# Rhode Island Innovates:
## A Competitive Strategy for the Ocean State

Prepared by Battelle Technology Partnership Practice in association with the Metropolitan Policy Program at Brookings with support from Monitor Deloitte and TEConomy Partners, LLC.

Battelle
*The Business of Innovation*

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# Executive Summary

Rhode Island has done it before.

When the state's initial trade glory ebbed after the American Revolution, the ingenuity of Rhode Islanders prevailed, and the state not only shifted into manufacturing but also launched America's industrial age at the Slater Mill by opening the first successful water-powered cotton-spinning factory in the United States.

The state innovated, transformed its drifting economy, and prospered.

Now, the state needs to do it again.

After several decades of drift, the Ocean State needs to transform itself once more by further leveraging its assets, ingenuity, and, yes, its beautiful rocky coastline and "hipness factor," to reverse substantial decline.

The moment is urgent. Ever since the Great Recession exposed deep structural erosion beneath the collapse of an outsized real estate bubble, Rhode Island has struggled to regain its economic footing at a time of technological disruption and "winner-take-all" markets.

The state's traded sectors—its most critical sources of prosperity—have been losing jobs since the 1970s and are only now stabilizing, though much reduced. Incomes are stagnating. A significant skills-building task has become urgent as a far more diverse younger population clamors for connection and more relevant training. And, for that matter, poverty and economic disparities have increased, with the median income of black households now standing at less than 60 percent and that of Hispanic households at just 50 percent that of white families.

Which is to say that Rhode Island—a small state in a large nation in a fiercely competitive world—is facing an existential choice about its future. Are the state's business, civic, university, and government leaders prepared to think deeply and act decisively as their predecessors did in order to meet profound uncertainty with innovation and ingenuity? Or will they merely make the best of slow decline?

Fortunately, the moment is propitious for renewal. The national economic backdrop is at last generally positive. An uptick in state revenues has modestly improved the budget outlook as has a refinancing of

state debt. And meanwhile, new leadership in key quarters has created space for a serious reassessment of the state's economic positioning and route toward improved performance.

Most notably, the administration of Gov. Gina Raimondo—focused on sparking an Ocean State comeback—has been working closely with the General Assembly to develop more strategic approaches for promoting increased and higher-value growth. Last summer, specifically, the Assembly passed and Gov. Raimondo signed a 2015–2016 budget equipped with a number of new incentive programs aimed at spurring growth in a variety of sectors, including in what the Brookings Institution calls high-value "advanced industry" clusters. Though billed as only a start toward growth the programs represented an important first step toward reorienting a drifting economy.

And yet, to go further and intervene more decisively, the state needs to know more about itself: about the state of its current economy; about the industries it has and their competitiveness; about the supportive assets it does and does not have. In short, what Rhode Island has needed is a fact-based, third-party analysis of the state's competitive position that leads to a compelling strategy and action steps for economic growth.

Which is why in spring 2015 a number of Rhode Island foundations and state-connected individuals supported work by the Metropolitan Policy Program at Brookings along with its analytic partner the Battelle Technology Partnership Practice (now TEConomy Partners, LLC) and in collaboration with Monitor Deloitte, Deloitte Consulting LLP to provide a detailed economic assessment and actionable recommendations for the state's economic development planning, with an emphasis on growing the state's critical advanced industries.

Hence this report: Designed to provide a fact-driven basis for action, **"Rhode Island Innovates: A Competitive Strategy for the Ocean State"** undertakes to provide a detailed assessment of the state's present situation and best opportunities for high-quality economic growth, with the goal of promoting an advanced economy that works for all.

To that end, the chapters that follow reflect the results of an intense six-month inquiry that sought to: distill the economic challenges the state faces; identify the state's best opportunities for industry expansion and high-value economic growth; assess the strengths and weaknesses of the state's growth platform; and provide an action plan for realizing the state's economic opportunities.

Along these lines, the pages that follow draw a number of conclusions about the state as it considers how to catalyze the next wave of Ocean State growth:

## 1. Rhode Island possesses unique assets but the decline of its core advanced industries has left the state adrift

Rhode Island embarks on the next phase of its economic history with a strategic geographic location and many assets. Rhode Island sits at the center of a 33-million-person megalopolis that stretches from

Portland, ME, to metropolitan New York. Each year this region produces a combined economic output of $2.1 trillion and a combined innovation output of 16,000 patents.

