VELOCITY
A BLUEPRINT FOR TRANSFORMING GREATER PHOENIX INTO AN INNOVATION ECONOMY

EXECUTIVE SUMMARY

METROPOLITAN BUSINESS PLAN
Velocity: A Blueprint for Transforming Greater Phoenix into an Innovation Economy represents a major milestone for the Greater Phoenix region, an unprecedented collaboration among business, civic and university leaders and elected officials convinced that our region must become a global innovation leader to ensure a strong economy for the long term.

It puts forward an ambitious plan to accelerate the transformation of the Greater Phoenix economy into a global force for innovation and technology by 2025 and welcomes engagement from throughout the region to help get the job done.

Beginning in 2013 the leaders of Velocity undertook an extensive and rigorous analysis of the economy, in partnership with The Brookings Institution Metropolitan Policy Program; RW Ventures of Chicago; and Stanford Research Institute International, a globally recognized research and commercialization firm.

The Blueprint’s recommendations for action emerged from the shared realization that metropolitan regions—not individual cities—are the economic engines of the new economy. The communities that make up the Greater Phoenix region will sink or swim together as we compete in a global economy.

The Velocity steering committee and all of its partners invite you to embrace our shared vision. It will take all of us—elected officials, business and education leaders, entrepreneurs, nonprofit organizations, and individual citizens—to secure a more prosperous future. We ask you to join us to accelerate this transformation and commit to creating a brighter future for Greater Phoenix, our children and future generations.
Decades of impressive growth have distinguished Greater Phoenix among major U.S. metropolitan areas and produced what is today the 15th largest regional economy in the United States. But the devastating impact of the Great Recession exposed areas of vulnerability and left the region with a choice:

- Continue on the current path of consumption-driven growth and accept the low wages and cyclical volatility that go with it, or
- Accelerate the region’s transformation for the new economy, charting a course to deliver better jobs and opportunity.

To pivot to that new direction, public and private sector leaders have come together to launch Velocity, a plan tailored to build on the unique strengths, assets, and talent already embedded in the Greater Phoenix economy.

Anchored in a comprehensive market analysis, Velocity’s **Blueprint for Transforming Greater Phoenix into an Innovation Economy** outlines strategies to ramp up the region’s capacity for technology development, grow the skills of its workforce, boost export trade, and enhance support for entrepreneurs and new firms.

Velocity unites mayors and elected officials from across the region who, together with business and education leaders, seek to reduce competition among its cities and increase regional cooperation, applying the discipline of private-sector business planning to the task of expanding opportunity and prosperity.

The future of Greater Phoenix and the state of Arizona depends on its success. The counties, cities, and towns that make up the Greater Phoenix region...
are home to 4.3 million people—more than two-thirds of both the state’s population and its job base. The region’s $176 billion annual economic output accounts for 76 percent of the state total.

Despite the region’s long-established advanced industry strengths, for nearly two decades Greater Phoenix has relied on population growth to drive economic growth, competing primarily on the low cost of labor, land, and taxes. Housing and real estate, retail trades, construction, and local services dominated its growth until the recession of 2008, when the region lost more than 300,000 jobs.

The recovery since then has been slow, thin, and rooted in the same dynamics that have degraded the economy since the late 1980s. As the global economy increasingly demands knowledge-based, innovation-driven industries and productivity, Greater Phoenix faces challenges in its industry portfolio and employment base. While jobs in advanced industries have grown 43 percent since the mid-1980s, consumption industry employment in hospitality, retail, construction, and real estate increased 93 percent.

On average, jobs in consumption industries pay only $31,636 annually, compared to $76,677 in advanced industries. In the late 1980s, per capita income in Greater Phoenix fell below the national average for the first time and has declined since. With a median household income of $51,359 in 2012, earnings trail behind most other large metropolitan areas in the United States, and the region’s 17.4 percent poverty rate places it among the highest.

