

# ScaleUP<sup>↑</sup> Sacramento

An Inclusive Economic Action Agenda

## ↑ OUR GOAL

To make Sacramento a prosperous place to live, work and play by preparing our region for sustainable, inclusive growth in the “Next Economy,” a dynamic, knowledge-based global economy that thrives on innovation, productivity, and building on its existing assets.



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## Preamble

This is a long, ambitious document. Yet it still leaves much unsaid. It aims to support a critical goal: For Sacramento’s transition to the next economy to result in an inclusive, prosperous, vital place to work, live and play. That means every person – regardless of race, gender or creed – participates in, drives and prospers from Sacramento's economic growth. It means every community is similarly connected to the region's prosperity, providing amenities, opportunity and choice for its residents. Achieving this requires addressing fundamental inequities that have prevented particular people and places from even getting to the starting line. It requires addressing structural and institutional racism. It requires providing exceptional public goods – from schools to transportation to parks and arts.

This document does not directly address many of these challenges. Rather, this is an inclusive economic development Action Agenda. It addresses one, but only one, of the most fundamental subjects to realizing these goals – the economics. You must get the economics right in order to have jobs for the people receiving job training; business opportunities to create wealth for entrepreneurs; and income and wealth to support home ownership, demand for retail and other amenities, and personal stakes in communities.

Because this Action Agenda is fundamentally focused on economic growth, much of it is quite dry: facts and figures, market analysis, discussion of specialized technologies and industries. It can be hard to see the people, businesses and places in the technical discussion. But they are there: their prosperity is the ends, as this Action Agenda addresses a critical part of the means, which is the economics. For example, it may seem abstract or distant from immediate concerns to focus on how co-packing facilities and other technical supports can grow food manufacturing. Yet this analysis reveals opportunities in an industry that lends itself to inclusion – in employment, ownership and location. ScaleUP Sacramento’s strategies and initiatives – the food innovation park, the diversifying ownership scale-up fund, the “master developer” to target new industrial development near disadvantaged people and communities – are all aimed at making sure the economics succeeds, and succeed for all of Sacramento.

In other words, the goal of inclusion for all people, businesses and places is deeply embedded throughout. It is neither a separate nor an after-the-fact consideration. Each market analysis, opportunity and strategy is informed by and intended to accomplish the goal of inclusion. Underpinning this work is the understanding that inclusion is a basic imperative for sustainable economic growth. At the same time, achieving inclusive growth requires addressing other preconditions besides the economics – from civic leadership to public safety. Sacramento continues to underscore its commitment to inclusion and equity by ensuring they are addressed in all city policies and practices. The city’s 2040 General Plan Vision Statement and Guiding Principles, adopted in November 2019, establishes the vision for the City of Sacramento to be a national model of sustainable, equitable growth and community development.<sup>1</sup> It is our hope

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<sup>1</sup> Sacramento 2040: Vision Statement and Guiding Principles Update, <https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/General-Plan/2040-General-Plan/Sac2040Vision--Guiding-PrinciplesFINAL.pdf?la=en>

that this Action Agenda provides a vital pillar, to inform and be informed by the other necessary activities, and which in conjunction with them will ScaleUP Sacramento for all.

## Overview

Development and discovery have been a part of Sacramento’s DNA from its earliest days. The origins of modern-day Sacramento – the “Indomitable City” at the heart of the Golden State – are entrepreneurial: seeing untapped market opportunities and capitalizing on them. From Sutter’s settlement at New Helvetia through the Gold Rush days to its push to win the fight for the State Capitol, leaders organizing and focusing the city’s resources on new opportunities have driven its greatest successes.

Today, Sacramento is at a major economic inflection point. The Fourth Industrial Revolution has unleashed “creative destruction” across the global economy, disrupting industries, labor markets and places, while generating enormous new economic and wealth-creation opportunities. In this context, every region needs to figure out what it will be good at and known for – what human capital, business, institutional and other assets it can deliberately build from to become *the* place where certain targeted industries and populations will be most productive.

Sacramento is no exception. Its legacy economy is dominated by government, and by slower growth and lower paying industries that serve local markets. As a result, it has been underperforming on basic measures of business and economic growth and faces formidable inclusion challenges that threaten its future growth. Yet, Sacramento is also undergoing an exciting transition. It has burgeoning entrepreneurial activity, anchored by exceptional universities, and emerging industries – from future mobility to ag-tech – which could become key engines for the city’s next economic iteration.

This transition will not take care of itself. It requires deliberate alignment of multiple economic assets and activities, from industry clusters to labor markets to infrastructure and more. As a result, Sacramento is creating an economic Action Agenda to provide a strategic framework, align work across the main drivers of success in the next economy, and prioritize key innovation and business initiatives to accelerate growth.<sup>2</sup> Building from the work of multiple prior local and regional plans, this Action Agenda – **ScaleUP Sacramento** – lays out an overall economic development vision and framework for the region. It is a bridge to action, offering deeper analysis of Sacramento’s most competitive assets and economic opportunities, and recommending integrated growth strategies to address them. To implement strategies, it also outlines a series of mutually reinforcing, transformative initiatives for making the transition to an inclusive, prosperous next economy in Sacramento.

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<sup>2</sup> In this context, with momentum building around making significant investments in Sacramento’s growth, the city passed Measure U, and has allocated substantial funds to invest in economic growth initiatives. ScaleUP Sacramento will be guided by, and seeks to inform, the process of investing these funds at meaningful and strategic scale. The proposed growth initiatives will leverage public resources to attract additional private investment and create on-going development capacity for the region.

At its core, the Action Agenda finds that:

- Sacramento's economy has historically been dominated by government, alongside universities and hospitals as major employer; going forward, it needs to diversify and build next economy industries, services and institutions.
- Sacramento has the makings of a successful next economy: competitive strengths in emerging advanced clusters, a skilled labor force, strong universities, accelerating entrepreneurial activities and increasingly attractive amenities.
- The region has especially substantial business, workforce, institutional and other assets in food production and manufacturing, life sciences, future mobility and some energy sectors.
- Strategic growth of these clusters can reposition Sacramento's economy towards becoming a center for high-growth, technology-driven industries, from gene therapies to nutraceuticals.
- Sacramento is a center of invention, with test beds and labs, along with incubators and other support for start-ups, but has little support for scale-up and larger firms; its clusters' competitiveness lie disproportionately in research and civic institutions and the regulatory environment, or in very early stage entrepreneurship.
- To become a dynamic center for these emerging, advanced industries, Sacramento must move up the value chain – from the place where products are invented to the place where businesses and industries are grown. This requires developing institutional, financial and other resources to grow, attract and support scale-ups and larger firms.
- Scaling up entails more cluster-based technical and financial resources for growing firms; targeted and aligned workforce development; building and better connecting the vibrant but fragmented entrepreneurial ecosystem; and shifting from a government-driven economy with relatively low private sector engagement and low risk tolerance to cross-sector networks and institutions much more driven by private sector leadership.
- Scaling up also demands a focus on *inclusion* across every economic growth activity: long-term growth is best achieved by, and not sustainable without, developing and deploying all available economic assets – and Sacramento is currently leaving many residents and communities behind.
- Fortunately, greater engagement, cross-sector focus and commitment to transformative economic development is emerging, as reflected in Measure U and major catalytic initiatives underway, such as the Future Mobility Center and Aggie Square. Sacramento is poised to transition to a global center for scaled up companies in new technology-driven industries, with a thriving workforce, vital communities and a high quality of life.



In short, Sacramento is at an exciting moment – once again organizing and focusing its tremendous assets, energy and development activity. The moment is right for Sacramento to create and implement a strategic Action Agenda that builds from the region’s distinctive economic strengths, securing a competitive position in the global economy, and generating sustained, inclusive economic growth.

To get there, Sacramento needs to deliberately capitalize on and connect the opportunities arising from its competitive assets, by aligning its human capital, industries, technologies, innovation ecosystem, built environment, and governance. In particular, ScaleUP Sacramento recommends exploring nine initiatives organized around nine strategies. The strategies are designed to be mutually reinforcing, and most of the initiatives support more than one strategy. They are also designed to be flexible, adapting as additional opportunities arise.

An economy literally grows through increasing the outputs of its firms. Accordingly, three of these strategies are designed around specific clusters – industry-based concentrations of firms and related economic actors and institutions. (See Clusters Approach and Methodology section for more detail). Sacramento needs to focus its efforts on a few priority clusters with high growth potential that build on its core strengths. Future mobility, life sciences and related agricultural sciences, food manufacturing and aspects of clean energy all meet that test. Each are high growth, high tech industries with distinctive attributes but overlapping strengths in firms, research institutions, labor force, technologies, policy environment and markets. The other six strategies, individually and in conjunction, address key cross-cutting factors which will make Sacramento a place where all people and firms are productive and grow.

### **STRATEGY 1 [Clusters]:**

**Become a global center for firms and labor force in food manufacturing.**

**Initiative 1.1: Food Manufacturing Innovation Park** – A food manufacturing innovation park, anchored by co-packing and co-production facilities while also providing shared business, technology, logistics and other support, would serve new scale-up food manufacturers, as well as existing small and medium sized firms adapting to the new challenges and opportunities in food manufacturing.

### **STRATEGY 2 [Clusters]:**

**Become a global center for firms and labor force in selected bio and ag sciences.**

**Initiative 2.1: Bioscience Manufacturing Park** – A bioscience manufacturing park, focused on next-generation therapies and biologics, would accelerate commercialization of new products, help scale-up companies and make Sacramento a center for larger scale drug manufacturing.

**Initiative 2.2: Life Sciences Inclusive Cluster Collaborative** – a Life Sciences Inclusive Cluster Collaborative would tie together, accelerate and scale growth through enabling industry stakeholders to coordinate more effectively and to collaboratively innovate and invest in workforce, supply chain, new technology, and market development.

### **STRATEGY 3 [Clusters]:**

**Become a global center for firms and labor force in future mobility.**

**Initiative 3.1: Mobility Hub** – The California Mobility Center (CMC) is a transformative initiative to grow capacity and move up the value chain – developing new, more sophisticated products – in the emerging mobility industries. Either as part of or building from CMC, the Mobility Hub would connect stakeholders (serving some of the functions of a cluster organization), and would offer additional technical, business, and financial support for advanced manufacturing in energy and autonomous vehicle hardware firms. That in turn would support entrepreneurs and start-ups that prototype products at CMC to scale-up their businesses, stay and succeed in Sacramento.

Several other emerging clusters – from creative economy to cannabis – also deserve attention. The strategies and initiatives overall (including particularly the ones below) are designed to make Sacramento a place where emerging high-tech industries and firms – in other emerging clusters as well – will want to locate and will thrive because of the wrap-around support available from policy to finance to private sector partnerships.

### **STRATEGY 4 [Aligned Human Capital]:**

**Move labor markets and workforce system towards demand-driven, sector-based workforce development aligned with sector opportunities: develop and deploy an inclusive future workforce for future work.**

**Initiative 4.1: Employer-Led, Inclusive Labor Market System** – An integrated, aligned approach to creating a next generation labor market system from two angles, leveraging (1) emerging sector-specific developments (particularly Aggie Square and the California Mobility Center) and (2) the Corporate Leadership Alliance to form and scale employer-led collaboratives that will drive systems-level change in hiring and training practices.

### **STRATEGY 5 [Innovation Infrastructure]:**

**Build a scale-up ecosystem – become the place to be for growing firms in emerging advanced industries.**

**Initiative 5.1: ScaleUP Services** – Create a sophisticated business and financial services organization targeting support to small and medium-sized firms seeking rapid growth (ScaleUP Services). It would identify firms with significant growth potential, and then provide tailored business development and management services, finance, training, and market connections to support rapid growth.

**Initiative 5.2 Diversity Management & Ownership Services** – This adaptation of the scale-up venture fund model would identify and provide specialized support and finance tailored to people of color and women entrepreneurs managing or interested in acquiring high growth firms.

### **STRATEGY 6 [Governance]:**

Expand cross-sector - and particularly private sector - engagement and institutional capacity to conceive, prioritize, coordinate and implement economic growth activities.

**Initiative 6.1: Corporate Leadership Alliance** – Establish a major corporate-led cross sector collaborative to drive a wide array of strategies and initiatives implementing the economic growth Action Agenda.

### **STRATEGY 7 [Spatial Efficiency]:**

Target real estate and infrastructure development to improve density and access.

**Initiative 7.1: Master Developer** – Establish a mission-driven, market-making, non-profit “master developer” to conceive major industrial development projects, do pre-development business planning and work, and partner with developers to execute, bringing patient capital and other resources to enable more market-making and inclusive development.

### **STRATEGY 8 [Clusters]:**

Develop a concentration of business services firms – building from the firms currently serving government – to meet the needs of high-growth, high-tech scale-up firms.

### **STRATEGY 9 [Branding and Attraction]:**

As the other strategies take hold, and quality of life amenities continue to grow in Sacramento, it will be time for Sacramento to re-brand itself as a “right sized city” for growing next economy firms and the people who work in them, and to tactically attract firms to build Sacramento’s targeted, emerging high-growth clusters.

Taken together, this array of linked strategies and their implementing initiatives is designed to make Sacramento a place where people and growing firms in targeted emerging high-tech industries will stay and thrive. The combination of sophisticated cluster-based support, business and financial support for scale-up firms, aligned talent development, and rich institutional networks can position Sacramento as a major global center for next economy innovation and inclusive growth.

## SCOPE OF THE ACTION AGENDA

This is a plan for *inclusive economic growth*, and consequently focuses on those aspects of the region that have the most direct impact on improving broadly shared economic outputs, employment and wages. Of course, other fundamental preconditions are vital to inclusive economic growth, including strong schools, safe streets, and a healthy environment. While addressing these preconditions is largely beyond the scope of this document, this Action Agenda does not diminish – but rather heightens – the need for coordinated action regarding education, public health, safety, the environment and overall quality of life. These issues are critical elements of an ecosystem that enables inclusive economic growth, but are touched on by ScaleUP Sacramento only to the extent that the interventions have direct ties to growth interventions. Fortunately, these other issues are being addressed by capable organizations and initiatives throughout the region.

ScaleUP Sacramento provides starting points, meant to collectively move Sacramento along its path to becoming a dynamic center for scale-up companies in new technology driven industries. Much other activity is and will be occurring, and these strategies and initiatives can be expanded, or others added, as opportunities arise. In other words, while a significant milestone, the process to date and this document are just the first iteration. Like a business plan, this Action Agenda will always be a work-in-process: the point is not the document, but the strategic enterprises it helps launch. Hence this draft represents only the foundational work for what should become a continuous process of stakeholder engagement, analysis, strategy revision, initiative design and execution, measurement of results, adjustment and adaptation to new economic conditions. Through this iterative process of developing the Action Agenda and building institutional capacity to execute it, the work aspires to:

- Produce **a shared roadmap**, aligning existing and new initiatives around a common vision. By bringing coherence to fragmented programming across multiple dimensions of the economy, it creates a shared understanding and strategic direction.
- Identify and begin prioritizing potential **signature initiatives** to begin implementation, moving Sacramento down its transition path, and creating **a new institutional capacity for economic growth**; and
- Represent an **ongoing enterprise**, geared toward action: The Action Agenda creates an integrated set of growth strategies and begins to identify a portfolio of potential new initiatives to build upon and leverage existing efforts.

In short, as it is continually refined and engages further stakeholders, the Action Agenda creates a “north star” for the city, around which regional strategies and initiatives can be continually developed and aligned.

## DOCUMENT OUTLINE

**Chapter I** summarizes the economic foundation for the Action Agenda. Examining the drivers of next economy growth reveals the changing dynamics and increasing importance of metropolitan regions, the need for a new form of economic growth planning, the market levers which drive inclusive prosperity in metropolitan regions in the 21st century and the critical importance of inclusive growth.

**Chapter II** provides market analysis, beginning with overall economic performance, and then assessing status with respect to each of the five market levers (described in Chapter 1) which drive inclusive economic growth in the next economy: clusters, aligned human capital, innovation infrastructure; spatial efficiency and governance. It also addresses the neighborhood development implications of the Action Agenda.

**Chapter III** outlines a vision for what Sacramento could become and articulates nine mutually reinforcing strategies that will shape Sacramento's economic trajectory to get there.

**Chapter IV** provides concepts for nine initiatives to implement the strategies.

# I. Economic Framing

Underpinning the Action Agenda is a series of key principles drawn from extensive research, analysis and practice addressing the changes in the next economy. These changes have implications for economic development practice and inform a methodology for market analysis, strategy development and initiative design. This section summarizes these principles and the methodological approach.

## *The Next Economy*

The global economy is undergoing a transformation that is fundamentally changing how productivity and growth occur. Knowledge assets embedded in technology and people are redefining how products are made, moved and sold across all sectors (not just “knowledge industries”). With the impact and value of knowledge greater than ever, human capital is solidifying its place as the single most important input for economic growth. A resulting more global, dynamic economy rewards continuous innovation, heightening the importance of rich, flexible cross-sector networks efficiently deploying and connecting human capital, business, technology and other assets. The pace of change in the economy is increasing: “creative destruction” is disrupting industries, occupations and places; while new products, firms, industries and markets are rapidly emerging, leading to enormous new wealth creation.<sup>3</sup>

One effect of these changes is that workers and businesses are experiencing ever greater benefits from locating close to each other, and thus are increasingly concentrating – and, more importantly, are more productive – in metropolitan regions. Metropolitan regions are dynamic, flexible and complex systems that nurture unique economies, which arise from an area's distinctive blend of industries, human capital, technologies, institutions and the built environment. Metropolitan areas have thus become the most important unit of geography in the global economy.<sup>4</sup>

Each region's unique combination of assets, markets, institutions and culture creates a “whole greater than the sum of the parts.” Each of the key dimensions – industry concentrations, labor pools, infrastructure – succeeds or fails within the context of the whole region. Therefore, strategies to grow an entire regional economy must be tailored to the region's distinct strengths and opportunities and should align across all aspects of the economy. There are no “one-size-fits-all” solutions for economic growth.<sup>5</sup>

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<sup>3</sup> Brophy, Paul, Weissbourd, Robert, and Andy Beideman, *Transformative Economies: Emerging Practices for Aligning Growth and Inclusion*, Federal Reserve Bank of Philadelphia: 2017.

<sup>4</sup> Evidence is emerging that there may be limits to the benefits of concentration in large metropolitan areas. As negative amenities like high housing costs and congestion emerge, more people and firms are moving to “second tier” metropolitan areas. (See Strategies section for more on the “right-sized cities” phenomenon).

<sup>5</sup> Deliberate, tailored strategies are particularly important in the knowledge economy because the growth trajectories of regional economies are diverging. In the past, underperforming regions tended to “catch up” with their higher-performing peers over time. In the new economy, this dynamic has changed. As knowledge assets – such as human capital, information

## METROPOLITAN REGIONS, CITIES AND NEIGHBORHOODS

The economy does not follow political boundaries. Instead, the economic growth of neighborhoods and their city and region are deeply linked, because these places are largely parts of the same economy. They share labor pools and housing markets; business-to-business relationships and supply chains; infrastructure and commuting patterns; cultural, recreational, retail, and other amenities; and anchor institutions, such as hospitals and universities. Generally, metropolitan regions are considered a key unit of economic analysis. Since this Action Agenda focuses on economic growth, its analysis is largely *regional* in scope. That said, the proposed strategies are targeted to specific economic geographies. In some cases, the strategies aim to connect neighborhood assets with economic activity in the city (see separate neighborhoods discussion). Other strategies are focused on assets, such as industry clusters, that extend across the entire region. Thus, while this is an Action Agenda prepared for and focused on the City of Sacramento, it is inherently about how to grow the regional economy as well. In that regard, it has been carefully coordinated with partners developing a regional plan – *Prosperity Strategy*<sup>6</sup> – and the two plans are intended to inform each other and align.

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### *A New Approach to Economic Growth*

The transformative nature of the next economy has major implications for the practice of regional economic development (see Figure 1). Traditional strategies are no longer well-suited to today's economic opportunities. Regions need a new approach, moving away from consumption-driven growth (e.g., retail, housing) and from deal-by-deal, opportunistic firm attraction efforts based primarily on lowering costs for companies.<sup>7</sup>

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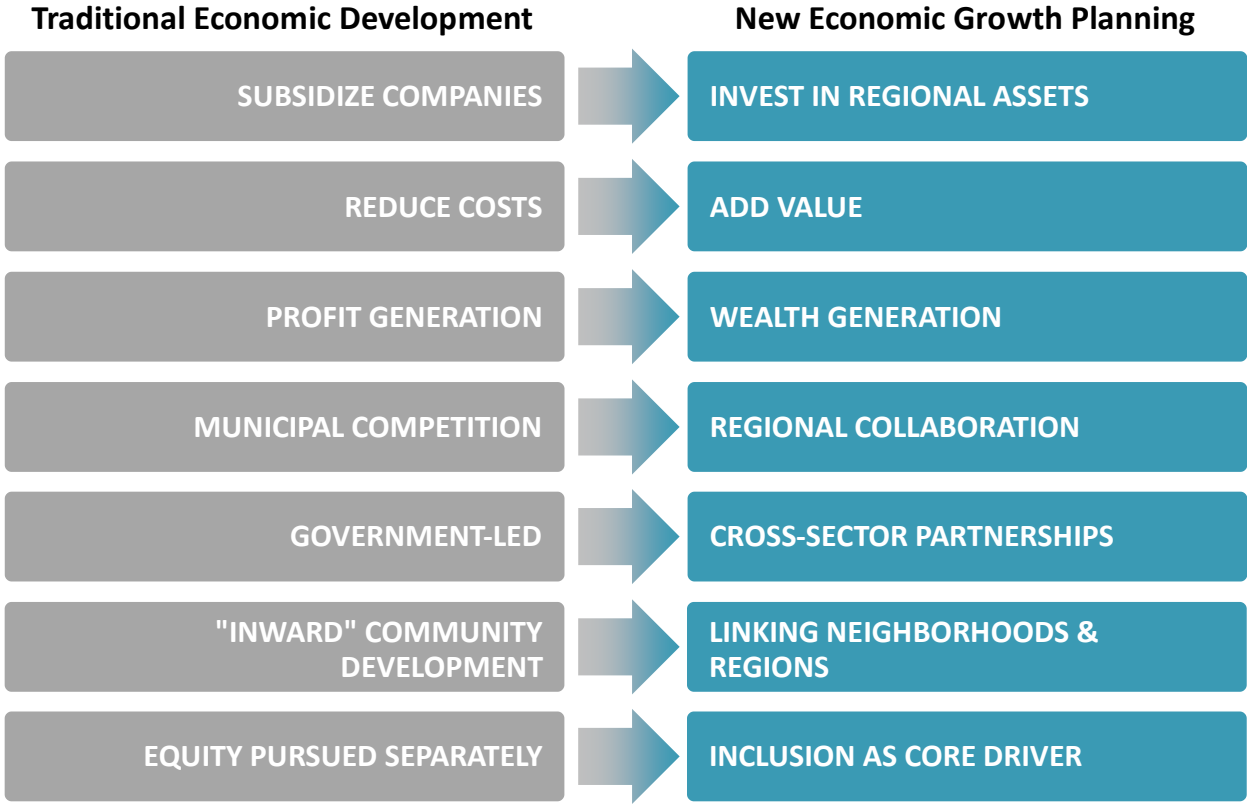
technologies and information sector firms – increasingly concentrate, they build upon themselves and generate increasing rather than diminishing returns. This drives a self-reinforcing growth cycle, and as a result, high-performing regions now tend to pull further ahead of their competitors. See generally: Joseph Cortright, “New Growth Theory, Technology and Learning: A Practitioner’s Guide,” *Reviews of Economic Development Literature and Practice*, 4: 2001; Weissbourd, Robert and Christopher Berry, *The Changing Dynamics of Urban America*, Online Publication: 2004.

<sup>6</sup> *Prosperity Strategy* is the title of the region’s Comprehensive Economic Development Strategy (CEDs), which has been collaboratively created by teams from the Sacramento Area Council of Governments (SACOG), Valley Vision, Sacramento Metro Chamber of Commerce and Greater Sacramento Economic Council. For more information, see <https://valleyvision.org/projects/ceds/>.

<sup>7</sup> Individual firm attraction instead plays an important role as a tactic employed to implement strategies tailored to the assets and characteristics of the region – e.g., targeting particular types of firms to fill out a strong local cluster. In these circumstances, the case that is made to attract the targeted firm is also different – less focused on direct financial incentives (cost reduction) and more on adding value through infrastructure, human capital and other programs that improve the region for the entire industry and make the attracted firms “stickier” (less likely to leave for the next, lower-cost location).

Instead, regions must try to create production-driven economies that compete by adding value, building on their unique assets, strengths and opportunities. To do this, regions must concentrate on increasing *productivity*. Successful regions are developing and implementing comprehensive, integrated and inclusive strategies across the five market levers (discussed below) that determine productivity.