Home to premier academic and research institutions in fields ranging from biotech, company management, the culinary arts, and design to IT, oceanography, and undersea warfare, Rhode Island also possesses a diversified portfolio of knowledge assets. And with 400 miles of coastline and a network of towns and cities rich in charm and urban cool, the state remains an attractive place to live.

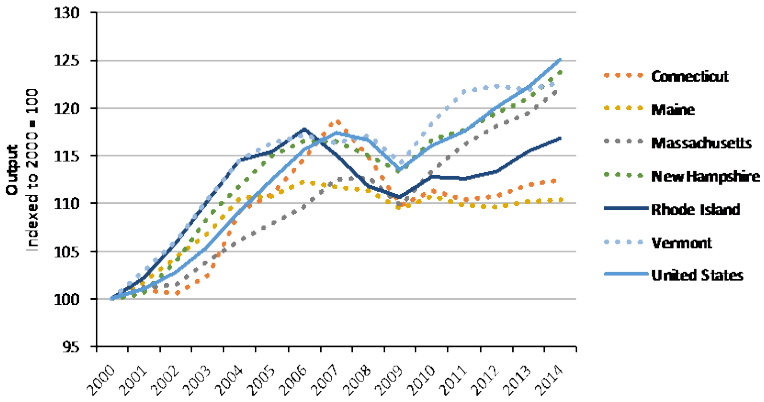
However, despite these strengths, reports Chapter 2, the state's economy has underperformed in recent years relative both to its neighbors and the nation as a whole. Three major findings bear notice:

- **Rhode Island's economy has lost growth capacity and is now a middling performer.** If Rhode Islanders are in a dour mood currently, it likely owes to a downward shift in the state's economic performance, even though in truth the state's economic condition is less dire than middling.

  In the early 2000s, Rhode Island's economy was a leader in New England and enjoyed relatively strong performance across economic measures relative to the United States. Annual job growth between 2000 and 2006 led the region and over the same time period the state enjoyed nearly double Massachusetts' annual GDP growth. In addition average wage growth generally tracked the nation's through the 1990s, and at times the unemployment rate was lower in the Ocean State than in the United States as a whole.

  However, the traumatic experience of the Great Recession and Rhode Island's unusually slow recovery have intensified fundamental problems while reducing the state's relative economic standing. Rhode Island slogged through the most severe recession of any New England state in the years 2007 to 2010 and it has continued to lag the region on certain measures of labor market health. Most notably, the state saw its unemployment level spike higher and decline slower than every other New England state. Today the state's highest-in-the-region unemployment rate of 5.4 percent still exceeds the state's pre-recession low unemployment rate of 4.8 percent. The state is also still over 10,000 jobs short of returning to its pre-recession employment levels and has

**Output growth in Rhode Island has lagged the nation, Massachusetts, New Hampshire, and Vermont since the reset of the Great Recession**




Source: Brookings-Battelle analysis of Moody's Analytics data.

seen one of the largest increases in inequality among states post-recession. While topline indices are for the most part not calamitous, they are just passable.

With that said, the most crucial trend data for the last decade suggest a fundamental problem: Rhode Island's growth capacity has deteriorated.

As a result, the economic reset of the recession has moved from the front to the middle of the pack on a variety of key performance measures.

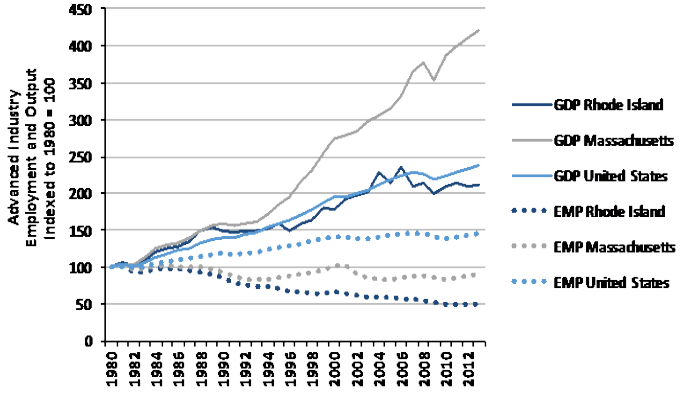
Output and job growth now tend to lag the nation's, as does average growth worker compensation. Within New England, Rhode Island's economic future looks even less clear. Prior to the recession, the economies of New England states largely moved together. In more recent years, performance has diverged with Massachusetts and New Hampshire pulling ahead, Connecticut and Maine falling behind, and Rhode Island drifting in between

