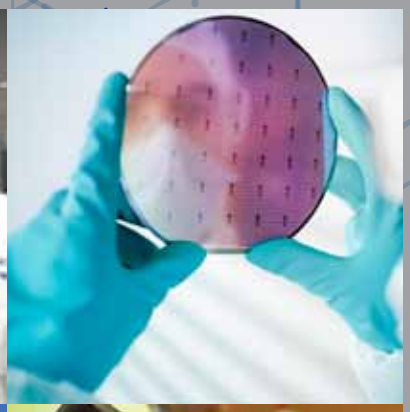


CRACKING THE CODE ON STEM

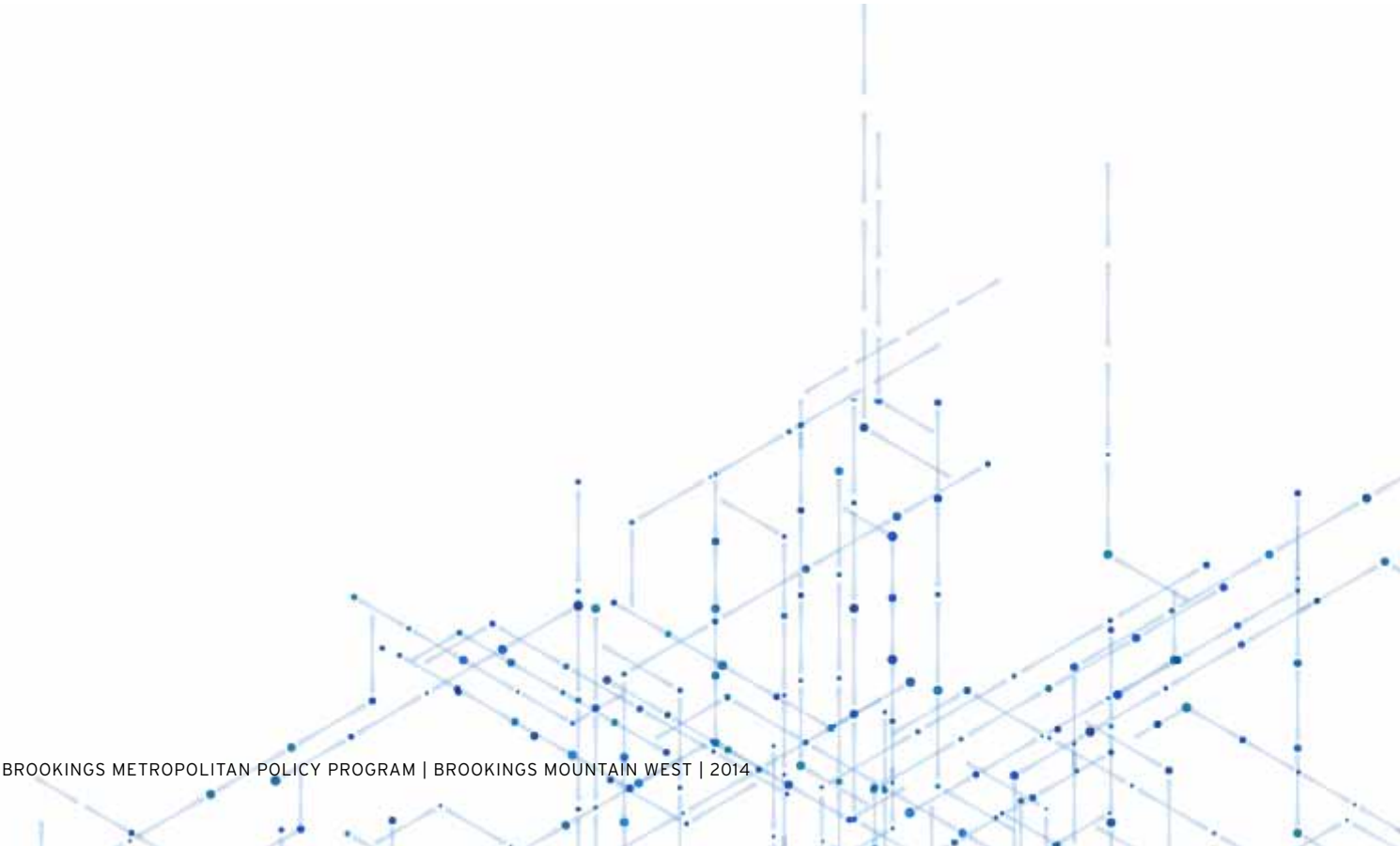
A People Strategy for Nevada's Economy

SCIENCE
TECHNOLOGY
ENGINEERING
MATH

CRACKING THE CODE ON STEM

A People Strategy for Nevada's Economy

BY JESSICA A. LEE, MARK MURO, JONATHAN ROTHWELL, SCOTT ANDES, AND SIDDHARTH KULKARNI



BROOKINGS METROPOLITAN POLICY PROGRAM | BROOKINGS MOUNTAIN WEST | 2014

Executive Summary

Nevada has in place a plausible economic diversification strategy—and it's beginning to work. Now, the state and its regions need to craft a people strategy.