**Figure 1: Changing Nature of Economic Development Practice**



At a high-level, the shift is from business development to economic development, from opportunistic deals to improving the economic system (which enables doing better deals). New practices emphasize:

- **Competing on value added, instead of low-cost**, becoming a place where firms and people are more productive because of better human capital, infrastructure, complementary firms, governance, and so forth. This makes the place “sticky,” continually attracting more firms and people. It is also a crucial approach for regions in states like California, where higher costs of living and doing business make it a losing proposition to attempt to compete on low-cost;
- **Identifying unique strengths and “building from the inside out,”** recognizing that growth starts with *existing* assets: most net growth comes from a region's existing firms, followed by start-ups and only then by firms moving in. Firm attraction is the tail, not the dog, of economic development. Combined with the value-added principle, this



means that initiatives should start by strengthening existing firms and industries and the assets which support them;

- **Acting strategically through context-specific, integrated solutions**, rather than having disconnected, siloed programs (or chasing isolated “big deals”)
- **Focusing on quality growth**, looking for long-term value and wealth creation rather than short-term profit extraction and other unsustainable development models.<sup>8</sup> A fundamental tenet of quality growth – developing and deploying ALL assets – is inclusive growth. Quality growth should also include focusing on climate conscience opportunities to grow clean jobs and industries that are more efficient and less polluting.

These principles indicate that the regions which build from the inside out, concentrating on their unique strengths, identifying their competitive advantages and then designing and launching market-based, targeted, integrated growth strategies that leverage all of their assets, will be most successful in creating strong, attractive economies and communities, resulting in more sustainable growth.

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## *Inclusive Growth*

A central aspect of today's economy is the “inclusive growth paradox.” On the one hand, in the short term, growth in this economy is disrupting (and in some cases, wiping out) legacy industries and labor markets. This is contributing to the disappearance of the middle class and creating unprecedented wealth inequality.

On the other hand, in the long term, it is increasingly clear that the regions with less inequity grow more sustainably over time. They utilize the talent of more of their workers and companies, are more efficient and productive and reduce the costs associated with poverty.<sup>9</sup> Sustained growth is positively correlated with lower inequality and racial segregation and smaller differences in city-suburb poverty levels.<sup>10</sup> A central challenge – and opportunity – for new economic development practice then, is aligning inclusion and growth. Equity and growth may have conflicted in the industrial economy; regardless, they can and *must* be two sides of the same coin in the next economy.

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<sup>8</sup> For more information on quality growth, see materials at <https://newgrowth.org/>, describing The New Growth Innovation Network, a new national organization that brings together economic development leaders committed to building a new field of quality economic growth practice.

<sup>9</sup> Pastor, Manuel and Chris Benner, *Equity, Growth, and Community: What the Nation Can Learn from America's Metro Areas*, University of California Press: 2015, available at <https://doi.org/10.1525/luminos.6>; Weissbourd and Berry, *The Changing Dynamics of Urban America.*; Ostry, Jonathan D., Berg, Andrew and Charalambos G. Tsangarides, “Redistribution, Inequality, and Growth,” IMF Staff Discussion Note: April 2014, available at [www.imf.org/external/pubs/ft/sdn/2014/sdn1402.pdf](http://www.imf.org/external/pubs/ft/sdn/2014/sdn1402.pdf); OECD Directorate for Employment, Labour, and Social Affairs, “Does Inequality Hurt Economic Growth?” Focus on Inequality and Growth, 9: 2014; OECD, *In It Together: Why Less Inequality Benefits All*, Online Publication: 2015, available at [www.oecd.org/social/in-it-together-why-less-inequality-benefits-all-9789264235120-en.htm](http://www.oecd.org/social/in-it-together-why-less-inequality-benefits-all-9789264235120-en.htm).

<sup>10</sup> Pastor and Benner, *Equity, Growth, and Community: What the Nation Can Learn from America's Metro Areas*.

A crucial aspect of inclusive growth is that it does not refer to separate inclusion practices, nor to traditional equity work, as important as those remain. Traditionally, growth has taken place and then the people and places left out have received some set-asides or redistribution. Inclusive growth does not separate inclusion from growth – it is one thing, not two – and instead is a different approach to all growth. It seeks to fundamentally reposition disadvantaged people and places, particularly communities of color, as leading owners, drivers and beneficiaries of the enormous growth opportunities in the new economy in the first place, not after the fact.<sup>11</sup> This is especially critical in Sacramento, given the disparities the city’s people of color populations currently face in educational attainment, job accessibility, employment in high-tech jobs and more.<sup>12</sup>

Inclusion generally occurs across four dimensions:

- **Employment** – improving the functioning of labor markets so that workers of all skill levels and backgrounds are efficiently prepared, matched and upskilled for quality jobs with strong career ladders;
- **Ownership** – growing company ownership by people of color to generate wealth creation and capture, especially by finding opportunities in high growth industries, as well as real estate ownership in residential, commercial and industrial development;
- **Location** – siting and supporting firms in places that are readily accessible to disadvantaged populations; and
- **Participation** – ensuring diverse representation of all races, genders, backgrounds, national origins, etc., at the relevant private, public and civic sector “tables” where growth strategies and economic policies are shaped.

Quality, inclusive growth practices that increase the employment, ownership, access and participation of communities of color in the city’s emerging economic opportunities are essential to Sacramento achieving lasting economic growth. Each of the growth strategies for Sacramento that have evolved from this plan have been shaped by the opportunities in those four avenues to inclusion.

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## Key Drivers of Growth

In the new economy, five market levers (listed below and diagrammed in Figure 2) account for the efficiency and productivity of regional economies and drive how much complementary, concentrated assets realize synergies.<sup>13</sup> Together, they provide a framework for understanding a region’s economic assets, challenges and opportunities.

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<sup>11</sup> Brophy et al., *Transformative Economies: Emerging Practices for Aligning Growth and Inclusion*.

<sup>12</sup> Parilla, Joseph, Liu, Sifan, and Marek Gootman, *Charting a Course to the Sacramento Region’s Future Economic Prosperity*, Brookings: 2018.

<sup>13</sup> For much more detailed literature review, see Weissbourd, Robert and Mark Muro, *Metropolitan Business Plans: A New Approach to Economic Growth*, Brookings Institution Metropolitan Policy Program: 2011; George Washington Institute of Public

- **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** (also referred to as The Future Workforce in the summary document)– 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** (also referred to as Integrated Neighborhood and Regional Development in the summary document) – 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** (also referred to as Connected Cross-Sector Economy in the summary document) – Not to be confused with *government*, *governance* encompasses all the institutions that foster economic networks, innovation and other activity. The increasingly dynamic economy places a premium on rich formal and informal networks that enable exchange of ideas and facilitate relationships, transactions and coordination across the public, private and civic sectors. 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 and fostering open, adaptive and flexible cross-sector networks.

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Policy and RW Ventures, LLC, *Implementing Regionalism: Connecting Emerging Theory and Practice to Inform Economic Development*, Online Publication: 2011, available at <http://rw-ventures.com/wp-content/uploads/2017/01/Surdna-Final-Paper-Combined-112111.pdf>; . There are, of course, other equally good economic frameworks: this one has just proven particularly useful in translating economic theory to practice in the context of particular regional economies.

**Figure 2: Five Market Levers for Economic Growth**



These market levers, of course, influence each other. The point is to understand, based on a particular places' assets, where there are key intersections of firms (clusters), people (human capital) and technology (innovation) that – when connected by the right built and virtual environment (spatial efficiency) and institutional environment (governance) – will create the synergies that make the place most productive and thus competitive for certain industries, firms and people.

## THE ROLE OF AMENITIES IN ECONOMIC GROWTH

A healthy debate exists about the causal relationship between the development of a region's quality of life amenities and the growth of its industries and jobs. One school of thought argues that improved retail, cultural, recreational and other quality of life amenities will attract a stronger talent pool, which in turn will attract companies. An alternative view is that strong industries, firms and jobs attract talent and generate income and wealth, which in turn provide demand for quality of life amenities.

The reality is that both are important, and iterate, as people seek jobs, firms seek talent and both care about quality of life. However, most often firms and people move to places where they can be most productive, seeking concentrations of similar labor pools and jobs, and this economic growth drives improvement in quality of life

amenities.<sup>14</sup> Because this Action Agenda is focused on economic growth, and since amenities tend to follow rather than lead growth, amenities are not significantly addressed in this Action Agenda. Sacramento has invested in quality of life amenities, and should continue to do so, particularly as they have separate relevance to the health of neighborhoods. Yet lack of amenities is not what is holding Sacramento back, nor will providing more amenities drive transition to next economy firms, jobs and talent driving inclusive growth.

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<sup>14</sup> Berry, Christopher, Bodini, Riccardo and Robert Weissbourd, *Grads and Fads: The Dynamics of Human Capital Location*, Online Publication: 2005, available at <http://rw-ventures.com/wp-content/uploads/2017/01/Grads-and-Fads-Paper-Final.pdf>

## II. Market Analysis

### *History and Overall Economic Performance*

#### *Economic History*

Sacramento, named for the river that borders the city's western edge, was founded in the late 1840s, capitalizing on its strategic position at the crossroads of major waterways and becoming a major port and trading hub. Its growth accelerated – unplanned, unchecked, and chaotic – with the discovery of gold at Sutter's Mill in 1848. The boom and bust of the short-lived Gold Rush left Sacramento's economy in need of diversification and stability. By the late 1860s, several developments had laid the foundation for Sacramento's economy, including an organized and focused pitch to win the State Capitol in 1854; the intensification of agriculture in the Central Valley; and the arrival of the railroads, steamboats, and large-scale irrigation projects. These assets seeded an economy linked closely to government, agriculture and the evolving forms of transportation and mobility that made it possible to move perishable goods to market and politicians to their constituents.

Advances in farming and harvesting techniques and equipment in the 1880s helped agriculture replace mining and cattle ranching as the region's most profitable industry.<sup>15</sup> Sacramento grew into a diverse farming town, home to Italian, Filipino, Portuguese, Japanese, Chinese and Mexican American residents, among others. Local canneries, state government, and the Southern Pacific Railroad were major employers for the region.<sup>16</sup>

During the first half of the 20<sup>th</sup> century, a wave of infrastructure investment and institutional innovation took place that further shaped Sacramento's economy and the region's land use and connectivity. New roads and bus routes connected major cities in the region, tap water was purified, and Works Progress Administration projects built bridges across the Sacramento River. The University of California, Davis (UC Davis) was founded in 1905, initially devoted entirely to researching farming techniques for California's specific conditions, given agriculture's impact on the state economy.<sup>17</sup>

During World War II, Sacramento experienced rapid growth, as a large influx of federal funding and the presence of two aviation installations, McClellan Air Force Base and Mather Field, drew tens of thousands of people to the region.<sup>18</sup> Sacramento's population boomed again in the late 1940s and 1950s, as veterans returned to civilian life and sought to start anew in California. By the 1950s, Sacramento's population was triple its pre-war levels.<sup>19</sup>

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<sup>15</sup> "Sacramento History Online," accessed October 16, 2019, [https://www.sacramentohistory.org/resources\\_timeline.html](https://www.sacramentohistory.org/resources_timeline.html).

<sup>16</sup> Public Broadcasting Service, "The War. The Witnesses. Four Towns.," accessed October 16, 2019, [https://www.pbs.org/thewar/the\\_witnesses\\_towns\\_sacramento.htm](https://www.pbs.org/thewar/the_witnesses_towns_sacramento.htm).

<sup>17</sup> Douglass, John and Sally Thomas, "University of California History Digital Archives: Davis Historical Overview," accessed November 7, 2019, [https://www.lib.berkeley.edu/uchistory/general\\_history/campuses/ucd/overview.html](https://www.lib.berkeley.edu/uchistory/general_history/campuses/ucd/overview.html).

<sup>18</sup> Public Broadcasting Service, "The War. The Witnesses. Four Towns."

<sup>19</sup> Capital Public Radio, "How World War II Changed The Face Of Sacramento," accessed November 7, 2019, <http://archive2.caprudio.org/articles/2011/05/27/how-world-war-ii-changed-the-face-of-sacramento>.

The closure of the military bases in the 1990s and early 2000s, the decline of agricultural food processing, and the Great Recession, among other global factors, have since changed the region's economic landscape. The Great Recession took an especially large toll on Sacramento. Construction and government were the region's largest employers in 2008, two sectors that were among the hardest hit nationwide.<sup>20</sup> Cuts to the state budget and other austerity measures led to reductions in government employment, affecting not just residents working in the public sector but also the companies contracting with the government and the downtown businesses that government workers patronized. Sacramento would be the last California metro area to recover all jobs lost during the recession.<sup>21</sup>

## State of the Regional Economy<sup>22</sup>

Taken together, indicators of Sacramento's economic status and trajectory paint a mixed picture, with substantial growth on some measures but other statistics showing a lagging economy with substantial racial and ethnic disparities.

While Sacramento has made gains since the Great Recession, its economy is still recovering by many accounts. Gross Regional Product (GRP) for the Sacramento Metropolitan Statistical Area (MSA) has increased steadily since 2010,<sup>23</sup> when the recession hit its peak. However, Sacramento's per capita GDP lags national averages by nearly \$8,000 dollars.<sup>24</sup> The unemployment rate, at 3.7%, is in line with national averages. This is a dramatic reduction from a high of nearly 13% in 2010, which substantially exceeded state and national figures. Median household income for the Sacramento MSA exceeds national levels but lags the state by nearly \$3,000 and still trails pre-recession figures.<sup>25</sup>

Within these overall trends, there are substantial differences in how racial and ethnic groups are faring. Many Sacramento residents still struggle to make ends meet, as 34% of the region's residents live in households that do not earn enough to cover basic household expenses, with a disproportionate share being Black, Hispanic or without a high school degree. This is driven in part by the gap between increases in wages and costs of living. While median wages increased by 6% between 2011 and 2016, this was offset by rapidly rising housing costs, such as a 30% increase in rents. Employment rates also differ by race, with 57% of Black residents employed, compared to 69% and 67% for white and Hispanic residents, respectively (see Figure 3).

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<sup>20</sup> Valley Vision, "Project: Next Economy," accessed November 7, 2019, <https://valleyvision.org/projects/next-economy/>.

<sup>21</sup> "Sacramento Region Finally Recovers All Jobs Lost in Recession," Sacramento Business Journal, accessed November 8, 2019, <https://www.bizjournals.com/sacramento/news/2015/12/18/pop-the-champagne-sacramento-recovers-all-jobs.html>.

<sup>22</sup> Much of the data below comes from earlier reports, including particularly the recent work by Brookings: Parilla, et al., *Charting a Course to the Sacramento Region's Future Economic Prosperity*.

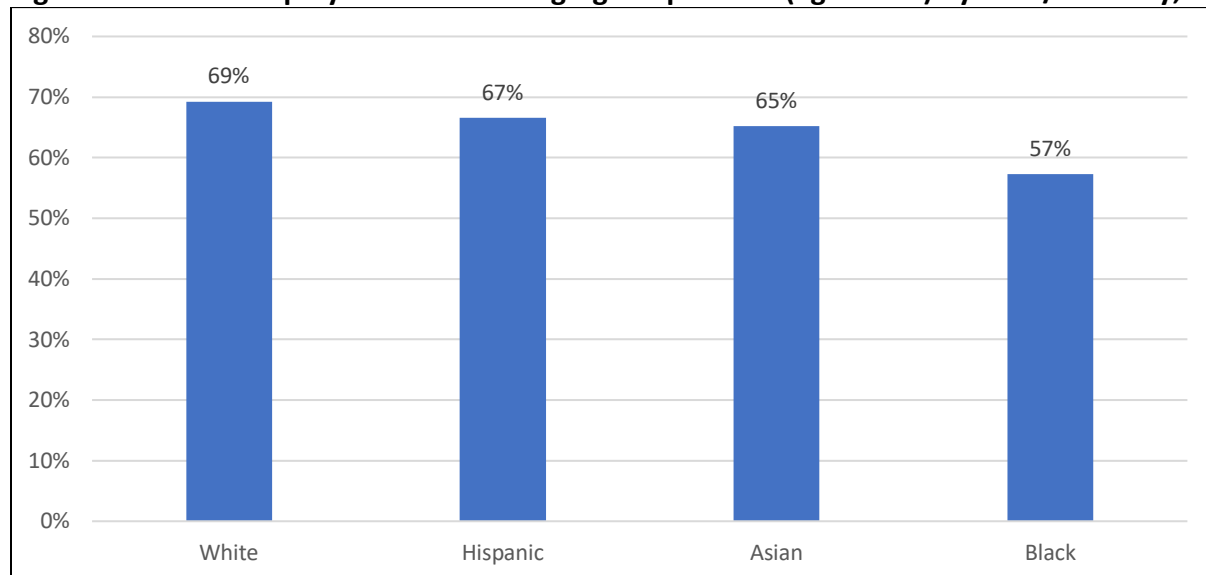
<sup>23</sup> U.S. Bureau of Economic Analysis, "Total Real Gross Domestic Product for Sacramento--Roseville--Arden-Arcade, CA (MSA)," FRED, Federal Reserve Bank of St. Louis, January 1, 2001, <https://fred.stlouisfed.org/series/RGMP40900>.

<sup>24</sup> Sacramento's per capital real GDP is \$46,769. See: Bureau of Economic Analysis, "Per Capita Real GDP by Metropolitan Area," accessed October 16, 2019, <https://apps.bea.gov/iTable/iTable.cfm?isuri=1&reqid=70&step=1#isuri=1&reqid=70&step=1>.

<sup>25</sup> Values adjusted for inflation. See: Bureau, U. S. Census. "American FactFinder - Results." Accessed November 7, 2019. [https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_08\\_3YR\\_B19013&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_08_3YR_B19013&prodType=table) and [https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_17\\_5YR\\_B19013&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B19013&prodType=table).



**Figure 3: Percent Employment of Working Age Population (age 18-64) by Race/Ethnicity, 2018**



Source: American Community Survey, with methodology updated from Brookings Institution, “Charting a Course to the Sacramento Region’s Future Economic Prosperity.”

The complexion of the region is also changing, as the population growth rate is beginning to increase after slowing for several years.<sup>26</sup> Nearly 460,000 new people moved to the region since 2001, with a sizeable number coming from the Bay Area, often in search of lower living costs. It is estimated that 192,000 households have relocated to the Sacramento region from the Bay Area – of these, an estimated 80,000 households earn less than \$50,000.<sup>27</sup>

Nearly half of Sacramento’s population is non-white, compared to 62% for the state and 39% for the nation.<sup>28</sup> Hispanic or Latino residents represent 21% of the region, Asian residents 13%; and Black or African American residents 7%. The people of color population has grown at a faster rate than the state or nation since 2010.<sup>29</sup> The workforce in particular is becoming more diverse – 54% of the region’s 18-to-34-year-old population is non-white, which is 10% higher than the nation overall (see Figure 4).

<sup>26</sup> Sacramento Area Council of Governments, “Regional Progress Report,” accessed November 8, 2019, <https://www.sacog.org/post/regional-progress-report>.

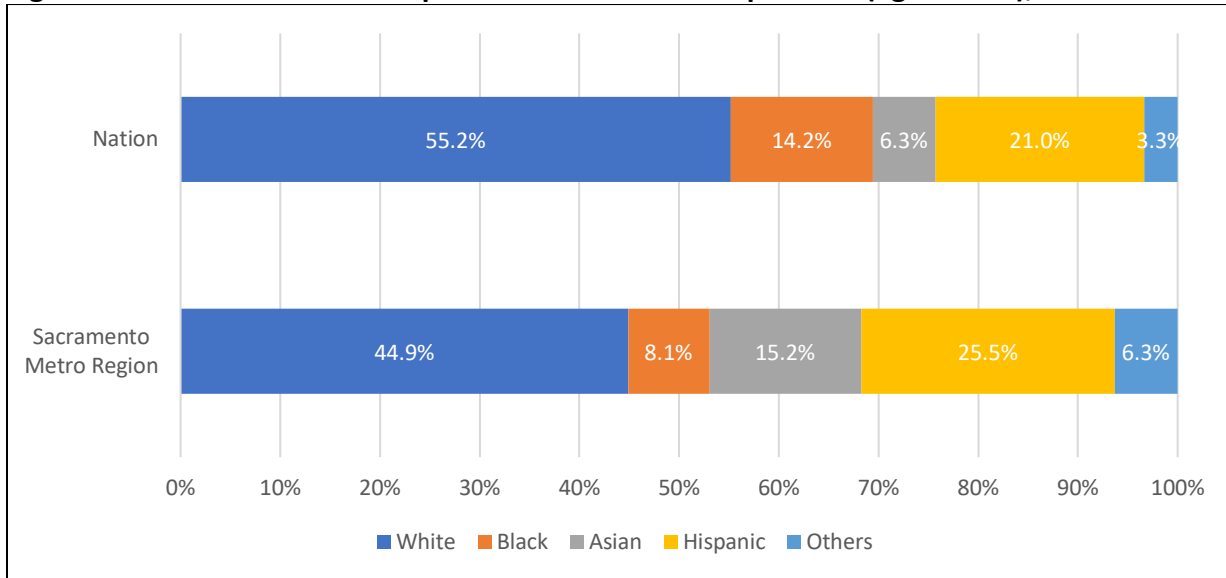
<sup>27</sup> The Sacramento Bee, “Bay Area Low-Wage Earners Moving into Central Valley CA Cities,” accessed October 14, 2019, <https://www.sacbee.com/news/california/big-valley/article219434160.html>.

<sup>28</sup> U. S. Census Bureau, “American FactFinder - Results,” accessed November 7, 2019, [https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_17\\_5YR\\_B03002&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B03002&prodType=table).

<sup>29</sup> U. S. Census Bureau, “American FactFinder - Results,” accessed November 7, 2019, [https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC\\_10\\_SF1\\_P9&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_SF1_P9&prodType=table).



**Figure 4: Racial and Ethnic Composition of Millennial Population (ages 18-34), 2018**



Source: American Community Survey, with methodology updated from Brookings Institution, “Charting a Course to the Sacramento Region’s Future Economic Prosperity.”

While Sacramento has recovered the jobs lost during the recession, its employment growth in advanced industries – high-growth, tech-based industries that include manufacturing, services, and energy – lags other metros. The regional economy, in general, is dominated by education, health, professional services, and government.<sup>30</sup> Industries in the region that are growing faster than the nation are largely non-tradable and pay average wages below the region’s median wage. Such industries include transportation and warehousing, health care, and state government. Sacramento’s firm creation rate – a measure of business dynamism – trails other comparable regions,<sup>31</sup> and Sacramento has the fourth lowest density of high-growth businesses for metros of its size.<sup>32</sup>

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<sup>30</sup> Sacramento Area Council of Governments, “Regional Progress Report.”

<sup>31</sup> Parilla et al., *Charting a Course to the Sacramento Region’s Future Economic Prosperity*.

<sup>32</sup> Ian Hathaway, “High-Growth Firms and Cities in the US: An Analysis of the Inc. 5000,” accessed November 9, 2019, <https://www.brookings.edu/research/high-growth-firms-and-cities-in-the-us-an-analysis-of-the-inc-5000/>.

## Clusters

### Approach<sup>33</sup>

Clusters are industry-based concentrations of firms and related economic actors and institutions that, because of their proximity and close interactions, experience greater efficiency and productivity due to reduced transaction costs, shared labor pools, knowledge exchange and similar benefits. Even if they are not explicitly recognized, clusters exist naturally in the economy. They may also be formalized and deliberately strengthened through collaborative cluster organizations or similar targeted initiatives.

ScaleUp Sacramento did not undertake cluster analysis of the Sacramento regional economy from scratch. Rather, the project team reviewed and built from prior analyses. In 2012-2013, Valley Vision undertook a broad assessment of Sacramento's economy to identify the region's most promising clusters. That work was updated in 2016 in partnership with the Center for Excellence and socialized with employers and workforce system partners in each cluster to create initial action plans for cluster development. More recently, the Brookings Institute furthered Valley Vision's work, taking their priority clusters and assessing each cluster's sub-parts. These studies have helped set a policy direction, providing initial indicators of the most promising clusters and sub-clusters. ScaleUP Sacramento deepens these analyses toward an operational level, drilling down and isolating where Sacramento has the greatest potential to become a global leader.

The Brookings Institute highlighted opportunities in Ag-Tech and Energy, as well as the potential for Health and Life Sciences to develop export activity and expand its economic impact. Better understanding these opportunities requires multiple approaches, including designing original cluster definitions from scratch (Ag-Tech) and drilling down into sub-clusters.<sup>34</sup> GSEC has identified the potential for Future Mobility/Autonomous Vehicles to become a competitive cluster, based on existing initiatives and investments.<sup>35</sup> The project team also analyzed the functional cluster<sup>36</sup> of Headquarters and Business Services firms currently

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<sup>33</sup> For literature review and much more extensive discussion, see Chapter 4 of George Washington Institute of Public Policy and RW Ventures, LLC, *Implementing Regionalism: Connecting Emerging Theory and Practice to Inform Economic Development* - available at <http://rw-ventures.com/implementing-regionalism-connecting-emerging-theory-and-practice-to-inform-economic-development/>.