- **Rhode Island's advanced industry employment base has shrunk.** Beneath the headline story of recent drift lies deeper structural change involving the industrial composition of the state economy. Most notably, Rhode Island's critical advanced industry base—anchored by its historical manufacturing sector—has lost both size and traction.

  Advanced industries as defined by the Brookings Institution are a group of 50 individual industries (ranging from aerospace manufacturing and shipbuilding to renewable energy to biotech and computer systems design) that conduct large amounts of R&D and employ a disproportionate share of science-technology-engineering-mathematics (STEM) workers. Given their orientation towards innovation, technology application, and exports, these industries anchor the U.S. economy by supporting long supply chains, driving productivity growth, generating knowledge spillovers, and paying high wages to workers with a variety of degrees. The success of these industries is a prerequisite for broadly shared prosperity.

  Over the past few decades, however, Rhode Island's advanced industry base has eroded. Total advanced industry employment declined at a faster rate in Rhode Island than in any other state from 1980 to 2013. Most of this decline reflects calamitous job losses in the state's declining jewelry, toy, and textiles manufacturing industries, which though moderately advanced remained relatively labor-intensive and low value-add—and thus susceptible to offshoring. At the same time, advanced industry output growth has been

**Stagnant advanced industries output growth (GDP) exacerbated job losses (EMP) in Rhode Island**




Source: Brookings-Battelle analysis of Moody's Analytics data

sluggish and located exclusively in Rhode Island's advanced services—a sector that has only somewhat offset the decline of the state's manufacturing base.

With that said, it bears noting that while Rhode Island advanced manufacturing output growth has been negative since 2000, the state's advanced services—IT, software, computer systems design, R&D—have been performing very well. Rhode Island boasted the highest advanced services output and employment growth in New England from 2000 to 2013.

And yet, the present-day situation is not yet advantageous. Rhode Island now combines best-in-region growth in advanced services (from a small base) with worst-in-region growth in advanced manufacturing (from a larger base). As a result, Rhode Island's critical advanced industries generate a smaller portion of state GDP and represent a smaller share of employment than the national average and any other New England state except Maine

- **Without new growth drivers, the state's economy will continue to drift.** Basically, the collapse of the state's legacy advanced industries combined with the too-slow emergence of new ones has left the state without a growth engine. Erosion of the state's advanced industry base and the failure to nurture new advanced industries has left the state adrift. In order to get back on track, Rhode Island needs to build more resilient, future-oriented industry specializations capable of securing prosperity for the next generation.

  Neighboring states Massachusetts and New Hampshire show the way forward. These states made successful transitions from legacy industries to more future-oriented knowledge- and innovation-based ones. As a result, Massachusetts has 4.8 percent more jobs today than it did at its pre-recession peak in 2008, and New Hampshire has witnessed a 10.1 percent jump in per-capita income since its nadir in 2010.

  Rhode Island, by contrast, remains 2.1 percent below its pre-recession employment peak and only 7 percent ahead of its per-capita income trough. The consequences of these trends can be seen in the long-term divergence of living standards between Rhode Island and its neighbors. In 1980, per capita personal income in Rhode Island was 98 percent that of New Hampshire, 92 percent that of in Massachusetts, and 80 percent that of Connecticut. By 2013, Rhode Island's relative incomes had slumped to 91 percent, 82 percent, and 74 percent, respectively. Rhode Island is beginning to see the consequences of losing much of its advanced industries base.

## 2. Five advanced industry growth areas and two "opportunity industry" growth areas hold out solid potential for rebuilding Rhode Island's high-value economic base and cultivating widely shared prosperity.

