The Prosperity Strategy

The Greater Sacramento Region's

Comprehensive Economic Development Strategy (CEDS) 2020-2025

valley vision
Community Inspired Solutions

RW Ventures

This report was prepared and submitted by Valley Vision for the six-county Sacramento Capital region, on behalf of the Prosperity Partnership, with the assistance of RW Ventures, LLC.

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THE GREATER SACRAMENTO REGION PROSPERITY PARTNERSHIP: THE FOUR PARTNERS

GREATER SACRAMENTO AREA ECONOMIC COUNCIL

The Greater Sacramento Economic Council ("Greater Sacramento") is the catalyst for innovative growth strategies in the Capital Region of California. The organization spearheads community-led efforts to attract business, capital and talent; grow and scale new businesses; develop advanced industries; and create jobs and investment throughout the six-county region. Greater Sacramento represents a collaboration between local and state governments, market leaders, and influencers and stakeholders, with the sole mission of driving economic growth.

SACRAMENTO AREA COUNCIL OF GOVERNMENTS

The Sacramento Area Council of Governments (SACOG) is an association of local governments in the six-county Sacramento region. SACOG provides transportation planning and funding for the region and serves as a forum for the study and resolution of regional issues. SACOG also approves the distribution of affordable housing in the region and assists in planning for transit, clean air, and other areas.

SACRAMENTO METROPOLITAN CHAMBER OF COMMERCE

The Sacramento Metropolitan Chamber of Commerce (Metro Chamber) advocates for and supports the inclusive economic prosperity of our Capital Region by leading efforts for business. Established in 1895, Metro Chamber is the largest, most prominent and established voice for business representing 1,400 members and their workforce in El Dorado, Placer, Sacramento, Sutter, Yolo and Yuba counties. The Metro Chamber provides businesses and individuals the programs, services and advocacy needed to build vibrant communities, a ready workforce, connected region and strong business.

VALLEY VISION

Valley Vision is an independent civic leadership organization headquartered in Sacramento, Valley Vision strengthens the region's communities through unbiased research, boundary-crossing collaboration and transformative leadership. Valley Vision has led, managed or supported hundreds of initiatives dedicated to creating the conditions for improved quality of life, economic growth and community vitality. These include the regional prosperity strategy, 21st century workforce, digital access and inclusion, and transformative climate readiness.

RW VENTURES, LLC

RW Ventures, LLC is an economic development firm specializing in market-based strategies for growing regional economies, served as a technical consultant and strategy advisor for the development of the CEDS.

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ACKNOWLEDGMENTS

On behalf of Valley Vision and the Prosperity Partnership, we would like to recognize the hundreds of partners, stakeholders, elected officials and the community at large for their participation and insights informing the development of the 2020-2025 Comprehensive Economic Development Strategy (CEDS). We thank the CEDS Steering Committee members for their time, expertise and guidance, and the many economic development, education and workforce development partners; chamber of commerce members; public/private stakeholders including employers and industry association leaders; jurisdictions – both elected officials and staff; and civic and nonprofit organizations across the six-county region that provided valuable information and input, especially to identify strategic priorities. Special thanks to the many partners who organized and convened focus groups and briefings with their local community stakeholders and elected officials on behalf of this process, and to those who participated in more in-depth interviews, especially business representatives and subject matter experts. As well, we thank our partners at the state and federal levels for their expert recommendations, and especially the Economic Development Administration, U.S. Department of Commerce, for both project grant funding and ongoing program support.

We also would like to thank most sincerely our consultant RW Ventures, LLC., the North/Far North Center of Excellence, California Community Colleges, the Brookings Institution, the city of Sacramento, local jurisdictions and other partners for their invaluable contributions of data, research, reports and expertise.

COVID-19. This report was being finalized before the rapid onset of the COVID-19 pandemic. The Sacramento region, like nearly every region globally, has been impacted by the pandemic on all levels: health, business, community, and personal. Our region has experienced drastic changes in our lives and daily operations. Businesses at all scales, government, educational and health institutions, nonprofits – every segment of our region has been deeply affected. Some of the region's assets, such as a strong health care and life sciences sector and a local-serving food and agricultural system, have provided ability for quick initial responses to the challenges of illness, rapid job loss in at-risk employment sectors, and rapidly rising levels of food insecurity. Other gaps, especially the disparities in access to broadband infrastructure and technology, are in full display with the immediate need for education at all levels to move to remote learning, and for all but essential workers to work from home.

Regional leaders have coalesced in the short weeks since Governor Gavin Newsom issued a stay home order to the State of California on March 19, 2020, in order to slow the spread of COVID-19.[1] Local, county, state, and federal partners have advocated for resources, especially for businesses, workers and critical government services in these uncertain times. At present, there are no specific vaccines or treatments for COVID-19 and no clear horizon, although there are some promising medical discoveries being tested and a major role for UC Davis, our hospital system and companies in the region, as part of the medical supplies chain.[2] There will be a "new normal" in future months and years, unknown to us yet.

[1] https://www.gov.ca.gov/2020/03/19/governor-gavin-newsom-issues-stay-at-home-order/

[2] Centers for Disease Control and Prevention. Coronavirus. Accessed April 5, 2020. https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html

The CEDS – as a five-year framework for inclusive economic development for the region - is a living document, intended to foster a resilient, innovative and sustainable regional economy. This is more important than ever as we face both the short and long-term impacts of COVID-19. Initial analysis by the Brookings Institution and others indicates that Capital Region is likely to fare better than many other regions, based on an assessment of at-risk industries such as travel, leisure/entertainment and hospitality/tourism, agriculture and transportation and warehousing; the region was ranked 263 out of 382 regions.[3] The Public Policy Institute of California estimated that the Sacramento-Roseville-Arden Arcade MSA ranked 11th of 14th major metro areas in California, for share of employment in at-risk industries – 16.5% compared to several major Southern California metro areas ranking from 22.2% to 27.2%.[4] No matter these estimates, tens of thousands of jobs in the region are at risk and tens of thousands of workers are at risk, given that poverty rates among workers in high-risk industries are already high.

According to PPIC and others, the pandemic is increasing the need for some jobs, such as in health, manufacturing and grocery stores, and reducing demand for others; the near-term impacts will affect industries differently. Longer-term economic impacts will be dependent on how long the crisis lasts, the path of the economy's "re-opening," impacts on government tax revenues and services, and government and public policy responses, including how fast and how equitably fiscal and other mitigation resources flow to businesses, workers and families. Our regional leadership is responding with characteristic collaboration and dedication, and coordinating with state and federal partners to provide timely information and resources across communities and sectors.

At the time of this writing, we are all operating in a moment of urgency, crisis response and triage. Even while so doing, we must think ahead to the moments to come – the restart and economic recovery of our region. It may not yet be clear when those next moments will come, but it is certain that they will. And when they do, as a region we will be ready to act and to lead because we will rely upon the framework identified in the CEDS / Prosperity Strategy.

Key to understanding, responding to, and recovering from disasters is the recognition that all disasters bring different phases of response and recovery. The COVID-19 crisis is no different. The Greater Sacramento Region has identified three phases as a framework for understanding the COVID-19 crisis to date, the current situation, and future pathway. Relying on this shared understanding will help shape the ways in which we work together to get there.

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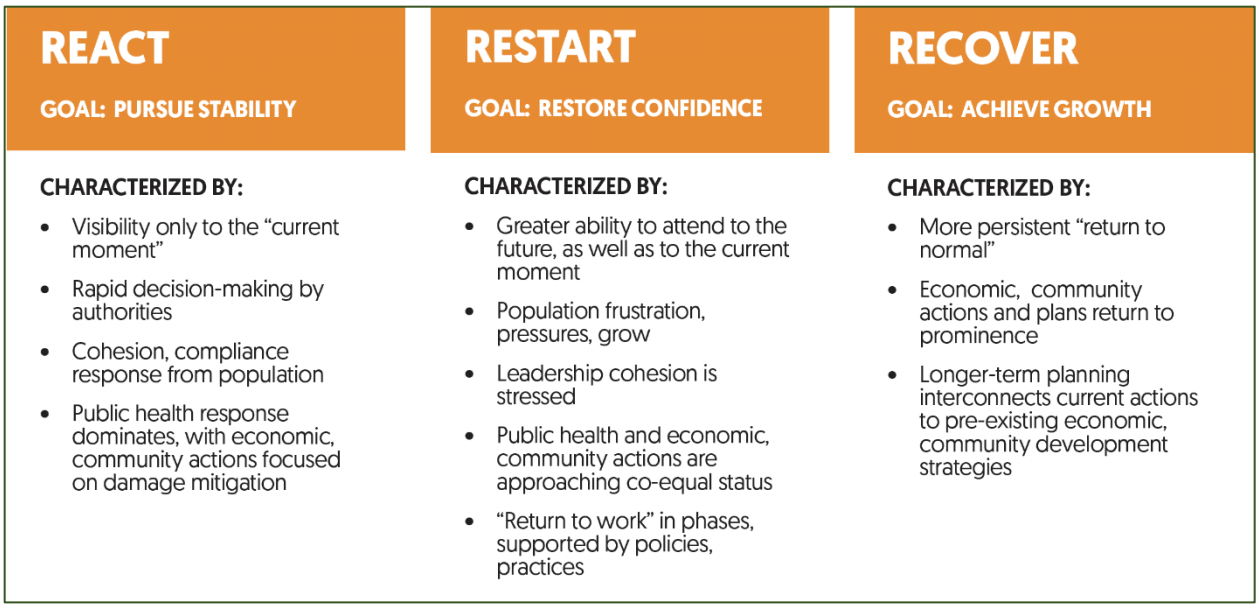
[3] Mark Muro, Robert Maxin and Jacob Whitan, "The Places a COVID-19 Recession will most likely hit hardest," Brookings Institution, March 2020. https://www.brookings.edu/blog/the-avenue/2020/03/17/the-places-a-covid-19-recession-will-likely-hit-hardest/

[4] Sarah Bohn, Marisol Cuellar Mejia, and Julian Lafortune, "How will the Coronavirus Affect California's Economy?", Public Policy Institute of California, March 20, 2020. https://www.ppic.org/blog/how-will-the-coronavirus-affect-californias-economy/



In the React phase, from mid-March through mid-May, the emphasis was on crisis mitigation and urgent response. Led by the public health response, the economic response was focused on creating and disseminating crisis resources to suddenly-closed businesses and suddenly-unemployed workers. At the federal and state levels, new programs were created and new policies deployed – including the SBA's Economic Injury Disaster Loan (EIDL), the Paycheck Protection Program (PPP)[5], and changes to terms and benefits for unemployment insurance[6]. This phase was marked by extreme urgency, with a wide range of entities acting swiftly, often nearly simultaneously, to accomplish as much as possible as fast as possible.

The Restart phase began, in the Greater Sacramento Region, in early-to-mid-May, with actions by the Newsom Administration, as well as growing pressure from a number of counties across the state with low instances of COVID-19 illnesses. Across the country, frustration began to mount, with protests in a number of State capitals, including Sacramento, advocating for a swifter reopening. Governor Newsom created criteria-based "return to work" plans, which counties began to implement. The public health response and economic and community-level priorities began to approach co-equal status.

Lastly, Recovery will begin when economic and social stability once again permits growth to be pursued and accomplished. The Prosperity Strateg /CEDS will provide the data-driven foundation of the Greater Sacramento Region's Recovery phases. While the COVID-19 crisis will alter the trajectory and specifics on implementation of the CEDS' core regional initiatives, the Prosperity Partnership is confident that the fundamentals of the Plan are strong and progress will continue. Unlike the Great Recession, where a regional strategy (the Next Economy) needed to be developed, the region is ready now: **the Prosperity Strategy/CEDS is the foundation for the region's Economic Recovery Strategy.** For example, several innovation projects such as Aggie Square and the Woodland

[5] Small Business Administration. Coronavirus Relief Options. Accessed May 18, 2020. https://www.sba.gov/funding-programs/loans/coronavirus-relief-options
[6] US Department of Labor. Unemployment Insurance Relief During COVID-19 Outbreak. Accessed May 18, 2020. https://www.dol.gov/coronavirus/unemployment-insurance

Technology Park are moving forward, and initiatives such as broadband deployment and workforce skills building – especially digital skills - in fact will be accelerated.

COVID-19 has catalyzed innovative public, private and civic sector responses to significant immediate challenges, including pilots and new partnerships, investments and processes in areas such as food access, remote learning, telemedicine, manufacturing supply chains, and essential construction projects (including transportation, hospitals, affordable housing, and flood control/watershed/forestry resilience). **These responses can serve as a platform and test bed for new ways of doing business and regional problem solving in the economic recovery and beyond, and will be incorporated into the CEDS as a dynamic, responsive roadmap for securing regional prosperity.**

This CEDS would not be possible without the continued support and guidance of all the partners, stakeholders and leaders cited above. With the continued guidance of the Steering Committee, the Prosperity Strategy will conduct an annual review and update to report on the status of the recommended initiatives and progress on metrics, as well as highlight opportunities and adaptations to be incorporated for the coming year, given our new realities.

TABLE OF CONTENTS

I. INTRODUCTION: CEDS PROCESS

A Comprehensive Economic Development Strategy (CEDS) is a region's economic roadmap that ensures an innovative, inclusive, and equitable economy by bringing together public, private, and civic stakeholders to establish regional goals, objectives, and a plan of action. The CEDS process analyzes existing regional conditions, opportunities, and global economic conditions, leading to a region-specific strategy-driven plan for economic prosperity. The CEDS must be updated every five years to stay relevant with changing economic conditions and to qualify for U.S. Economic Development Administration (EDA) funding assistance under its Public Works and Economic Adjustment Assistance programs. Annual assessments of progress to date and plans for the coming year also are required.

The Capital Region's previous CEDS, Next Economy, covered 2013-2018. To prepare for the region's next CEDS, Valley Vision, Greater Sacramento Economic Council, Sacramento Metro Chamber, and Sacramento Area Council of Governments launched the Prosperity Strategy process in 2018, with the four organizations comprising the Prosperity Partnership, a collaboration model similar to that of the Next Economy. The Partnership engaged the Brookings Institution to prepare a market assessment of the region related to global competitiveness compared to 15 other "Middleweight Regions" across the country. The report, "Charting a Course to the Sacramento Region's Future Economic Prosperity," provided a roadmap for the development of the Prosperity Strategy within an Inclusive Growth framework based on five market factors or drivers: Tradable Clusters, Innovation, Talent, Infrastructure, and Governance.[7]

The CEDS process requires a planning organization, fulfilled by Valley Vision (as recipient for the EDA planning grant), that is responsible for developing and contributing to the next CEDS, with the process guided by a Steering Committee. (*Steering Committee Participants*). The Committee is vital to a CEDS because it includes a diverse set of members (including private sector representatives, nonprofits, education institutions, and workforce development boards) that represents how a region's key stakeholders collectively work together for the highest economic interests of the region.

A CEDS contains the following components[8]:

1. Background: Demographic description of a region and a realistic depiction of its current condition.
2. SWOT: An economic development analysis of the region's strengths, weaknesses, opportunities, and threats, while considering human and economic assets, and external and internal factors.
3. Goals and Objectives: Identification of regional expectations while capitalizing on a region's resources.
4. Community and Private Sector participation: Cross-sector relationships.
5. Strategic Projects, Program, and Activities: Identified and designed to implement Goals and Objectives.
6. Plan of Action: Roadmap for implementation of Goals and Objectives for priority Projects, Programs, and Activities.
7. Performance Measures: A list of measures to be used to evaluate the successful development and implementation of the CEDS.

Throughout 2019, the Prosperity Partnership led an extensive strategic planning process to address the requirements of the CEDS and prepare a companion Prosperity Strategy document highlighting a set of strategic

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[7] Joe Parilla, Sifan Liu and Marek Gootman, Brookings Institution, 2018, https://www.brookings.edu/research/charting-a-course-to-the-sacramento-regions-future-economic-prosperity/

[8] Comprehensive Economic Development Strategy (CEDS) Content Guidelines: *Recommendations for creating an impactful CEDS*, December, 19, 2020. https://www.eda.gov/files/ceds/CEDS-Content-Guidelines-full.pdf

priorities for focused implementation in 2020. The process built upon the Brookings Institution findings, conducting additional research and analysis in coordination with RW Ventures, which served as a technical consultant and strategy advisor to the Prosperity Strategy, along with preparing an economic strategy for the City of Sacramento. RW Ventures' research on and assessment of the regional economy, national and global economic trends, best practices and economic development opportunities is a shared framework for both the Region's and the City's strategies. The following additional activities informed the development of the CEDS:

- Approximately 35 meetings, briefings, focus groups and presentations convened directly for input for the Prosperity Strategy/CEDS, including Steering Committee meetings; meetings of Greater Sacramento Economic Council's Economic Development Task Force (EDDT) advisory committee of economic development directors for the region's cities and counties; presentations and briefings with local elected officials and staff; and meetings convened for the Prosperity Partnership by local community and chambers of commerce partners; and to regional representatives at the California Economic Summit (see Appendices A, B &C); in total more than 400 persons have provided input, expertise, and guidance
- In-depth Interviews with employers, industry associations, subject matter experts and stakeholders regarding industry cluster issues and priorities, and innovation ecosystem leaders
- Updated labor market research and industry cluster trends prepared by the North/Far North Center of Excellence, at Los Rios Community College
- Integration with the SACOG Metropolitan Transportation Planning process
- Review of local and regional economic strategies, including the CEDS for Yuba-Sutter counties (prepared by Yuba-Sutter EDC) and Placer and El Dorado County (prepared by Sierra Business Council)
- Consultation with subject area experts including the Brookings Institution, and state and federal agencies on funding strategies; and with experts to formulate strategic initiatives
- Ongoing coordination with the city of Sacramento on its Scale Up Sacramento Economic Action Agenda, prepared by RW Ventures, given that the location of several core strategy initiatives is in the City
- Ongoing consultation with core anchors institutions, including UC Davis, California State University, Sacramento, the region's three community college districts (Los Rios, Sierra and Yuba), and hospitals
- Input from ongoing regional projects related to focus Strategy areas
- Integration of emerging initiatives into the Strategy
- RW Ventures Analysis of the regional economy for the city of Sacramento's report Scale-Up Sacramento is a more in-depth source for information, especially on cluster market assessment and initiatives.

The research and analytic findings, consultation and stakeholder input were synthesized to develop a set of core strategies within an inclusive growth framework. **The Prosperity Strategy is a regional call for action,** translating the findings of the region's detailed and candid self-assessment into a collective agenda for prosperity. The Strategy notes that preserving the region's quality of life and establishing the region as a center of inclusive and high-quality growth demands a renewed focus on the key factors of regional competitiveness and a shared commitment to targeted, near-term action that responds to the strengths, weaknesses, opportunities and threats facing the region and its economy. The focus is on signature initiatives of regional impact that will accelerate economic prosperity across the diversity of the region, branding the region as a test bed for innovation across integrated sectors, and organized to reach scale more quickly. As noted, COVID-19 will affect timing and process.

GOAL

The Capital Region's Prosperity Strategy is focusing on three principle goals: improve business, support people, and develop place. The strategy is a triple bottom line approach that will catalyze a strong, inclusive, innovative and resilient economy for the Greater Sacramento region.

INCLUSIVE ECONOMIC GROWTH

Inclusive economic growth is economic growth that is distributed fairly across society and creates opportunities for all. Inclusion generally occurs across four dimensions – employment, ownership, location (as in, whether firms are located in places accessible to disadvantaged populations) and participation (as in, who sits at the relevant industry "tables"). In this framework, inclusion is both a quality of and way of undertaking growth.[9] Regions with lower levels of inequality have shown to grow more sustainably over time, by optimizing assets, operating more efficiently and productively, and reducing the burden of poverty. The economic focus is on wealth-generation rather than profit-generation. In essence, communities build long standing wealth and not just profits, making it beneficial for both people and place.

Inclusive growth is also a business imperative. Rather than bifurcating an economic strategy and a poverty alleviation strategy, both are part of an overall process to provide broad opportunity and include ways for underutilized assets to part of the new value creation.it seeks to fundamentally reposition disadvantaged people and places, particularly communities of color, as drivers and beneficiaries of the growth opportunities of the next economy. This includes linking neighborhoods and rural areas to regions and making regions a place of choice for both business and talent. This is especially critical given the disparities identified by Brookings for the region's minority and underrepresented communities in areas such as educational attainment, digital skills, job accessibility and more.

The Prosperity Strategy/CEDS is a mindful way for how we will build the tools to ensure we align growth with equity. It is economic placemaking at its core. The specific initiatives and actions recommended in the Strategy are grounded in this core principle.

[9] Paul C. Brophy, Robert Weissbourd, and Andy Beideman, prepared for the Federal Reserve Bank of Philadelphia, Transformative Economies Emerging Practices for Aligning Growth and Inclusion; 2017, p. 3.

CEDS STEERING COMMITTEE MEMBERS

As noted, the CEDS Steering Committee's role is support the formulation of a regional economic strategy for the Greater Sacramento six-county region The Steering Committee includes organizations and agencies representing the private, public and civic sectors, with regional reach and diversity, listed as follow.

First Name	Last Name	Organization
Jim	Alves	Sacramento Municipal Utility District (SMUD)
Meg	Arnold	Valley Vision
Albert	Ayala	Sacramento Metropolitan Air Quality Management District
Amy	Ayers	Sacramento Municipal Utility District (SMUD)
Garett	Ballard-Rosa	Sacramento Area Council of Governments (SACOG)
Leilani	Barnett	Federal Reserve Bank of San Francisco
Erika	Bjork	Sacramento Metro Chamber of Commerce
Amanda	Blackwood	Sacramento Metro Chamber of Commerce
Stephanie	Bray	United Way California Capital Region
Barry	Broome	Greater Sacramento Economic Council
Jason	Buckingham	Golden Sierra Job Training Agency
Danielle	Casey	Greater Sacramento Economic Council
Damon	Conklin	Sacramento Regional Builders Exchange
James	Corless	Sacramento Area Council of Governments (SACOG)
Cathy	Creswell	Sacramento Housing Alliance
Linda	Cutler	Sacramento Region Community Foundation
Walter	Di Mantova	The Gen Lab
Nathan	Dietrich	California State University, Sacramento
Suzanne	Dizon	Sacramento Municipal Utility District
Sonia	Duenas	Valley Vision
Willy	Duncan	Sierra College
DeNelle	Ellison	Greater Sacramento Urban League
Pat	Fong-Kushida	Sacramento Asian-Pacific Chamber of Commerce
Phil	Garcia	California State University, Sacramento
Dave	Gordon	Sacramento County Office of Education
Yvonne	Harris	California State University, Sacramento
Chet	Hewitt	Sierra Health Foundation
Doug	Houston	Yuba Community College District
John	Jackson	William Jessup University
Cassandra	Jennings	Greater Sacramento Urban League
Trish	Kelly	Valley Vision
Roy	Kim	Sacramento Employment and Training Agency
Brian	King	Los Rios Community College District
Kathy	Kossick	Sacramento Employment and Training Agency
Lucy	Lu	Greater Sacramento Economic Council
Gina	Lujan	Hacker Lab
Denise	Malvetti	City of Sacramento

Thalia	Marroquin	California Community Colleges
Malinda	Matson	U.S. Economic Development Administration
Gary	May	University of California, Davis
Kate	Meis	Local Government Commission
Theresa	Milan	Los Rios Community College District
Tammy	Montgomery	Los Rios Community College District
Ryan	Montoya	Sacramento Kings
Khaim	Morton	Sacramento Metro Chamber of Commerce
Bill	Mueller	Integrated Communications Strategies, Inc.
Debbie	Muramoto	California Capital Financial Development Corporation
Tim	Murphy	Sacramento Regional Builders Exchange
Robert	Nelsen	California State University, Sacramento
Chris	Norem	North State Building Industry Association
Jamey	Nye	Los Rios Community College District
Matt	Perry	Sacramento County Office of Education
Scott	Powell	Greater Sacramento Economic Council
Mike	Rizzo	Five Star Bank
Mabel	Salon	University of California, Davis
Fabrizio	Sasso	Sacramento Central Labor Council
Randy	Sater	Stonebridge Properties
Amy	Schulz	Sierra College
Ryan	Sharp	University of California, Davis
Louis	Stewart	City of Sacramento
Michael	Stretch	North State Building Industry Association
Alex	Taghavian	Capitol Impact
Christine	Tien	The California Endowment
Marq	Truscott	Urban Land Institute - Sacramento
Brandon	Weber	The Urban Hive
Molly	Weber	The Urban Hive
Susan	Wheeler	Sacramento Municipal Utility District (SMUD)
Aaron	Wilcher	North/Far North Center of Excellence, Los Rios
Clarence	Williams	California Capital Financial Development Corporation
Tyrone Roderick	Williams	Sacramento Housing and Redevelopment Agency
Joshua	Wood	Sacramento Region Business Association
Gabe	Youtsey	University of California, Agriculture and Natural Resources

II. SNAPSHOT: THE PROSPERITY STRATEGY

An Inclusive Strategy for the Six-County Sacramento Region

PURPOSE

A strategic framework and bridge to action for the six-county region that prioritizes our core economic initiatives, resulting in a more aligned, prosperous and resilient Sacramento Region. This snapshot provides a high- level summary of The Prosperity Strategy, as well as an overview of key initiatives.

GREATER SACRAMENTO REGION

El Dorado County
Placer County
Sacramento County
Sutter County
Yolo County
Yuba County

HOW WE GOT HERE

The Sacramento Region is a place in transition, building on its storied history and strong roots in agriculture and government, while fashioning a new future that embraces innovation in a knowledge-based economy. The Great Recession hit the region very hard. Although the region recovered and has been relatively prosperous compared to other markets, the Brookings Institution study identified a troubling trajectory, especially as it relates to middle class earnings and worker productivity. The region needed a collective strategy to prosper and compete against other mid-markets and set a unified course for our future.

CORE STRATEGIES

1. Be the global leader for entrepreneurs, firms and workforce in food, agriculture and health innovation.
2. Be the global leader for entrepreneurs, firms and workforce in life sciences.
3. Be the global leader for entrepreneurs, firms and workforce in future mobility.
4. Target infrastructure investment to support economic clusters and market drivers.
5. Expand demand-driven, sector-based workforce development, aligned to key opportunity clusters and a more inclusive workforce, prepared for future work.
6. Create an environment to be the most business-friendly region in which to operate in the State of California.

OUR CLUSTERS

Tradeable clusters are groups of related industries that create wealth. Three tradeable clusters were identified as having the most opportunity and potential to scale an inclusive economy for the Sacramento Region: food and agriculture, life sciences and related agricultural sciences, and future mobility, with aspects of clean energy. Each have high growth potential that build on its core strengths; they are high tech industries with distinctive attributes but overlapping strengths in firms, research institutions, labor force, technologies, policy environments and markets.

FOOD AND AGRICULTURE

The supply chain that generates our food and ag economy is deep, with its own unique networks and sub-clusters. As America's Farm-to-Fork Capital, the Sacramento Region is both fertile and productive, with $2 billion in farm gate (crop) output value, more than 7,200 farms and more than 1.5 million acres of farmland. The overall cluster had an economic impact of more than $7.2 billion.[10] In particular,

[10] Food and Agriculture: Cluster and Workforce Needs Assessment: Sacramento Capital Region. SACOG, Centers of Excellence, Los Rios Community College District and Valley Vision, 2016.

Food and Beverage Manufacturing and two emerging sub-clusters of Agricultural Production offer promising opportunity to position the region as a global leader in food, agriculture and health innovation.

Industry trends are changing dramatically as consumer demand for functional/healthy and niche foods is creating a space for small, nimble and creative food and beverage manufacturers – many of which are locating or starting up in the Sacramento Region. Alongside major food manufacturers such as Blue Diamond and Pacific Coast Producers already based in the region, and with new companies locating in the region, especially in Yolo County, there is significant room for growth, given the region's access to transportation arteries, robust production of high value high quality crops, and national distribution capabilities.

The production sub-clusters of Digital Farming and AgBiotechnology also provide opportunity to fuel an inclusive economy. The region is well-positioned to lead this space given its specialized assets, including the largest patch of Class 1 soil, beneficial Mediterranean climate, 300 types of crops which digital farming startups have as a wide testing ground, one of the world's leading agricultural universities at UC Davis, and innovative farmers at all levels of scale.

Lastly, the region has key assets in AgBiotechnology that include strong agriculture research assets, especially at UC Davis, with a growing sector of AgBiotechnology startups and R&D facilities for global companies such as Bayer Crop Science, Syngenta and HM.CLAUSE and several incubators. As AgBiotechnology grows to a $39.5 billion industry globally, the Sacramento Region can capture market position through technology and environmental sciences, including technologies that improve resource efficiencies such as with water and energy use, improving the sustainability of agriculture, and advancing soil, seed, plant, product, human and community health.

LIFE SCIENCES

The Life Sciences cluster focuses on discoveries and developing new therapies for patients, accelerated with innovations in computational technologies. Opportunities range from the specialized manufacturing of new drug therapies to the manufacturing of medical devices. This cluster attracts top talent with specialized expertise and is fueling strategic, flexible and collaborative approaches to partnerships. A growing place for startups, over 25 percent of the region's startups are tied to this cluster. Multiple accelerators and incubation spaces exist to support its growth, especially UC Davis and future sites including Aggie Square, one of the region's catalytic initiatives that will advance the region's innovation ecosystem by developing a 25-acre innovation district.

While work is being done to scale up manufacturing, parallel efforts will be needed to recruit and incentivize contract manufacturers to meet the commercialization needs of startups. These contract manufacturers have a high multiplier effect as more life sciences companies move and start up in the region.

Life Sciences also offers significant overlap with our AgTech cluster. For example, already established Sacramento firms in areas such as seeds/biologics and biological pest management/plant health are fostering partnerships to enable further research and development in this ag-bio sector.

FUTURE MOBILITY

Mobility-related industries are undergoing rapid transformation due to the rise of autonomous mobility, connectivity, the electrification of vehicles and shared mobility options. The electric vehicle market alone is expected to pass $420 billion by 2025, and by 2040 it is predicted that 57 percent of all vehicle sales will be EVs.

The California Mobility Center (CMC), also referred to as the Future Mobility Center, is one catalytic initiative currently under development that will position the Sacramento Region as a leader in Future Mobility. Its goals are to promote the development of EV and AV technologies; accelerate their commercialization; facilitate the development of standards and policies; and carry out applied research to advance global EV adoption (including for public transportation). Multiple regional entities including SMUD, Los Rios Community College District, California State University Sacramento, UC Davis, Valley Vision and GSEC have partnered to advance the CMC.

In addition, the Sacramento Region is also home to the Civic Lab initiative, an accelerator for government agencies that is funding innovative mobility pilot projects across the six- county region and connecting public agencies with private sector mobility partners. Civic Lab has attracted experimental pilot projects deploying autonomous shuttles, on-demand rideshare and rural microtransit in order to test new services in more suburban and rural settings. The proximity of the California State Legislature, the California Air Resources Board, the California Energy Commission and other policy and funding leaders makes the geographically diverse Sacramento region a perfect testbed for future mobility.

TRANSPORTATION & INFRASTRUCTURE

The Prosperity Strategy advocates for a shift from business as usual in how the Sacramento Region approaches transportation and infrastructure investments: the region needs to be strategic and innovative in the choices made with limited resources in order to build an advanced and inclusive economy. This shift is more than just a response to future fuel tax revenue reductions or increasing infrastructure costs. A shift is necessary to provide the spatial efficiency required to drive a more dynamic, knowledge-intensive economy that increasingly favors mixed-use development with strong transportation connections, thereby increasing mobility and accessibility, including to job centers.

Expanded broadband infrastructure and access is another important strategy to achieve sustainable connectivity and digital equity across the region, as well as drive the deployment of ag technologies and strengthen the region's rural communities. "Dig Once" and joint use transportation and broadband infrastructure projects, especially in designated Strategic Corridors, will improve efficiency in infrastructure investments while reaching underserved communities. A region-wide plan to accelerate broadband infrastructure, including for 5G (the next generation of high-speed Internet), also will help address Digital Divide disparities and enable remote learning, telemedicine, telecommuting, emergency services and other critical necessities, while positioning the region for the 21st century economy. These disparities have been elevated by COVID-19 and must be a high priority.

The Prosperity Strategy's infrastructure section highlights initiatives to prioritize investments that align with and helps further economic prosperity outcomes, including through increased accessibility to jobs and services. Housing as a critical foundation also is addressed, along with strategies to improve forest resiliency and better resources management which also affects areas such as water supply and quality.

WORKFORCE

Human capital is the single most important input for economic growth, particularly in an economy where the impact and value of knowledge is greater than ever. The Sacramento Region is facing a regional talent development challenge – dealing not only with rapid technology changes and the dynamics of the global economy, but also demographic shifts and looming gaps in middle-skill jobs across all industries.

Although the region has a relatively well-educated workforce, more than one-third of residents struggle to meet daily expenses; a disproportionate amount of these individuals are minorities and those with lower levels of education. There is also an increasing disparity in attainment of digital skills. Boosting educational attainment, especially by assisting those "near-completers" to finish their education, is another regional priority. Preparing proactively for the "future of work" is vitally important.

Workers need to be better informed about the emerging skills required for high-growth, in-demand jobs and supported to gain those skills. Employer partnerships are vital for addressing current skills gaps and creating the workforce pipeline of the future, with training and education systems becoming more agile and continually upgraded to align with this market demand. This includes emerging clusters that will need a highly proficient workforce requiring increased cross-functional skills and fundamental workplace skills such as critical thinking.

The Sacramento Region's education and workforce partners are working with employers, Valley Vision and other partners on a demand-driven workforce ecosystem focused on priority cluster initiatives, especially to tackle the middle-skills gaps and the digitalization of skills, and reach disconnected youth and adults. Community colleges are responding to these shifts through the Strong Workforce Program, with new investments in career education programs for high-demand skills, including in manufacturing across a range of sectors, ICT/cyber security, health, construction and agtech.

While employers currently help identify the skills gap, there is a need for greater private sector involvement and investment in the development and deployment of training programs and pipelines – including through programs offered in-house by employers or employer collaborations to address skills gaps in specific industries. More systemic partnerships with employers, education, and private training firms also are needed.

COVID-19 will have a dramatic impact on jobs and businesses, with different sectors being affected differently. Research indicates that workers in jobs most at risk of automation also are most at risk of displacement. Rapid response efforts will be needed to assist workers through the difficult times, through transitioning to other in-demand sectors, up-skilling and re-skilling.

BUSINESS FRIENDLY ENVIRONMENT

The Greater Sacramento region can become the California option for business – based on a value-added proposition rather than a low-cost pitch, and one that positions the region as the place business and workers want to locate and stay because they will be more productive. The region has a unique opportunity to be a destination in which culture, networks, finance and talent overlap and connect, and to do so by leveraging its position as the capital of the fifth largest economy in the world. Its proximity to policy makers and its geographic location near education, industry and agriculture provide a competitive advantage over other California regions.

The Prosperity Strategy focuses on regional policies that strengthen our innovation ecosystem including financing, facilities and business development resources to support start-ups, scale ups and spinouts in our highest performing sectors. A cohesive messaging strategy will communicate that the region is a destination for innovation, testing, piloting, and scaling for businesses in California.

III. BACKGROUND/ECONOMIC AND DEMOGRAPHIC TRENDS

The Sacramento region is a dynamic place in which to work, live, and play. Historically, the region has enjoyed a high degree of prosperity relative to other mid-sized metropolitan areas. Yet the Great Recession exposed structural vulnerabilities in the regional economy that hindered a full recovery, including an expanding gap between rich and poor, between access and opportunity.

A key component of our region's success over time has been the ability to revisit shared priorities as conditions change. Next Economy helped guide the region out of a deep and sustained recession. However, the economy looks significantly different now than either the pre-recession boom or early recovery. As such, the time was right to revisit our region's goals and priorities given the economic trajectory and pace of change of the last decade. Answering these questions required a comprehensive look at the region's economic performance and assets, as well as a framework and strategy to ensure a strong, inclusive, and resilient economy that works for all residents and communities over the long term.

GREATER SACRAMENTO REGION PROFILE: SUMMARY

In developing the CEDS, the Prosperity Partnership, with the assistance of RW Ventures and the Center of Excellence, conducted substantial quantitative and qualitative market research and analysis to assess the economic competitiveness of the Sacramento region. This section provides an overview of the region's economic conditions, with a focus on some of the key data points that helped inform the strategy development. The SWOT analysis and action plan that follow provide a more detailed discussion of the regional market assessment.

INDUSTRY, EMPLOYMENT AND EQUITY

Between 2007 and 2017 the Sacramento region ranked in the bottom half of the 100 largest regions in the country on measures of change in employment (61st), gross metropolitan product (GMP) (63rd), and median income (74th).[11] The Prosperity Partnership explored these decade-long trends through a detailed market assessment, finding that while the region started from a position of relative prosperity, the Great Recession was deeper and more sustained in the Sacramento region compared to most other parts of the nation, and a full recovery therefore took longer.[12]

More recent data is more promising. The Brookings 2020 Metro Monitor for the first time categorizes metro areas into three classes based on size: very large metro areas (population over 1 million, 53 regions total), large metros (population between 500,000 and 1 million, 56 total) and midsized metro regions (between 250,000 and 500,000 population, 83 total). With a four-county metro population of more than 2.3 million in 2018, the Sacramento metro region is ranked in the very large metro area category. From 2017-2018, the most recent time period, the

[11] 2020 Brooking Metro Monitor. Note the Brookings Metro Monitor data only covers the 4-county Sacramento MSA (Sacramento-Roseville-Arden-Arcade); it does not include Sutter and Yuba Counties, which is a separate MSA.

[12] Brookings Market Assessment

region flipped from lagging the nation to above average progress. Notably, the region ranked 8th in job growth, 19th in change in GMP, and 4th in change of median earnings.[13]

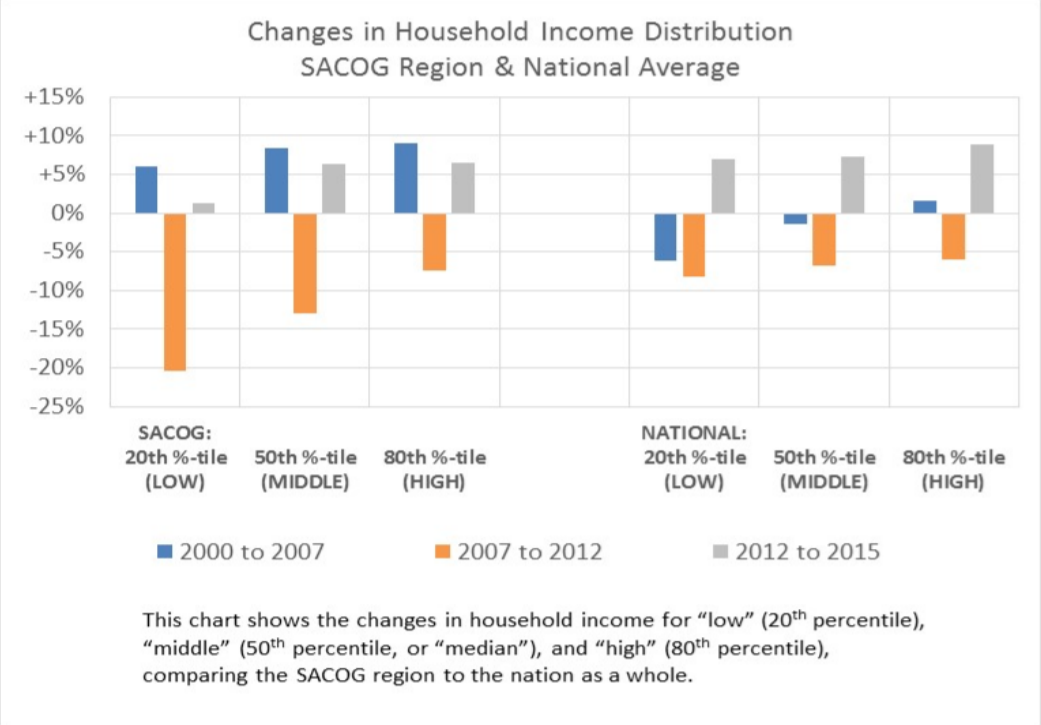
Notwithstanding recent growth, the region's experience the past decade points to challenges in a new economy of rapid technological transformation, further global integration, and environmental and demographic changes that the Prosperity Strategy must address. First, like many other metro areas, more than one-third of residents in the Sacramento region struggle to make ends meet, as median income now is lower than the pre-recession boom (when adjusted for inflation).[14] Earnings growth has been most stagnant at the lowest end of the income spectrum. Analysis by SACOG showed that the region's lowest income households saw the largest percentage decline in household incomes during the recession, while their income growth in the first years of the recovery has trailed the national average for the same income cohort, as well as for higher income households in the region.[15] See Figure 1. The share of struggling families is disproportionately concentrated in communities of color and individuals with lower levels of education. See Figure 2. In response, the Prosperity Strategy puts forth an inclusive economy framework to drive quality growth outcomes.

Figure 1.

[13] 2020 Brookings Metro Monitor

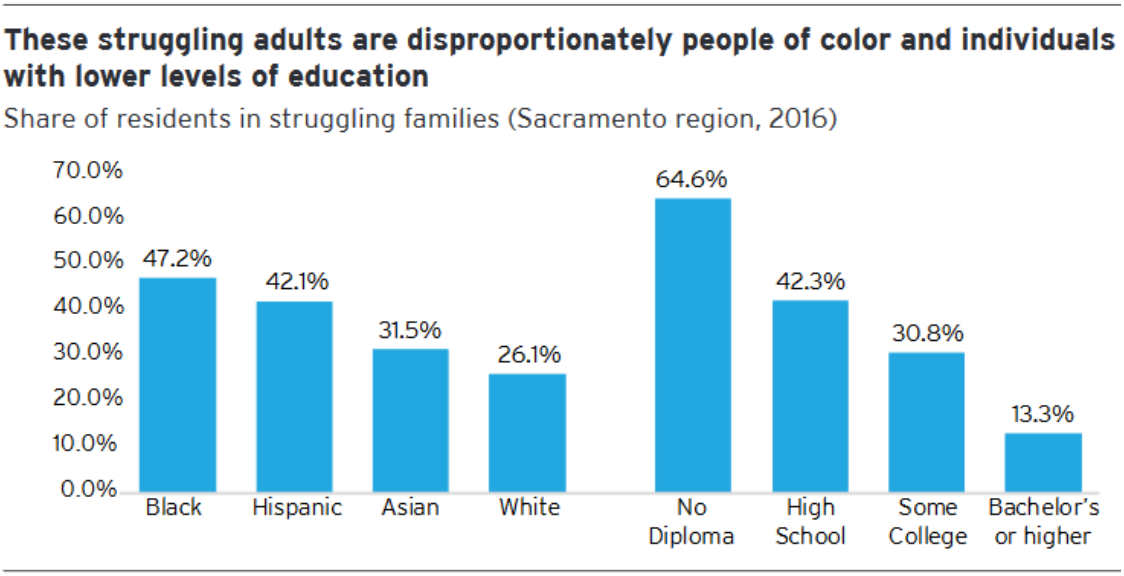
[14] SACOG Progress Report

[15] SACOG Progress Report



Source: SACOG, May 2017: SACOG region data from ACS 1-year samples; national data from US Census Bureau

Figure 2.



Source: Brookings analysis of the University of Washington Center for Women's Welfare County-Based Sufficiency Standard

INNOVATION

A second key theme for the Prosperity Strategy is innovation. Advanced economies must constantly innovate to maintain regional competitiveness in the face of disruptive technological and other change. The Brookings Institution assessment shows the region has solid assets in university research and patenting rates, but a lagging firm startup and scaling rate: The region ranked 68th out of 100 over the last decade on employment growth at young firms, and 13th out of its peer group of 16 in a combined assessment of startup, scale-up and high growth firms.[16] In the most recent time period of 2017-2018, however, the region saw a positive trend, as its 5.2% employment growth in young firms (0 to 5 years old) earned a rank of 15th highest in the very large metro areas category.[17] The Prosperity Strategy dives into the region's innovation ecosystem, including strategies to build off recent momentum in business dynamism.

INDUSTRY SECTORS

The Prosperity Strategy also explores the region's sectoral mix to identify opportunities for firm growth and good job creation. The region's economy has historically been dominated by several large sectors, including government, education, health, and professional services. Government (state, local, and federal) has accounted for 25 percent of the region's jobs over time, which has proven more stable to economic swings, with quality jobs, but is not projected to be a growth industry. Indeed, the region has had a longstanding goal to diversify its economy

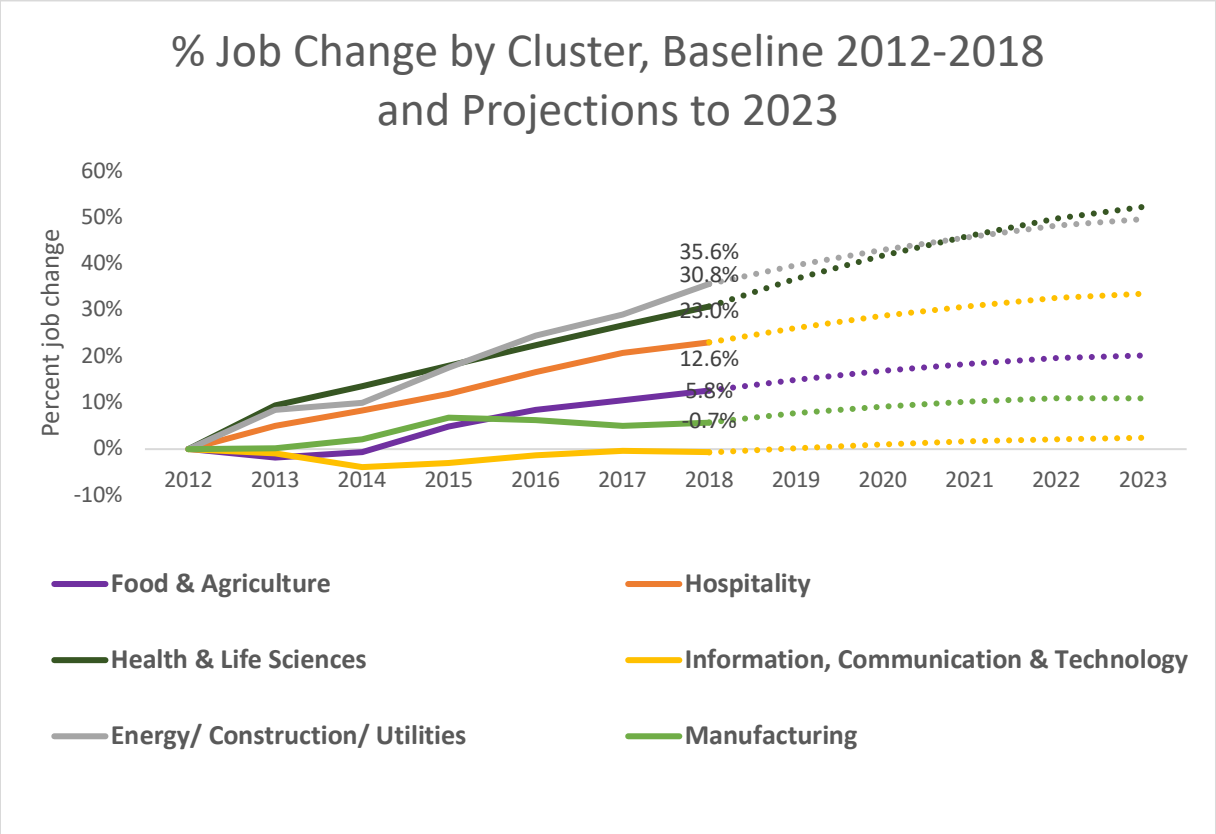
[16] Brookings Market Assessment

[17] 2020 Brookings Metro Monitor

beyond its public sector concentration. Further, the regional economy looks significantly different now than in the pre-recession boom, with an evolving sectoral mix.

Since 2000, healthcare services has been a rapidly growing industry, adding 74,000 jobs, or about half the total job growth in the region. Leisure and hospitality also has increased its share of regional employment, while professional and business services has seen its strongest job growth in the last five years. The region was particularly hard hit in loss of construction and financial services jobs due to the recession, with construction losing over 31,000 jobs.[18] Figure 3 shows job growth data from 2012, with recent data showing a more positive trajectory since finally coming out of the recession. The Energy, Construction and Utilities (ECU) industry cluster has had a strong recovery since 2014, while manufacturing is trending upwards. The Food and Agriculture Cluster, which includes food processing, also has had steady growth since 2014. As both the manufacturing and construction sectors have recovered, they are facing looming skills gaps which are constraining growth; the construction sector has a large projected skills gaps which will affect the region's ability to deliver large scale commercial, public sector and infrastructure projects as well as housing, unless addressed.