<sup>34</sup> "Energy" for example, arguably encompasses over thirty sub-clusters ranging from energy efficient lighting to recycling. See: Robert Weissbourd, "The Energy of the Future for the Economy of the Present: Business Opportunities in the Green Economy," Online Presentation: 2010, available at <http://rw-ventures.com/the-energy-of-the-future-for-the-economy-of-the-present-business-opportunities-in-the-green-economy/>. See also: RW Ventures, LLC and IMEC, *Chicagoland FOOD: Seizing the Opportunity to Grow Chicagoland's Food Industry*, Online Publication: 2015, available at [http://rw-ventures.com/wp-content/uploads/2017/01/Chicagoland-FOOD-Report\\_Final.pdf](http://rw-ventures.com/wp-content/uploads/2017/01/Chicagoland-FOOD-Report_Final.pdf).

<sup>35</sup> For example: the Prosperity Strategy emphasizes transportation investments; SMUD is committing to and making investments in reduction in GHG emissions through electrification of cars; SMUD and other regional partners are contributing to development of the Center for Future Mobility; the City of Sacramento and Valley Vision have initiated contracts with AI companies to analyze Sacramento's cellular network capabilities, pilot teleoperated vehicles, and create a high-definition street map with drone technology to inform the deployment of AVs.

<sup>36</sup> Functional clusters vary from industrial clusters in that they represent concentrations of services and products that can cross-cut multiple industries (e.g., accounting, legal, architectural). Thus they can attract certain segments of an industry rather than

serving city, county and state government agencies, evaluating whether the these companies' services could attract corporate headquarters of mid-tier companies.

Each cluster's analysis is organized into four parts:

### 1. Cluster Definition

Defining the cluster is ultimately a complex task, as much art as science, and based on empirical examination of what companies and related institutions are indeed concentrating, interacting with each other and how in a particular place. For analytical purposes, to get started, it is necessary to make a first approximation from quantitative data and national research.<sup>37</sup> This starting point allows defining an initial universe of companies and institutions on which to concentrate, and enables quantitative analysis of the characteristics of the cluster based on largely national quantitative data sources and statistical analysis. This analysis then allows engaging with companies to better understand how the cluster is in fact operating in place. Through interviews and other qualitative research, what is in fact clustering can be further refined, along with enhanced understanding of the dynamics and drivers of cluster performance.

### 2. Market Observations

After defining the cluster, analysis shifts to relevant global and national market conditions and trends. Major industry-wide events and changes influence what growth opportunities and barriers companies face. These factors can include new and emerging markets, possibly driven by changing consumer demand; new product or process innovations; state or federal regulations; trends in input prices; opportunities for start-up growth and success; broad workforce trends (e.g., diversification, aging and retirements); etc.

Most of these trends will surface growth opportunities, but they will also indicate barriers to growth. Some clusters have high barriers to entry, leading to consolidation that stifles competition and innovation. A region may struggle to fill job openings in its strongest clusters due to gaps between demand and supply of relevant skills. These conditions and others will impact the cluster's growth potential.

### 3. Sacramento's Assets and Market Position

Once the cluster is defined generally, and its global dynamics are understood, it is possible to analyze where Sacramento currently fits in. This section describes the cluster as it exists in

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an industry as a whole – for example, company headquarters v. production facilities. See George Washington Institute of Public Policy and RW Ventures, LLC, *Implementing Regionalism: Connecting Emerging Theory and Practice to Inform Economic Development* and World Business Chicago, *Plan for Economic Growth and Jobs*, Online Publication: 2012, available at <https://www.chicago.gov/content/dam/city/depts/dcd/general/Plan-for-Economic-Growth-and-Jobs.pdf>.

<sup>37</sup> For example, existing cluster definitions are often drawn from Michael Porter's foundational work; see: Harvard Business School and The US Economic Development Administration, "US Cluster Mapping," <http://clustermapping.us/>.

Sacramento -- its concentrations, employment and outputs. It also analyzes drivers of cluster success as they exist in Sacramento -- key inputs (e.g. workforce), related industries and institutions, as well as other assets (from university research departments to infrastructure to policies) that contribute to the cluster and its productivity.

An emerging practice is to assess clusters on the extent to which they offer inclusive growth opportunities. Building upon traditional cluster metrics, additional criteria measure the potential for the cluster's growth to be owned and driven by traditionally disconnected populations. These criteria include the number of quality entry-level jobs and good career ladders, low barriers to entry for entrepreneurs and the presence of companies in or near neighborhoods with large lower-income populations.<sup>38</sup>

#### 4. Assessment – Sacramento's Opportunities

Analysis then turns to the products, services, programs and initiatives relevant to the cluster's opportunities in Sacramento. This begins by prioritizing the many factors impacting a cluster, informed by qualitative firm interviews. Using these targeted issues, global and national models are assessed to identify successful interventions that can be tailored to the identified challenges and opportunities. Workforce training and career pathways curricula; industry-led, sector-based partnerships; innovation hubs; seed funds; cluster organizations – these options inform concept development, partner engagement, business planning, financing, and so on.

The likelihood of success of any cluster growth initiative is directly correlated with the degree of industry participation, championing, and agenda setting. Identifying and engaging the cluster's leading companies and owners is critical to understanding cluster dynamics, both operationally and culturally (e.g., is there a cluster center of gravity, whose voices are most respected).

This section essentially builds from the first three to assess in what ways with respect to what parts of the cluster Sacramento might become competitive. Specific initiatives to seize these opportunities are suggested in Section IV of this Action Agenda.

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## Life Sciences

### *Cluster Definition*

The Life Sciences industry discovers and develops new therapies for patients, both small and large molecule drugs, accelerated with innovations in computational technologies.<sup>39</sup> 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

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<sup>38</sup> See: RW Ventures, LLC and IMEC, *Chicagoland FOOD: Seizing the Opportunity to Grow Chicagoland's Food Industry*.

<sup>39</sup> JLL Research, *Life Sciences Outlook: Breakthrough Discoveries at A Breathtaking Pace*. Online Publication: JLL, 2018.

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 locally serving, this analysis focuses on Life Sciences, in particular the biopharmaceutical sector (see Appendix 4 for more detail).

### *Market Observations*

Life Sciences is a dynamic and evolving sector, expanding rapidly in size as well as in the breadth and sophistication of its products. Employment in Life Sciences is increasing at approximately 3% nationally, its fastest pace since 2000.<sup>40</sup> This expansion is largely driven by biotechnology pursuits, which receive about half of life sciences funding.<sup>41</sup> Revenue growth in Life Sciences, for start-ups and emerging companies involved in developing new therapies, most often results from external deals through strategic licensing, mergers and acquisitions and joint ventures,<sup>42</sup> heightening the importance of external and non-traditional partnerships for growth of the sector. In particular, partnerships with tech giants are on the rise as technological advances are increasingly applied to clinical development.<sup>43</sup>

This market is experiencing significant disruption, largely due to the rise of technology companies involved in bioinformatics and computational analysis and next-generation therapy start-ups.<sup>44</sup> Therapeutic compounds called biologics<sup>45</sup> (large-molecule drugs produced from living organisms and administered through injection) are outpacing growth of small-molecule drugs (chemically manufactured drugs administered through a pill).<sup>46</sup> Next-generation therapies are changing the biotechnology sector, and in particular, subsets of biologics such as

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<sup>40</sup> Specifically, within California, in 2018, there were 3,418 life sciences companies in the state (169 more than 2017). CBRE Research, *2019 US Life Sciences Clusters: Markets Positioned for 'Century of Biology'*. Online Publication: CBRE, 2019.

<sup>41</sup> CBRE Research, *2019 US Life Sciences Clusters*.

<sup>42</sup> In particular, for pharma companies facing patent expiries, competition from and biosimilars, weak new drug pipelines, and growing technology needs. Deloitte, *2019 Global Life Sciences Outlook: Focus and Transform, Accelerating Change in Life Sciences*. Online Publication: Deloitte, 2019.

<sup>43</sup> For example, the planned Discovery Labs complex in Philadelphia will house Life Sciences, Healthcare, and Tech companies. JLL Research, *Life Sciences Outlook: Innovation is Alive and Well*, Online Publication: 2019.; For example, a third of Google Ventures' funding goes to 60 Health and Life Sciences companies. Deloitte, *2019 Global Life Sciences Outlook*.

<sup>44</sup> Approximately 250 next-generation therapy start-ups across the nation are innovating in this field, while relatively few big pharma companies are. Deloitte, *2019 Global Life Sciences Outlook*.; Susan Dettmar, "Disruptive potential of genomics could prompt life sciences companies to accelerate deal-making," Deloitte's Life Sciences and Health Care Blog, *Deloitte Center for Health Solutions*, November 1, 2018, <https://blogs.deloitte.com/centerforhealthsolutions/disruptive-potential-genomics-prompt-companies-accelerate-deal/>.; The growth of the US 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." The White House, *National Bioeconomy Blueprint*. Online Publication: The White House, 2012.

<sup>45</sup> Bayer, "Small and Large Molecules," accessed August 15, 2019, <http://pharma.bayer.com/en/innovation-partnering/technologies-and-trends/small-and-large-molecules/>.

<sup>46</sup> Royal Society of Chemistry, "How biologics have changed the rules for the pharmaceutical industry," accessed August 15, 2019, <https://www.chemistryworld.com/molecule-to-market/how-biologics-have-changed-the-rules-for-pharma/3010301.article>.

cell and gene therapy<sup>47</sup> (the transfer/editing of existing genes) and synthetic biology<sup>48</sup> (the assembly of new genomes) are demonstrating strong growth potential.<sup>49</sup> The complex manufacturing processes and shortage of specialized expertise in these areas are driving the creation of new approaches to biologic development. For instance, gene therapies must be delivered by vectors, which are difficult to produce and often are sourced from a third-party supplier with a multi-year wait list.<sup>50</sup>

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,<sup>51</sup> and predict 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.<sup>52</sup> Healthcare generates a third of worldwide data,<sup>53</sup> making analytics increasingly important in defining trends and developing new products.

In addition, 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.<sup>54</sup> Biotechnology firms are lacking in racial diversity, with non-Hispanic whites and Asians over-represented in biotech workforces and in particular in NIH Principal Investigators (72% white).<sup>55</sup> The industry has started to respond with initiatives such as the BIO Boardlist, which

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<sup>47</sup> The first gene therapy, Luxturna, was approved in 2017. McDonald, Michael and Irena Royzman, "FDA Approves the First Gene Therapy to Treat an Inherited Disease," *Biologics Blog, Patterson Belknap*, January 3, 2018, <https://www.biologicsblog.com/fda-approves-the-first-gene-therapy-to-treat-an-inherited-disease>; Clinical research programs in gene therapy now target about 50 indications (rising from 10 a few years prior) and innovation rates are expected to continue. Colasante, Walter, Diesel, Pascale, and Lev Gerlovin, "How are Cell and Gene Therapies Changing Drug Development Models?" accessed August 15, 2019, <https://www.cellandgene.com/doc/how-are-cell-and-gene-therapies-changing-drug-development-models-0001>; The FDA is expecting a surge in cell and gene therapy trials, anticipating 200 applications in 2020. Ryan Cross, "FDA prepares for huge growth in cell and gene therapy," accessed July 20, 2019, <https://cen.acs.org/business/investment/FDA-prepares-huge-growth-cell/97/i3>.

<sup>48</sup> For instance, synthetic biology can redesign an organism to produce new medicines, fuels, or nutrients. National Human Genome Research Institute, "Synthetic Biology," accessed August 3, 2019, <https://www.genome.gov/about-genomics/policy-issues/Synthetic-Biology#targetText=Some%20examples%20of%20what%20scientists,our%20water%2C%20soil%20and%20air>.

<sup>49</sup> "The market for cell therapies was valued at \$2.70 billion in 2017 and is expected to reach \$8.21 billion in 2025, growing at a compounded annual growth rate of 14.9% between 2017 and 2025." Patricia Van Arnum, "What's New in Biologics," accessed September 1, 2019, <https://www.dcatvci.org/6057-what-s-new-in-biologics>; The synthetic biology market is estimated to reach USD 17.36 Billion by 2026 with CAGR of 18.9%. GlobeNewswire, "Synthetic Biology Market to Reach USD 17.36 Billion by 2026," accessed October 1, 2019, <https://www.globenewswire.com/news-release/2019/06/05/1864826/0/en/Synthetic-Biology-Market-To-Reach-USD-17-36-Billion-By-2026-Reports-And-Data.html>.

<sup>50</sup> <https://www.cellandgene.com/doc/how-are-cell-and-gene-therapies-changing-drug-development-models-0001>

<sup>51</sup> CBRE Research, *2019 US Life Sciences Clusters*; JLL Research, *Life Sciences Outlook 2018*.

<sup>52</sup> JLL Research, *Life Sciences Outlook 2018*.

<sup>53</sup> Deloitte, *2019 Global Life Sciences Outlook*.

<sup>54</sup> MassBio, *Opening the Path to a Diverse Future: Creating Gender Balance in Massachusetts Life Sciences Sector*. Online Publication: 2017, available at <http://files.massbio.org/file/MassBio-Liftstream-Gender-Diversity-Report-2017-C849.PDF>.

<sup>55</sup> Brady Hugget, "Biotech's pale shadow," *Nature Biotechnology*, 36, <https://www.nature.com/articles/nbt.4046>.

connects diverse leaders with board opportunities in the industry,<sup>56</sup> or initiatives to increase K-12 exposure to Life Sciences careers,<sup>57</sup> 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,<sup>58</sup> 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.<sup>59</sup> 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”.<sup>60</sup>
- **Research Partnerships** – Many companies have shifted from in-house R&D to outside partnerships/alliances,<sup>61</sup> looking to academia and contract research organizations (CROs) for expertise and technology that is not available in-house.<sup>62</sup> These assists 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,<sup>63</sup> but given the significant amount of VC funding required to bring new companies through the R&D phase to proof of concept,<sup>64</sup> 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.<sup>65</sup> This is particularly important given that new venture capital (VC) funding precedes employment increases by about a year.<sup>66</sup>

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<sup>56</sup> IndustryWeek, “Biotechnology Industry Wants to Diversify Leadership,” accessed October 3, 2019, <https://www.industryweek.com/talent/biotechnology-industry-wants-diversify-leadership>.

<sup>57</sup> TEconomy Partners, LLC, *Driving Innovation and Economic Growth for the 21<sup>st</sup> Century*, Online Publication: 2016.

<sup>58</sup> 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 and 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*.

<sup>59</sup> Deloitte, *2019 Global Life Sciences Outlook*.

<sup>60</sup> EY, *The pharmaceutical industry is consolidating: opportunities for current players and new entrants*, Online Publication: 2017.

<sup>61</sup> 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*.

<sup>62</sup> Deloitte, *2019 Global Life Sciences Outlook*.

<sup>63</sup> 63% of drugs over the last five years that were developed by small companies. JLL Research. *Life Sciences Outlook 2018*.

<sup>64</sup> 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*.

<sup>65</sup> JLL Research, *Life Sciences Outlook 2018*.

<sup>66</sup> CBRE Research, 2019 US Life Sciences Clusters



- **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. These models are often needed to meet demand of growing companies even when lab vacancy is low.<sup>67</sup>

### *Sacramento's Assets and Market Position*

Sacramento has a core group of Life Sciences firms at various stages of development, and these firms predominantly fall into the Research and Testing and Instrument/Supplies Manufacturing sub-sectors, rather than Product Manufacturing.<sup>68</sup> The sector has a location quotient (LQ) of 0.97.<sup>69</sup>

Life Sciences 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. National figures suggest that inclusion is challenging in this industry,<sup>70</sup> particularly at the leadership level (80% male in leadership positions, 72% white principal investigators). When looking at a small sample of the region's NIH Principal Investigators (active NIH grants over \$1 million), they are 70% male and 80% white (none are black or Hispanic),<sup>71</sup> indicating the region is more unequal than the national imbalance reported in race, and while it does slightly better on gender statistics than the national average, it is by no means equal. Looking beyond leadership at employment more generally, national data reports that in the biopharmaceutical industry, of the 563,000 employed, 49% are women, and breakdown by race is: 75% White, 10% Black or African American, 14% Asian, and 11% Hispanic or Latino.<sup>72</sup> Compared to national employment trends (78% White, 12% Black or African American, 6% Asian, 17% Hispanic or Latino), the biopharmaceutical industry employs more Asians and fewer Black and Hispanic populations.

Average wages in the Life Sciences sector are higher than most (see Table 1), 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<sup>73</sup> - meaning, there are various avenues to enter careers in this sector.

<sup>67</sup> JLL Research, *Life Sciences Outlook 2018*.

<sup>68</sup> Business data for the Sacramento region (that fall within Life Sciences NAICS codes in Appendix) includes 373 companies, predominantly small (6-19 employees).

<sup>69</sup> This is slightly misrepresentative of the sector's concentration for next-generation therapy development because, in addition to biopharmaceuticals (the focus of the market analysis), this analysis also includes lab instrument/supply manufacturers for medical devices. The LQ for biopharmaceuticals is anticipated to be higher than 0.97.

<sup>70</sup> NIH, "Racial Disparities in NIH Funding," accessed October 1, 2019, <https://diversity.nih.gov/building-evidence/racial-disparities-nih-funding>

<sup>71</sup> Qualitative analysis of the 35 PIs on the largest Davis-Sacramento region NIH grants

<sup>72</sup> Data source: 2018 BLS data for "Pharmaceutical and medicine manufacturing" (NAICS 3254). NAICS 3254 is the area of Life Sciences experiencing the most growth.

<sup>73</sup> TEconomy Partners, *Driving Innovation and Economic Growth for the 21<sup>st</sup> Century*.



**Table 1: Life Sciences in Sacramento MSA, employment data summary**

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

Source: Mass Economics and RW Ventures, LLC analysis of data from U.S. Census Bureau, County Business Patterns; Bureau of Economic Analysis, Input-Output Accounts; Bureau of Labor Statistics Employment Projections

Large firms in the greater Sacramento region include Genentech (pharmaceuticals),<sup>74</sup> 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).<sup>75</sup> 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 (e.g., Environmental Science Associates, Vacuum Process Engineering).<sup>76</sup> 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.<sup>77</sup>

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.<sup>78</sup> UC Davis has several research centers and projects focused on innovations in

<sup>74</sup> Reportedly, Genentech may be expanding its production and entrepreneurship support activities and could be a key partner in the Life Sciences initiatives in this report. Confidential interviewee, interview by RW Ventures, phone, October 16, 2019.

<sup>75</sup> 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.

<sup>76</sup> Firms with over 25 employees at a single site.

<sup>77</sup> UC Davis' Venture Catalyst program; UC Davis-HM.CLAUSE Life Science Innovation Center - with biochemistry, molecular biology and chemistry lab space, and 1,800 ft<sup>2</sup> 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.

<sup>78</sup> CBRE Research, 2019 US Life Sciences Clusters.

treatment. They reported 34 therapeutics patent disclosures in FY 2016-2017,<sup>79</sup> and several of their largest NIH grants fund studies related to cell and gene therapy.<sup>80</sup> This area of focus is supported by Davis' GMP Laboratory<sup>81</sup> and is likely to grow with plans for a new Gene Therapy Center.<sup>82</sup>

In addition, UC Davis' Aggie Square innovation district, located in Sacramento, will add major capacity to this sector, with potential to catalyze Sacramento's position in Life Sciences, particularly with respect to cell and gene therapy (in addition to three other focus areas in digital health, medical devices, and neuroscience). 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.<sup>83</sup> Phase 1, to be developed by Wexford Science & Technology and GMH Capital Partners, will include approximately 1 million square feet to support: life sciences, technology and engineering; lifelong learning; food and health.<sup>84</sup> 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.<sup>85</sup>

Sacramento has access to a highly skilled workforce, trained by institutions such as UC Davis<sup>86</sup> and California State University Sacramento (Sac State), to support growth in Life Sciences. Sacramento is one of the top 20 markets for new Life Sciences talent (ranked 15<sup>th</sup>), 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,<sup>87</sup> 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

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<sup>79</sup> Greater Sacramento Economic Council, *Innovation Analysis* report, provided to authors by GSEC.

<sup>80</sup> Data was obtained from the NIH project database: <https://projectreporter.nih.gov/>. Active grants over \$1 million were analyzed.

<sup>81</sup> UC Davis Health, "UC Davis Good Manufacturing Practice Laboratory," accessed July 30, 2019, <https://health.ucdavis.edu/stemcellresearch/gmp/>.

<sup>82</sup> 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>.

<sup>83</sup> 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>.

<sup>84</sup> UC Davis, "UC Davis Selects Development Partner for Aggie Square," accessed March 30, 2020, <https://www.ucdavis.edu/news/uc-davis-selects-development-partner-aggie-square/>.

<sup>85</sup> UC Davis Center for Regional Change. *Developing Productive and Equitable Community-University Partnerships for Aggie Square*, Online Publication: UC Davis CRC, 2019.

<sup>86</sup> 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 UC Davis; MIND Institute Intellectual and Developmental Disabilities Research Center.

<sup>87</sup> Including facilities such as Sacramento Medical Center, Kaiser Permanente, Dignity Health, UC Davis Medical Center, CA Northstate University College of Pharmacy and Sutter Health.

(several hundred patients, to test effectiveness of a drug),<sup>88</sup> 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 that conduct 22%, 17%, 12%, and 7% respectively.<sup>89</sup> Emerging Life Sciences clusters in locations with comparable populations to Sacramento (Minneapolis, Pittsburgh, Atlanta) also conduct more clinical trials (6%, 7%, 9% respectively),<sup>90</sup> but areas like Fresno, California – not an emerging or leading cluster, conduct 1%.<sup>91</sup> 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.<sup>92</sup>

### *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.<sup>93</sup> 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,<sup>94</sup> and Sacramento has the space availability to provide this resource.

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

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<sup>88</sup> High-level summary of the clinical trial phases:

- Preclinical – determine the safe dose; often involves animal testing (approx. 1 in every 5000 compounds in this phase later becomes an approved drug)
- Phase 0 - few small doses of a new drug in a few patients
- Phase I - find the highest dose of the new treatment that can be given safely without serious side effects
- Phase II – approx. 25 -100 patients receive a dose to assess whether patients benefit
- Phase III – several hundred patients receive the new drug to compare results against existing drugs
- Submission for FDA approval

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.

<sup>89</sup> 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%).

<sup>90</sup> Data was obtained from the NIH clinical trial database: <https://clinicaltrials.gov/ct2/home>.

<sup>91</sup> Data was obtained from the NIH clinical trial database: <https://clinicaltrials.gov/ct2/home>.

<sup>92</sup> Confidential interviewee, interview by RW Ventures, phone, August 20, 2019.

<sup>93</sup> CBRE Research. *2019 US Life Sciences Clusters*; Deloitte. *2019 Global Life Sciences Outlook*.

<sup>94</sup> 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.

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 Ag-Tech section). Firms such as Bayer Crop Science<sup>95</sup> (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-Biotech”) sector (e.g., developing microbial solutions to agricultural challenges).<sup>96</sup> 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.<sup>97</sup> This is assisted by research efforts in synthetic biology, which has both pharmaceutical and agricultural applications<sup>98</sup> – as well as energy applications (for instance, creating biofuels – see Clean Economy section). 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 mapping and precision nutrition.<sup>99</sup> Access to specialty crops and greenhouses in the region can assist in testing Ag-Biotech products, and as a benefit to the region, many of these products may reduce future healthcare costs.

Some of the market observations – such as 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. However, additional work is necessary to understand this potential, including exploring practical synergies with the Life Sciences cluster. Aggie Square includes a focus on digital health.

The LQ 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

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<sup>95</sup> A division of Bayer’s Biologics group focused on innovative biological pest management solutions; <https://www.cropscience.bayer.us/who-we-are/locations/sacramento>

<sup>96</sup> Through of genetic engineering, molecular markers, molecular diagnostics, vaccines, and tissue culture

<sup>97</sup> 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>.

<sup>98</sup> 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/>.

<sup>99</sup> 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>.

Sacramento beyond Series A funding rounds.<sup>100</sup>

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,<sup>101</sup> building this capability in the Sacramento region will not only grow the local cluster but also bring in revenue from other regions looking for space to manufacture complex biologics. In addition, 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,<sup>102</sup> shared spaces,<sup>103</sup> and manufacturing initiatives, Sacramento may need to augment its current funding with greater VC<sup>104</sup> 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,<sup>105</sup> thereby improving the inclusivity of the cluster.<sup>106</sup> Together, these interventions will assist in turning early-stage R&D into manufacturing and related commercial enterprises and scaling them up.