To rectify the losses of recent decades, Rhode Island needs to identify and nurture new sources of high-potential, high-value economic growth. To help the state identify such growth possibilities, Brookings

and Battelle (TEConomy) employed a data- and consultation-intensive process that assessed industry potential through objective and systematic analytics rather than anecdotes or trend picking.

In this fashion, Battelle executed a rigorous three-step process for identifying the most significant detailed industries and cluster connections in Rhode Island; assessing where the state's deeper competencies and assets across industry and research institutions differentiate clusters with special know-how and depth; and considering whether the identified potential growth areas provide a clear "line-of-sight" to large-scale market expansion. Informed by this analysis, Chapter 3 of the report recommends the state focus its economic development activities on seven broad growth areas and 15 or more "priorities within the priorities."

Five of these growth areas encompass "advanced industries"—industries that invest heavily in R&D and STEM workers, prize innovation, and demonstrate high productivity, strong exports, and higher pay. According to Brookings these advanced industries "…encompass the nation's highest-value economic activity…[and]…are the country's best shot at innovative, inclusive, and sustainable growth." Rhode Island's advanced industry growth areas include:

- ***Biomedical Innovation*****:** This growth area advances scientific knowledge of biological processes and systems in ways that are reshaping the diagnosis and treatment of disease. These advances converge with technological developments in electronics, information technology, imaging, and nanosciences to offer new insights that inform the creation and improvement of various biomedical products. Rhode Island has particularly strong market opportunities in neuroscience-related therapeutics; medical devices for orthopedic, biosensing, and neurological applications; and health care informatics and digital innovations

- ***IT / Software, Cyber-Physical Systems, and Data Analytics*****:** As the world transitions into the next phase of the information technology revolution, a range of technologies—including wireless communications, sensing and imaging data, and the Internet of Things—are converging with rising demand for technologies and applications capable of storing, processing, and analyzing large, complex datasets to inform real-time decisions. Specific opportunities for the state include cyber-physical systems and data analytics, autonomous underwater vehicles, remote medical device monitoring systems, environmental and energy monitoring, and smart grid infrastructure

- ***Defense Shipbuilding and Maritime*****:** Rhode Island is home to a wide range of maritime industry activities, including boat building, defense-related ship and submarine building, ocean cartography and engineering, and marine tourism. A highly integrated maritime economy that encompasses manufacturing, services, and research reinforces the state's competitive advantages as the Ocean State

- ***Advanced Business Services*****:** Modern corporations rely on back-office and headquarter operations such as web services, data processing, marketing, client management, human resources, financial services, and strategy and product development support. Applying advanced

technologies to these activities can help firms improve their competitiveness in the marketplace. Rhode Island can drive growth in this area by leveraging existing strengths and its strategic geographic location

- ***Design, Food, and Custom Manufacturing*****:** Industrial design provides significant competitive advantages for companies. Driven by rapid technological developments, falling costs, and 3D printing technology, industrial design is an increasingly important part of product and service development. Meanwhile, a burgeoning maker movement is lowering the barriers to designing and manufacturing goods. Particular opportunities for Rhode Island include rising demand for industrial design and growing interest in food manufacturing that stands at the nexus of food and health

In addition, two growth areas encompass "opportunity industries"—industries that offer good jobs with livable wages for individuals with varying levels of educational attainment. These two area hold out particular promise for the state:

- ***Transportation, Distribution, and Logistics*****:** This growth area encompasses the state's multi-modal freight transportation system, which includes ocean shipping, rail shipping, and trucking. These activities inform decisions about warehouse siting and distribution networks as well as demand for logistics services. Rhode Island has particular opportunities in grocery wholesaling and warehousing and storage