Specifically, the state needs to boost the number of Nevadans who possess at least some postsecondary training in the fields of science, technology, engineering, or math—the so-called "STEM" disciplines (to which some leaders add arts and design to make it "STEAM").

The moment is urgent—and only heightened by the projected worker needs of Tesla Motors' planned "gigafactory" for lithium-ion batteries in Storey County.

Even before the recent Tesla commitment, a number of the more high-tech industry sectors targeted by the state's new economic diversification strategy had begun to deliver significant growth. Most notable in fast-growing sectors like Business IT Ecosystems (as defined by the Governor's Office for Economic Development) and large sectors like Health and Medical Services, this growth has begun to increase the demand in Nevada for workers with at least a modicum of postsecondary training in one or more STEM discipline.

However, there is a problem. Even though many available opportunities require no more than the right community college certificate, insufficient numbers of Nevadans have pursued even a little STEM training. As a result, too few Nevadans are ready to participate in the state's emerging STEM economy. The upshot: Without concerted action to prepare more Nevadans for jobs in STEM-intensive fields, skills shortages could limit growth in the state's most promising target industries and Nevadans could miss out on employment that offers superior paths to opportunity and advancement.

Which is the challenge this report addresses: Aimed at focusing the state at a critical moment, this analysis speaks to Nevada's STEM challenge by providing a new assessment of Nevada's STEM economy and labor market as well as a review of actions that leaders throughout the state—whether in the public, private, civic, or philanthropic sectors—can take to develop a workforce capable of supporting continued growth through economic diversification.

Accordingly, this report draws three conclusions:

1. Growth in some of Nevada's more STEM-oriented target sectors—such as Business IT Ecosystems and Health and Medical Services—is beginning to challenge the state's ability to deliver an adequate supply of both blue collar and professional STEM workers.

In this regard, growth patterns across the state's nine target sectors affirm the state's decision to adopt a structured economic diversification strategy. At the same time, they

also highlight the growing importance of STEM-oriented industries and the increasing need for workers prepared for employment in these sectors.

Most notably, significant growth in a number of the state's target sectors is already ratcheting up the state's demand for both professional and middle-skill STEM-trained employees. Specifically, the frequently long duration of online postings of STEM-oriented job openings shows that the sharpening demand for STEM workers—combined with the relatively limited number of STEM-trained workers in Nevada—is beginning to create supply-side pinch points that could slow future growth.

Nevada's Business IT Ecosystems and Health and Medical Services sectors epitomize the opportunities and challenges. While 70 percent of job openings in these two sectors require STEM knowledge, less than half require a four-year degree (though the most in-demand positions in IT do tend to require one). And yet job posting data reveal that open positions take longer to fill in these two industries than in others, which suggests that employers are keen to hire but struggle to find qualified workers. Many IT and health sector job openings remain posted for a month or more, whether at the four-year or two-year training level.

This is important because Nevada's emerging STEM economy is larger and more important than may be appreciated. Using Brookings' definition of STEM, which encompasses both blue-collar STEM occupations for which sub-baccalaureate training is sufficient as well as professional occupations requiring a four-year degree or more, analysis shows that as of 2013 170,200 jobs in Nevada—a full 15 percent of all jobs in the state—require a high level of knowledge in at least one STEM field.

What is more, STEM jobs pay a substantial wage premium at all levels. Individuals with four-year degrees working in STEM occupations within the state's target industries earn on average almost $77,000 per year, compared to roughly $51,800 for similarly educated workers in non-STEM jobs in the same industries—a premium of nearly 50 percent. For those with just some college or an associate degree, the STEM wage premium is even higher, reaching 60 percent.

2. A number of significant challenges threaten to undercut the state's ability to cultivate the STEM-skilled workforce needed to advance Nevada's economic diversification.