Today, Greater Phoenix is regaining economic momentum, but the fastest-growing occupations require only low skills and pay low wages. Since the recession, employment in consumption industries has recovered and continues to expand, while jobs in advanced industries remain below 2001 levels.

Yet, Greater Phoenix possesses the assets to fuel its transformation for the next economy, with a strong industrial base, emerging technology sectors, and an entrepreneurial culture as the foundation for an advanced economy and promising future.
THE GREATER PHOENIX REGION OUTPERFORMS THE NATION ON KEY MEASURES BUT LAGS ON PRODUCTIVITY AND INCOME GROWTH

1. CHANGE IN ECONOMIC OUTPUT, 2000 TO 2013 compared to national average

2. CHANGE IN EMPLOYMENT, 2000 TO 2013 compared to national average

3. CHANGE IN OUTPUT PER WORKER, 2000 TO 2013 compared to national average

4. CHANGE IN MEDIAN HOUSEHOLD INCOME, 1999 TO 2012 compared to national average

Source: Brookings and Greater Phoenix Economic Council analysis of Moody’s Analytics, U.S. Census, and American Community Survey data
To break from the current growth model, Greater Phoenix must embrace the fundamental transformation underway in the global economy, where knowledge assets centered in people and technology concentrate and drive higher productivity in metropolitan areas.

The acceleration of technology, innovation, and globalization is changing the dynamics of productivity and economic growth around the world. Market dynamics are more fluid and geared to reward continuous innovation in products, technology, production techniques, and business models.

The global economy also is evolving rapidly toward even greater integration, with goods, services, talent, capital, and supplier relationships seamlessly crossing national boundaries. Metropolitan regions have emerged as the vital hubs of these activities, the engines of the new economy.

This more dynamic environment demands a new approach to economic development anchored in a deep understanding of the region’s market strengths and weaknesses and focused on strategies designed to leverage those strengths by fostering a culture of collaboration between public and private sector leaders.

Regions with the greatest capacity to understand this confluence of forces, think strategically, act globally, and build on their assets will forge ahead in this new environment. Those that do not will fall further behind.
A region grows by consistently improving its production capacities and enhancing the productivity of firms and industries and their standing in the global marketplace. The region’s ability to accomplish this depends on five critical factors that are mutually reinforcing:

- the region’s “clusters,” or concentrations of related firms and industrial specializations
- the talent and skills of its people
- its capacity for innovation and the environment for entrepreneurs
- the quality of its infrastructure and built environment; and
- the quality of government and networks of civic leadership

In a metropolitan economy, all people and all parts of the region are inextricably linked as well. Regions that develop more of their total human capital and talent, including every socio-demographic and ethnic group, and effectively deploy their land and production assets, do better in the long run than those that do not. Inclusive growth is good for the region and good for business.

The Blueprint for Transforming Greater Phoenix into an Innovation Economy emerged from rigorous analysis that drew on the insights of partners and stakeholders across the region and builds on significant work already underway to strengthen its education capacity, entrepreneurial culture, research base, and other assets.

In partnership with the University of Arizona and Arizona State University, Velocity engaged SRI International for an assessment of the region’s global position in the innovation economy and for assistance in identifying market opportunities, and developing strategies and initiatives to strengthen its position and accelerate its transformation. The full market assessment and analysis behind Velocity can be found at: www.DiscoverVelocity.com.
**KEY FINDINGS**

**1 GREATER PHOENIX HAS WELL-DEFINED ECONOMIC ADVANTAGES IN ELECTRONICS AND OTHER ADVANCED INDUSTRIES THAT, WITH A MAJOR INVESTMENT IN INNOVATION, CAN ENHANCE ITS COMPETITIVE POSITION.**

A strong base of advanced industries related to semiconductors and electronics, navigational instruments and sensors, and aerospace and defense form the foundation of the production economy in Greater Phoenix. In fact, many of the region’s strongest industrial assets arise from a core competency in electronics that cuts across several sectors.

That base has eroded over the last two decades. The region has not developed into a major hub for R&D and innovation in most of its advanced industry sectors, and, although they provide an important high-wage employment base, many of them are maturing.