- ***Arts, Education, Hospitality, and Tourism*****:** This growth area brings together creative and recreational services across the arts, higher education, hospitality, full-service restaurants, conventions, gambling, and tours and sightseeing. Opportunities include expanding on an already vibrant tourism industry and expected employment gains in higher education

| **RHODE ISLAND GROWTH AREAS** | |
|---|---|
| **Advanced Industry** Growth Areas | |
| **Biomedical Innovation** | • 31,548 jobs in 2013<br>• Priority areas: biopharmaceuticals, medical devices, digital health |
| **IT/ software, cyber-Physical Systems, and Data Analytics** | • 12,538 jobs in 2013<br>• Priority areas: data sciences, cyber-physical systems |
| **Shipbuilding and Maritime** | • 19,107 jobs in 2013<br>• Priority areas: submarine & boat building, ocean sciences, marine/coastal tourism |

| | |
|---|---|
| **Advanced Business Services** | • 34,780 jobs in 2013<br>• Priority areas: back office operations |
| **Design, Materials, Food, and Custom Manufacturing** | • 11,045 jobs in 2013<br>• Priority areas: product design, food processing |
| **Opportunity Industry** Growth Areas | |
| **Arts, Education, Hospitality, and Tourism** | • 42,801 jobs in 2013<br>• Priority areas: marine/coastal tourism, colleges & universities |
| **Transportation, Distribution, and Logistics** | • 21,322 jobs in 2013<br>• Priority areas: grocery wholesale, warehousing & storage |

Overall, Chapter 3's detailed examination of the industries powering Rhode Island's present economy reveals that the state possesses a number of promising industry development growth areas. At the same time, the chapter suggests that the state would not be well served by an economic development strategy that relies on heavy investment in individual industry targets. Rhode Island lacks industries that are large enough and competitive enough to warrant narrowly focused industrial policy. Instead, the analysis shows that Rhode Island's intricate webs of smaller interconnected industries, when aligned with core competencies, add up to a finite set of legitimate broader growth opportunities.

## 3. To leverage its growth opportunities Rhode Island should pursue a focused strategy of investing in the most critical advanced industries growth drivers while improving its statewide platform for growth

Ultimately, "Rhode Island Innovates" calls on the state to embrace three growth initiatives: "Rhode Island Innovates," "Rhode Island Competes," and "Rhode Island Acts." The prioritization of these themes reflects, first, the central importance of strengthening the state's advanced industries, and second, the need to shore up the broad platform for growth on which all firms and industries rely.

Along these lines, Chapter 4 of the report asserts that a relatively short list of crosscutting sources of competitive advantage matters inordinately to Rhode Island's future.

In the foreground are three critical **competitiveness drivers** that lie at the center of any state's growth platform, especially when it comes to its advanced industry base. These drivers include the state's *innovation capacity*, or its ability to generate new products, services, processes, and ways of managing; its *quality of place*, or the unique set of physical and human qualities that define the state's locales and make them attractive; and its *talent and skills*, or the collective value of the knowledge, competencies, and know-how of its workforce. Supporting these competitiveness drivers are crosscutting **supporting**

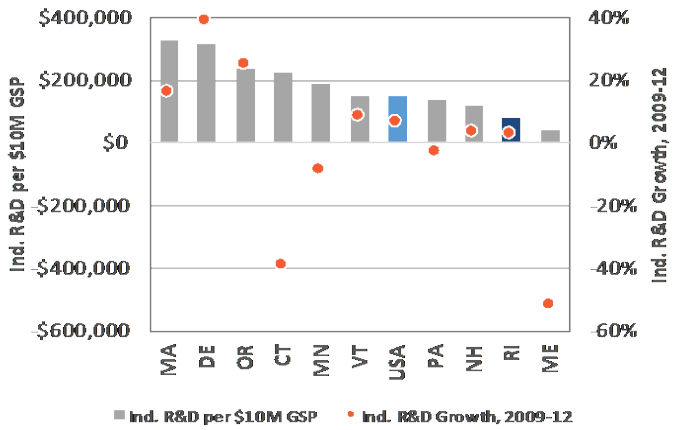
**platforms**, none more salient in Rhode Island than the state's *business environment* and its governance, especially its *business-led civic engagement*.

