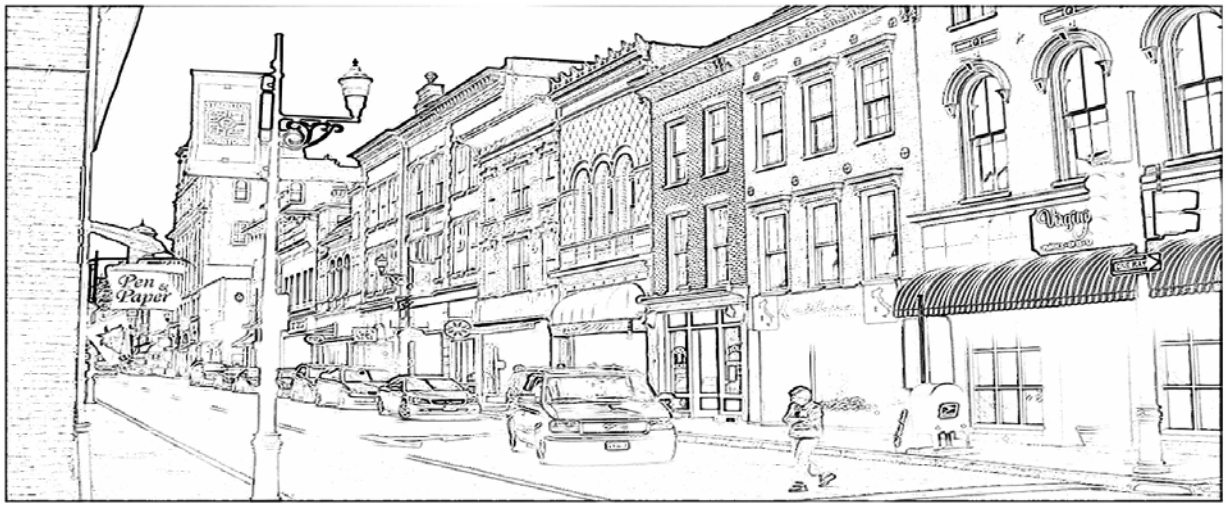

Innovation and Economic Performance:

Strategy Options for Wisconsin

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Key Points

- Innovation, which is driven by the ideas of insightful, talented, and creative people, is vital to economic growth and development.
- Wisconsin ranks 20th in the nation for innovation, measured by spending on research and development (R&D), but is lagging behind neighboring states.
- While the majority of spending on R&D in Wisconsin comes from businesses, the University of Wisconsin – Madison accounts for about 27% of all R&D expenditures in the state. Spending levels at the UW-Madison have been declining over the past several years.
- Compared to the nation, Wisconsin is less active in the most innovative industries. This could limit the potential for sustained economic growth and development.
- Policy options must take a long-term perspective.

Innovation and Economic Performance: Strategy Options for Wisconsin

Introduction

Economic growth and development hinge on how firms conduct business. For firms striving to maximize profits there are two broad approaches: (1) minimize the costs of operations or (2) bring new products to market through innovation. Realistically, in a competitive, capitalist economy most firms attempt to accomplish both: be innovative while keeping an eye on costs.

Joseph Schumpeter, the economist who introduced the notion of economic progress through "creative destruction" (new ideas, inventions or innovations that replace, or "destroy", existing processes and products) via entrepreneurial processes, casts these two approaches to firm profitability by thinking in terms of "ordinary" and "quality" competition. Ordinary competition focuses purely on pricing the good or service offered by the firm. These firms focus on reducing costs. Quality competition emphasizes consumer satisfaction through new innovations and quality products/services. Economists generally agree that the engine of long-term sustainable economic growth and development is driven not by Schumpeter's ordinary competition but rather quality competition. In other words, economic growth and development is driven by innovation.

> Economic growth and development is driven by innovation and by firms that invest in innovation, not by firms that narrowly focus on the cost of conducting business.

