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Benchmarking Innovation

By Erik R. Pages and Graham S. Toft

HOW TO BUILD A REGIONAL INNOVATION INDEX

As economic development organizations become more aggressive in supporting innovation and entrepreneurship, they must find ways to better understand how their regional innovation economy operates and how their programs affect individuals, businesses, and other key stakeholders. **This article offers tips on how economic development organizations can benchmark their regions against other communities in terms of supporting innovation.** It presents guidelines for identifying and accessing key metrics and statistics, for publishing benchmarking reports, and for effectively communicating the results to various regional audiences.

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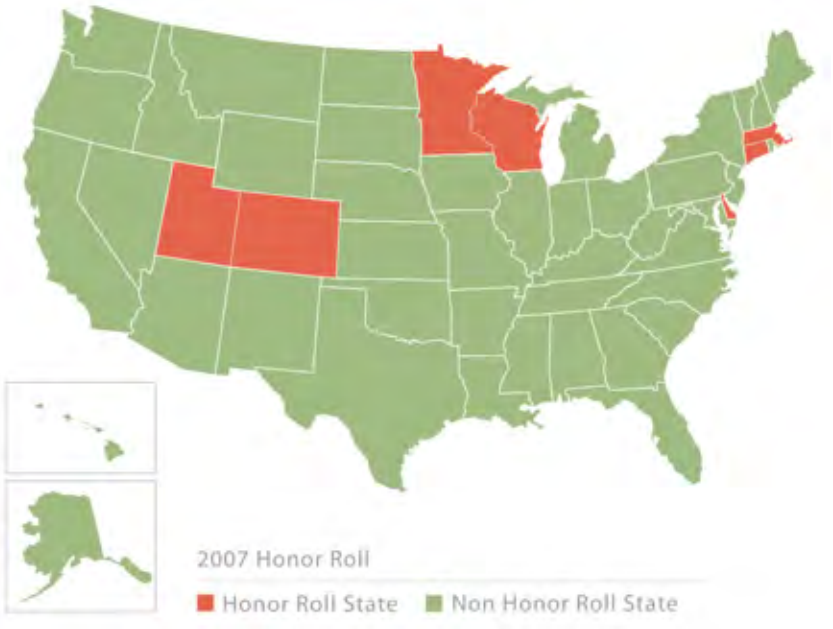
INTRODUCTION

When it comes to 21st century economic development, innovation is the name of the game. States and localities recognize that their future prosperity depends on their ability to nurture innovation in local communities, local businesses, and in local residents. Hundreds, if not thousands, of economic development programs seek to foster innovation. These take numerous forms ranging from cluster development strategies to technology commercialization programs to business incubators to youth entrepreneurship programs and so on.

States and localities want to support and nurture innovation, but how can they be sure that they are succeeding in the process? Benchmarking regional innovation offers one approach to keeping score and tracking a region's innovation trajectory. Regions across the US and across the globe are creating local report cards or innovation indices that track how they, and their economic development programs, are performing.

Savvy economic developers have always benchmarked themselves against competitors and the "best in class" programs and regions. Yet, the importance of this process has grown in recent years as innovation-based economic development strategies have become more prevalent. While the pace of change has quickened, innovation strategies require a sustained long-term effort. Big job gains do not usually materialize over night. Instead, innovation manifests itself as gradual improvements in local business productivity, new product launches here and there, new business starts buttressed by fewer business failures, gradual relocations of young companies into the area, and other often barely perceptible shifts in the economic landscape.



The Corporation for Enterprise Development (CFED) Development Report Card of the States tracks states on their economic performance, business vitality, and development capacity. Only two states – Connecticut and Delaware – earned straight As on all measures in the 2007 index.

All of these transformational improvements are seldom apparent on a day-to-day basis. Big changes may be underway but may not be recognized until after the fact. In contrast, a new plant opening is readily apparent and likely to generate immediate and measurable local impacts.

Since innovation strategies operate according to a different pattern and timeline, they similarly call for better and different ways to measure progress and to continuously assess the strengths and weaknesses of a local innovation economy. That is where benchmarking comes in. In short, to do innovation right, you need to keep score.