In keeping with that framework, a multi-state benchmarking of Rhode Island's capacity for economic growth across key platform dimensions yields a mixed picture of the state's growth capacity:

- On the key **drivers of advanced industry competitiveness:**
    - The state's **innovation capacity** is anchored by its solid university research base and the presence of the Naval Undersea Warfare Center (NUWC). However, these assets' impact is undercut by a paucity of industry-sponsored research and weak commercialization activities
    - The state's **quality of place** is alluring and increasingly well-known, and includes not just the shoreline and historic charm but distinctive cities and towns, vibrant food and art scenes, and an increasing "coolness factor." However, the innovation community remains atomized and lacks the focal points, collaboration spaces, and state-of-the-art "innovation districts" and neighborhoods that are needed to retain and attract talent
    - Although the **talent and skills** of Rhode Island's workforce are competitive, especially at higher levels of education, demographic and education/training system challenges raise questions about whether the state will be able to keep up with the rising demand for the skilled STEM/STEAM workers that drive advanced industry growth

**Rhode Island lags the nation and peer states in industry research and development relative to the size of its economy**

**Industry R&D expenditures per $10 million of gross state product, 2012 and growth from 2009-2012**




Source: National Science Foundation BRDIS, 2013

- On the **supporting platforms for growth:**
    - Recent tax and regulatory progress has begun to send positive signals about the state's **business environment** inside and outside the state but a heavy overhang of burdensome provisions continues to earn the state negative ratings on national assessments. At the same time, a shortage of large development ready land parcels and suboptimal rail service may be preventing Rhode Island from taking full advantage of regional growth opportunities

  - Although the state's multiple small-scale business and civic organizations (and several strong chambers) reflects a degree of **business-led civic engagement** it is not paired with the presence of a central high-powered CEO organization that can mobilize money and organize at a decisive scale

Turning to strategy, Chapter 5 of the report concludes that the realities depicted in the situational analysis argue for the state to embrace a multi-dimensional set of linked initiatives and action steps aimed at systematically upgrading the state's growth platform. Specifically, the state and its business and civic partners should:

- **Launch a Rhode Island Innovates initiative** to invest in the state's innovation capacity, quality of place, and skilled workforce. This three-pronged initiative should:
  - Invest to spur technology innovation through: targeted faculty recruitment; grant support for proof-of-concept testing; a Rhode Island Global Innovation Challenge accelerator program; and a Rhode Island Entrepreneurs in Residence program that could attract and retain foreign entrepreneurs who would be enabled to set up and grow their companies in Rhode Island
  - Strengthen several innovation districts or neighborhoods around the state by developing several place-based industry-university-laboratory collaboration centers and engaging in strategic placemaking that will enhance their status as focal points for idea exchange and talent attraction and retention
  - Complement a strong statewide PK20 STEAM education and training agenda with RI Codes—a coding initiative to prepare more Rhode Islanders for careers in tech
- **Launch a Rhode Island Competes initiative to** upgrade the state's business environment. Key moves would:
  - "Plus up" the state's underperforming R&D tax credit; reform the unemployment insurance payroll tax; modernize the state's permitting regulations and processes; take Rhode Island's e-permitting initiative statewide; reform occupational licensing requirements; and reduce or eliminate the restrictions of the state's non-compete rules
  - Expand state-wide land-assembly and site-preparation
  - Improve Rhode Island's rail connections by targeting new subsidies and spearheading the development of a new app-based "Rhody Pass" ticket option
- **Launch a Rhode Island Acts initiative to increase the state's capacity for business-led civic engagement** by establishing a business-led Partnership for Rhode Island to facilitate strategic action among private-, civic-, and public-sector leaders

## STRATEGIES AND ACTIONS FOR ADVANCING RHODE ISLAND'S ECONOMY

# Rhode Island Innovates

## Rhode Island Innovates

| $ = Low cost: < $1m/yr | $$ = Moderate cost: $1 m - $5 m/yr | $$$ = High cost: $10m +/yr |
|---|---|---|

### Launch a multi-dimensional initiative to spur Rhode Island technology innovation

| | |
|---|---|
| Recruit and support impact faculty at Rhode Island universities | $$$ |
| Support proof-of-concept grants for new advanced-industry products | $ |
| Prioritize matching funds for industry-university technology development | No budget implications |
| Support a Rhode Island Global Innovation Challenge | $$ |
| Create a Rhode Island Entrepreneurs in Residence Program | $$ |