These two approaches to increasing profitability relate directly to how we think about business climate, the wide range of local resources, regulations and other factors that affect business location and performance. Businesses competing on cost ("ordinary" competition) will likely seek the lowest cost location for their business. For firm's engaged in ordinary competition, where firms attempt to compete on price and the cost of operations, a good business climate is defined in terms of policies that lower the cost of production. These businesses will likely prioritize low taxes, limited regulation and right-to-work type policies.

Firms that focus on developing innovations and bringing those innovations to market, or "quality" competition, will define business climate differently. For these firms, a positive business climate focuses on access to a diverse pool of highly educated and skilled people, strong networks facilitating the flow of information, and public investment in research and development (R&D). Because

innovation comes from things people do, the quality of the workforce comes to the forefront: investments in education, a culture of invention, risk-taking, adaptation, a culture embodied in the spirit of entrepreneurship.

These different perspectives on what constitutes a desirable business climate have strong policy implications. Communities that focus on policies aimed at promoting low-cost structures through, for example, low property taxes, will likely encourage the formation of firms engaged in ordinary competition and cultivate a low-cost business sector.

Places that appeal to firms based on their skilled workforce, information networks, and entrepreneurial experimentation are more likely to cultivate a business sector that features innovative firms engaged in "quality competition." Comparatively, the innovative environment will incentivize education, training, and experimentation and thereby generate value in the economy.

Consider two different communities, A and B. Community A focuses on keeping taxes, fees and charges as low as possible and as a result lack the resources to invest in community services like libraries, parks and recreational services and extracurricular activities in local schools. Community B elects to tax itself to invest in those same community services. Here community A is creating a business climate that is most attractive to firms that compete on costs (ordinary competition). Community B views business climate as one that is attractive to an innovative workforce which in turn will be attractive to firms that compete on innovation (quality competition).

The fact that different types of firms prefer different business environments puts policy makers in a position to implement strategies to attract the type of firms and competitive environment that their constituents desire. The question the policy makers in Wisconsin, at both the state and local levels, must address is what is their constituents' vision of the future of the Wisconsin economy. Is the Wisconsin economy of tomorrow one based on businesses that are focused on the cost of doing business or on businesses that focus on innovation and quality? How that fundamental question is answered determines the direction of state and local economic growth and development policies.

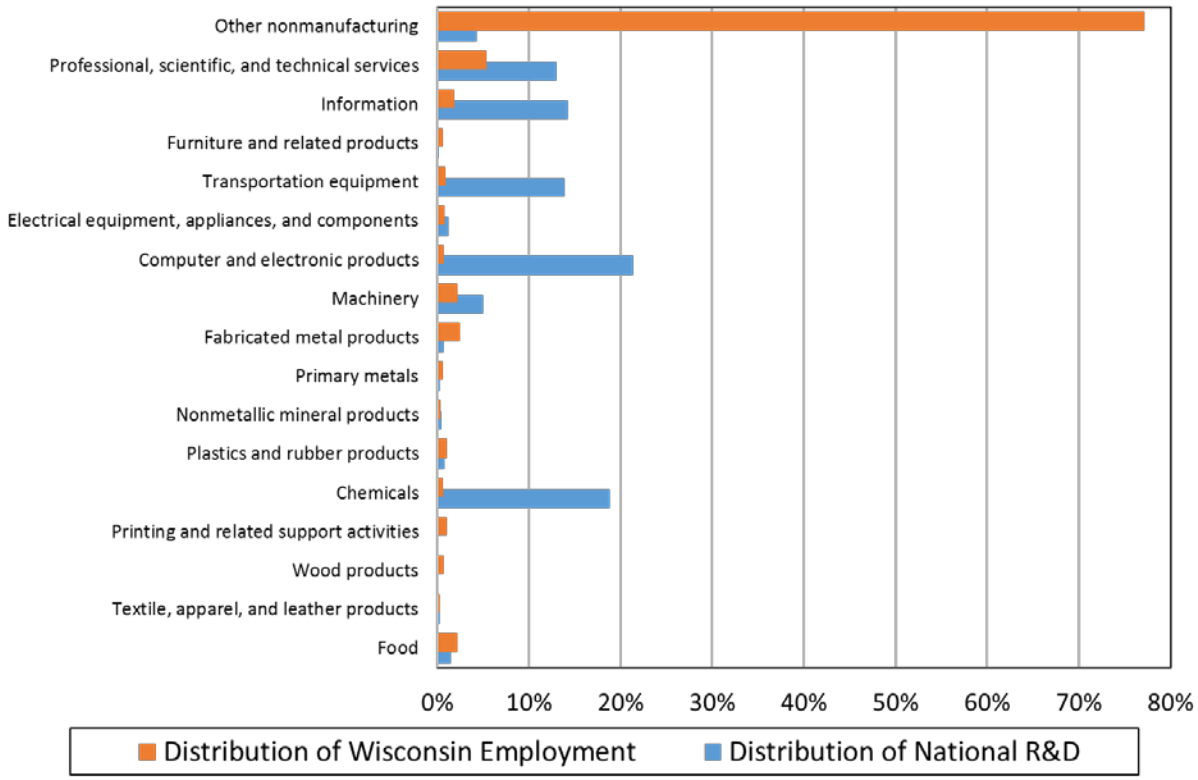
> Should the future of the Wisconsin economy be based on businesses that focus only on costs or on businesses that focus on innovation?