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## Clean Economy

### Cluster Definition

The Clean Economy is “economic activity... that produces goods and services with an environmental benefit or adds value to such products using skills or technologies that are uniquely applied to those products.”<sup>107</sup> The Clean Economy represents a variety of industries and is not considered a cluster itself; it employs over 2.7 million workers,<sup>108</sup> spread across diverse industries (26% of which are involved in manufacturing).<sup>109</sup>

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<sup>100</sup> 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.

<sup>101</sup> Deloitte, *2019 Global Life Sciences Outlook*.

<sup>102</sup> 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*.

<sup>103</sup> Lack of lab space, particularly wet lab space, has been noted in interviews as a challenge.

<sup>104</sup> 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*.

<sup>105</sup> Interviews with large companies and start-ups indicated a willingness to hire certificate-holders and even help with developing a certificate program.

<sup>106</sup> Solano Community College’s biotech certificate program is an example: <http://www.solano.edu/biotech/>.

<sup>107</sup> Muro, Mark, Rothwell, Jonathan, and Devashree Saha, *Sizing the Clean Economy: A National and Regional Green Jobs Assessment*, Online Publication: The Brookings Institution, 2011.

<sup>108</sup> Muro et al., *Sizing the Clean Economy*.

<sup>109</sup> Muro, Mark, Tomer, Adie, Shivaram, Ranjitha, and Joseph Kane, *Advancing Inclusion through Clean Energy Jobs*, Online Publication: The Brookings Institution, 2019.

Instead, it is comprised of several sub-sectors (e.g., Brookings identifies 39),<sup>110</sup> each representing an area that, with the right synergies, can begin to develop into a promising cluster. While established and universal definitions for the Clean Economy and the sectors that comprise it do not exist, various methodologies have been used to segment the Clean Economy into seven sectors, four of which will be examined in this report (see Appendix 5 for more detail):

1. Renewable Energy
2. Energy and Water Efficiency
3. Environmental Compliance and Education
4. Recycling and Waste Reduction

Of these four sectors, Renewable Energy has the greatest potential to grow the economy. In Sacramento, the Energy and Water Efficiency sector is comprised of firms in the architecture, engineering and construction industries that design and install energy-efficient spaces but do not make products (e.g., sensors that monitor and reduce energy and water use). Statewide efforts to identify new career pathways and skillsets within the Energy, Construction and Utilities may grow opportunities within the Energy and Water Efficiency sector moving forward – although, these are likely to overlap with career pathways in Renewable Energy cluster.<sup>111</sup> The Environmental Compliance and Education sector – the largest in Sacramento, in terms of number of firms – focuses on professional, governmental services (often regulatory). The Recycling and Waste Reduction sector is comprised of recycling haulers, facilities, and remediation services. As these three sectors are less tradeable and demonstrate lower potential for growth, they are considered supporting industries throughout the analysis.

Therefore, the market analysis will focus on the Renewable Energy (or, Clean Energy) sector to assess trends and identify emerging opportunities for Sacramento.<sup>112</sup> Renewable Energy “includes establishments that focus on producing, distributing, and installing technologies, which harness, generate, store, and distribute renewable sources of energy” including solar, wind, waste-to-energy, biofuels/biomass, hydropower, and geothermal.<sup>113</sup>

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<sup>110</sup> Muro et al., *Sizing the Clean Economy*.

<sup>111</sup> California Community Colleges, “Energy, Construction & Utilities,” accessed April 20, 2020, <https://www.ecusector.com/>

<sup>112</sup> For an example of a similar analysis, see: RW Ventures & Innovation Network for Communities, *The Chicago Region’s “Green” Economic Opportunities*, Online Publication: Metropolis Strategies, 2012.

<sup>113</sup> Centers of Excellence, Los Rios Community College District, Valley Vision, and Burris Service Group, *Clean Economy Cluster: Workforce Needs Assessment*. Online Publication: Centers of Excellence, 2016.

## Market Observations

Global investment in Clean Energy in 2018 was \$332 billion, led by Europe and China and followed by the United States.<sup>114</sup> Globally, VC and private equity investments in Clean Energy rose 127%, from \$7.3 to \$9.2 billion,<sup>115</sup> predominantly focused on electric vehicles.

In the United States, new investments in Clean Energy are mostly in wind, closely followed by solar, driving notable increases in utility-scale wind and solar electricity generation.<sup>116</sup> Declining costs of wind/solar generation, improved battery storage technology, and improvements in renewable integration into the grid assisted in driving growth in 2018 and this trend is expected to continue.<sup>117</sup>

In addition, emerging trends that are expected to drive growth include:

- **Corporate procurement and investment** - Increases in corporate procurement of renewables,<sup>118</sup> partially in response to state mandates, are driving demand for clean energy. Large companies – such as oil and gas companies – are investing in renewables to diversify their portfolios.<sup>119</sup>
- **Improvements in energy storage and technology** - Combining renewables with energy storage improves their ability to compete with conventional technologies,<sup>120</sup> and prevents intermittency in power supply. Storage is anticipated to be a “core component of all new energy technologies moving into the future.”<sup>121</sup>
- **Improved manufacturing skills** - The advanced nature of clean energy technologies will increase demand for new manufacturing skill sets.

As electric power grids modernize to include renewable energy, renewable energy storage product deployment is growing, partially in response to declining costs of batteries.<sup>122</sup> Battery storage in particular has multiple applications, value streams, and business models, enabled by technological advances in areas such as AI, blockchain, and predictive analytics.<sup>123</sup>

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<sup>114</sup> “Investment in renewable energy excluding large hydro-electric projects, but including equity-raising by companies in smart grid, digital energy, energy storage and electric vehicles.” While this represents an 8% decline from 2017, this is largely due to reduced costs of solar panel construction. BloombergNEF, “Clean Energy Investment Exceeded \$300 Billion Once Again in 2018,” accessed April 1, 2019, <https://about.bnef.com/blog/clean-energy-investment-exceeded-300-billion-2018/>.

<sup>115</sup> BloombergNEF, “Clean Energy Investment Exceeded \$300 Billion Once Again in 2018.”

<sup>116</sup> Marlene Motyka, *2019 Renewable Energy Industry Outlook*, Online Publication: Deloitte, 2019.

<sup>117</sup> Motyka, *2019 Renewable Energy Industry Outlook*.

<sup>118</sup> 204 companies have committed to transition to 100% renewables. RE100, “Companies,” accessed October 13, 2019, <http://there100.org/companies>.

<sup>119</sup> Motyka, *2019 Renewable Energy Industry Outlook*.

<sup>120</sup> Motyka, *2019 Renewable Energy Industry Outlook*.

<sup>121</sup> Forbes, “6 Renewable Energy Trends to Watch in 2019,” accessed April 15, 2019,

<https://www.forbes.com/sites/jamesellsmoor/2018/12/30/6-renewable-energy-trends-to-watch-in-2019/#7ac7fe9c4a1f>

<sup>122</sup> Deloitte Center for Energy Solutions, *Supercharged: Challenges and Opportunities in global battery storage markets*, Online Publication: Deloitte, 2019.

<sup>123</sup> For example: US-based Stem uses a platform to use AI “to dispatch and reconfigure a network of batteries” quickly, allowing them to “better manage their energy decisions and avoid demand charges – all without manual intervention such as turning off heating, ventilation, and air conditioning systems and lights,” along with services for utilities and grid operators to offset capacity shortfalls. Deloitte Center for Energy Solutions, *Supercharged*.



Clean energy jobs, although growing nationally, are unequally distributed; for instance, women account for about 25% of energy efficiency and solar jobs, African Americans account for 8% of energy efficiency jobs and 7% of solar jobs.<sup>124</sup> Gender and racial inequalities continue at the occupational level; for instance, in the solar industry, executive-level positions are, on average, 88% white and 80% men.<sup>125</sup> Surveys indicate that women, particularly women of color, feel that the established networks within the industry are a barrier to inclusion and would value informal and formal mentorship (only offered by 37% of firms) to navigate the solar industry.<sup>126</sup> Looking more broadly at the utility industry – nationally, it is comprised of 21% women, and racial breakdown is: 86% white, 9% Black, 3% Asian and 11% Hispanic. Black, Asian, and Hispanic populations all fall below the national averages (of 23%, 6%, and 17%, respectively). Workers in Clean Energy earn higher wages than other industries by 8 to 19% - and in general jobs have lower educational requirements (but greater science/technical skills) than other industries nationally.<sup>127</sup>

### *Sacramento's Assets and Market Position*

Sacramento is ranked 20<sup>th</sup> of 75 cities in Clean Energy rankings, taking into account local government operations, community-wide initiatives, building policies, energy and water utilities, and transportation policies.<sup>128</sup> As of 2017, the Clean Energy sector employs 16,376 (44% growth since 2010 and projected to continue).<sup>129</sup> It has a LQ of 1.06, a 16% growth since 2010 (see Table 2). Jobs in this sector often require substantial science/technical knowledge and skills rather than degree requirements (42% are accessible without a high school degree) and therefore have lower barriers to entry.<sup>130</sup> Although skills-based hiring has the potential to increase diversity in the sector by increasing recruitment pathways, as mentioned above, this is not enough. To combat national trends showing disparities in gender and race within the Clean Energy sector, recruiting from outside established networks will be important.

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<sup>124</sup> Ribeiro, David, Samarripas, Stefen, Tanabe, Kate, Bastian, Hannah, Cooper, Emma, Drehobl, Ariel, Vaidyanathan, Shruti, Jarrah, Alexander and Mary Shoemaker, *The 2019 City Clean Energy Scorecard*, Online Publication: ACEEE, 2019.

<sup>125</sup> The Solar Foundation and SEIA, "US Solar Industry Diversity Study 2019," accessed November 8, 2019, <https://www.thesolarfoundation.org/wp-content/uploads/2019/05/Solar-Industry-Diversity-Study-2019-2.pdf>.

<sup>126</sup> The Solar Foundation and SEIA, "US Solar Industry Diversity Study 2019," accessed November 8, 2019, <https://www.thesolarfoundation.org/wp-content/uploads/2019/05/Solar-Industry-Diversity-Study-2019-2.pdf>; IEA, "Commentary: Addressing the diversity challenge in energy sector recruitment," accessed November 8, 2019, <https://www.iea.org/newsroom/news/2019/july/addressing-the-diversity-challenge-in-energy-sector-recruitment.html>.

<sup>127</sup> Muro et al., *Advancing Inclusion through Clean Energy Jobs*.

<sup>128</sup> Ribeiro et al., *The 2019 City Clean Energy Scorecard*.

<sup>129</sup> The broader Clean Economy industry employs 50,720 (18% growth since 2010).

<sup>130</sup> Muro et al., *Sizing the Clean Economy*.



**Table 2: Clean Energy in Sacramento MSA, employment data summary**

Clean Energy (Renewable Energy)			
	2017	% Change, 2010-2017	% Change, 2017-2027 (projected)
<i>Sacramento MSA</i>			
Employment	16,376	44%	18%
LQ	1.06	16%	n/a
Output (\$ Billions)	\$3.4	n/a	n/a
Output per Employee	\$210,264	n/a	n/a
Average Wage	\$69,155	n/a	n/a
% Jobs Accessible with HS degree or less	42%	n/a	n/a

Source: Mass Economics and RW Ventures, LLC analysis of data from U.S. Census Bureau, County Business Patterns; Bureau of Economic Analysis, Input-Output Accounts; Bureau of Labor Statistics Employment Projections

The greater Sacramento region’s Renewable Energy sector includes 776 companies,<sup>131</sup> predominantly small (6-19 employees). Looking specifically at tech-focused companies within the Renewable Energy sector (CleanTech), 26 of 83 specialize in alternative energy equipment, nearly all focusing on solar PV systems with just a few focusing on wind power.<sup>132</sup> Examples of renewable-focused headquarters with over \$10 million in revenue include companies focused on solar PV systems and their installation, as well as biomass.<sup>133</sup> Large Sacramento-based firms that support the renewable energy sector are predominantly trade contractors (that install efficient energy equipment) and electric transmission and distribution companies. Growing, innovative firms include Lucent Optics (technology to trap sunlight in solar cells), Terzo Power (compact hydraulic systems), Empower Energy (solar-storage technology), and Sierra Energy (gasification). Biomass electric power generation has a very high LQ (19.8) compared to the nation and therefore is already a significant economic activity,<sup>134</sup> likely due to proximity to agricultural by-products.<sup>135</sup>

The largest company in the sector is the Sacramento Municipal Utility District (SMUD), whose voluntary demand for renewable energy provides a strong base for Sacramento’s continued investment in clean energy. SMUD’s Innovation Generator program partners with companies that have developed energy monitoring projects and connects them to their smart grid (in exchange for a licensing fee). The sector is also supported by the Environmental Compliance and Education sector (1,138 companies), Energy and Water Efficiency sector (649 companies)

<sup>131</sup> Clean Economy NAICS businesses, Excel document: June 2019, provided by Greater Sacramento Economic Council.

<sup>132</sup> Such as - Frontier Wind, Greenwave Energy, ReVair Wind. The referenced list includes 83 CleanTech companies in the Sacramento region, categorized into 24 ‘primary industry codes’, the largest of which is Alternative Energy Equipment (26 companies). Clean Energy Companies, Excel document: June 2019, provided by Greater Sacramento Economic Council [downloaded from PitchBook on 6/14/2019; US Metro Area (CSA): Sacramento-Roseville].

<sup>133</sup> SMA America (PV systems), Sunworks (solar installation), SunSystem Technology (solar installation) and Greenleaf Power (renewable energy, biomass).

<sup>134</sup> Parilla et al., *Charting a Course to the Sacramento Region’s Future Economic Prosperity*.

<sup>135</sup> Agricultural waste can be converted to energy, or enriched soil can be created to enhance agriculture outputs.

and Recycling and Waste Reduction sector (145 companies).<sup>136</sup> The significant presence of compliance-focused companies is not surprising, given that state capitals have a disproportionate share of clean jobs in the public sector.<sup>137</sup>

Sacramento has start-ups, academic institutes and networks to support the growth of the renewable energy sector. Start-ups in the clean-tech and sustainability sectors more generally comprise about 8% of start-ups in Sacramento.<sup>138</sup> Renewable-focused start-ups have been emerging, particularly in innovative energy storage through battery packs, flywheels, and solar panels.<sup>139</sup> Growth in early-stage companies is supported by CleanStart, a nonprofit that accelerates the development of Northern California clean-tech ventures by strengthening the network by hosting clean-tech meetups, a business plan competition, and occasional courses.<sup>140</sup>

UC Davis' Energy and Efficiency Institute is the largest research institution in the sector; it has three research centers focused on efficiencies in lighting, water, and cooling. Individually these each have projects that address renewable energy, but the region does not have a renewable-focused research hub. The in-progress Sierra Energy Research Park will include both incubation and accelerator spaces for companies from a variety of sectors (medical devices, agricultural technology, robotics, unmanned vehicles and drones, renewable energy) and in addition to renewable energy more generally will test new applications for Sierra Energy's gasification technology.<sup>141</sup>

The regulatory environment in California also supports growth in this industry.<sup>142</sup> This, in addition to Sacramento's affordability as compared to the Bay Area, has increased international interest in Clean Energy investments (e.g., Finland, UK, New Zealand) and has increased state interest in facilitating these international partnerships with Sacramento.<sup>143</sup> In addition, there may be opportunities for economic growth in residential solar, given that solar panels will be

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<sup>136</sup> Clean Economy NAICS businesses, Excel document: June 2019, provided by Greater Sacramento Economic Council; In addition – of 85 clean-tech companies in the Sacramento region, majority fall into Renewable Energy and Energy and Water Efficiency categories. CleanStart, *Progress Report 2019: CleanTech*, Online Publication: CleanStart, 2019.

<sup>137</sup> Muro et al., *Sizing the Clean Economy*.

<sup>138</sup> StartupSac, "Sacramento Startup Directory," accessed October 1, 2019, <https://startupsac.com/sacramento-startup-directory/>.

<sup>139</sup> RePurpose Energy (re-uses Nissan battery packs for commercial energy storage), Empower Energy (battery system for homes), SPIN Systems (flywheels for energy storage), and Simpl Global (storage unit on back of solar panels). CleanStart, *Progress Report 2019*.

<sup>140</sup> Key CleanStart initiatives are: 6 clean-tech meetups per year; Startup Weekend (business plan competition); occasional courses (e.g., CEO Crash Course); partnership with BlueTech Valley.

<sup>141</sup> Sierra Energy, "About Sierra Energy," accessed August 12, 2019, <https://www.sierraenergy.com/company/about-sierra-energy/>.

<sup>142</sup> SB 100 - mandates 60% of power from renewable sources by 2030 (100% goal by 2045); SB 350 mandates 50% increase in building energy efficiency; SB 150 mandates reduction of GHG emissions 40% below 1990 levels by 2030 (requiring upgrades to regional transport and land use plans to meet it); SB 535 Disadvantaged Communities; AB 1550 Priority Populations; SB 1072 - directs the Strategic Growth Council (SGC) to facilitate the provision of technical assistance to communities that would like to be more competitive for the Cap and Trade funding through the creation of regional collaboratives by 2020. CleanStart, *Progress Report 2019*.

<sup>143</sup> Confidential interviewee, interview by RW Ventures, phone, October 11, 2019.

mandatory on all new homes in 2020 in California,<sup>144</sup> and considering just 15% of homes currently have solar.<sup>145</sup> The most in-demand renewable energy occupations in Sacramento are solar energy installation managers, solar photovoltaic installers and solar sales reps. There are five existing training programs in the region, at American River College, Sierra College, and UC Davis Extension, offering up-skilling in these areas.<sup>146</sup> The commercial opportunity is likely in renewable energy storage and corporate procurement of renewables, following national trends.

### *Assessment: Sacramento's Opportunities*

The highest-ranked Clean Energy clusters (taking into account local government operations, community-wide initiatives, building policies, energy and water utilities, and transportation policies) are in Boston, San Francisco, and Seattle, largely due to utilities working to increase their supply of renewables and, in Seattle's case, energy-efficient transit investments.<sup>147</sup> New clean energy investments in the US are mostly in wind, closely followed by solar, driving notable increases of utility-scale wind and solar electricity generation.<sup>148</sup> Although policy and public investment heavily influence the trends of this sector, creating somewhat unpredictable growth and decline, technological innovation in the sector is creating new value streams.

Sacramento's Clean Energy sector has innovative start-ups, established firms, and research institutions – but they do not interact synergistically to create a strong cluster. CleanStart is creating a network amongst emerging companies and additional capacity can assist in building an inclusive cluster organization in the Clean Energy cluster.

The region's leading opportunities are energy storage, as many emerging companies are innovating in this area and SMUD is incentivizing their growth – and biomass, as Sierra Energy's new research park will accelerate innovation in this area and the region has a very high LQ in this sub-sector indicating its potential to continue to lead nationally. Both areas present opportunities to supplement the region's energy needs. Energy storage enables renewable integration into the energy grid (e.g., SMUD is using battery storage to absorb renewable energy oversupply and expects that technological advances will increase battery storage support for renewable integration).<sup>149</sup> Biomass production presents an opportunity for the re-

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<sup>144</sup> California Energy Commission (CEC) adopted a rule (in Dec 2018) to have solar on all new homes in 2020, adding \$10,000 to upfront cost but reducing energy costs by \$19,000.

<sup>145</sup> Rachel Kaufman, "California will Require Solar panels on all New Homes," accessed April 2, 2019, <https://nextcity.org/daily/entry/california-will-require-solar-panels-on-all-new-homes>

<sup>146</sup> Centers of Excellence et al., *Clean Economy Cluster: Workforce Needs Assessment*.; A solar PV installer is projected to be the fastest growing occupation between 2016 and 2026 (Bureau of Labor Statistics), and pay is between \$39,490/year and \$53,880/year. Julia Parzen, "Opportunity and Needs Assessment: Using OZones to Accelerate an Equitable Clean Economy," Draft provided to RW Ventures, 2019.

<sup>147</sup> Ribeiro et al., *The 2019 City Clean Energy Scorecard*.

<sup>148</sup> Motyka, *2019 Renewable Energy Industry Outlook*.

<sup>149</sup> SMUD, *Draft SMUD IRP: Scenarios Summary Report*, 2018.

use of old processing plants as anaerobic processing plants<sup>150</sup> that produce energy to supplement the region’s energy needs.

Growing the energy storage and biomass sectors can be further accelerated by a focus on clean energy *manufacturing* within these sectors.<sup>151</sup> Sacramento is already working to grow its advanced manufacturing capabilities across several clusters. In particular, the CMC presents opportunities for cross-cluster initiatives that grow both the Clean Energy and Future Mobility sectors through battery storage improvements and high-tech manufacturing growth (see Future Mobility section). The CMC’s focus on electric vehicles (EVs) (cars, buses, trains) is supported by a Clean Energy policy environment that encourages growth of EVs and by incentives and cap and trade funding that are expected to further accelerate EV adoption.

Finally, the statewide regulatory environment supporting growth of residential solar creates demand for solar installation. This in itself is not a high-growth economic opportunity; however, if investments are made in solar installation, their focus should be on expanding solar installation training programs to include skills to move into higher-growth areas such as solar PV manufacturing and developing innovative solar storage systems. The City should continue to pursue programs to support California’s climate goals and green job growth. Sacramento launched one of the first Property Assessed Clean Energy (PACE) Financing programs with YGreene. Through the PACE framework, the program allows multiple providers to conduct energy efficiency and renewable energy retrofits, enabling over 4,500 projects, and over \$83 million in investment in clean energy, efficiency, and water-conservation improvements on private property. Programs, like PACE, support a variety of trades, professional, and business related careers with industry employers. Increasing the number of women and people of color in programs like this can be done with recommendations presented in the Human Capital/Labor Markets section.

The Clean Energy sector has significant activity – in research institutions, start-ups, and firms. CleanStart is laying initial groundwork to unite early-stage companies, both to share resources and to provide scale-up support. However, the nonprofit does not have the funding or capacity to build significant momentum within this cluster to accelerate its growth. The Clean Energy sector is still somewhat fragmented and would benefit from more deliberate collaboration, bringing together major stakeholders within Clean Energy (as well as related industries: Energy and Water Efficiency, Environmental Compliance and Education, Recycling and Waste Reduction).



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<sup>150</sup> Anaerobic processing breaks down animal and plant waste to produce energy from methane and other by-products. Per interviewees, the process is zero emission and can a sustainable electricity and heat source.

<sup>151</sup> Manufacturing already has a strong presence in the Clean Economy sector - making up about quarter of Clean Economy jobs nationally.

## Future Mobility

### 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.<sup>152</sup> This area is projected to experience substantial sales growth and product expansion<sup>153</sup> 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.<sup>154</sup> As a nascent cluster, future mobility does not have an established definition. For the purposes of this report, the cluster is defined as the sectors that employ cutting edge technology to generate mobility options that are more time and space efficient and environmentally friendly (See Appendix 6 for additional detail). Specifically, it encompasses advances in:<sup>155</sup>

- **Connected** – Transportation that connects to external systems using the internet, facilitating advanced features like global positioning systems (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 artificial intelligence (AI) capabilities.<sup>156</sup>
- **Shared** – Transportation modes or services that users share. Within future mobility, this often refers to ride-sharing, car-sharing, shared rideables (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).<sup>157</sup>
- **Electric** – Modes of transportation that rely on electricity or clean energy and the associated infrastructure (e.g., charging stations).

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<sup>152</sup> 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>

<sup>153</sup> 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.

<sup>154</sup> McKinsey Center for Future Mobility, “Autonomous Driving,” accessed June 25, 2019,

<https://www.mckinsey.com/features/mckinsey-center-for-future-mobility/overview/autonomous-driving>.

<sup>155</sup> McKinsey Center for Future Mobility, “Autonomous Driving,”

<sup>156</sup> 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.”