### Strengthen several innovation districts or neighborhoods around the state by targeting them for place-based technology collaboration centers and strategic placemaking

| | |
|---|---|
| Create one or two industry-university-laboratory tech collaboration centers | $$$ |
| Offer priority access to collaborative innovation centers to a range of state innovation programs | No budget implications |
| Targeted Rhode Island Innovates! place-based tax incentives | $$ |
| Incorporate placemaking into the planning of major innovation districts or neighborhoods | No budget implications |
| Bolster Main Street RI program to support enhanced placemaking | $$ |
| Ensure state marketing targets young professionals and brands "hipness," especially with regard to food and design | No budget implications |
| Partner to deliver "pop-up" urbanism | $ |
| Establish a state-level New Urban Mechanics (NUM) team | $ |

## Complement a strong statewide STEAM education and training agenda with RI Codes—a coding initiative to prepare more Rhode Islanders for careers in tech

| | |
|---|---|
| Designate a STEAM Champion | $ |
| Roll out a large-scale statewide marketing campaign | $ - $$ |
| Invest in ongoing, high-quality professional development by bringing UTeach to URI and/or Rhode Island College | $ |
| Establish a STEAM Workforce Challenge grant program | $$ |
| Scale up Wavemaker | $$ |
| Provide free access to online learning platforms like Treehouse, Thinkful, or Bloc to teach coding skills | $$ |
| Make short-term tech training available at CCRI | Negligible funding required (administrative support) |
| Expand LaunchCode's Partnership for Real IT Jobs to help firms create tech apprenticeships that lead to promising jobs | $ |
| Create an RI Diversity Initiative to cultivate a more diverse tech workforce | $ |
| Incorporate computer science into the P-12 curriculum | Negligible funding required |
| Encourage more students to sit for the Advanced Placement computer science exam | $ |

# Rhode Island Competes

## Continue improving the state's suboptimal tax and regulatory structures

| | |
|---|---|
| "Plus up" Rhode Island's underperforming R&D tax credit by raising the cap on deductions and making the credit refundable | $$ |
| Reform the unemployment insurance payroll tax by reducing its incidence on young firms | Revenue neutral |
| Create the nation's first-ever "A-Corp" corporate designation | $$ |
| Modernize permitting regulations and processes to make it easier for businesses to start and grow | No budget implications |

| | |
|---|---|
| Take Rhode Island's e-permitting initiative statewide to cover all municipalities and permit types | $$ |
| Reform occupational licensing requirements to make them competitive with neighboring and peer states | No budget implications |
| Reduce or eliminate restrictions of the state's non-compete agreements | No budget implications |

## Build on success to create a statewide land assembly and site management body

| | |
|---|---|
| Assemble and prepare more pad-ready commercial-industrial building sites | $$$ |

## Improve Rhode Island's rail connections to Boston and beyond to strengthen regional economic links

| | |
|---|---|
| Target new rail subsidies and spearhead the development of a new app-based "Rhody Pass" ticket option | $$ |
| Establish new express commuter rail service between Providence and Boston and expand intercity rail service | $$$ |
| Drive new station improvements and transit hub developments, highlighted by a new Pawtucket/Central Falls commuter rail station | $$$ |

# Rhode Island Acts

## Develop a Partnership for Rhode Island

| | |
|---|---|
| Establish a Partnership for Rhode Island to facilitate strategic action among private, civic, and public sector leaders | No budget implications |
| Create a small implementation unit to oversee implementation of the new strategy | $ |

* * *

A few final notes are in order: First, although no formal cost-benefit analysis has been carried out for "Rhode Island Innovates" given the difficulty of extrapolating **impacts and outcomes** for the sorts of recommendations advanced here, extremely conservative assessments suggest that implementation of these actions could appreciably accelerate output and job growth over time—perhaps enough to move the state up a quintile or more in the state growth rankings. In any event, the study team believes that the significant government, private, and philanthropic investments advanced here are justified by the need for urgent action at scale and, if implemented successfully, could energize the state.

Second, it should be stated that while each of the initiatives and action steps advanced here could add value in isolation, the array of items presented is intended as a comprehensive **package**. Significant economic literature suggests that the impact of the various actions will be multiplied by the kinds of synergies and spillovers that occur in dense local economies and between, especially, innovation, place, and talent dynamics.