If Wisconsin residents want a state economy that is driven by innovation and quality, we need to better understand innovative Wisconsin industries. In a companion study to this policy brief, Deller and Conroy (2017) find that Wisconsin ranks 20th in the nation for research and development (R&D) spending per capita with about a quarter of all R&D expenditures in Wisconsin attributed to University of Wisconsin – Madison. Unfortunately, in that

same analysis of National Science Foundation data, Deller and Conroy (2017) find that the UW-Madison has fallen out of the top five research universities, based on R&D expenditures, for the first time in over 40 years.

As in most states, the bulk of the research and development expenditures that drive innovation in Wisconsin is undertaken in the private sector. Nationally, the most R&D intensive industries tend to be chemical (including pharmaceutical), professional, scientific, technical and information services, transportation manufacturing as well as computers and electronics (Figure 1). If Wisconsin has a high level of activity, such as employing a large share of people, in these same industries, we would expect that Wisconsin is well-positioned to benefit from investment and innovation. Wisconsin, unfortunately, has relatively low levels of employment in these high-innovation industries. The distribution of national R&D shares across industries and Wisconsin employment shares appears to place Wisconsin at a comparative disadvantage. Given Wisconsin's industrial composition, the state appears to be in poor position to benefit from national trends in innovation and growth in these sectors. In this light, the decline in

Figure 1: Distribution of U.S. R&D Spending and Wisconsin Employment



R&D expenditures at the UW-Madison is even more important.

If sustained long-term economic growth and development hinges on fostering an industrial mix that is driven by quality competition and innovation and Wisconsin appears to lagging in that mix, then what policies can be considered to improve the competitive position of Wisconsin? In the remainder of this report we outline a framework to think about policies that can move Wisconsin toward a more innovative environment. It is imperative to note at the beginning of this discussion is that policies and investments to foster an innovative economy must take a long-term perspective. Too often economic policy is reactive to immediate issues such as high rates of unemployment. The approaches outlined here requires a shift from short-term thinking to a long-term perspective. Unfortunately, as outlined by Peter Eisinger (1995) the short election cycles faced by all elected policy makers creates a strong political incentive to prefer short- over long-term thinking.

Wisconsin, unfortunately, has relatively low levels of employment in these high-innovation industries.

Policy Implications

A number of years ago Wisconsin embraced the notion of economic clusters as a foundation for economic growth and development policies. A wide range of industrial clusters were identified ranging from agriculture and food processing to plastics and tourism.[1] At the local level, the adoption of clusters built on the understanding that functional economies cover large geographic areas and the economic well-being of one community directly influences the well-being of all communities within that region. The growth of a number of regional economic development organizations in Wisconsin, such as the New North, Momentum West, and the Milwaukee 7, to name a few, aimed at helping facilitate regional cooperation also

The approaches outlined here requires a shift from short-term thinking to a long-term perspective.