Figure 3.

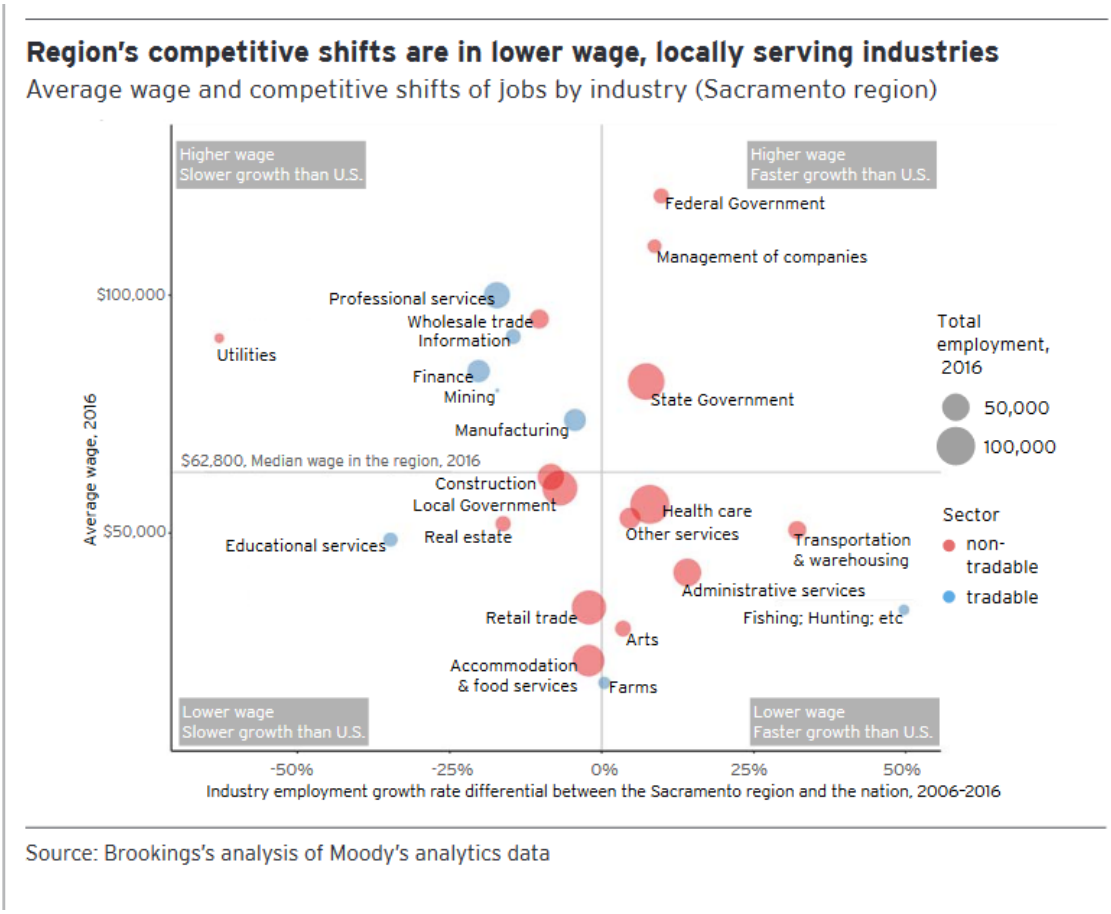


Source: Centers of Excellence, North/Far North Region

[18] SACOG Progress Report

As the region looks to diversify its economy, tradable industries will be critical to ensure good job and wage growth. Due to its concentration of public sector employment, the Sacramento regional economy is less concentrated in private tradable industries compared to the nation at large: tradable industries contribute about a quarter to regional GDP compared to the national average of 43 percent.[19] Regional employment growth in tradable industries has trailed the nation as a whole, and most of the region's recent job growth has been in primarily locally serving industries such as health care, segments of the economy that tend to pay less than tradable industries. Engagement with employers indicates increased levels of job growth in higher wage industries and it will be important to foster continued growth in these industries through skills building strategies, especially with the impacts of automation, technology and job displacement accelerated by COVID-19.

Figure 4.



Source: Brookings's analysis of Moody's analytics data

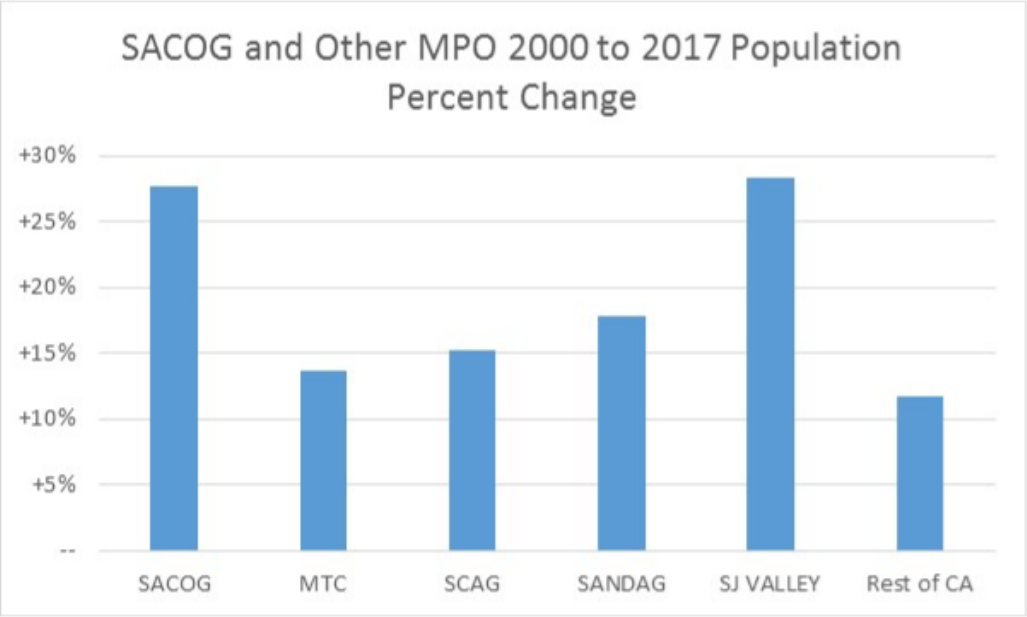
The Prosperity Strategy delves into three tradable clusters that show competitive advantage growth potential—food/agriculture, life sciences, and innovative mobility—to put forward strategies to grow the region's tradable base and diversify its economy.

[19] Brookings Market Assessment

POPULATION AND DEMOGRAPHICS

The Sacramento region continues to be one of the fastest growing areas in California - since 2000, only the San Joaquin Valley has had a higher growth rate.[20] See Figure 5. However, the Sacramento region has grown more slowly since the recession and now more closely mimics other regions in the state; the region's population growth rate currently stands at about a third of its pre-recession level. Overall, the region has added 537,000 new residents since the year 2000. There are differences in growth rates across the region's counties; from 2018 to 2019, Placer County was the fastest growing county in the state, increasing its population by 1.9%, compared to .5% for California and .3% for Sutter County.[21] Also more recently, the region is seeing strong migration from the Bay Area, which has important workforce, housing and infrastructure implications .

Figure 5.



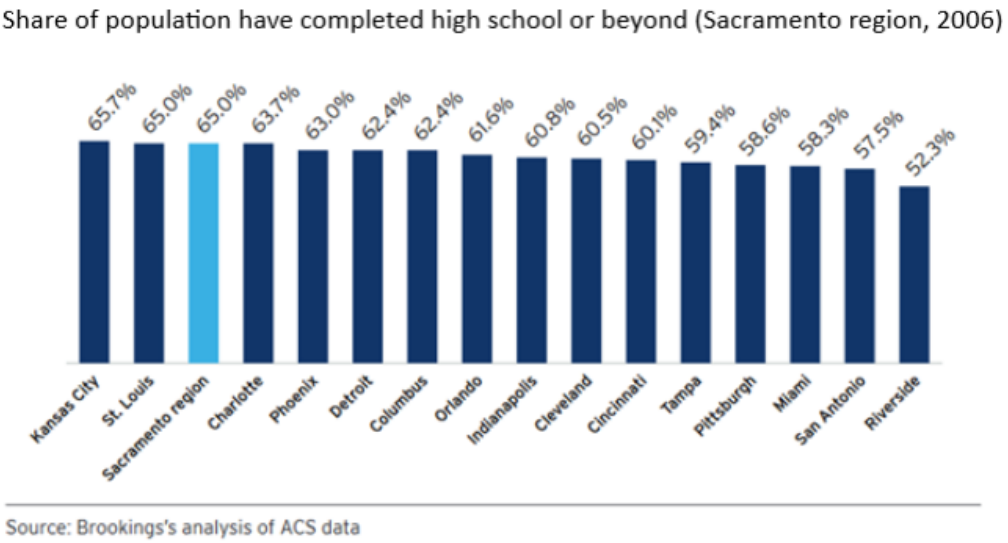
Source: SACOG, based on California Department of Finance.

The region's workforce is relatively well-educated compared to other mid-sized areas. According to the Brookings Institution, 65 percent of the region's residents have at least a high school education, with about a third holding a bachelor's degree or higher. The region's share of population that has completed high school or beyond ranks third in its peer group of mid-sized metropolitan areas. See Figure 6. The Strategy has a priority to increase educational attainment, especially for those who lack a small amount of credits for degree completion.

[20] SACOG Progress Report

[21] California Dept. of Finance, E-1 Population Estimates for Cities, Counties and the State – January 1, 2018 – January 1, 2019, May 2019.

Figure 6.



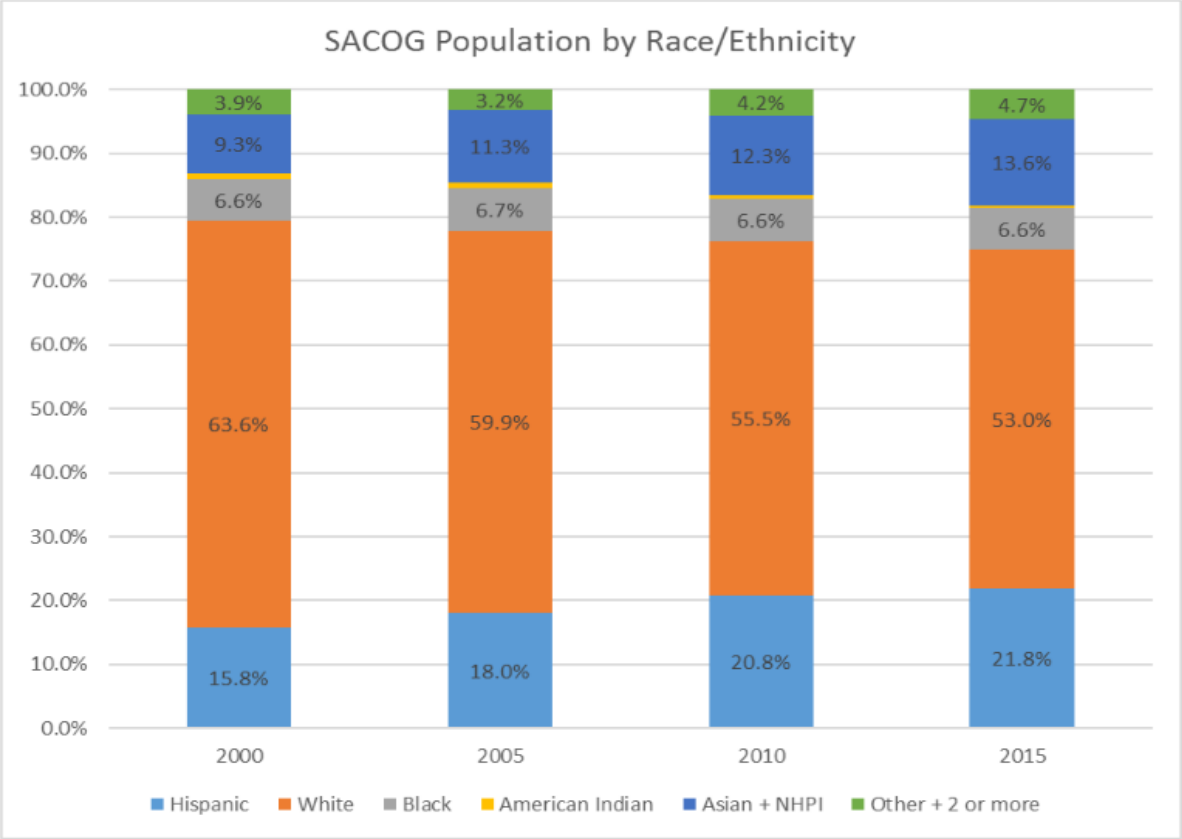
In addition to educational attainment, employers are increasing looking for increased digital literacy skills in the workforce. While the digitalization of occupations is occurring nationwide, the shift is even more marked in the Sacramento region. Brookings found the region's mean digital occupation score, which measures what digital skills are needed by occupation, is second highest within its peer group, and rapidly growing: In 2002 less than 50 percent of occupations in the region required medium or high digital skills; this number now stands at over 70 percent.[22]

Finally, like the rest of the state and country, the Sacramento region continues to age. In 2000 about 11 percent of the regional population was 65 or older. This has now grown to 14 percent, and is expected to increase to 18 percent by 2030. The region also is becoming more ethnically diverse, with the share of non-white residents overall increasing from 36 percent in 2000 to 47 percent in 2015.[23] See Figure 7. Youth are already majority minority which has strong implications for the region's education and workforce development systems. Currently whites and Asians have higher levels of educational attainment than black and Hispanic residents in the region. In the workforce section, the Prosperity Strategy explores how to ensure our increasingly diverse workforce has the in-demand skills to compete in an evolving economy, including the shift towards digital skills.

[22] Brookings Market Assessment

[23] SACOG Progress Report

Figure 7.



Source: 2000 & 2010 Decennial Census, 2005 & 2015 Census 1-year ACS

INFRASTRUCTURE AND BUILT ENVIRONMENT

Housing production in the Sacramento region peaked in the housing bubble of 2004 to 2007 at over 20,000 units per year, then bottomed out to a few thousand in the heart of the recession. Housing production is beginning to increase, but is still slower than historic levels. Notably, the Sacramento region appears to be lagging much the rest of the state in the so called "apartment boom." While regions such as San Diego, Los Angeles, and the San Francisco Bay Area have greatly increased the percentage of total new units built since 2010 that are multi-family, the Sacramento region has actually seen this ratio drop: while about two-thirds of all new housing units in those coastal regions now are multi-family, the same indicator for the Sacramento region stands at less than 15 percent.[24] Brookings found that a less dense development pattern has resulted in a decline in the number of jobs the average resident can access within a reasonable commute, as both jobs and housing dispersed to more outlying areas. The Prosperity Strategy explores the spatial efficiency of the region's recent growth pattern, and its link to economic prosperity.

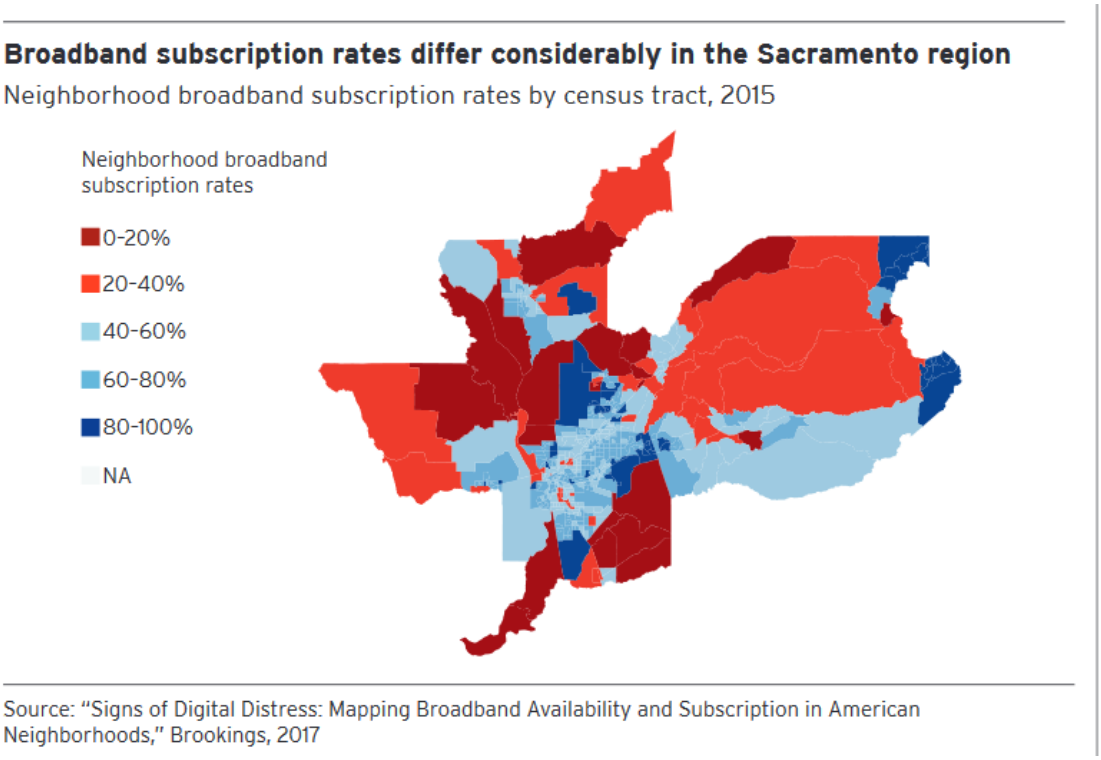
[24] SACOG Progress Report

In addition to housing production, the region's commute patterns were affected by the recession. Historically the region has had much less delay on a per traveler basis than the other large metropolitan areas in the state. Regional congestion actually decreased during the recession, as the loss of jobs and income, combined with relatively high fuel prices, contributed to the large decline in vehicle miles traveled between 2008 and 2012.

Data from the America Community Survey suggest that the largest shift in travel behavior during the recession was a decline in carpooling and an increase in working at home. The region also saw a small uptick in trips by bicycle, and the region now possesses above average shares of walking and bicycling commute trips (though these overall numbers are still quite small). Since the economic rebound the Sacramento region has seen single occupancy vehicle trips increase noticeably, while regional transit service and ridership has not yet recovered to pre-recession levels. In response, the Prosperity Strategy delves into the types of transportation infrastructure that best support an inclusive and advanced regional economy.

Finally, broadband has been an area of focus for the Partnership and is a targeted area of the CEDS. Large swaths of the region's rural communities have low broadband access, as do central city neighborhoods with high poverty rates, as shown in Figure 8 below. This disparate regional broadband coverage dampens business opportunities, hurts workforce participation and training, constrains public safety and emergency services – especially critical in this time of disasters, and limits access to opportunities. High-speed broadband and access to technology are critical foundations for the smart, connected, sustainable and equitable communities of the future, and for leveraging the benefits of ag technologies to increase agricultural productivity, sustainability and innovation in this vitally important economic cluster, as well as serving as a vital enabling technology for the future mobility cluster.

Figure 8.



PROSPERITY PARTNERSHIP LAUNCHED NEXT CEDS IN RESPONSE TO CANDID SELF-ASSESSMENT

The above profile gives a brief overview of the regional economic situation, highlighting some worrisome indicators that if unaddressed could erode regional economic competitiveness, but also noticeable positive momentum as the region rebounds from a recession that was deeper and more sustained in the Sacramento region than in most other parts of the nation. Working with a broad array of stakeholders across the full six-county region, the Prosperity Partnership has organized around a shared economic development vision that responds to such vulnerabilities and builds off the positive indicators of the last several years. This work forms the basis for the Prosperity Strategy, the foundation for the region's 2020-2025 CEDS.

The Prosperity Strategy is anchored by a set of core principles that lay out a vision for an advanced, inclusive economy. The principles were vetted and refined in 2019 through input from local elected officials, the business community, the equity working group, and the general public. They nest within three themes: improve business, support people, and develop place:

Improve Business

1. Advance competitiveness, drive jobs and investment into the region
2. Target advanced industry and traded sector job creation, including in the food/ag and health/life science clusters, and in mobility
3. Support improvements to the business climate that increase innovation, university tech transfer, and business dynamism and scaling

Support People

4. Improve access to requisite education and in-demand occupational skills, making digital skills a shared workforce development priority
5. Leverage workers and entrepreneurs from all backgrounds to foster equitable wealth creation and inclusive growth
6. Increase access to community programs, jobs, capital, health care, and stable housing for vulnerable and struggling communities

Develop Place

7. Invest in infrastructure that supports regional mobility and accessibility, including affordable transportation options for low-income residents
8. Increase housing affordability through production, diversity of housing types, supportive infrastructure and community investments
9. Support healthy, safe and complete communities with place-making assets and 'next-generation' transportation options

Key to these principles, and serving as an overlay to the full strategy, is an inclusive economy framework that recognizes that an economically prosperous region must tackle both growth and inclusion. As noted in the Introduction, regions with less inequity grow more sustainably, as they are more efficient and productive and reduce costs of concentrated poverty. Research shows a positive correlation between sustained growth and lower levels of inequality, racial segregation, and income disparities between different parts of a region.[25] Thus, there is both a moral imperative and a business case for focusing on more inclusive growth, where underserved people and communities participate in new growth opportunities. The Prosperity Strategy's framework treats inclusion as an essential part of decision making, rather than as a separate consideration after the deployment of strategies.

While there are many contributors to competitiveness, the Prosperity Strategy focuses on five key leverage points as they have shown to be the key drivers/levers and enablers of successful metropolitan economies; these five areas are also where regions have stronger institutional capacity or other influence to execute upon a shared regional vision. These include: regional clusters, human capital, infrastructure and spatial efficiency, innovation and governance. [26]

Figure 9. **Five Market Levers for Economic Growth**

Source: RW Ventures, Scaleup Sacramento Report

[25] RW Ventures, "Scale-up Sacramento: An Economic Agenda."; Manuel Pastor and Chris Benner, *Equity, Growth and Community: What the Nation Can Learn From America's Metro Areas*.

[26] RW Ventures, "Scale-up Sacramento: An Economic Agenda."

- **Clusters –** Industry-based concentrations of firms and related institutions that are more efficient and productive when co-located, due to lower transaction costs among buyers, suppliers and customers; sharing of labor pools and other common inputs; facilitating knowledge exchange; and enhancing the cluster's innovative capacity.
- **Human Capital Development and Deployment –** Human capital is the most important asset in today's knowledge economy. Maximizing its impact requires better developing workers' skills to match emerging jobs and efficiently connecting workers to those jobs. This requires strategies such as changing employer hiring practices to emphasize skills over (often outdated) credentials, creating better means of matching workers with jobs and upskilling opportunities, and tailoring education and training to in-demand skills in growing clusters.
- **Innovation and Entrepreneurship –** The ability to innovate is the core driver of increasing productivity. In a more competitive, fast-paced, knowledge-based economy continual innovation, commercialization and business creation is crucial for economic success.
- **Spatial Efficiency –** The relative location of businesses, suppliers, workers and consumers within a region (and the physical and virtual infrastructure that connects them) greatly influences efficiency and productivity. Co-location and connecting infrastructure determine the costs for moving goods, people and ideas, in turn enhancing or diminishing many economic benefits of agglomeration.
- **Governance –** Not to be confused with govern*ment*, govern*ance* encompasses all the institutions, formal and informal, that provide the infrastructure to foster economic networks, innovation and other activity. While government plays a key role – shaping and enabling market activity and providing the public goods that enhance productivity and efficiency – a broad range of civic, private-sector and cross-sector institutions are central to establishing an environment conducive to economic growth.

In the next section of this report, the Prosperity Strategy looks deeper into the strengths, weaknesses, opportunities and threats facing the regional economy. Next, it lays out an action plan that responds to the findings of the regional market assessment.

IV. ANALYSIS OF REGIONAL STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS (SWOT)

METHODOLOGY

As part of the CEDS process, a series of stakeholder outreach and consultation activities occurred with focus groups, community, and practitioner engagements, and Board of Supervisor and staff briefings beginning in 2018 and over the course of 2019 (*see Appendix A for List of Meetings & Briefings*). Consultations were organized to gather input on regional assets and local assets with a regional impact, and to help identify critical factors to further the region's unique economic positioning. This process – an in-depth analysis of the regional strengths, weaknesses, opportunities, and threats (SWOT), also featured content from four of the six counties that have already adopted their own sub-regional CEDS: Yuba and Sutter counties within the Yuba-Sutter Economic Development District; and Placer and El Dorado counties as part of the Sierra Business Council CEDS. Local and county economic development strategies also were reviewed.

The focus groups were organized by local economic development partners, chambers of commerce and workforce board members and included business owners and civic leadership organizations and education representatives. Greater Sacramento Economic Council's local Economic Development Directors Taskforce (EDDT) provided guidance and input over several meetings and members assisted with focus group convenings (*see Appendix B for EDDT group* and *Appendix C for List* of *Representatives* of focus groups and briefings along with other participants including interviews and subject matter consultations). The groups provided input on their economic prosperity priorities within the context of alignment/connection with the regional strategy and the areas of focus which the Brookings Institution identified.

The results of the SWOT included but were not limited to specific areas in the region's tradable clusters (Food and Agriculture and Life Sciences); the state of the regional and global economy as globalization advances; the Future of Work and the impact – both promising and alarming – of automation; trends in education and skillset needs within workforce development; the rising yet comparable cost of living; public safety and preparedness; infrastructure in regards to transportation and broadband access; and regional branding to the external market. Some of the areas were considered as both strengths and weaknesses, such as housing costs being a strength when compared to Bay Area prices, but a weakness within the region given wage levels and rapidly increasing costs which are constraining affordability, including for the workforce. The following is a synthesis of key areas and perceptions.

STRENGTHS

- Capital of 5th Largest Economy in the World/Global Policy and Innovation Leader
- Bay Area Proximity / Megaregion
    - Comparative to the Bay area, there is an advantage to the cost of living advantage, but the *rising* cost of living is tough for historically vulnerable populations, such as aging populations, economically disadvantaged, workforce. Therefore, can be a threat in that aspect
    - Proximity to the San Joaquin Valley (e.g., Stockton Port and Agriculture), especially for south region locations, yet still within proximity for Greater Sacramento and Bay Area relationships
    - Telecommuting opportunities
- High Level Health Care System:
    - Level I-IV trauma centers
    - Four major hospital systems/clinical trials
    - Life sciences capabilities, especially through UC Davis
- Diversifying Economy in Key Clusters
    - Manufacturing companies
    - Food and Agriculture sector
    - California Mobility Center
- Education & Workforce Training Systems
    - Education establishments: UC Davis research university; #5 public university; #1 Veterinary Science, CSU Sacramento (regional university), University of the Pacific, William Jessup University, Community Colleges (3 CC districts), and satellite campuses
    - Strong STEM programs in some areas; developing education-workforce pipeline programs
    - Strength in life sciences and sustainability
- America's Farm to Fork Capital
    - The region coined Farm to Fork as an authentic brand in Food & Ag
    - Ag & Ag Tourism – recreation and tourism is a huge piece across the region, and one of the strongest economic drivers
- Natural Resources
    - Water supply, hundreds of parks, Sierra Nevada, American River Parkway, rivers, flyways, open space
- Leadership in Climate Change Response and Resiliency
- Emerging Innovation and Entrepreneurship Ecosystem:
    - UC Davis Venture Catalyst
    - UC Davis institutes, research centers, entrepreneurship academies
    - Carlsen Center for Innovation & Entrepreneurship at CSU Sacramento
    - Sacramento Urban Technology Lab; StartUp Elk Grove
    - Incubators/Accelerators; co-working spaces; ecosystem network organizations (i.e., Sac Start Up, CleanStart); Community Colleges Maker Spaces/Hacker Lab
- Transportation Network
    - Sacramento International Airport, Beale Air Force Base, McClellan Air Force Base, Mather Airport
    - Local Bus and Light Rail Transit Services (also a weakness)
- Inclusive Growth Opportunities
- Quality of Life
    - Tourism, arts, film recreation, and businesses come for travel. A significant growth year over year
    - **Geographic** diversity of the population (not high cultural/ethnic diversity, but continues to increase)
    - Affordability
    - Good place to raise a family/do business

WEAKNESSES

- Workforce Skills Gaps in High Demand Occupations (especially middle skills/career technical)
    - Disparities in digitalization of skills
    - Don't have the workforce for many entry-level positions, especially in the region's cluster sectors; the agricultural workforce is in short supply
    - The shortage in middle skills jobs causes companies to pull workforce from elsewhere (e.g. construction), but there is also competition within the region for skilled workers across companies
    - The pipeline could be strengthened between education & workforce systems
- Economic Disparities/Housing/Homelessness:
    - Food Insecurity - 20% of our residents are food insecure
    - Lack of affordable housing is an increasing problem; compared to the Bay Area we're a great housing bracket, but within our region and given the rate of pay our housing costs are rising
    - Regulations are affecting the cost of housing
    - The scale of homelessness is driving business away in commercial areas
- Public and Natural Safety at Risk; Lack of Preparedness
    - Forest health is in danger with the fires (also, communities and water supply); also affecting availability and cost of insurance
    - Levees failures/flood risk/drought risk
    - Clean air is at risk, especially as a result of fires
    - Homeless with mental health issues pose public and business safety concerns
- Business and Corporate Presence
    - Minimal corporate presence and/or lack of corporate headquarters
    - Companies face challenges with obtaining access to capital, or lack a promising financing vehicle altogether; trouble scaling to maintain competitive advantage
    - The lack of wet lab space, innovation center(s), and development sites
    - Financing for agriculture is scarce, often resulting in microloans
    - Region is risk averse, and lacks "new money" for investment; limited access to capital
- Infrastructure
    - Transportation – increasingly broken transit system and aging infrastructure; is not good or non-existent in certain areas; major fragmentation
    - Rural infrastructure: transportation, water (supply, quality, etc.), sewer/wastewater, forest/watershed, levees, fire detection
    - Broadband infrastructure and access gaps
- Government Fragmentation
    - Results in duplicate work, missed opportunities, and/or over regulation
    - Government agencies are centralized downtown, which is a significant contributor to traffic, time of commute, and wear and tear on road infrastructure.
- Tariffs: having a major impact on the food and agriculture sector
- Ethnic and Cultural Diversity:
- Although there are concentrated communities and activities that reflect ethnic and cultural diversity, ultimately, there is not evenly spread ethnic and cultural diversity throughout the region. Research has shown that diversity ca be a growth-enhancing driver to innovation, creativity, and technological process[27]
- The shift in consumer behavior: affecting everything from retail to housing; impacts retail tax revenues

[27] Rodríguez-Pose, A., von Berlepsch, V. Does Population Diversity Matter for Economic Development in the Very Long Term? Historic Migration, Diversity and County Wealth in the US. Eur J Population 35, 873–911 (2019). https://doi.org/10.1007/s10680-018-9507-z

OPPORTUNITIES

- Business Growth and Trends
    - The region has a lot of opportunity for increased business growth in core cluster sectors (food and agriculture, health sciences, mobility, agritourism, and manufacturing)
    - It is more cost effective to do business here than in the Bay Area; the region should capitalize on it.
    - The trend in the Future of Work suggests an opportunity to work remotely, telecommute, and in turn decentralize the downtown core, reducing the density of traffic
    - Although retail, nationally, is negatively trending, it is still a leading economic driver in several of the cities and counties considering the casinos, agritourism, and food entrepreneurs
- Strengthening/Creating Alignment of the Workforce Talent Pool and the Education System through maximizing existing assets (makerspace, digital skills initiatives, Career Technical Education programs, Sacramento Valley Manufacturing Initiative, partnerships with the education system at all levels)
- Transportation
    - Metropolitan Transportation Plan investments
    - Investment in workforce-related transportation
    - Partnering with private companies, such as ride sharing
    - Use the region for pilot projects and a testbed for transportation (e.g. busing workforce into the region; autonomous vehicle pilot programs)
    - Emerging potential for mobility and alternative transportation. The region has an opportunity to establish itself in sustainable energy, sustainable transportation, advanced transportation, CleanTech, and innovation in transportation through the California Mobility Center
- Invest in the Emerging Innovation Ecosystem (UC Davis Venture Catalyst, Aggie Square, CA Mobility Center)
    - The innovation ecosystem is an emerging strength and evolving opportunity for the region, especially in food and ag and health care/life sciences. The opportunity can expand to other sectors as well
    - There is an opportunity to invest and capitalize in food entrepreneurship
- Maximizing the Region's Areas for Project Development and to Attract Business Growth
- Changing the External Branding and Perception of the Area
    - Marketing as a region with tremendous opportunity to be a pilot location, that utilizes proximity to the State Capitol. The sub-regions have an opportunity in taking ownership in it being okay not to be like everyone else; diversity of communities.
- Maximizing the Region's Natural Resources (e.g. lead on development of forest resilience/recovery, watershed restoration, development of new sustainable wood products that could help revitalize rural communities)
- Prepare for the Next Recession and Global Dynamics
    - Develop a proactive process that accounts for Future of Work, technology/societal disruption and job displacement, leadership as a region, and agility as a region
- Investing in Infrastructure and Broadband – getting the region ready for 5G, smart communities
- Economic Development
    - Opportunity zones have the potential to bring private capital to communities, if regulated correctly
- Co-creation of sustainable community-based economic development with communities most impacted by divestment and historical barriers to opportunity
- Better understanding of the number of entrepreneurs of color in the industry clusters and their potential for investment and growth

THREATS

- Education & Workforce Systems:
    - Sacramento Unified School District facing potential bankruptcy. This will reduce businesses coming here due to long-term impact of workforce development, implications of conflict
- Job Displacement (e.g. automation):
    - Automation poses as a threat to certain occupations and sectors
- Trade Policy/Tariffs
- Natural disasters (wildfire, drought, floods, tree mortality, levee breaks)
- Economic Downturn
- Infrastructure Failures
- Brain Drain is a problem (people leaving and not enough high-quality jobs for youth)
- Greenhouse Gas Emissions / Climate Change
- Public Safety
    - Forest health, wildfires would be catastrophic
- Opportunity Zones
    - Presents the potential to displace vulnerable communities
- Housing costs/availability
- There are not enough Developers given the need for certain types of new facilities and infrastructure; shortage of the construction workforce
- Aging Population in rural towns/counties
- Water thieves
    - Don't have the right to store water and water regulations can be a major obstacle.
- Affordability all Around (housing, food, cost of living)
- Preparedness in Public Safety:
    - Public safety at risk (forest health, levees, etc.)
    - Homelessness and mental health issues. We do not have an effective way to deal with rapid increase in mental health issues across the region. This is also a manifestation of the economic disparities, lasting effects of recession cuts in mental health funding, and how local business partners are responding to the impacts on business investment and corridors
- Onset and Increase of Concerning Trends
    - Human trafficking, mental health, and addiction
    - One of the biggest issues that for-profits have about our region is the increase in homelessness; it is challenging for businesses from a security and appearance standpoint, and a humanitarian crisis
- Insurance
    - Loss of access to insurance and the increase on insurance rates due to fire threats
    - Devastating to seniors: if and/or when they decide to sell property, they find it difficult to sell
- Pension Pressures
    - We are in a region that has a sector dedicated to government; as pension costs are increasing, services and financial standing of jurisdictions are impaired
- Disengagement/exclusion of communities from prosperity planning through a top-down approach to inclusion

The following sections of the Prosperity Strategy delineate near-term priorities and corresponding tangible actions the region will take in the five action levers/market drivers, with an evaluation framework to measure progress over the course of the CEDS. The CEDS also includes examples of projects across the region that align with the core strategies that can be developed/added over time, given the five-year time frame of the CEDS.

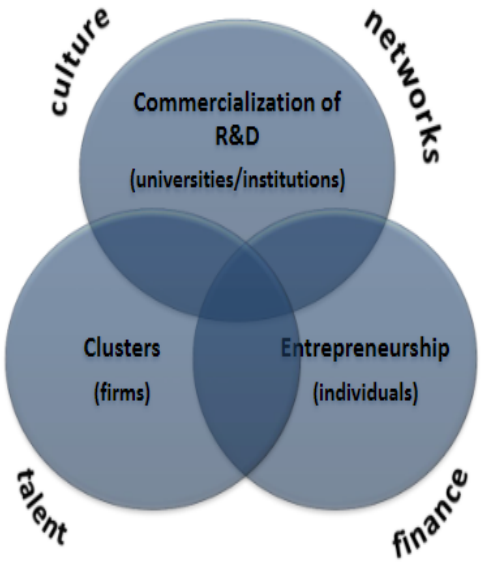
V. INNOVATION AND ENTREPRENEURSHIP

A key element of a region's economic growth is the depth and impact of its innovation activities. At a fundamental level, all economic growth stems from a form of innovation, which by definition generates new value from existing resources through the creation and sale of novel products and the implementation of new processes. While this basic description is relatively straightforward, the ways in which innovation arises and is nurtured are not as commonly understood. An examination of the mechanisms through which innovation occurs in the economy clarifies where opportunities exist to grow a region's innovation activities.

As framed by RW Ventures, Figure 10 illustrates the pathways, institutions and factors – sometimes called "ecosystem[28]" -- that enable and support innovation. Central to this system are the connections between three primary sets of actors and their activities: 1) basic and applied research emerging from universities and private institutes and the commercialization of those findings; 2) individual entrepreneurs and their ability and willingness to conceive of, prototype, pilot and produce new products and processes; and 3) the clusters of firms that generate, support and scale innovations to produce substantial economic impact. Surrounding and facilitating those connections are crucial supporting elements: an innovative, risk-taking culture; a rich talent pool; nimble, flexible networks to connect the system's actors; and the right capital to scale each actor's activities.

Figure 10.

Innovation Ecosystem



Understanding these interactions also explains innovation's relationship to entrepreneurship. The two overlap but are not equivalent, as not all entrepreneurs are engaged in ground-breaking, market-making enterprises.

[28] The phrase "innovation ecosystem" is often used to refer slightly more narrowly to the ecosystem supporting entrepreneurship, which heavily overlaps with but is not identical to this broader framing of drivers of innovation.

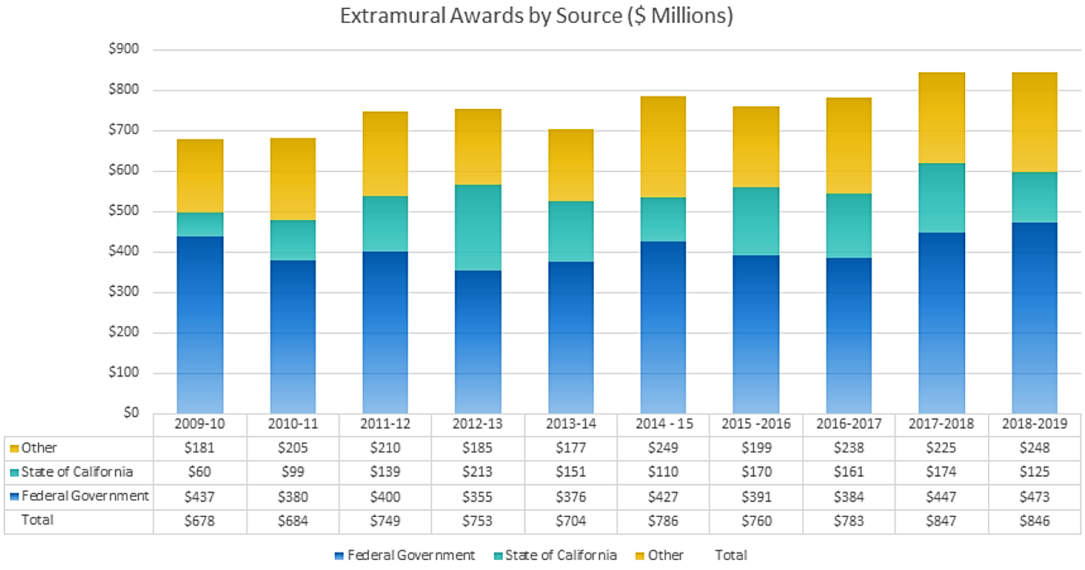
Entrepreneurship also encompasses more standard small business formation, and growth in existing products and services. While this type of entrepreneurship may not generate transformative innovations, it is still relevant for regional growth, as it provides a path to increased wealth and ownership. The analysis in this section is the foundation for the Prosperity Strategy's approach to create a highly supportive business-friendly environment.

GREATER SACRAMENTO REGION MARKET FACTS

ACADEMIC R&D AND ACCOMPANYING TECH TRANSFER AND COMMERCIALIZATION

The Sacramento region's research engine is dominated by UC Davis, an institution ranked fifth among public universities in the United States, first in the world for veterinary science, first in the nation for agriculture, and second in the world for research in agriculture and forestry.[29] These research strengths generate substantial funding for research and development (R&D): $847 million in 2017-2018, about three quarters derived from state and Federal sources.[30] Three fields dominate: health sciences (26 percent), biological and biomedical sciences (25 percent), and agricultural sciences (19 percent). Total extramural R&D funding is up about a third over the past decade in nominal terms.

Figure 11.



	2009-10	2010-11	2011-12	2012-13	2013-14	2014 - 15	2015 -2016	2016-2017	2017-2018	2018-2019
Other	$181	$205	$210	$185	$177	$249	$199	$238	$225	$248
State of California	$60	$99	$139	$213	$151	$110	$170	$161	$174	$125
Federal Government	$437	$380	$400	$355	$376	$427	$391	$384	$447	$473
Total	$678	$684	$749	$753	$704	$786	$760	$783	$847	$846

Source: UC Davis Office of Research

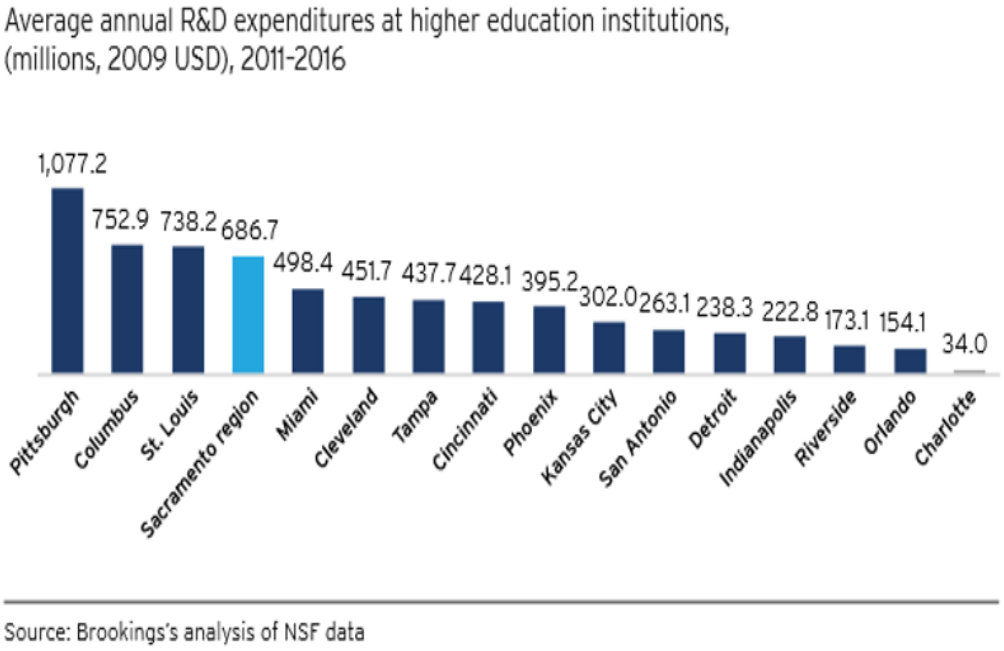
[29] UC Davis College of Agricultural and Environmental Sciences, *Country's Best Ag College Ranked #2 in the World*, February 2018. https://caes.ucdavis.edu/news/articles/2018/february/were-the-1-agricultural-school-in-the-nation and UC Davis rankings: https://www.ucdavis.edu/about/rankings/

[30] UC Davis Office of Research, *Research Engaged,* September 2019. https://research.ucdavis.edu/wp-content/uploads/OR-Annual-Report-2017-18-FINAL-3.15.19.pdf

These research dollars help make UC Davis an academic powerhouse. The Centre for Science and Technology Studies (CWTS) and Leiden University found that within life and earth sciences, UC Davis is the world leader in "high-impact publications" - those ranked within the top 10 percent of most cited publications.

Along with $15 million in R&D at Sacramento State University, UC Davis research drives the region's relative success in R&D: "The region stands out among American Middleweights in its amount of university led R&D. Among its peer group, the Sacramento region generated higher average levels of university R&D than all but three other regions between 2011 and 2016, led by the University of California Davis' (UC Davis) average of $672 million per year and California State University, Sacramento's $15 million per year."[31]

Figure 12.



COMMERCIALIZING UNIVERSITY RESEARCH

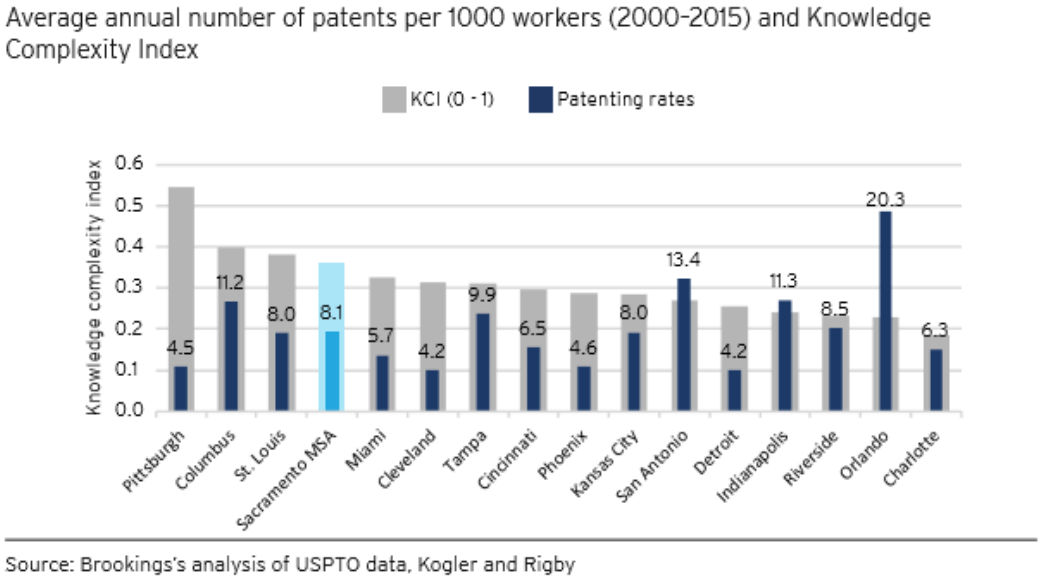
R&D is only the first step in the path to production and growth. The next step – commercialization – is critically important and also a formidable challenge. To create economic value, applied R&D must be introduced into the marketplace – commercialized – through existing firms or the creation of new firms. Translation of research into viable technologies, products and services that meet market needs is a complex and iterative process and therefore challenging to measure. However, UC Davis has implemented several programs since 1999 to support the transition of new technologies into the marketplace, and these are generating positive results. These include

[31] Parilla, Joseph, Sifan Liu, and Marek Gootman. "Charting a Course to the Sacramento Region's Future Economic Prosperity," April 2018. https://www.brookings.edu/wp-content/uploads/2018/04/sacramentoregioneconomicprosperity_fullreport.pdf. p. 24.

the newly recast Innovation and Technology Commercialization (ITC) Division with the Office of Research, with both InnovationAccess and Venture Catalyst. ITC enables technology development, from conception to commercialization, by providing tools, services, resources and connections to researchers and entrepreneurs.

Many technologies invented at UC Davis have substantial commercial promise. Overall, UC Davis received 98 patents in 2018, with 154 records of invention, and over 900 active patents currently under management.[32,33] Commercialization often requires the protection of intellectual property (IP), so patenting activity is a useful proxy for measuring the connection between knowledge and commercialization. Overall, the Sacramento region's patenting activity is fairly typical for similar regions; it generated 8.1 patents per 1,000 employees between 2000 to 2015, which does however lag high-patenting advanced manufacturing centers like Detroit, Cincinnati, and Cleveland (see Figure 13).

Figure 13.