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As economic development organizations become more aggressive in supporting innovation and entrepreneurship, they must find ways to better understand how their regional innovation economy operates and how their programs affect individuals, businesses, and other key stakeholders. This article offers tips on how economic development organizations can benchmark their regions against other communities in terms of supporting innovation. It presents guidelines for identifying and accessing key metrics and statistics, for publishing benchmarking reports, and for effectively communicating the results to various regional audiences.

THE NATURE OF INNOVATION

While innovation is the buzzword of the day, it can often be an abstract concept. A simple definition is "doing things better, faster, cheaper and greener". You often cannot feel or touch it directly. Until quite recently, many observers contended that innovation was synonymous with technology. If you had technological change, you had innovation. Innovation could thus be measured with various measures of technological progress, such as patents or research and development spending.

This thinking aligned with a model that some have dubbed the "pipeline model" of innovation. Under this approach, innovation proceeded along a linear path from ideas to technologies to prototypes to final products or services. Today, most experts have a much more holistic picture of innovation. Advocates of open innovation or co-creation recognize that good ideas and innovative concepts can come from anywhere — from customers, from partners, from employees, and from outside forces as well.

Innovation is similarly not restricted to the creation of new products; it can refer to changes in technologies, products, services, and processes. It can include reorganizing work for higher productivity, combining the core competencies of various firms to launch new or better products, or finding creative ways to expand or penetrate new or changing markets. Innovation is no longer the sole province of scientists, engineers, and businesses – it may also be evident in the creative arts and cultural expressions of a community.

There are literally hundreds of different ways to define innovation. One of the more comprehensive definitions comes from the January 2008 report to the U.S. Secretary of Commerce from the Advisory Committee on Measuring Innovation in the 21st Century Economy. The Committee defines innovation as

> *"the design, invention, and development and/or implementation of new or altered products, services, processes, systems, organizational structures, or business models for the purpose of creating new value for customers in a way that improves financial returns for the firm."*

As the definition of innovation becomes broader, new tools and metrics to measure innovation must also be introduced. This task is receiving high-level attention, as the US Commerce Department has even convened a blue ribbon Advisory Committee on Measuring Innovation in the 21st Century (www.innovationmetrics.org). Its report, released in January 2008, included a number of interesting recommendations, including support for creation of a national innovation index to assess how the US economy is performing on key measures of innovation.

WHERE DOES BENCHMARKING FIT IN?

Communities seeking to assess their innovation performance or potential must find surrogate metrics and use comparisons with competitors to know if they are achieving and sustaining innovation. That is where benchmarking comes in.

The basic concepts of benchmarking originated in business as a tool to evaluate various business processes in relation to industry "best practices." For example, many manufacturers seek to benchmark their processes vis-a-vis the vaunted Toyota Production System, or retail firms might benchmark their distribution systems against industry leaders like Wal-Mart.

When these concepts are moved to a non-business setting, they can sometimes be misapplied. Many communities simply assess how they are performing on certain key measures, such as job growth or new business starts, and consider the benchmarking job done. But, benchmarking is not just an analytical exercise. It is a process that begins with analysis, and hopefully ends with a diagnosis of business shortcomings and solutions to help fix them.

Benchmarking is often confused with performance measurement, which seeks to assess how a particular program or organization is operating. Benchmarking is more of a comparative exercise that assesses performance in relation to the best in class.

In many cases, economic development organizations will go through the rigor of the analytics, but they may fail to follow through with the examination of the best practices of the leading competitors or the engagement of key local actors to ensure steps for constructive change. Because the economic development profession is closely aligned with the business community, it is advisable to stick to benchmarking as implemented by the best companies. It is often advisable to engage business partners in the benchmarking process – especially those firms that are already deploying similar tools to their advantage.

Benchmarking is often confused with performance measurement, which seeks to assess how a particular program or organization is operating. Benchmarking is more of a comparative exercise that assesses performance in relation to the best in class. It has been described as a process of "borrowing shamelessly." While much of this article focuses on the analytics component, ultimately what you are trying to do is identify the smartest ideas and practices, and then creatively adapt them to your situation.