Based on its analysis, SRI characterized the region as a “fast-follower” in technology development with its traditional strengths based predominantly on defense contracting and semiconductor manufacturing. A next generation of firms is also growing up, however, prompting SRI to characterize the region’s overall technology profile as a “hidden gem” that positions the region to accelerate its transformation for the next economy.

Advanced industries and traded sectors drive prosperity and create opportunity by drawing in new resources from other regions and around the world, which stimulates growth both directly and in other sectors, including those that primarily serve local markets.

Dramatic shifts are occurring in several sectors vital to Greater Phoenix. The region’s aerospace industry is downsizing, for example, but has strong potential to lead in a number of specialized fields including intelligence, surveillance, and reconnaissance; cyber technology and communications systems; precision instruments; and controls and electronics for aircraft, weapons systems, and satellites.

With federal investment in R&D on a downward spiral for almost a decade, both the region’s aerospace industry and its research base continue to be vulnerable to the global forces that are already reshaping its advanced industry base.

The semiconductor and electronics industries will undergo significant transformation as new applications are developed to embed sensors and processors into products in virtually every area, from new materials and manufacturing techniques to medical devices and other health care technologies, communications and clean energy.

All of those innovations hold major opportunities for Greater Phoenix and play to its strengths.

In global trade, Greater Phoenix remains one of the top regions in the country in terms of export value, but export growth has been low for a decade, and its ranking among U.S. regions in international trade has fallen from 11th in 2003 to 17th in 2012.

The region’s export strengths are concentrated in two high-value sectors—aerospace and semiconductors—that are highly susceptible to market fluctuations. To support those key industries and expand the region’s global presence, opportunities exist to grow exports in other sectors, including advanced services, materials, and high-value electronics.

In the midst of global restructuring and a resurgence of manufacturing, expanding and enhancing the region’s capacity to take advantage of opportunities in each of those areas will renew and protect its established production base and open new avenues for growth.
BECAUSE A SKILLED WORKFORCE FUELS THE KNOWLEDGE ECONOMY, GREATER PHOENIX MUST GENERATE MORE TALENT AND HIGHER SKILLS TO MEET THE DEMANDS OF AN INNOVATION ECONOMY.

Greater Phoenix has one of the fastest growing working-age populations in the country, increasing 19 percent from 2002 to 2012 to reach 4.3 million people, primarily as a result of in-migration. It also is comparatively young and increasingly diverse. While the median age in Greater Phoenix rose from 26.7 to 34.8 over the last four decades, it remains almost two and a half years lower than the nation, and ethnic and racial minority groups now make up 41 percent of the population.

Educational attainment has improved over the last decade but lags behind Greater Phoenix’s peer regions on most levels. More importantly, college attainment rates are lower among young adults than among older workers, a trend that creates both an opportunity and a threat for the region.

Over the last decade, the region lost ground on the high-skill jobs that pay higher wages, with a net decline of three thousand positions in its engineering workforce. Nearly 20 percent of the workforce is engaged in STEM occupations critical to the next economy, but that concentration is lower than in top technology regions. And most jobs being created even in STEM fields are in lower-skilled positions.

Although low-skill, low-wage jobs predominate, rising demand for more complex skills indicates that promising change is occurring in the regional labor market. Despite its young workforce, many of the region’s advanced industries rely on older workers; 25 percent of aerospace engineers, for example, are age 55 or older, and as many as half of the workers in some technical fields are approaching retirement.

Generational turnover will offer new opportunities for younger workers, many of whom are struggling to find a foothold in the new economy.

Producing the workforce Greater Phoenix needs to grow its advanced industry and technology base will require significantly elevating its efforts to improve STEM education, expanding and enhancing engineering capabilities, and taking deliberate steps to engage its young workforce in developing higher skills.
GREATER PHOENIX HAS A DYNAMIC ENTREPRENEURIAL CULTURE THAT GENERATES NEW STARTUPS BUT NEEDS TO ENHANCE ITS ECOSYSTEM TO GROW MORE FIRMS TO SCALE.