Nevadans are beginning to recognize the shortcomings of the state's STEM education and workforce systems and respond to them. However, despite these often-impressive efforts, at least three challenges currently hobble the state's ability to deliver the strongest possible STEM workforce:

- ***Nevada lacks a cohesive, forceful vision for its STEM economy and the STEM-oriented workforce needed to achieve the state's economic goals.*** Nevada's STEM approach, like that of many other states, remains diffuse and low-profile. The state has not yet taken strong steps to articulate the importance of STEM education and STEM-intensive industries to Nevadans' future prosperity. And notwithstanding the many individually promising STEM initiatives that have been undertaken to date, the state has yet to coordinate and scale these activities.
- ***Nevada's education and workforce training systems are inconsistently aligned with the current and future needs of the state's STEM industries.*** Despite job growth that has begun to surface in STEM-intensive target industries such as Business IT Ecosystems and Health and Medical Services, the state's education and training ecosystems are not yet fully aligned with the state's economic goals. As a result, Nevada is struggling to maximize the impact of its efforts to produce competent, technically oriented workers.
- ***A STEM proficiency crisis affects all aspects of the state's education system.*** Threatening to subvert all other efforts, student outcomes at Nevada's educational institutions reflect a system in crisis that extends well beyond the realm of STEM education. Nevada's Pre-K through 12 (P-12) education system struggles to deliver basic STEM education—a fact that jeopardizes the state's ability to seize opportunities held out by its emerging STEM economy.

3. Nevada needs to create a people strategy to complement its economic strategy.

Economic diversification, in short, demands a new human capital approach. Where a forceful pro-STEM vision and strategy is missing, one needs to be put in place. To the extent that the state's STEM activities and actors are not now aligned, they should be aligned. And to the extent that a massive STEM proficiency crisis threatens to preclude real progress, its root causes must be addressed.

Along these lines, the state's public sector should work with other actors to **build a system for STEM education and training**. Meanwhile, civic entrepreneurs need to **change the dynamic in Nevada's regions** to promote STEM skills-building. (More detailed accounts of key recommendations summarized here can be found at www.brookings.edu/research/reports/2014/11/12-nevada-stem-economy).

The Public Sector: Build a System

The public sector—working closely with business, civic, and philanthropic stakeholders—needs to do more to integrate the state's diffuse set of STEM education and training activities. To that end, the three major deficits of the state's current STEM activities—lack of a strong vision, shaky alignment of programming with state economic goals, and a persistent STEM proficiency crisis—each call for specific responses. See page 6 for a complete list of actions that the public sector can take to address these three major challenges.

Among the many actions needed to build a strong system for STEM education and training, the public sector should:

- Deploy the governor's bully pulpit
- Appoint a dedicated STEM Champion in the governor's office and reconstitute the STEM Advisory Council to support the STEM Champion's work
- Create a P-12 STEM competitive grant program to support the creation and replication of effective STEM education strategies throughout the state
- Strengthen or recast industry sector councils to better deliver industry-led skills intelligence and inform workforce training efforts
- Establish a STEM workforce challenge grant competition to support industry-led workforce training initiatives
- Incorporate computer science into the P-12 curriculum
- Support high-quality, ongoing professional development for P-12 STEM educators
- Implement proven approaches to postsecondary remediation that speed students' time to degree

Civic Entrepreneurs: Change the Dynamic

Nevada's impressive network of business, civic, and philanthropic leaders also need to mobilize to strengthen the state's STEM economy. After all, Nevada's civic entrepreneurs can bring to bear tremendous initiative, clout, resources, energy, and expertise to the work of advancing STEM training and education in the state.

These leaders also have a major role to play in setting out a vision for STEM, aligning actors and activities, and fostering greater STEM proficiency among Nevada students. See page 7 for a full list of recommendations on how civic entrepreneurs can advance these three goals.

Of the many activities required to bring about this level of change, the civic sector should:

- Develop and fund a powerful statewide STEM marketing campaign
- Support promising applicants to the proposed P-12 STEM education and STEM workforce challenge grant competitions
- Create RDA-led regional STEM internship programs
- Support high-quality, ongoing professional development for P-12 STEM educators
- Recruit best-in-class charter management organizations (CMOs) to radically increase the number of charter schools in the state
- Encourage "blue sky" thinking in STEM education

* * *

Highly distilled and broad-ranging, these recommendations represent the beginning of a STEM training and education agenda for Nevada.

