recorded testimony of Charles W. Wessner to the Small Business and Entrepreneurship Committee of the U.S. Senate. Available at: http://www7.Nationalacademies.org/ocga/testimony/SBIR_Program.asp.
4. For more information on Innovation Engineering, see the interview with Doug Hall, this issue: Lukens, Margo. 2014. "Interview with Doug Hall on the Role of Training in Innovation." Maine Policy Review 23(1): 75–79

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