Finally, it should be observed that while the report recommends significant state-government outlays, it more notably proposes a new degree of **partnership** across the public, private, civic, and philanthropic sectors. Quite simply, the nature and scale of the economic challenges facing Rhode Island—intensive global competition; an unreliable national government; persistent budgetary stress; and the need to invest continuously in innovation, quality places, and skills development—require a new kind of collaborative governance that brings together the private, public, and civic sectors. No one sector has the capacity or expertise to design, finance, execute, and sustain the kinds of initiatives with the potential to set the state onto a more prosperous trajectory. Instead, all sectors will need to engage in coordinated ways:

- **State government,** in partnership with the private sector, local intermediaries, and third-party experts, should lead on several initiatives including: innovation activities such as the design of competitions for the industry-university-laboratory tech collaboration centers; STEAM and coding initiatives; and business environment reforms related to tax, regulatory affairs, land development, and rail

- The **private sector** can lead and/or contribute on multiple fronts, including by helping provide resources for impact faculty and create a Global Innovation Challenge and Rhode Island Entrepreneurs in Residence Program; supporting STEAM and coding initiatives, several of which will be delivered by private intermediaries; and helping mobilize business community support for key initiatives

- **Philanthropy and the civic sector** should also lead and/or contribute on multiple fronts, including the recruitment and support of impact faculty; the support of placemaking activities and "pop-up urbanism"; and in the testing and scale-up of critical STEAM and coding initiatives

In short, "Rhode Island Innovates" envisions state government more as a catalyst and leader of co-developed problem-solving than as the sole owner of all actions. Granted, such co-development of bold solutions will be a challenge to an often-splintered state. However, in the end, the strategies and action

steps proposed here are challenging but warranted. Strong actions will be necessary to locate large new sources of growth in the state, just as they were when Moses Brown and Samuel Slater triggered the state's shift from farm to factory.

Certainly the task is large, but the fact remains that Rhode Island has done it before.

## About Battelle

Battelle is the world's largest nonprofit independent research and development organization, providing innovative solutions to the world's most pressing needs through its four global businesses: Laboratory Management, National Security, Energy, Environment and Material Sciences, and Health and Life Sciences. It advances scientific discovery and application by conducting approximately $5 billion in global R&D annually through contract research, laboratory management and technology commercialization. Battelle's Technology Partnership Practice (TPP) assists local, state, and regional organizations, universities, nonprofit technology organizations, and others in designing, implementing, and assessing technology-based economic development programs.

## About TEConomy Partners, LLC.

In late 2015, TEConomy Partners, LLC. was formed as an independent company, transitioning the complete staff and capabilities of the Technology Partnership Practice (TPP) from Battelle Memorial Institute. In 1990, Battelle formed TPP to serve state and local organizations, universities, non-profit technology organizations, industry and professional associations, and others in the assessment, design, and implementation of research and technology programs. Over time, the practice evolved into a full service assessment and strategy group in innovation-based economic development. Today, that practice is TEConomy Partners, LLC.

## About the Metropolitan Policy Program at the Brookings Institution

The Brookings Institution is a private nonprofit organization devoted to independent research and innovative policy solutions. For nearly a century, Brookings has analyzed current and emerging issues and produced new ideas that matter - for the nation and the world.

At the Metropolitan Policy Program (Metro Program), our mission is to deliver research and solutions that help inform cities and metropolitan areas in order to build an advanced economy that works for all. We embrace an affirmative vision of what is possible in everything we do, exemplifying Brookings's values of quality, independence, and impact. As the Metro Program prepares to enter its third decade, we are providing leaders in our cities and metro areas the tools they need to foster a vibrant economy. These tools include:

- Empirical research. We help leaders in cities and metropolitan areas understand their economies by revealing key drivers of economic growth and prosperity.

- Practical solutions. We work closely with city and metropolitan leaders to translate our research into new insights that lead to practical solutions that can be adapted and scaled nationally and internationally.
- Public- and private-sector reforms. We inform federal and state governments and private-sector firms and philanthropies of smart policy reforms
- Innovative networks. We convene city and metropolitan leaders who work together to solve problems, learn the latest innovations, and advocate for national change.

## About Monitor Deloitte

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