[1] See Forward Wisconsin at: http://www.forwardwi.com/category44/Industry-Clusters

reflect this approach to cluster development. This approach has helped many communities focus on maximizing local input supply chains in a strategic manner.

But viable clusters are more than a geographic concentration of industries and related input suppliers. As outlined in Goetz, Deller and Harris (2009), the key to effective clusters is the inherent qualities associated with Schumpeter's quality competition. Because they are geographically near to each other, firms that make up the cluster learn from each other, take advantage of what economists call "thick labor markets" of highly educated and skilled people, and spur innovation through quality competition. Morgan (2007) talks in terms of "learning regions" where learning to do new things in different ways is at the heart of innovation. Learning regions are "where knowledge is the most important resource and learning is the most important process" (Lundvall 1994). Effective clusters are collections of learning and innovative firms not simply a geographic concentration of similar firms looking to maximize profitability by reducing costs (ordinary competition).

Morgan (2007) talks in terms of "learning regions" where learning to do new things in different ways is at the heart of innovation. Learning regions are "where knowledge is the most important resource and learning is the most important process" (Lundvall 1994). Learning regions are necessary for economic clusters to growth and thrive.

The policy implication here is to create an environment that helps facilitate networking and learning opportunities. Morgan (2007) suggests that policies should be aimed at promoting three different types of competencies.

Technology competence is the ability of firms to adopt and master technology that is relevant to its needs. Here it is important to note that Schumpeter's quality competition is broader than the creation of new innovations, but also the ability of firms to adopt new innovations in an efficient and timely manner. Here the technology transfer programs promoted by the University of Wisconsin (e.g., UW-Stout Technology Transfer Institute), the Department of Agricultural and Consumer Protection, and the Wisconsin Technology Council, among others, help Wisconsin firms adopt new innovations in their processes.

Entrepreneurial competency is the ability to integrate relevant technology and new processes with the wider strategies of the firm. Part of this competency involves the willingness of firms to experiment with and constantly seek out new ideas or innovations. It also involves the ability of firms to nurture new ideas or innovation, make the investments to develop those innovations to bring them to markets, but most important, separate out those new ideas and innovations that have market potential from those that do not.

Learning competency, structure and culture of the firm to enhance the ability to absorb and process information concerning

changing market conditions and new innovations. While investments in public education plays a key role here more nuanced policies focused on the promotion of public-private partnerships that can facilitate networking opportunities for not only key principals of the business but more importantly the workforce. These can be informal participation in workshops and seminars offered by local institutions of higher education, structured professional development programs, or simply networking opportunities. The key is that innovative firms are constantly seeking to learn new things and are willing to make the necessary investments to facilitate that learning.

Another way to think of policy within this quality competition or innovation environment is what Cooke (2001) calls "innovation infrastructure", "soft infrastructure" and "network infrastructure". Here the use of the word "infrastructure" helps visualize what needs to be in place as an enterprise support subsystem for economic growth and development. Public policy is aimed at fostering that infrastructure which allows for networking and continuous learning.

A simple example would be local and regional economic development organizations working with business partners (i.e., public-private partnerships) to offer continuous learning opportunities for specific industries and the labor force. The organization of, for example, an annual plastics manufacturing conference would allow firms and their employees to network and learn not only from each other but from formal workshops and seminars covering a range of topics related to the industry.

Another direct Wisconsin example is the formation of an Engineering Technology Program hosted by the UW-Oshkosh in partnership with several other institutions of higher education in the northeast region of Wisconsin. Beginning with a regional analysis of the Fox Cities economy (Muench and Deller 2001) a team of local community leaders identified a gap in the local economy around engineering serves. By partnering with regional businesses and local institutions of higher education an engineering program was established to address the need. Such regional public-private partnerships represent an investment in the learning infrastructure for long-term sustainable economic growth and development.

One means of moving forward is to establish a series of long-term objectives to help guide policy discussions. Building off the Wales Regional Technology Plan (Wales, United Kingdom), an attempt by the Welsh government to create a "learning region" based economy, consider the following operational principles that may be suitable for Wisconsin:

- A culture of innovation is vital for personal and economic success.
- Wisconsin must profit from global innovation and technology.
- Firms learn best from each other, their supply chains and networks are crucial.
- Finance for innovation must be readily available in Wisconsin.