Source: Brookings's analysis of USPTO data, Kogler and Rigby

Sacramento region patents cluster in biotechnology, computer technology, basic materials chemistry, and IT methods for management. Large patentees in the region include major biotechnology and agricultural technology firms like Novozymes, AgraQuest (now Bayer CropScience), and Marrone Bio Innovations, as well as major manufacturers like Intel and Hewlett Packard, and of course UC Davis itself.[34]

Some patents are more valuable than others. Dieter Kogler and David Rigby have developed a "knowledge complexity index" which attempts to capture the value of patents. Data from the index suggests that Sacramento's

[32] UC Davis Office of Research, Innovation and Technology Commercialization, FY 18-19. https://itc.ucdavis.edu/wp-content/uploads/2018-2019-ITC-Annual-Report.pdf

[33] UC Davis Technology Management and Corporate Relations, FY 17-18 https://research.ucdavis.edu/wp-content/uploads/2018-TMCR-Annual-Report.pdf

[34] UC Davis op.cit.

patents are relatively high value, ranking fourth among similar regions. High value patents are more likely to be commercialized, and complex knowledge also tends to be less mobile, as it requires more complex support systems.[35] Complexity is therefore a positive characteristic of Sacramento's patenting patterns.

Research organizations can commercialize their technologies by licensing the technology for private sector use, whether to an established firm or to a start-up newly formed specifically to commercialize that particular technology. spinning out firms in the form of startups. Other variations such as business partnerships are relatively rare. UC Davis has employed both pathways for licensing technologies. In 2018, it completed a total of 55 license agreements, along with 212 combined option and letter agreements. It also generated more than $10 million in royalties and fees from licensing agreements, a higher return per $1 million in research funding than is generated anywhere else in the University of California system. UC Davis also supports startups. Between the period of FY 13-14 to FY 18-19, the university enabled 14 startup companies per year on average.[36]

The region's commercialization path is supporting a lot of early stage innovation, but thus far may not be leading to as many firms as might be expected to stay and scale up – a measure of the region's "business dynamism" discussed below. However, UC Davis Venture Catalyst reports that from 2013 to 2018, about 73% of the program's startups have remained in the region.[37]

ENTREPRENEURSHIP AND STARTUPS

Startups are an important component of the regional innovation ecosystem. They represent new ideas, and in some cases, become carriers or commercializers of industry-transforming technologies. Every large firm was at one point a startup, so generating enough startups for some to become substantial firms is critical for long term growth. Startups in particular benefit from a highly networked environment. This is an acknowledged strength of innovation hubs such as Silicon Valley, Austin, and Route 128 in Boston, to name a few, where potential entrepreneurs, investors, experts, lawyers, mentors, technical talent, and potential partners rub closely together, and where the friction provides both the creative spark for new ideas and quickly helps turn those ideas into new companies.

In Sacramento's business culture, this fertile broth of cross-pollination generally has lagged, as reflected in data on "business dynamism," which measures the rate at which new firms are created. While dynamism has been declining nationally,[38] it has slowed more than the national average in the Sacramento region. A Kauffman Foundation study ranked Sacramento 13th out of 16 comparable regions for business dynamism.[39]

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[35] Balland, Pierre-Alexandre, and David Rigby. "The Geography of Complex Knowledge." *Economic Geography* 93, no. 1 (January 2017): 1–23. https://doi.org/10.1080/00130095.2016.1205947).

[36] UC Davis Venture Catalyst. https://itc.ucdavis.edu/wp-content/uploads/UCD-At-a-glance-infographic-V11.pdf

[37] Felicia Alvarez, "New Companies come out of UC Davis," Sacramento Business Journal (August 2, 2019).

[38] Haltiwanger, John C. and Hathaway, Ian and Miranda, Javier, Declining Business Dynamism in the U.S. High-Technology Sector (February 2014). Available at SSRN: https://ssrn.com/abstract=2397310 or http://dx.doi.org/10.2139/ssrn.2397310

[39] Arnobio Morelix and Josh Russell-Fritch, "Growth Entrepreneurship: Metropolitan Area and City Trends" (Kansas City: Kauffman Foundation, 2017).

It is possible that low rates of firm formation are partly historical. Anecdotal evidence suggests that more startups have been forming recently, and more entrepreneurs are being attracted to the region. As noted earlier in the report, the recent Brooking Metro Monitor shows a major improvement in ranking of jobs at young firms - #15 out of 53 very large metro areas from 2017-2018, compared to #46 ranking from 2008-2018.[40] A recent analysis ranked Sacramento as the 11th best area in the country for startup companies, as the region is increasing becoming a landing spot for highly educated young workers and businesses from the high cost Bay Area.[41]

The region's innovation culture and support for start-ups and entrepreneurs is itself accelerating, as several startup-oriented initiatives gain traction. These include *StartupSac,* a nonprofit aimed at accelerating Sacramento's startup and innovation ecosystem, and *HackerLab*. StartupSac is primarily focused on entrepreneur educational and networking. StartupSac runs several events for founders, entrepreneurs and innovators; Warmup Pitch – a competition to help entrepreneurs hone presentation skills for investors; and 1 Million Cups, the local chapter of a national education and networking program with weekly presentations and monthly entrepreneurship happy hours. Launched in fall 2018, 1 Million Cups has already hosted over 100 startups presenting at events. [42] StartupSac also offer training programs for potential entrepreneurs at Sierra College (which partners with HackerLab to run a maker and co-working space in Rocklin).

The region has several incubators, accelerators and entrepreneurship programs, with recent facilities, programs and partnerships in several cities including Sacramento, Davis, Woodland, Elk Grove, and Rancho Cordova. StartUp Sacramento's updated StartUp and Innovation Ecosystem Subway Map in Figure 14 and Figure 15 shows the connections and relationships of and support services available to entrepreneur and investors in the region's growing startup various resources (https://startupsac.com/sse/) – please refer to the link for detailed information.[43] Partners are working to decrease fragmentation and strive for a broader ecosystem/platform to connect startups to larger firms, financial resources and other pathways for scaling up.

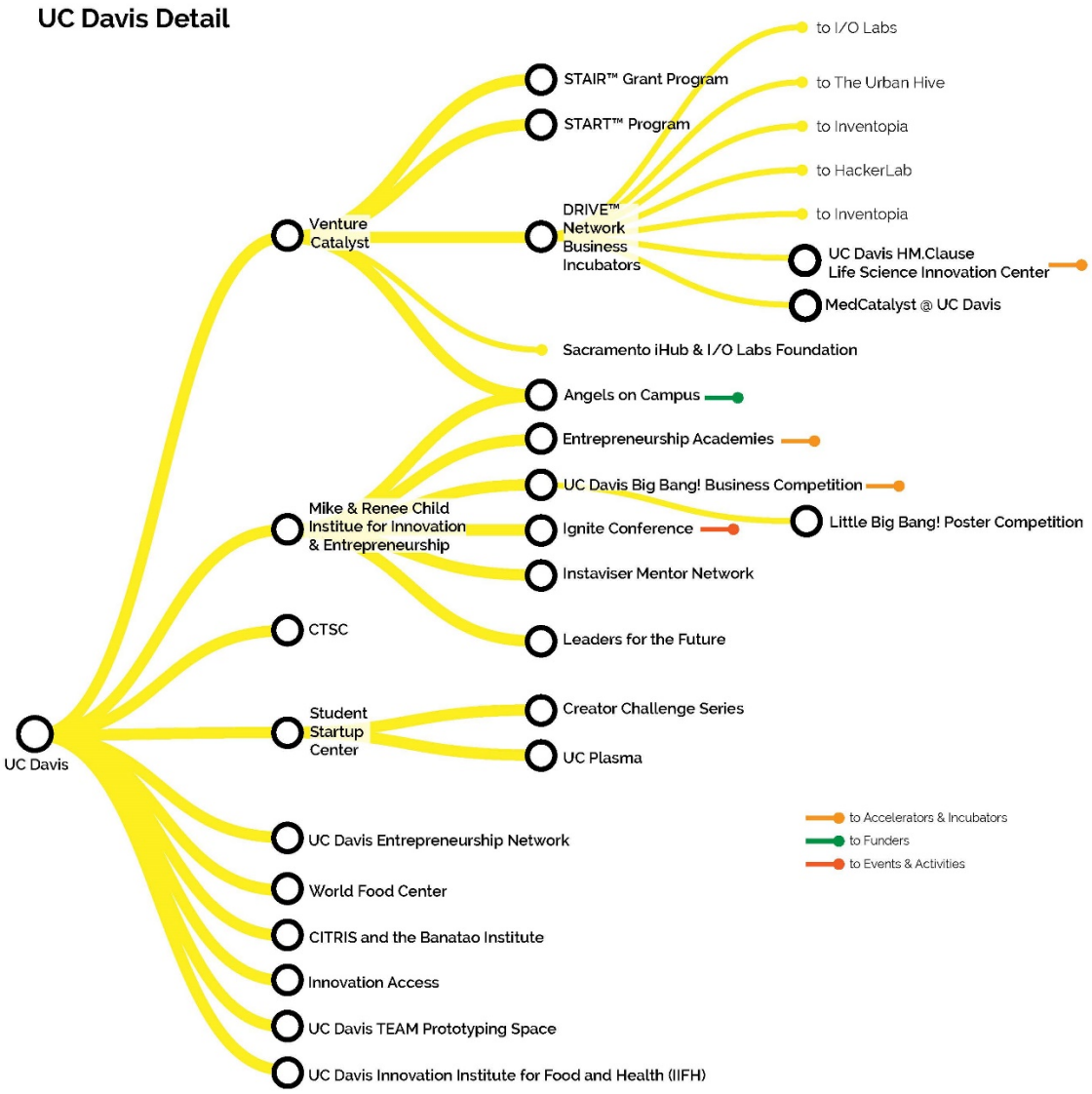
[40] Brookings Metro Monitor 2020

[41] Commercial Café, Ranked: Ten Best US Cities for Startups and Entrepreneurs (June 2019). https://www.commercialcafe.com/blog/top-20-startup-us-cities-2019/

[42] https://www.1millioncups.com/sacramento/events/17894

[43] Figure 14 is under update. Additional information can be found at https://startupsac.com/sacramentos-startup-ecosystem-map-gets-an-update/

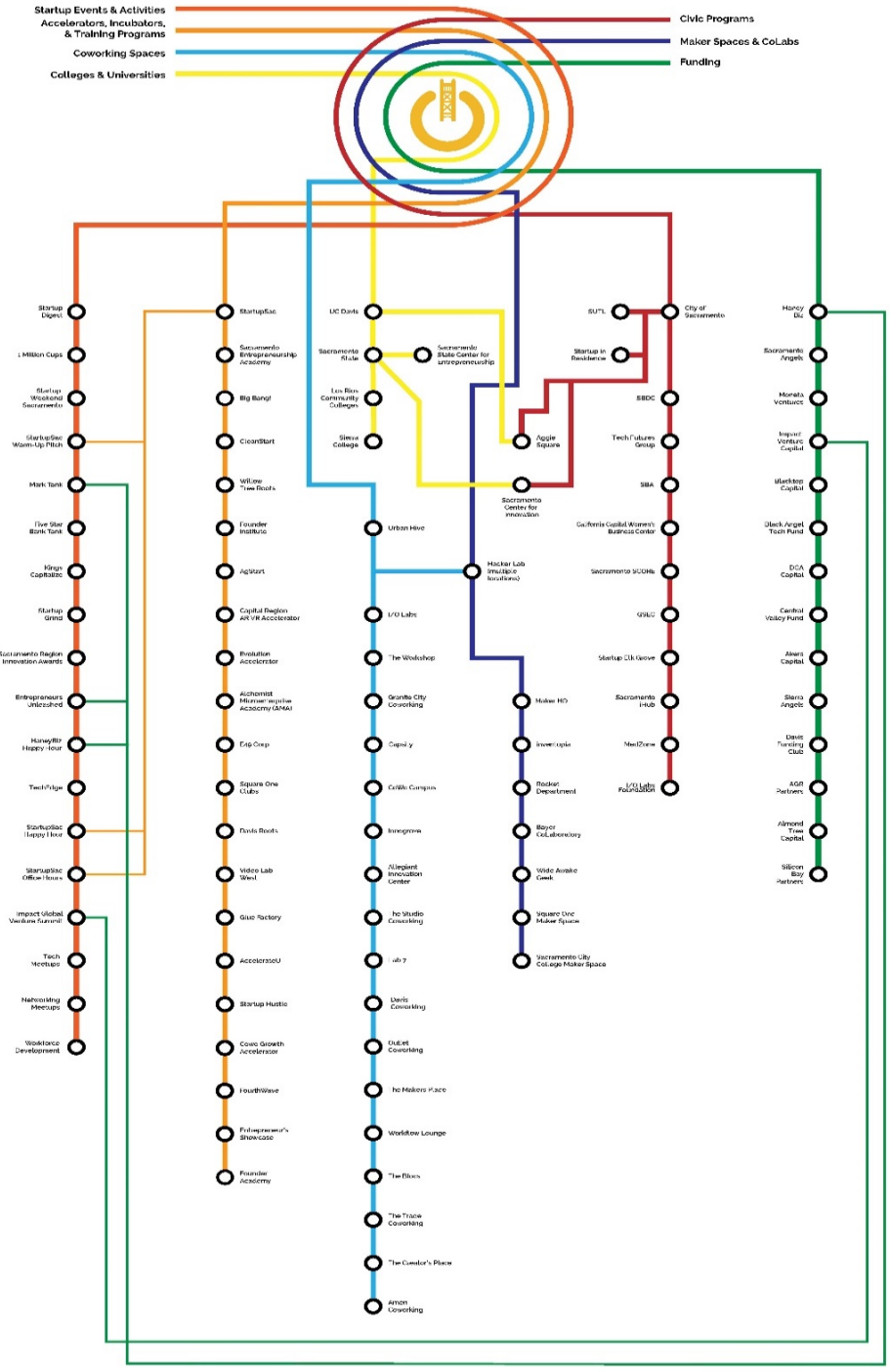
Figure 14.

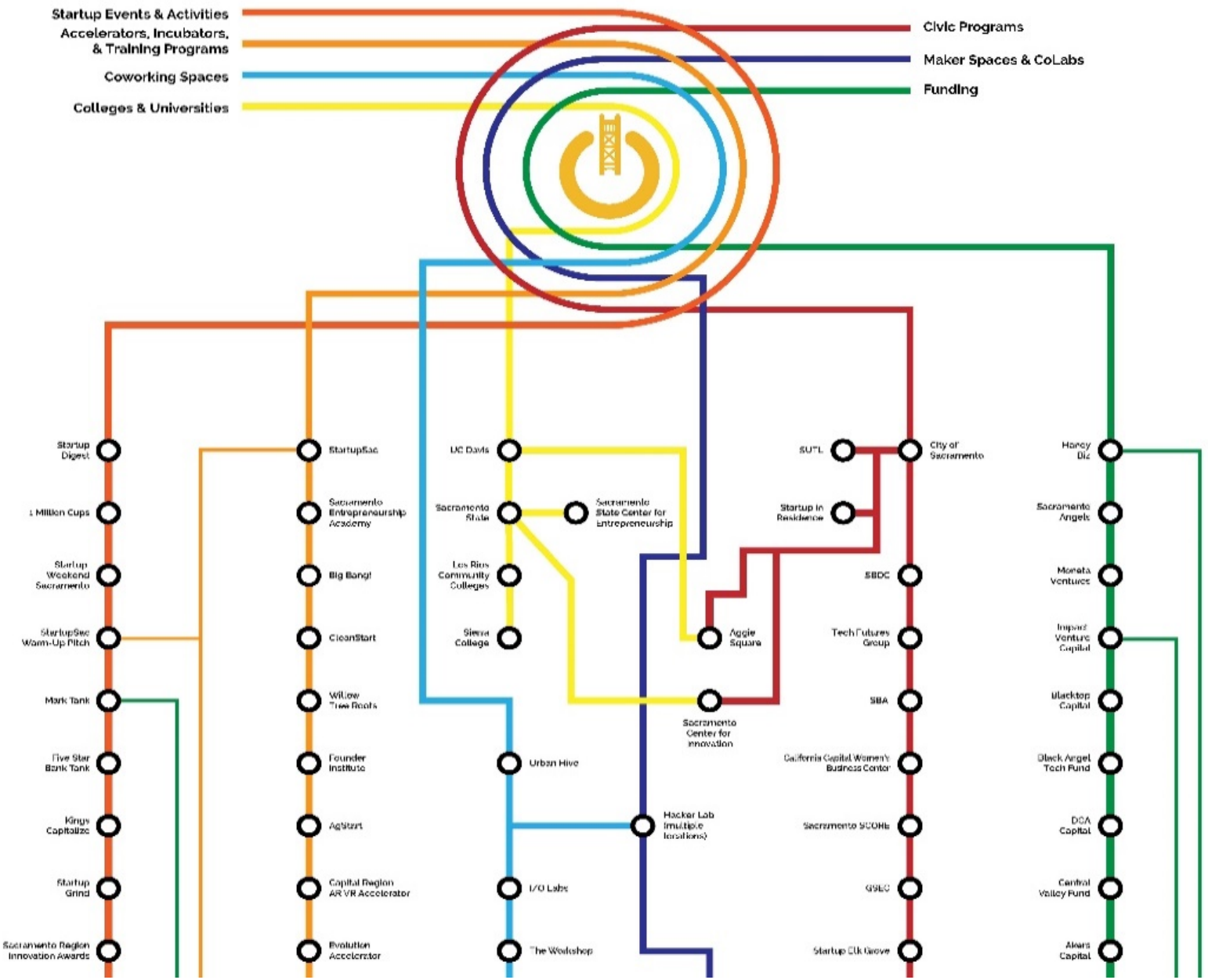


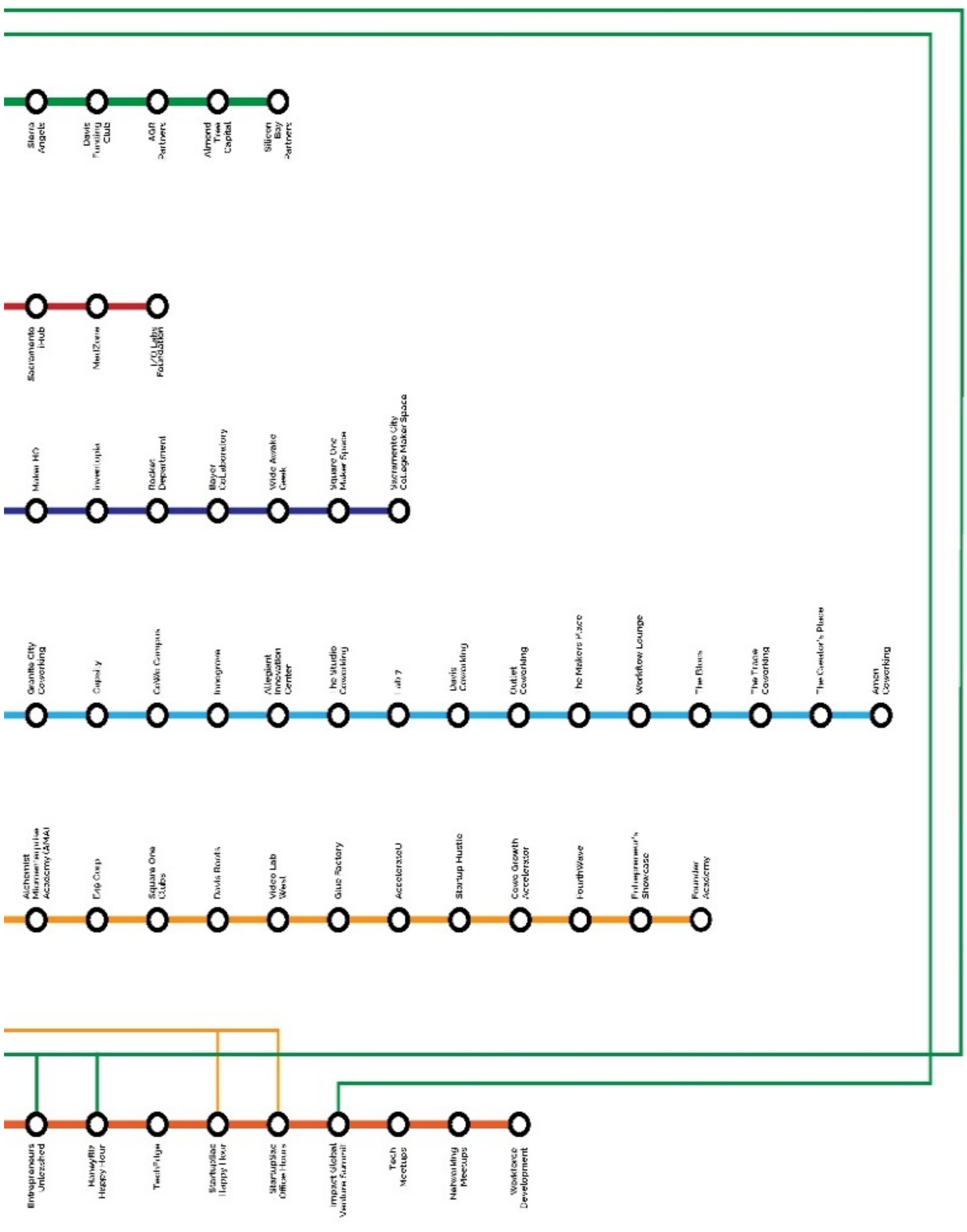
Source: Startup Sac (2/20) (note: will be updated by UC Davis)

Figure 15.

Sacramento Startup and Innovation Ecosystem Diagram v5.0




Startup Events & Activities
Accelerators, Incubators, & Training Programs
Coworking Spaces
Colleges & Universities
Civic Programs
Maker Spaces & CoLabs
Funding
Startup Digest
1 Million Cups
Startup Weekend Sacramento
StartupSac Warm-Up Pitch
Mark Tank
Five Star Bank Tank
Kings Capitalize
Startup Grind
Sacramento Region Innovation Awards
StartupSac
Sacramento Entrepreneurship Academy
Big Bang!
CleanStart
Willow Tree Roots
Founder Institute
AgStart
Capital Region AR VR Accelerator
Evolution Accelerator
UC Davis
Sacramento State
Sacramento State Center for Entrepreneurship
Los Rios Community Colleges
Sierra College
Aggie Square
Sacramento Center for Innovation
Urban Hive
Hacker Lab (multiple locations)
I/O Labs
The Workshop
SUTL
Startup in Residence
City of Sacramento
SBDC
Tech Futures Group
SBA
California Capital Women's Business Center
Sacramento SCOREs
GSEC
Startup Elk Grove
Harvey Diz
Sacramento Angels
Moneta Ventures
Impact Venture Capital
Blacktop Capital
Black Angel Tech Fund
DCA Capital
Central Valley Fund
Alears Capital


Sierra Angels
Davis Funding Club
Almond Tree Capital
Silicon Bay Partners
Sacramento I-Hub
MedZone
I/O Labs Foundation
Maker HQ
Inventopia
Rocket Department
Bayer CoLaboratory
Wide Awake Geek
Square One Maker Space
Sacramento City College Maker Space
Granite City Coworking
Allegient Innovation Center
he Studio Coworking
Davis Coworking
Outlet Coworking
he Makers Place
Workflow Lounge
The Trade Coworking
The Creator's Place
Amen Coworking
Alchemist Microenterprise Academy (AMA)
Square One Clubs
Davis Roots
Video Lab West
Glue Factory
Startup Hustle
Cowo Growth Accelerator
FourthWave
Entrepreneur's Showcase
Founder Academy
Entrepreneurs Unleashed
StartupSac Happy Hour
StartupSac Office Hours
Impact Global Venture Summit
Tech Meetups
Networking Meetups
Workforce Development

Resources for entrepreneurs and emerging companies includes the Urban Hive, CleanStart, and AgStart. The Urban Hive is a coworking "community" with more than 500 entrepreneurs, designers, creatives, coders and others, offering coworking spaces, offices, workshops and classes and networking and educational opportunities. CleanStart supports and connects clean technology entrepreneurs and system partners and tracks growth of companies in the sector. AgStart provides both an incubator and programs/services for ag and food tech entrepreneurs from within and outside of the region, including through a partnership with the UC Agriculture and Natural Resources to implement the VINE (Verde Innovation Network, a statewide network of incubators, accelerators and research networks funded by an EDA i6 grant - https://www.agstart.org/thevine.html). The *Entrepreneurs Resource Finder* is an online resource locator for services that support the region's entrepreneurs, similar to Kansas City's SourceLink Resource Navigator.[44] The Finder is funded by the region's four workforce development boards and is operated by I/O Labs.[45]

Startup Hustle is a training course for company founders modeled after Steve Blank's Lean Launchpad and is similar to programs available in Silicon Valley. Operated by Hacker Labs, its 9th cohort entered the program in 2019. Startup support for woman-led companies includes *FourthWave*[46] and *The Power of SHE* (Shaping & Honing Entrepreneurs), an incubator program for women of color from Willow Tree Roots.[47] Two new programs are also operating: the *California Capital AR/VR* accelerator serves early-stage companies in the augmented reality (AR) and virtual reality (VR) industry, while the *Founder Institute* had its first cohort January 2019.[48]

These networking and informational resources have been accompanied by the growth of incubators, accelerators and maker spaces. The largest and most established is *Hacker Lab,* a community-focused for-profit which operates out of two regional locations. It holds more than 100 classes/month and has more than 700 members, bringing "people, training, and advanced prototyping equipment together under one roof."[49] Its maker-space has more than $500,000 worth of equipment available to members.[50] Hacker Lab is, by design, an inexpensive place where ideas for new products can be tested and can move toward the prototype stage. A separate set of incubators is aligned with UC Davis (see below). Several of the region's community colleges have maker spaces (as well as teach business entrepreneurship courses), and California State University Sacramento is launching a new maker space as part of its new Carlsen Center for Innovation and Entrepreneurship.

Other more specialized support for entrepreneurs is emerging, such as Alchemist CDC's business training program and incubator for aspiring food entrepreneurs from low-income populations, Cowo Campus, a seed-stage startup accelerator that leverages expertise of the Northern California region and is powered by NorCal SBDC Finance

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[44] http://www.kcsourcelink.com/resource-navigator

[45] https://valleyvision.org/growing-entrepreneurial-communities/

[46] https://fourthwave.io/about/

[47] https://www.willowtreeroots.org/the-power-of-she?fbclid=IwAR2LvxEqj067ZTMJqUjW8oPRfRIPVDDYn3pPqbQQwMUOXixLm7QZuWyBJFU).

[48] https://startupsac.com/founder-institute-sacramento-graduates-its-inaugural-cohort/

[49] https://hackerlab.org/en. Accessed Oct 10, 2019

[50] https://hackerlab.org/en. Accessed Oct 10, 2019

Center,[51] and *MicroMentor*, a Mercy Corps social enterprise initiative with a mentoring platform. There are approximately ten coworking spaces in operation in Sacramento, with more planned for 2020. These provide entrepreneurs with relatively inexpensive startup space.

The City of Sacramento also supports the innovation ecosystem by positioning itself as the Sacramento Urban Technology Lab (SUTL), supporting various initiatives to build the region's tech sector – with the entire city as an innovation lab. The Sacramento Area Council of Governments has developed Civic Lab, working with teams around the region to design and launch creative pilot projects that address regional challenges. These types of initiatives signal that the region is positioning itself to be a test bed for innovation broadly applied.

STARTUP ACTIVITY AT UC DAVIS

UC Davis is a unique source of innovative ideas in the region, and it has made a concerted effort to support commercialization by the university's researchers and innovators through technology transfer. These efforts include programs that offer funding as well as advice for very early stage enterprises. In particular, Venture Catalyst, started in 2013, offers four main programs for entrepreneurs:

- *Science Translation and Innovative Research* (STAIR) (2013) provides proof-of-concept grants of $25,000 to $50,000 for university researchers to prove commercial feasibility of technologies being developed. STAIR has awarded over $1.8 million to 42 recipients, supporting 13 UC Davis-associated startups, and funding is growing: in 2019, six recipients were awarded a total of $409,000.[52]
- *Distributed Research, Incubation, and Venture Engine* (DRIVE) offers affordable, mixed office/lab business incubation spaces in Davis and Sacramento, and connects UC Davis entrepreneurs to partner incubators (see inset for partners).[53]
- *Smart Toolkit of Accelerated Research Translation* (START) supports entrepreneurs with company incorporation and legal support, market research, investor pitch coaching, connection to business and technology mentors, grant writing workshops, and access to contract service providers. One of the services START offers is the Economic Engagement and Community Outreach (EECO) systems, which facilitates connections between startups and the regional innovation and economic development ecosystem.[54]

DRIVE Incubators include:

- UC Davis-HM.CLAUSE Life Science Innovation Center
- Bayer CoLaborator
- HackerLab
- The Urban Hive
- I/O Labs
- Inventopia
- UC Davis Chile Life Science Innovation Center
- Davis Coworking
- MedCatalyst @UC

In addition, several UC Davis schools have their own programs aimed at supporting potential entrepreneurs. *The Mike and Renee Child Institute for Innovation and Entrepreneurship* (CFI) (2011) operates in the Graduate School of

[51] https://cowocamp.us/. Accessed March 25, 2020

[52] UC Davis Office of Research, Annual Report 2019, https://research.ucdavis.edu/wp-content/uploads/2018-2019-ITC-Annual-Report.pdf

[53] https://research.ucdavis.edu/offices/vc/start/drive/

[54] https://research.ucdavis.edu/offices/vc/start/

Management, hosting Entrepreneurship Academies, BigBang! Business Competition and other events. The *Center for Nano and Micro Manufacturing* offers state-of-the-art micro-nanofabrication technologies, processes, and services, and *Translating Engineering Advances to Medicine* (TEAM) provides design, prototyping, and fabrication facilities to speed the commercialization of new medical technologies.[55] *Seed Central* is a joint initiative of UC Davis's Seed Biotechnology Center and SeedQuest, and has significant traction within the seed industry. *Innovation Institute for Food and Health* focuses on developing and deploying breakthrough solutions to global issues across the food system. The Student Startup Center is designed to provide students with an opportunity to experience the entrepreneurial process while developing, refining and prototyping their ideas for technology startups; and Aggie Square, a planned innovation district that will house partners and community-based programs with UC Davis innovation and research.

As an institution, UC Davis is dedicated to supporting entrepreneurs as part of its strategy for translating university research into commercial activity. Its programs offer a wide range of supports. In addition to its own activities, UC Davis encourages startups to tap other resources. Notably, UC Davis startups received a total of $18.1 million from SBIR/STTR funding in 2017-2018, of which $4.5 million is linked to participation in Venture Catalyst SBIR/STTR workshops. The National Institutes of Health and National Science Foundation accounted for $16.7 million,[56] which further underscores the biomedical tilt of UC Davis commercialization. Associated startups also received $369 million in angel and venture funding.

Overall, the growing level of entrepreneurial activity in the region is encouraging. While historically an environment dominated by government and to a lesser degree by large companies as well as large hospitals and research institutions is not usually associated with high rates of business dynamism, there are new opportunities for the region - as the capitol of the 5th largest economy in the world - that can be leveraged to create advantages – both as a policy and incentive environment that supports new industries and start-ups and a new set of business services. This is particularly the case given the State's leadership around climate resiliency efforts and supporting investments. Changes in the business environment are also reflected in a number of recent initiatives in the region, including high impact cluster-based initiatives that are being planned which will accelerate the innovation ecosystem, discussed in below sections.

FUNDING/FINANCING

Few startups are – at least outside Silicon Valley – immediately good candidates for venture capital funding, which typically focuses somewhat further downstream, after initial revenues have been achieved and when valuations support a substantial investment. Bay Area venture funds have also been somewhat reluctant to fund companies in Sacramento. Angel funding, the frequent precursor to venture funds, is therefore a critically important component in the regional innovation infrastructure. There are a few angel networks in the region.

Sacramento Angels brokers connections between entrepreneurs seeking funding and members of the group. Investments are made by individual members, not the group itself; a limited number of companies are funded annually. To expand funding options, interested members invest collectively via an LLC vehicle. That should allow

[55] https://team.ucdavis.edu/

[56] https://itc.ucdavis.edu/wp-content/uploads/UCD-At-a-glance-infographic-V11.pdf, p. 1

investors to reduce their commitment to individual companies and hence support more startups.[57] Sacramento Angels also has three VC members – Akers Capital, Moneta Ventures, and Medforce – which provide advice and can step in if additional funding is needed.

Sierra Angels is Nevada's premier angel investment group. Its members provide funding, mentoring and strategic introductions for early-stage technology companies primarily in Nevada and Northern California. It also collaborates with other angel groups throughout the Western States. Investments so far support more than 60 companies in industries that include software, Internet, wireless, social media, IT, health tech, and clean tech. A *Davis Angels Network* is in the early stages of development.

Earlier assessments indicated that in the Sacramento region there are significant lags and gaps in the earliest seed funding, which is often provided by friends, family, previous founders as well as accelerators, crowdfunding platforms, and small angel investments. This initial funding of $10,000 - $500,000 is the oil that greases the initial development of ideas to the point that they are fundable at a more substantial level. These gaps are important, as obstacles in any segment of the innovation pipeline has ramifications downstream. They could in part be filled by better organized and more extensive pursuit of additional funding (e.g. from SBIR), as well as by the gradual emergence of a more risk-accepting business culture, in which individual investors are prepared to act as angels, accepting higher-risk in pursuit of higher returns.

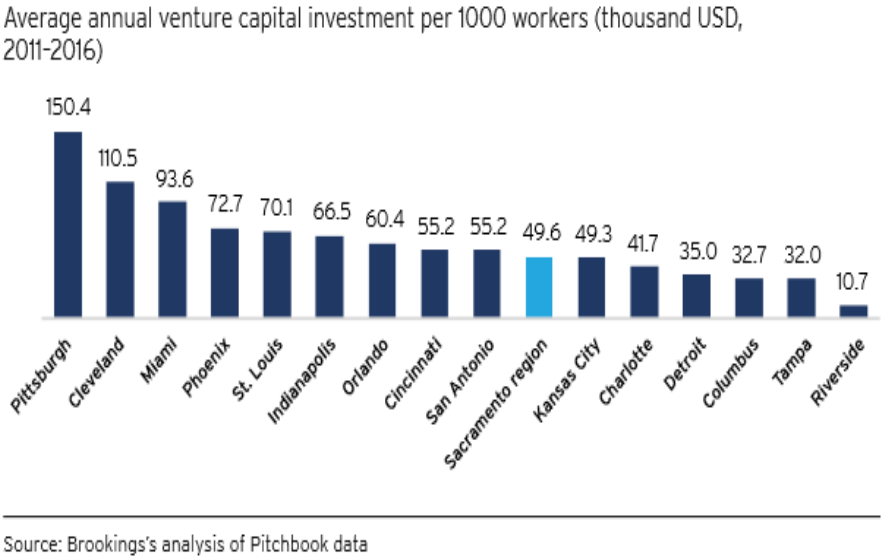
Angel funding, bootstrapping, funding from industrial partners, and government support such as SBIR can all play a role in supporting startups. But once the seed stage is complete, and companies are either startups entering the growth phase, or more established companies seeking to undertake a significant growth initiative, different kinds of funding are needed.

Venture capital (VC) is one key source, as these funds can provide substantial capital at the scale necessary. Sacramento compares poorly against peer regions (ignoring the venture capital centers on the coasts). It ranked 10th out of 16 comparable metro areas, generating about $50,000 in venture funding per 1,000 workers annually between 2011 and 2016, compared to $150,000 in Pittsburgh and $111,000 on Cleveland.[58] (See Figure 16.) According to StatsAmerica, the Sacramento SMA ranked 88.9 compared to a USA baseline of 100 on the Venture Capital Dollar Measures of the Innovation 2.0 Index, with the Yuba City SMA not registering at all on the Index.

[57] "Sacramento Angels Creates Investing LLC," Sacramento Business Journal. Jan 25, 2019

[58] Parilla, Joseph, Sifan Liu, and Marek Gootman. "Charting a Course to the Sacramento Region's Future Economic Prosperity," April 2018. https://www.brookings.edu/wp-content/uploads/2018/04/sacramentoregioneconomicprosperity_fullreport.pdf. p. 24.

Figure 16.



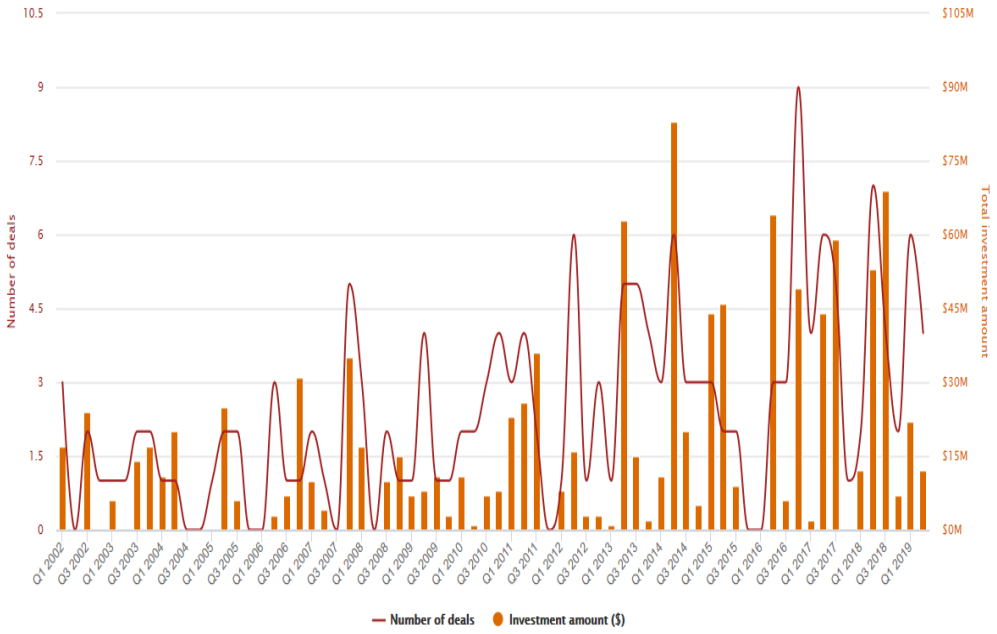
There are five venture capital funds in the region: Moneta Ventures (enterprise technology, healthcare and internet/consumer application sectors), DCA Partners (technology, media, telecom, financial services, manufacturing, distribution, logistics and construction industries), AGR Partners (food and agribusiness companies), March Fund, launched in 2019 (biotech, machine intelligence and sustainable nutrition solutions), and Impact Venture Capital (artificial intelligence applied to cybersecurity, robotics, drones, autonomous vehicles, digital health, and other fast-growing industry sectors).

Investments of these funds within the region vary. Overall, venture capital interest in Sacramento has grown steadily. The PWC MoneyTree survey shows that the number of deals annually increased from 5 in 2008 to 15 in 2018. Funding rose as well from about $42 million to about $140 million over the same period (see Figure 17).[59] In comparison, Pittsburgh firms raised about $190 million in venture funding in 2018. The trend for Sacramento is unmistakably positive, and the size of the 2018 deals suggests that perhaps venture funds are seeing more opportunity in Sacramento. Note that this data covers only the Sacramento metro area, not the entire 6 county region.

[59] PWC MoneyTree report, https://www.pwc.com/us/en/industries/technology/moneytree/explorer.html#/,. Accessed Oct 10, 2018

Figure 17.

Number of VC Deals and Investment Funding



Source: PWC MoneyTree

Indications are that fundraising is underway for existing local venture funds to launch new funds. In addition, the Sacramento Metropolitan Utility District is raising a venture capital fund to back startup companies developing mobility technology, as part of the effort to establish the region as a center for future mobility initiative, and to further catalyze the future California Mobility Center. An initial SMUD investment of $5 million will seed a proposed $100 million venture fund.

SCALE-UPS – CLUSTERS AND FAST-GROWING BUSINESSES

Startup support is important, but it's not enough to drive growth in a regional economy. Job growth comes primarily from the expansion of existing firms. There are several thousand mid-sized firms (>20 and <500 employees) in the region; amongst them are the firms that could scale up, and in doing so have significant impacts on the regional economy.

Medium-sized firms, including potential high growth firms graduating from incubators, accelerators and so forth, need a different kind and level of business expertise and facilities. They are a key source of growth, but they also face significant challenges, such as the lack of the type and size of space needed to support companies emerging from incubators (particularly in the tradable clusters or mobility). Also, lacking deep revenues, they often operate in a world of tightly constrained resources. At the same time, they often need additional help. They don't have an inhouse division of market researchers, or expensive product testbeds, or a deep understanding of key regulations

or IP options, and often find the opportunities and challenges of a globalizing marketplace intimidating. To fully maximize return on the innovation activity and entrepreneurship ecosystem, scaleups are essential.

The evidence indicates that scale-ups face headwinds in Sacramento. A 2014 study of Inc. 5000 firms found that Sacramento had lagged badly in the creation of fast-growing businesses: among all US metro areas with more than 1 million residents, Sacramento had the fourth lowest percentage of startups that reached 50 employees within 10 years.[60] While this information likely reflects the deep impact of the recession on local business growth opportunities, this area is worth further exploration.

One of the most substantial supports for helping established businesses innovate is focused on manufacturing, through the NIST Manufacturing Extension Partnerships (MEP) program. Primary MEP support is focused on incremental improvement of manufacturing processes via implementation of lean manufacturing, Six Sigma, and similar methodologies. It is not especially well equipped to help companies scale rapidly.[61] Typically, MEP funding is used to match funding raised by the company to pay jointly for improvement initiatives at the company.

The California Manufacturing and Technology Consulting (CMTC) along with its affiliate MANEX supports several organizations in the Sacramento region, providing funding and capacity building for the Sacramento Valley Manufacturing Initiative (SVMI) and Valley Vision, along with Sierra College Training and Development, and SBDC - Northern California Region on workforce development efforts.

Support for startups is somewhat generic – they all need help with initial funding, organizing a business, legal issues, accounting, and other basic business practices. But potential scaleups have needs that are much more diverse and specific. They need to know how to source a specific technology, cut their costs by 30% for a specific product line, deal with ITAR regulations for international trade, or know the state of the market for data services in Kazakhstan.

Additional resources available for expanding companies include programs through the SBDC Northern California Network, with the Capital Region SBDC hosted by the Sacramento Metro Chamber and the Sierra SBDC hosted by the Sierra Business Council, and the region's numerous chambers of commerce, including ethnic and minority chambers. The SBDCs are a valuable resource for small businesses looking to grow, with both business planning and capital access services. California Capital, a financing development corporation, provides small business planning assistance, business loans including a revolving loan fund, and government contracting assistance, and runs a Women's Business Center.

There are also several organizations that provide assistance to companies to scale through international trade, including the Northern California World Trade Center, the Sacramento Asian Pacific Chamber of Commerce, the Sacramento Center for International Trade Development at Los Rios.

Individual jurisdictions like the cities of Elk Grover and Rancho Cordova are creating investment funds to support high-growth companies for scale-up and the city of Sacramento has created an investment fund through Measure

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[60] Ian Hathaway, "High-growth firms and cities in the U.S.: An analysis of the Inc. 5000" (Washington: Brookings Institution, 2017).

[61] National Academies, 21st Century Manufacturing: The Role of the Manufacturing Extension Partnership Program, National Academies Press, Washington DC, 2013

U to invest in inclusive economic development, building on an earlier fund to invest in innovation-based companies. However, there is a no single program or entity focused specifically on helping firms turn themselves into gazelles (firms that grow at least 20% annually for at least 3 consecutive years).

It is apparent that as the size and maturity of a firm grows, the specialization of its needs grows with it. **Mostly, needs vary by company and by sector, and scale-up needs to match: support should therefore be an integral part of industry cluster plans.** While startups are important and a key step from research to commercialization, scaleup is where the payoff for all the startup activity can be found.

MAJOR INNOVATION INITIATIVES: AGGIE SQUARE, CALIFORNIA MOBILITY CENTER, GLOBAL INSTITUTE FOR FOOD/AG/HEALTH INNOVATION INSTITUTE, TECHNOLOGY PARKS, WATER/ENERGY/FOREST RESILIENCY

While networks are vital to the innovation ecosystem, researchers, entrepreneurs and system partners need place-based facilities, services and programs to test, pilot and scale products. There are several new cluster-based and innovation-driven initiatives advancing that will provide needed spaces for entrepreneurs and growing firms and catalyze the entire innovation ecosystem.

One major initiative is the UC Davis Aggie Square project, a direct physical response to the need for better networking and a richer and more creative environment. This 25 Acre innovation district, located on the UC Davis Sacramento Campus, will offer research facilities, modern office and mixed-use space, housing and other amenities, including, eventually, more than half a million square feet of state-of-the art labs. The project is also intended to house business partners and community-based programs to "create a stronger and healthier shared community." In late 2019, UC Davis selected a developer to design, build, own, and manage the first phase of Aggie Square. Phase I construction is expected to start in 2021.[62]

Aggie Square is important for several reason. It demonstrates a new effort to connect UC Davis to Sacramento itself, and to the Sacramento economy. It will provide significant new facilities attuned to the needs of startups and researchers. It should provide the central hub for innovation that previous reports have identified as a major gap in the innovation landscape. And is should specifically connect UC Davis innovation programs to the rest of the Sacramento startup ecology. All these features are strongly positive for the region's innovation ecosystem.

Sacramento State University owns 25 acres within a designated innovation planning area, and is exploring the site's feasibility as the location for the proposed California Mobility Center. The California Mobility Center will develop, prototype and commercialize innovative mobility research and products, including for autonomous vehicles, electrification of the transportation system, shared mobility services, and public policy innovations.

A third sector-based initiative is the proposed Global Institute for Agriculture, Food and Health Innovation that would bridge the innovation gap between research and development and commercialization. The Institute would include industry-led research, prototyping, testing, manufacturing and training coupled with investment and a support ecosystem to accelerate speed-to-market, with a focus on precision nutrition, food science and nutraceuticals, agricultural science, smart ingredients, and next generation food processing. Given the nexus between agbiociences and life sciences, there will be strong linkages between Aggie Square and the Institute. The

[62] https://www.ucdavis.edu/news/uc-davis-selects-development-partner-aggie-square

Institute, Aggie Square and the California Mobility Center are discussed further in the section on cluster-specific initiatives.

There are other major planned development projects that will greatly enhance innovation-based assets of the region. These include the historic Sacramento Railyards, the nation's largest infill site at 244 acres that will be the location of an innovative Kaiser Permanente Hospital, new Major League soccer stadium, and a transportation hub, with commercial facilities including incubators that will focus on sustainability, health, food and wellness. The Railyards is in an Opportunity Zone. The Woodland Research and Technology Park is a 350-acre technology park that will leverage its proximity to UC Davis and nearby labs and research facilities, providing wet and dry labs, research and incubator space, and high-tech manufacturing space. Construction will begin in 2020. Wet labs are a high priority for growing the region's life sciences and ag tech companies.

Other locations around the region have dedicated areas and facilities for innovation-focused development, including for business centers, wet labs and advanced manufacturing. These include two former military air bases, McClellan Park and Mather Airpark in Sacramento County, that are major centers for job creation, and business attraction and expansion.

There are major needs for infrastructure projects across the region, including transportation, sewer, water, wastewater, energy, flood control and telecommunications, especially in the more rural communities, that will be required to facilitate local participation in the priority regional initiatives, including those with cluster-based advanced manufacturing potential described in the following sections of the report. This will include new food and beverage processing opportunities, especially in the region's more rural areas, and the manufacturing supply chain for future mobility prototyping and scaling. SACOG, along with Caltrans and in partnership with local agencies, is developing a plan for vital transportation projects to support greater economic prosperity in the region's rural areas, those most needed to foster tradable clusters and growth in key sectors, such as agriculture, tourism, manufacturing, military and technology sectors.

Beale Air Force Base is a major technology asset. There is an opportunity to grow the location of defense and aerospace technology companies connected with this asset. An example could be for such companies to partner with public agencies tasked with resource management, including the Yuba Water Agency, to develop and test a number of potential applications of drone technology to assist with resource measuring and monitoring.[63]

Given the extensive and valuable natural resources of the region, including forests, watersheds, and working landscapes, and the need for sustainable resource management, disaster planning and recovery, and long-term resiliency, there are also opportunities to develop a technology cluster focused on water and energy research and development, biomass/bioenergy, resource management/restoration and monitoring, and new wood products. Several public agencies in Yuba, Sutter, Placer and El Dorado counties are exploring a range of opportunities, including through project feasibility studies and new financing mechanisms, such as the innovative "Forest Resilience Bond (FRB)." The FRB is a new tool for financing interventionary forest practices; it works by raising private capital to fund interventions, like forest restoration, that reduce the chances of fire.[64]

Several organizations including the University of California Agriculture and Natural Resources (UC ANR), California Forward, Golden State Financing Agency, RCRC, state and federal forestry agencies, local agencies, and other

[63] Yuba County Economic Strategy, prepared for Yuba County Water Agency by Applied Development Economics, 2019.