Benchmarking is a strategic function – it must be driven by broader goals and strategies that can be either explicit or implicit. For example, a community might be developing a new strategic plan that seeks to position the region as a leader in the life sciences industry. In this case, the region should seek to assess its performance on key measures of life sciences strength, and compare this performance to regions already identified as strong biotech hubs.

As the process unfolds, remember that the analytics of benchmarking are a means to an end. The primary outcome is change – becoming more like "best in class." The analysis helps communities figure out how to get there. There is no "one best way" to undertake a benchmarking analysis. The analytics will require qualitative investigation (interviews, roundtables, collective explorations) as well as quantitative measures. In the following section, we review some of the existing products that can help ease the burden of the analytics task.

EXISTING PRODUCTS

While benchmarking can be a complicated process, there is some good news. In most cases, economic developers don't need to create their own Innovation Index from scratch. Each year, states, communities, media organizations, and think tanks create hundreds of "report cards" and benchmarking reports. These report cards cover nearly every topic under the sun. For instance, you can find listings of the best places to own pets, to be a father, to work in the federal government, to reinvent your life, to launch your career, and to retire. The lists seem endless. You must get to know the internal assumptions and methods to be able to use them well. This step allows you to better understand any potential biases in a ranking scheme.

As you begin the benchmarking process, you should review other similar reports and indexes. These reports will help provide lots of ideas on what to do and what not to do in terms of measures to use and in terms of how to do the analytics, qualitative investigations and communicate your results.

As you review various lists, a couple of general rules of thumb can help to separate serious benchmarking reports from more frivolous "best of" lists designed to sell magazines or newspapers. First, an effective report is transparent. It provides citations for all of its measures and also explains how it calculates various scores or rankings.

Second, an effective report explains how and why each of its specific metrics matter. For example, if a region tracks patenting activity as part of an innovation index, it should also explain why patents are an important innovation indicator.

Understanding this underlying "theory of change" becomes especially important when working with indexes produced by national organizations or think tanks. Most of these reports promote a particular perspective or approach to economic development and may thus contain explicit or implicit biases.

Finally, an effective report reflects the unique innovation environment of a given state, region, or locality. Measure what matters to you and what is relevant to your own community's economic development vision. This may require specific measures tied to a leading industrial sector or cluster, or unique local quality of life assets or challenges.

For example, the Small Business and Entrepreneurship Council's State Small Business Survival Index builds on a belief that taxes and regulation are key impediments to economic growth. Thus, most of the Small Business Survival Index's measures are focused on comparing tax and administrative burdens across states.

Similarly, the Corporation for Enterprise Development (CFED) Development Report Card of the States is based on economic development vision that supports equity, inclusion, and expanding opportunity for low-income individuals and families. Thus, this ranking places heavy emphasis on measures of equity and quality of life.

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For example, the annual Index of Silicon Valley places a heavy emphasis on local energy use, the cost of housing, and other quality of life measures. These metrics are critical to the region's innovation capacity, because they affect its ability to attract and retain talent. If the region becomes too crowded, too costly, or too polluted, talented individuals may opt to locate somewhere else. In contrast, the Indiana Chamber's annual Report Card places heavy focus on measures (such as college attainment levels and new business starts) related to building a stronger innovation economy.

These general guidelines can help you better understand existing products and tools that are already available. The following reports are particularly helpful or useful as guides for how to correctly do innovation benchmarking:

National Reports

Dozens of national think tanks and trade associations produce annual or semi-annual rankings of how states and metropolitan areas perform on various measures of

innovation. The Milken Institute produces a number of useful benchmarking reports. These include the State Technology and Science Index (produced in 2004 and 2008) and the annual "Best Performing Cities" series. Other useful national reports include CFED's Development Report Card of the States, which has been published for 20 years, and the Information Technology and Innovation Foundation's State New Economy Index (produced in 1999, 2002, 2007 and 2008). This report heavily emphasizes information technology and includes many related metrics such as broadband penetration and the use of IT in schools and government.

Dozens of national organizations produce regular "places rated" or "best places" listings. Here are some of the more useful sources:

- Beacon Hill Institute for Public Policy Research, *Metro Area Competitiveness Report 2007*. Available at www.beaconhill.org.
- Corporation for Enterprise Development, *Development Report Card of the States*. Available at www.cfed.org.
- Information Technology and Innovation Foundation and the Kauffman Foundation, *State New Economy Index 2008*. Available at www.itif.org.
- Milken Institute, *State Technology and Science Index 2008*. Available at www.milkeninstitute.org.