<sup>157</sup> 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/>

## Market Observations

Future Mobility market projections have a significant margin of error due to several factors: rapidly advancing technologies, traditional production processes' ability to respond to and leverage those technologies (including adjustments to the supply chain), and regulatory and policy responses to accommodate new mobility developments. Despite the uncertainty in market projections, the combination of the following four markets predicts significant growth in Future Mobility:

- **Connected** – The connected mobility market is expected to experience 19% CAGR between 2018 and 2023.<sup>158</sup> The market is diverse and can be segmented in several different ways – for instance, by connection type (5G, Wi-Fi, Bluetooth) or by application (personal vehicle, commercial vehicle). About 470 million connected vehicles will be on the road by 2045.<sup>159</sup>
- **Autonomous** – High automation is expected between 2020 and 2022, with full automation projected to arrive by 2030, reaching a market value of \$127 billion by 2027.<sup>160</sup> However, past predictions have often proved inaccurate, and industry leaders have recently expressed skepticism about how soon fully autonomous vehicles (AVs) will be ready for market entry.<sup>161</sup> AVs will have applications beyond the movement of people to the movement of goods (e.g., delivery and logistics) and a significant tech-based supply chain will grow alongside vehicle development (e.g., high functioning sensors).
- **Shared** – In 2017, the global shared mobility market size was valued at approximately \$105 billion and projected to experience 25% compound annual growth rate (CAGR) between 2018 and 2025 to a value of \$620 billion (with the Asia-Pacific market taking the largest share).<sup>162</sup> While ride-hailing dominated the shared-mobility market in 2017, docked bike sharing is forecasted to experience the highest growth from 2018 to 2025<sup>163</sup> and dockless bike-sharing companies are re-focusing on e-scooters.<sup>164</sup>
- **Electric** – The electric vehicle market is expected to pass \$420 billion by 2025.<sup>165</sup> EV sales have risen from a few thousand in 2010 to over 2 million in 2018, and by 2040 it is predicted that 57% of all vehicle sales will be EVs.<sup>166</sup> This growth is due to declining

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<sup>158</sup> Reuters, "Connected Mobility Solutions Market 2019 Global Industry Size, Growth Analysis, Segmentation, Future Trends, Sales Revenue, Key Vendors by Forecast to 2027," accessed June 14, 2019, <https://www.reuters.com/brandfeatures/venture-capital/article?id=86407>

<sup>159</sup> <https://www.marketresearchfuture.com/reports/connected-mobility-solutions-market-871>

<sup>160</sup> McKinsey Center for Future Mobility, "Autonomous Driving."

<sup>161</sup> NY Times, "Despite High Hopes, Self-Driving Cars are 'Way in the Future'."

<sup>162</sup> Grand View Research, *Shared Mobility Market Size, Share & Trends Analysis Report By Vehicle, By Service Model, And Segment Forecasts, 2019-2025*, Online Publication: Grand View Research, 2019.

<sup>163</sup> For example, recently, LimeBike raised \$62 million in 2017 to expand operations. Grand View Research, *Shared Mobility Market Size*.

<sup>164</sup> National Association of City Transportation Officials, "84 Million Trips Taken on Shared Bikes and Scooters Across the U.S. in 2018," accessed June 15, 2019, <https://nacto.org/2019/04/17/84-million-trips-on-shared-bikes-and-scooters/>

<sup>165</sup> GlobeNewswire, "Electric Vehicle Market size to surpass \$420bn by 2025: Global Market Insights, Inc.," accessed June 3, 2019, <https://www.globenewswire.com/news-release/2019/05/17/1826635/0/en/Electric-Vehicle-Market-size-to-surpass-420bn-by-2025-Global-Market-Insights-Inc.html>

<sup>166</sup> BNEF, "Electric Vehicle Outlook 2019," accessed August 5, 2019, <https://about.bnef.com/electric-vehicle-outlook/>



battery pack costs, resulting from lower-cost materials achieving greater energy density and the lower assembly costs that come with increased production volume.<sup>167</sup> They are predicted to decline from a \$176 per kWh average in 2018 to \$62 per kWh in 2030.<sup>168</sup>

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.<sup>169</sup> Therefore, major auto manufacturers (Original Equipment Manufacturers or OEMs) have invested in ramp-up factories,<sup>170</sup> which assist in building first prototypes and beginning batch production, while simultaneously identifying suppliers and testing and validating new products. New mobility products contain a wealth of highly specialized components (e.g., high-voltage battery, fiber-reinforced plastic),<sup>171</sup> many of which have a “rising degree of individualization”<sup>172</sup> and are made by “numerous manufacturers with the necessary expertise.”<sup>173</sup> 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,”<sup>174</sup> (e.g., batch production for commercial use) making it difficult for them to become suppliers or major players in future mobility.<sup>175</sup>

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 engineers (with demand six times higher than the supply).<sup>176</sup> These jobs will require different skillsets<sup>177</sup> than present mobility systems,

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<sup>167</sup> Lutsey, Nic and Michael Nicholas, “Update on electric vehicle costs in the United States through 2030,” accessed October 5, 2019, [https://theicct.org/sites/default/files/publications/EV\\_cost\\_2020\\_2030\\_20190401.pdf](https://theicct.org/sites/default/files/publications/EV_cost_2020_2030_20190401.pdf).

<sup>168</sup> Lutsey and Nicholas, “Update on electric vehicle costs in the United States through 2030.”

<sup>169</sup> 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*.

<sup>170</sup> For example, the Audi pre-series center, the Daimler start-up factory in Sindelfingen and the VW Pilot Plant.

<sup>171</sup> Rudert, Steffen and Jens Trumpfheller, *Well Considered: The product development process*, Online Publication: Porsche Engineering.

<sup>172</sup> Steffen and Trumpfheller, *Well Considered*.

<sup>173</sup> Dörfer et al. *Ramp-Up Factory as Part of the California Mobility Center*.

<sup>174</sup> Dörfer et al. *Ramp-Up Factory as Part of the California Mobility Center*.

<sup>175</sup> 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*.

<sup>176</sup> 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>

<sup>177</sup> For instance, in artificial intelligence, machine learning, robotics, data sciences, and computer software.

demanding “cross-functional ‘tinkerers,’” rather than specialists for specific automobile parts.<sup>178</sup> 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.<sup>179</sup> Even today, around 55% of digital mobility workers have a high school diploma or less (as compared to 32% nationally).<sup>180</sup>

Areas like Silicon Valley, Boston, and Pittsburgh are poised to become future mobility job centers because of their strong retention of engineers and their technology institutes performing mobility research (that also enable skills-based training to grow a workforce of “cross-functional ‘tinkerers’”). Automobile manufacturing centers like Detroit may retain market share depending on industry investments in cultivating this new mobility workforce.<sup>181</sup>

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 coningle 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. For this reason, assessing inclusivity in employment is challenging. Using an over-inclusive definition of traditional mobility industries (raw materials, manufacturing, and professional and technical services at 3-digit NAICS codes), data reveals that there are significantly fewer women than the national average and fewer Black, Asian and Hispanic populations than national averages, with exceptions highlighted in Table 3. The Future Mobility sector is expected to grow with advances in mobility technology, meaning that, of the categories in the chart, “computers and electronic products manufacturing” and “professional and technical services” will become more dominant in the sector – and both have notably low levels of Black and Hispanic employees.

**Table 3: Gender and Race breakdowns in traditional-mobility-related sectors, nationally**

2018 BLS data							
Industry	NAICS (3-digit)	Total employed (in thousands)	Percent of total employed				
			Women	White	Black or African American	Asian	Hispanic or Latino
<i>Total, 16 years and over</i>		155,761	46.9	78.0	12.3	6.3	17.3
Primary metals and fabricated metal products manufacturing	331-332	1,680	17.2	85.7	7.9	3.2	15.5

<sup>178</sup> 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*.

<sup>179</sup> BCG, “Mobility and Automotive Industry to Create 100,000 Jobs, Exacerbating the Talent Shortage.”

<sup>180</sup> Brookings, “Equipping today’s AV workforce with skills to succeed tomorrow,” accessed November 7, 2019, <https://www.brookings.edu/blog/the-avenue/2019/01/31/equipping-todays-av-workforce-with-skills-to-succeed-tomorrow/>.

<sup>181</sup> BCG, “Mobility and Automotive Industry to Create 100,000 Jobs, Exacerbating the Talent Shortage.”



Machinery manufacturing	333	1,218	21.0	83.3	8.8	4.8	11.4
Computers and electronic products manufacturing	334	1,096	29.2	72.8	4.6	20.1	11.9
Electrical equipment and appliances manufacturing	335	402	31.2	75.4	12.4	9.6	12.3
Transportation equipment manufacturing	336	2,528	23.8	76.9	13.1	7.2	10.9
Plastics and rubber products manufacturing	326	526	26.2	78.0	14.5	3.9	15.0
Professional and technical services	541	12,105	42.2	79.0	6.6	12.1	8.7

Source: U.S. Bureau of Labor Statistics, Labor Force Statistics from the 2018 Current Population Survey

Given that the future mobility workforce is expected to be sourced based on skills, not degrees, there is tremendous opportunity for cities to grow a diverse workforce through training programs specifically focused on increasing the pipeline of women and people of color. Within California, the executive, managerial, professional, and sales workforce in the “computers and electronic products manufacturing” and “professional and technical services” sectors is largely white and Asian, while technicians, office workers, craft workers, operatives, laborers and series workers are largely Black and Hispanic.<sup>182</sup> New training programs and recruitment practices present an opportunity to shift this distribution for the future workforce.

The future mobility sector also provides significant opportunity for the construction trades. The 2019 Sacramento EV Blueprint prepared for the City by Frontier Energy noted that infrastructure to support zero emission vehicles (ZEV) will be the biggest source of ZEV jobs in the next five years. Given existing shortages and lack of representation in the trades, this also provides a significant workforce opportunity to increase the number of women and people of color.

### *Sacramento’s Assets and Market Position*

In Sacramento, traditional mobility companies – focused on raw materials, components manufacturing, research, systems operations, and retail – employ over 100,000, growing at a rate of 7% since 2010. A LQ 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

<sup>182</sup> Data sourced from: EEOC, 3D NAICS employment by sex, race, ethnicity.

degree or less (see Table 4). Market research indicates that different skillsets will be required for future mobility jobs, which is not accounted for in this data.

**Table 4: Mobility in Sacramento MSA, employment data summary**

Mobility			
	2017	% Change, 2010-2017	% Change, 2017-2027 (projected)
<i>Sacramento MSA</i>			
Employment	100,285	7%	7%
LQ	0.81	-14%	<i>n/a</i>
Output (\$ Billions)	\$21.9	<i>n/a</i>	<i>n/a</i>
Output per Employee	\$29,941	<i>n/a</i>	<i>n/a</i>
Average Wage	\$73,711	<i>n/a</i>	<i>n/a</i>
% Jobs Accessible with HS degree or less	33%	<i>n/a</i>	<i>n/a</i>

*Source: Mass Economics and RW Ventures, LLC analysis of data from U.S. Census Bureau, County Business Patterns; Bureau of Economic Analysis, Input-Output Accounts; Bureau of Labor Statistics Employment Projections*

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 electric rail manufacturing facility. Sacramento-based components manufacturers of over 25 employees include Mitsubishi Chemical Carbon Fiber and Composites, John Boyd Enterprises and Teeco Products. Supporting services include delivery, logistics, and engineering and infrastructure (e.g., CH2M Hill, AECOM, URS Group, Nolte Associates).

Several firms in the Sacramento area are shifting to focus on electric mobility, among them, Siemens, 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). Four scooter companies (Jump, Bird, Lime, Spin) are anticipated to add 1,000 scooters to the city, intended to provide a transportation alternative to low-income communities.<sup>183</sup>

Assembly of EVs largely fits into traditional automobile clusters but many of the sensing technologies for AVs require more specialized manufacturing expertise. There is potential to increase innovation in mobility through new partnerships with Sacramento-based tech companies (e.g., AT&T, Abacus, Verizon Business Network Services) or large engineering and manufacturing firms (e.g., Siemens, General Dynamics Mission Systems, System Integrators). Notable firms that have started to focus on AV technology include ThinCl, a rapidly growing start-up developing next-generation computing platforms with many applications, among them, autonomous driving.

<sup>183</sup> 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](http://www.sacbee.com/news/local/transportation/article231711563.html).

The regional cluster has several related research assets, including UC Davis automotive modeling research<sup>184</sup> and various UC Davis Institutes. Supporting institutions are also present that can assist in workforce development and sector growth. The city's Sacramento Urban Technology Lab (SUTL) framework is focused on enabling Sacramento to become a "living laboratory" in seven policy and tech-driven verticals (including Mobility). The Sacramento Valley Manufacturing Initiative (SVMI) is committed to developing the region's future manufacturing workforce, which has potential to train workforce to staff the future Ramp-Up Factory and its client companies (described below).

The major intervention that aims to grow Sacramento's future mobility sector is the CMC, also referred to as the Future Mobility Center, which plans to accelerate mobility innovation in all four future mobility markets.<sup>185</sup> The CMC's 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). The CMC builds on the Autonomous Transportation Open Standards Lab (ATOS), a public-private partnership developed to establish a demonstration environment for connected and autonomous vehicles. Originating from efforts of the City and State regulators, ATOS is designed to position the Sacramento region as a policy and standard setting leader by bringing regulators and autonomous transportation companies together to share best practices.

SMUD worked with two firms to complete feasibility studies connected to the CMC.<sup>186</sup> 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.<sup>187</sup> The CMC has now moved into the planning and implementation phase, which includes raising capital and identifying baseline technologies upon which to focus the CMC's market-building efforts.

The Ramp-Up Factory of the CMC will focus on hardware for high-tech appliances and future mobility solutions – and provide space for projects and start-ups 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

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<sup>184</sup> 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.

<sup>185</sup> Although not yet operational, it has secured \$15 million from SMUD on the condition that it raises \$50 million in funding commitments.

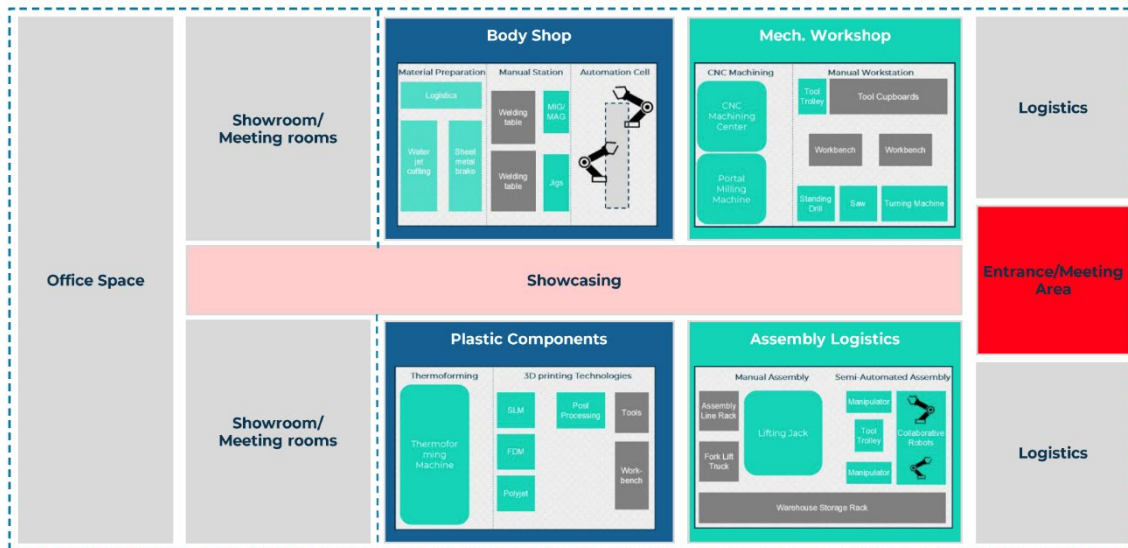
<sup>186</sup> Dörfer et al. *Ramp-Up Factory as Part of the California Mobility Center*.

<sup>187</sup> SMUD is working to raise capital to back startups developing new mobility technologies (through a fund managed by EnerTech). Adam Steinhauer, "SMUD to seed venture capital fund to back mobility technology startups," accessed October 5, 2019, <https://bit.ly/2oG7TkD>.

for start-ups, 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. 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.

The first phase of the factory (10,000-15,000 sf repurposed building; see Figure 5) will include machinery to enable a variety of products to be made, and the expansion phase (~53,000 sf new building, in proximity to the first phase building) will focus on the “parcels battery, electric motor and testing,” with machinery “more specific and tailored to high-tech applications.”<sup>188</sup> Sites have been proposed for these buildings, intended to be adjacent (to form a campus), but none have been selected. The expansion phase is yet to be defined and will be informed by scale-up needs and specializations identified during the first phase. Although the project timeline is not yet confirmed, 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.<sup>189</sup> Together, these functions will allow start-ups, SMEs, and OEMs to move more quickly from design to production-readiness.

**Figure 5: Diagrammatic layout of first phase of Ramp-Up Factory**



Source: PEM Motion

The region is also supported by a strong state-wide regulatory environment,<sup>190</sup> which creates incentives and can be an asset for companies developing innovative products that may require

<sup>188</sup> PEM Motion, *The Ramp-Up Factory as Part of the California Mobility Center*. Presentation.

<sup>189</sup> 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.

<sup>190</sup> In 2018, the State of California passed numerous pieces of legislation to aggressively curb carbon emissions, including: a

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.<sup>191</sup> 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%. Furthermore, a significant amount of AV research, development and testing is occurring in California.

Sacramento’s in-progress infrastructure support for future mobility includes a 5G Network, development of a smart grid, and charging stations (developed by companies like Clipper Creek). The region is prioritizing carbon reduction; on June 29, 2020 the Mayors’ Commission on Climate Change adopted their final report for achieving carbon zero by 2045 in Sacramento and West Sacramento,<sup>192</sup> which will be achieved in part by promoting shared and electric mobility to achieve carbon-free mobility.<sup>193</sup> As part of the 2040 General Plan Update, the City of Sacramento is updating their Climate Action and Adaptation Plan’s strategies for emissions reduction, several of which are mobility-related, encouraging increased biking, electric vehicle adoption, and public transit service. In 2017, the City adopted its first EV Strategy. This was the City’s first strategic action plan for EV and other zero-emission vehicle (ZEV) initiatives. The actions within the Strategy outline the trajectory for zero-emission mobility and will be initiated by 2020, with full implementation by 2025. The Strategy seeks to spur the use of ZEVs by calling for outreach programs, expanded charging infrastructure, new incentives and other activities.

In addition, SMUD has a goal of net-zero carbon emissions by 2030, which includes investments in charging stations.<sup>194</sup> Sacramento was designated as Electrify America’s (owned by Volkswagen) first “Green City,” which included deployment of two electric car-sharing services, installation of ten fast-charging depots, electric buses and micro-transit shuttles, and broad community outreach through a \$44 million nationwide pilot program.<sup>195</sup> 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.

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commitment to be carbon neutral by 2045, including 100% of its electricity coming from clean sources; funding to expand EV charging infrastructure; incentives for self-generated energy like wind, biogas, and fuel cells; easing of weight restrictions for commercial EVs; mandated approval of EV charging stations in rent-controlled properties; reference for carpool stickers to low-income drivers with EVs. Michael J. Coren, “California’s 2018 legislative blitzkrieg delivered its most ambitious climate policies ever,” accessed June 3, 2019, <https://qz.com/1409065/californias-2018-legislative-blitzkrieg-delivered-its-most-ambitious-climate-policies-ever/>

<sup>191</sup> SMUD, *California Mobility Center: Driving the Future of Electric Mobility*, Presentation.

<sup>192</sup> Mayors’ Commission on Climate Change, “Achieving Carbon Zero in Sacramento and West Sacramento by 2045” accessed September 29, 2020, <https://www.lgc.org/climatecommission/>.

<sup>193</sup> City of Sacramento, “Sustainable Mobility Now,” accessed November 7, 2019, [https://www.lgc.org/wordpress/wp-content/uploads/2018/09/Sacramento\\_Sustainable-Mobility-NOW.pdf](https://www.lgc.org/wordpress/wp-content/uploads/2018/09/Sacramento_Sustainable-Mobility-NOW.pdf).

<sup>194</sup> SMUD, *Draft SMUD IRP: Scenarios Summary Report*, 2018.

<sup>195</sup> Electrify America and City of Sacramento, “Electrify America and the City of Sacramento Announce New Zero-Emissions Car Sharing Programs, Zero-Emissions Shuttle Bus Routes and Electric Vehicle Charging Infrastructure,” accessed June 27, 2019, [https://www.electrifyamerica.com/sites/default/files/inline-files/Electrify\\_America\\_Sacramento\\_Green\\_City\\_Projects.pdf](https://www.electrifyamerica.com/sites/default/files/inline-files/Electrify_America_Sacramento_Green_City_Projects.pdf)

## *Assessment: Sacramento's Opportunities*

The CMC is poised to become 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 start-ups, SMEs, and OEMs (as well as suppliers). Sacramento has existing manufacturing strengths in both vehicle components and rail manufacturing,<sup>196</sup> 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. Start-ups 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 and Ramp-Up Factory will also grow manufacturing capabilities for clean energy initiatives (e.g., re-using car batteries for energy storage; prolonging battery lifetime; innovations in EV production). (See the Clean Economy Section for more detail on opportunities in these sectors). In addition, 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).<sup>197</sup>

Beyond readying new products for series production, the CMC has the opportunity to also 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).<sup>198</sup>

As a site has not yet been selected for the Ramp-Up factory, attention should be paid to selecting locations accessible to disadvantaged populations, to support inclusivity, in conjunction with diverse entrepreneurship and ownership support and tailored workforce training (all 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, specifically focused on increasing gender and racial diversity in the workforce. The CMC will be working with several local educational institutions including UC Davis, Sac State, and Los Rios

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<sup>196</sup> Confidential interviewee, interview by RW Ventures. Conversations with EV component-producing firms indicated that they are located in Sacramento to be near manufacturing.

<sup>197</sup> Confidential interviewee, interview by RW Ventures.

<sup>198</sup> 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/>.



Community College District and other stakeholders to develop student internship programs at the CMC and with high-growth future mobility companies, in addition to providing space for students to prototype or test thesis projects or start-up ideas.<sup>199</sup> Training programs will be both run by the CMC and by partner institutions. Los Rios Community College District 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).<sup>200</sup> 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 that outweighs the region's high labor costs, incentivizing companies to do business or locate in the region.<sup>201</sup>

Being the state capital, 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.

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## Agriculture and Food and Beverage Manufacturing

### *Cluster Definition*

The food system that encompasses the entire supply chain that generates the food we eat and beverages we drink is a vast, interconnected network that is not contained within a single cluster, but instead consists of several distinct, yet related, clusters (see Figure 6). Working literally from the ground up, the food system begins with agriculture production, which includes not just the farms that cultivate crops and ranches that raise livestock, but also the inputs into those operations, such as seeds, fertilizers and equipment. Agricultural outputs then feed into food and beverage manufacturing and packaging, where all manner of produce and

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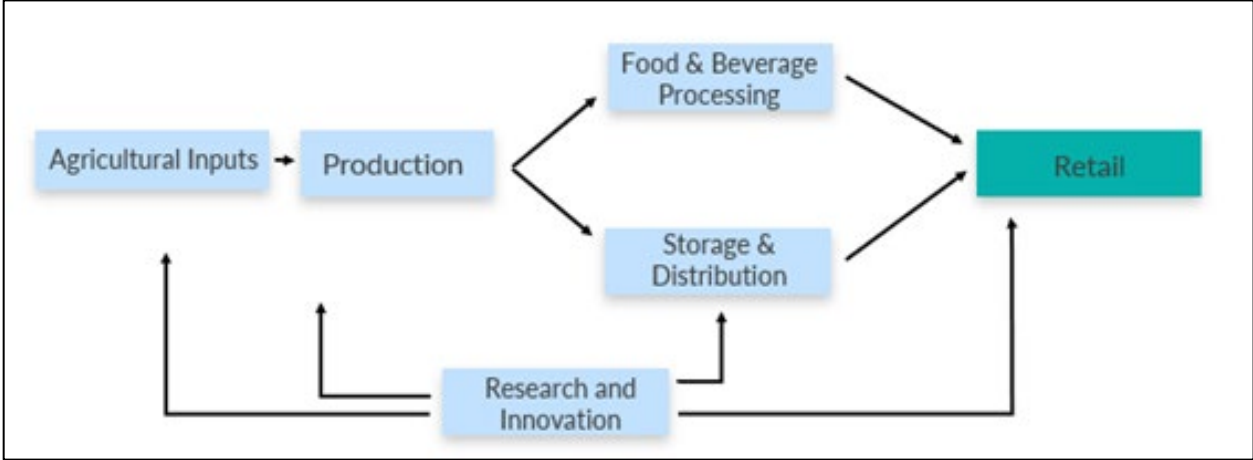
<sup>199</sup> PEM Motion, in their planning and implementation analysis, will “identify the baseline technologies to help articulate the value proposition more clearly to potential founding members and other members who will join the CMC.” PEM Motion, *California Mobility Center - Planning and Implementation Phase*. Proposal.

<sup>200</sup> Confidential interviewee, interview by RW Ventures.