[64] Sierra Business Council, Draft Comprehensive Economic Development Strategy, 2019.

research institutions are assessing the potential for a Forest Products Innovation Testing Center that would make productive use of excess woody materials, repurpose and upgrade underused wood processing facilities, reduce fire risk, create healthier watersheds, provide alternative energy sources, and support rural prosperity,

The potential for Opportunity Zone projects also is being assessed across the region.

GREATER SACRAMENTO REGION ASSESSMENT

Sacramento's innovation and entrepreneurship environment is in transition, shifting from a traditional business culture centered around government and large, well-managed but not necessarily fast growing firms, to a more fluid and diverse culture more heavily influenced by startups and their emerging networks.

Academic research continues to be a strongpoint, with UC Davis as flagship. Academic research especially in selected fields is very strong; UC Davis is the world leader in "high-impact publications" within life and earth sciences. As a result, UC Davis continues to attract considerable research funding, and overall research funding attracted compares favorably with similar regions.

Translating research into products remains a challenge (as in most other regions). The Sacramento region generates an average number of patents compared to peers, but its patents are relatively high value, a positive sign. UC Davis is licensing technologies and generating patents at a substantial rate, and is generating significant licensing revenues. The relatively low rate of past firm formation is an important negative indicator; new firms are a key element in the innovation ecosystem.

At the same time, support for new firms is expanding rapidly. New major nodes of entrepreneurial support have emerged, as shown in the Innovation Ecosystem map, and there is much more entrepreneurial energy and connection than was previously the case. Several angel networks exist, and UC Davis also has developed a considerable portfolio of supports for university-related entrepreneurs, some campus-wide and others specific to individual schools and disciplines. There is certainly room for more coordination and leveraging of existing assets, and in particular for finding more sources of early stage funding, but the Sacramento region has made some important gains.

The continuing low rates of firm formation suggest that additional efforts will be needed to encourage startups. But a more substantial set of initiatives may be needed to help firms scale. This is the payoff for all the early stage investment, in the form of growth and jobs; the data suggest that Sacramento is not developing enough fast-growing firms. Relatively low levels of venture funding – even in areas where Sacramento and UC Davis generate world-class research, is disappointing. Efforts to address the scale-up problem will be found in the sections below on specific industry clusters. The outlook overall for startups has brightened considerably in recent years. Several organizations and networks are providing important shared resources and have helped thicken the innovation ecosystem considerably. UC Davis is successfully translating research into commercial technologies, with several programs to support entrepreneurs, as noted. Aggie Square, the California Mobility Center and other initiatives can underpin a substantial move forward, becoming hubs for innovation and interconnection.

Innovation 2.0 metrics from StatsAmerica provide a baseline for tracking progress over time.[65] StatsAmerica, a rich data base of economic development information resources, is a service provided by the Indiana Business Research

[65] http://www.statsamerica.org/

Center, funded in part by EDA. Information from Innovation 2.0 provides a composite Innovation Index based on three categories of innovation inputs – Human Capital and Knowledge Creation Index, Business Dynamics Index, and Business Profile Index – and two categories of innovation outputs – Employment and Productivity Index and Economic Well Being Index.

Data shows differences across the region; the overall Innovation Index for the Sacramento four county SMA (Sacramento-Roseville, Arden-Arcade area) shows a measure of 108.8 (with 100 being the US baseline) and a measure of 90.5 for the Yuba City SMA (Sutter and Yuba Counties).[66] Individual county indices range from 82.7 for Sutter County, 94 for Yuba County and 98.0 for El Dorado County, to 107.5 for Sacramento County, 110.9 for Yolo County and 113.1 for Placer County. For the Sacramento MSA, highlights include:

- The Business Dynamics Index overall is positive, ranked 71 out of 380 metros across the US, with a high relative capacity to innovate, a very high human capital and knowledge creation level, strength in establishment formation and expansions, but lagging in all venture capital dollar measures; it has a relative high business dynamics level.
- The Employment and Productivity Index showed high patent diversity, and low cluster diversity and strength but high cluster growth factor
- The Connectivity Core Index is high for residential high-speed connectivity, but very low on other metrics including farms with Internet access

Displaying regional disparities, the Yuba City Metro Area (Sutter and Yuba Counties) rankings showed:

- The area has a low relative capacity for innovation, with a low Business Dynamics level, especially in venture capital measures
- The area has a normal employment and productivity level, including a high level of cluster diversity and strength but low patent rate

The next section of the report focuses on targeted industry cluster assessment and initiatives. As noted, clusters are industry-based concentrations of firms and related economic actors and institutions. Because of their proximity and close interactions, cluster firms experience greater efficiency and productivity due to reduced transaction costs, shared labor pools and extensive knowledge exchange. Whether they are recognized explicitly, clusters exist naturally in the economy, but they may also be formalized within a region through organizations or other targeted efforts that seek to expand and strengthen clusters. They both contribute to and benefit from a region's innovation ecosystem.

The Brookings Institution highlighted opportunities in the Food and Ag cluster as well as the potential for Health and Life Sciences cluster to develop expanded export activity and expand its economic impact. Each of the cluster strategies requires refinement in various ways, such as assessing the sub-cluster components to clarify best high-leverage growth opportunities. In addition, the emerging cluster of Future Mobility, including autonomous vehicles and electrification of the transportation system, was identified as an area for deeper cluster analysis based on its potential to create a regional comparative advantage in this new innovation area.

[66] See StatsAmerica: http://www.statsamerica.org/ii2/overview.aspx

STRATEGIES AND RECOMMENDATIONS

STRATEGY #1. IMPLEMENT REGIONAL POLICIES THAT STRENGTHEN THE REGION'S INNOVATION ECOSYSTEM INCLUDING FINANCING, FACILITIES AND BUSINESS DEVELOPMENT RESOURCES TO SUPPORT START-UPS, SCALE UPS AND SPINOUTS IN THE HIGHEST PERFORMING SECTORS.

The Sacramento region can become the California option for business – based on a value-added proposition rather than a low-cost pitch, and one that positions the region as the place business and workers want to locate and stay because they will be more productive. The region has the opportunity to be a destination in which culture, networks, finance and talent overlap and connect, and to do so by leveraging its position as the capital of the fifth largest economy in the world. Its proximity to policymakers and its geographic location near education, industry and agriculture provides a competitive advantage over other California regions. In addition to new and emerging targeted industry sectors, the region also can lead with pioneering solutions to water, energy, forest and watershed management, working landscapes and other resources challenges, and new product development such as wood products and alternative/clean energies and technologies that also contribute to environmental solutions and leadership.

GOALS FOR 2020

- Assess, identify and address the biggest barriers to the region's most promising start-ups, with the region's business and civic leadership.
- Expand business support and financing programs, including revolving loan funds and economic gardening programs that support the region's small business, minority business and women-owned businesses and start-ups.
- Support development of innovation districts and initiatives, including those to catalyze University-led economic development and the bridge to commercialization, and region-wide innovation ecosystem development
- Develop a cohesive messaging strategy for the region as a destination for innovation, testing, piloting and scaling for business in California.
- Attract and support contract manufacturers to support all three clusters.
- Encourage and support local governments to create "sandboxes" to allow real world urban testing of mobility solutions.

METRICS

- Improvements in Business Dynamics Index, Employment and Productivity Index, and Connectivity Core Index, and with Venture Capital and other investments (Stats America)
- Other Innovation and Business Growth Indicators as summarized in Section XI

VI. FOOD AND AGRICULTURE CLUSTER

OVERVIEW OF THE FOOD AND AGRICULTURE CLUSTER

As one of the identified strengths for the Greater Sacramento region, the food and agriculture cluster is comprised of a deep supply chain that extends from research to commercialization of new technologies and production of goods and services, ranging from soil and seeds, to crop production and food and beverage processing, packaging and distribution, through to the retail and consumer end, including grocery stores, restaurants and institutions like schools and hospitals.

The COVID-19 pandemic has had a dramatic immediate impact on this cluster, including through closures of restaurants and facilities that serve food, such as hospitals, schools and entertainment venues, with related job losses; rapid increases in levels of food insecurity and demand for emergency food services; disruptions in the supply chain, especially for farmers, producers and food distributors; and shifts in getting products to customers safely. Food system partners have mobilized quickly to address challenges, creating new models to get healthy foods to at-risk populations; support farmers, restaurants and other businesses gravely affected by the pandemic; and keep workers in food processing, preparation and delivery safe. As America's Farm to Fork capital, the actions, responsiveness and creativity of our food and ag ecosystem partners are demonstrating the importance of a resilient local food system that is truly farm to every fork. As new solutions and models emerge, the cluster can continue to innovate within the framework of the strategies identified below.

Pre-COVID, the food and agriculture cluster was already undergoing a global challenge, faced with feeding a growing population with increasingly scarce resources, addressing climate change impacts, and battling rising rates and costs of diet-related disease. Consumer demand for healthy, sustainably and locally grown foods is rising, driving change across the supply chain. In the United States, the average age of the farmer is 58 years old, raising concerns about the next generation of farmers. The U.N.'s Food & Agriculture Organization estimates food production will need to increase by 70 percent to feed the world in 2050. Scientists estimate that for each 1.8°F increase in temperature, key crop yields drop 10 percent. Changes in the frequency and severity of droughts and floods could pose challenges for farmers and ranchers and threaten food safety. Overall, climate change impacts will make it more difficult to grow crops, raise animals, and harvest fish in the same ways and same places as we have done in the past.

In one major segment of the food and ag cluster, industry trends in Food and Beverage Manufacturing are changing dramatically. National employment in Food and Beverage is increasing tremendously, with a 12% increase between 2010 and 2017. This growth is largely due to consumers increasingly seeking more variety, leading to booms in the markets for niche, healthy, ethnic, indulgent, higher-value and quality foods and beverages. These trends cross a wide range of product types – while certain buyers prioritize "free-from," such as gluten-free and allergen-free, or organic foods, others are interested in novel processed items, such as nutraceuticals and functional foods (intended to provide health benefits and to treat/prevent disease).

No longer considered a niche segment, functional foods and beverages are becoming a larger part of the American diet and are expected to grow at a CAGR of 8% through 2021.[67] The functional beverage market is primed to

[67] https://www.technavio.com/report/global-non-alcoholic-beverages-global-functional-foods-and-beverages-market-2017-2021

capitalize on this growth, as venture capital companies put more than $170 million in functional beverage companies in the first eight months of 2018.[68]

In this context, the food industry is undergoing significant upheaval. Small and medium sized enterprises (SMEs), given their ability to be nimbler and more creative, are increasingly leading the way on product innovation while the larger consumer packaged goods companies are slower to respond. New processing and packaging technologies are creating opportunities for more efficient production and added product value. These technologies, along with heightened food safety requirements and an aging manufacturing workforce, are driving the need for new training programs for Food and Beverage Manufacturing workers.[69]

In addition, other trends will drive growth and restructuring of Food and Beverage Manufacturing, affecting which companies will become significant operators in the space and what products will be produced:

- **Rise in Meat Demand**. According to the Food and Agriculture Organization, as incomes increase, demand for greater food variety grows, including demand for higher-value and quality foods such as meat, eggs and milk. These changes in consumption, together with sizeable population growth, have led to large increases in the total demand for animal products in many developing countries. The total demand for animal products in developing countries is expected to more than double by 2030.[70]
- **Rise in Vertical Integration.** Big food companies like Costco are making moves into Food and Beverage Manufacturing in order to maintain a steady supply and price. These moves also help establish better tracking and control capabilities, a direct response to shopper concerns over the source of their food.

The Greater Sacramento region has a unique opportunity to address these global challenges because of its specialized assets, competencies and business presence across the supply chain. With $2 billion in agricultural output value from a wide diversity of crops, over 7,200 farms and 1.5 million acres of farmland, the region - one of only five Mediterranean growing zones in the world - is fertile and productive. With proximity to the agricultural abundance of the Great Central Valley, one of the world's major growing regions, the region has supply-chain advantages for specialty crops, in turn producing high quality valued-added products from these crops. With an overall cluster impact of more than $7 billion, the cluster is growing, adding almost 3,000 jobs between 2014 and 2017, including in food and beverage processing.[71] New innovations and technologies that can be utilized across the supply chain to make processes more efficient and sustainable are being developed by the world-renowned UC Davis. The following analysis identifies key sections of the supply chain that have growth potential for the region.

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[68] https://www.fooddive.com/news/functional-drinks-are-playing-the-claim-game/531143/

[69] For more detail, see "Chicagoland Food," at <http://rw-ventures.com/chicagoland-food-seizing-the-opportunity-to-grow-chicagolands-food-industry/>.

[70] http://www.fao.org/3/y4252e/y4252e07.htm

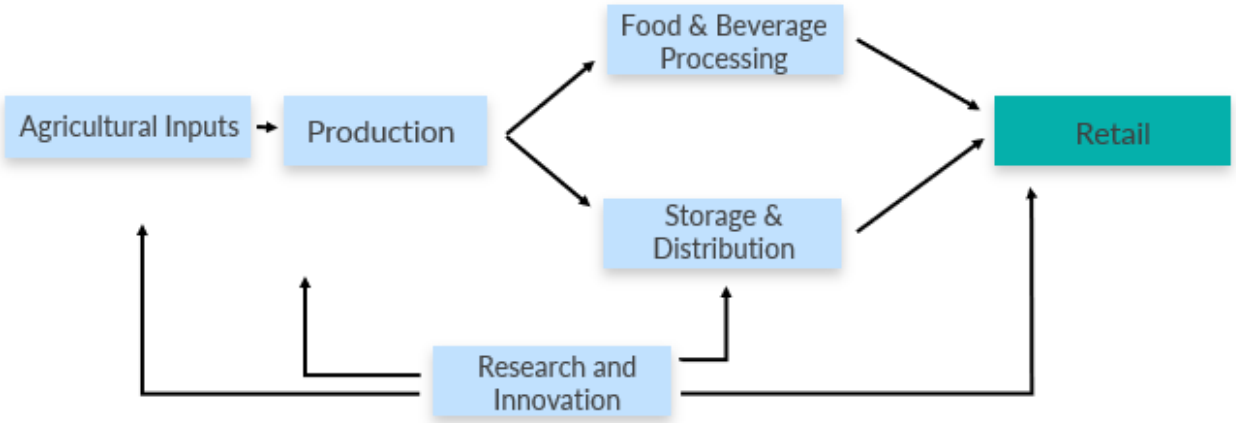
[71] Aaron Wilcher, North/Far North Center of Excellence, Agriculture, Water and Environmental Technology Regional Workforce Advisory Meeting (February 2019).

CLUSTER DEFINITION

Because the food and agriculture industry is so broad and encompasses many parts of the supply chain, the cluster sectors are grouped into sub-clusters so as to accurately identify and analyze growth potential, as shown below in Figure 18..

Figure 18.

Food and Agriculture Cluster Supply Chain Sub-clusters



Source: Greater Sacramento Economic Council

- Agriculture Inputs/Supports: This sector includes the seeds, fertilizers and machinery firms for agricultural production, and firms that support agricultural production by providing resources and equipment for growing and harvesting crop and animal products.
- Crop and Animal Production: These establishments, including farms and ranches, are part of the actual production of raw crop and animal products.
- Storage and Distribution: These firms store, transport, or sell crop or animal products in bulk quantities as merchant wholesalers and also distribute processed products.
- Food and Beverage Processing: This sector includes firms that receive commodities from the storage and distribution centers to be processed, and packaged and turned into goods for consumption.
- Retail: While retail is not evaluated in this analysis because it is not considered a tradable sector, retail services include grocery stores, restaurants, food shops, and other food retail services.

While these sectors contain the traditional supply chain of food and agriculture, new technologies are being developed and applied in each of these sectors, defined as food and agtech, which is noted as the “research and

innovation" area which crosses all aspects of the supply chain. To further define agtech, AgFunder's "2018 AgriFood Tech Investing Report" identifies 14 separate AgriFood Tech categories, listed below.[72]

- **Ag Biotechnology**
- **Agribusiness marketplaces**
- **Bioenergy & Biomaterials**
- **Farm Management Software, Sensing, & IoT (Internet of Things)**
- **Farm Robotics, Mechanization & Equipment**
- **Midstream Technologies**
- **Novel Farming Systems**
- **Innovative Foods**
- **In-Store Retail & Restaurant Tech**
- **Restaurant Marketplaces**
- **eGrocery**
- **Home Cooking Tech**
- **Online Restaurants and Meal Kits**
- **Miscellaneous**

Each of these areas are generating new and innovative technologies that are being applied to the entire food and ag cluster, increasing productivity, sustainability, health, safety and traceability.

MARKET ANALYSIS OF THE GREATER SACRAMENTO REGION

This analysis identifies key sections of the supply chain that have growth potential for the region. While the region has strengths across the cluster, the focus of this analysis is on the manufacturing sub-cluster because it is traded, and the region has assets that can make it competitive in this space. The analysis also identified opportunities in the production cluster, specifically two emerging sub-parts of the cluster, digital farming and Agriculture Biotechnology ("AgBiotechnology"), because these sub-parts are traded, growing globally and becoming increasingly important to the Agriculture, Food and Beverage domain.

FOOD & BEVERAGE MANUFACTURING

Food and Beverage Manufacturing contributes more than $4 billion to the Greater Sacramento economy and employs over 11,000 individuals, though at the same time, its 2017 location quotient was only 0.71, meaning it was under the State average for concentration of employment. Employment in this sub-cluster is expected to grow 6% over the next ten years. Food and Beverage Manufacturing is a particularly attractive cluster from an inclusion point of view, by virtue of its employment structure and needs; 41% of the jobs are accessible with HS degree or less, with decent entry level jobs and good job ladders, and the ways in which industry is restructuring is creating opportunities for entrepreneurs and SMEs, especially with new types of food and beverage products.

[72]AgFunder AgriFood Tech Funding Report: Year Review 2018. https://research.agfunder.com/2018/AgFunder-Agrifood-Tech-Investing-Report-2018.pdf

Food and beverage manufacturing is concentrated primarily in Yolo County, in Woodland and West Sacramento, and in the cities of Sacramento, Rancho Cordova and Elk Grove in Sacramento County.[73] Overall, there is moderate activity in the Food and Beverage Manufacturing cluster, as six of the twenty largest food and agriculture businesses in the Greater Sacramento region are food/beverage manufacturing companies, with revenue ranging between $46 million and $1.6 billion.

Compared to other regions in California, the volume of Food and Beverage Manufacturing in Greater Sacramento is relatively low. Both Modesto and Fresno employ nearly two times more people in Food and Beverage Manufacturing than Greater Sacramento.[74] Nevertheless, the region's transportation arteries and robust crop production means it has national distribution capabilities and access to high quality raw material inputs.

The region can leverage these resources to become a center for food manufacturing in value-added, higher quality products. The large variety of specialty crops in the region are prime for manufacturing, including being lightly processed, frozen and/or dried to meet new consumer food preferences. UC Davis's research and development capabilities can serve as a source for new product ideas, assisting with producing new technologies in food innovation, food safety, nutraceuticals and food science. These assets combine to create opportunities to take advantage of the major shifts occurring in the global food industry.

As well, several food and beverage companies have been relocating or consolidating operations to the region over the past few years, especially from the Bay Area, but also moving from other areas or countries. Food and ag-related initiatives such as Woodland's Food Front are branding the region as a locus for food-related production activities. There is a burgeoning movement of food entrepreneurs who are searching for affordable sites, shared facilities, and business supports, as documented by developers of proposed food incubators, a business model being actively pursued to "grow the next generation of food companies." There are several food incubators in California and many models across the country that are spinning out growth companies and creating new jobs.

Beyond incubators, several regions are supporting their food producers and entrepreneurs through food processing innovation centers that provide facilities, business planning support, co-packing solutions, and financing, with some connecting entrepreneurs to new technologies in food science through university partnerships. Examples include the Food Innovation Center at Rutgers University (New Jersey) and the Western Massachusetts Food Processing Center. While UC Davis already works with many food processing companies, a food innovation center would facilitate connections, innovation adoption and scaling up.

A market driver that will support the growth of new food producers is the increasing interest in institutional procurement of locally sourced produce and food and beverage products across the region, with leaders such as the Golden 1 Arena, UC Davis Health, Sacramento City Unified School District and several other local school districts showing the way. These institutions have transformed their food purchasing practices, sourcing from Northern California farms, ranches, processors and distributors, redirecting millions of dollars from external suppliers toward these businesses. In addition to the positive economic impact, consumers, including those in underserved communities, are benefitting increased access to healthy locally grown foods. There are several major hospital systems and school districts in the region that are exploring increased local purchasing, including joint purchasing collaborations and partnerships such as with the region's food banks.. The region's locally

[73] SACOG, Centers of Excellence, and Valley Vision, "Food and Agriculture: Cluster and Workforce Needs Assessment, Sacramento Capital Region, p. 16 (April 2016).

[74] Ibid

headquartered grocery stores, Raley's and Nugget Markets, not only purchase from local growers and producers, but also provide market space for testing of new products.

DIGITAL FARMING

The challenges and trends described above facing the global food and agriculture cluster present major opportunities for technology-enabled solutions. Digital farming refers to utilizing specialized equipment, software and IT services to access timely information on crop, soil and climate conditions and more broadly to move to the next generation of automation in farming. The region is well-positioned to lead in this space given its assets. The region's biggest asset is its volume and variety of agriculture production, as the region is home to the world's largest patch of Class 1 soil, a classification that indicates it is the amenable to growing nearly any kind of produce. The region produces over 300 types of products; is a leading producer of rice, almonds, walnuts and grapes; and serves as California's largest grower of apples and pears, and processor of tomatoes. Thus, there is abundant production which digital farming startups can use to test their technology.

The combination of agriculture production, research institutions, and proximity to the Bay area suggests that the region could lead the burgeoning digital farming space. However, the critial lack of rural broadband access, high-tech equipment manufacturers and a strong venture capital network will all need to be addressed in order for the region to be successful.

AGRICULTURE BIOTECHNOLOGY - VEGETABLE SEED BREEDING & MICROBIAL/MICRO BIOME

AgBiotechnology, which includes food sciences, seed and vegetable sciences, and nutraceuticals, presents a growing and attractive opportunity. The industry accounted for $20.08 billion in 2015 and is expected to reach $39.5 billion by 2022, growing at a CAGR of 10.1% from 2015 to 2022.[75]

The region has key assets In AgBiotechnology, including of course a strong agriculture research institution, UC Davis, leading in research, patents and licenses in agriculture and biological sciences. More than thirty AgBiotechnology start-ups are headquartered in the region, as well as the R&D facilities of major agriculture firms like Bayer, Syngenta and HM.Clause. (See Life Sciences section for more information.) New start-ups companies also are located to the region, drawn by access to the assets of UC Davis, a robust agricultural community, and supportive culture. Incubators such as AgStart, the CoLaborator at Bayer CropScience, and the UC Davis-HM.Clause Life Science Innovation Center are providing strong support to agtech entrepreneurs.

CHALLENGES

COMPETITION WITH THE BAY AND OTHER AGRICULTURE FOCUSED REGIONS

As part of the Prosperity Strategy planning process, approximately 25 leaders across the food and ag cluster were interviewed to identify challenges and opportunities to grow the cluster. Several stated that the region has a major obstacle to retaining and recruiting talent due to high paying employment opportunities in the San Francisco Bay Area, especially for talent prospects with technical degrees, such as data scientists, software engineers, control engineers, megatronic engineers and more.

[75] https://www.marketwatch.com/press-release/agricultural-biotechnology-market-2018-global-analysis-industry-demand-trends-size-opportunities-forecast-2023-2018-08-24

Another issue is that the cost of doing business in California is considered high in comparison to other regions that have agriculture research and innovation centers, specifically St. Louis and Research Triangle Park. California's high minimum wage ($15 per hour) and the region's comparatively high development costs and energy costs have been called out. Some interviewees noted that research facilities lacking energy efficiency technologies led to higher costs, especially in the summer.

UNDERDEVELOPED INFRASTRUCTURE ASSETS

A lack of broadband access is rural areas was repeatedly cited by stakeholders across the region. Low broadband penetration prevents the adoption of high-tech products and services on farms and to support business operations, as well as for quality of life and public safety for the region's rural communities. This deficit will greatly constrain the ability to develop, test and deploy innovative technologies, depriving farmers and rural businesses access to a core 21st century infrastructure and limiting the region's attractive to agtech entrepreneurs. New business models for deployment should be explored.

Another major infrastructure deficit is the chronic lack of wet lab and greenhouse space. Without these facilities, start-up and scale-up companies have no place to begin operations and to scale. Several interviewees acknowledged the high cost of facilities but felt there would be market viability, and that the region has a lack of experienced or willing developers to develop this kind of needed facilities. Development projects must address this critical need.

WEAK VENTURE CAPITAL AND ENTREPRENEURIAL ECOSYSTEM ACTIVITY

Another challenge is the lack of venture capital investment in the region. In Q4 '19, venture capital funding for the Sacramento region was $52 million; in comparison, venture capital funding for San Francisco, Silicon Valley and Los Angeles totaled $7.1 billion, $4.3 billion, and $1.4 billion, respectively. In addition, the network of incubators, accelerators and scientific labs (i.e., wet lab space) is described as sparse and unconnected by stakeholders in the region. There is not enough "critical mass" of support and investment for startups and entrepreneurs to scale and spin off. In short: The Greater Sacramento entrepreneurial ecosystem is underdeveloped, as discussed in the previous section of this report.

Also, the region lacks a cohesive strategy and brand to market the region as a center of food and ag innovation, compared to areas like the Research Triangle. Better marketing is needed on the value proposition of the industry, and incentives to support companies, especially start-ups, lower operating costs and attract talent.

LABOR SHORTAGE

There is a dearth of technical talent in the region, with strong competition for skilled labor from the Bay Area and a persistent local skills gap, especially as the industry changes and become more technology dependent. Another contributing factor is that education/training feeder programs are insufficient. The region's community colleges and universities generally have lagged in responding to the needs of manufacturers that are transitioning to more automated plants with sophisticated technology and equipment. Companies are often compelled to send workers to training programs out of state, such as to the Perry Institute in Washington, or recruit from outside the region. However, there are increasing assets in the region. Sierra College has a strong megatronics program that local manufacturers are using, including for contract education, and several colleges are developing needed career education programs for high-demand occupations such as the mechanical trades, electronics and robotics, and

agtech through the Community Colleges Strong Workforce Program, and partnerships with the Sacramento Valley Manufacturing Initiative (SVMI).

Another perceived issue is that the careers in the food and ag industry are not attractive. People are not aware of the range of job opportunities and the technology transforming the industry that invites opportunities for upskilling and income mobility. This is a shared challenge across industries that need middle-skills workers (more than a high school degree but not necessarily a four-year degree) and a significant campaign to increase career awareness and readiness, to create a pipeline for the future workforce.

EMERGING FOCUS

AgriFood Tech will play an important role in the food, beverage and agriculture industry in the future. As AgriFood Tech captures more of the nearly $8 trillion agriculture and food industry globally, the Greater Sacramento region can be a global innovation leader by pairing a strong commercialization strategy alongside its globally-leading agriculture, food, and health research and manufacturing assets. The region should ensure that it is supporting startups that are developing technologies in Agrifood Tech so that it gains a market foothold. This strategy would see the region become home for creation of individual technologies or a combination of technologies related to areas such as seed optimization, fertilizer and crop inputs, irrigation, remote sensing (including drones), farm management, food safety and traceability, and agricultural big data.

The lack of rural broadband access, high-tech equipment manufacturers and a strong venture capital network makes it unlikely that the region will be a leader in the overall AgTech space in the near term. Thus, the region should focus on a facet of AgriFood Tech in which it is currently positioned to be a leader, agbiosciences. As noted, the region has many assets and opportunities to support becoming a national leader in agbioscience, and perhaps the same potential exists for smart farming.

Related to food and beverage manufacturing, the region is positioned to expand this sector in response to market demands for new types of products and manufacturing processes, tied to the intersection of food, agriculture and health innovation. Strategies will build upon the partnerships and resources of the Central Valley AgPlus Food and Beverage Manufacturing Consortium, one of 24 federally-designated manufacturing communities across the country and a member of the American Manufacturing Communities Collaborative, a national network of manufacturing communities, federal agencies including EDA, foundations, and manufacturing innovation institutes (http://cvagplus.org/). AgPlus is managed by Valley Vision in the Sacramento region, along with Chico State in the North State, and Fresno State in the San Joaquin Valley. Together they are developing strategies with education and workforce organizations, in partnership with employers including the California Food Producers, to support the next generation of skilled manufacturing workers as well food entrepreneurs.

STRATEGIES AND RECOMMENDATIONS

STRATEGY #1. DEVELOP A GLOBAL INSTITUTE FOR AGRICULTURE, FOOD AND HEALTH INNOVATION, TO BRIDGE THE INNOVATION GAP BETWEEN RESEARCH, DEVELOPMENT AND COMMERCIALIZATION OF HEALTH AND SUSTAINABILITY SCIENCE AND TECHNOLOGY BREAKTHROUGHS.

While there is strong research and innovation happening in the region, resources to help the commercialization of research are limited. The Global Institute for Agriculture, Food, and Health Innovation (Institute) will bridge the "innovation gap" between research/early innovations developed by universities, startups, scale-ups and or large companies, and provide a strategic set of expertise, networks, facilities and funds. Activities will include industry-led research, prototyping, testing, manufacturing, demonstration, community-building and training, coupled with a robust investment and support ecosystem to accelerate speed to market.

The Institute will be headquartered in the Greater Sacramento region, due to proximity to UC Davis; the state capitol; a diverse cluster of food, agriculture, health and technology industry leaders; and access to the Central Valley. Location considerations are underway, with a commitment to locate it in a rural/agricultural community.

Institute planning will be led by UC California Agriculture and Natural Resources (UC ANR), from its headquarters location in Davis, in partnership with UC Davis, key industry leaders, local jurisdictions, the Prosperity Partnership and many other entities across the region and the state. Public and private sector partners have been working for two years to develop the Institute concept. The UC ANR launch team will seek funding for program and infrastructure planning, partner development, pilot projects, and early launch activities in 2020. The project will contribute to and help connect and expand the region's innovation ecosystem and partners, including existing incubators and accelerators and the VINE (the Verde Innovation Network), a statewide network managed by UC ANR, funded by an EDA i6 Innovation grant, with AgStart as a partner. Current VINE team partners include the UC Davis Innovation Institute for Food and Health, the March Fund, the Rockefeller Foundation and MARS, Inc.

The initial list of Institute programs and facilities focus areas includes: precision agriculture; digital food and precision nutrition; food science and nutraceuticals; agricultural sciences; and smart ingredients and food processing. The latter includes next generation ingredients and products that are healthy, sustainable and affordable, with sustainable processing technologies that capitalize on the region's high-quality specialty crops, focus on regenerative agriculture, and provide expertise in seed and plant biologics for healthy food systems. A partnership with is being explored with One-Research Center in the Netherlands, a public-private partnership supported by a large investment of public funding, to develop innovative digital technologies in agriculture, food and health. First year activities:

- Begin proof-of-concept projects in digital agriculture, precision nutrition and food technology to demonstrate early success.
- Pilot global collaboration through a Dutch-California Innovation AgriFood Tech partnership.
- Prepare a business plan for the Institute, including a technology roadmap identifying assets, food system supply chain, and technology priorities; identify Institute programs, services, facilities and equipment; assess potential site locations; explore partnership models; and develop a capital strategy to fund and scale the Institute, building on and combining the best of existing models globally.
- Conduct marketing of the Institute outside of the region; develop and implement attraction strategy of international food and agriculture companies.

STRATEGY #2. EXPAND WET LAB AND GREENHOUSE INNOVATION SPACES ACROSS THE REGION.

Currently, wet labs in the region only have the capacity to host early stage startups with relatively small teams. As startups scale up, they struggle to find sufficient wet lab and greenhouse space. Given that both are paramount to the commercialization of research in agbiosciences and life sciences, the region should expand its number of wet lab and greenhouse space facilities to accelerate the commercialization of research and support growing startups. AgStart incubator is seeking federal and other funding support for a space in Woodland, with fund and equipment matches already provided by local governments and technology partners, and other plans are underway, including eventually significant facilities at Aggie Square and the Woodland Research and Technology Park, but space also is needed immediately. UC ANR is upgrading facilities at its Davis location for a set of greenhouses that would be part of the growing set of regional assets proving the case for a flagship Institute for Agriculture, Food and Health Innovation.

First year activities:

- Identify potential facilities that could add space, develop cost estimates, and proactively identify and seek funding resources and developers.
- Work with jurisdictions, infrastructure and facilities funders and others to identify potential funding and other support.

STRATEGY #3. SUPPORT SCALE-UP FOR FOOD MANUFACTURING COMPANIES.

The costs of manufacturing are increasingly expensive with higher labor costs and input costs, cost of utilities, and new environmental regulations. Regional leaders should work with local municipalities, state and federal agencies, utilities and others to assist manufacturers in obtaining incentives to offset manufacturing costs. Development of co-packing and co-production facilities, shared logistics, technology, workforce and business services, and support for new product development will grow the cluster, through development of a Food Manufacturing Innovation Park. The Center would be a hub for food production innovation, geared to two segments: small, growing food firms, and established, mid-sized firms adapting to a rapidly changing food industry. The Center could also draw tenants and customers such as equipment manufacturers seeking small production facilities where potential customers can test new technologies, including through partnerships with UC Davis food science researchers.

First year activities:

- Assess feasibility of a Food Manufacturing Innovation Park; identify viable models in other regions and replication/adaption potential.
- Identify potential location and tenants/users of the Park and its services.

STRATEGY #4. SUPPORT DEVELOPMENT OF FOOD SYSTEM INFRASTRUCTURE PROJECTS.

There are several proposed food system infrastructure projects across the region, including those which are focused on the front end of the pipeline for scale-up – i.e., startups and food entrepreneurs. These companies could have the potential to grow into the food manufacturing firms of the future and food and beverage products of the future with the right kinds of support and services. Supporting a network of food system projects will strengthen the ability to draw on the various specialties of the region, serve expanded local markets, and support the economic development of both local communities and the region. Some of these projects include the Woodland Research and Technology Park; incubators such as the Food Factory and the Alchemy Kitchen; a possible Food Hub and Veterans Rehab Facility in Live Oak (conversion project); Wheatland Ag Innovation Zone; a sustainable meat food processing center (Placer County); and projects and partnerships that implement institutional procurement programs, such as school districts, hospitals, and other large purchasers, which is an

interest across the region. Connections with agri-tourism will help with branding and marketing of both the region and new food and beverage products, including under the rubric of We Are Farm to Fork, illustrating the breadth and depth of an interconnected regional food system. COVID 19 has upended the food system and there will be emerging business and market models that should be incorporated, including to increase food access to underserved communities; regionalize supply chains; and support community-based enterprises and entrepreneurs.

First year activities:

- Compile/update list of food system infrastructure projects from across the region.
- Identify successful food system infrastructure models nationally.
- Explore feasibility to develop a Healthy Food Financing Fund modeled after the Michigan Healthy Fund Financing Fund, to support startup and scale-up food companies and suppliers; identify a broader range of food system and development financing mechanisms (an area that is not usually seen as an asset class for investment). See https://www.cdfa.net/cdfa/cdfaweb.nsf/pages/food-system-finance.html

GOALS FOR 2020

- Implement early proof-of-concept projects for Global Institute for Agriculture, Food and Health Innovation
- Pilot a Dutch-California Innovation AgriFood Tech Partnership
- Expand wet lab and greenhouse innovation spaces
- Assess feasibility of a Food Manufacturing Innovation Park
- Support emerging food system infrastructure projects and expand institutional procurement
- Develop a cohesive branding and marketing strategy for the region's food and ag assets
- Address broadband infrastructure challenges

METRICS

- Two proof-of-concept projects for Global Institute for Agriculture, Food and Health Innovation
- Agreement for and initiation of a Dutch-California Innovation AgriFood Tech Partnership
- New wet lab/greenhouse innovation space project
- Food Manufacturing Innovation Park feasibility assessment
- One new institutional procurement project
- Two new rural broadband ag-related infrastructure projects, preferably fiber to the premises

VII. LIFE SCIENCES CLUSTER

INTRODUCTION TO THE LIFE SCIENCES CLUSTER

The Life Sciences industry discovers and develops new therapies for patients, both small and large molecule drugs, accelerated with innovations in computational technologies. In addition to drug development it encompasses the specialized manufacturing of medical devices, instruments and supplies that enable research, development and manufacturing of new drug therapies. This industry involves a much longer research and development process than most industries, before moving to product manufacturing. While the Life Sciences sector often interacts with and is supported by the Healthcare industry, it is an advanced manufacturing industry rather than one providing direct clinical services to patients, and so stands as its own cluster apart from Healthcare. Since Life Sciences provides more tradeable economic growth opportunities, while Healthcare is primarily local serving, this analysis focus on Life Sciences, in particular the biopharmaceutical sector.

Life sciences is a dynamic and evolving sector, expanding rapidly in size as well as in the breadth and sophistication of its products. The U.S. Life Sciences industry is growing at its fastest pace since 2000, largely driven by research and development in biotechnology. The industry is growing in California. The most competitive and most mature life sciences clusters are in Boston, San Francisco, San Diego and New York/New Jersey. These areas receive a disproportionate share of NIH funding. The growth of the U.S. bioeconomy, economic activity resulting from research/innovation in biological sciences, is due in large part to the development of three foundational technologies: genetic engineering, DNA sequencing and automated high-throughput manipulations of biomolecules. This market is experiencing significant disruption, largely due to the rise of technology companies involved in bioinformatics, computational analysis, medical devices, and next-generation therapy startups.

COVID-19 is having a major impact on this sector; there are potential growth opportunities for the region, especially with the rush to find a vaccine and needed supplies and equipment. With the strong presence of UC Davis and local businesses and labs, opportunities range from contributing to the research, development and testing of new vaccines and therapies, to manufacturing of these therapies, as well as medical supplies and equipment (especially personal protection equipment for both medical professionals and businesses, households and institutions), and products for the supply chain.

A growing workforce challenge for this cluster is developing and attracting top talent with specialized expertise. National trends predict that employment in research and development in biotechnology will grow twice as fast as other Life Sciences sectors, with a national workforce shortage in areas like privacy, connectivity, encryption and cybersecurity. Increasingly, Life Sciences companies are competing with the technology industry for hires, due to the frequent application of computing to drug development and need for skills in areas such as data analytics, 3D printing, AI, next-generation sequencing, and CAD. Healthcare generates a third of worldwide data, making analytics increasingly important in defining trends and developing new products.

The Life Sciences workforce lacks gender and racial diversity. Leading Life Sciences clusters such as Boston have reported a gender gap that widens at every level of the career ladder. Biotechnology firms also are lacking in racial diversity. The industry has started to respond with initiatives to connect diverse leaders with board opportunities in the industry, or initiatives to increase K-12 exposure to Life Sciences careers, but location-specific, market-based initiatives are lacking.

Additional trends that are expected to drive growth emphasize new approaches to research, manufacturing and finance that are more strategic, flexible and collaborative:

- **Manufacturing Partnerships.** Large firms have moved from transactional outsourcing to strategic partnerships, particularly for biologics development, manufacturing capacity,[76] data-driven clinical innovation, and advanced technologies (e.g., AI, robotics). Firms are beginning to focus on strategic partnerships with contract manufacturing organizations (CMOs) and contract development and manufacturing organizations (CDMOs) – although these facilities can have wait times of one to two years.[77] In-demand specialty CDMO services include "high potency API manufacturing, development and manufacturing of large molecules (biologics and biosimilars), sterile liquid formulations, and the emerging platforms of gene and cell therapies".[78]
- **Research Partnerships.** Many companies have shifted from in-house R&D to outside partnerships and alliances,[79] looking to academia and contract research organizations (CROs) for expertise and technology that is not available in-house.[80] These assist in connecting to global markets as well.
- **New Funding Models.** Funding structures are shifting away from traditional models. Innovation is driven by early-stage ventures,[81] but given the significant amount of VC funding required to bring new companies through the R&D phase to proof of concept,[82] industry giants have set up funds to create a diverse portfolio of early-stage companies and access to outside talent in areas that align with their strategic focus.[83] This is particularly important given that new venture capital (VC) funding precedes employment increases by about a year.[84]
- **Flexible Space Use Models.** Currently, there is an insufficient inventory of flexible spaces that can accommodate smaller companies and changing working models. A greater supply of innovative facilities is needed, such as incubators that are part fund/part accelerator, as well as unique real estate solutions such as multi-tenant labs and collaborative research space.[85]

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[76] National trends note that the "shift to biologics, personalized medicine, and specialized, often low-volume, small molecules is creating a shortage in manufacturing capacity" with only one-third of manufacturing now conducted in-house (both in development or commercialization). The next-generation therapy industry provides one example; as start-ups grow (in areas such as adoptive cell transfer, monoclonal antibodies, gene therapy, and cancer vaccines), they are having difficulty manufacturing their products. Deloitte. *2019 Global Life Sciences Outlook.*

[77] Deloitte. *2019 Global Life Sciences Outlook.*

[78] EY, *The pharmaceutical industry is consolidating: opportunities for current players and new entrants*, Online Publication: EY, 2017.

[79] 33% of biopharma companies – such as Roche, Merck, Novartis and Pfizer – are reconfiguring their R&D to focus on outside partnerships/alliances. JLL Research. *Life Sciences Outlook 2018.*

[80] Deloitte. *2019 Global Life Sciences Outlook.*

[81] 63% of drugs over the last five years that were developed by small companies. JLL Research. *Life Sciences Outlook 2018.*

[82] For every 1000 patents in biotech typically one is commercialized. VC funding is typically 3 times higher for biotech concentrations than is typical for other metropolitan areas. Cortright, Joseph and Heike Mayer, *Signs of Life: the Growth of Biotechnology Centers in the US*. Online Publication: The Brookings Institution Center on Urban and Metropolitan Policy, 2002.; The average cost to get a drug to market with FDA approval is $2.6 billion. JLL Research. *Life Sciences Outlook 2018.*

[83] JLL Research. *Life Sciences Outlook 2018.*

[84] CBRE (2019), 2019 US Life Sciences Clusters

[85] JLL Research. *Life Sciences Outlook 2018.*

DEFINITION

The Life Sciences cluster has three subsectors:

- Manufacturing Pharma: This sector encompasses manufacturing for pharmaceutical drugs, which includes biopharmaceuticals, in-vitro diagnostic substances and traditional pharmaceuticals.
- Manufacturing -lab instruments/supplies: These are the firms that manufacture lab instruments and supplies for testing, such as surgical appliances, dental equipment, optical instruments and other analytical laboratory instruments.
- Research: These firms conduct research and development in various physical life sciences, nanotechnology, biotechnology and other medical and testing laboratories.

MARKET ANALYSIS OF THE GREATER SACRAMENTO REGION

Sacramento has a core group of Life Sciences firms at various stages of development, which predominantly fall into the Research and Testing and Instrument/Supplies Manufacturing sub-sectors, rather than Product Manufacturing. The sector has an average location quotient of 0.97.

The Sacramento region has about 11,000 employed in the Life Sciences cluster. Employment is projected to grow 9% by 2027, three times faster than the previous 10 years. Ensuring that this growing workforce is inclusive may be more challenging in this sector than other industries, particularly in the leadership level, as suggested by national figures. Average wages in this sector are higher than most, and there are a range of career pathways. For instance, in the biopharmaceutical industry, the workforce is comprised of around 15% scientists, 15% production workers, and 10% administrative and production management - meaning there are various avenues to enter careers in this sector. Table 1 following shows trends and projections in employment for the Life Sciences cluster.

Table 1.

Life Sciences Employment, 2010-2017, 2017-2027 (Projected)			
	2017	**% Change, 2010-2017**	**% Change, 2017-2027 (projected)**
Sacramento MSA			
Employment	11,138	3%	9%
LQ	0.97	-10%	*n/a*
Output ($ Billions)	$ 3.4	*n/a*	*n/a*
Output per Employee	$ 4,657	*n/a*	*n/a*
Average Wage	$ 120,543	*n/a*	*n/a*
% Jobs Accessible with HS degree or less	27%	*n/a*	*n/a*

Source: RW Ventures

Large firms in the greater Sacramento region include Novogene (genome sequencing), StemExpress (cell collection/manufacturing labs), and Novozymes (enzymes and microbes). These firms are supported by a small presence of instrument/supply manufacturers focused on indoor environmental quality products (very significant in biologics manufacturing spaces) and automated complex biomedical testing (e.g., Beckman Coulter).[86] Within Sacramento, larger firms include manufacturers of instruments and drugs (e.g., Immuno Concepts, Nivagen Pharmaceuticals), testing services (e.g., Alpha Analytical), and contract research.[87] Several of these firms provide services to other sectors beyond Life Sciences, whereas the biopharmaceutical-specific firms are found in the greater region. Life Sciences start-ups make up about 25% of all start-ups in the Sacramento region and about 75% of start-ups that are involved with UC Davis' Venture Catalyst program, with biotechnology companies dominating incubation spaces.[88]

Significant regional research and innovation supports Life Sciences growth. In 2018, UC Davis received $230 million in NIH funding making it the sixth largest NIH-recipient in California – although, to compare, UC San Diego, one of the largest Life Sciences clusters, receives about 4 times more.[89] UC Davis has several research centers and projects focused on innovations in treatment. They reported 34 therapeutics patent disclosures in FY 2016-2017,[90] and

[86] There are many other companies manufacturing medical devices and lab instruments but many support the Health industry or are not directly supporting the production of next-generation therapies.

[87] Firms with over 25 employees at a single site.

[88] UC Davis' Venture Catalyst program; UC Davis-HM.CLAUSE Life Science Innovation Center - with biochemistry, molecular biology and chemistry lab space, and 1,800 ft² of contiguous greenhouse space; Crop Science CoLaborator - West Sacramento biotech startup incubator (located within Bayer's Innovation Hub); and MedCatalyst - an incubator lab on the UC Davis Medical Center campus in Sacramento.

[89] CBRE Research. *2019 US Life Sciences Clusters*.

[90] Greater Sacramento Economic Council, *Innovation Analysis* report, provided to authors by GSEC.

several of their largest NIH grants fund studies related to **cell and gene therapy**.[91] This area of focus is supported by Davis' GMP Laboratory[92] and is likely to grow with plans for a new Gene Therapy Center.[93]

UC Davis' Aggie Square innovation district, to be developed in the Oak Park community in Sacramento next to the UC Davis Medical Center, will add major capacity to this sector, with potential to catalyze the region's position in Life Sciences, particularly with respect to cell and gene therapy. Aggie Square will feature research facilities, office and mixed-use space, and is intended to house business partners and community-based programs with UC Davis innovation and research to create a strong shared community.[94] Phase 1 is anticipated to start in 2021 and will begin to build out four focus areas: Cell and Gene Therapy; Digital Health; Medical Device (bioengineering); Neuroscience. As Aggie Square develops, the project has the potential to address the 19% unemployment rate in surrounding neighborhoods through strong partnerships with the community, including workforce development and entrepreneurship strategies.[95]

Sacramento has access to a highly skilled workforce, trained by institutions such as UC Davis[96] and California State University Sacramento, to support growth in Life Sciences. Sacramento is one of the top 20 markets for new Life Sciences talent (ranked 15th), and UC Davis has the second-most Life Sciences graduates nationally, topped only by UC San Diego.

The region benefits from the California Biotech Foundation, pHarma, California Life Sciences Association (CLSA) and California Life Sciences Institute (CLSI), and is supported by a large medical system,[97] which also provides extensive capacity for clinical trials. For products that move into clinical trials in Phase I (~20-100 patients to assess safety of a drug) or Phase II (several hundred patients, to test effectiveness of a drug),[98] the region benefits from access to a diverse population for testing next-generation therapies. Of the national clinical trials (32,500), Sacramento conducts about 4%, as compared to leading clusters like New York City, Boston, San Francisco, and San Diego.[99] Emerging Life Sciences clusters in locations with comparable populations to Sacramento (Minneapolis,

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[91] Data was obtained from the NIH project database: https://projectreporter.nih.gov/. Active grants over $1 million were analyzed.

[92] UC Davis Health, "UC Davis Good Manufacturing Practice Laboratory," accessed July 30, 2019, https://health.ucdavis.edu/stemcellresearch/gmp/.

[93] UC Davis Health, "UC Davis Invests $4 Million to launch new research centers," accessed September 27, 2019, https://health.ucdavis.edu/publish/news/newsroom/14168.