Greater Phoenix recently has ranked among the nation’s top regions for the concentration of technology startups and specialized IT firms taking root in the region.

Over the last decade, regional partners have knit together an impressive network of incubators, accelerators, and prototyping centers. Tallwave’s High Tide for Health Care IT competition and the Arizona Commerce Authority’s Innovation Challenge are examples of the support available to new innovation forces and entrepreneurs.

That dynamic entrepreneurial culture represents a key asset. Nevertheless, Greater Phoenix needs to address systemic weaknesses that persist and upgrade its overall capacity for innovation and growing new firms.

Networks of support thin out after the startup phase and particularly as companies grow to scale. Over the last decade, for example, national venture capitalists have invested less than 1 percent of their total outlays in Arizona firms, substantially below the level of investments in nearby regions.

In terms of research, while the region started from a comparatively low base in university R&D, relevant measures are trending up. But the region’s over dependence on federal funding creates an imperative to find new streams of support to grow its innovation capacity, particularly market-driven R&D linked to advanced industry.

NEW FORMS OF ECONOMIC PLACE MAKING, ALONG WITH 21ST CENTURY INFRASTRUCTURE AND GOVERNANCE, ARE NEEDED TO FOSTER AN ENVIRONMENT THAT CULTIVATES KNOWLEDGE INDUSTRIES.

Rapid suburban expansion over several decades has created a patchwork of major employment centers, urban areas, and residential suburbs that extend across the Greater Phoenix region. New forms of economic place making and infrastructure can enhance the region’s prospects for dynamic and inclusive growth.

Distinctive neighborhoods and areas tailored to technology firms and workers are emerging across the country, offering new models of development linked to transportation and urban infrastructure. Those approaches allow for the greater concentrations of workers and firms that support the flow of people, ideas, and knowledge critical to the innovation economy.

As a young region, Greater Phoenix is not as hampered by the multiple layers of government that stymie many regions. But unified action requires new forms of civic leadership and collaboration across a complex network of cities and counties—and overcoming the competition within the region that often drives economic development decisions. ■
A key objective of the *Blueprint for Transforming the Greater Phoenix Region into an Innovation Economy* is to move the region from the ranks of “fast followers” in technology into the league of “early adopters” by expanding its capacity for innovation to revitalize its core industry strengths. Pursuing that objective will generate new opportunities for firms of all sizes, while simultaneously building the skills and talent necessary to reposition the region.

The Blueprint is structured around three broad and far-reaching strategies designed to create synergy and momentum for next economy growth, better jobs, and greater prosperity.
STRATEGY 1:

CREATE WORLD-CLASS CAPACITY AND TALENT FOR CONTINUOUS INNOVATION IN NEXT GENERATION TECHNOLOGIES FOR ADVANCED INDUSTRIES AND EMERGING SECTORS.

The core challenge confronting Greater Phoenix is to move its advanced industries to center stage as the drivers of new economic growth and to demonstrate the region’s capacity to support high-potential technology firms as they scale up.

To carry out this strategy, the region will launch the Metro Innovation Initiative (MII), a multi-year collaboration between industry and the public sector to catalyze a sustained flow of technology and skills development in targeted advanced industries, with the goal of generating new opportunities for firms of all sizes and for workers. It will pioneer a systemic approach, creating a powerful engine and platform that will accelerate economic transformation.

Leveraging its advanced industry strengths, the region will seed development of new assets for technology development and commercialization, expanding its capacity for industry-led market-driven R&D, elevating its engineering capacity and talent pool, and growing skills and opportunities for workers at all levels.

Analysis conducted by SRI International identified potential technology target areas, including intelligent control systems, mobile energy management, active sensing and cyber-defense, healthcare devices and data, alternative energy management, materials manufacturing, and academic technologies. Further refinement of target technologies linked to the region’s industry strengths will occur as the business plan for the Metro Innovation Initiative is finalized.