State Reports

Many state agencies or state-focused non-profits engage in annual innovation benchmarking exercises. These efforts are often of varying quality but they inevitably produce useful insights. At a minimum, they inform policy makers about how the local technology sector is performing. In the best case scenario, these benchmarks help drive policy making as it relates to the innovation economy.

The Massachusetts Technology Collaborative's annual Index of the Massachusetts Innovation Economy is one of the earliest, and still among the best, state benchmarking reports. It tracks 20 key indicators and also benchmarks the Bay State against other US states and other global regions, too. Annual reports produced by the Small Business Association of Michigan and the several state Chambers of Commerce use a larger number of measures compiled and tracked by GrowthEconomics, a consulting firm specializing in innovation benchmarking. For example, the Michigan Entrepreneurship Scorecard tracks the state's performance on 128 different measures. Other excellent state benchmarking reports are produced by Maine's Office of Innovation and the Washington Technology Center.

Local Reports

State innovation benchmarking reports are relatively common because they are relatively easy to construct. State-level data for key innovation indicators, such as college attainment, patenting, and new business starts, are readily available from public sources. As we move to a regional or local level, data availability issues arise. Much information can be found at the level of a county or metropolitan statistical area (MSA). Unfortunately, few regions or few economic development service areas ever align perfectly with these geographical categories. These data limitations complicate our ability to obtain regional innovation measures and to compare regions to one another.

Despite these challenges, many regions produce excellent innovation benchmarks. The Index of Silicon Valley, produced by Joint Venture Silicon Valley, has helped spawn similar projects in Boston; Long Island; and Modesto, California. Several regions, such as the Denver Metro area and Western Michigan, have also produced impressive innovation reports as part of the Federal WIRED program.

Local and regional government agencies have also produced a number of useful benchmarking studies. Here are some useful local sources:

- Joint Venture Silicon Valley, *The 2008 Silicon Valley Index*. Available at www.jointventure.org
- Team NEO (Northeast Ohio), *Northeast Ohio Economic Review*. Available at www.teamneo.org.
- Twin Cities Compass (Minneapolis-St. Paul, MN). Available at www.tccompass.org

Issue-Specific Reports

In addition to using benchmarking reports that focus at the state, regional, or local level, economic developers can also tap into studies that examine a single issue or set of issues. For example, BIO, the biotechnology trade association, annually tracks state performance in life sciences industries. Similarly, the Kauffman Foundation produces an annual index of entrepreneurial activity that tracks state levels of new business creation.

YOUR OWN INDEX: WHAT TO MEASURE?

Because "innovation" is an abstract concept and pervades all economic activity to some degree, its measurement is a challenge. The approach that works best is to use baskets of key indicators that tend be correlated with an innovation economy. Typical categories might include talent, business dynamism, or technology commercialization.

Listed below are several of these key headers/correlates matched with indicators that are frequently used as surrogate measures of innovation activity. Data on all of

these indicators are obtainable, depending on the size of the unit of analysis – the smaller the area, the less available some data will be. Most indicators are ratios, scaled to the size of the area using employment, number of businesses etc. as the denominator. This list is not intended to be complete but offered as a starting framework.

Key Correlate with Innovation	Possible Measurable Indicators
Technological Innovation	Patents; R&D expenditures; R&D Productivity (pat./R&D $); R&D facilities/employment
Talent	Number of scientists and engineers; % "knowledge workers;" % skilled workers/technicians
Business Dynamism	Business starts and failures; incubator /tech. park spin outs; growth companies –%, growth rate, age, location
Commercialization	University spin-offs; joint ventures between university and business
Capital Formation	Seed and venture capital; IPO's; SBIR awards/grants
Productivity	GDP /capita; sales per employee
Types of Jobs Gained/Lost	In-out migration of scientists and engineers; employment growth in knowledge occupations; high skilled/educated immigrants
High Value Added Exports	% of exports that are high tech; growth in high tech exports

YOU'VE BUILT THE INDEX, NOW WHAT?