[94] UC Davis Leadership, "Aggie Square will work for the university, for the community and for industry," accessed August 30, 2019, https://leadership.ucdavis.edu/aggie-square/about.

[95] UC Davis Center for Regional Change. *Developing Productive and Equitable Community-University Partnerships for Aggie Square*, Online Publication: UC Davis CRC, 2019.

[96] Their research centers include: CA National Primate Research Center; UC Davis Clinical and Translational Science Center; UC Davis Environmental Health Sciences Core Center; UC Davis Alzheimer's Disease Core Center; Mutant Mouse Resource and Research Center at UCD; MIND Institute Intellectual and Developmental Disabilities Research Center.

[97] Including facilities such as Sacramento Medical Center, Kaiser Permanente, Dignity Health, UC Davis Medical Center, CA Northstate University College of Pharmacy and Sutter Health.

[98] Large-scale manufacturing is needed for commercialized drugs – but during the long clinical phase, smaller-scale manufacturing is needed to make smaller batches of products for testing.

[99] Data was obtained from the NIH clinical trial database: https://clinicaltrials.gov/ct2/home. The percentages account for clinical trials that are classified as: Active (not recruiting); Enrolling (invitation only); Recruiting. Cancer-related clinical trials were also assessed (as they may provide a better indication of clinical trials focused on large-molecule therapeutics), and of national clinical trials, Sacramento conducts 5% as compared to New York City (30%), Boston (20%), San Francisco (14%), and San Diego (8%).

Pittsburgh, Atlanta) also conduct more clinical trials (6%, 7%, 9% respectively).[100] Sacramento's diverse population, while an asset, is under-enrolled in clinical trials often due to cultural and historical barriers and due to lack of collaboration across institutions.[101]

ASSESSMENT: SACRAMENTO'S OPPORTUNITIES

The most competitive – and most mature – Life Sciences clusters are in Boston, San Francisco, San Diego, and New York/New Jersey. However, many mid-sized clusters are beginning to compete, particularly as companies are pushed to city peripheries in over-saturated markets, investors seek opportunities outside of mature clusters, and mature clusters look elsewhere to fill talent/research gaps.[102] In particular, Sacramento is poised to grow as the Bay Area Life Sciences cluster becomes saturated and early-stage companies in the sector look to move to areas with research strengths, supportive networks, and greater affordability. Due to the long commercialization process in life sciences, after one to two years in an incubator, many companies are still in need of an affordable shared wet lab space to continue working towards revenue generation.[103]

Sacramento's research institutions, NIH funding, large companies, and start-ups grow sectors of Life Sciences that position the region particularly well to compete in **biologics** (both **cell and gene therapy** and **synthetic biology**). Improved DNA sequencing capabilities have the potential to accelerate growth in this area, and Sacramento's strong sustainability culture is an impetus for the growth of synthetic biology. These areas of focus align with next-economy growth trends.

There is additional opportunity in Sacramento at the intersection of the Life Sciences and Ag-Tech sectors (see AgriFood Tech section). Firms such as Bayer Crop Science[104] (seeds/biologics) and Marrone Bio innovations (pest management/plant health) are already established in Sacramento and are fostering partnerships to enable further research and development and start-up activity in the **agricultural biotechnology** (ag-bio) sector (e.g., developing microbial solutions to agricultural challenges).[105] There is opportunity to further grow this sector by advancing and improving plant disease resistance – or, using genetically engineered bacteria and yeasts to produce new crop varieties or create plant-based drugs.[106] This is assisted by research efforts in synthetic biology, which has both pharmaceutical and agricultural applications[107] – as well as energy applications (for instance, creating biofuels – see Clean Economy section of Scale Up Sacramento report). In addition to genetic modification, data computational analysis can be applied to the ag-bio sector to improve the nutritional value of food with molecular

[100] Data was obtained from the NIH clinical trial database: https://clinicaltrials.gov/ct2/home.

[101] Confidential interviewee, interview by RW Ventures, phone, August 20, 2019.

[102] CBRE Research. *2019 US Life Sciences Clusters*.; Deloitte. *2019 Global Life Sciences Outlook.*

[103] Confidential interviewees, interview by RW Ventures, by phone on August 16, 2019 and October 11, 2019 and in person in July 2019. For example, one company interviewed was housed in an incubator space for two years and is now poised to grow but needs an affordable next-step wet lab space to continue developing their product in the Sacramento region.

[104] A division of Bayer's Biologics group focused on innovative biological pest management solutions; https://www.cropscience.bayer.us/who-we-are/locations/sacramento

[105] Through of genetic engineering, molecular markers, molecular diagnostics, vaccines, and tissue culture

[106] Stanford, "Stanford research engineers genetically engineer yeast to produce opioids," accessed August 2, 2019, https://news.stanford.edu/news/2015/august/opioids-yeast-smolke-081315.html.

[107] SynbioBeta, "Bayer Collaborates with Greater Sacramento in New Incubator Space," accessed June 30, 2019, https://synbiobeta.com/bayer-collaborates-with-greater-sacramento-in-new-incubator-space/.

mapping and precision nutrition.[108] Access to specialty crops and greenhouses in the region can assist in testing agricultural biotechnology products, and as a benefit to the region, many of these products may reduce future healthcare costs.

Some of the market observations, particularly in relation to the enormous amount of data produced by the healthcare sector, the large medical system in Sacramento, and increased technical skillsets needed in both Health and Life Sciences, indicate that Sacramento may be able to grow its digital health capabilities – but, additional work is necessary to explore how that could be leveraged or redirected to synergize more directly with the Life Sciences cluster. Aggie Square will be a key component of growth in digital health as it is a focus area of UC Davis' innovation district, working in proximity to the region's hospitals.

The Location Quotient in Life Sciences – lower than would be expected – likely reflects that, despite significant research activity, commercialization of products is low, signifying a need for increased scale-up support for early stage companies to remain and grow in the region. Revenue in this industry often grows after many years of research and development – through mergers and acquisitions or IPOs – and therefore long-term investment and support is needed for companies to stay in Sacramento beyond Series A funding rounds.[109]

Growth in research and development, testing as well as manufacturing is needed to develop a competitive, mature Life Sciences cluster. Given the national shortage of manufacturing capacity for next-generation therapies,[110] building this capability in the region will not only grow the local cluster but also bring in revenue from other regions looking for space to manufacture complex biologics. Since growth is increasingly driven by strategic partnerships in the Life Sciences sector, Sacramento has the existing assets that will allow for cross-sector collaborations between research institutions, hospitals, start-ups and established firms. **What is missing is better connectivity between these assets.**

Alongside growth in collaboration,[111] shared spaces, [112] and manufacturing initiatives, Sacramento may need to augment its current funding with greater VC[113] and NIH funding, given the long timeline for biotechnology research and development. In addition, Sacramento must provide greater training programs to allow for certificate-holders to enter the Life Sciences industry,[114] thereby improving the inclusivity of the cluster.[115] Together, these

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[108] This involves integrating data of food composition, chemical structure, and modifications – and matching it with molecular components of plants/animals to provide targeted, individualized nutritional support. University of California, *Food 3.0 and Food Valley: Global Agriculture + Food + Health Innovation,* PowerPoint presentation; Gan, Junai, Siegel, Justin, and J. Bruce German, "Molecular annotation of food – Towards personalized diet and precision health," *Trends in Food Science and Technology*, https://doi.org/10.1016/j.tifs.2019.07.016.

[109] Start-ups at the Series A stage find benefits in Sacramento including affordable spaces and labor, particularly compared to the Bay area. Confidential interviewee, interview by RW Ventures, phone, October 11, 2019.

[110] Deloitte. *2019 Global Life Sciences Outlook.*

[111] SF has seen increased attention of commercial real estate investors as the cluster has grown, with deals being made by institutional investment managers, private equity, REITs and owner-occupants. CBRE Research. *2019 US Life Sciences Clusters*.

[112] Lack of lab space, particularly wet lab space, has been noted in interviews as a challenge.

[113] Increases in VC funding have been seen in Philadelphia, Chicago, Raleigh-Durham, and San Diego. Note: the two largest recipients of VC funding were also the two largest IPOs in 2018. CBRE Research. *2019 US Life Sciences Clusters*.; VC funding is typically 3 times higher for biotech concentrations than typical for other metropolitan areas. Cortright & Mayer, *Signs of Life.*

[114] Interviews with large companies and start-ups indicated a willingness to hire certificate-holders and even help with developing a certificate program.

[115] Solano Community College's biotech certificate program is an example: http://www.solano.edu/biotech/.

interventions will assist in turning early-stage R&D into manufacturing and related commercial enterprises and scaling them up.

EMERGING CLUSTER FOCUS

The following areas are identified as potential sectors where Sacramento may develop a competitive cluster:

- **Agricultural biotechnology** – There are opportunities for better connectivity with Sacramento's agriculture strengths
- **Cell and gene therapy** – The region has research strengths in this area, although firms in this space may gravitate towards more established clusters
- **Synthetic biology** – Current assets include land availability and a focus on sustainability, but additional research capacity is needed
- **Digital health** – There is a workforce shortage in areas like privacy, connectivity, encryption, and cybersecurity - and opportunity for Sacramento to become a leader in this space.

The Life Sciences sector would benefit from better connection between existing assets, to grow partnerships and shared resources to drive innovation, productivity and cluster growth. Much of Sacramento's current strengths are in the early stage R&D activities; business support and finance programs are needed to build the innovation ecosystem, particularly to help translate the R&D into manufacturing and related commercial enterprises, and scale them up. In addition, Sacramento's talent is at risk of being pulled to the Bay Area to access the strengths of their maturely developed Life Sciences cluster.

Growing the cell and gene therapy and biotechnology industries in Sacramento will require greater commercialization of next-generation therapy and biotechnology products. Growing these industries will require increased physical spaces to support the scale-up of emerging companies, including lab space for product development, manufacturing space for clinical phases, and manufacturing space for larger-scale commercialization. There is an opportunity to assist both emerging and larger firms with their product development and specialized drug manufacturing needs, thus deepening the Sacramento Life Sciences cluster with capabilities to move companies from R&D through to commercialization and large-scale production.

STRATEGIES AND RECOMMENDATIONS

STRATEGY #1. SUPPORT THE DEVELOPMENT OF AGGIE SQUARE.

Aggie Square is a regional innovation hub that focuses on research and development of technologies, especially in cell and gene therapy, genomics and imaging diagnostics, which are all strengths of UC Davis. Aggie Square will also focus on inclusive strategies to bring students, nearby residents and industry benefits for partnerships and workforce development. It will support new entrepreneurs who will create local startup companies as well as retain UC Davis graduates, and catalyze the regional innovation ecosystem.

First year activities:

- Collaborate with UC Davis and Aggie Square master developer on timeline for construction and development of facilities and space, and targeted employers.
- Assist with community and industry partnerships, including connected with health and food access.

STRATEGY #2. DEVELOP A WORKFORCE INITIATIVE FOCUSED ON LIFE SCIENCES AND SUPPORT OCCUPATIONS

Since workforce is a huge asset in life sciences, the universities, community colleges and training programs need to aligned with the industry needs, such as producing lab technicians and clinical lab scientists who have a variety of educational backgrounds. Workforce training programs and educational curriculum need to be tailored for the right types of jobs and occupations. The city of Sacramento has been working with a wide range of education, labor and community partners on a workforce strategy targeted for residents of the Oak Park/Stockton Boulevard/Fruitridge neighborhoods. The work plan will include development of apprenticeships and internships to promote inclusive skills development and retention of university graduates.

First year activities:

- Complete local workforce development plan, addressing needs for digital literacy/skills as already documented in this underserved community; focus on current unmet skills gaps in sectors such as allied health, cyber security/digital health, manufacturing and construction that are needed for current employers, while building skills and work experience that can prepare workers for future jobs in the Life Sciences Cluster. Collaborate with the Community Colleges State Director for Life Sciences who will provide resources on programs and curricula from best practices in other regions that have strong industry-academic partnerships and expertise.
- Coordinate with labor organizations on developing apprenticeships, especially in high-demand construction trades.

STRATEGY #3. FOCUS ON ATTRACTING AND SUPPORTING CONTRACT MANUFACTURERS

Life sciences startups often have a hard time scaling their products once they are ready for production. Contract manufacturers allows these startups to commercialize their products without the large-scale factories or high capital costs that mega life sciences companies have. Greater Sacramento's region lacks the abundance of contract manufacturers and therefore need to focus on attracting more of these companies into the region to support the innovation coming out of Aggie Square and the region. Local communities should offer incentives and business assistance to these new businesses to incentivize them to move into the region. Not only will these contract manufacturers produce goods that can be exported, they have a high multiplier effect for more life sciences companies to move and start in the region.

First year activities:

- Work with local communities to identify locations for contract manufacturing and attract manufacturers.
- Conduct an analysis of regional supply chains the map existing manufacturing capabilities/opportunities.

GOALS FOR 2020

- Secure industry partners focused on the industry subsectors to be tenants of Aggie Square
- Complete the Aggie Square work force plan; identify key in-demand occupations in the Life Sciences industry and initiate work experience and apprenticeships in current in-demand occupations
- Secure additional venture capital investors to boost the startup ecosystem
- Interact with local communities to create incentives that would attract contract manufacturers
- Identify spaces that can be repurposed for wet lab and manufacturing space
- Establish an industry-led life Sciences Cluster Collaborative

METRICS

- Collaboration with new Life Science industry partner tenants/workforce needs identified
- Workforce plan for current skills gaps and program/curriculum for new Life Sciences cluster training pathway; apprenticeship program established
- Supply chain analysis of existing manufacturing capabilities/opportunities
- Establishment of Life Sciences Cluster Collaborative

VIII. FUTURE MOBILITY CLUSTER

INTRODUCTION TO THE FUTURE MOBILITY CLUSTER

The Prosperity Strategy has identified innovative mobility as a potential growth industry in the Sacramento region. Unlike more established market segments, the field is too new to conduct a traditional quantitative assessment using NAICS codes. Further, innovative mobility is not yet a cohesively defined industry; different economic activities currently couched under the innovative mobility umbrella may have drastically differing workforce needs, scale-up timelines or investment levels and thus different growth strategies. Thus, this section takes a more qualitative approach compared to the other cluster analyses in identifying what appear to be regional strengths or emerging opportunities in innovative mobility.

The Partnership sees a tremendous opportunity in the innovative mobility industry in the Greater Sacramento region. Positioning the region as an early adopter of innovative mobility technologies can help improve transportation efficiencies, improve overall quality of life, and raise the region's profile as a forward-thinking, environmentally conscious, center of activity. These outcomes support the region's broader business climate, as more firms across many industry segments may be willing to locate or expand in the region. Given the inchoate status of the innovative mobility industry, however, these potential benefits are still speculative. The Prosperity Strategy looks instead at strategies that move beyond testing to include tradable industry components such as manufacturing that produce jobs, add value, and offer inclusive career pathways. As the cluster expands, greater Sacramento also will benefit from broader quality of life outcomes that enhance the attractiveness of the region across multiple industry segments.

CLUSTER DEFINITION

"Future Mobility" is an emerging field that refers to disruptive mobility innovations. From an economic perspective, mobility is the ability for people, goods and other economic inputs and outputs to efficiently move between and within regions. Mobility-related industries are undergoing rapid transformation due to the rise of connected, autonomous, shared and electric vehicles.[116] This area is projected to experience substantial sales growth and product expansion[117] due to global trends such as urbanization and climate change, policy trends like energy decentralization and related product innovations such as the Internet of Things.[118] RW Ventures defines innovative mobility as advancements in four distinct areas:

- **Autonomy:** Modes of transportation that can partially or fully operate without human interaction, instead relying upon sensors (including radar and sonar technology), cameras, and software to generate and utilize artificial intelligence.

[116] [116] McKinsey, "The trends transforming mobility's future," accessed April 1, 2019, https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/the-trends-transforming-mobilitys-future

[117] New drive technologies have global sales potentials of ~500 billion Euros per year. McKinsey & Company 2009, cited in Dörfer, Marc, Löffler, Bernd, Lienemann, Christoph and Hannes Puhlmann, *Ramp-Up Factory as Part of the California Mobility Center: Study on the Feasibility of Implementing a state-of-the-art Prototyping, Testing and Manufacturing Facility in Sacramento.* Report produced for SMUD, 2019.

[118] McKinsey Center for Future Mobility, "Autonomous Driving," accessed June 25, 2019, https://www.mckinsey.com/features/mckinsey-center-for-future-mobility/overview/autonomous-driving.

- **Electrification**: Modes of transportation that rely on electricity or clean energy and the associated infrastructure (e.g., charging stations).
- **Connectivity:** Transportation that connects to external systems using the Internet, facilitating advanced features like GPS and autonomy and enabling data collection to improve interactions between the vehicle and occupants, until the vehicle can operate in any conditions a human can navigate and fulfill occupants' stated and unstated needs with cognitive AI capabilities. [119]
- **Shared mobility:** Transportation modes or services that users share. Within future mobility, this often refers to ride-sharing, car-sharing, bike-sharing, scooter-sharing and microtransit (privately-operated, small-scale transit services with either fixed routes and schedules or flexible routes and on-demand scheduling). [120]

AUTONOMOUS MOBILITY

The autonomous vehicle (AV) market segment has seen an influx of not only research and development, but also public interest. Despite the recent attention, the industry still needs substantial developments before widespread commercialization of fully autonomous vehicles. Near-term applications will augment the semi-autonomous features already found in many existing automobiles to produce a higher degree of automation. Further application of autonomous technologies in transportation modes may be constrained in the short term as rapid developments in technology can outpace regulatory agencies and insurance companies.

Partners are working to showcase the region as an early tester and adopter of AVs. For example, Sacramento is partnering with the companies Deepen AI and Phantom Auto to develop a testing environment for AVs, while both Sacramento State, CalExpo, and the White Rock Corporate Campus in Rancho Cordova have tested an autonomous 3D-printed shuttle. Such efforts are exciting first steps, though more work needs to be done to translate this momentum into tradable industries here in the region- if firms test equipment in the region, but retain business and manufacturing operations elsewhere, the economic benefit to the region is much less.

Leaders in autonomous vehicle development include a mix of hardware, software, rideshare and automotive companies. Generally, these firms are well-established and can bear the high costs for research and development. For example, Apple, Amazon and Alphabet all have purchased or invested in AV companies. As such, there appears to be less opportunity for the region to establish an early market share that outcompetes investments already totaling in the billions. A more promising approach may be to look at areas with the larger AV supply chain, such as sensors, high-powered cameras or global positioning software – technologies that may have dual uses in other industries like agriculture, along with diversified manufacturing.

CONNECTED MOBILITY

Connected mobility equips a vehicle with Internet access, links the vehicle to other smart devices, and allows for data sharing. Safety and efficiency are two benefits most likely to be realized from further connectivity in vehicle fleets. There is strong overlap between this and the autonomous segment of innovative mobility, as autonomous

[119] McKinsey Center for Future Mobility, "Connectivity," accessed April 1, 2019, https://www.mckinsey.com/features/mckinsey-center-for-future-mobility/overview/connectivity; McKinsey, "The trends transforming mobility's future."

[120] Examples include Chariot, Bridj, Via, Lyft Shuttle. American Public Transportation Association, "Microtransit," accessed October 1, 2019, https://www.apta.com/research-technical-resources/mobility-innovation-hub/microtransit/

vehicles will be connected to each other through a wireless network. Major multi-national firms such as Mitsubishi or Cisco Systems have invested heavily in connected mobility research. The Sacramento region's strongest play might be through investments in 'smart city' infrastructure such as operation centers, intelligent transportation systems, or enhanced broadband to establish an early adopter status for connected mobility. Verizon Wireless' partnership to bring next-generation 5G wireless technology to the region is one example of getting ready with such 'smart city' infrastructure. Smart city infrastructure will require widespread deployment of fiber to enable advanced wireless technologies.

ELECTRIC (AND OTHER CLEAN ENERGY) MOBILITY

The electric vehicle market continues to grow, especially in California, which has demonstrated strong demand for electric vehicles and other zero emission vehicles (ZEVs). The state's commitment to curb greenhouse gas emissions from the transportation sector presages even further demand for clean vehicles. These efforts, however, do not necessarily translate to increased regional economic activity around ZEVS (beyond final sales). For example, Sacramento's partnership with ElectrifyAmerica is helping increase EV penetration locally but is not growing the innovative mobility industry beyond nontraded installation and maintenance of equipment. The production of electric automobiles to date largely fits within the traditional automobile clusters throughout the country.

The region may find a competitive advantage within a specific component of the ZEV supply chain. Market research suggests an ever-increasing demand for energy storage systems at the state, national and global levels. The Sacramento region has launched several companies focused on broader energy storage systems, such as RePurpose Energy in Davis (commercial energy storage), Simpl Global in Rocklin (storage for solar energy) or SPIN Systems in Sacramento (flywheels for energy storage). Within the larger energy storage market, the project's market research consultant sees an opportunity to build out a regional specialization in battery/energy storage for emerging mobility applications as a potential regional growth industry.

SHARED MOBILITY

The shared mobility market segment has rapidly expanded in the last few years: there are more the 400 cities in North America with car or bike-share systems, and over 600 with ridesharing. As for the other facets of innovative mobility, further shared mobility applications can help improve the efficiency of the regional transportation network. The region's initial bikeshare program has been widely successful, as Sacramento is the first city in the country where trips on the shared bike network exceeded trips on the Uber shared car service. Bike share systems are set to begin in the suburban cities of Elk Grove, Folsom, and Rancho Cordova, expanding shared mobility options further into the region. To maximize economic growth and base job creation, however, the region needs to build out more of the tradable components of shared mobility companies here in greater Sacramento. Both the bicycles and now scooters that are increasingly found across the region are manufactured outside the region, so the main job growth opportunities to date have been in non-tradable segments such as installation and maintenance. Shared mobility systems have been temporarily impacted by COVID.

INNOVATIVE MOBILITY WORKFORCE

As an emerging industry it is not yet possible to assess the full workforce needs of the innovative mobility economy. At a high level, the innovative mobility economy will likely suffer from a shortage in engineers, which could be a challenge for the region to fill without a dedicated educational pipeline. The field will also likely need to fill more middle skills jobs around AV/ZEV mechanics, remote support staff for connected systems, or scale-up

manufacturing. These jobs will require a different skillset than for present mobility solutions and include specialized technology not currently being taught in local schools. Workers will need to have knowledge in artificial intelligence, machine learning, robotics, data sciences and computer software – skills also identified as needed for the Future of Work.

Looking at the experience of the clean economy workforce—an industry segment several years ahead of innovative mobility—can provide valuable lessons of the type of workforce found in developing clusters. Clean economy occupations often have lower educational requirements (half do not require more than a high school diploma) and pay higher wages than national averages. As such, the industry has the potential to be a more inclusive pathway for middle skill jobs, especially through manufacturing industries. In application, however, the clean economy workforce lacks racial diversity when compared to other occupations nationally. While it is still too soon to measure the workforce composition of the innovative mobility economy, the experience from the clean economy and other emerging industries suggests the innovative mobility economy will need built-in actions to link the potential for skill development with inclusive outcomes.

Time-to-market "is a differentiating feature and competitive advantage" for new mobility products; for instance, reducing ramp-up time (testing, validation and production) from nine to six months has significant profitability improvements for companies.[121] Major auto manufacturers (Original Equipment Manufacturers or OEMs) have invested in ramp-up factories, which assist in building first prototypes and beginning batch production, while simultaneously identifying suppliers and testing and validating new products.[122] New mobility products contain a wealth of highly specialized components (e.g., high-voltage battery, fiber-reinforced plastic), many of which have a "rising degree of individualization"[123] and are made by "numerous manufacturers with the necessary expertise."[124] SMEs that develop these products have difficulty producing small quantities at a reasonable cost and transitioning from "workshop-oriented prototype production to actual series production," (e.g., batch production for commercial use) making it difficult for them to become suppliers or major players in future mobility.[125]

In addition to improving ramp-up processes, firms introducing new mobility products to the market will need to innovate and adapt quickly. For instance, the advent of fully autonomous technologies will result in a decline in consumer demand for conditionally automated technologies (e.g., shared operation between vehicle and driver), making these products obsolete unless they are quickly integrated into new production processes.

Rapid advances in mobility technology are expected to lead to a talent shortage. Of the 100,000 new mobility jobs projected in the next 10 years, two-thirds will be skilled trade workers and one-third will be computing-related

[121] The production of new mobility components is affected by trends such as enormous cost pressure to be competitive and significant fluctuations in concepts, new variants of automotive models, individualization and number of units. For instance, in the past, Audi introduced a new variant of the A4 to the market once per year but now does this once per three months (with trends showing this will continue to decrease). Dörfer et al. *Ramp-Up Factory as Part of the California Mobility Center.*

[122] For example, the Audi pre-series center, the Daimler start-up factory in Sindelfingen and the VW Pilot Plant.

[123] Steffen and Trumpfheller, *Well Considered.*

[124] Dörfer et al. *Ramp-Up Factory as Part of the California Mobility Center.*

[125] In addition to creating prototypes and accessing specialized manufacturing processes, it will also be important for SMEs to position their products well in the market. Steffen and Trumpfheller, *Well Considered.*

engineers (with demand six times higher than the supply).[126] These jobs will require different skillsets than present mobility systems (i.e., artificial intelligence, machine learning, robotics, data sciences, and computer software), demanding "cross-functional 'tinkerers," rather than specialists for specific automobile parts.[127] The need for constantly evolving skill sets may make mobility jobs more difficult to fill, leading to alternative sourcing such as start-up acquisition rather than direct hires.[128]

Areas like Silicon Valley, Boston, and Pittsburgh are poised to become future mobility job centers because of their strong retention of engineers; these cities all have technology institutes performing mobility research. Automobile manufacturing centers like Detroit may retain market share depending on industry investments in cultivating the new mobility workforce.[129] As noted above, future mobility is an emerging industry that warrants a different approach from a traditional cluster analysis. The industry is new and highly specialized, and thus available data sources comingle future mobility companies and activities with existing, traditional mobility functions. Therefore, investigating future mobility requires an evaluation of mobility broadly defined, providing information on supply chains related to future mobility and closely related industries, such as automotive manufacturing and information and communications technology.

MARKET ANALYSIS OF THE GREATER SACRAMENTO REGION

In Sacramento, traditional mobility companies – focused on raw materials, components manufacturing, research, systems operations, and retail – employed over 100,000 in 2017, growing at a rate of 7% since 2010. A location quotient of 0.81 represents a 14% decline from 2010. The sector provides well-paying job opportunities, as seen in its high average wage ($73,711), and jobs in the traditional sector overall are relatively accessible, with 33% of jobs requiring a high school degree or less.[130] Market research indicates that different skillsets will be required for future mobility jobs, which is not accounted for in this data.

Sacramento has strengths in vehicle components manufacturing (about 245 companies and 9,037 employees), predominantly in electric components like semiconductors, and rail manufacturing, most notably through the Siemens rail manufacturing facility. Assembly of EVs largely fits into traditional automobile clusters but many of the sensing technologies for AVs require more specialized manufacturing expertise. Several firms in the Sacramento area are shifting to focus on electric mobility, among them, Highlands Power (designs and produces electric motors), Glide Cruisers (sells personal electric scooters), First Priority Green Fleet (provides commercial EV solutions), and ClipperCreek (holds a 20% share of all charging station equipment sales in the US).[131]

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[126] BCG, "Mobility and Automotive Industry to Create 100,000 Jobs, Exacerbating the Talent Shortage," accessed April 15, 2019, https://www.bcg.com/d/press/11january2019-mobility-and-automotive-industry-create-jobs-exacerbating-talent-shortage-211519

[127] In addition, ~10-15% of jobs in powertrain and drive technology sector risk elimination. McKinsey & Company 2009, cited in Dörfer et al. *Ramp-Up Factory as Part of the California Mobility Center.*

[128] BCG, "Mobility and Automotive Industry to Create 100,000 Jobs, Exacerbating the Talent Shortage."

[129] Ibid.

[130] Mass Economics and RW Ventures LLC analysis

[131] Tony Bizjak, "'Scooter Wars' to hit Sacramento: Here's who's bringing 1,000 e-scooters to town," accessed July 8, 2019, www.sacbee.com/news/local/transportation/article231711563.html.

The regional cluster has several related research assets, including UC Davis automotive modeling research and various UC Davis Institutes.[132] Supporting institutions are also present that can assist in workforce development and sector growth. The Sacramento Urban Technology Lab (SUTL) is focused on enabling Sacramento to become a "living laboratory" in seven tech-driven verticals (including Mobility). Sacramento Valley Manufacturing Initiative (SVMI), an industry-led collaboration to build and sustain a robust manufacturing sector in the region by partnering with education and training providers, is committed to developing the region's future manufacturing workforce in areas such as mobility and clean energy.

The major initiative that aims to grow Sacramento's future mobility sector is the California Mobility Center (CMC), which plans to accelerate mobility innovation in all four future mobility markets.[133] The CMC is a public-private partnership of governmental and non-governmental entities, leading universities and colleges, electric utilities, technology and automotive companies, entrepreneurs, venture capitalists and others. The CMC's goals are to promote the development of EV and AV technologies, accelerate commercialization, facilitate the development of standards and policies, and conduct applied research to advance global EV adoption (including for public transportation). The CMC builds on the Autonomous Transportation Open Standards Lab (ATOS), a public-private partnership developed in Sacramento to create a testing environment for connected and autonomous vehicles.

A core partner and investor, the Sacramento Municipal Utility District (SMUD) worked with two firms to complete feasibility studies connected to the CMC.[134] PEM Motion, a spin-off of RWTH Aachen University in Germany that is innovating in the mobility sector, evaluated the potential for a Ramp-Up Factory – a key component of the CMC. EnerTech Capital Partners, a VC firm specializing in growing companies in energy, transportation and technology, created the business plan and developed the financial structure for the CMC. The CMC has now moved into the planning and implementation phase, which includes raising capital, identifying baseline technologies upon which to focus the CMC's market-building efforts, and securing a location for the Ramp-Up Factory.

The Ramp-Up Factory will focus on hardware for high-tech appliances and future mobility solutions – and provide space for projects and startups to prototype, validate, and begin to scale products in a shared space, allowing them to be more competitive in both time-to-market and cost of production. It will take these products from idea stage through to pre-series production (readiness for commercial series production). In addition to providing services for startups, it will also allow SMEs and OEMs to conduct research and development on new technologies, future vehicles and individual components. The product development process will simultaneously identify the most effective technologies to enable an efficient and competitive series production process for new products. The first phase of the factory (an approximately 20,000 sf repurposed building) will include machinery to enable a variety of products to be made. Machinery will be available to companies sharing factory space or available to rent at hourly rates, with technicians and engineers with expertise in high-tech equipment providing assistance.

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[132] Including topics such as: precision tooling, micro- and nano- fabrication, robotics, advanced materials, physical electronics, micro-mechanical devices, high-powered batteries and energy efficiency. Is auto research also focuses on auto safety, high-powered batteries, energy efficiency, and robotics.

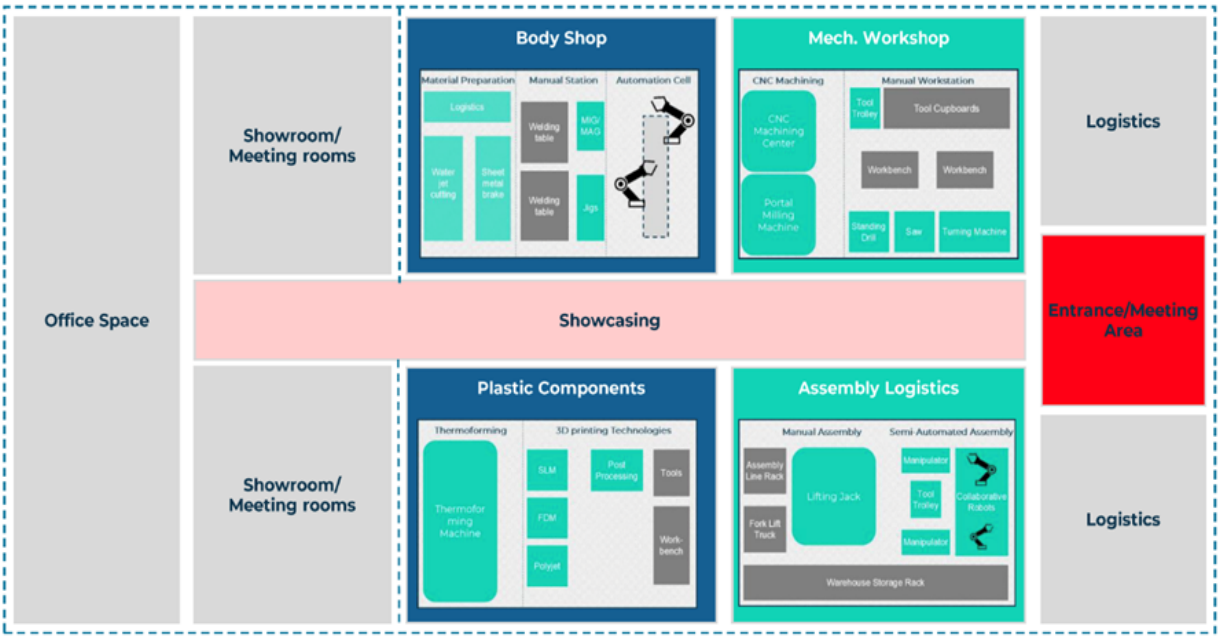
[133] https://www.bizjournals.com/sacramento/news/2019/12/10/california-mobility-center-beginning-to-take-shape.html

[134] Dörfer et al. *Ramp-Up Factory as Part of the California Mobility Center.*

The expansion phase (approximately 50,000 sf new building will focus on the "parcels battery, electric motor and testing," with machinery "more specific and tailored to high-tech applications."[135] The expansion phase is yet to be defined and will be informed by scale-up needs and specializations identified during the first phase. The first phase of the Ramp-Up Factory could be operational in 2020 and will include both automated machinery and hand tools for processes like joining, forming, cutting and assembly.[136] Together, these functions will allow startups, SMEs, and OEMs to move more quickly from design to production-readiness.

Figure 19.

Ramp-Up Factory Concept



The region is also supported by a strong state-wide regulatory environment, which can be an asset for companies developing innovative products that may require regulatory adjustments before they can be commercialized – and can assist in cooperation to set global standards. The California Air Resources Board regulates the automotive market, and in 2017, released a funding plan for nearly $400 million for clean trucks and buses. The California Department of Transportation and Department of Motor Vehicles are engaged in AV initiatives. The State of California has an aggressive climate action plan, including a goal to have 5 million EVs on the road by 2030. The market potential is huge – in order to meet that goal, EV sales in California need to grow by 36 to 50 percent. Furthermore, a significant amount of AV research, development and testing is occurring in California.

The region's in-progress infrastructure support for future mobility includes development of a 5G Network (see Section X. Infrastructure), a smart grid, and charging stations (developed by companies like Clipper Creek).

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[135] PEM Motion, *The Ramp-Up Factory as Part of the California Mobility Center.* Presentation

[136] .The Factory will include: body shop (with joining, cutting, and forming machines); a thermoforming machine to design, optimize and validate processes and tools for new components; a flexible milling and machining center (which can also produce molds for the thermoforming process); a vehicle assembly center which includes both assembly robots and hand tools.

Regional leaders are prioritizing carbon reduction. The Mayor's Commission on Climate Change has a goal of net-zero by 2045 for West Sacramento and Sacramento, which will be achieved in part by promoting shared and electric mobility. SMUD has a goal of net-zero carbon emissions by 2040, which includes investments in charging stations. The city of Sacramento recently entered into a partnership with ElectrifyAmerica (owned by Volkswagen) that will deploy two electric car-sharing services, installing ten charging depots, and making two area bus lines fully electric, as part of a $44 million nationwide pilot program. Additional partners such as Deepen AI and Phantom Auto have been evaluating Sacramento's infrastructure potential as an AV test site by assessing the cellular network coverage/capability and conducting high definition street mapping (along with initial AV tests). Sacramento's land availability is another asset that supports AV testing.

ASSESSMENT: GREATER SACRAMENTO'S OPPORTUNITIES

The California Mobility Center (CMC) is a core initiative upon which a strong Future Mobility cluster can be built. In particular, the launch of the Ramp-Up Factory will strengthen the synergies needed for clustering to occur, by connecting research, design and manufacturing processes for startups, SMEs, and OEMs (as well as suppliers). Sacramento has existing manufacturing strengths in both vehicle components and rail manufacturing, and by supporting initiatives like the Ramp-Up Factory, these strengths can be better connected to a larger regional and global network and repositioned to move into the future mobility market. Startups and SMEs making hardware components for new technologies can more easily create new, market-ready products and compete in a market previously dominated by auto giants and traditional supply chains.

The CMC also will grow manufacturing capabilities for clean energy initiatives across the region (e.g., re-using car batteries for energy storage; prolonging battery lifetime; innovations in EV production). (See the Clean Economy Section of start Up Sacramento for more detail on opportunities in these subsectors). As the Future Mobility industry evolves, there will be opportunities to make ancillary software products to support the sector (e.g., dynamic traffic signals, lights and infrastructure, enhanced passenger experience, wearable technologies to communicate surroundings), again, across the region.

Beyond readying new products for series production, the CMC also has the opportunity to improve future mobility-related manufacturing processes. The mobility industry uses batch production to make vehicular components and is constantly exploring ways to find efficiencies and reduce production time, reducing time-to-market for new products. The Ramp-Up Factory's efforts can be augmented with programs focused on the redesign of manufacturing processes (for instance, implementing additive manufacturing into series production). It will help stimulate and sustain and regional and domestic advanced manufacturing supply chain.[137] The CMC will locate the Ramp-Up factory in an area accessible to low-income populations, to support inclusivity, in conjunction with diverse entrepreneurship and ownership support and tailored workforce training (both described elsewhere).

To further support the CMC – and, given the expected nationwide talent shortage in future mobility – there is opportunity to turn Sacramento into a mobility industry talent hub. The CMC will work with several local educational institutions including UC Davis, Sacramento State University, Los Rios Community College District and other stakeholders including high-growth future mobility companies to develop student internship programs at the CMC, in addition to providing space for students to prototype or test thesis projects or startup ideas. The CMC and

[137] Frost & Sullivan, *Additive Manufacturing for Series Production: Opportunity Analysis*, Online Publication: Frost & Sullivan, 2019; Beau Jackson, "Audi to save 50% on lead times by switching to 3D printing for prototyping," accessed October 1, 2019, https://3dprintingindustry.com/news/audi-save-50-lead-times-switching-3d-printing-prototyping-134355/.

SVMI will collaborate with educational partners in developing workforce training resources, based on key workforce and technical skills required by the CMC.

Los Rios Community College is developing certifications to train the future workforce, and other opportunities for upskilling exist in related industries such as industrial/process engineering, AI, cybersecurity, and construction (e.g., roadways adapted to smart technology). As university programs are developed, their design should address how they can nimbly scale and adapt to remain aligned companies' skills demands. Given the rapidly evolving skill sets in Future Mobility, a workforce trained in specialized yet easily adaptable future mobility skillsets could present a compelling asset for the region. Programs will incorporate knowledge from other regions with specializations in future mobility, including the experience of PEM Motion, and the Advanced Transportation Sector expertise of the Community Colleges.

Being the state capitol, Sacramento is an ideal place to showcase new technologies to more easily facilitate their adoption into regulations and standards – for instance, in collaboration with the California Air Resources Board. Sacramento should capitalize on the first mover advantage for untouched parts of the future mobility supply chain – by identifying and growing specialized components of research and manufacturing (such as battery storage or sensors) at which Sacramento could excel, engaging the private sector in building these areas of specialty, and in addition, training the workforce for readiness in the future mobility sector.

STRATEGIES AND RECOMMENDATIONS

The Prosperity Strategy finds substantial assets in greater Sacramento relating to innovative mobility. Many of these assets are in supporting institutions, a reinforcing regulatory environment, early stage research, or a willingness to test and pilot emerging solutions. The goal of the Prosperity Strategy is to help the region move beyond testing/demonstrating into scaled up activities in tradable industry segments. One catalytic initiative currently under development that can help the region build out its strengths in innovative mobility is the California Mobility Center. Based on the PEM Motion model in Aachen, Germany, the California Mobility Center will focus on developing, prototyping, and the commercializing innovative mobility research. Multiple regional entities including SMUD, Los Rios Community College District, California State University Sacramento, University of California Davis, Valley Vision, and the Greater Sacramento Economic Council (GSEC) have partnered to advance the California Mobility Center. The center can serve as the anchor institution for other supporting strategies:

STRATEGY # 1. SUPPORT THE DEVELOPMENT OF THE CALIFORNIA MOBILITY CENTER

The establishment of an international industry-led Future Mobility Partnership across the region to enable strategic collaboration amongst industry stakeholders, including workforce, supply chain and market development will foster the development of the California Mobility Center (CMC). The CMC will be the anchor for advanced innovation, prototyping and manufacturing future mobility technologies. This will put Greater Sacramento on the map as the center for future mobility, in partnership with the California Air Resources Board, which is the world leader in environmental and sustainable policies. The CMC will spinout new companies and tradable jobs that will add benefit to the economy. It will also link supportive civic and policy efforts to an innovative mobility business development model. The immediate focus of the CMC will be to build out specialization in energy and battery storage. Supporting the CMC will help the region become world renowned, from prototyping and market development to specialized manufacturing.

First Year Activities:

- Support legislation and secure funding for Green Means Go – a multi-year pilot program to lower greenhouse gas emissions in the region by accelerating infill development, reducing vehicle trips, and electrifying remaining trips.
- Initiate a regional economic gardening program to scale early stage future mobility manufacturing companies, through an intensive business support and finance program.
- Increase funding and expand the reach for SACOG's "Civic Lab" program to pilot test innovative mobility solutions throughout the six-county region.
- Market the Center to outside regions through strategies like market visits, virtual branding, collaborations.
- Develop policy framework for mobility testing and implementation.

STRATEGY #2. DEVELOP A WORKFORCE INITIATIVE FOCUSED ON FUTURE MOBILITY

With the development of the CMC, there also needs to be awareness and coordination amongst universities and workforce development groups to ensure sufficient talent is being developed to support the Center and spinoffs from the Center. The initiative needs to be inclusive and provide training and workforce development for all groups of people and class of workers. Ideas include developing curriculum at four-year institutions to provide engineering talent for the Center while also ensuring certification are being provided for automotive manufacturing and the supply chain across the region. Workforce initiatives can serve as a model nationally in addressing the expected nationwide talent shortage in future mobility.

First Year Activities:

- Identify key skills and occupations needed for mobility-related firms and gaps in existing programs, and develop a tailored workforce initiative for the mobility sector that includes primary and secondary institutions, workforce training centers and SMVI.
- Develop an after-care program for the CMC to retain graduates.

GOALS FOR 2020

- Fully capitalize the California Mobility Center and Venture Fund
- Secure location for the Ramp-Up Factory and begin operations
- Adopt educational pipeline aligned with the California Mobility Center (mobility engineering degree program at CSUS; Certificates in AI, robotics, AV/EV repair, mechanical trades at community colleges)
- Adopt MOU: SACOG-SMAQMD-CARB that aligns public investments in innovative mobility (Civic Lab, Our Community CarShare, etc.)
- Pass Green Means Go legislation

METRICS

- Capitalization of the CMC first phase
- Launch of Ramp-Up Factory
- Design educational pathways with educational and workforce partners
- Secure MOU between the regional organizations and CARB
- Passage of Green Means Go Legislation

IX. REGIONAL TALENT DEVELOPMENT

OVERVIEW

"*Perhaps the most important factor that will determine long-run economic prosperity in the Sacramento region is its ability to grow, retain, and attract a strong workforce."*[138]

Prior to COVID-19, the Greater Sacramento region, like regions across the state and the country, was facing the challenge of regional talent development – dealing with not only rapid technology changes and the dynamics of the global economy but also demographic shifts and looming skills gaps in middle-skill jobs (those requiring more than a high school degree but less than a four year degree), as well as a shortage of those with four year degrees. Workforce ecosystems are complex and solutions require both a dedicated short and long-term collaborative, systemic approach that improves the efficiency of the labor market and is responsive to the needs of both employers and workers. The recommended initiatives in this report were geared towards meeting this challenge.

The global economy has been upended by COVID-19, with no clear path or timeline for recovery, and no clear understanding of what the "new normal" looks like. The magnitude of job loss, especially among already vulnerable workers, is difficult to grasp and will have far reaching impacts. A new report by the Urban Institute estimated there were more than 121,000 out-of-work people in the Sacramento region in April 2020 (about 10% of the jobs in the region).[139] According to WARN layoff notices filed by employers with local workforce boards, a high percentage are for temporary layoffs but there is uncertainty as to when rehiring can begin and in what way.

As noted in the introduction to the report, industry sectors have been affected differently, with retail/hospitality/tourism, services, transportation and warehousing and agriculture – including hard-hit small businesses – experiencing the greatest shocks and challenges. Other sectors including those considered essential – health, food, construction, manufacturing and government (including education) – are experiencing immediate transition and adaption. All industries and pivoting to new ways of operating.

In addition, the state of California has gone from having a healthy budget surplus to grappling with a financial crisis with a COVID-related deficit estimated at more than $54 billion by the Governor (May Budget Revise). As a result, there will be significant cuts to education and workforce training resources, as well as local budget cuts, which will impact the ability, for some time, to prepare students and workers for the new workplace and help them through this time of great transition. At the same time, learning at all levels of education will be remote, with higher education on-line except for limited on-site instruction through the end of the year. While this has meant a rapid transition for instructors, thousands of students are at risk of being left behind, due to lack of Internet access at home and/or lack of access to technology for learning, such as computers.

The pandemic has exposed the underlying structural disparities in the economy. According to a new report from McKinsey, "Low wage, part-time, and minority workers are the most vulnerable. Three quarters of all vulnerable workers earn less than $40,000 a year. Minorities make up 25% of the newly unemployed, even though they are

[138] Parilla, Joseph, Liu, Sifan, and Gootman, Marek, "Charting a Course to the Sacramento Region's Future Economic Prosperity", Brookings, April 2018, p. 46.

[139] Finch, Michael, "Staggering jobs losses have hit California low-wage workers," Sacramento Bee, May 3, 2020.

just 20% of the work force."[140] A new report by the North/Far North Center of Excellence – "Automation Risk for Jobs in the Capital Region" (described in more detail in this section of the report) provides further insights on workforce disparities. The imperative to ensure that the region's workforce strategies are truly inclusive is more critical than ever.

Given this context, the core strategies of the CEDS remain relevant and even more vital as issues like the impacts of automation, AI, technology, Big Data and Internet of Things on the workforce and workplace are accelerated, given the turn to remote learning and new ways of how work will occur, as well as with digitalization of skills. Along with regional research, economic research entities like Forbes, McKinsey Institute, the Brookings Institution and others all have emphasized how the Coronavirus Pandemic is accelerating the future of work. As a McKinsey CEO expressed in a recent webinar, "We just put our two-year digital transformation in place in two weeks."

While interventions must deal with immediate unemployment and displacement needs – especially for the large number of displaced workers in the region, education and workforce system partners and employers should accelerate action around two core areas: addressing current and long-term skills gaps, and preparing for the "Future of Work." Efforts should re-skill and upskill workers through activating a major digital skills initiative across all industry sectors. Education and workforce investments must continue to be aligned to support a demand-driven economy, and workers need opportunities to gain skills and secure livable wages more than ever.

REGIONAL WORKFORCE DEVELOPMENT ECOSYSTEM

Similar to large and geographically and demographically diverse metropolitan region, the workforce development ecosystem is complex and dynamic. This section provides a brief overview of key system entities, their roles and select initiatives relevant to the Prosperity Strategy.

HIGHER EDUCATION

There are 24 institutions of higher education in the Greater Sacramento region, with more than 192,000 students enrolled in 2018.[141] The region's public universities and colleges serve 93% of these students. UC Davis, one of the top public research universities in the country, has more than 38,000 students, while California State University Sacramento has more than 31,000. There are three community college districts with eight campuses and several education centers serving more than 110,000 students – 57% of all higher education students in the region. They include Los Rios Community College District, with four colleges and almost 78,000 students - the second largest community college district in the state; Sierra College with more than 18,000 students; Yuba Community College District with two colleges and 13,000 students; and Lake Tahoe Community College with 2,900 students. The remainder of the institutions are private for-profit and nonprofit, providing four-year degrees, juris doctorates, and graduate degrees in business, health, law, education, public administration, theological and other areas. These institutions contribute to the region's status with a relatively well-educated workforce and rich educational asset base.