Operating as a public-private partnership, the initiative will institutionalize a rigorous approach, driven by industry to ensure that it is grounded in market realities. It will catalyze strategic action on two major tracks:

Organize and support financially independent and sustainable industry consortiums focused on research and development in targeted technology domains.

The MII will develop a market-driven approach guided by industry to pursue groundbreaking work in emerging technologies tied to key regional specializations. Funded through co-investment, each industry consortium will design and support R&D directed at identified market needs in specific technology areas associated with advanced industries. Each will anchor a network of firms, industries, and universities from across the country and around the world with the goal to increase the diversity of the region’s economy, its job base, and prosperity. Their output will generate opportunities for firms of all sizes throughout the region and for entrepreneurs.
➤ Upgrade the region’s talent and skill base at all levels through an integrated approach designed to connect people to opportunities in advanced industry:

➤ Expand the level of engineering capacity and the supply of engineering talent in the region.

Elevate engineering programs at the region’s public universities to create world-class research and education focused on market opportunities in order to attract, train, and retain engineers and technical workers by accelerating university-industry partnerships and commercialization.

➤ Upgrade skills and open access to new opportunities.

Create a sector- and demand-driven approach that provides workers at all levels with the skills to take advantage of new opportunities, tailoring training to advanced industries and emerging technology firms, ensuring that the labor market works effectively to link workers with higher-wage jobs.

➤ Accelerate STEM education.

Implement a comprehensive approach to ensure that students in Greater Phoenix are inspired and prepared to join the innovation workforce through careers in STEM fields.

### Notable Technology Opportunities

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<thead>
<tr>
<th>Current Regional Strengths</th>
<th>Technology Opportunities</th>
<th>Global Market</th>
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<tbody>
<tr>
<td>Aerospace &amp; Defense</td>
<td>Active Sensing &amp; Cyber-defense; Intelligent Control Systems</td>
<td>$76.9 Billion by 2018-20 (Active Sensing)</td>
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<td></td>
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<td>$54.1 Billion by 2016-17 (Controls)</td>
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<tr>
<td>Electronics &amp; Instruments</td>
<td>Advanced Materials</td>
<td>$435.5 Billion by 2030 (Advanced Materials)</td>
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<tr>
<td>Mining, Materials &amp; Chemicals</td>
<td>Alternative Energy Deployment; Mobile Power Management</td>
<td>$640 Billion by 2030 (Capital Deployment of Renewable Energy)</td>
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<tr>
<td>Advanced Manufacturing</td>
<td>Academic Technology; Healthcare Device &amp; Data</td>
<td>$73.8 Billion by 2020 (Academic Technology)</td>
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<tr>
<td>Energy &amp; Environment</td>
<td></td>
<td>$302 Billion by 2017 (Medical Device)</td>
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<tr>
<td>IT, Telecom, Engineering, &amp; Research Services</td>
<td></td>
<td>$21.3 Billion by 2020 (Healthcare Analytics)</td>
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Sources: Lucintel, Forbes, Marketsandmarkets, Oxford Research, Bloomberg, GTM Research; SRI International analysis
STRATEGY 2:
ENHANCE THE INNOVATION ECOSYSTEM AND BUILT ENVIRONMENT FOR FIRMS TO START UP AND SCALE UP.

Building on assets developed over the last decade, the region will enhance its support for entrepreneurs, startups and emerging firms growing to scale. Its focus on technology development and commercialization will link young firms to market-driven R&D and the skilled workforce needed to turn research into marketable products and services.

Designing new approaches to urban development and investing in infrastructure tailored to the demands of the next economy will bolster the region as an environment for growing advanced industry and technology firms. Initial action on these fronts will:

➤ Develop more resources for early-stage firms. Pioneering approaches to technology development and commercialization will fill out the region’s entrepreneurial ecosystem, particularly for early-stage firms with high growth potential.