- High quality business and innovation support is essential for Wisconsin firms, and
- Educational and training for innovation and technology are vital for the Wisconsin economy.

Examples of specific strategies that can be used to build on these principals include, but not limited to, targeted tax credits for small and medium size firms to invest in research and development under certain guidelines, low interest loans, small grants or loan guarantee programs to help small and medium size firms adopt new technologies, grant programs to help establish professional development opportunities within targeted innovation areas, technical assistance for technical problem-solving, opportunities to facilitate international networking activities of firms in targeted innovation clusters.

When thinking about broad-based strategies aimed at promoting quality competition, learning regional economies, or an environment conducive to an innovation milieu, there are some fundamental concepts to keep in mind. It is necessary to develop broad political support and general consensus within the private sector. Without "buy-in" from both public and private actors there is a danger of developing vague strategies on unrealistic ideas that are unlikely to achieve the desired long-term outcomes. Here efforts must be "bottom-up" where local partners work in tandem with state policy makers to craft strategies that are specific to regional needs. Top-down approaches that do not recognize regional differences have proven to be less than successful.

Strategy building and implementation is a learning process in itself in much the same way that research and development forms the foundation of an innovation economy. Through various forms of experimentation, strategies are informed through a learning process. The formation of these strategies must be conceived and implements in an evolutionary process with recursive feedback loops. At each stage of the process strategies must be evaluated with an eye toward learning from successes as well as failures. Asking the question of what worked, what did not work, and why can be a powerful learning process. Part of this learning process also takes advantage of exchanges of experiences from other regions, but only if their regional priorities are clearly defined and consistent with the region of interest.

Philip Cooke (2001) offers a set of simple characteristics that distinguishes ordinary and quality competition (Table 1) that can help guide policy discussions. These characteristics can also be used to distinguish between dynamic growing economic clusters and a simple geographic concentration of similar ordinary competition types of firms. For example, competitive versus cooperative cultures separates firms that operate in isolation and those that build partnerships. Are firms that are in all practical purposes competitors willing to work together through a business association to improve the profitability of the whole industry. The Wisconsin's Plastic Cluster Partnership saw

a wide number of competitors realize that by working together as an industry each individual firm can profit (see Goldsmith and Green (2009) for a detailed discussion).

Table 1: Ordinary versus Quality Competition

Ordinary Competition	Quality Competition
Competitive culture	Cooperative culture
Individualistic learning	Interactive learning
Self-acquired skills	Worker mentoring
Antagonistic labor relations	Harmonious labor relations
Low taxes	Investment in community
Limited regulations	Flexible regulations
Piecemealed innovation projects	Regional university-industry synergies
Stand-alone R&D	Interactive innovation
Closed door policy discussions	Inclusive policy discussions
Reacting	Monitoring
Authoritative	Consultative
Hierarchical	Networking
Security	Experimentation

One of the outcomes of the Wisconsin's Plastic Cluster Partnership was the creation of professional development opportunities for not only management but all employees. Rather than an antagonistic relationship with labor where training and required skill acquisition are the responsibility of the employee firms view workers as one of, if not the most, important asset to the business. Innovative firms promote interactive learning of all employees, encourage networking and embrace employee experimentation with new ideas. Innovative firms are attracted to communities that have quality labor and are willing to invest in that labor.

The notion of "thick labor markets" comes into focus when thinking about the types of community characteristics that are attractive to innovation driven businesses. These businesses are constantly seeking out skilled or trained workers, problem solvers, innovative employees who can think creatively, or what Richard Florida (2014) refers to as the "creative class" of workers. For decades economists found that in a mobile economy people tended to follow jobs, but more recently that historical pattern appears to be reversed. Increasingly it appears now that jobs follow people. The policy implication is clear: invest in the characteristics that innovative people, or the creative class, look for in making decisions about where to live. Characteristics like quality schools, recreational opportunities, natural amenities, and cultural events come to the forefront.