The community colleges play a critical role in the regional workforce development system. They are the primary providers of Career Education (technical) (CE), leading to pathways for middle skill jobs in high demand industry sectors. The **Strong Workforce Program (SWP)** (passed by the Legislature in 2016-2017) has provided more than

[140] Murry, Alan and Meyer, David, "McKinsey has some chilling data on unemployment," April 29, 2020.

[141] Sacramento Business Journal, Book of Lists, December 28, 2018, p. 82, and Valley Vision.

$200 million annually for more and better CE, to address California's estimated 1 million middle skills job gap and the need for more Associates degrees, certificates or industry-valued credentials. Another SWP priority is to increase student success and economic and social mobility, and fuel regional economies.

Strong Workforce Program funding is allocated for 60 percent to go directly to colleges and 40 percent to regional impact projects in targeted industry sectors. In 2018, the California Legislature passed the K-12 Strong Workforce Program to support K-12 local education agencies to create and expand upon CE courses of study and pathways as a bridge to higher education pathways. These funds are awarded on a competitive basis. SWP K-12 builds upon the State's earlier investments in the Career Pathways Trust program to support CTE in K-12.

The colleges are supported by the Center of Excellence (COE) for the North/Far North regions of the statewide Community College system; the North region covers the seven county Greater Sacramento region. The COE conducts research on industry and labor market trends and workforce assessments, occupational demand, program resources, and other topics, and provides data for a wide range of community partners, including workforce boards, community-based and civic organizations, industry associations and jurisdictions. (See Far North COE website for industry reports and more http://www.coeccc.net/region/GreaterSacramento.aspx). The colleges have Regional Directors for Employer Engagement who serve as a liaison between faculty and colleges and the employer community to foster Strong Workforce Program and other outcomes.

Among other uses, this quantitative information along with the cluster analyses is used to provide the analytical framework for regional employer advisory meetings, cluster forums and other events and processes, which is then vetted with employers and stakeholders and further informed by qualitative input and real-time input and guidance. This process helps inform alignment of education and training resources and foster partnerships with employers, including for work-based learning opportunities.

WORKFORCE DEVELOPMENT BOARDS

The federal Workforce Innovation and Opportunity Act (WIOA) of 2014 provides funding to states to local business-led workforce development boards on a formula basis, along with discretionary funds. The State's goals are aligned with those of the Community Colleges to produce a million middle-skill industry valued and recognized post-secondary credentials and double those in apprenticeship programs. This is accomplished through a focus on sector strategies, career pathways, regional partnerships, earn and learn models, supportive services and more to foster demand-driven skills attainment and enable upward mobility for workers.

There are four workforce areas in the Greater Sacramento region which form the Capitol Region Regional Planning Unit: SETA, Golden Sierra Job Training Agency (El Dorado, Placer and Alpine counties), Yolo County, and North Central Counties Consortium (Yuba, Sutter, Glenn and Colusa counties). The four areas have a long history of collaboration on joint projects and initiatives, and a long list of regional partners including state and federal agencies, county CalWorks departments, local economic development agencies, community colleges, county offices of education, the Capital Region Adult Education Consortium, Jobs Corps and numerous community-based organizations.[142]

The workforce boards run a network of America's Job Centers which coordinate a range of services for both job seekers and employers, with a network of partners, including community-based organizations. The Centers

[142] WIOA Strategic Workforce Development Plan for the Capital Region, 2017-2020, 2017.

prioritize services for hard-to-serve customers with multiple barriers to employment and combine workforce preparation activities with education and wrap-around supports. The Boards also provide a number of employer services and support regional industry sector initiatives such as the Prosperity Strategy, critical cluster convenings, the Sacramento Valley Manufacturing Initiative (SVMI), the Future of Work project (all described below), project labor agreements, and the Prison to Employment project.

PROSPERITY STRATEGY PARTNERS

Partnership partners play varied roles in support in the regional workforce ecosystem:

Table 2.

Organization	Role/Key Activities
Greater Sacramento Economic Council	Provides market signals on skills gaps and workforce needs from existing and prospective employers; conducts specialized research including data dashboards and workforce characteristics; markets regional assets; convenes Competitiveness Council and Ag Innovation Council with employers and system partners
Sacramento Area Council of Governments (SACOG)	Identifies job centers and seeks to align transportation investments and resources to increase worker access to education, training and jobs and reduce congestion; supports pilot projects to increase transportation access to employment
Sacramento Metro Chamber	Advances education and workforce policy solutions for the region at the local, state and national levels; identifies best practices (e.g., study missions); engages network of cross-cutting sector business membership on workforce issues and priorities
Valley Vision	Serves as a Regional Organizer (per Capital Region Workforce Boards) to conduct sector research; convene, engage and connect employers with education and workforce partners; help align resources/programs; help facilitate and implement regional workforce projects on behalf of the community colleges, workforce boards and industry (Sacramento Valley Manufacturing Initiative), and philanthropy

Align Capital Region, an affiliate organization, is a leadership initiative focused on aligning people, programs and resources to achieve greater outcomes in education, workforce development and community vitality. It is currently focused on a major goal to increase the region's educational attainment by supporting the completion of degrees and certificates by those close to graduation, especially for four-year degrees (Project Attain!).

Across the region there is also a large network of nonprofits and other organizations providing sector-specific training, workforce development, career readiness and support; union apprenticeship and pre-apprenticeship programs; K-12 career education pathway programs and career academies; and employer-led initiatives. While strong assets, greater coordination, alignment and integration is needed for a more effective workforce system.

REGIONAL WORKFORCE ASSESSMENT

This next section of this report provides a summary of key research and findings that inform the recommended impact strategies for inclusive, resilient regional talent development. These include summary findings from the Brookings Market Assessment; trends in priority regional industry clusters, labor market trends, and projected openings in high-demand middle skills occupations (pre-COVID 19); and data on the Future of Work shaping the dynamics of regional workforce strategies, including the Digitalization of Skills and a new Center of Excellence report on how AI (artificial intelligence), automation and technology will impact jobs and occupations in the Capital Region, with recommendations for how the region can be prepared for impending skills shifts.

The Brookings Institution report highlighted important trends in the analysis of the region's talent-related status and identified several areas for needed focus. This analysis helped focus the direction of strategy development, including the need to address the digitalization of skills:

- *The region has a relatively well-educated workforce.* However, more than one-third of residents struggle to make end meet, and those struggling adults are disproportionately people of color and individuals with lower levels of education.
- *The labor market requires and rewards higher levels of education and training.* Bachelor's degree-level (and above) workers realized the greatest earnings gains (2010-2016)
- *The labor market is demanding and rewarding workers with digital skills.* That share of jobs now requiring high or medium levels of digital skills has greatly increased over the past 14 years, exceeding the national average. Seventy-two percent of occupations now require medium or high levels of skills, compared to only forty-seven percent 14 years earlier. (See Figure 20 below.) The higher the level of digital skills, the higher the average annual wage. The need to train workers with digital skills is greater than ever.
- *The region's future workforce will be majority-minority.* The region's current 18-to-34 year-old millennial population is 54 percent non-white, compared to the nation at 44 percent. The region has significant educational disparities by race, with Whites and Asians having much higher levels of educational attainment than Blacks and Hispanics. (See Figure 21 below).
- *Digital skills lead to higher earnings.* However, Black and Hispanic workers are underrepresented in medium and high digital occupations.[143]

[143] For further information, see https://www.brookings.edu/research/charting-a-course-to-the-sacramento-regions-future-economic-prosperity/, pp. 28-35.

Figure 20.

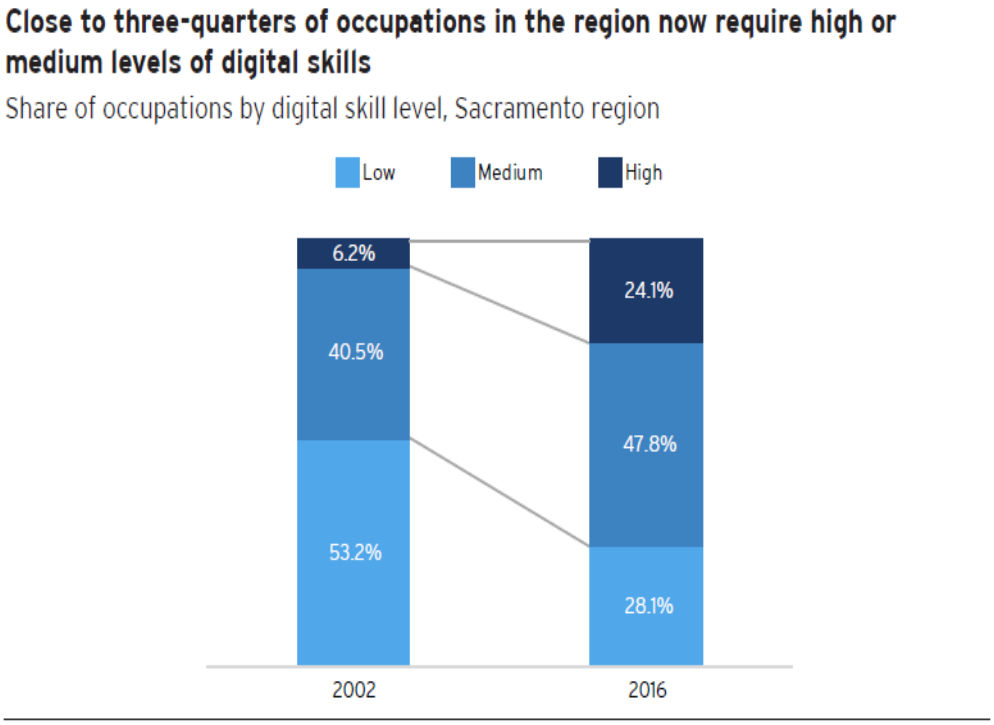
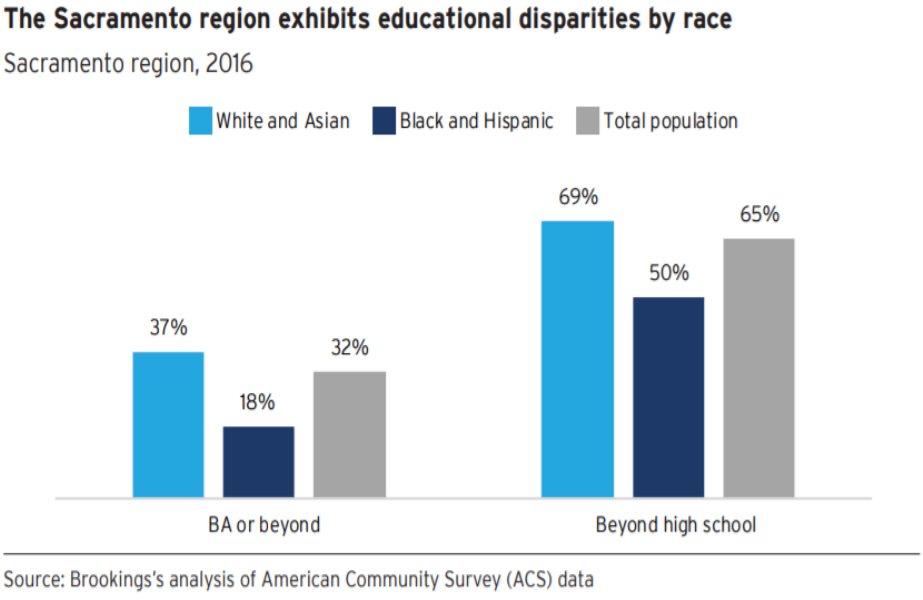


Figure 21.



INDUSTRY TRENDS/SKILLS GAPS

The region's previous economic strategy Next Economy identified six opportunity industry clusters in 2011/2012 that had the potential to move the region toward economic recovery from the devastating impacts of the Great Recession. These clusters were Advanced Manufacturing, Clean Economy, Education and Knowledge Creation, Food and Agriculture, Information and Communication Technologies (ICT), and Life Sciences and Health.

In 2015 JPMorgan Chase Foundation funded Valley Vision to update the cluster analyses and prepare workforce assessments of emerging middle skills gaps in high demand occupations, as part of its New Skills at Work national initiative. Valley Vision partnered with the North/Far North Center of Excellence (COE) to prepare updated workforce cluster workforce assessments in 2016. Since then, Valley Vision and COE have collaborated with industry, workforce and education partners and local jurisdictions to conduct research, convene industry sector employers, identify workforce sector priorities, and support action strategies to address skills gaps and mobilize follow up activities.[144]

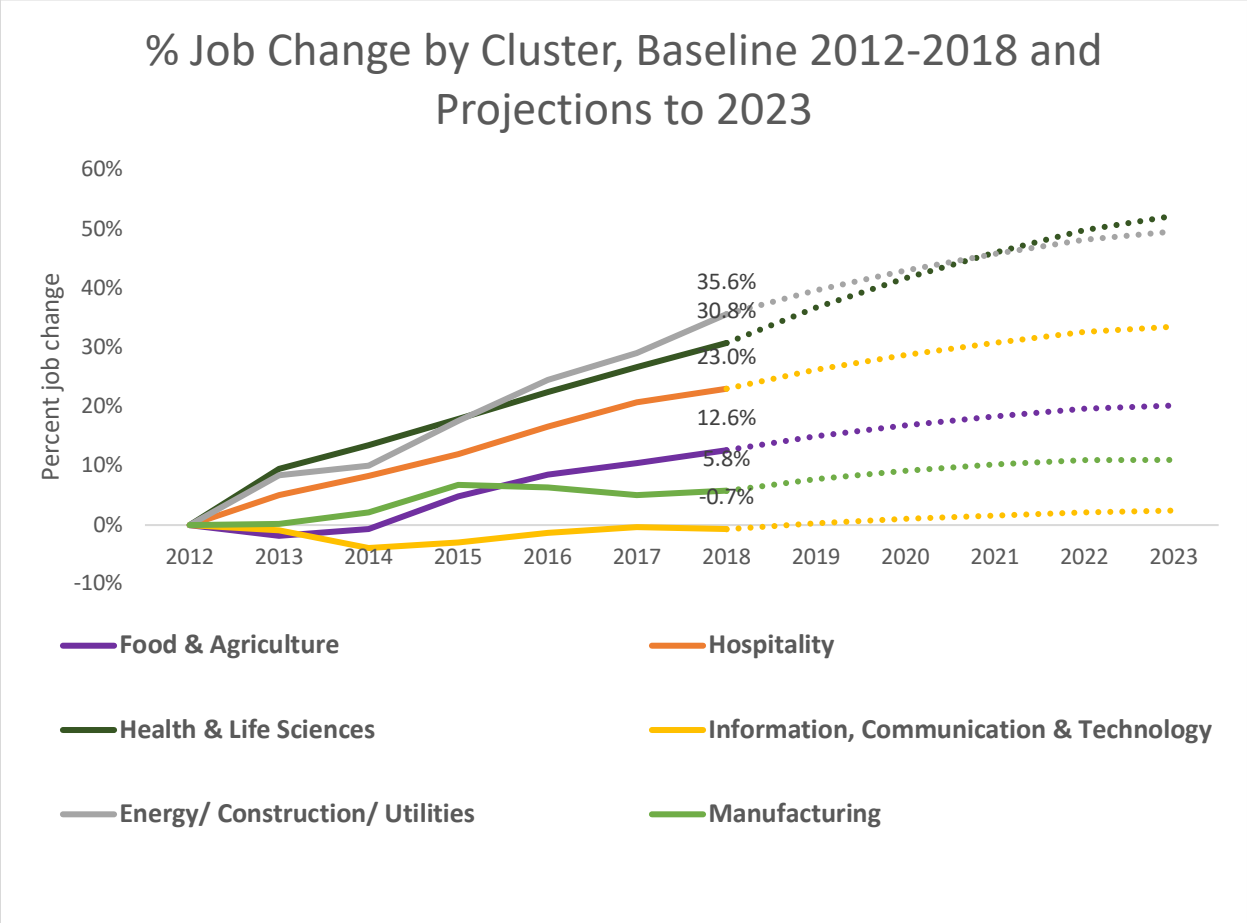
Since 2017, this work has included the process of convening spring and fall regional industry advisory meetings for the Community Colleges Strong Workforce Program Since the fall of 2017, Valley Vision has organized and convened at least 25 regional advisory board meeting and workforce cluster forums, with approximately 2,000 participants and 400 employers. The focus has shifted to the following six industry sectors: Energy, Construction, Utilities (ECU), Food and Agriculture, ICT, Life Sciences and Health, and Manufacturing, along with Retail, Hospitality and Tourism, given its large presence in the regional economy. There is coordination with the Innovative Pathways to Public Service project, as public sector occupations occur across all industries. The process explores ways to improve and increase impact and outcomes, including more formally organizing employers to garner more sustained engagement and partnerships.

The region's four workforce boards invest in these efforts along with philanthropy to foster a more cohesive regional workforce system. The region's Community Colleges and Workforce Boards have adopted and use the same set of clusters/sectors for regional planning initiatives and investments, along with K-12, Adult Ed and other partners.

The following data shows job change for the six Prosperity Strategy Clusters, for two time periods – 2012 to 2018 (the six-year period including recovery from the Recession) (Figure 22) and projections for 2018 to 2023 (five-year period) (Table 3). This is not all employment in the region (1.2 million jobs in 2018); employment in the selected clusters represents about 46 percent of total employment. Due to COVID-19, projected demand will likely vary greatly across various industries, depending on job recovery circumstances.

[144] See https://valleyvision.org/projects/capital-region-workforce-action-plan/ information on cluster assessments, meeting proceedings and other resources; the COE also has numerous additional reports http://www.coeccc.net/region/GreaterSacramento.aspx.

Figure 22.



Source: North/Far North Center of Excellence, October 2019

Between 2012 and 2018, all clusters grew except for ICT, with some variations in their trajectories over the period. More than 93,000 total jobs were added in this time period. The Life Sciences and Health Services Cluster, driven primarily by population growth and impacts from increased coverage and access to health services due to adoption of the Affordable Care Act, had the largest amount of jobs added – comprising 43 percent of all jobs added. The Construction and Hospitality clusters both added larger numbers of jobs. Food and Ag held its own, and overall, Manufacturing increased from the 2012 job count although in 2018 was slightly down from its peak in 2015. Manufacturing employers have reported that industry growth has been constrained by lack of a skilled workforce.

ICT had growth in some areas such as software and programming, other technical services, but was offset by declines in telecom, wholesale, and retail industries. There is likely to be a growth opportunity area for the region in ICT and Digital Media with digitalization of skills and increased activity around innovation labs and maker spaces, co-working spaces and other “creative” economy nodes emerging. All clusters are projected to grow from 2018 to 2023, with growth strongest in the Health and ECU clusters. The ECU cluster has an additional opportunity with the focus on an emerging cluster around mobility and sustainability.

Table 3.

Cluster Job Count and Projected Change Summary					
Cluster	**Job Count**			**Job Change**	
	2012	**2018**	**2023**	**2012-2018**	**2018-2023**
Food & Agriculture	31,640	35,641	38,031	12.6%	6.7%
Hospitality, Tourism	93,786	115,387	125,221	23.0%	8.5%
Health & Life Sciences	128,906	168,563	196,255	30.8%	16.4%
Information, Communication & Technology	41,103	40,812	42,111	-0.7%	3.2%
Energy, Construction, Utilities (ECU)	72,928	98,914	109,109	35.6%	10.3%
Manufacturing	37,705	39,881	41,844	5.8%	4.9%
Total	**406,068**	**499,198**	**552,571**	**23%**	**11%**

Source: North/Far North Center of Excellence, October 2019

THE MIDDLE SKILLS JOB GAP

While projections estimate the creation of almost 54,000 new cluster jobs total between now and 2023 as seen in Table 3, the picture is very different when considering not just new jobs but also replacement jobs that will need to be filled, due to retirements and separations, and workers who switch careers. An average of 69,099 projected annual jobs openings totals 345,000 jobs over the next five years. The largest projected openings are in hospitality and tourism and health services and life sciences. (See Table 4).

Table 4.

Projected Annual Job Openings, 2018-2023 Total & Top 15 Middle Skill Occupations by Sector		
Cluster	**Total Annual Openings**	**Annual Openings for Top 15 Middle Skill Occupations**
Food & Agriculture	5,022	843
Hospitality, Tourism	20,974	1,956
Health Services & Life Sciences	22,560	6,234
Information, Communication & Technology	4,130	1,051
Energy, Construction, Utilities (ECU)	11,551	4,619
Manufacturing	4,862	1,059
Total	**69,099**	**15,762**

Source: Greater Sacramento/Far North Center of Excellence, October 2019

Within each of the clusters, there are high-growth, high-demand occupations that represent a major middle skills gap due to the difficulty employers are having to find the right talent. There are almost 16,000 projected job openings a year that need to be filled, for a **total of almost 79,000 jobs** over the next five years, with the majority in Health Services/Life Sciences and ECU. These jobs are among the hardest to fill in each cluster.

Some of the cross-cutting issues facing employers across industries are the looming retirement of skilled workers; the push for students to attend four year college over other education and work experience choices; the lack of awareness of what career education jobs are really like in today's economy; and underinvestment in career technical education and work experience. All of these factors have led to current skills shortages and the lack of pipeline for a future workforce. They represent an immediate opportunity on which to focus workforce development efforts with current K-12 and higher education students and incumbent workers, and to target Strong Workforce Program and other career technical education investments, while also ensuring that current programs meet employer needs.

Information on the top fifteen middle skills occupations for each cluster, including projected annual openings, percent change (growth), and average hourly wages, along with detailed information on skill levels (low, medium and high), typical entry level education, and work experience required and typical on-the-job training for each occupation, and distribution across occupations in various industries, is available for each cluster (See Capital Region Workforce Action Plan). The Center of Excellence also has occupational profiles for each cluster along with summary of programs offered by the colleges (See Centers of Excellence).

FUTURE OF WORK

The "Future of Work" encompasses the transformation of both society and the economy through the impact of technology, and the more specific technical and workplace skill sets that will need to be improved across all industry sectors. As noted above, according to McKinsey Institute, Forbes, Brooking Institution and many others, the Coronavirus Pandemic will accelerate the Future of Work.[145]

The information technology revolution has vastly transformed the present and future workforce needs of our national and global economy. Innovation and entrepreneurship have become vastly prominent due to the revolution of information technology. Digitalization, automation, artificial intelligence (AI) and other innovative technologies are altering jobs across all sectors of industry, improving human capacity and task efficiency or shifting skill needs entirely.

In all sectors of the economy, digital technologies are creating a dramatic shift in the way we learn, work, and communicate. As civic, economic, and cultural institutions move forward with the productivity gains and increased outputs that digital technologies bring to their day-to-day work, all populations must be able to share in those gains in a meaningful way. Through a variety of historic, financial, political and societal factors, significant sectors of our region's populations are being left behind.

The digitalization of work is affecting jobs across all sectors of industry, stimulating a widespread discussion, both nationally and internationally. Speculation ranges widely – will rapid digitalization, automation, and artificial intelligence result in the end of work for most people, or simply change the types of skills most workers need? As technological advancement persists, there is a growing need for research to reveal how automation, artificial

[145] McGowan, Heather, "How the Coronavirus Pandemic is Accelerating the Future of Work," www.forbes.com

intelligence and digitalization will impact our workforce. The future growth and prosperity of our region requires that we quickly and inclusively prepare the region's workforce for the changing nature of work.

In response to these trends, the region's four workforce development boards initiated a Future of Work project with Valley Vision in 2018. A cross-section of employers identified critical trends, how they are preparing for the coming changes, and what they need from workforce and education systems. Every employer across every industry sector validated the kinds of issues being faced and the need for forceful, intentional responses. Some of the key recommendations were as follows: [146]

- Expand the high-skill Information Technology (IT) talent pipeline. Expand the regional pool of available IT talent in order to support growth and link workers to tech-sector employment, including jobs that are infused throughout a variety of "tech-using" industries that are creating sharp demand for skilled digital workers across the economy. Strategies could include:
    - ✓ Upskilling incumbent workers
    - ✓ Scaling-up the use of certification and work-based training approaches for IT roles
    - ✓ Broadening the availability of tech "boot camps" and other accelerated learning solutions
    - ✓ Creating career on-ramps, with an emphasis on underrepresented populations
    - ✓ Aligning and expanding computer-science education

- Expand basic digital literacy, especially among underrepresented groups. Strategies could include:
    - ✓ Training and certifying workers and students on "basic, everyday" software, such as Microsoft Excel or Salesforce
    - ✓ Developing marketing campaigns focused on the value of basic digital skills

- Cultivate durable human qualities, such as communication, problem-solving, emotional intelligence and other professional skills. Strategies could include:
    - ✓ Fostering adaptability
    - ✓ Encouraging a mindset of constant learning
    - ✓ Focusing on enhancing interpersonal skills and emotional intelligence

As follow up, the North/Far North Center of Excellence conducted an analysis for the workforce boards that identified the jobs and occupations most at risk of impact from automation, to create a baseline and identify strategies to help employers, workers and communities be better prepared for coming changes, and inform education and training institutions about the areas where skills upgrading and transitions will be needed. Prosperity Strategy recommendations are based on report findings, some of which are summarized below:[147]

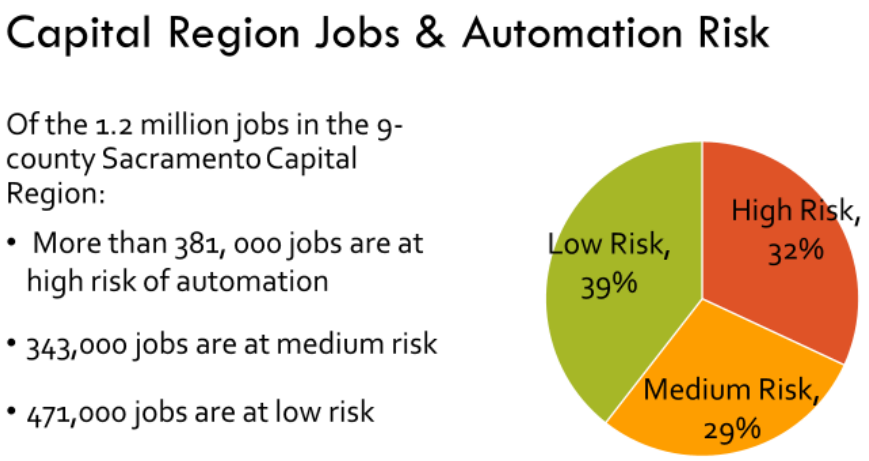
- *Half of Capital Region jobs are at medium to high risk of automation impacts.* Half of the region's 1.2 million jobs are concentrated in six sectors; three of those have above average automation risk scores: retail trade, accommodations and food services and construction. More than 381,000 jobs (32% of all jobs) are at high risk of automation impacts and 343,000 are at medium risk. (See Figure 23.)

[146] Capital Region Tech Workforce Forums, Summary of Proceeding, Valley Vision, 2018, p.7

[147] Benzing, Ebony, "Automation Risk for Jobs in the Capital Region," North/Far North Center of Excellence, March 2020.

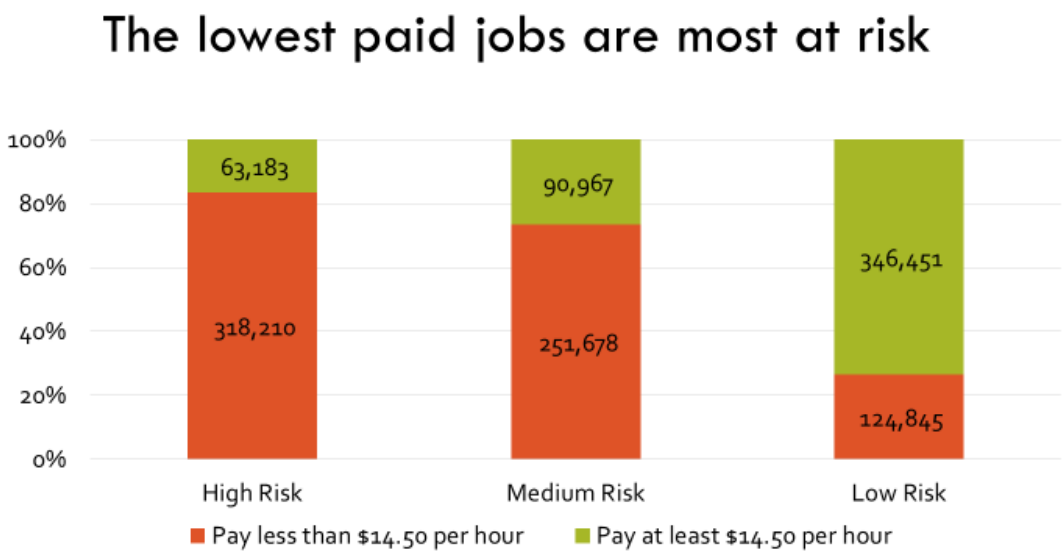
- *The lowest paid jobs are most at risk.* Wages are an important indicator of jobs that are vulnerable to automation. Eighty percent of high risk jobs (318,210 jobs) and more than 250,000 medium risk jobs pay less than $14.50/hour. (See Figure 24.)
- *Jobs requiring lower levels of education are most at risk.* Forty-three percent of jobs requiring a high school degree (or equivalent) are most at risk, compared to six percent for those requiring a bachelor's degree of higher. (See Figure 24.)
- *Women are most at risk in employment.* Occupations at high risk of automation impact disproportionately employ women.
- *Historically minoritized workers are most at risk.* American Indian, Pacific Islander, Hispanic/Latinx and Black workers work in jobs that are most at risk of automation.

Figure 23.



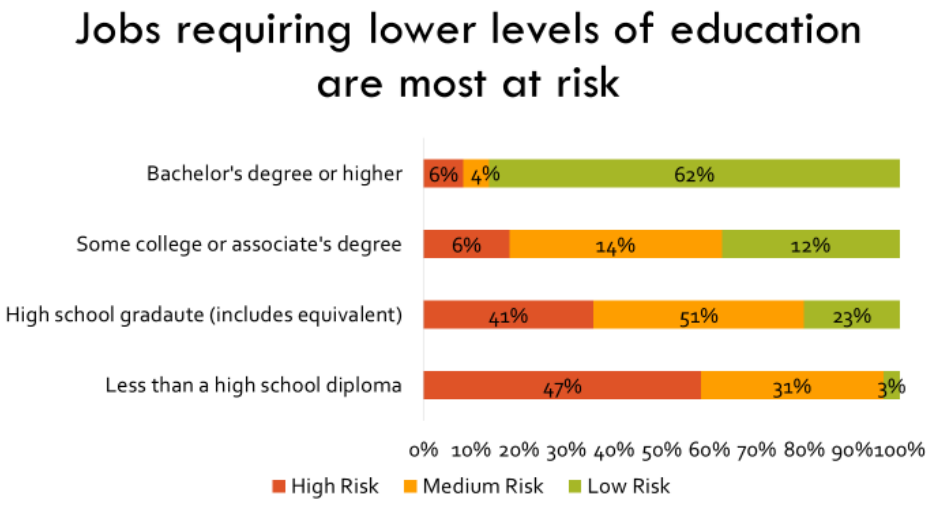
Source: Automation Risk for Jobs in the Capital Region, North/Far North Center of Excellence, 2020

Figure 24.



Source: Automation Risk for Jobs in the Capital Region, North/Far North Center of Excellence, 2020

Figure 25.



Addressing existing educational disparities by race, and investing in training in high-demand digital skills for underrepresented workers, especially youth, must be a high priority for the region. There is also a need to invest in workforce preparation/readiness activities, especially for disconnected youth and adults, including those facing significant, systemic barriers to employment. Preparing and connecting young workers to in-demand occupations across the region's multiple industries is critical for addressing widespread workforce shortages, providing opportunity for those workers at risk of being left behind, and reducing jobs at risk of automation impacts.

Although some public and expert perspectives on technology disruption's impact on the future of work are encouraging and hopeful, communities need to support both ends of this issue. Industry that benefits and advances due to tech disruption, automation, and AI need support from educational institutions and municipalities to ensure the prosperity and competitiveness of our workforce whilst enforcing guardrails and policies that can promote and advance economic inclusion.[148] The findings of the Automation Risk report, along with the accelerated disruption from the COVID-19 Pandemic, underscore the imperative for effective interventions. This includes addressing the region's Digital Divide and building digital equity into the core of the Prosperity Strategy.

DIGITAL INCLUSION AND DIGITAL SKILLS

Talent development that addresses the digital skills gap is one of the five market drivers identified by the Brookings inclusive growth framework for the region. The report was a call to action in 2018. A series of activities percolated across the region to equip workers to meet the demands of the 21st century workforce. **Most significantly was the regional consensus that the region is in need of a unified digital skills initiative that addresses and works to resolve the growing Digital Divide in basic digital skills, digital literacy, and digital equity and access.** This Divide has been made manifesting clear in urban, suburban and rural areas of the region with COVID-19.

Digitalization, or the process of employing digital information and communications technologies to transform business operations, is dramatically changing the workplace and the skills required to be gainfully employed. Middle-skill, or "good" jobs – jobs that offer workers **without** four-year college degrees the opportunity to earn livable wages and to socially advance – are rapidly digitizing and demanding higher levels of digital competency.

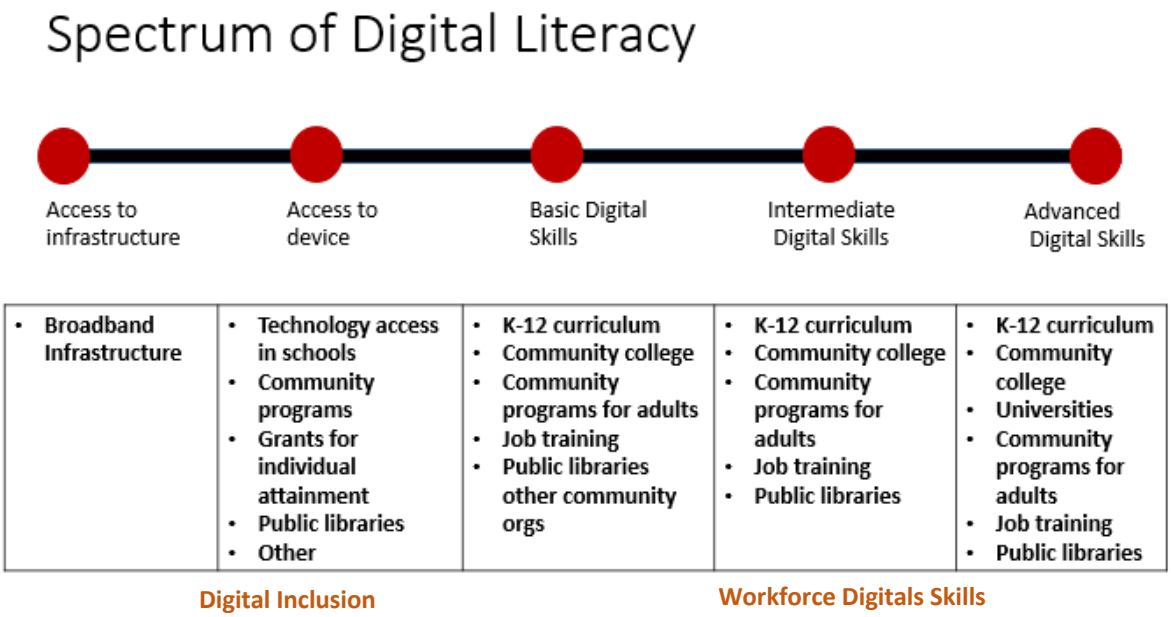
The Sacramento region has a persistent and increasing Digital Divide as manifested in disparities in broadband access and adoption, educational attainment by race, and lack of basic digital literacy skills as well as more advanced digital skills. Approximately 20,000 households in region are completely unserved according to California Public Utilities data, and many areas across the region have low or failing levels of connectivity.[149]

To successfully implement a truly inclusive economic growth strategy, the Digital Divide must be aggressively confronted through a systemic effort to ensure widespread digital inclusion. In this context, digital inclusion requires access to broadband infrastructure and affordable, reliable internet service; access to affordable computing devices appropriate for the given task; and essential digital literacy skills which are increasingly required for the middle-skills jobs of today and tomorrow. This continuum is the foundation for the acquisition of more advanced digital skills required in the workforce and workplace, as shown in Figure 26 following.

[148] Future of Work (2019). Valley Vision working paper.

[149] Broadband Report Card Maps, Connected Capital Area Broadband Consortium, Valley Vision, http://www.valleyvision.org/wp-content/uploads/Map-Broadband-Report-Card-2020.pdf

Figure 26.



Source: Valley Vision

DIGITAL SKILLS INITIATIVE

In response to the Brookings Assessment, several activities occurred to mobilize a regional Digital Skills Initiative. A Steering Committee was formed by the City of Sacramento's Office of Innovation and Economic Development, the Sacramento Public Library and Valley Vision, convening more than 40 community partners and organizations to launch the Sacramento Coalition for Digital Inclusion (SCDI), which produced a framework of priorities and goals for a three-year time period, including a **Digital Skills Initiative**.[150] Read more about the SCDI and its report at: www.digitalinclusionsac.org.

The goal of the Digital Skills Initiative is to educate and train a broad and increasingly diverse homegrown labor supply to fill jobs in demand today, and into the future. As part of the analysis, SCDI convened community workshops in Sacramento County to collect community feedback and direct service provider insights on digital equity needs with the County. Key findings included the identification of "digital equity deserts" throughout the County. The SCDI prepared some initial report recommendations for policy makers to:

- Focus on skill acquisition for the K-12 population across a variety of technology skills, starting with out-of-school learning for 7,500 high-need students that focuses on Code, Digital Media Creation and Digital Literacy – the **7.5K Technology Challenge.**
- Increase the availability of free and low-cost computing devices.
- Increase access to public computing labs and adoption of affordable home broadband subscription plans.

[150] Sacramento Coalition for Digital Inclusion Report. 2019.

- Invest in organizational infrastructure and capacity to coordinate, track, and measure progress toward regional equity goals.

It is critical to the future prosperity of the Sacramento Capital region that students and workers are empowered with relevant skills, obtain access to technology, and ongoing training that prepares them with competitive and employable skills throughout their careers. In order for the Digital Skills Initiative to succeed, the front-end of the Digital Divide (broadband access, adoption, and digital literacy) must be addressed. A major regional challenge is connecting pockets of concentrated poverty to regional employment and the digital opportunities afforded by broadband access. With the Shelter in Place mandates from COVID-19 and extension of education at home into the fall, those students and families lacking access to the Internet and technology is in stark display, which is driving efforts to connect all students and families across the region to address the Homework and Achievement Gap.

Several national middleweight metros – ones that are comparable to the Greater Sacramento region as identified by Brookings - have launched high-potential initiatives and demonstrated specific efforts towards closing the Digital Divide in their regions, including Kansas City, Charlotte, San Jose, San Diego and Seattle. These models offer insights as to how the Sacramento region can embrace the challenges and opportunities of digital inclusion. (See *Appendix D* for examples.) Valley Vision manages the Connected Capital Area Broadband Consortium (funded by the California Public Utilities Commission), to support initiatives to drive broadband infrastructure, access and adoption and address the Digital Divide, as part of a statewide network of broadband consortia,[151] and is working through both the SCDI and many local partners including school districts and higher education to address remote learning challenges The Prosperity Strategy Partners also are working to identify strategies, policies and ordinances, and public-private partnerships to drive investments in broadband infrastructure and connectivity (see Section X on Infrastructure).

REGIONAL TALENT DEVELOPMENT MODEL

California's future economic success, and that of its people, depends upon better informed and more durable collaboration between regional workforce systems, education and training institutions, and business and economic leaders all facing large scale challenges that demand an integrated and systemic approach. What is greatly needed is a Regional Talent Development approach that more purposefully aligns regional business and education organizations and partners in co-developing and co-managing better informed strategies for education and training programs that align to the shape and trajectory of the regional economy and labor market.

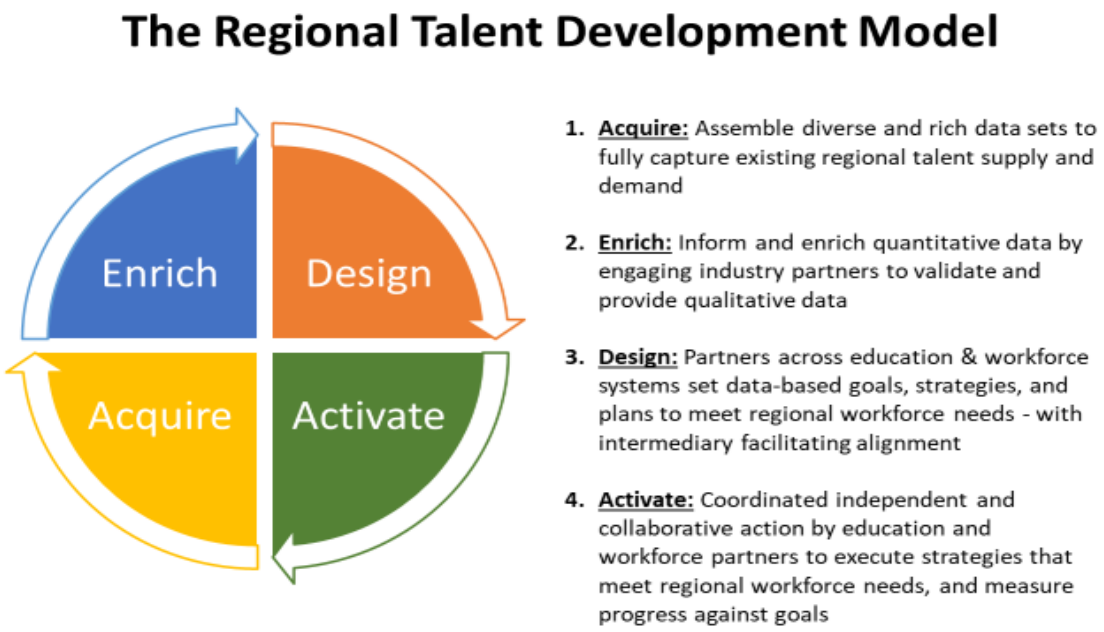
The Los Angeles Chamber of Commerce (L.A. Chamber), supported by a grant from JPMorgan Chase, has established a Regional Talent Development (RTD) framework to guide alignment of regional business and education organizations for better informed education and training programs. The Chamber also is supporting a statewide network using this model to address skill shortages in demand industry sectors by engaging five other regions across the state: Bay Area, Silicon Valley, Sacramento, Inland Empire and Orange County. Valley Vision represents the Greater Sacramento region.

The network team has worked for more than a year on the development and refinement of the Regional Talent Development Model, with ongoing technical assistance and peer learning provided to the network. The Model provides a systemic and systematic way to create a continuous feedback loop between training providers (K-12 education, adult education, community colleges, four-year institutions and workforce development boards) and

[151] (http://valleyvision.org/wp-content/uploads/2017/11/BB-One-Pager_7.2.19.pdf).

business and industry to address regional workforce needs. The model explores the role of the regional organizations to serve as workforce intermediaries to facilitate the process of identifying and aggregating the labor and skills needs of employers through a range of functions and helping improve the workforce development system. The model is comprised of four linked segments that are presented below.

Figure 27.



Through the collaboration with the Center of Excellence and other research activities, and the partnerships with the Community Colleges and Workforce Boards to engage employers and industry stakeholders, the Greater Sacramento region appears to be among the strongest across the state on the first two elements of the model. The regional advisory meetings and forums and ongoing development of cluster partner networks have been leading to action in the third element of the model, with progress made on the fourth element. All regions are grappling with the challenge of systematizing the process for sustained and meaningful employer engagement and partnerships; developing and deploying analytically-based, industry validated, region-specific career education programs that are fully aligned to regional economic conditions and will truly help students develop into the skilled workforce of the future with upward mobility for workers; and building capacity and sustaining the role of the regional workforce intermediary.

One key area of focus is the mechanism for employer leadership and engagement. The efficacy of regional employer/industry councils is being assessed. For example, there are three employer-led manufacturing councils in the Central Valley, including the Sacramento Valley Manufacturing Initiative (SVMI), that focus on meeting current workforce skills gaps and creating strong pipeline of workers for the future. These entities are hosted by regional "intermediary" organizations including NorTEC (the North State Workforce Development Board), Valley Vison, and the Fresno Business Council. The Council model and other structures will be further explored. (See https://www.sacvalleymfg.org/.)

The network collaborates with California Forward, as members of the California Stewardship Network, and the Economic Summit to work with the State on a state policy framework for regional talent development and resources to support regional alignment and action across workforce and education systems.

PROJECT ATTAIN!

Align Capital Region (ACR) is a regional initiative to align resources to achieve greater outcomes in education, workforce development and community vitality. Through an intensive year long process, ACR and community leaders determined that a high regional priority is to increase the region's educational attainment levels and support income mobility by targeting working age adults who are within 15 units of completing an academic program - "near-completers." Estimates are that the region has more than 83,000 working age adults who are near-completers. See Table 5 below. A collaborative effort, the project is being led by CSU Sacramento.

A disproportionate group of those most affected are people of color and women. As research has shown, these are factors that exacerbate the equity and inclusion gap of the region. Many adult near-completers encounter dispositional, situational, and institutional barriers hindering completion of their educational attainment. Project Attain! Will assist near-completers to overcome their barriers.

Table 5.

Project Attain! 2019					
County	**Working Age Adults**	**Some College, No Degree**	**Near Completers**	**Potentials (w/in 15 units)**	**Eligible (Completed Academic Requirements)**
Colusa	10,612	2,430	608	219	389
El Dorado	169,898	26,760	6,690	2,408	4,282
Nevada	50,056	15,087	3,772	1,358	2,414
Placer	194,498	50,191	12,548	4,517	8,031
Sacramento	789,380	206,461	51,615	18,581	33,034
Sutter	47,374	12,651	3,163	1,139	2,024
Yolo	101,745	19,784	4,946	1,781	3,165
Yuba	38,844	12,063	3,016	1,086	1,930
Regional Total	**1,402,407**	**345,427**	**86,357**	**31,088**	**55,268**
California	30,531,394	4,532,783	1,133,196	407,950	725,245
US	186,356,524	36,025,193	9,006,298	3,242,267	5,764,031

Source: Align Capital Region Summit Attain!

PRIORITY CLUSTER WORKFORCE NEEDS

The Prosperity Strategy workforce initiatives focus on meeting the skills gaps and "Future of Work" needs for the priority clusters, including Food and Agriculture, Life Sciences and Health Services, and Future Mobility. As major development initiatives such as Aggie Square and the California Mobility Center begin to build out, better information from prospective employers will emerge that will be used to assess the efficacy of current education and workforce programs, and provide the foundation to identify and design responsive pathways and pipeline of prepared workers. This information will be supplemented by knowledge of similar cluster initiatives in other regions, and networks of partners who can provide relevant curriculum and programs.

As a major focus of the inclusive growth strategy for both the city of Sacramento and the region, City representatives, education, workforce development, nonprofit and community partners are developing a collaborative workforce plan for the Aggie Square initiative in Oak Park that will include activities and resources to ensure that residents surrounding neighborhoods benefit from development opportunities and have access to skills building resources, employer connections and training partnerships. This effort will focus initially on the skills gaps and unfilled jobs in existing sectors (e.g., health, ICT, construction, manufacturing and the public sector), working with existing employers. In addition to in-demand skills and occupations in the target clusters, other job skills are required, especially in management, business, and technology-related occupations, along with workforce preparation. This approach can be replicated across the region.

There is a large current skills and worker shortage in construction, which is impairing project delivery and increasing costs of construction throughout the region and the state. There are already several large construction projects underway in the region, including hospitals, commercial and housing developments, the Sacramento Convention Center, the Railyards, state projects and regional transportation and other infrastructure projects. Ensuring a pipeline of workers for the development of Aggie Square, which is expected to start construction in early 2021, will be critical for delivering on the promise of the project and to capture employment opportunities for local residents.

Each of the region's key industry sectors requires a workforce qualified with basic digital literacy skills as well as workers with more advanced industry-specific digital and technical skills. The World Economic Forum (2018) identified upward trends in areas for building skills of the future, and occupations expected to see increasing demand:

Upward Trends

Social and emotional skills; innovation and creativity; and critical thinking will be highly sought-after skill sets for jobs of the future. Occupations expected to experience increasing demand in the next three years include: Data Analysts and Scientists, Software and Applications Developers, Ecommerce and Social Media Specialists, Customer Service Workers, Sales and Marketing Professionals, Training and Development, People and Culture, and Organizational Development Specialists, Innovation Managers, AI and Machine Learning Specialists, Big Data Specialists, Process Automation Experts, Information Security Analysts, User Experience and Human-Machine Interaction Designers, Robotics Engineers, and Blockchain Specialists. Contributing factors to these projections relate to increasing technology dependence, uniquely human skills, and emerging technology. Additionally, industry sectors that utilize uniquely human skills with positive prospects for the future of work include marketing, sales, and service; and health science.