➤ Establish innovation districts and other new forms of development. Innovation districts and other development forms will foster the geographic concentrations of industries and firms, enhancing the region’s advantages for targeted specializations.

➤ Support investment in transportation and infrastructure for the 21st century. New modes of transportation and infrastructure improvements will facilitate the movement of people, goods, and ideas.

STRATEGY 3:
ESTABLISH GREATER PHOENIX AS A GLOBAL TRADE HUB BY CONNECTING INDUSTRIES AND ENTREPRENEURS TO GROWING MARKETS AND MAKING THE REGION A LOCATION OF CHOICE FOR GLOBAL INVESTORS.

Through participation in the Global Cities Initiative: a Joint Project of Brookings and JPMorgan Chase, Greater Phoenix is developing a comprehensive initiative to increase exports with a specific emphasis on expanding access to new markets for small- and medium-sized firms.

Tailored to the region’s industry and location strengths, a comprehensive plan for export growth will center on building up trading partnerships in North America and beyond, building on groundbreaking work already underway in the region and forming new collaborations to raise its profile in the world economy. It will aim to double the region’s export intensity, the share of gross regional product generated through exports, and position the region among the top 10 regions in the United States.
Velocity represents a signature effort to move Greater Phoenix onto a new economic footing and accelerate its transition to the next economy. It embodies a shared aspiration and a strong sense of urgency to improve economic opportunities for people and communities throughout the region.
Achieving its goals will require unprecedented collaboration and work across multiple sectors and partners, engaging leaders in the public and private sectors in a shared vision and commitment to stay the course for long-term change.

The public-private partnership behind Velocity is committed to implementation of the Blueprint for Transforming Greater Phoenix into an Innovation Economy, organizing action, and securing the substantial resources required.

Its leaders will ensure that the region takes bold but carefully calculated risks, responding with agility and flexibility to new opportunities and challenges. It will establish performance metrics and track progress, measuring impact on economic output in the region, job growth, wages, and productivity.

Already, a growing circle of partners in Velocity have come together to push the work forward, organizing plans for implementation under each strategy, beginning with full business planning for the Metro Innovation Initiative.

In partnership with the Maricopa County Education Services Agency, education leaders are developing plans to support the creation of a more robust STEM pipeline in the K-12 system. The Maricopa Community Colleges District has convened industry leaders, educational institutions and workforce organizations to explore closer alignment of technical education and training with advanced industries.

Arizona State University has engaged top-tier engineering leadership from across the country to develop an approach to expand its capacities and education programs to supply advanced industries with the right engineering talent and support.

Implementation of the Blueprint will require groundbreaking collaboration and support from many more partners across the region to pursue its high aspirations.

The steering committee that oversaw the development of the Blueprint will finalize initiatives under each of its strategies, with the first emphasis on implementing the Metro Innovation Initiative. It will move forward on successive waves of action, aligning and building on important activities already underway in the region and engaging new partners in this shared vision.

Its intention is to usher in a new way of doing business based on regional collaboration around the vision, creating a virtuous cycle of growth and innovation in targeted advanced industries for a more sustainable economy.
ACKNOWLEDGMENTS
Enormous gratitude is extended to leaders and organizations that provided the significant commitments of time, staff, and intellectual resources that went into the creation of Velocity and the Blueprint—a true, regional, collaborative effort.

The Steering Committee of Velocity also thanks the Maricopa Association of Governments, Arizona State University, and the University of Arizona for their generous financial support.

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The full report can be found at www.DiscoverVelocity.com
ABOUT THE BROOKINGS-ROCKEFELLER PROJECT ON STATE AND METROPOLITAN INNOVATION

This is part of a series of papers being produced by the Brookings-Rockefeller Project on State and Metropolitan Innovation.

States and metropolitan areas will be the hubs of policy innovation in the United States, and the places that lay the groundwork for the next economy. The project will present fiscally responsible ideas state leaders can use to create an economy that is driven by exports, powered by low carbon, fueled by innovation, rich with opportunity, and led by metropolitan areas.

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