<sup>201</sup> Average hourly wages in the Sacramento region (\$27.13) are about 9% above the nationwide average of \$24.98. US Bureau of Labor Statistics, “Occupational Employment and Wages in Sacramento-Roseville-Arden-Arcade – May 2018,” accessed April 20, 2020, [https://www.bls.gov/regions/west/news-release/occupationalemploymentandwages\\_sacramento.htm](https://www.bls.gov/regions/west/news-release/occupationalemploymentandwages_sacramento.htm). In California more broadly, “on rankings that emphasize low tax rates, affordable labor costs, and limited regulatory compliance as indicators of a competitive business environment, California typically ranks low, as it is a high-cost, regulation-heavy, and high-tax state.” Parilla et al., *Charting a Course to the Sacramento Region's Future Economic Prosperity*. For the full analysis, see: Kolko, Jed, Neumark, David and Marisol Cuellar Mejia, “Business climate rankings and the California economy,” *Public Policy Institute of CA*: 2011.

meats are processed and packaged into the products we eat and drink. Finally, the finished goods are delivered to consumers through food retail and restaurants. Thus, there are three primary clusters within the food system: agriculture production and farming, or *production*; Food and Beverage Manufacturing, or *manufacturing*; and food retail, or *retail*. While Sacramento has strengths across all three of these clusters, the focus of this analysis is on the manufacturing cluster because (1) it is traded and (2) the region has assets that can make it competitive in this space. There are also two especially interesting emerging opportunities within the production cluster worth deeper examination – digital farming and Ag-Biotech – that are traded, growing and becoming increasingly important to the overall food system (see Appendix 7 for more details).

**Figure 6: Clusters and Major Components within the Overall Food System**



*Food and Beverage Manufacturing*

*Market Observations*

The Food and Beverage Manufacturing industry is changing dramatically. National employment in Food and Beverage has increased significantly, rising 12% 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” products, such as gluten-free and allergen-free, or organic foods, others are interested in novel processed items, such as nutraceuticals and functional foods.

Counterbalancing the growing opportunities for smaller companies is a rise in vertical integration in connection to large retailers. Costco (with its chicken operation in Nebraska) or Walmart (with its dairy manufacturing operation in Indiana) 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 sources of their food.



Consumer desires to stall the aging process have increased demand in the functional food and beverages segment. No longer 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 2012.<sup>202</sup> The functional beverage market is primed to capitalize on this growth, as venture capital companies put more than \$170 million in functional beverage companies in the first eight months of 2018.<sup>203</sup>

Globally, generally increasing incomes will likely lead to a rise in demand for meat. As household incomes grow, so does their demand for greater food variety, leading to more purchases of higher-value and quality foods such as meat, eggs and milk rises, compared with plant-based food such as cereals. These changes in consumption, together with sizeable population growth, have led to large increases in the total demand for animal products, especially from developing countries, where total demand for animal products is expected to more than double by 2030.<sup>204</sup>

In this context, food and beverage companies are experiencing 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.<sup>205</sup>

Food and Beverage Manufacturing is a particularly attractive cluster from an inclusion point of view. Its employment structure and needs provide decent entry level jobs and good job ladders. Many jobs are open to individuals without college degrees; in fact, more than half the jobs require little more than a high school degree.<sup>206</sup> Workers of color have strong representation in the industry: in 2018, African American and Hispanic/Latino employees were 16% and 28% of the Food and Beverage Manufacturing workforce, respectively, compared to national employment figures of 12% and 17% across all industries. The cluster is slightly underperforming national statistics in terms of female employment, with women comprising only 39% of the cluster nationally, well below their proportion across all industries (47%).<sup>207</sup>

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<sup>202</sup> Technavio, "Functional foods and Beverages market by Product and Geography," accessed October 15, 2019, <https://www.technavio.com/report/global-non-alcoholic-beverages-global-functional-foods-and-beverages-market-2017-2021>.

<sup>203</sup> Cathy Siegner, "Functional Drinks are Playing the Claim Game," accessed October 15, 2019, <https://www.fooddive.com/news/functional-drinks-are-playing-the-claim-game/531143/>.

<sup>204</sup> Food and Agriculture Organization, *World Agriculture: towards 2015/2030: An FAO Perspective*, Online Publication: 2003, <http://www.fao.org/3/y4252e/y4252e07.htm>.

<sup>205</sup> For more detail, see: RW Ventures, LLC and IMEC, *Chicagoland FOOD: Seizing the Opportunity to Grow Chicagoland's Food Industry*.

<sup>206</sup> RW Ventures, LLC and IMEC, *Chicagoland FOOD: Seizing the Opportunity to Grow Chicagoland's Food Industry*.

<sup>207</sup> Data source: Bureau of Labor Statistics, 2018.

California’s balance of leadership by people of color in Food and Beverage Manufacturing employment is lagging. Hispanic and Latino populations comprise 65% of total Food and Beverage Manufacturing employees, yet they hold only 13% of executive/senior level positions. Women are only 24% of executive leadership, and African Americans represent only 6% of the entire Food Manufacturing workforce and less than 1% of its top positions.<sup>208</sup> Although these facts are disappointing, this weakness presents a major opportunity to improve inclusivity metrics, given national employment standards.<sup>209</sup>

The cluster is also promising with respect to other dimensions of inclusion. Industry restructuring creates accessible opportunities for entrepreneurs and SMEs, and nationally, firm ownership by people of color is already more prevalent than in most industries. In addition, food and beverage firms often locate in or near disadvantaged neighborhoods, on re-developed urban industrial land. Overall, the industry's growth is naturally creating opportunities for a broad range of people and places.

### Sacramento’s Assets and Market Position

Overall, there is moderate activity in the region’s Food and Beverage Manufacturing cluster. Food and Beverage Manufacturing contributes \$4.1 billion<sup>210</sup> to the Greater Sacramento economy and employs over 11,000 individuals, although its 2017 LQ was only 0.71. Employment in Food and Beverage Manufacturing is expected to grow 6% over the next ten years and, notably, 41% of jobs are accessible with a HS degree or less, which is within the top quartile of all clusters (see Table 5).

**Table 5: Food and Beverage Manufacturing in Sacramento MSA, employment data summary**

Food & Beverage Manufacturing			
	2017	% Change, 2010-2017	% Change, 2017-2027 (projected)
<i>Sacramento MSA</i>			
Employment	11,552	6%	6%
LQ	0.71	-11%	n/a
Output (\$ Billions)	\$4.1	n/a	n/a
Output per Employee	\$355,868	n/a	n/a
Average Wage	\$55,408	n/a	n/a
% Jobs Accessible with HS degree or less	41%	n/a	n/a

Source: Mass Economics and RW Ventures, LLC analysis of data from U.S. Census Bureau, County Business Patterns; Bureau of Economic Analysis, Input-Output Accounts; Bureau of Labor Statistics Employment Projections

<sup>208</sup> Beverage Manufacturing ethnicity employment data was unavailable at the State level.

<sup>209</sup> Data source: Equal Employment Opportunity Commission.

<sup>210</sup> Centers of Excellence, *Food and Agriculture: Cluster and Workforce Needs Assessment*, Online Publication: 2016, [https://www.sacog.org/sites/main/files/file-attachments/coe-los\\_rios\\_food\\_and\\_ag-web.pdf](https://www.sacog.org/sites/main/files/file-attachments/coe-los_rios_food_and_ag-web.pdf)

Six of the twenty largest food and agriculture businesses<sup>211</sup> in Greater Sacramento are food/beverage manufacturing companies, with revenue ranging between \$46 million and \$1.6 billion (Blue Diamond). Sacramento County leads all other regional counties in beverage manufacturing, with \$319 million in 2017 output. Yolo county, led by activity in the City of Woodland, had a beverage manufacturing LQ of 7.4 and output of \$104 million in 2017, and a food manufacturing LQ of 1.4 and output of \$676 million.

### Assessment: Sacramento's Opportunities

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.<sup>212</sup> Nevertheless, the region's transportation arteries and robust crop production means it has national distribution capabilities and access to raw material inputs. The region can leverage these resources to become a center for food manufacturing in value-added, higher quality products.

In addition, many of the specialty crops in the region are prime for manufacturing, including being lightly processed, frozen and/or dried to meet new consumer food preferences. These specialty crops include, for example, strawberries, pears, apples and walnuts. Also, UC Davis's research and development capabilities can serve as a source for new product ideas, assisting with producing new technologies in food innovation, nutraceuticals and food science. These assets combine to create opportunities to take advantage of the major shifts occurring in the food industry.

### Agriculture Production

While this Action Agenda analyzes the regional economy to produce the economic context for Sacramento, the bulk of the region's Agriculture Production activities occur well outside the city. Thus, little time is spent here on the production cluster. Two opportunities, however, have particular implications for the City and deserve mention.

### Digital Farming

Several global and regional trends are causing significant upheaval in the Agriculture Production cluster: climate change (causing rising temperatures, drought frequency and severity, and CO<sub>2</sub> levels; and depleting water resources), resource scarcity, pest and disease control, and population increases increasing global food demand.<sup>213</sup> These challenges and trends present

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<sup>211</sup> Blue Diamond, Sunsweet Growers, Farmers Rice Cooperative, Renaissance Food Group, GH Foods Ca, and Wilbur Packing Company.

<sup>212</sup> Valley Vision, *CEDs Prosperity Strategy*, Review Draft.

<sup>213</sup> The Ogallala Aquifer supplies 30% of U.S. irrigation groundwater. The aquifer is projected to be 60% depleted by 2060 - Steward, David R., Bruss, Paul J. , Yang, Xiaoying, Staggenborg, Scott A., Welch, Stephen M. and Michael D. Apley, "Tapping unsustainable groundwater stores for agricultural production in the High Plains Aquifer of Kansas, projections to 2110,"

major opportunities for technology-enabled solutions that can make farming operations more sustainable, efficient and productive. Seizing upon these opportunities is the emerging sector of Agricultural Technology (“Ag-Tech”).

Ag-Tech encompasses many different technologies that enhance productivity within agriculture production as well as throughout food systems (i.e., in manufacturing, distribution and retail as well), including novel farming systems, food innovation, agribusiness marketplaces, food traceability software and others. The region and city may have a unique opportunity to capitalize on the Ag-Tech category of digital farming.

Digital farming refers to utilizing specialized equipment, software and IT services to access crop, soil and air conditions and more broadly to move to the next generation of automation in farming. The Sacramento region is well-positioned to lead in this space given its assets. The area is home to the world’s largest patch of Class 1 soil, a classification that indicates it is amenable to growing nearly any kind of produce.<sup>214</sup> Plus, the region produces over 300 types of products. Notably, it is a leading producer of almonds, walnuts, rice and grapes,<sup>215</sup> and serves as California’s largest grower of apples and pears, and processor of tomatoes. This wide range of crops represents a varied set of scenarios in which digital farming start-ups can test and deploy new farming technologies. To do so effectively, the region’s lack of rural broadband access would need to be addressed.

In some cases the technologies related to digital farming – such as sensors and automated harvesters – overlap with future mobility technologies. The synergies between these two clusters can present opportunities for co-development of software and hardware that support the automation of vehicles across those two contexts.

### Agricultural Biotechnology and Biomass

Ag-Biotech, which includes food sciences, seed and vegetable sciences, and nutraceuticals, is an emerging field. The industry accounted for \$20 billion in 2015 and is expected to reach \$40 billion by 2022, growing at a CAGR of 10% from 2015 to 2022.<sup>216</sup>

The region has key assets in Ag-Biotech, including UC Davis, a national leader in research, patents and licenses in agriculture and biological sciences. More than thirty Ag-Biotech start-

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Proceedings of the National Academy of Sciences of the USA: 2013, <https://www.pnas.org/content/110/37/E3477>. Projections indicate that food production will need to increase 70% by 2050 to keep pace with the expanding population. Duss, Arne and Jonah Kolb, “Beyond the Hype: How Agriculture Technology Wins Customers and Creates Value”, AgFunder: 2016, <https://research.agfundernews.com/moorewarner/agtech-beyond-the-hype.pdf>.

<sup>214</sup> Emma Cosgrove, “Sacramento is Making Moves to become an AgTech Hub”, AgFunder: 2017, <https://agfundernews.com/sacramento-making-moves-become-agtech-hub.html>

<sup>215</sup> Greater Sacramento Economic Council, “Food and Agriculture Cluster Analysis”, data provided by GSEC to RW Ventures, LLC, 2019.

<sup>216</sup> Herald Keeper, “Agricultural Biotechnology Market 2018 Global Analysis, Industry Demand, Trends, Size, Opportunities, Forecast 2023,” accessed August 15, 2019, <http://heraldkeeper.com/news/science/agricultural-biotechnology-market-2018-global-analysis-industry-demand-trends-size-opportunities-forecast-2023-104490.html>

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).

Finally, the region's agricultural waste can be repurposed for energy production through biomass processing plants. This industry may also offer opportunities for the city as its supply chains overlap with other clusters and technologies in which the city is becoming competitive (see Clean Energy section for more information).

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## Headquarters and Business Services

Sacramento's strong concentration of business services firms that serve government clients represents an asset that could potentially be expanded upon. It is worth examining if this set of companies can pivot and expand their operations to serve and attract corporate headquarters.

### *Cluster Definition*

Headquarters and business services constitutes a different kind of cluster, known as a functional cluster.<sup>217</sup> In contrast to more traditional clusters, where the complementary economic activities which benefit from concentrating tend to be centered within an industry's supply chains – such as auto in Detroit or film in Hollywood – functional clusters reap benefits from concentrating complementary economic functions. In the increasingly global and knowledge-based economy transportation costs for goods and the costs of managing remotely have decreased, while the value of face-to-face interactions have increased. This has led many corporations to separate functions that previously needed to be in the same place, resulting in urban regions specializing in different parts of the production process.<sup>218</sup> For example, Boeing's manufacturing, headquarters and back-office functions are each in different cities.

The most common functional cluster is headquarters and the functions that serve them, from finance to commercial real estate. Being in proximity to other headquarters is itself attractive to corporations, as the headquarters benefit from exchanging information on market conditions, industry developments, international trade and so forth.<sup>219</sup> A larger presence of headquarters in turn attracts and is attracted by mutually reinforcing concentrations of business services, resulting in the emergence of this functional cluster. While the most common examples reflect clustering of the headquarters of large, multi-site corporations with a broad array of business services in larger urban regions, such as in Chicago, headquarters of mid-size multi-site firms and the businesses that serve them can concentrate in mid-size cities, such as Kansas City (see Appendix 8 for more detail).

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<sup>217</sup> See: Duranton, Gilles and Diego Puga, "From Sectoral to Functional Urban Specialization," Working Paper. National Bureau of Economic Research: August 2002, <https://doi.org/10.3386/w9112>.

<sup>218</sup> Stuart Rosenfeld, "Industry Clusters: Business Choice, Policy Outcome, or Branding Strategy?," *Journal of New Business Ideas and Trends*, 3(2): 2005.

<sup>219</sup> Lovely, Mary E., Rosenthal, Stuart S. and Shalini Sharma, "Information, Agglomeration, and the Headquarters of U.S. Exporters," *Regional Science and Urban Economics* 35(2), 167-91: 2005., <https://doi.org/10.1016/j.regsciurbeco.2003.09.002>.

## Market Observations

While the Sacramento region has a relatively strong concentration of business services, these companies tend to be focused on meeting the demands of the public sector, rather than corporate headquarters. For example, Sacramento exhibits relative strengths in legal services, business associations and professional organizations, activities that are regularly associated with lobbying. Sacramento is relatively weaker in services that are less needed by government, but likely to be demanded by corporate headquarters, such as advertising or management services. Regions that offer depth and diversity in business service providers allow corporate headquarters to find the precise expertise for their needs.<sup>220</sup> In addition, Sacramento is currently home to surprisingly few headquarters, as government is still its dominant industry. Major headquarters in Sacramento include Adventist Health, Vision Service Plan Global and Raley's.

Employment in the cluster has increased by nearly 30% since 2010 and is projected to continue growing in the future. Approximately one-third of the jobs in the cluster are accessible with a high school degree or less. However, the sub-clusters that are growing and accessible with that amount of education – such as repair and servicing and local trucking – are not strongly associated with corporate headquarters.

## Market Assessment

The impetus to assess this cluster was that Sacramento's concentration of largely government-serving business services firms might be pivoted to become the core of a headquarters and business services cluster. This repurposing of the city's business services does not appear to currently be viable, considering the focus of its existing business services companies; the small number of large, multi-site corporate headquarters in Sacramento; and additional challenges such as limited transportation options (to access customers and subsidiaries in other parts of the nation or world) and the relatively higher costs of doing business.

However, in the context of the overall strategy emerging in this Action Agenda, it is worth exploring further whether the concentration of business services in Sacramento may better align with the strategy to develop, attract and support high-growth, high-tech firms in the region. Specific sub-clusters that have a relatively strong presence in Sacramento that could pivot to support high-growth, high-tech firms in target industries include specialized design services (such as engineering services); IT services (such as custom computer programming); and legal services; among others.

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<sup>220</sup> Henderson, J. Vernon and James Davis, "The Agglomeration of Headquarters," Center for Economic Studies: 2004.

## Other Cluster Opportunities

In addition to the clusters analyzed above, there are many other promising opportunities emerging or that will emerge as Sacramento transitions.<sup>221</sup> Some of these will naturally grow alongside the clusters outlined above, either through direct interaction or indirectly through supply chains or related industries. Others warrant future analytical work to assess their potential for growth (and the targeted initiatives that could support this growth). A few of these opportunities are highlighted below.

### *Creative Economy*

When defining creative economies, it is vital to distinguish between the *creative industries* as a cluster-based economic growth opportunity, and a community's *creative (cultural) amenities* which help drive growth by improving quality of life. Of course, these subjects are related, as having vibrant creative industries leads to cultural amenities, and demand for creative amenities supports the market for creative industries. In the context of this economic growth Action Agenda, the focus is on creative industries; the role of amenities is addressed elsewhere. Much of the focus to date in Sacramento on building its creative assets has been on amenities rather than industries, though that work has noted the need to focus on the latter, and has recognized the substantial assets and opportunities in the creative industry community.<sup>222</sup>

Despite creatives and makers being the backbone of thriving neighborhoods and communities, too often they are not considered an important part of the economy or supported with the resources needed to unlock their potential for growth. Generations of creative entrepreneurs have contributed to cities' quality of life and culture beyond their direct operations. These locally grown businesses give unique identities to neighborhoods across the U.S. and are increasingly jumpstarting local economies. They also have economic impacts from wealth creation, increased productivity and innovation and job creation<sup>223</sup> (though their impacts in these areas are generally less than other traded industries).

Creative entrepreneurs hail from industries such as music, film and TV, jewelry, digital media, architecture, food, fashion and product design. The support infrastructure and ecosystem for the creative industries includes a community's social infrastructure, education and training, financial and business services, key public private places and spaces and festivals.<sup>224</sup> To support the growth of such industries, the City recently made a significant investment to establish and

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<sup>221</sup> These were not included in the analysis primarily because the project was tasked with going deeper on a specific set of priority clusters that were identified in previous work, but also because they are still emerging, do not represent a clearly defined cluster or critical mass of high potential assets yet, represent less inclusive growth potential, or were otherwise beyond the scope of this project.

<sup>222</sup> See: Sacramento Metropolitan Arts Commission, *Creative Edge*, Online Publication: 2018, <http://www.sacmetroarts.org/Creative-Edge-Plan>.

<sup>223</sup> Stu Rosenfeld, *Mississippi's Creative Economy: Study Realizing the Economic Potential of Creativity in Mississippi*, Online Publication: 2011.

<sup>224</sup> The Creative Economy ecosystem is outlined a diagram provided by Stu Rosenfeld.



staff the Sacramento Film Office, focusing additional resources on supporting expanded film activities in the city.

Further highlighting the economic importance of creative makers, more Americans are moving toward this sort of often independent employment. Perhaps even more importantly, 3.5 times more dollars stay in local economies when spent with a local independent maker or creative small business compared to national chain retailers.<sup>225</sup>

In music, performing arts, and video production alone employment in the Sacramento metro topped 1,500 employees in 2016.<sup>226</sup> The city has several assets that could provide a foundation for creative industry growth: robust food and agriculture industries (including being “America’s Farm-to-Fork Capital”), exceptional cultural strengths including one of the largest collections of community theaters in the state, and the Sacramento French Film Festival.<sup>227</sup> Sacramento’s amenities and natural beauty create potential to generate revenue as a film destination but a complex permitting process and lack of staff resources create challenges to growth in this industry.

Continuing to programmatically and financially support initiatives like the Creative Economy Pilot Project<sup>228</sup> and the City of Sacramento’s Creative Edge Cultural Plan<sup>229</sup> – and to take the next steps (referenced in the Creative Economy Plan) to focus more deeply on the dynamics of the creative industry cluster – can expand the region’s creative industries cluster strength. In particular, sophisticated, tailored business and finance support for artists and start-ups would assist in scaling up work in the creative industries – enabling small businesses to better align with market-based opportunities. While not likely as high-growth a tradable cluster as the others discussed, there is genuine economic opportunity here, and also very important ancillary benefits in building creative amenities. Also, this is a cluster that has diverse participation from the outset, low entry barriers and other features that offer strong opportunities for inclusion.

## Cannabis

Since California legalized the cannabis industry in 2016, the state has worked to redefine its relationship with marijuana and capitalize on this new market. Significant increases in tax revenue, job and income creation (both directly and indirectly), and reduction in law enforcement expenditures are some of the clearest economic benefits California is

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<sup>225</sup> Local multiplier data is based on nine separate 2012 studies from Civic Economics. Findings: an average of \$48 of local economic return per \$100 spent at independent retailers compared to \$14 per \$100 spent at national chain retailers.

<sup>226</sup> Harvard Business School and The US Economic Development Administration, “US Cluster Mapping Tool,” accessed October 9, 2019, [http://clustermapping.us/region/msa/sacramento\\_roseville\\_\\_arden\\_arcade\\_ca](http://clustermapping.us/region/msa/sacramento_roseville__arden_arcade_ca)

<sup>227</sup> The Next Web, “An Entrepreneurs Guide to Sacramento’s Startup Scene,” accessed October 9, 2019, <https://thenextweb.com/podium/2019/04/25/an-entrepreneurs-guide-to-sacramentos-startup-scene/>

<sup>228</sup> City of Sacramento, “Creative Economy Pilot Project,” accessed October 9, 2019, [http://www.cityofsacramento.org/-/media/Corporate/Files/Media/Creative-Economy-Fact-Sheet.pdf?utm\\_source=Friends+of+MOFIE&utm\\_campaign=bae704d2e8-](http://www.cityofsacramento.org/-/media/Corporate/Files/Media/Creative-Economy-Fact-Sheet.pdf?utm_source=Friends+of+MOFIE&utm_campaign=bae704d2e8-)

[EMAIL\\_CAMPAIGN\\_2017\\_11\\_06&utm\\_medium=email&utm\\_term=0\\_2479332284-bae704d2e8-89632427](http://www.cityofsacramento.org/-/media/Corporate/Files/Media/Creative-Economy-Fact-Sheet.pdf?utm_source=Friends+of+MOFIE&utm_campaign=bae704d2e8-EMAIL_CAMPAIGN_2017_11_06&utm_medium=email&utm_term=0_2479332284-bae704d2e8-89632427)

<sup>229</sup> Sacramento Metropolitan Arts Commission, *Creative Edge*.



experiencing.<sup>230</sup> California's total cannabis market is expected to earn about \$12.8 billion in 2019, an increase of more than 500% from 2018.<sup>231</sup> Local economies are getting a significant boost from an estimated 64,000 current jobs in the industry.<sup>232</sup> These jobs are projected to grow 20% by the end of 2019, encompassing jobs in growing, distribution, retail, manufacturing of secondary products and oversight and regulation.<sup>233</sup> With marijuana removed from the state's list of controlled substances, law enforcement and court costs have fallen, as have the social and economic impacts that criminal records have on former offenders after sentences are completed.

The Sacramento market has other advantages in this industry, including being such a strong center of agricultural production. Growing innovation in biopharmaceutical development (as discussed elsewhere) may intersect with the cannabis industry.<sup>234</sup>

Being America's largest cannabis market is attracting foreign investment, driving consolidation in California's cannabis industry, and threatening the viability of smaller businesses.<sup>235</sup> More broadly, this new industry is still in its "wild west" stage, and it is too early to determine how it will shake out as intense competition, consolidations and acquisitions occur. While diminishing in market share, the black market, with its avoidance of sales taxes, also still holds significant appeal to some consumers. With marijuana still illegal at the federal level, it can be challenging for start-ups to obtain financing. Local programs will need to continue to train new talent to meet the growing demand for workers in this industry.

While the City of Sacramento currently allows dispensaries, cultivation, manufacturing and testing in specific zones within the city, local businesses still face start-up and scaling challenges. The community is working to minimize these challenges by establishing programs to support the marijuana industry – most notably the social equity program Cannabis Opportunity Reinvestment and Equity (CORE). CORE assists applicants with licensing, navigating regulations and other aspects of the start-up process. The Sacramento Cannabis Industry Association also supports small businesses and serves as a voice for change, progress, and innovation. This too is a cluster that offers strong opportunities for inclusion.