STRATEGIES AND RECOMMENDATIONS

STRATEGY #1: STRENGTHEN THE REGIONAL WORKFORCE DEVELOPMENT SYSTEM

Across the country, regional leaders are collaborating to bring about better employer and worker outcomes by focusing on employer-demand driven workforce development systems. Much progress has been made to better regionalize connections, information platforms, pathways and resources, but the system needs to deepen, especially around sustained employer engagement and partnerships. This includes close collaboration with the community colleges in their leadership role of delivering career technical education. Adopting a focused model for regional talent development will advance our capabilities to perform as a 21st century workforce-ready region.

First year activities:

- Adopt the pilot Regional Talent Development Model. Work with the statewide network of regions, supported by JPMorgan Chase, to prototype and more fully implement the Regional Talent Development model as a regional workforce intermediary. The goal is to institutionalize a durable systems change approach to align regional business, workforce and education organizations to meet labor market demand and improve the economic and social mobility of the region's underserved communities.
- Assess regional employer/community college/workforce system partnership models such as the LA Center for a Competitive Workforce; the Milwaukee 7 Regional Talent Partnership; Advancing San Diego, a project of the San Diego Regional EDC funded by JPMorgan Chase; and West Michigan initiatives to develop an "innovation ecosystem" for workforce development, including Talent 2025, an employer-led coalition.
- Provide scale-up support for Sacramento Valley Manufacturing Initiative (SVMI) as an industry-led council and assess the potential for developing additional regional advisory employer councils, including in the Health Services and Life Sciences, Construction and ICT sectors.

STRATEGY #2: FORMALIZE SUCCESS MODEL FOR DEMAND DRIVEN TRAINING PROGRAMS

With a projected major middle skills gaps facing the region's priority industry clusters of **almost 80,000 jobs** over the next five years, and changing sector demand impacted by job dislocation due to COVID-19, there is a need for strengthened, clear pathways for those in need of connections and mobility through skills acquisition, reskilling and upskilling, and job supports. There is also a need to improve the efficiency of the labor market. While the near-term priorities will shift because of COVID-19 impacts, there will continue to be unmet skills gaps in specific sectors, and emerging opportunities such as in clean energy and other technologies.

First year activities:

- Develop a standard template for career pathway development and awareness, especially to focus on skills needed by firms affected by rapidly advancing technology adoption and by COVID-19. Models include LEAP in Nevada, which is a standard template for curriculum development that makes it easier for schools to train students with the right skills. Other models include the Talent-to-Industry Exchange serving Kansas City, replicable public/private partnerships that bring industry and education groups together around specific sectors, and the West Michigan Talent Innovation Lab. Develop a cohesive strategy to identify dislocated workers and connect them with career awareness and pathways in other sectors with

job demand that have persistent as well as skills gaps; the Hospitality/Health sector partnership the Communities Colleges are working on with the City of Sacramento is a potential model.

- Develop and expand bridge programs that prepare people with low academic skills for further education and training. Potential models include Neighborhood Employment Hubs which embed recruitment and training within community institutions to reach potential workers disconnected from traditional agencies; Employer Resource Networks which bring together business partners interested in improving employee recruitment and retention practices through better coordination with area human services and workforce development partners; and the Milwaukee 7 Regional Talent Partnership INSPIRE online platform that provides a central hub where students and educators can interact with local employers and career coaches.
- Further assess models such as Project Lead the Way, Inc. and Linked Learning to accelerate work-based learning opportunities, adopt STEM programs, bring additional resources to schools and the region, and foster K-12 to college pathways.
- Increase apprenticeship opportunities, are proven success models for developing strong workforce talent pipelines, both in the trades and increasingly, in non-traditional industry sectors. Adopt standards of practice for collaborating with industry and education partners to design short-term apprenticeship programs for both young people and adults.

STRATEGY# 3: CATALYZE THE CAPITAL REGION'S DIGITAL SKILLS INITIATIVE (DSI)

Digitalization is accelerating across all industries and has the potential to provide benefits to businesses, communities, and ultimately the region, needed to maximize our preparedness and competitiveness. The focus of the DSI is to train a broad and increasingly diverse homegrown labor supply with the needed digital skills sets, and to promote wide-spread digital inclusion and equity. It is the locus for continuing research on the Future of Work and developing strategies to address findings on the jobs and occupations at risk of impact from automation.

First year activities:

- Build upon the Sacramento Coalition for Digital Inclusion's (SCDI) inventory of local digital literacy efforts (see **asset map** of current programs) to greatly expand programming to prepare the workforce for middle-high digital skills given the risk profile of low digital skills jobs.
    - Increase the availability of digital literacy training for residents of all ages across a full spectrum of skills development – reach 7,500 youth after school – the 7.5K Coding Challenge.
    - Increase the availability of free and low-cost computing devices and increase access to public computing labs, WiFi hot spots, and adoption of affordable home broadband subscription plans, including through schools and libraries.
- Identify key partners or organizations to carry out or continue the following strategies:
    - Define basic digital skills required for entry-level employment across all industries
    - Identify high-skill needs and training requirements by industry sector
    - Expand and improve computer science instruction in K-12 and post-secondary education
    - Develop pathways to upskill incumbent IT workers (e.g., from helpdesk and network administration to software development and cybersecurity)

- Expand awareness of IT careers outside of computer science, and awareness of multiple post-secondary options for certification and skills development, and awareness of the high-skill "STEM" careers in industry sectors (construction, manufacturing, agriculture, etc.)
- Expand non-degree training options including industry valued badging and credentials, and immersive training and experiential learning programs
- Develop and implement inclusive outreach to ensure women, people of color, immigrants, and older adults are informed of and have access to digital opportunity

- Continue targeted research on Future of Work issues, developing a cohesive strategy to address jobs most at risk of displacement, including those workers displaced through COVID-1 and implementing a regional plan for continual upskilling and re-training initiatives to prepare for the digitalization of skills and automation. Connect with the California Commission on Future of Work.

STRATEGY #4: ADDRESS CURRENT SKILLS GAPS/WORKFORCE SHORTAGES FOR PROSPERITY PROJECT INITIATIVES

Targeted Workforce Plans for Aggie Square and the California Mobility Center will help ensure that residents obtain local jobs and benefit from economic investments. The Plans will focus on filling existing skills gaps and identifying and preparing pathways and programs to meet employer needs as job creation levels and types of occupations become known. Research from other regions with successful sector-related workforce programs will provide information on emerging occupational demand and needed skills, including for life sciences and future mobility. Given the construction of the planned centers, along with other major public infrastructure and building projects, it will be important to address the construction workforce shortage, . The plans could be replicated across the region, and could include sector-based training facilities, including for construction, manufacturing, health sciences and cybersecurity, in partnership with education, workforce, labor and industry entities.

First year activities:

- Complete workforce action plans for Aggie Square and the California Mobility Center, identifying projected demand occupations based on information from employers expected to locate at the new facilities, or that will be part of the supply chain of companies regionally, along with existing community assets, community conditions, and resources needed.
- Identify models from Strategy #2 that deepen the level of resources needed to support dislocated workers and hard-to-serve communities, including programs to assess workers' skills sets and provide supportive services.

STRATEGY #6: IMPLEMENT REGION-WIDE CAMPAIGN TOWARDS CLOSING THE NEAR-TERM COMPLETION GAP

The team for the CSU Sacramento and ACR-backed initiative, ProjectAttain! will implement educational attainment strategies to serve the growing population of working age adults (25-64) with some college experience or credits, but no degree. This is as an immediate first step strategy to catalyze efforts, existing programs, and expertise towards unifying alignment, and targeting degree and certificate completion for students within near term status of degree/certificate completion.

First year activities:

- Identify first tier of near completers and generate funding to initiate workplan.

- Coordinate with Strong Workforce Program/Middle Skills Gap efforts to support students earlier in the educational process, to improve opportunities for completions.

GOALS FOR 2020

- Adopt the Regional Talent Development Model, including supporting regional employer advisory councils
- Identify and design a career pathways and career awareness template to address middle skills gaps, with a success model bridge program
- Prepare high impact Digital Skills/Job Displacement Strategy for continuous learning/upskilling, especially for dislocated and disconnected workers and those at risk of job loss due to automation
- Prepare Workforce Action Plans for Prosperity Strategy Innovation initiatives (Aggie Square, California Mobility Center)
- Increase resources to address the Digital Divide, including Internet access and access to technology
- Increase apprenticeships, including in the manufacturing sector
- Advance ProjectAttain!

METRICS

- Bridge Program for career pathways in high-demand middle-skills gap
- Innovation Initiatives Workforce Action Plans (Aggie Square, California Mobility Center)
- Digital Skills/Jobs Displacement Strategy
- Increased broadband adoption rates
- New Manufacturing apprenticeship program
- Increase in the number of Sacramento's working age adults with high-quality degrees, certificates and other credentials (to 60% by 2025) (Project Attain!)

X. INFRASTRUCTURE

OVERVIEW

A region's physical infrastructure underpins the primary drivers of economic prosperity. Infrastructure increases access to the many facets of opportunity, improves connectivity between firms and workers, fosters broader mobility, and supports overall quality of life. The Brookings assessment delved into various forms of regional infrastructure (such as housing, broadband internet, and transportation), noting the region has uneven geographies of opportunity due to disparities in accessibility and mobility options. Overcoming these challenges is possible, however, if the region focuses on economic objectives to guide planning and infrastructure investments.

In response to Brookings' charge to focus implementation efforts on areas of collective influence or control, the Prosperity Partnership selected **transportation** as an emphasis for the first year of the Prosperity Strategy's infrastructure focus. The Prosperity Strategy also includes implementation strategies that address other facets of regional infrastructure, including broadband deployment and expanding housing choices. These areas were high priorities articulated in the SWOT analysis, which also references such important infrastructure needs as water and wastewater systems, flood control and watershed and forest management and restoration, especially in the region's rural areas.

TRANSPORTATION

Prioritizing Transportation Investments that Support an Advanced and Inclusive Economy

COVID-19 impacts will greatly affect revenues and expenditures for all kinds of infrastructure, and recovery funds will likely be focused on shovel-ready projects. The immediate shift to all but essential workers working from home, closure or reduced operations of businesses and other facilities, and remote learning for education systems has had a profound short-term impact on the transportation system and it remains to be seen how much transportation and mobility operations and options, including public transit, will be affected. One clear outcome is that the need for broadband infrastructure and access as critical 21st century infrastructure has greatly elevated, along with the persistent Digital Divide that exists in the region. Opportunities exist to strengthen both transportation and broadband infrastructure through mechanisms such as joint use/dig once policies, and to ensure connectivity for housing, schools and other important facilities.

BACKGROUND

The Prosperity Strategy posits that in addition to achieving the region's mobility goals, transportation infrastructure investments are essential for regional economic prosperity. The chapter lays out three infrastructure strategies to advance transportation investments that support an advanced and inclusive economy: (1) preserve and better maintain our transportation system in a state of good repair, (2) advance innovative transportation system management and operations, and (3) prioritize expansion projects that align with the economic prosperity principles. Near-term actions are proposed to accelerate and demonstrate early success on these outcomes for projects that can take decades to plan and construct.

The work draws on several key inputs. First, this infrastructure chapter builds off the recommendation from the Brookings market assessment to better focus implementation actions on areas where the Sacramento region has

the capacity to make near-term change, such as in policy or civic and private investment. Without a clear focus on a limited set of near-term actions, earlier visioning and planning efforts limited the region's ability to convert strategy into sustained action. In contrast, Brookings recommended that the Prosperity Strategy prioritize infrastructure investments that better support economic prosperity objectives, for greater impact.

Secondly, the Prosperity Strategy also draws on the region's long-range transportation plan, the Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS). The MTP/SCS lays out a 20-year transportation and land use strategy to support an economically prosperous region that can compete successfully for talent, jobs, and investment. Expanding mobility options and improving access to jobs and economic opportunity for all residents are among the key goals of the MTP/SCS. The MTP/SCS demonstrates that the region cannot afford to build and maintain all the transportation infrastructure or transit services envisioned in our local plans. The challenges are on both the expenditure and revenue side. Many capital infrastructure costs are rising faster than the rate of inflation, while improvements in fuel efficiency and increasing numbers of electric and hybrid vehicles erode the purchasing power of fuel taxes upon which we have relied.

Brookings, regional stakeholders and the MTP/SCS all advocate a shift from business-as-usual in how we approach transportation infrastructure investments. Each point to the need to be strategic and innovative in the choices we make with limited resources to maintain and enhance our transportation system. The Prosperity Strategy builds off this top-level guidance with strategies to prioritize transportation infrastructure investment that align with economic prosperity outcomes. This chapter summarizes the proposed strategies and recommended supporting near-term actions. It then describes each strategy in greater depth, concluding with a discussion of implementation steps to be taken in the year 2020 to support tangible progress on projects that often have multi-year timelines.

SUMMARY OF TRANSPORTATION INFRASTRUCTURE STRATEGIES

The Prosperity Strategy advances a 'pyramid' approach of three mutually reinforcing strategies for transportation investment to support an advanced and inclusive economy.

The base of the pyramid is the region's commitment to **preserve and better maintain our transportation system in a state of good repair**. Often called a 'fix-it-first' approach, the idea is that we must prioritize investing in our existing transportation assets. The region faces a significant backlog of roadways in poor condition and aging transit rolling stock that if left unaddressed will result in much more expensive costs down the line. Examples of projects supporting this fix-it-first first strategy include replacing the region's fleet of aging light rail vehicles with safer, low-floor ones, or routinely investing in roadway pavement overlays to avoid deterioration to the point where much costlier reconstruction is needed.

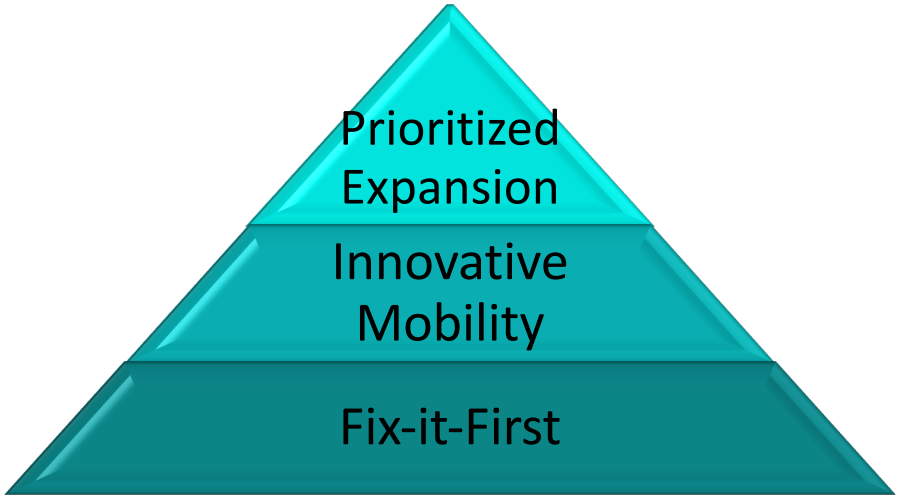
The middle of the pyramid advances **innovative transportation system management and operations strategies** that optimize infrastructure investments, promote travel options, and reduce greenhouse gas (GHG) emissions. It is critical to squeeze as much efficiency as possible out of our transportation assets to realize the highest return from our investments. Defined by the Prosperity Strategy as innovative mobility, these solutions offer high returns on comparatively low-cost projects and can delay or remove the need for additional capital-intensive infrastructure. Examples include new technologies for more efficient traffic operations, multi-modal traveler information, promotions, and programs to increase walking, biking, transit use, carpooling, and telecommuting. By helping the region realize more benefit for each dollar invested, innovative mobility allows for more financial

resources to be focused on our region's very serious maintenance needs. Further, creative solutions to solve existing transportation problems cost-effectively can spark a potential growth industry for the region.

Finally, the top of the pyramid lays out an approach to **prioritize capital expansion projects that align with the Prosperity Strategy principles**. For a region forecasted to add 270,000 new jobs and 620,000 new residents, we will need to strategically expand our transportation system. Capital-intensive infrastructure is expensive, however, so the region needs to be selective and limited in its priorities, realizing fiscal savings from implementing fix-it-first and innovative mobility solutions helps make possible system expansion investments. The Prosperity Strategy has developed a draft method to prioritize strategic capital expansion projects that support economic outcomes across the themes of business, people, and place.

Figure 28.

Transportation Infrastructure: Strategy Overview



Source: Sacramento Area Council of Governments

SUMMARY OF RECOMMENDED NEAR-TERM IMPLEMENTATION ACTIONS

Transportation projects can take years, even decades, to move from initial concept to final construction. The Prosperity Strategy recognizes the realities of this longer timeframe, but also strives for tangible actions in the near-term. To meet the overall effort's charge for near-term implementation, the infrastructure chapter concludes with several recommended actions that could be completed in 2020. These tangible actions accelerate broader implementation of the three transportation infrastructure strategies or help reach concrete milestones within longer-term project development efforts on economic prosperity priority projects.

Recommended actions supporting the broader strategies:

- Establish project priorities for competitive federal or state grants
- Update Project Performance Assessment tool with improved accessibility and observed data

- Design, secure funding, and implement pricing pilot
- Support local agencies in approving dedicated taxes or fees for transportation improvements

TRANSPORTATION STRATEGY #1: PRESERVE AND BETTER MAINTAIN OUR TRANSPORTATION SYSTEM

Our region faces a critical challenge in preserving our existing transportation system in a time of increasing costs and decreasing revenues. During the last decade our local road conditions have declined significantly, leading to a growing backlog of maintenance projects. Between 2008 and today, our roadway conditions have dropped from an average pavement condition index score of 70 to a score closer to 60. (A pavement condition index is a consistent way to monitor the condition of roads. A score of 70 or above generally means a road is in good condition, requiring routine maintenance. Scores in the 60s are signs that road conditions are deteriorating at an increasing pace, and at risk of failing). As roads degrade further, routine maintenance becomes insufficient, and more extensive (and thus more expensive) repairs are needed. The infusion of California's SB 1 funding will help cities and counties curtail further deterioration of our roadways, at least in the short term, but falls short of helping us climb out of the hole we've accumulated over the past decade. To bring our roads to a state of good repair in the next decade would require nearly $900 million annually, a far cry from the $350 to $400 million we're spending today. Deferring routine maintenance today leads to a much larger price tag in the future.

The picture for transit is similar. In just the next five years, roughly half of our region's more than 500 buses are due for replacement. Nearly 60 percent of the light rail vehicles still in operation today are over 25 years old and in need of replacements or significant refurbishing. The cost of replacing all these vehicles likely exceeds $400 million.

The regional economy cannot function, let alone grow, without a well-maintained transportation network. In addition to the more expensive repairs required as maintenance is put off, poor road conditions and out-of-date transit vehicles have direct implications for the region's firms, their employees, and potential investors and entrepreneurs. Failing roads lead to more wear and tear on vehicles and reduced miles per gallon, hitting commuters and commercial fleets at both the pump and the shop. Older transit vehicles result in more service calls and less service reliability, limiting the ability for users to rely on the system. And major reconstruction projects cause more disruption and delay than routine maintenance projects.

The foundational strategy for the region's infrastructure is to preserve and maintain our current transportation system. This strategy serves as the base of the proposed pyramid of transportation infrastructure investments; without a state of good repair the other proposed strategies will fall short in meeting the goals of the effort.

An approach that begins with existing infrastructure aligns strongly with the Prosperity Strategy principles to improve business, support people, and develop place. Notably, most regional job creation comes from growth within existing businesses; these same firms rely on and are served by the current transportation system.

The current transportation system also supports people, connecting workers to employment and training, including affordable options such as transit for low-income residents. Finally, preserving the current transportation helps develop place, such as through rehabilitation projects with context-sensitive elements that improve the travel experience of bicyclists, pedestrians, and transit riders, or safety on roads built to outdated standards. These

'complete street' investments lead to healthier, safer, and more complete communities. Such efforts also increase the vibrancy, and thus the investment potential, of the numerous aging commercial corridors found across the region. In short, the first strategy helps preserve and enhance overall quality of life in a region competing in a global economy.

Strategy 1: Preserve and better maintain our transportation system. A network of well-maintained complete streets and farm-to-market corridors supports economic prosperity outcomes	
Illustrative Project	**Agency**
Nevada Street	City of Auburn
5th Street Rehabilitation	City of Marysville
Placerville Drive	City of Placerville
Franklin Boulevard Complete Streets	City of Sacramento
E. Main Street Complete Streets	City of Woodland
Bridge Street	City of Yuba City
Diamond Springs Parkway	El Dorado County
Highway 49 Sidewalk Gap Closure	Placer County
Arden Way Complete Streets	Sacramento County
County Round 98	Yolo County
North Beale Road Complete Streets	Yuba County
Transit Vehicle Replacements & Rehabilitation	All 13 transit agencies serving the region

Numerous efforts are underway that support this first strategy. For example, Sacramento Regional Transit District is working to replace aging light rail vehicles and upgrade existing stations to accommodate modern low-flow vehicles. Not only can these new vehicles improve reliability, they will also augment accessibility, especially for passengers with disabilities, resulting in a more inclusive transit system. They also will be more energy efficient.

On the road rehabilitation side, the North Beale Road Complete Streets project in Yuba County is providing more options for bicyclists and pedestrians to access the local community college and improving road conditions to the nearby Beale Air Force base, a major regional employer and potential future innovation hub for advanced technologies. The project responds to needs of the local rural community, where many people are walking and biking on the facility out of necessity. As another example, the Arden Way Complete Streets project in Sacramento County is leveraging the multi-modal and placemaking elements of the road rehabilitation project to increase private investment on the commercial corridor. The above table showcases other example rehabilitation projects under development in the region that link maintenance investments with economic prosperity outcomes.

TRANSPORTATION STRATEGY #2: ADVANCE INNOVATIVE TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS

The second component of the Prosperity Strategy's infrastructure is based on the region's capability to employ proven operational and emerging innovative solutions to enhance the existing transportation system's ability to meet economic prosperity goals, often without the need for any capacity improvements. These approaches can

help the region realize more benefit for each dollar invested, which in turn allows more resources to be focused on our very serious maintenance backlog. Defined by the Prosperity Strategy as innovative mobility, these solutions offer high returns on comparatively low project costs. There are many examples of how the region can accelerate innovative mobility solutions to optimize infrastructure investments, promote travel options, and reduce greenhouse gas emissions. Three promising examples include (1) system management, (2) travel demand management, and (3) new mobility modes.

Strategy 2: Advance Innovative Mobility. Investments to optimize infrastructure, promote travel options, and implement new technologies offer high returns and support an emerging economic cluster	
Illustrative Project	**Agency**
Camino Safety Project	Caltrans, El Dorado County
Carpool matching app	San Juan Unified School District
Dynamic corridor ramp metering	Caltrans
Electric and other car sharing programs	Gig, Envoy, SMAQMD, etc.
I-5 auxiliary freeway lane to serve expanding business park	Caltrans in partnership with Sacramento County
Olli shuttle pilot	Sacramento State, Cal Expo, Rancho Cordova
On-demand microtransit	SacRT, Via, YCTD, etc.
Rural broadband deployment	Connected Capital Area Broadband Consortium
Suburban bike share	Elk Grove, Folsom, Rancho Cordova, etc
US 50 integrated corridor management	Caltrans, in partnership with Sacramento County and the cities of Folsom, Rancho Cordova, and Sacramento.

The focus of the first example is in applying cost-effective technology solutions to actively manage the transportation system. This includes improving arterial traffic flow (e.g., traffic signal coordination) and offering transit priority treatments (e.g., signal priority and queue jumps at intersections). We traditionally think about accommodating multiple modes of travel primarily in areas surrounding a light rail or bus station. But other parts of the transportation network can also employ system management techniques to accommodate multiple modes. For example, more and more highway projects are exploring how to improve transit service either along the facility itself or on a parallel corridor. Such options can include integrated corridor management or allowing buses to use the highway's shoulder during peak congested travel. These options improve the reliability (and thus attractiveness) of the transit service for a 'win-win' outcome that reduces the number of single-occupant vehicles and improves travel conditions for all travelers. Other system management approaches to improve highway efficiency include through traveler information (e.g., changeable message signs), access management (e.g., ramp meters, consolidating driveways), improved incident response (e.g., freeway service patrol) and pricing managed lanes.

A second approach within innovative mobility solutions is called transportation demand management (TDM). TDM focuses on strategies that maximize traveler choice, leading to a more efficient use of the existing system (such as through ridesharing or active transportation), different travel behavior (such as through incentives and pricing), or

a reduction in the number of car trips during rush hour (such as through broadband deployment or teleworking). When done well, TDM can be a cost-effective alternative to expensive additions to the physical infrastructure.

Finally, new technologies and mobility options have changed the way the people think about transportation. Such change is only to grow in the future, as the suite of mobility options—from autonomous vehicles to e-scooters—is already changing so fast they are hard to predict over the near-term, much less over a project development timeline that can take multiple years. In order to discover how new mobility technologies will work in our communities, we need to test them. One significant effort in this area has been through Civic Lab, the region's innovation accelerator. The program launched multiple pilots in 2018-2019, such as testing the 3D-printed electric and autonomous Olli shuttle. Positioning the region as a test-bed for new mobility can accelerate deployment of innovative solutions that respond to existing transportation challenges. It can also help respond to the region's deficiency of tradable industries, by developing an emerging cluster of innovative mobility firms. Section VIII explores how this innovative mobility can serve as a job growth industry in greater Sacramento, as the region moves from testing pilot projects to manufacturing new mobility products exportable to other regions, along with pioneering policy solutions.

Strategy Example: Linking Broadband and Transportation Investments

Valley Vision, as manager of the PUC-funded regional broadband consortium (Connected Capital Area Broadband Consortium - CCABC) has been working with SACOG, Caltans, the PUC and local partners to identify strategic broadband corridors that can help overcome the region's existing Digital Divide, and support connected communities. Transportation construction often represents an opportune time to also deploy fiber optics. Examples like these exemplify the thinking behind the strategy to advance innovative solutions—broadband deployment not only helps address an existing digital divide, but also reduces demand on the transportation network. Initial work has identified possible transportation corridors that could benefit from greater broadband infrastructure, such as US 50 corridor in El Dorado County, sections of the I-5 Corridor, CA 113 in Yolo County and corridors near Beale Air Force Base. The CEDS' broadband section builds out a regional broadband strategy as an economic prosperity initiative and will support Joint Use/Dig Once policies linking transportation and broadband infrastructure projects (See https://www.valleyvision.org/projects/connected-community-initiative/

TRANSPORTATION STRATEGY #3 DESCRIPTION: PRIORITIZE EXPANSION PROJECTS THAT ALIGN WITH THE PROSPERITY STRATEGY PRINCIPLES

As noted earlier, most regional job creation comes from growing existing businesses. Both fix-it-first and innovative mobility support this firm growth as a far more cost-effective solution compared to redesigning our region's transportation system to serve a more dispersed pattern of new employment sites. A more compact footprint also helps keep agricultural land in production (a key input to our food/ag cluster) and reduces maintenance costs because roadway expansion is more limited.

As the Sacramento region continues to add residents, jobs, and housing, however, the Prosperity Strategy recognizes the region will need to strategically expand our transportation network to serve this growing region. Yet the strategy also argues we cannot afford to build all the new transportation infrastructure and services we may want, especially given our significant backlog of maintenance projects. The third component of the Prosperity Strategy's

infrastructure approach explores how the region can maximize the limited dollars available for expansion to focus on projects that support economic prosperity outcomes across themes of business, people, and place.

An expansion transportation project can support regional economic prosperity in many ways. For example, the Brookings market assessment notes how regional employment is spatially concentrated in job hubs that largely contain the region's tradable industries; transportation investments better serving existing and emerging job centers can help the region developed stronger economic clusters. An expansion project also can improve access to training or educational opportunities, including for underserved communities, or access to telehealth services. Or the project could help relieve congestion on a key jobs or freight corridor and provide multi-modal options to support more marketable communities.

To identify expansion transportation investments with strong economic outcomes the Prosperity Partnership has developed a draft methodology aligned with the findings of the market assessment. The proposed approach uses four steps. It begins by analyzing proposed expansion transportation projects across nine economic prosperity data indicators. The expansion projects identified in the Sacramento Metropolitan Chamber of Commerce's 2019 Cap-to-Cap program serve as examples of business-endorsed projects supporting economic development. As the Cap-to-Cap list is meant to be representative, not exhaustive, the evaluation method also draws on the highest scoring additional expansion projects (on the nine data indicators, by community type) from the MTP/SCS long-range plan. Second, the Prosperity Partner agencies conducted an expert review on how projects identified from the data assessment support the nine qualitative economic prosperity principles. Thirdly, this combined assessment is meant to foster an initial discussion of priority economic prosperity projects across the data (quantitative indicators) and expert review (qualitative principles) measures.

Yuba City-Marysville 5th Street Bridge: Prosperity Project in Action

Testing the Prosperity Strategy's draft prioritization methodology not just on proposed future projects, but on recently constructed projects, is one useful way to examine the effectiveness of the approach. In this vein, the Partnership applied the draft economic prosperity methodology (discussed below) on the recent work to expand the Feather River Bridge at 5th Street between Yuba City and Marysville. The results highlight the expected economic prosperity benefits from this project. For example, the data tool noted the heavy existing congestion that the project helps address, while the expert review thought the expanded bridge could help better drive jobs and investment in the Yuba-Sutter area, and improve accessibility in environmental justice communities on both sides of the river. Tracking these outcomes through time, and as the project is fully utilized, can help assess the effectiveness of the draft methodology to identify expansion transportation projects with strong economic outcomes.

For the fourth step, the Prosperity Partnership is asking project sponsors to assess and provide feedback on the draft methodology. The Infrastructure chapter's technical appendix explains the overall methodology and each of the data indicators in further depth and it is summarized below in Figure 29.

Figure 29.

Prosperity Strategy's Proposed Draft Transportation Evaluation Approach

Source: Sacramento Area Council of Governments

STEP 1: EVALUATE PROJECTS ON NINE QUANTITATIVE DATA INDICATORS

Table 6.

Improve Business	**Support People**	**Develop Place**
1. Does project serve high job growth area? (base sectors) *Data: Projected base job growth*	4. Does project serve schools/ education institutions? *Data: Number of K12 & univ. enrollments w/in project area*	7. Does project respond to an existing congestion need? *Data: Level of existing congestion in project area*
2. Does project support employment clustering? (agglomeration) *Data: Job center access*	5. Does project invest in underserved community? *Data: % of population residing in envir. justice community*	8. Does project serve area of relative housing density? *Data: Relative dwelling units per acre*
3. Does project improve firms' access to workers? (labor shed) *Data: Labor shed accessibility w/in reasonable commute*	6. Does project improve workers' access to employment opportunities? *Data: Job accessibility w/in reasonable commute*	9. Does project support complete communities? *Data: Transit, walk, and bike mode share*

STEP 2: EXPERT PANEL REVIEWS PROJECTS USING THE NINE QUALITATIVE PROSPERITY STRATEGY PRINCIPLES

Improve Business

1. Does project advance competitiveness, drive jobs and investment into the region?
2. Does project target advanced industry and traded sector job creation, including in the food/ag, health/life science clusters, and mobility?
3. Does project support improvements to the business climate that increase innovation, university tech transfer, and business dynamism and scaling?

Support People

4.Does project improve access to necessary education and in-demand occupational skills, making digital skills a shared workforce development priority?
5. Does project help the economy leverage workers and entrepreneurs from all backgrounds to foster equitable wealth creation and inclusive growth?
6. Does project increase access to community programs, jobs, capital, health care, and stable housing for vulnerable and struggling communities?

Develop Place

7. Does project invest in infrastructure that supports regional mobility and accessibility, including affordable transportation options for low-income residents?
8. Does project serve a community that increases housing affordability through production, diversity of housing types, supportive infrastructure and community investments?
9. Does project support healthy, safe and complete communities with place-making assets and 'next-generation' transportation options?

The Prosperity Strategy tested the draft prioritization methodology on the expansion projects included in the 2019 Cap-to-Cap program (see M ap below, Figure 30) and the highest scoring additional projects (by community type) were nominated to the region's long-range transportation plan.

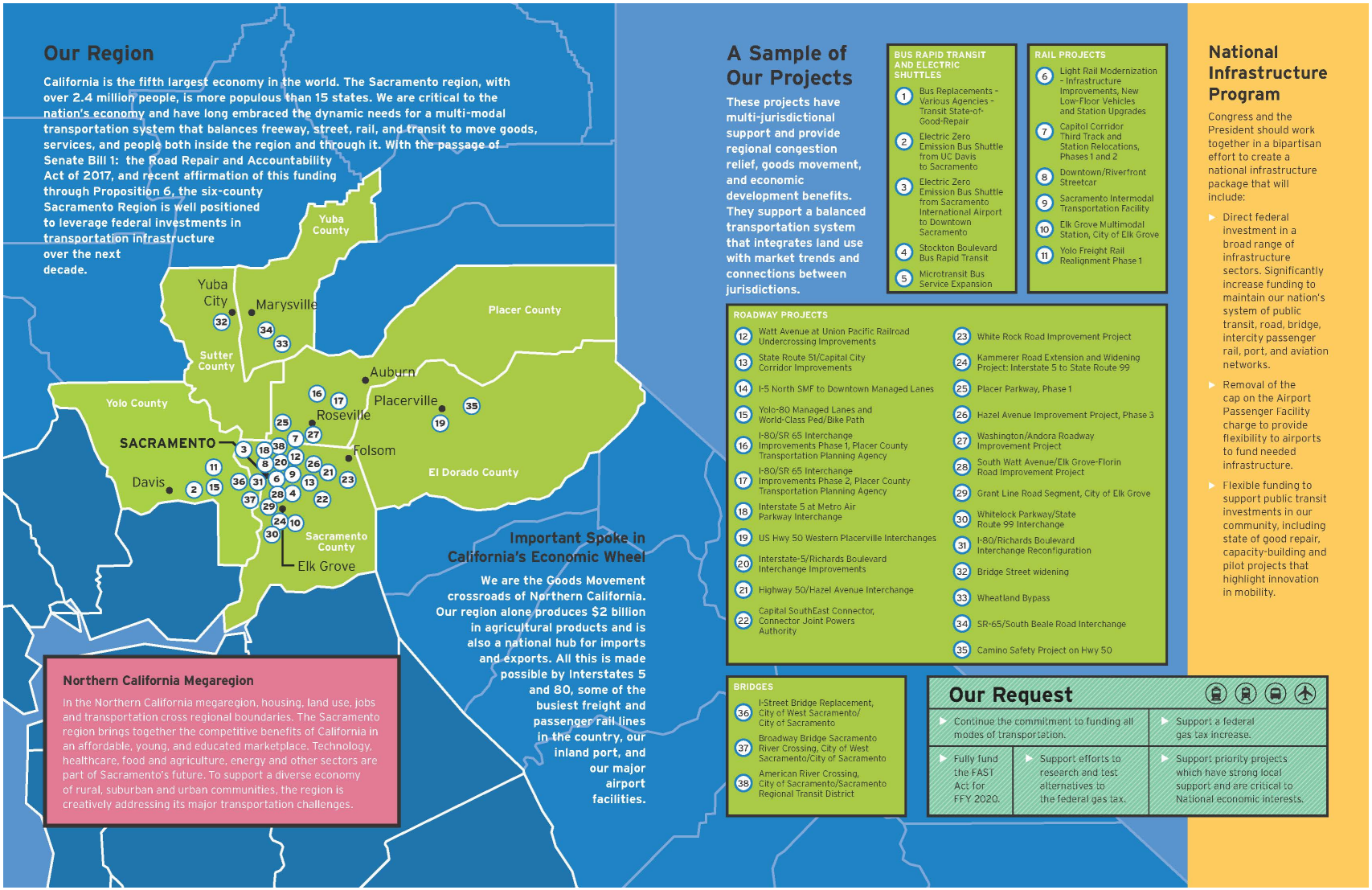

Our Region
California is the fifth largest economy in the world. The Sacramento region, with over 2.4 million people, is more populous than 15 states. We are critical to the nation's economy and have long embraced the dynamic needs for a multi-modal transportation system that balances freeway, street, rail, and transit to move goods, services, and people both inside the region and through it. With the passage of Senate Bill 1: the Road Repair and Accountability Act of 2017, and recent affirmation of this funding through Proposition 6, the six-county Sacramento Region is well positioned to leverage federal investments in transportation infrastructure over the next decade.
Yuba County
Yuba City
Marysville
Placer County
Sutter County
Auburn
Yolo County
Placerville
Roseville
SACRAMENTO
Folsom
El Dorado County
Davis
Sacramento County
Elk Grove
Northern California Megaregion
In the Northern California megaregion, housing, land use, jobs and transportation cross regional boundaries. The Sacramento region brings together the competitive benefits of California in an affordable, young, and educated marketplace. Technology, healthcare, food and agriculture, energy and other sectors are part of Sacramento's future. To support a diverse economy of rural, suburban and urban communities, the region is creatively addressing its major transportation challenges.
Important Spoke in California's Economic Wheel
We are the Goods Movement crossroads of Northern California. Our region alone produces $2 billion in agricultural products and is also a national hub for imports and exports. All this is made possible by Interstates 5 and 80, some of the busiest freight and passenger rail lines in the country, our inland port, and our major airport facilities.
A Sample of Our Projects
These projects have multi-jurisdictional support and provide regional congestion relief, goods movement, and economic development benefits. They support a balanced transportation system that integrates land use with market trends and connections between jurisdictions.
BUS RAPID TRANSIT AND ELECTRIC SHUTTLES
1 Bus Replacements - Various Agencies - Transit State-of-Good-Repair
2 Electric Zero Emission Bus Shuttle from UC Davis to Sacramento
3 Electric Zero Emission Bus Shuttle from Sacramento International Airport to Downtown Sacramento
4 Stockton Boulevard Bus Rapid Transit
5 Microtransit Bus Service Expansion
RAIL PROJECTS
6 Light Rail Modernization - Infrastructure Improvements, New Low-Floor Vehicles and Station Upgrades
7 Capitol Corridor Third Track and Station Relocations, Phases 1 and 2
8 Downtown/Riverfront Streetcar
9 Sacramento Intermodal Transportation Facility
10 Elk Grove Multimodal Station, City of Elk Grove
11 Yolo Freight Rail Realignment Phase 1
ROADWAY PROJECTS
12 Watt Avenue at Union Pacific Railroad Undercrossing Improvements
13 State Route 51/Capital City Corridor Improvements
14 I-5 North SMF to Downtown Managed Lanes
15 Yolo-80 Managed Lanes and World-Class Ped/Bike Path
16 I-80/SR 65 Interchange Improvements Phase 1, Placer County Transportation Planning Agency
17 I-80/SR 65 Interchange Improvements Phase 2, Placer County Transportation Planning Agency
18 Interstate 5 at Metro Air Parkway Interchange
19 US Hwy 50 Western Placerville Interchanges
20 Interstate-5/Richards Boulevard Interchange Improvements
21 Highway 50/Hazel Avenue Interchange
22 Capital SouthEast Connector, Connector Joint Powers Authority
23 White Rock Road Improvement Project
24 Kammerer Road Extension and Widening Project: Interstate 5 to State Route 99
25 Placer Parkway, Phase 1
26 Hazel Avenue Improvement Project, Phase 3
27 Washington/Andora Roadway Improvement Project
28 South Watt Avenue/Elk Grove-Florin Road Improvement Project
29 Grant Line Road Segment, City of Elk Grove
30 Whitelock Parkway/State Route 99 Interchange
31 I-80/Richards Boulevard Interchange Reconfiguration
32 Bridge Street widening
33 Wheatland Bypass
34 SR-65/South Beale Road Interchange
35 Camino Safety Project on Hwy 50
BRIDGES
36 I-Street Bridge Replacement, City of West Sacramento/ City of Sacramento
37 Broadway Bridge Sacramento River Crossing, City of West Sacramento/City of Sacramento
38 American River Crossing, City of Sacramento/Sacramento Regional Transit District
Our Request
Continue the commitment to funding all modes of transportation.
Support a federal gas tax increase.
Fully fund the FAST Act for FFY 2020.
Support efforts to research and test alternatives to the federal gas tax.
Support priority projects which have strong local support and are critical to National economic interests.
National Infrastructure Program
Congress and the President should work together in a bipartisan effort to create a national infrastructure package that will include:
Direct federal investment in a broad range of infrastructure sectors. Significantly increase funding to maintain our nation's system of public transit, road, bridge, intercity passenger rail, port, and aviation networks.
Removal of the cap on the Airport Passenger Facility charge to provide flexibility to airports to fund needed infrastructure.
Flexible funding to support public transit investments in our community, including state of good repair, capacity-building and pilot projects that highlight innovation in mobility.

Figure 30.

STEPS 3 & 4: PRIORITIZATION AND REVIEW

The Prosperity Strategy recognizes the challenges of any evaluation methodology, in particular a methodology applied for the first time and in a new subject area. Through the CEDS outreach the partnership is seeking comments on the proof of concept approach. The Prosperity Strategy includes an ongoing process where project sponsors can review and weigh in on the draft methodology.

This sponsor review can help respond to some of the limitations of the existing methodology. First, while the quantitative measures are relative to project length, the analysis is not a full benefit/cost assessment. Second, the method relies on the Project Performance Assessment tool to produce the nine quantitative measures. The tool, however, is still new, with limited applications to date. The partnership is working to better distinguish how the tool analyzes the effects of freeway projects, accounts for projects whose primary benefit is in relieving other facilities, and is also working to bring in more observed data through an updated version of the tool ready in 2020. The technical appendix provides further detail on the tool and proposed approach.

RECOMMENDATIONS: TRANSLATING THE STRATEGIES INTO ACTIONS

Prior visioning and planning efforts in the region have demonstrated the power of collaboration, but also the challenge of converting numerous priorities into sustained action. Learning from these efforts, an overarching goal of the Prosperity Strategy is to translate the trends and opportunities identified in the strategic assessment of the region into focused, actionable initiatives across the five market pillars of tradable industries, innovation, human capital, effective governance, and enabling infrastructure. Experience has shown these to be key drivers of regional economic competitiveness; these five factors are also the areas where regions have stronger institutional capacity or authority to execute upon a shared strategy.

This Infrastructure chapter lays out three specific transportation strategies that support an advanced and inclusive economy. The Prosperity Partnership recognizes that progress in these areas requires actions by many different stakeholders, and that the longer-term timeframe of transportation projects doesn't easily translate into near-term action. To meet the overall Strategy charge for implementation, this section of the chapter concludes with a limited set of priority actions that can be completed in 2020. By design, the recommendations focus on fewer initiatives that most strongly align with the three transportation strategies, but don't necessarily encompass the breadth of work ongoing in the region.

These tangible actions accelerate broader implementation of the three larger strategies. The improved performance assessment can also help identify concrete milestones within longer-term project development efforts for economic prosperity priority projects.

- **Establish project priorities for competitive federal or state grants.** Over the coming year, there will be numerous competitive transportation funding opportunities to pursue. Selecting priority projects for federal and state grant opportunities can be an effective means to pool together resources, focus advocacy efforts, and bring more transportation revenue into the region. The Prosperity Partnership offers a unique opportunity to leverage support from business and economic development interests in setting these priorities. This can offer a competitive advantage for greater Sacramento in comparison to other regions where public agency project sponsors do not have focused regional priorities or the clear

backing of business and economic development interests. Near-term opportunities include the state's Senate Bill 1 competitive grant programs focused on goods movement, intercity rail, and congestion relief (early 2020), the federal BUILD program for multi-modal projects (spring 2020) and the federal INFRA program for large goods movement projects.

- **Update Project Performance Assessment tool with improved accessibility and observed data.** The Prosperity Strategy's transportation evaluation approach uses the Project Performance Assessment (PPA) tool to produce the quantitative economic data indicators. Several exciting data developments could be incorporated into the tool over the coming year to improve upon the draft methodology. First, the tool could expand its treatment on accessibility to include a point of interest and enhanced school/educational facility accessibility layer. Research has shown that points of interest are a leading driver of transportation demand, which could be added to the performance evaluation under the complete communities principle, while the augmented educational access calculation would be an improvement over the current buffered approach. The tool could also be expanded as an early adopter of emerging applications in 'big data' that would replace current modeled/forecasted estimates with a much fuller portrayal of observed conditions than was previously possible. Efforts such as these would greatly enhance the functionality of the existing tool, bolster the draft evaluation methodology, allow for broader applications to link investment and economic prosperity outcomes in 2020, and establish regional priority projects.

- **Secure funding to design a pricing pilot.** The MTP/SCS demonstrates the need to proactively seek a revenue replacement for fuel taxes that are declining in purchasing power over time. It's a national concern and our region has an opportunity to be an early innovator and test bed for possible solutions. Because of this, an implementation priority of the Prosperity Strategy could be to collaborate with public and private sector partners to initiate a pricing pilot. Standing up a Pay-As-You-Go (PayGo) pricing pilot will benefit from the early involvement of the Partnership in securing the funds for design and implementation efforts.

- **Support local agencies in approving dedicated taxes or fees for transportation improvements.** The coming year provides an important opportunity to pursue local funding to implement priority transportation projects. In addition to the anticipated ballot measures for sales tax increases in Placer and Sacramento counties, there are multiple opportunities for local ballot measures across the region. History suggests that presidential election years offer the greatest chance for success because voter turnout is relatively high. Local agencies that have a fee or tax dedicated to transportation investments also are eligible to receive a portion of state formula funding annually from the Senate Bill 1 Local Partnership Program (LPP). In other words, local agencies without a dedicated revenue towards transportation lose out on this guaranteed state funding. The LPP formula distribution favors counties with dedicated sales tax revenues, but even a small fee qualifies a jurisdiction to qualify. Leveraging a relatively small dedicated local fee to qualify for LPP formula funds is a proven success for some fiscally conservative jurisdictions in

our region, such as Yuba County. As a credible voice for business and economic development interests, the Partnership could be an important partner for pursuing dedicated transportation taxes fees across the region. The LPP leveraging opportunity distinguishes this opportunity from other ballot measures that simply create a new fee or increase local tax burdens.

See Appendix E for the Technical Appendix, which contains the draft methodology to evaluate expansion transportation projects that align with Economic Prosperity Outcomes.

This chapter also includes a brief summary of two other core infrastructure areas to be addressed: housing and broadband.

HOUSING

Housing is a key component of any region's physical infrastructure, and a foundational factor supporting overall regional quality of life as well as the economic drivers emphasized in the Prosperity Strategy. It is seen as both a strength and a challenge for the region, raised by many stakeholders through the SWOT analysis and outreach process. The region compares positively to the Bay Area and other high-cost regions, but within the region rapidly rising costs for both homeownership and renters has strained households, affected first time buyers, and is seen as contributing to homelessness. There are also large variations across the region in terms of cost, availability, housing choice, and access.

The Brookings assessment noted in 2018 that housing costs across the region greatly outpaced wage growth: the median regional sale price of all types of homes rose by over 80 percent since its low in 2012, yet median wage growth increased by only 6 percent over a similar period. For renters, the situation pre-COVID was dire. According to SACOG, 51 percent of renters in the region are cost burdened compared to 33 percent of homeowners. For lower income renters the situation is worse. The National Low Income Housing Coalition reports that in the Sacramento Metropolitan Area only 20 affordable and available rental homes exists for every 100 extremely low income renters who need them.

The rising cost of housing fundamentally affects the Prosperity Strategy's goals for an inclusive economy, as currently the regional economy is not delivering wage growth commensurate to housings costs. The region's low-income residents and more vulnerable populations are most impacted by the increasing unaffordability of housing.

The actions of the Prosperity Strategy and its core drivers help address this challenge through increased wage growth and wealth building. Experience from regions across the nation and the globe has shown these drivers the most promising mechanisms for such growth, as industry clusters pay above-average wages and have a higher multiplier effect, so that less of the associated economic gain leaks out of the regional economy. In other words, if implemented, the actions of the Prosperity Strategy can help drive more broad-based and sustained wage growth across market segments, thus helping with housing affordability from the purchasing power side. Yet the Prosperity Strategy also recognizes more needs to be done on the housing supply and cost side to tackle the intractable issue of housing affordability.

Instead of creating new strategies directed to the cost and supply of housing, the Prosperity Strategy supports the numerous efforts already underway in the region. Notably, the region has recently adopted its most current cycle of the Regional Housing Needs Allocation (RHNA), a state-mandated process where cities and counties must adequately plan to meet the housing needs of everyone in the community, regardless of income. In late 2019 the

SACOG Board adopted the latest RHNA methodology, and now cities and counties must update their housing elements to demonstrate how they will plan to meet the expected housing growth need.