When it comes to producing a Regional Innovation Index and publicizing its results, good data are not enough. Benchmarking is process. You need to follow-on with examination of what the best in class are doing well, to engage leaders in creative adaptation of best practices to the local context and to tell a "good story." To effectively communicate your findings, you must also develop a comprehensive communications strategy to accompany the report and action plan release.

An effective communications strategy addresses three key sets of questions:

1) **What are the Index's key story lines?** These key story lines could focus on both challenges, (e.g., our region needs to invest more in K-12 education) or opportunities (e.g., our region hosts a strong life sciences cluster).
2) **What is your "theory of change?"** While we don't recommend using the term "theory of change" in your published reports, it is essential that you address this question. Theory of change is a process that defines the building blocks along a path toward completing a long-term goal. In the case of regional innovation, a theory of change might note that enhanced investments in people and development of an entrepreneurial infrastructure will create a more innovative and prosperous economy in the future. This theory of change must be empirically grounded using evidence from the Index

This process of identifying and defining key economic building blocks will help strengthen your ability to communicate the Index's findings. It requires that you present a specific and concrete explanation for why improvements in key Index measures, such as new business starts or college attainment levels, will contribute to higher levels of regional innovation.

Benchmarking Case Study: The Maine Innovation Index

For many years, the state of Maine has aggressively supported economic development programs that help nurture its science and technology base. It operates an Office of Innovation within the state Department of Economic and Community Development while a separate non-profit, the Maine Technology Institute, also promotes technology-based economic development. The state currently operates with an aggressive goal of achieving $1 billion in R&D activity by 2010.

As it has undertaken aggressive technology support activities, Maine has also been diligent in terms of assessing program performance and benchmarking its economy against other states. Beginning in 2001, Maine has produced an annual evaluation of its R&D activities along with an annual Innovation Index that benchmarks Maine's science and technology performance in comparison to a number of other states. In the 2008 Innovation Index, Maine's performance is compared to national averages, other states in New England, and states that participate in the EPSCoR, a National Science Foundation initiative to support states that have traditionally received lower levels of federal R&D spending. The Index also tracks Maine's performance over one year and over a longer period of five years.

The 2008 Maine Innovation Index tracks 25 indicators that fall into five categories: research and development capacity, innovation capacity, employment and output capacity, education capacity, and connectivity capacity. The Index finds that Maine's performance is quite strong in key areas such as entrepreneurial activity, household and school connectivity, and math and science skills of 8th grade students. Maine's performance is weaker in areas such as R&D performance, venture capital investments, patents issued, and the presence of high-growth entrepreneurial ventures.

Maine's leaders do not just view these benchmarking reports as an academic exercise. The results are reported to the governor, the legislature, and the business community. These findings are also used to design new programs and strengthen existing initiatives. For example, state leaders are now developing a new initiative to help spur the creation of more high-growth entrepreneurial ventures across the state of Maine.

3) **Why should they care?** An effective communications strategy also engages local residents. It clearly explains why key measures matter to the average citizen. It makes the case that regional innovation is not just about high technology industries: it is about building a more prosperous region, through creativity on several fronts.

Beyond the basics of effective communications, world class development organizations also bring another unique perspective to the benchmarking process. They view benchmarking as a core activity that becomes embedded in the organization. They do not view a Regional Innovation Index as a one-time exercise to produce a glossy report. They instead view benchmarking as a way to foster continuous improvement, identify new trends, and address growing challenges. Given that much relevant data is released yearly, full biannual Index updates make sense, coupled with half yearly "dashboards" designed to pick up recent changes.

CONCLUSION

Innovation is a cross-cutting theme that overlaps with a number of leading approaches to economic development. Nearly every aspect of local, regional, or state economic growth is now affected by the innovation climate and innovation strategies. Consequently, innovation benchmarking is moving up the priority list for competitive economic development organizations.

The task of innovation benchmarking can begin simply, possibly using published scorecards and metrics developed by state or national think tanks. Then, gradually one can add local sophistication, collecting local intelligence and analyzing more complex datasets. The key is to begin and to drive a process that includes analytics, tracking the best performers, engaging leaders in action planning, and communicating incessantly, not just once but on an ongoing basis.

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