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<sup>230</sup> Investopedia, "Economic Benefits of Legalizing Weed," accessed October 9, 2019, <https://www.investopedia.com/articles/insights/110916/economic-benefits-legalizing-weed.asp>

<sup>231</sup> The Sacramento Bee, "California's legal marijuana will outsell the black market in 5 years, forecast says," accessed October 9, 2019, <https://www.sacbee.com/news/politics-government/capitol-alert/article234150842.html>

<sup>232</sup> News Review, "Could Big Cannabis Overrun California," accessed October 9, 2019, <https://www.newsreview.com/sacramento/could-big-cannabis-overrun-california/content?oid=28231656>

<sup>233</sup> News Review, "Could Big Cannabis Overrun California," accessed October 9, 2019, <https://www.newsreview.com/sacramento/could-big-cannabis-overrun-california/content?oid=28231656>

<sup>234</sup> For instance, bio-engineered yeasts can create the medicinal effects of cannabis in a lab, replacing the farm-to-factory process; Stanford Report, "Stanford researchers genetically engineer yeast to produce opioids," accessed August 15, 2019, <https://news.stanford.edu/news/2015/august/opioids-yeast-smolke-081315.html>

<sup>235</sup> News Review, "Could Big Cannabis Overrun California," accessed October 9, 2019, <https://www.newsreview.com/sacramento/could-big-cannabis-overrun-california/content?oid=28231656>

## Videogaming

Videogaming has evolved tremendously over the last two decades, significantly expanding to now engage an estimated 2.5 billion video gamers worldwide.<sup>236</sup> In California alone the industry generates roughly \$32 billion each year,<sup>237</sup> from investors to product development and from hardware to consumers. It is estimated the state's industry constitutes 27% of the American market,<sup>238</sup> by far the largest proportion of any state. As gaming platforms have evolved from computers to game consoles, the use of the cloud to deliver streaming gaming has accelerated, exploding the field's growth potential with the use of mobile devices and gaming on the go. Video game companies are evolving their business model from physical purchases of games toward downloads, and from a one time-software purchase to in-game add-on purchases.

Increasingly, other states are luring video game companies away with the promise of tax credits, lower taxes and a lower cost of living. Recently, the State of California passed legislation to protect the state's gaming industry by providing financial incentives for video game companies.<sup>239</sup>

Sacramento has a growing video game industry presence. As host to the California State Fair, Esports made its debut this year in Sacramento in an event that showcased a few of the area's professional esport teams and California's first state-wide competition.<sup>240</sup> The city also hosts several other expos and tournaments each year and is becoming known as a hub for the growing sport. Sac State has a computer science program focusing on developing video game programming talent. In 2016, over 3,200 workers in the Sacramento metro were employed in software publishing, computers, and software reproduction.<sup>241</sup> Since 1998, the industry has added about 500 jobs in software publishing alone, with significant growth projected in the near future. With notable success stories like EA's acquisition of KickNation (now known as Bioware Sacramento), the city is becoming known for its quality pool of talent and entrepreneurs.

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<sup>236</sup> We PC, "2019 Video Game Industry Statistics, Trends & Data," accessed October 9, 2019, <https://www.wepc.com/news/video-game-statistics/>

<sup>237</sup> Culver City Crossroads, "Sacramento Moves to Protect Video Game Industry," accessed October 9, 2019, <http://culvercitycrossroads.com/2018/05/15/sacramento-moves-to-protect-video-game-industry/>

<sup>238</sup> Business Insider, "5 Ways the Video Game Industry will Change in the Next Decade," accessed October 9, 2019, <https://markets.businessinsider.com/news/stocks/5-ways-the-video-game-industry-will-change-in-the-next-decade-2019-7-1028394586#streaming-gameplay1>

<sup>239</sup> The Sacramento Bee, "California must protect its video game industry," accessed October 9, 2019, <https://www.sacbee.com/opinion/op-ed/soapbox/article200169194.html>; CBS Sacramento, "California Leads Video Game Industry, But Cost Concerns Mount," accessed October 9, 2019, <https://sacramento.cbslocal.com/2018/02/16/video-game-development-cost/>

<sup>240</sup> Mountain Democrat, "State Fair to host Bear Cup Esports Gaming Tournament," accessed October 16, 2019, <https://www.mtdemocrat.com/prospecting/state-fair-to-host-bear-cup-esports-gaming-tournament/>

<sup>241</sup> Harvard Business School and The US Economic Development Administration, "US Cluster Mapping Tool," accessed October 9, 2019, [http://clustermapping.us/region/msa/sacramento\\_roseville\\_arden\\_arcade\\_ca](http://clustermapping.us/region/msa/sacramento_roseville_arden_arcade_ca)

## *Internet of Things*

“Internet of Things” (or IoT), an emerging cross-cutting cluster between tech and other industries, has become an increasingly hot topic of conversation in economic growth. The field can be defined as “... connecting any device with an on and off switch to the Internet (and/or to each other).”<sup>242</sup> This connectivity extends well beyond the products that are expected to have internet access (e.g., cellphones, computers) to include traditional appliances, personal electronics, wearable devices and more. A primary example of this phenomenon is the Smart Home concept, with interconnected devices that can be controlled remotely and that send and receive data to the cloud. By 2022, worldwide technology spending on IoT is projected to reach \$1.2T.<sup>243</sup>

In the Sacramento region, around 4,500 workers are employed in the Information Technology industry, a level of employment that has been consistent for the last two decades.<sup>244</sup> Within this larger cluster, software publishing (a key component of IoT technology) has grown 30% in the last two decades and is expected to double in size in the coming years.<sup>245</sup> Sacramento is also home to a growing collection of tech companies specializing in IoT such as Capitol Tech Solutions and Appsvolt. Becoming one of the first cities to offer 5G wireless technology will further enhance Sacramento’s competitiveness in IoT.

IoT is a vast and rapidly evolving set of practices (which will likely become many distinct if overlapping clusters). Parts of the emerging industry have a very strong nexus with the complimentary industries on which Sacramento is focusing – such as future mobility and Ag-Tech – suggesting opportunities for the region to establish itself as a hub for selected IoT.

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## *Human Capital/Labor Market*

“Human capital” refers to the knowledge and skills possessed by an area’s workers. It is often measured by educational attainment, but also encompasses skills and experience obtained through less formal means. 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. To maximize that impact, human capital must be properly deployed into the jobs that best utilize and reward workers’ skills and education. Getting this right requires addressing not only education and training programs, but also job creation in growing sectors (see Clusters section

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<sup>242</sup> Forbes, “Simple Explanation of Internet of Things that Anyone Can Understand,” accessed October 9, 2019, <https://www.forbes.com/sites/jacobmorgan/2014/05/13/simple-explanation-internet-things-that-anyone-can-understand/#17b136b81d09>

<sup>243</sup> Forbes, “2018 Roundup of Internet of Things Forecasts and Market Estimates,” accessed October 9, 2019, <https://www.forbes.com/sites/louiscolombus/2018/12/13/2018-roundup-of-internet-of-things-forecasts-and-market-estimates/#2280f6c37d83>

<sup>244</sup> Harvard Business School and The US Economic Development Administration, “US Cluster Mapping Tool,” accessed October 9, 2019, [http://clustermapping.us/region/msa/sacramento\\_roseville\\_\\_arden\\_arcade\\_ca](http://clustermapping.us/region/msa/sacramento_roseville__arden_arcade_ca)

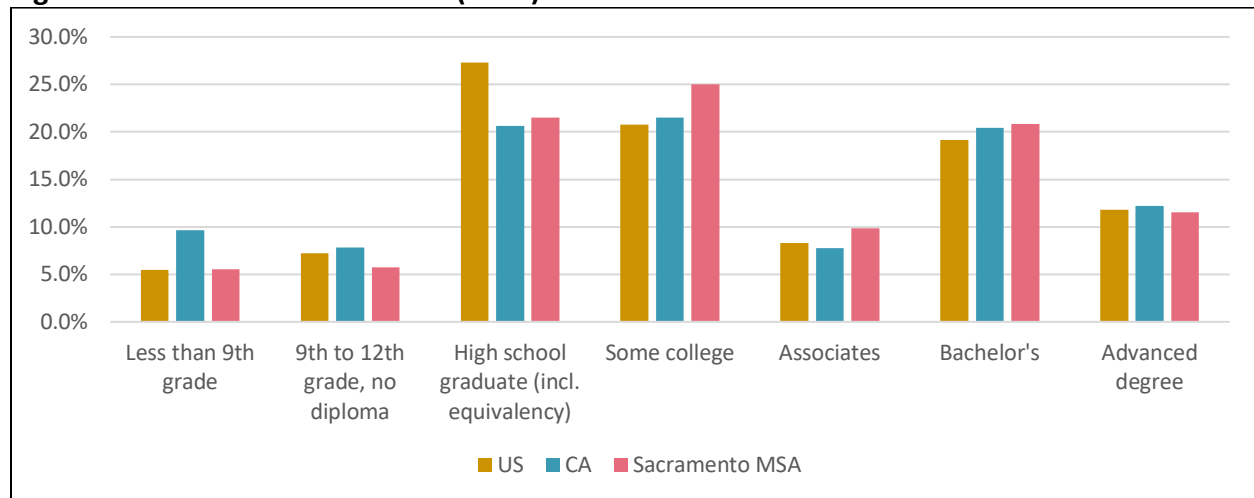
<sup>245</sup> Harvard Business School and The US Economic Development Administration, “US Cluster Mapping Tool,” accessed October 9, 2019, [http://clustermapping.us/region/msa/sacramento\\_roseville\\_\\_arden\\_arcade\\_ca](http://clustermapping.us/region/msa/sacramento_roseville__arden_arcade_ca)

above), the systems that match labor supply and demand and opportunities to make labor markets more efficient.<sup>246</sup>

## Supply: Educational Levels

In the aggregate, Sacramento’s residents are relatively well educated. Across most education levels, the distribution of the region’s population resembles national and state figures (see Figure 7). The main differences are in the categories of residents with high school diplomas or equivalents and some college without a degree – Sacramento’s population skews toward the latter category. The area also has a slightly larger proportion of residents holding an Associate degree. Altogether, these figures suggest that Sacramento has a middle-skilled population (generally considered those with a high school diploma through an Associates) that is more educated than U.S. and California averages.

**Figure 7: Educational Attainment (2017)**



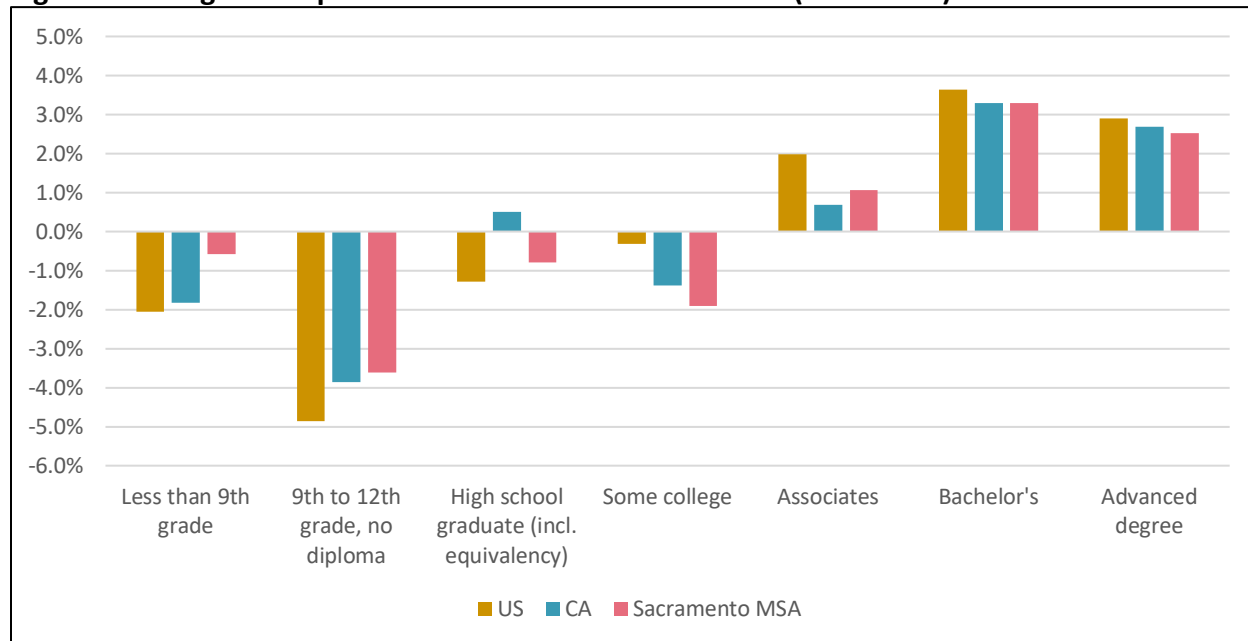
Source: RW Ventures analysis of American Community Survey data

In contrast to the national and state comparisons, Sacramento’s education levels are lower than its peer regions. As of 2017, 89% of residents had a high school diploma or higher, placing Sacramento 11<sup>th</sup> out of 16 peers. With 32% of residents holding a bachelor’s or more, the region stood 8<sup>th</sup>. Current trends may help to close those gaps as the region’s residents are generally becoming more educated (see Figure 8). Some of this change, but not all, can be attributed to migrants to the region. Recent movers to Sacramento have significantly more education than those who have been in the area longer. However, these new residents only represent 5% of the population,<sup>247</sup> so some of the increase in education is likely due to changes for longer-term residents. Those rates of change are slower than what is being seen for the U.S. and California as a whole, calling into question whether Sacramento is catching up to comparable regions.

<sup>246</sup> For much fuller discussion and literature review, see George Washington Institute of Public Policy and RW Ventures, LLC, *Implementing Regionalism: Connecting Emerging Theory and Practice to Inform Economic Development*.

<sup>247</sup> Parilla et al., *Charting a Course to the Sacramento Region’s Future Economic Prosperity*.

**Figure 8: Change in Proportions of Educational Attainment (2010-2017)**



Source: RW Ventures analysis of American Community Survey data

Notable disparities by race exist within these educational levels. White and Asian residents in the region are roughly twice as likely to have a bachelor’s degree or higher than Black or Hispanic/Latino residents. Smaller gaps exist for those with a high school degree or more: 95% of white residents have that much education, versus 89% of Black residents. Hispanic and Asian residents trail more significantly, at 73% and 83%, respectively. Most of Sacramento’s racial and ethnic groups are more educated than national averages, excepting Asian residents, who have relatively fewer bachelor’s and advanced degrees.

The educational gaps for people of color demand attention, and are even more pressing given the already high and increasing degree of diversity in the region’s population. The Sacramento metro’s overall workforce will soon become “majority-minority.” This is already true for younger workers, as 54% of the region’s millennial population identifies as people of color versus 44% for U.S.<sup>248</sup> The composition and trajectory of the region’s workforce heightens the urgency of addressing the existing education gaps and making sure that all residents, regardless of race or ethnicity, are acquiring the skills that the region’s employers are seeking.

### Supply: Occupations

Occupational data provides further insight on the supply of workers and their skills, but also begins to blend into observations on labor demand. Trends in residents’ occupations suggest where they are providing the right mix of skills to fill in-demand roles. At the same time, this

<sup>248</sup> Parilla et al., *Charting a Course to the Sacramento Region’s Future Economic Prosperity*.

analysis shows what jobs employers are offering and filling. This section focuses on the former subject, while labor demand is evaluated through separate, but related, analysis below.

The Sacramento region has experienced reasonable employment growth over the last decade, at a rate just slightly below that of the U.S. Within the overall increase, the composition of the workforce has changed. Across a high-level set of 22 job groupings, 15 saw increases in employment from 2010 to 2017.<sup>249</sup> Out of those same 22 categories, 16 grew or shrank by more than 1,000 employees, providing a window into the major shifts in residents' occupations (see Figure 9). In line with national employment trends, health care, services and food-related occupations saw the largest growth from 2010 to 2017. Sales and office jobs declined substantially, along with construction and extraction occupations.

Each of these broad categories covers a variety of positions that require a range of skills, education and expertise. The average skill levels of these occupational groups can be approximated from federal O\*NET data from the BLS. O\*NET estimates the level of education needed to obtain a particular job. Extrapolating from this "job zone"<sup>250</sup> information indicates that three of the top five growing occupational categories – (1) healthcare practitioners; (2) education, training and library; and (3) computer and mathematical – are comprised mostly of high-skill positions, requiring a bachelor's degree or more. The other two top growth categories – food preparation and personal care and services – skew significantly toward lower-skill and lower-wage positions. In contrast, the three groups with the largest decreases in employment have average job zone scores in a middle-skill range. Though approximate, these results suggest that the job profile of the region is bifurcating. High- and low-skill jobs are expanding while middle-skill opportunities contract. This represents a potentially concerning mismatch between residents' skill sets and emerging demand, given the strong concentration of residents with a middle-skill educational profile, as referenced above.

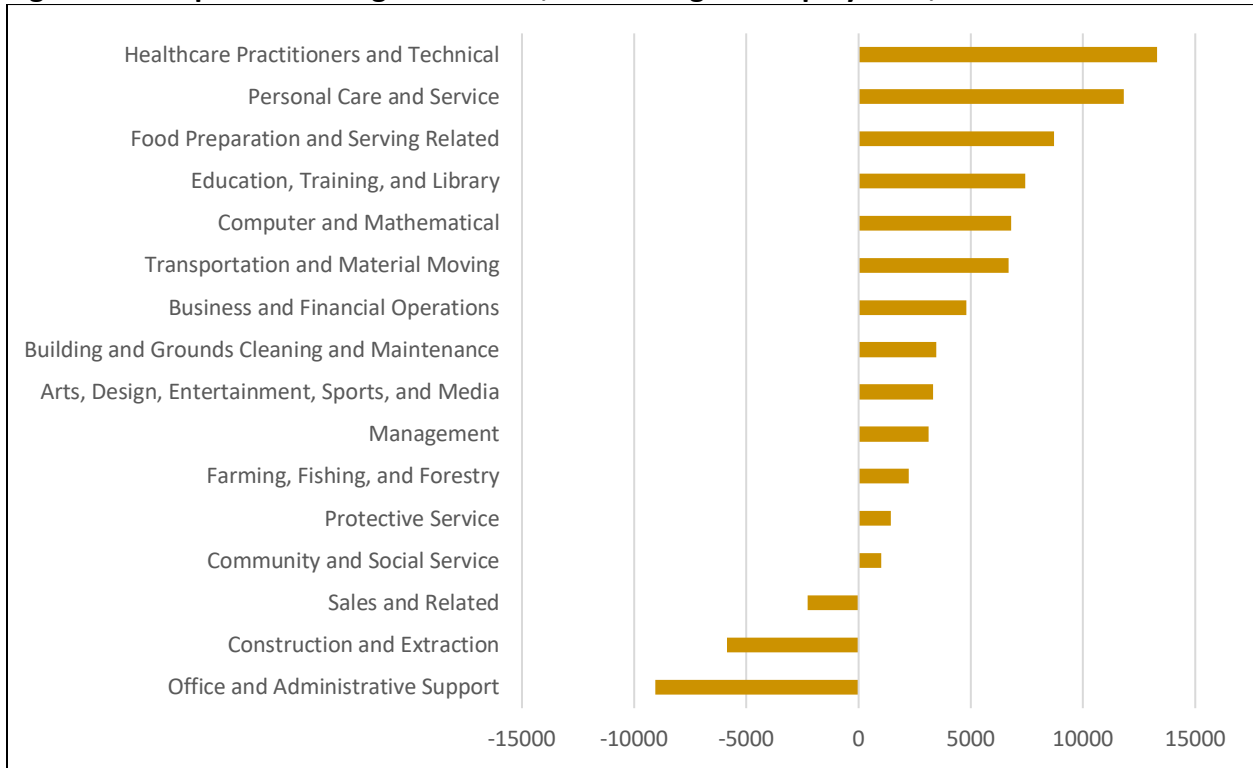
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<sup>249</sup> U. S. Census Bureau, "American FactFinder - Results," accessed October 9, 2019, [https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_17\\_5YR\\_S2401&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_S2401&prodType=table).

<sup>250</sup> BLS's "Job Zone" scale goes from 1 to 5 to indicate the level of education and preparation generally required for a given occupation, where:

- 1 = little or no prep (some may require HS diploma)
- 2 = some prep (usually requires HS diploma)
- 3 = medium prep (usually requires an associate's degree, vocational training or related on-job experience)
- 4 = considerable prep (most require bachelor's degree)
- 5 = extensive prep (most require graduate degree)

**Figure 9: Occupational Categories with 1,000+ Change in Employment, 2010-2017**



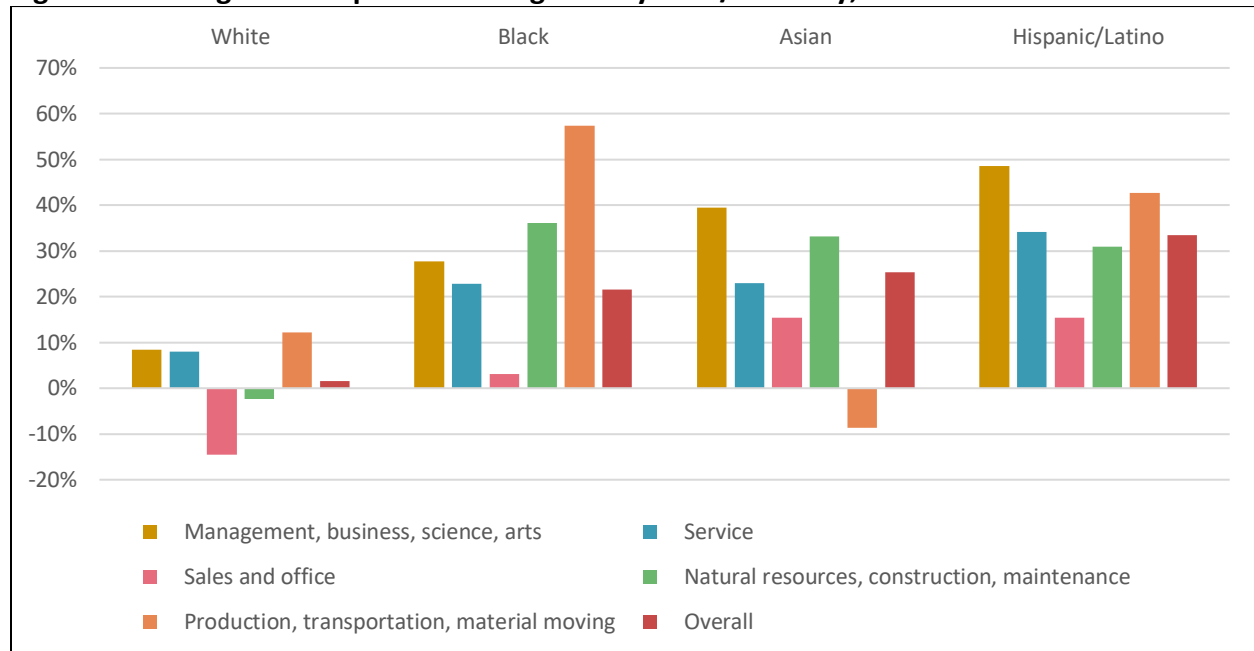
Source: RW Ventures analysis of American Community Survey data

Within these occupational trends, patterns of change have varied across races and ethnicities. People of color captured the majority of the region’s recent job growth. While white residents still represent most of the workforce, they only experienced a 2% increase in occupations from 2010 to 2017. In that same period, occupations held by Black and Asian residents grew by approximately one-quarter and for Hispanic/Latino residents by one-third.<sup>251</sup>

Breaking down those changes into broad categories shows that the possible bifurcation toward high- and low-skill positions is occurring in various ways across all groups. For middle-skill sales and office occupations, white workers experienced significant declines (see Figure 10), while people of color experienced only small gains in that category. With a handful of exceptions, each racial and ethnic group’s growth rates in the other categories – which again, skew toward high- and low-skill positions – were higher than their overall job growth.

<sup>251</sup> U. S. Census Bureau, “American FactFinder - Results,” accessed October 9, 2019, [https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_17\\_5YR\\_B24010&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B24010&prodType=table).

**Figure 10: Change in Occupational Categories by Race/Ethnicity, 2000-2017**



Source: RW Ventures analysis of American Community Survey data

Though the general trends in occupational distribution seem to be shared across the Sacramento population, the effects on earnings vary. As discussed above, median income levels exhibit racial and ethnic disparities – Asian and white households earn around \$70,000, while Black and Hispanic/Latino residents have incomes roughly 60% and 75% below that, respectively. Occupational changes suggest that people of color are moving into some higher skill positions at rates faster than whites – for instance, the growth in people of color holding management, business, science and arts positions ranged from 30% to 50%, while white employment in that category rose less than 10%. For Black residents, those trends are not helping narrow the income gap; their median incomes rose less than 3% from 2013-2017 while Whites’ increased nearly 4%. In that same period, Hispanic/Latino households experienced a median income increase of over 11%. Even though there are common trends in general occupational shifts across these groups, the economic outcomes are not the same. This raises questions of the variation within these broader categories – which positions each group is moving into and the rates of pay associated with them.