The RHNA objectives align with the Prosperity Strategy's overarching goal of an advanced and inclusive economy. RHNA aims to:

- Increase housing supply and mix of housing types, which helps with housing affordability and tenure, as well as provide the mix of product types that support a vibrant, varied workforce
- Promote infill, equity and the environment. Here both the housing and transportation strategies are aligned around an efficient development pattern, with both informed by the Metropolitan Transportation Plan/Sustainable Communities Strategy.
- Ensure jobs/housing balance and fit, and promote regional income parity. RHNA directs jurisdictions with a high ratio of low-wage workers but few affordable housing units to zone for more affordable housing types.
- Affirmatively further fair housing, to open high opportunity areas to all economic segments of the community.

RHNA plays an important role in ensuring the region plans for the housing needs of the community. However, it does not directly impact housing production. The Housing Policy Toolkit[152] is a collection of best practices and policy options to remove the barriers to new housing in amenity-rich locations. It provides resources to allow for more housing product choices to be built in more locations, focusing on policies that local jurisdictions directly control, such as Accessory Dwelling Unit ordinances, or streamlined development review. Several new resources, such as the Senate Bill 2 grants, provide funding to local jurisdictions to support these policy approaches. The Prosperity Strategy supports these efforts to decrease the cost of housing and improve product type, mix and tenure through increased supply in amenity-rich locations. When paired with the strategies of the Transportation infrastructure section, these efforts strengthen spatial efficiency to support the core drivers of regional prosperity.

While the crash in the housing and financials markets led to the Great Recession, the current economic crisis is caused by a health pandemic. As such, construction is a viable sector and continued housing production can help lead the region to economic recovery through increasing housing supply, improving affordability and providing good wages and pathways to opportunity, especially for dislocated workers.

BROADBAND

The importance of broadband infrastructure and access has been repeatedly emphasized throughout the course of this report. It is the critical 21st century enabling technology for productivity, sustainability, and equity in the region, and is referenced throughout the Prosperity Strategy because of its application to each of the five critical market drivers (e.g., tradeable clusters, digital skills, talent development, etc.). The COVID-19 crisis has dramatically elevated the need for high speed ubiquitous Internet access – given the critical need for broadband

[152] Sacramento Area Council of Governments, Housing Policy Tool Kit, 12/13/2018.

for remote learning, telework, telemedicine, emergency services, food access, business and government operations, social connections and a whole range of needs. A connected region is an innovative region.

Yet California — in spite of its being the fifth largest economy in the world — still experiences significant, persistent connectivity gaps. The six-county Capital region's overall broadband infrastructure grade is a "D+," with a range from a "D- "in El Dorado, Placer, and Yolo counties to "D+" in Sutter and Yuba Counties and Yolo counties, to a "C+" in Sacramento County.[153] The Broadband Infrastructure grades are based on an analysis of data from the California Public Utilities Commission for primary, wireline infrastructure, considering a combination of factors including broadband speeds, number of providers (competition), cost, reliability, and so forth compared to the California average.

The Capital region is served by two broadband consortia funded by the CPUC through the California Advanced Services Fund — the Connected Capital Area Broadband Consortium (CCABC) and the Gold Country Broadband Consortium (GCBC). Valley Vision manages the CCABC, which covers the four counties of Sacramento, Sutter, Yolo, and Yuba and the Sierra Business Council manages the GCBC, which covers El Dorado and Placer counties.

As manager of the CCABC, Valley Vision collaborates with and supports jurisdictions, anchor institutions such as schools and libraries, CBOs, telecom providers, and community partners to increase broadband infrastructure, access and adoption. Valley Vision also works with a wide network of partners to support regional efforts and collaborate on advancing a regions-based state policy agenda – Broadband for All[154], including the Governor's Office, CPUC, the California Broadband Council, the California Emerging Technology Fund (CETF), California Forward (CaFWD), the California State Association of Counties (CSAC), the University of California Agriculture and Natural Resources, and the Rural County Representatives of California (RCRC), among others. Efforts are supported by federal agencies partners, our congressional delegation, and local elected officials, especially as a high policy priority for the Sacramento Metro Chambers Capital to Capital program.

Current priorities to address infrastructure gaps and the Digital Divide include catalyzing projects and assisting infrastructure and telecom providers to invest in infrastructure projects, especially in the rural unserved and underserved areas of the region; driving agtech deployment; supporting School to Home projects to bring address the Homework Gap by ensuring that students and families in high need schools have access to technology (devices) and low cost Internet; generating information on best practices for local project planning, permitting and financing to decrease barriers to investment; and identifying new business and financing models, including the potential for cooperatives and new technologies, especially in rural areas.

Another project is the Strategic Broadband Corridors (SBC), the ultimate goal of which is to engage the statewide network of PUC-funded regional broadband consortia and councils of government (COGs) to coordinate planning and development of broadband and transportation projects with the California Department of Transportation (Caltrans) and the California Transportation Commission (CTC). Valley Vision is helping to lead this statewide effort and is collaborating closely with SACOG on implementation. As referenced earlier in this chapter, initial "priority" corridors have been developed and are being refined to line-up with the proposed upcoming transportation

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[153] http://www.valleyvision.org/wp-content/uploads/Broadband-Report-Card-2020-1.pdf, prepared by Tellus Ventures for the Connected Capital Area Broadband Consortium, January 17, 2020.

[154] https://www.agri-pulse.com/articles/12910-newsom-launches-rural-broadband-initiative

projects. The collaboration with SACOG also is focused on potential joint-use/dig once projects which can be incorporated into transportation projects across the region. This includes projects identified through the Metropolitan Transportation Plan and the regional plans for the Smart Region Sacramento project for the regional intelligent transportation system that include local plans with broadband project opportunities identified.[155]

Several local jurisdictions have conducted broadband plans (El Dorado County, Yolo County and the city of West Sacramento) or are planning to (Yuba County). In particular, El Dorado County's plan has explored several financial and business models, including public-private partnerships, to bring fiber to the premises of all residences and businesses.[156] The costs are large and new models and technologies must be further explored, especially to reach rural areas of the region.

With COVID-19, new pilots have emerged such as the city of Sacramento's collaboration with Regional Transit, Caltrans, Sacramento City Unified School District and several providers to deploy unused buses into underserved neighborhoods to provide Internet Access especially for remote learning. Other initiatives are addressing the Digital Divide by providers computers and low/no-cost Internet to disconnected students and families. The COVID-19 crisis also has spurred a collaborative effort between the Prosperity Partnership, the City of Sacramento and the Cal Asian Pacific Chamber of Commerce to develop a region-wide plan to accelerate investment and deployment, including for the next generation of Internet – 5G – which requires fiber infrastructure in order to install small cell towers that deliver service. In other words, the fundamental goal is to provide at least Gigabit connectivity across the entire region, while setting the stage for 5G – a technology that will be developed primarily, at least over the next few years, in dense urban areas.

Initiatives to increase digital literacy are described elsewhere in the report. High speed broadband, access and adoption is critical to the success of the Digital Skills Initiative and ultimately, the region.

[155] "Smart Region, STARNET Gap Analysis and Future Roadmap," prepared for SACOG by Kimley-Horn and Associates, February 2019.

[156] "Financial Considerations, County of El Dorado Broadband Models, " prepared for the County by NEO Connect, August 2018.

XI.IMPLEMENTATION/METRICS

The Prosperity Strategy/CEDS is a five-year framework the success of which will require dedicated, strategic collaboration and investment from institutions, jurisdictions and the public and civic sectors. The Prosperity Partnership will continue to work together to accelerate with region's economic recovery within the framework of the Prosperity Strategy, as described in the Introduction to the report. It will take all hands-on deck to achieve regional goals and ensure inclusive, sustained economic resiliency. Valley Vision, as coordinator of the CEDS process, will continue to convene the CEDS Steering Committee periodically to review progress towards milestones and measure outcomes on an annual basis, and to identify adaptations to update the Strategy for each successive year.

Each section of this report contains metrics specific to each type of recommended strategy. Performance measures used to evaluate the organization's implementation of the CEDS and impact on the regional economy. The following more metrics will be monitored on an annual basis to assess overall progress toward goals from the standpoint of regional as opposed to project-specific outcomes, and to track the overall trajectory of the Prosperity Strategy and the recovery – Our Path Forward. They are summarized as follows:

REGIONAL INCLUSIVE ECONOMIC INDICATORS

- MSA Performance on Growth, Prosperity and Inclusion (Data Source: Brookings Institution Metro Monitor)
- Median Annual Household Income by Zip Code (Data Source: U.S. Business Census)
- Cost of Living Index Compared to Other Mid-markets (Data Source: Council for Community and Economic Research)
- Wage Gain Over Time by Sector, Skill-Level and Education (Data Source: U.S. Bureau of Labor Statistics and Brookings Institution Metro Monitor)
- Average Annual Wage by Sector (Data Source: U.S. Bureau of Labor Statistics)
- Relative Poverty Rate (Data Source: U.S. Business Census)
- Households Struggling to Make Ends Meet (Data Source: California Budget and Policy Center and Brookings Institution Metro Monitor)

INNOVATION AND BUSINESS GROWTH INDICATORS

- Business Employment Dynamics Index (Data Source: U.S. Bureau of Labor Statistics)
- Number of Business Openings by Area, both Solely and Multi-Employee (Data Source: U.S. Business Census)
- Jobs at Young Firms (Data Source: Brookings Institution Metro Monitor)
- Venture Capital Funding Investment in Businesses (Data Source: PWC MoneyTree)
- Innovation Index 2.0 (Data Source: Stats America)
- Entrepreneurial Business Growth (Date Source: Kauffman Foundation Growth Entrepreneurship Index)

WORKFORCE INDICATORS

- Labor Market Equity by Census Tract, Gender and Race (Data Source: U.S. Bureau of Labor Statistics & U.S. Business Census)
- Number of Degrees and Awards in Emerging Industries (Data Source: U.S. Bureau of Labor Statistics)
- Projected Skills Gap and Labor Shortages (Data Source: U.S. Bureau of Labor Statistics & U.S. Business Census)
- Levels of Education for People of Color Data Source: U.S. Bureau of Labor Statistics & U.S. Business Census)

TRANSPORTATION AND INFRASTRUCTURE INDICATORS

- Public Transit Wait Times
- Number of Transit Oriented Development Projects, Including Housing (Data Source: SACOG and Regional Transit)
- Roadway Reliability – Trucks and Passenger Vehicles (Data Source: FHWA and SACOG)
- Bike Share and Micro-Mobility Trips Per Capita (Data Source: SACOG and System Operators)
- Annual Home Price (Data Source: California Association of Realtors)
- Average Rent per Unit (Data Source: Apartment List)
- Federal and State Funding Investment in Infrastructure Projects (Data Source: SACOG)
- Households Served by Internet (Data Source: California Public Utilities Commission)

APPENDIX A: LIST OF MEETINGS/BRIEFINGS/PRESENTATIONS - LOCATIONS & DATES

2018

August 23	CEDS Steering Committee /Advisory Group Meeting
October 3	CEDS Steering Committee /Advisory Group Meeting

2019

January 11	Digital Literacy Initiative Working Group Meeting
February 6	CEDS Steering Committee /Advisory Group Meeting
March 6	Digital Literacy Initiative Working Group Meeting
March 15	Economic Development Directors Taskforce (EDDT) meeting with GSEC
April 24	Food and Ag Stakeholders Meeting
April 24	Health and Life Sciences Stakeholder Meeting
April 25	Innovation and Entrepreneurship Stakeholder Meeting
April 25	Education and Workforce Stakeholder Meeting
May 10	El Dorado County Chamber of Commerce, El Dorado Hills Chamber of Commerce, County of El Dorado, City of Placerville, El Dorado County, business industry, Golden Sierra Job Training Agency
May 24	Placer County Chamber of Commerce, City of Auburn, Rocklin Chamber of Commerce, partners, economic developers, and North State BIA Foundation
June 11	Meeting with the Rancho Cordova & Folsom cities and Chambers of Commerce
June 25	CEDS Steering Committee /Advisory Group Meeting
July 16	Yolo Board of Supervisors Strategic Planning Session
July 30	Meeting with Sacramento County Board Supervisor Phil Serna
July 31	Meeting with El Dorado County Supervisor Shiva Frentzen
August 7	Meeting with Yolo County Supervisor Don Saylor, Board Chair
August 23	CEDS Steering Committee /Advisory Group Meeting
August 26	Meeting with Yolo County, City of West Sacramento, City of Davis, City of Woodland, and education sector partners
August 28	Meeting with El Dorado County Supervisors Lori Parlin & Sue Novasel
August 28	Meeting with El Dorado County Supervisors Brian Veerkamp & John Hidahl
September 5	Meeting with the Cities of Elk Grove, Isleton, Galt, economic developers, business, and chambers of commerce
September 9	Meeting with Sacramento County Board Supervisor Sue Frost
September 16	Meeting with Sacramento County Board Supervisor Don Nottoli
September 17	El Dorado County Board of Supervisors Meeting/Presentation
September 19	Sacramento Area Council of Government Board Meeting
October 11	Meeting with Placer County Board Supervisor Kirk Uhler, Chair
October 18	All Chamber Gathering hosted by the Sacramento Metro Chamber of Commerce
November 7-8	California Economic Summit (45+ audience attendees and participants)
November 21	Yuba City Economic Development Commission Meeting

2020

January 17	Economic Development Directors Taskforce (EDDT) meeting with GSEC
January 29	Placer County Economic Development Director Sherri Conway
February 26	CEDS Steering Committee /Advisory Group Meeting

APPENDIX B: ECONOMIC DEVELOPMENT DIRECTORS TASKFORCE (EDDT) ADVISORY COMMITTEE, GREATER SACRAMENTO ECONOMIC COUNCIL, 2019 AND 2020 MEETINGS

2019			**2020**		
First Name	**Last Name**	**Organization**	**First**	**Last Name**	**Organization**
Lawrence	Acosta	PG&E	Lawrence	Acosta	PG&E
Jim	Alves	SMUD	Luis	Aguilar	City of Elk Grove
Melissa	Anguiano	City of Sacramento	Crystal	Bethke	Sacramento County
Rick	Balazs	Sacramento County	David	Bradford	City of Roseville
Neal	Best	CA Mobility Center	Troy	Holt	City of Roseville
Crystal	Bethke	Sacramento County	Meghan	Huber	City of Citrus Heights
Rachael	Brown	City of Elk Grove	Terrel	Locke	City of Yuba City
Robert	Cline	City of Roseville	Amie	Mendes	City of Galt
Sherri	Conway	Placer County	Amanda	Norton	City of Rancho Cordova
Suzanne	Dizon	SMUD	Diane	Richards	City of West Sacramento
Darrell	Doan	City of Elk Grove	Phil	Scott	Gr. Folsom Partnership
Paul	Griffith	Placer County	Ryan	Sharp	UC Davis
Curt	Haven	City of Rancho Cordova	Shawn	Tillman	City of Lincoln
Ken	Hiatt	City of Woodland	Abbie	Wertheim	JLL
Troy	Holt	City of Roseville	Sarah	Worley	City of Davis
Meghan	Huber	City of Rancho Cordova	Kyle	Zimbelman	El Dorado County
Pam	Johns	City of Folsom			
Laura	Matteoli	City of Roseville			
Amie	Mendes	City of Galt			
Marc	Mondell	City of Rocklin			
Amanda	Norton	City of Rancho Cordova			
Diane	Parro	City of Davis			
Diane	Richards	City of West Sacramento			
Wendy	Ross	City of Woodland			
Ryan	Sharp	UC Davis			
Brynda	Stranix	Yuba-Sutter EDC			
Alexander	Tengolics	Yolo County			
Shawn	Tillman	City of Lincoln			
Clark	Whitten	Sacramento County			
Chad	Willis	Sacramento County			

APPENDIX C: LIST OF ADDITIONAL STAKEHOLDER PARTICIPANTS, INTERVIEWEES, SUBJECT MATTER EXPERTS

First Name	Last Name	Organization
Binu	Abraham	Sacramento Area Council of Governments
Assm. Cecilia	Aguiar-Curry	California State Assembly
Luis	Aguilar	City of Elk Grove
Paul	Akuna	Elk Grove Unified School District
Emily	Alejandro	California Department of Water Resources
Julian	Alston	University of California, Davis Agriculture and Resource Economics
Jared	Amalong	Sacramento County Office of Education
Melissa	Anguiano	City of Sacramento
Julius	Austin	Sacramento Housing and Redevelopment Agency
Andy	Awadallah	Pacific Coast Producers
Phyllis	Baltz	Dignity Health
Mark	Beckford	HotSpot AG
Kristin	Belden	StudioToBe
Michael	Bell	Synbyo
Ebony	Benzing	North/Far North
John	Bjerke	Cisco
Jeff	Bennett	Start Up Sacramento
Laurel	Brent-Bumb	El Dorado County Chamber of Commerce
David	Bubbenheim	NASA Ames
Jason	Buckingham	Golden Sierra Job Training Agency
Alejandro	Cabrera	Office of Councilmember Eric Guerra, City of Sacramento
Christa	Campbell	Rainbow Orchards
Cynthia	Carrillo	Greater Sacramento Economic Council
Matt	Carpenter	Sacramento Area Council of Governments
Terri	Carpenter	Sacramento Employment and Training Agency
Nieves	Castro	CalTrans
Matthew	Ceccato	Office of Congressman Ami Bera, M.D.
Kathleen	Chance	TOMRA Sorting Solutions
Zilan	Chen	California Department of Transportation
Saori	Choulos	Saori Choulos Consulting
Larry	Chung	Walt Disney Parks and Resorts
George	Claire	VSP Global
Patricia	Clark	California Department of Water Resources
Sherri	Conway	Placer County
Terry	Daffin	KAI Partners
Steve	Danna	Danna Farms
Santana	Diaz	UC Davis Health

Walter	Di Mantova	The Gen Lab
Michael	Dixon	Sacramento City College
Darell	Doan	City of Elk Grove
Chris	Durr	Sacramento Public Library
DeNelle	Ellison	Greater Sacramento Urban League
Marc	Epstein	California Environmental Technology Education Network
Adrian	Ferrero	Biome Makers
Mark	Fink	Yolo County Library
Dan	Flynn	UC Davis
Supervisor Shiva	Frentzen	El Dorado County Board of Supervisors
Supervisor Sue	Frost	Sacramento County Board of Supervisors
Roland	Fumasi	Rabobank
Marlene	Garcia	California Student Aid Commission
Markus	Geissler	Consumnes River College
Debbi	Gibbs	Office of Congressman John Garamendi
Thomas	Gibbs III	Sacramento Housing and Redevelopment Agency
Paul	Golaszewski	California Transportation Commission
Laura	Good	Start Up Sacramento
Marek	Gootman	Brookings Institution
Joshua	Green	State of California
Terri	Griffin	Roseville Joint Union High School District
Jennifer	Grove	Elk Grove Unified School District
Patrick	Guild	Breathe California
David	Gull	New Helvetia
Erle	Hall	California Department of Education
Barbara	Halsey	Halsey Consulting
Noah	Hampton-Asmus	Individual
Paula	Hanzel	Sacramento City Unified School District
Yvonne	Harris	California State University Sacramento
Nicholas	Hastings	Square Root Academy
Lon	Hatamiya	The Hatamiya Group (consultant to Yuba Water Agency/Wheatland)
Angela	Hatter	Charles A. Jones Career & Education Center
Barbara	Hayes	Rural County Representatives of California (RCRC)
Katy	Hensley	Sacramento City Unified School District
Chet	Hewitt	Sierra Health Foundation
Ken	Hiatt	City of Woodland
Supervisor John	Hidahl	El Dorado County Board of Supervisors
Joel	Hockman	Sacramento Rainbow Chamber
Dan	Holloday	BRIDG
Julie	Holt	Health Workforce Initiative
Andrea	Howard	Parker Development Company

Sue	Hubbard	Elk Grove Unified School District
Glenda	Humiston	University of California Agriculture and Natural Resources
Ioanna (Yanna)	Iatridis	Shasta College
David	Inniss	Spotlight Education
Michael	Jasso	City of Sacramento
Alona	Jennings	CodeForHood
Cassandra	Jennings	Greater Sacramento Urban League
Christy	Jewell	William Jessup University
Tim	Johnson	California Rice Commission
Eric	Johnson	California Housing Finance Agency
Andrew	Kehoe	City of Sacramento
Will	Kempton	Greater Folsom Partnership
Roy	Kim	Sacramento Employment and Training Agency
Mary	Kimball	Center for Land-Based Learning
Stephanie	King	Walt Disney Parks and Resorts
Ejnar	Knudsen	AGR Partners
Deb	Kollars	California Forward
Francois	Korn	Seed Central
Kathy	Kossick	Sacramento Employment and Training Agency
Rick	Larkey	North State Building Industry Foundation
Cameron	Law	CSU, Sacramento Carlsen Center for Innovation
Mao	Lee	California Department of Housing & Community Development
Andrea	Lepore	Food Factory
Terrel	Locke	City of Yuba City
Antonio	Lopez	Sacramento City College
Adrian	Lopez	University of California, Davis
Gina	Lujan	Hacker Lab
Hoa	Ly	California Department of Water Resources
Elaine	Lytle	Yolo County
Denise	Malvetti	City of Sacramento
Debbie	Manning	El Dorado Hills Chamber of Commerce
Branka	Marceta	Capital Adult Education Regional Consortium
Pam	Marrone	Marrone Bio Innovations
Kevin	Mather	World Trade Center Northern California
Malinda	Matson	Economic Development Administration, U.S. Dept. of Commerce
John	Matthesen	Biome Makers
Kevin	McGrew	Siemens
Sean	McNall	The Pearl Theatre Company
Sunne	McPeak	California Emerging Technology Fund
Lauren	Mechals	Sacramento Employment and Training Agency

Amie	Mendes	City of Galt
Lenny	Mendonca	Governor's Office of Business and Economic Development
Theresa	Milan	Los Rios Community College District
Claudia	Mildner	California Department of Housing and Community Development
Bob	Miller	-
Chelsea	Minor	Raley's
Leah	Moehle	California Conservation Corps
Lewis	Moeller	California Department of Water Resources
Shawn	Monsen	Sierra College
Irma	Mora	Isleton Chamber of Commerce - Sacramento Public Library
Coleen	Morehead	Clear Strategies LLC
Cleve	Morris	City of Placerville
Michael	Mott	Hacker Lab
Jeff	Mrizek	California Community Colleges
Steve	Muir	GlobeRunners
Patrick	Mulvaney	Mulvaney's B&L
Teri	Munger	Los Rios Community College District
Deborah	Muramoto	California Capital Financial Development Corporation
Jenni	Murphy	California State University, Sacramento
Kelsey	Nederveld	Sacramento City Unified School District
Rob	Neenan	California League of Food Producers
David	Nelson	CalAsian Chamber
Cindy	Newton	California Workforce Association
Laura	Niznik Williams	University of California Davis
Amanda	Norton	City of Rancho Cordova
Supervisor Don	Nottoli	Sacramento County Board of Supervisors
Judy	Notolli	California Air Resources Board
Supervisor Sue	Novasel	El Dorado County Board of Supervisors
Jamey	Nye	Los Rios Community College District
Annette	Nylander	Sierra College
Oscar	O'con	O'con and Associates
Jim	O'Donnell	MCU Connect
David	Ogilvie	Wilson Vineyards/Muddy Boot Wines
Fred	Palmer	Sacramento Rainbow Chamber
Kriztina	Palone	City of Sacramento
Joe	Parilla	Brookings Institution
Supervisor Lori	Parlin	El Dorado County Board of Supervisors
Diane	Parro	City of Davis
Dean	Peckham	Sacramento Valley Manufacturing Initiative
Joey	Penneman	Sacramento Municipal Utility District

Carol	Pepper-Kittredge	Sierra College
Alice	Perez	AT&T
Matt	Perry	Sacramento County Office of Education
Angela	Perry	City of Isleton
Carrie	Peterson	Woodland Community College
Stephen	Pistoresi	Granular SF
Lynn	Plocher	Sacramento City Unified School District
Eileen	Prince	Charles A. Jones Career & Education Center
Kiara	Reed	Uptown Studios
Dianne	Richards	City of West Sacramento
Theresa	Riviera	League of Women Voters
Sergio	Robles	Office of Congressman Ami Bera, M.D.
Lynette	Rodriguez	Program Leader
Nicole	Rogers	Nugget Market
Diann	Rogers	Rancho Cordova Chamber of Commerce
Nick	Romo	League of California Cities
Jane	Ross	Elk Grove Unified School District
Mora	Rowe	City of Auburn
Jacob	Sacks	Alchemist CDC
Mabel	Salon	University of California, Davis
Brandon	Salzberg	Rhombus Systems
Marc	Sapoznik	Rancho Cordova Travel and Tourism
Supervisor Don	Saylor	Yolo County Board of Supervisors
Tracey	Schaal	Power Inn Alliance
Kif	Scheuer	Local Government Commission
Tiffany	Schmid	County of El Dorado
Bob	Segar	UC Davis
John	Selep	AgStart/Ag Innovation
Supervisor Phil	Serna	Sacramento County Board of Supervisors
David	Shabazian	Sacramento Area Council of Governments
Ryan	Sharp	University of California, Davis
Chad	Shearer	Brookings Institution
Amy	Shulz	Sierra College
Logan	Sidle	Office of Congressman John Garamendi
Gary	Simon	CleanStart Inc.
Christopher	Skidmore	California State University, Sacramento
Bailey	Smith	California Air Resources Board
Kevin	Speace	Elk Grove City Council's District 3 - candidate
Tom	Stallard	Woodland City Council Member
Louis	Stewart	City of Sacramento
Meaghan	Stiles	Office of Congresswoman Doris Matsui

James	Stottlemyer	Precision Ag Consultant
Karina	Talamantes	Sacramento Public Library
Deema	Tamimi	The VINE
Joseph	Taylor	California State University, Sacramento
Audrey	Taylor	Chabin Concepts
Michael	Teel	Raley's
Alex	Tengolics	Yolo County
Sergey	Terebkov	Slavic-American Chamber of Commerce
Danny	Thirakul	Student Senate for California Community Colleges
Christine	Tien	California Endowment
Aleks	Tica	City of Live Oaks, Councilmember
Rick	Toft	Port of West Sacramento
Stephanie	Tom	California Department of Technology
Robin	Trimble	Rocklin Chamber of Commerce
Robert	Tse	U.S. Dept. of Agriculture
Deborah	Tucker	Bayer
Supervisor Kirk	Uhler	Placer County Board of Supervisors
Eric	Ullrich	Hacker Lab
Kim Dolbow	Vann	USDA Rural Development California
Supervisor Brian	Veerkamp	El Dorado County Board of Supervisors
Harsh	Verma	R Systems
M. Anne	Visser	University of California, Davis
William	Walker	Sacramento Employment and Training Agency
Chris	Ward	Pacific Coast Producers
Trevor	Warren	AGR Partners
Susan	Wheeler	Sacramento Municipal Utility District
Maureen	White	CA Community Colleges Chancellor's Office
Aaron	Wilcher	Centers of Excellence, Los Rios Community College District
Clarence	Williams	California Capital Financial Development Corporation
Jonathan	Williams	Intel
Chris	Worden	Sierra College
Sarah	Worley	City of Davis
Kyle	Zimbelman	County of El Dorado
Miela	Zitelli	Sacramento City College

APPENDIX D: CASE STUDIES OF NATIONAL DIGITAL SKILLS/DIGITAL LITERACY MODELS

DIGITAL CHARLOTTE

Digital Charlotte's mission is to empower organizations to deliver digital inclusion resources to their communities. The organization was developed from the Queens Knight School's Master Plan to strengthen digital and media literacy in Charlotte, North Carolina. Digital Charlotte provides digital inclusion news, teaching curriculum, volunteer training, organizational partnerships, and other resources/community opportunities for organizations to deliver into their communities. The program connects organizations and the public to free/low-cost wireless networks in Charlotte by crowdsourcing resources onto a Google map; connecting people and place and reducing equity gaps. Additionally, the organization provides both national and local training, and low-cost device resources in an effort to address all aspects of access and adoption of digital literacy.[157]

KANSAS CITY

Kansas City leaders have taken significant innovative steps to establish their region as a digital leader. Through technology initiatives, digital coalitions, and developing a regional digital roadmap, Kansas City has led the model for closing the digital divide, and securing economic prosperity to improve the quality of life for residents.

Two Kansas City models are the Kansas City Digital Drive,[158] and KC STEM Alliance.[159] The Kansas City Digital Drive, a non-profit organization with the sole purpose of making Kansas City a digital leader, is pushing the region forward through ensuring access and capacity, expanding economic opportunity, building next generation innovation, and establishing the reputation of Kansas City as a Smart City. Key areas include gigabit applications, digital inclusion, economic development, transportation, civic tech, and government. KC STEM Alliance is a collaborative network of educators, business partners and organizations that galvanize careers in STEM to generate a tech ready, prosperous region.

KC Rising is Kansas City's shared vision for regional prosperity.[160] The mission is to build capacity and drive businesses to scale so that the greater Kansas City region may realize and reach greater potential by promoting and measuring economic growth in the regional GDP, quality jobs, and median household income. The region plans to leverage existing economic drivers of trade, ideas, and people to rise as a region. A core initiative of KC Rising is their Education Asset Inventory,[161] a regional effort that aligns educational outputs with high-demand occupations, updated annually, and ensures pathways to talent development. This model similarly exemplifies the approach Sacramento seeks to produce in an effort to build our strong workforce.

ST. LOUIS

LaunchCode is a program piloted in St. Louis in 2913 by the founder of Square, when he couldn't find skilled tech talent. It has been adopted by five additional cities. Its focus is to connect people of color to opportunities in the

[157] Digital Charlotte. Digital Inclusion Empowers Everyone. 2019. Accessed from http://digitalcharlotte.org/.

[158] Kansas City Digital Drive. 2018. Making Kansas City a Digital Leader. Accessed from https://www.kcdigitaldrive.org/.

[159] KC STEM Alliance. 2018. Accessed from https://www.kcstem.org/about/.

[160] KC Rising. 2018. Accessed from https://kcrising.com/.

[161] Grad Force. 2018. Education Asset Inventory for Greater Kansas City. Accessed from http://www.kcworkforce.com/Assets/EAI.pdf.

tech field, with the goal to create pathways to economic opportunity and upward mobility for people of all backgrounds. The program provides prospective workers with free accessible tech training and paid apprenticeship job placements to enter the tech field. It has educated thousands of workers in various programming languages, webpage design and development platforms, and connected trained workers with companies. The program has a strong percentage of participants who are female and people of color.

The program works closely with both education partners and hiring partners, with education partners offering free or discounted training resources to LaunchCode students. Training solutions are tailored to specific needs of employers, related to skills and geographic locations. The program has graduated more than 4,500 students and connected almost 1,000 with new tech apprenticeships and jobs. https://www.launchcode.org/

SAN JOSE

The City launched a Digital Inclusion Fund in 2019, with the goal to bring high speed Internet to 50,000 homes in the next ten years, funded in part by fees the City is charging wireless providers to install technology (small-cell antennas and other equipment) on light poles, which is needed to support the next generation of wireless networks, known as 5G. The City plans to use the funds (about $2.2 million a year), to supply broadband internet to homes and schools. The partnership offers providers the opportunity to use City infrastructure to test new Internet of Things products in exchange for their paying 5G installation fees partly into the inclusion funds. The City is working with the California Emerging Technology Fund (CETF), which helped negotiate the MOU between the City and Verizon, to implement and manage the Digital Inclusion Fund. The Fund will connect 50,000 households with universal device access and higher speed connectivity, and they achieve digital skills proficiency levels. An Advisory Board of local stakeholders will help to allocate the funding.

SAN DIEGO

San Diego was one of five cities to receive funding from JPMorgan Chase's AdvancingCities Challenge, an initiative to drive inclusive growth and create greater economic opportunity across the U.S. The three main goals of Advancing San Diego are to: build a strong local talent pipeline, equip small businesses to compete, and address the affordability crisis. The San Diego Regional Economic Development Corporation and its Inclusive Growth Steering Committee, comprised of 40 regional employers, have officially endorsed a regional goal to create 50,000 new quality jobs within small businesses by 2030. Utilizing nine working groups to determine the collective talent needs/competencies of priority industries and align educational and workforce programming, the Steering Committee rewards higher education students with priority access to work-based learning and engagement opportunities, as well as subsidized internships.

Source: Valley Vision

APPENDIX E: SACOG TECHNICAL APPENDIX OF DRAFT METHODOLOGY TO EVALUATE EXPANSION TRANSPORTATION PROJECTS THAT ALIGN WITH ECONOMIC PROSPERITY OUTCOMES

This technical appendix describes the draft methodology developed through the Prosperity Strategy to evaluate expansion transportation infrastructure projects' support for economic prosperity outcomes. The method employs a combined quantitative/qualitative approach. First, expansion transportation projects are assessed on nine economic prosperity data indicators. An expert panel consisting of the Prosperity Strategy partner agencies then evaluated the highest scoring of these projects based on the nine qualitative principles developed through the Prosperity Strategy.

Quantitative Review (data indicators):	Qualitative Review (expert panel): Does project-
Base industry job growth	Advance competitiveness, jobs, investment?
Job center access	Support traded sectors, especially regional specializations (e.g., food/ag, life sciences)?
Labor shed accessibility (no direct overlap with qualitative principle)	Increase innovation, business dynamism and scaling?
Educational enrollments	Improve access to education and in-demand skills, especially digital skills?
Environmental justice	Leverage workers from all backgrounds?
Job accessibility	Increase community access?
Congestion	Increase mobility?
Density	Increase housing affordability?
Transit, walk, bike mode share	Support complete communities?

STEP 1- ANALYZE EXPANSION PROJECTS ON NINE DATA INDICATORS

Quantitative assessment's data indicators

The Prosperity Strategy's infrastructure evaluation uses nine quantitative measures nested within the themes of business, people, and place. These nine indicators align with the findings and themes of the Brookings market assessment. Not all the quantitative indicators have a direct overlap with the Prosperity Strategy's qualitative principles, given the lack of available data or nexus to transportation. In particular, there is no way to measure changes in business climate (Principle #3) through a transportation investment; instead, the third quantitative business measure uses a more general assessment of labor shed accessibility, under the assumption that this measure is also vitally important to regional firms. And for the overall mobility principle the method uses congestion as a proxy, recognizing that other included metrics track mobility indicators such as accessibility.

The quantitative approach uses SACOG's Project Performance Assessment (PPA) tool to calculate the data measures. The PPA tool creates a buffered area around a transportation investment using a GIS (geographic information system) and examines both existing and forecasted conditions in the buffered area. The assessment uses data from SACOG's long-range transportation plan (MTP/SCS) and compares a base year where the project is not built to a horizon year with the project built. SACOG's website has more detailed information on the PPA tool.

Business indicators

#1: Does project serve high base job growth area?
Data: Projected base job growth
Economic base industries are those that export from the region, compared to nonbase industries that serve the regional population. The Brookings market assessment directs the region to focus on base tradable industries that inject new wealth to the region and tend to boost productivity and wages. The first business measure calculates the projected growth over the course of the MTP/SCS in base sector jobs per buffer acre of the project. The measure defines base jobs as the base components of education and medical, as well as office, industrial, and a broader 'other employment' category. The measure excludes changes in retail, government and other population-serving industries from the calculation.

#2: Does the project support employment clustering?
Data: Job centers within project buffer
The Brookings market assessment stresses the importance of agglomeration economies, noting that employment is spatially concentrated in job hubs that largely contain the region's tradable industries. The assessment recommends the region prioritize business development in these accessible nodes of regional employment. The second business measure of the Prosperity Strategy calculates the number of primary job centers within a 4-mile buffer of a project. For projects in rural corridors and rural established communities this definition also includes secondary and planned job centers, recognizing that job concentrations in rural areas often to not reach the employment density threshold of primary job centers.

#3: Does project improve firms' access to workers?
Data: labor shed accessibility
This measure calculates the number of workers within a 'reasonable commute' from the project location in the horizon year (2040) of the long-range metropolitan transportation plan (MTP/SCS). In other words, it measures accessibility from the firm/employer perspective: how many potential employees could the firm draw on as its labor shed? Firms want to access as many potential workers as possible, to maximize the probability of landing the most skilled labor for the position. Projects that expand labor shed accessibility through improved mobility support this business competitiveness measure.

The measure defines 'reasonable commute' as 30 minute drive time or 45 minute transit time during peak conditions. Road projects use the drive time measure while transit projects use the transit travel time. The measure calculates both total horizon year accessibility as well as the change in labor force accessibility between the base year without the project (2016) and the horizon year with the project (2040).

People indicators

#1: Does project serve an area of high student enrollments?
Data: Rate of kindergarten through university enrollments within the project area
The Brookings market assessment stresses the importance of training current and future workers for the changing and high-skilled needs of the labor force. The first of the people measures calculates K-university enrollments per buffer acre of the project for the horizon year of the MTP/SCS. Projects improving accessibility to these concentrations of educational facilities support the goal of connecting youth and disadvantaged populations to opportunity and training. Note that the partnership does not have a comprehensive data set on the location of other training facilities (such as employer-based training, etc), a key limitation of the current available data. Educational enrollments are also heavily concentrated in fewer locations. The below section on the technical approach describes how this affects the measure's distribution.

#2: Does the project invest in an underserved community?
Data: Percent of environmental justice residents within the project area
The second of the people measures calculates the percentage of current residents in the project area that classify within SACOG's environmental justice definition. Note this measure tracks if a project is located within a disadvantaged community, but does not necessarily ascribe if the project benefits the community. As part of the qualitative evaluation the partnership weighs if the project provides benefits to underserved populations.

#3: Does project improve workers' access to employment opportunities?
Data: Job accessibility
This measure uses the same approach as labor shed accessibility, but instead approaches accessibility from an employee's perspective: how many job locations can a worker access via the project within a reasonable commute?

The measure defines 'reasonable commute' as 30 minute drive time or 45 minute transit time during peak conditions. Road projects use the drive time measure while transit projects use the transit travel time. The measure calculates both total horizon year accessibility as well as the change in labor force accessibility between the base and horizon year.

Place indicators

#1: Does project respond to an existing congestion need?
Data: Existing congestion in project area
The first of the place measures uses congestion as a proxy for mobility limitations. The measure calculates congested vehicle miles traveled (CVMT) compared to total vehicle miles traveled (VMT) on the loaded model network in the base year (2016). If the project is a freeway project the calculation uses freeway CVMT/VMT. All other projects use surface street CVMT and VMT.

#2: Does project serve an area of relative housing density?
Data: Relative dwelling units per buffer area
The Brooking assessment notes that regional housing prices have far outpaced median wage growth. The Prosperity Strategy's principles aim to increase housing affordability through production and diversity of housing types. This second measure uses density as a proxy and tracks if a transportation project serves an area of relative

housing density. Like all measures, this calculation is relative to the project's community type. The measure calculates both the total dwelling unit density in the project area at the plan's horizon year, as well as the change in dwelling unit density between the base and horizon years.

#3: Does the project support complete communities?
Data: Transit, bike and walk mode share
The Prosperity Strategy envisions healthy, safe and complete communities across the region. This goal will require many different types of investments. From a transportation perspective, one component of complete communities is the proportion of people that use alternative forms of transportation. This final measure calculates the percentage of bicycle, walking and transit trips to total trips in the project area in the study horizon year.

Quantitative assessment's technical approach

Analyzes a subset of projects (expansion projects, not all transportation projects)

The quantitative approach developed through the Prosperity Strategy to assess transportation projects on nine economic prosperity data indicators can only analyze those projects that can be mapped to a specific location and modeled/forecasted using existing analytical tools (i.e., have a specific extent and impacts that can be captured in SACOG's travel demand model). As such, the demonstration of this methodology through the Prosperity Strategy focuses only on the third component of the infrastructure strategy—how to prioritize the limited amount the region will spend on expanding the transportation system in order to maximize economic prosperity outcomes. These expansion projects can be assessed and quantified with existing analytical tools. The method does not assess the pool of potential projects within the infrastructure chapter's first strategy (to preserve and maintain a state of good repair), or the second (to pair investments with innovative or operational improvements), as these projects often cannot be quantified and/or mapped in an observed data source.

Uses combination of data:

The assessment of expansion projects draws on data from SACOG's 2020 metropolitan transportation plan (MTP/SCS). Individual transportation projects would have differing outcomes if the region were to grow and develop in an alternative fashion to that envisioned in the MTP/SCS.

The data analysis is based in part on current conditions (land use, demographics, characteristics of the transportation system), and in part on future modeled or forecasted conditions, to capture change over time. The approach focuses on the ability to increase access to jobs and other opportunities, improve opportunities for lower income and high minority communities, manage congestion, and support development of diverse travel options for the regions' residents. The change-over-time indicators use the plan's horizon year of 2040. As such, the data measures point to projects that exhibit stronger performance benefits by the year 2040, which does not necessarily translate to equal benefits in the immediate term.

Looks for high performing outliers:

The Prosperity Strategy is a prioritization effort, so this transportation infrastructure evaluation methodology is meant, by design, to call attention to a small set of high-performing expansion projects, recognizing that other projects have further mobility, economic, environmental, or quality of life benefits not captured in this analysis.

The assessment began with the expansion projects identified by the Sacramento Metropolitan Chamber of Commerce for the 2019 Cap-to-Cap program. The assessment started with these projects because they had already been vetted by the business community as examples of projects providing regional congestion relief, goods movement, or other economic development benefits. As the Cap-to-Cap list was meant to be illustrative, not exhaustive, the prosperity partners added to this initial list the highest scoring projects by community type on the nine data indicators (described above) of the approximately 1,000 transportation projects nominated to SACOG's long-range transportation plan that can be quantified and analyzed based on the location and type of project. There was strong overlap between these two sources. The supplemental assessment of the larger list added several projects that exhibited strong data scores on the nine indicators not included in the illustrative Cap-to-Cap list. These projects included transportation infrastructure serving the Railyards development as well as accessibility improvements around Mather Field.

Compares to peer projects:

Every expansion project analyzed through the Prosperity Strategy received a score between 0 and 1 on each of the nine data indicators. Projects were compared to those in the same community type, so projects in rural areas get compared to other projects in rural areas, and so on for center & corridor communities, established communities, and developing communities. The method grouped projects by community type in recognition that the geographic location of a project will affect that project's ranking on the quantitative measures. For example, accessibility is an important metric for evaluating projects. Accessibility measures the number of activities that can be reached within a given travel time, and in general, the higher the accessibility, the greater potential impact a project may have. However, accessibility in the central part of the region is much higher than in more outlying areas and rural areas. By grouping projects in the community types they are located in, projects in similar areas are compared against each other.

Each analyzed transportation project received a score on each indicator relative to its community type average.

The Prosperity Strategy groups transportation projects into the following community types:

- Centers and Corridors
    - Including rural/small town main street and suburban corridor classifications
- Established Communities
    - Including rural/small town and established community classifications
- Developing Communities
- Rural Residential
- Agriculture and other working lands/open space

To measure a project's distribution within its community type the methodology uses its z-score. A z-score is a statistical approach measuring how many standard deviations from the mean a single data point is. The purpose of the z-score approach is to: 1) identify outstanding projects that are significantly above average on a metric, based on the quantitative, data review; and 2) allow for fair comparisons of each project against the average for its "peer" projects (i.e. projects of similar cost and in similar community types). This is a quantitative way of ensuring that the rankings are fair, and that smaller projects in one area type are not compared to larger projects in another area type. The scoring for each of the nine indicators works on a 0 to 1 scale. Projects that are two or more standard deviations above the mean for that indicator in their community type receive a score of 1. Projects

between 1.5 and 2 standard deviations above the mean score 0.85, while projects above 1 standard deviation but below 1.5 score 0.7. Projects within a single standard deviation (above or below) of the mean score 0.5 (i.e., most projects receive an 'average' score of 0.5 in any given indicator; this aligns with the Prosperity Strategy's goal to focus on a limited number of high performing projects). A project below a standard deviation from the mean receives a score below 0.5 based on the individual measure's distribution. Finally, given the unique distribution of educational enrollments (highly concentrated in fewer locations), the 'People1' measure tracking current and projected school enrollments uses its own z-score threshold (above 4 standard deviations to receive a score of 1, above 3 for score of .85, and above 1.5 for a score of 0.7).

STEP 2- EXPERT PANEL'S QUALITATIVE REVIEW OF HIGH SCORING PROJECTS

In the second step of the combined quantitative/qualitative performance assessment, staff from the prosperity partnership agencies qualitatively evaluated the projects scoring highest on the nine data indicators by community type. The expert panel focused on how these high performing projects support the nine prosperity principles. Each analyzed project received a score between 0 and 1 on each of the qualitative prosperity principles. The project's qualitative score by principle is the average from all reviewers on that measure. SACOG did not score projects, as the purpose of the qualitative review was for the partnership's private and civic-sector partners to provide their expert assessment of regional economic opportunities, priorities, and alignment to the Brookings market assessment, as well as an independent reasonableness check on the quantitative analysis discussed above. As such, this second step includes more subtle, professional judgment factors compared to the quantitative data indicators.

The nine Prosperity Strategy principles stem from a similar exercise in the Portland, Oregon region that engaged Brookings in a market assessment and then shifted to implementation. Using this as a starting point, the Prosperity Strategy vetted and refined the principles to be more relevant to our region, including input from local elected officials (Regional Futures Forum), the business community (through the Metro Chamber's membership), an equity stakeholder group, and public outreach through SACOG's MTP/SCS.

<u>The Nine Prosperity Strategy Principles</u>

Improve Business

1. Advance competitiveness, drive jobs and investment into the region
2. Target advanced industry and traded sector job creation, including in the food/ag and health/life science clusters
3. Support improvements to the business climate that increase innovation, university tech transfer, and business dynamism and scaling

Support People

4. Improve access to necessary education and in-demand occupational skills, making digital skills a shared workforce development priority
5. Leverage workers and entrepreneurs from all backgrounds to foster equitable wealth creation and inclusive growth
6. Increase access to community programs, jobs, capital, health care, and stable housing for vulnerable and struggling communities

Develop Place

7. Invest in infrastructure that supports regional mobility and accessibility, including affordable transportation options for low-income residents
8. Increase housing affordability through production, diversity of housing types, supportive infrastructure and community investments
9. Support healthy, safe and complete communities with place-making assets and 'next-generation' transportation options

STEP 3- SUMMARY

The methodology's proposed final step is to summarize the results of the combined data indicators and expert review into a single table of ten priority expansion projects. The synthesis would be based on the project's overall score in its cost category and county. In other words, this rollup would include the top scored project in each county and cost category to ensure the list reflects high-performing projects from across the region, such as projects that have smaller benefits compared to the largest infrastructure projects, but also smaller costs.

LIMITATIONS AND ONGOING REVIEW

The Prosperity Strategy recognizes the challenges of any evaluation methodology, in particular a methodology applied for the first time and in a new subject area. The final step of the proposed methodology is an ongoing process, where project sponsors have the opportunity to review and weigh in on the draft approach.

This sponsor review can help respond to some of the limitations of the existing methodology. First, while the quantitative measures are relative to project length, the analysis is not a full benefit/cost assessment. This proof of concept methodology did not include a cost-effectiveness measure, and many of the highest scoring projects also have the highest costs. The method reduces this shortcoming somewhat by grouping projects into cost categories. However, future work can build out a more robust way to measure cost effectiveness.

Next, the method relies on the Project Performance Assessment tool to produce the nine quantitative measures. Some tools delve into complex indicators that only apply to a few projects. Others use more sketch-level data or simplified rules to assess a much wider universe of projects. The Project Performance Assessment tool aims to strike a balance of coverage (a tool that can be applied to a wider variety of projects), feasibility (a tool that runs in a reasonable amount of time) and reportability (a tool that produces project-specific measures). The tool, however, is still new, with limited applications to date. Several sponsors have raised suggestions on the initial version of the tool to better meet this balance, including the need to better distinguish the effects of freeway projects, the need to account for projects whose primary benefit is in relieving other facilities, and the need for more observed data. SACOG is working to address these comments through an updated version of the tool ready in 2020.

Finally, the Prosperity Partnership recognizes this is the first time the tool has been used on economic prosperity outcomes. As it is the first time using the tool in this new context, the final step of partner review can help transition the methodology from a proof of concept into a more durable and stable approach.

PROSPERITY PROJECT TEAM

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For additional information:

See: https://www.valleyvision.org/projects/capital-region-prosperity-strategy/

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For information on documentation of the CEDS for EDA applications, please contact Valley Vision.