By taking actions like these, Nevada can put in place a people strategy to match its economic strategy—and so link more Nevadans to a more prosperous, technically oriented future. ■

Strategies for Expanding Opportunity and Growth in Nevada's STEM Economy

PUBLIC SECTOR AGENDA

$ = Little to no cost $$ = Low cost $$$ = Moderate cost $$$$ = Higher cost

SET A VISION	
Deploy the governor's bully pulpit	**$**
Appoint a dedicated STEM champion in the governor's office	**$$**
Reconstitute the Nevada STEM Advisory Council	**$**
Craft clear guidelines for effective STEM education programs	**$**
Create a P-12 STEM competitive grant program	**$$$$**
PURSUE ALIGNMENT	
Make industry sector councils more valuable forums for industry-led workforce training	**$**
Enhance the exchange of market information within the sector councils	**$**
Establish a competitive STEM workforce alignment challenge	**$$$$**
Update the public state college governance model	**$$-$$$**
ESTABLISH PROFICIENCY	
Incorporate computer science into the P-12 core curriculum	**$$-$$$**
Repurpose the computer literacy graduation requirement as a computer science requirement	**$$-$$$**
Expand funding for high-quality STEM-related professional development	**$$$-$$$$**
Expand UNR's Principals' STEM Academy into an Administrators' STEM Academy	**$$-$$$**
Create and fund a public charter school strategic growth fund	**$$$$**
Encourage student excitement about STEM and the careers available to those with STEM knowledge	**$-$$**
Design and implement STEM outreach efforts that are accessible to all students	**$$**
Develop a high-impact web portal to raise student awareness of STEM career pathways	**$$**
Implement proven approaches to postsecondary remediation that speed students' time to degree	**$$-$$$**

Strategies for Expanding Opportunity and Growth in Nevada's STEM Economy

CIVIC SECTOR AGENDA

$ = Little to no cost $$ = Low cost $$$ = Moderate cost $$$$ = Higher cost

SET A VISION	
Join the governor in speaking out on the importance of STEM education and training	**$**
Develop a powerful statewide STEM marketing campaign	**$$$-$$$$**
Pledge matching funds for promising applicants to the proposed P-12 STEM competitive grant program	**$$-$$$**
Create regional competitive grant programs to support P-12 STEM education	**$$$-$$$$**
PURSUE ALIGNMENT	
Participate in the sector councils	**$**
Engage in any STEM workforce challenge grant competitions	**$$$**
Seek out opportunities to shape STEM programs	**$-$$**
Expand student access to work-based learning opportunities	**$$-$$$**
Develop a regional STEM internship program	**$$$**
ESTABLISH PROFICIENCY	
Reinforce the connection between the CCSS and NGSS and the state's economic health	**$**
Provide vocal and material support for P-12 computer science education	**$$-$$$$**
Support high-quality, ongoing professional development for P-12 STEM teachers	**$$$-$$$$**
Provide signing and retention bonuses for hard-to-fill positions at high-need schools	**$$$-$$$$**
Help identify, implement, fund, and scale up strong STEM approaches and practices	**$-$$$$**
Recruit best-in-class charter management organizations into the state	**$$$$**
Create a regional charter school incubator	**$$$$**
Encourage "blue sky" thinking in STEM education	**$$-$$$$**
Host field trips and visit classrooms	**$-$$**

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About the Metropolitan Policy Program at the Brookings Institution

Created in 1996, the Brookings Institution's Metropolitan Policy Program provides decision makers with cutting-edge research and policy ideas for improving the health and prosperity of cities and metropolitan areas including their component cities, suburbs, and rural areas. To learn more visit: www.brookings.edu/metro.

About Brookings Mountain West

Established in 2009 as a partnership between the Brookings Institution and the University of Nevada, Las Vegas (UNLV), Brookings Mountain West (BMW) seeks to bring high-quality independent and influential public policy research to the critical issues facing the dynamic metropolitan areas of the Mountain West region. In this, the new initiative builds upon the work of Brookings' Metropolitan Policy Program, which focuses on helping metropolitan areas like Las Vegas grow in robust, inclusive, and sustainable ways through attention to the fundamental drivers of prosperity such as innovation, infrastructure, human capital, and quality of place, as well as regional governance. Along those lines, BMW, along with partners throughout the Mountain West, takes a deep interest in such areas as infrastructure improvement, economic growth, demographic change, environmental impact, alternative energy, and real estate investment.

As the Mountain West emerges as a new American Heartland, it will play an increasingly significant role in shaping national policy discussions. BMW provides a forum for this dialogue and offers knowledge-based policy solutions to help improve the quality of life in the West. Learn more at http://brookingsmtnwest.unlv.edu.

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