Care must be taken to think that this apparent reversal of "people follow jobs" to "jobs follow people" in absolute terms. Once a viable cluster is established geographically, people who wish to pursue careers in those industries will be drawn to that particular geography. For example, if a person wishes to work in creating computer games there is a strong incentive to move to the Austin, Texas region where there is a vibrant computer gaming software industry.

As that particular industry has grown and prospered the development of a thick labor market has created opportunities for other software oriented businesses. This is the "agglomeration effect" that is tied to viable economic clusters. Thus innovative businesses that focus on quality competition are drawn to communities with high quality labor and that same labor is drawn to innovative businesses. The common denominator is high quality of life within the community.

> The policy implication is clear: invest in the characteristics that innovative people, or the creative class, look for in making decisions about where to live. Characteristics like quality schools, recreational opportunities, natural amenities, and cultural events come to the forefront.

One policy approach that is drawing increased attention across Wisconsin is referred to as "place-making". In the simplest sense, place-making focuses on improving the quality of life within the community with an eye toward making the community as attractive to people as possible. Sauk County, for example, is building on its proximity to Madison by encouraging the creative class to move, live and conduct business in Sauk County. By focusing on creating a community attractive to innovative people or the "creative class" the community will be more attractive to innovative and quality competition oriented businesses. By focusing on making the community a better place to live Sauk County will be better positioned for economic growth and development.

A second motivation for the Sauk County place-making initiative is the community's interest in fostering entrepreneurship and small business development. As outlined in detail in Conroy and Deller (2015) nearly all new net job growth in Wisconsin comes from business start-ups, which tend to be small. While there are many types of entrepreneurial firms, many could be characterized as focusing on quality competition. By creating a high quality of life community that is attractive to innovative workers an environment is created that is both attractive to innovative firms and entrepreneurs. Here we can begin to see significant overlap across policies that foster innovative oriented businesses and entrepreneurship and new business development.

The potential downside to promoting innovative oriented businesses is that it is a long-term approach. Investments made today may not have payoffs for years to come. At the local level this long-term view of economic growth and development policies is viable because community residents are often thinking about making their community a better place for their children. At the state and federal level, however, the shorter election cycles forces these policy makers to take a much shorter-term view of economic growth and development options. In this shorter-term thinking policies aimed at promoting a business climate that favors ordinary competition become attractive. The

challenge we face is that short-term policy options that favor ordinary competition firms are detrimental to long-term policies that favor quality competition firms.

Conclusions

There is a common joke that economists seldom agree on anything. While there is some truth to this old joke, economists do agree that innovation, the creation of new ideas, processes and products and the ability to bring them to market, is fundamental to economic growth and development. The profit motivation to be first to innovate and bring it to market is the driving force behind firms investing significant resources into research and development (R&D). The first to successfully bring a new idea to market could earn outsized profits. Joseph Schumpeter, the economist who introduced the notion of "creative destruction", argued that there are two different types of firms in the economy. Those firms that face ordinary competition where the drive to profitability is through reduced costs and those firms that face quality competition where the drive to profitability is through innovation. In reality, the most profitable firms balance the two: invest in innovations while keeping an eye on costs.

If individual communities, regional partnerships across several communities, or the state government assumes a proactive role in fostering economic growth and development, we can think about these two types of competition through the lens of business climate. Firms that face ordinary competition view a positive business climate as one with low costs of operations: limited regulation, low taxes, inexpensive labor and land. Firms that face quality competition need access to a high quality labor force that drives innovation. These businesses view a community with a positive business climate as one that is willing to tax itself in order to invest in itself, builds on public-private partnerships, facilitates networking and is open to new ideas and ways of thinking about the community and economy. A positive business climate includes notions around quality of life and what makes a community an attractive place to live and work.

Just like businesses that are willing to make long-term investments in research and development (R&D) innovative communities with a positive business climate takes a long-term view of the community. Rather than taking a self-serving confrontational approach, which is inherent to the ordinary competition oriented business, a collaborative partnership approach is embraced. Through these public-private partnerships and higher levels of networking within and across the community more effective short- and long-term strategies can be put in place.

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