## Labor Demand

The extent to which workers are productively deployed into the regional economy depends largely on how well their skills are aligned with employers’ demand. This includes both current and projected demand – ideally, workers (along with the educators and trainers helping them obtain new skills) could anticipate trends in occupational and skills growth and find the targeted programs that would properly prepare them for those jobs. Recent trends and current projections in occupational change, coupled with information on the average educational



requirements for certain positions, provides some insight into what Sacramento’s employers are seeking from their workforce.

At a high level, employers in Sacramento appear to be looking for a notably higher skill set than what is seen in the national economy. Using data on who is employed in the Sacramento MSA (versus the analysis above, based on the occupation of the region’s *residents*), weighted job zones can be calculated across the same 22 high-level occupational categories analyzed previously. The results show that in 15 out of 22 categories, Sacramento’s occupational mix has a higher job zone score than for the U.S. as a whole (see Table 7). Of the 7 occupations with a lower job score, 6 of the 7 are within 1% of the national figure.

**Table 7: Sacramento / US Weighted Job Zones by Occupational Group, 2018**

Occupation Group Title	Sacramento Weighted Job Zone	US Weighted Job Zone	Percent Difference
Production	2.1	1.7	24.1%
Community and Social Service	4.4	3.8	15.4%
Healthcare Support	2.6	2.4	10.0%
Business and Financial Operations	3.8	3.6	5.1%
Arts, Design, Entertainment, Sports, and Media	3.6	3.5	4.4%
Legal	4.4	4.3	4.3%
Education, Training, and Library	3.9	3.7	3.9%
Computer and Mathematical	4.0	3.9	2.5%
Farming, Fishing, and Forestry	1.2	1.1	2.2%
Architecture and Engineering	3.9	3.8	2.1%
Transportation and Material Moving	1.9	1.9	1.6%
Healthcare Practitioners and Technical	3.5	3.4	1.2%
Office and Administrative Support	2.3	2.3	0.7%
Management	3.8	3.8	0.1%
Life, Physical, and Social Science	4.3	4.3	0.1%
Protective Service	2.5	2.5	-0.3%
Building and Grounds Cleaning and Maintenance	1.3	1.3	-0.5%
Construction and Extraction	2.2	2.3	-0.7%
Personal Care and Service	2.2	2.2	-0.8%
Food Preparation and Serving Related	1.3	1.3	-1.0%
Installation, Maintenance, and Repair	2.8	2.8	-1.0%
Sales and Related	2.2	2.3	-3.6%

Source: Bureau of Labor Statistics, Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates, 2013 and 2018

Of the 15 categories for which Sacramento has higher weighted job zones, three categories stand out. Sacramento’s mix of Production Occupations has a weighted job zone 24% higher than the US. This suggests that the region’s manufacturing may be notably more advanced,

demanding more skilled employees. Community and Social Service Occupations have a 15% more skilled occupation mix; this group consists largely of social workers, a highly educated group that receives relatively low average wages. Finally, Health Care Support positions skew 10% more toward advanced positions. This is due to a larger balance of workers in assistant occupations – nursing, dental, and medical – than aides in home health, physical therapy, psychiatry, etc. Similar to community and social service workers, these relatively more skilled occupations pay wages below average for their job zone.

Further evidence that Sacramento’s employers are seeking higher skilled workers than average is seen in trends in digital skills. Nationwide, the use of digital technologies is spreading throughout all industries and jobs, with more digitized positions paying higher average wages.<sup>252</sup> Sacramento’s job market has shown a significant increase in demand for digital skills. Occupations requiring high or medium digital skills grew from 47% of all jobs in 2002 to 72% in 2016.<sup>253</sup> Among its peer regions, Sacramento has the second highest score for overall digitalization of occupations. Demand for some of these jobs is outstripping supply, with several of the region’s hardest-to-fill positions (e.g., software developers, other computer occupations, medical and health services managers) requiring high digital skill levels.

Underneath these broad occupational and digital skills trends, there are more cluster- and industry-specific needs. Isolating these more targeted skills requires comprehensive data analysis and validation on a sector-by-sector basis that is beyond the scope of this Action Agenda. High-level cluster-based observations on current and future skills demand are included in the Emerging Clusters and Programs section below.

## Labor Market/Workforce Programs

The next economy is having major implications for all aspects of growth, including dramatic impacts on labor markets. Employers’ demands for skills are evolving rapidly. They are increasingly seeking workers who are nimble and flexible, with specialized skills and credentials tailored to specific industries and jobs. As labor markets are undergoing this transition, the existing systems to match employers and workers are not keeping up. Employers tend to rely on legacy hiring processes and procedures that are more oriented around traditional credentials, rather than understanding the specific skills required for a position and assessing job candidates based on those skills. This makes it harder for incumbent and prospective employees to know what skills they need for current or emerging occupations. Even when they are aware of the required skills, it can be difficult to identify the programs where they can be properly trained.

These conditions are aggravated by a workforce system training system largely driven by third-party providers who are not subject to normal market forces from employers or would-be

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<sup>252</sup> Muro, Mark, Liu, Sifan, Whiton, Jacob and Siddharth Kulkarni, *Digitalization and the American Workforce*, Brookings Institution: 2017, [https://www.brookings.edu/wp-content/uploads/2017/11/mpp\\_2017nov15\\_digitalization\\_full\\_report.pdf](https://www.brookings.edu/wp-content/uploads/2017/11/mpp_2017nov15_digitalization_full_report.pdf).

<sup>253</sup> Parilla et al., *Charting a Course to the Sacramento Region’s Future Economic Prosperity*.

employees. These providers are critical because the private sector underinvests in developing their workers; since employees can leave at any time, employers are reluctant to spend on training when workers may take those skills elsewhere.<sup>254</sup> As a result, workforce training at many levels (from basic K-12 education to professional) is largely a public good provided through public agencies or subsidized non-profits. While this is to some degree necessary, the rapid, continuous changes in labor markets make these workforce training and education systems outdated and insufficiently nimble, struggling to quickly design and launch programming that is responsive to in-demand skills. Though many of these systems are working to become more employer- and demand-driven, it is easier said than done. Employers are generally hard to engage on efforts outside their day-to-day business activities, and they themselves need to change their systems first to genuinely enable flexible and responsive training delivery.

The net effect: complex, inefficient labor markets where employers are unable to find the talent they need, workers struggle to identify or understand the skill requirements for job opportunities, and trainers and educators struggle to keep their courses up to date. Major structural change to re-align employer, job seeker and workforce program practices is needed for new labor market systems that work for the next economy.

In the Sacramento region, a range of workforce programs exist that have begun to move toward a more industry-driven, flexible, nimble labor market system. Additional innovations are needed to improve the impact of these programs, and greater capacity is needed to develop the region's human capital to meet skills demand.

### *Existing Programs*

The Sacramento region has several programs driven by community colleges and educational institutions or run in conjunction with them. The Strong Workforce Program is a state program, administered locally by each region's community colleges. The program is scaling and improving technical training programs offered by the state's community colleges, aiming to increase the number of middle-skill workers. Valley Vision supports the program for the Sacramento region,<sup>255</sup> managing and convening six regional advisory committees (organized by six priority clusters<sup>256</sup>) that assemble employers, community colleges, institutions, workforce development boards and others. These committees are evolving to become the primary means by which these stakeholders meet and address changes to labor market practices, replacing many of the local, decentralized advisory councils.

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<sup>254</sup> Robert Weissbourd, *Into the Economic Mainstream*, Opportunity Finance Network: 2006, <http://rw-ventures.com/wp-content/uploads/2017/01/Distribution-Draft-IEM-Paper-8-6-06-rw.pdf>.

<sup>255</sup> Valley Vision, "Capital Region Workforce Action Plan," accessed November 5, 2019, <https://www.valleyvision.org/projects/capital-region-workforce-action-plan/>

<sup>256</sup> Natural Resources & Environmental Technology; Energy, Construction & Utilities; Health Services & Life Sciences; Information & Communication Technology; Manufacturing; Hospitality, Tourism, and Recreation

There are 24 higher education institutions in the region, including UC Davis, Sac State, and three Community College Districts (encompassing 7 colleges). Many of these have created sector-specific training programs aimed at providing Sacramento’s workforce with the skills to meet emerging industry needs (see Table 8). These programs include certificates and degrees in Energy Technology (Sierra College), Solar Energy Technology and Biotechnology (American River College) and Sustainable Agriculture (Woodland College). Valley Vision is managing the creation of specific action plans for each cluster noted in Table 8 through the Strong Workforce Program.

**Table 8: Life Sciences in Sacramento MSA, employment data summary**

	Advanced Manufacturing	Clean Economy	Education & Knowledge Creation	Food & Agriculture	Health Services & Life Sciences	ICT
American River College						
Cosumnes River College						
CSU - Sacramento						
Folsom Lake College						
Sacramento City College						
Sierra College						
UC - Davis						
Woodland College						
Yuba College						

Source: Valley Vision, *Next Economy Workforce*

The Sacramento City Unified School District (SCUSD) recruits industry partners and has developed industry-specific programs that utilize a career-themed learning approach.<sup>257</sup> SCUSD also co-runs an adult education program targeting 18-24 year-olds and vulnerable adults, with programs of study ranging from general to industry-specific.<sup>258</sup> Employee partners work with instructors to develop the curricula. SCUSD also funds a program that offsets the cost of training programs to employers after they demonstrate success in employee retention following the training program.<sup>259</sup>

Workforce Investment Boards (WIBs) in the region provide labor market data, business resources, recruitment assistance and basic training, along with deploying funding resources (mostly state innovation grants). WIBs and community colleges share a goal of significantly increasing middle-skill post-secondary credentials and apprenticeships. The four boards in the region – Sacramento Employment and Training Agency (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) – collaborate frequently on program

<sup>257</sup> Confidential interviewee, interview by RW Ventures, in person, April 24, 2019; SCUSD, “College & Career Readiness,” accessed November 11, 2019, <https://www.scusd.edu/college-and-career-readiness>.

<sup>258</sup> SCUSD runs (or co-runs) two adult education centers, the A. Warren McClaskey Adult Center and Charles A. Jones Career and Education Center. The latter offers programs of study in HVAC, pharmacy, nursing, etc. For more information, see: <https://caj.scusd.edu/about-us>.

<sup>259</sup> Confidential interviewee, interview by RW Ventures, in person, April 24, 2019.

development, including support for initiatives such as SVMl and the Future of Work project. SETA is a joint powers agency of Sacramento City and County, which in addition to providing early education and community services for populations in need, also provides free workforce services for both employees and employers through its network of job centers (12 in the Sacramento region).<sup>260</sup> The city is working closely with SETA to explore adding a sector-specific job center to the current network.

Building on and bolstering this network of workforce development organizations, the city recently launched the Mayor’s Workforce Collective, a group of nearly 75 members representing approximately 50 organizations in the workforce ecosystem that has been meeting since summer 2019. The Collective is working to align the programs and efforts of the area’s disparate trainers and educators, orienting them toward industry demand. The group anticipates coordinating training programs with the jobs and skills demand that are emerging from growing industries in Sacramento and their related activities – such as Aggie Square and CMC – and is also evaluating opportunities that will likely arise in the construction and trades sectors due to major development projects on the horizon, including the stadium for the MLS team recently awarded to Sacramento.

Workforce development is also a focus of location-based projects. Sacramento’s Promise Zone includes programs to help the SMUD build job training initiatives that prepare students and young adults for jobs in the electric vehicle economy. In addition, they are working to incorporate continuing education and workforce training for technology jobs as part of Aggie Square.

These sectors and more are addressed in Valley Vision’s Future of Work project, which evaluates skills gaps for clusters including Agriculture, Environmental Technologies and Natural Resources, Life Sciences and Health Services, and Future Mobility. The project gathers data on high-demand occupations within these sectors and their current skills gaps and holds forums with workforce partners, educators and employers to identify the trends they see. This work has thus far resulted in recommendations to expand the high-skill IT talent pipeline, expand digital literacy and cultivate skills-based development (communication, problem solving, etc.). This has led to the creation of the Sacramento Coalition for Digital Inclusion (40 organizations working with the community to increase digital inclusion) and the Digital Skills Initiative (increasing digital skills in K-12).

Other developing initiatives such as ProjectAttain! and Working Scholars address the educational gap more broadly, targeting adults within 15 units of completing an academic program (about 83,000 adults in Sacramento). Run by Align Capital Region (ACR) – a regional initiative to align resources in education, workforce development and community vitality – and led by CSU Sacramento, the program helps “near-completers” overcome barriers to finish their respective programs.

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<sup>260</sup> Sacramento Employment and training Agency, “Sacramento Works,” accessed November 5, 2019, <https://www.seta.net/workforce-development-services/>

Online platforms have begun to emerge in the region to address skills gaps and provide greater opportunities in career pipelines. Launchpath matches high school and community college students with paid internships in growing industries, while CareerGPS guides students through career exploration processes and provides basic publicly available labor market information.

At a state level, Sacramento-area companies have the potential to obtain training funding from the Employment Training Panel (ETP). This state agency has a budget allocation of over \$100M for fiscal year 2019-20, available to reimburse employers for certain incumbent worker or unemployed worker training. As part of their funding decision making process, the ETP prioritizes a set of industries considered essential to the California economy. Several of these align with Sacramento's strongest clusters, including Agriculture, Biotechnology and Life Sciences, Green/Clean Technology and Manufacturing/Food Production.

### *Emerging Clusters and Programs*

In line with the high-level occupational analysis above, Sacramento's priority and emerging clusters project a need for a highly skilled future workforce. Forecasting this demand is by nature speculative, especially in an economy that is highly disruptive and rapidly evolving. This is especially the case with some of Sacramento's major cluster opportunities, as they are emerging industries whose global markets are still taking shape. General observations include:

- **Future Mobility** – Rapid advances in this sector will likely lead to a talent shortage. The future workforce is anticipated to be two-thirds skilled trade workers and one-third computing-related engineers (with demand six times higher than the supply).<sup>261</sup> These jobs will require “cross-functional ‘tinkerers,’” rather than specialists.<sup>262</sup>
- **Food Systems** – Technological advances in processing and packaging are driving the need for new training programs for food and beverage manufacturing workers.<sup>263</sup>
- **Clean Energy** – Workers often have greater science/technical skill requirements than other industries nationally.<sup>264</sup>
- **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.<sup>265</sup>

The workforce in these emerging clusters will need skills-based training, particularly on technology applications to specific industries, and frequent upskilling to meet the demands of

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<sup>261</sup> 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>

<sup>262</sup> 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*.

<sup>263</sup> For more detail, see: RW Ventures, LLC and IMEC, *Chicagoland FOOD: Seizing the Opportunity to Grow Chicagoland's Food Industry*.

<sup>264</sup> Muro et al., *Advancing Inclusion through Clean Energy Jobs*.

<sup>265</sup> JLL Research, *Life Sciences Outlook 2018*.

rapid technological growth. The workforce must be adept at using high-tech machinery and able to adapt to process changes. There is demand for specialized, yet easily translatable high-tech skill sets, particularly as industries frequently see innovation arising from cross-sector partnerships and high-growth startups rather than large, established firms. At the same time, employers and industry at large need to engage more in creating the resources that will help provide incumbent and potential employees with these in-demand skills. Two Sacramento entities are starting to address these conditions:

- SVMII, a nonprofit membership organization, is working with educators and industry partners to develop workforce programs for future manufacturing careers. They coordinate with Valley Vision on the Manufacturing cluster's Regional Advisory meetings that occur through the Strong Workforce program, working to tailor college programs to manufacturers' needs.<sup>266</sup> SVMII runs two pre-apprenticeship programs<sup>267</sup> at Sierra College, one targeting those who want a career change and the second focused on minority/low-income populations. Manufacturers have begun to partner with SVMII to provide a pathway for students completing these programs (such as TriTool and InSight Manufacturing Services). SVMII is scaling up their operations and looking to expand programming, such as launching a new training center targeting disadvantaged populations, focused on material handling, machining and welding.
- CMC plans to grow the Future Mobility sector in Sacramento through applied research, facilitating standards and policies for new technologies, product development support for EV and AV technologies and a Ramp-Up Factory to make products. As part of this, the CMC is initiating partnerships with universities, colleges, industry and other stakeholders to train the future workforce, through programs run by the CMC and partner institutions.

## Assessment: Sacramento's Opportunities

Sacramento's workforce development efforts are largely driven by workforce boards and higher education institutions, though they are moving toward more collaborative structures that streamline and coordinate activities and seek deeper industry engagement and leadership. The Strong Workforce program and its cluster-specific regional advisory committees are moving toward a more industry-owned and driven set of sector partnerships, supplemented by emerging multi-stakeholder collaborations through SVMII and the CMC. In addition to providing support services for employers and jobseekers, these entities are planning for future skills gaps by accessing data and employer needs and sharing lessons across the region to determine the best path forward to meet skills shortages. Employers are involved in focus groups and roundtables to highlight these shortfalls.

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<sup>266</sup> They are currently addressing interest for electronics, machining, C&M, computer aided machining training

<sup>267</sup> In addition, an apprenticeship is in development in the Sacramento region based on an MOU signed with CTMAA <https://www.calmachinist.com/>



While employers are currently engaged in the work to outline skills gaps, there is a need for a next level of systems change from the private sector. Companies should be reassessing their perspective on talent management, ideally taking a “life cycle” perspective on developing the entire workforce pipeline, akin to how they have engaged in proactively improving their supply chains.<sup>268</sup> Internally, a life cycle framework will naturally lead to reconfiguring hiring practices, taking a skill-based approach to assessing job requirements, upskilling incumbent workers and evaluating prospective employees. Externally, this will lead to deeper involvement in the design and deployment of training programs – either through in-house initiatives or employer-led collaboratives to address skills gaps in specific industries. Efforts like the Digital Skills Initiative are already assessing in-demand digital skills by sector, and involving employers more deeply into the project can support strong industry partnerships. When properly assembled and managed, these partnerships can identify areas suitable for company collaboration so that, rather than strictly competing for talent, industry can develop the region’s skills together.

As mentioned above, there is a need for targeted, skills-based training programs, that align with demand and can be nimbly scaled. This requires a shift in typical training and educational structures, allowing for increased access and flexibility and continual upgrades to address new market demands. As current and new sector-based collaboratives develop, they will need workforce development practitioners to critically assess their infrastructure, addressing the barriers that have traditionally slowed their ability to respond to industry-driven skills demand. There will also need to be a critical mass of regional employers committed to approaching hiring differently, so that assessments of current and potential employees inform and align with training providers’ programming. Reorienting hiring around skills will allow for less reliance on academic credentials that may be outdated or inadequately reflective of a workers' ability to perform well.

Tailoring workforce programs to sectors projected to grow within the region will help Sacramento grow a talent hub for specific industries. When these pools of skilled workers reach a sufficient scale, they will become a valuable regional asset that will help outweigh the region’s high cost of labor. This will dissuade firms from looking elsewhere for talent and serve instead to attract high-growth companies to the region.<sup>269</sup> Creating this skilled labor pool is a long-term objective – moving in this direction will require a staged approach, incorporating the right elements of this framework to build momentum and lay the groundwork for further changes.

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<sup>268</sup> See, for example, the U.S. Chamber of Commerce Foundation’s Talent Pipeline Management Initiative, <https://www.uschamberfoundation.org/talent-pipeline-management>.

<sup>269</sup> For instance, in interviews, manufacturers have reported the attraction to Sacramento is for its affordability and land availability but have looked elsewhere for manufacturing talent – a trend that is reversible.

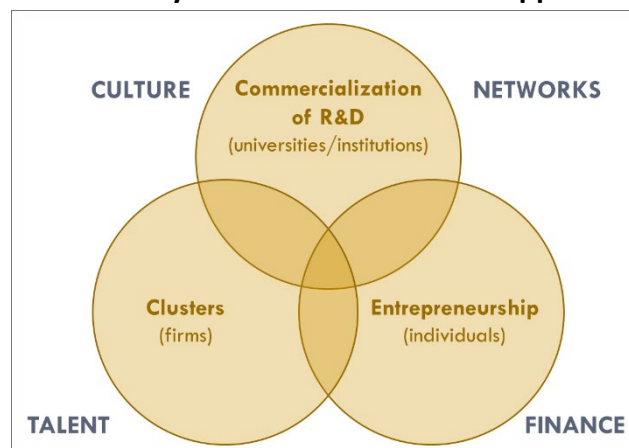
## Innovation and Entrepreneurship

At a fundamental level, in the long run, all economic growth stems from innovation, which by definition generates new value from existing resources through the creation 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.<sup>270</sup>

Figure 11 illustrates the pathways, institutions and factors – sometimes called “ecosystem”<sup>271</sup> – that enable and support innovation. Innovation occurs through three primary sets of actors: (1) commercialization of basic and applied research emerging from universities and private institutes; (2) entrepreneurs conceiving, prototyping, piloting and producing new products and processes; and (3) activities within existing firms. These pathways overlap and function best when closely connected (e.g., research can be commercialized through industry partnerships or entrepreneurs). Crucial supporting elements facilitate those connections and support innovation activities: 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.

Understanding these interactions also explains innovation’s relationship to entrepreneurship. The two overlap but are not equivalent, as not all entrepreneurs are engaged in 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 well as to inclusion since it provides a path to increased wealth.

**Figure 11: The ecosystem that enables and supports innovation**



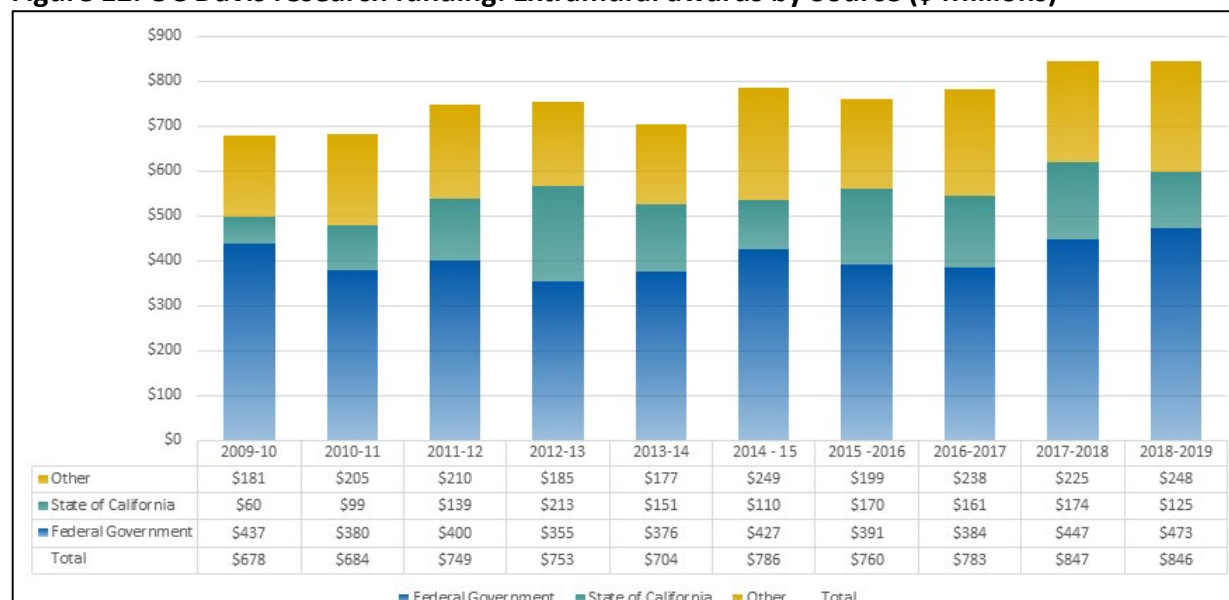
<sup>270</sup> For a much more detailed innovation review, see: George Washington Institute of Public Policy and RW Ventures, LLC, *Implementing Regionalism: Connecting Emerging Theory and Practice to Inform Economic Development*.

<sup>271</sup> The phrase “innovation ecosystem” is often used to refer more narrowly to the ecosystem supporting entrepreneurship, which heavily overlaps with but is not identical to this broader framing of drivers of innovation.

## Commercialization

The Sacramento region’s research engine is UC Davis, an institution ranked second in the world for research in agriculture and forestry. UC Davis generates substantial funding for research and development (R&D): \$846 million in 2018-2019, with about three quarters derived from state and federal sources (see Figure 12).<sup>272</sup> Three fields are predominant: health sciences (26%), biological and biomedical sciences (25%), and agricultural sciences (19%). Total extramural R&D funding has increased over time, up by about a third over the past decade. Because of UC Davis (and, to a smaller extent, Sacramento State), the region is considered a powerhouse for academic R&D, having “generated higher average levels of university R&D that all but three other regions between 2011 and 2016.”<sup>273</sup>

**Figure 12: UC Davis research funding: Extramural awards by Source (\$ Millions)**



Source: UC Davis, Office of Research

While critical to the innovation ecosystem, R&D is only the first step in the path to production and growth. To create economic value, applied R&D must be introduced into the marketplace – commercialized – through existing firms (industry partnerships) or the creation of new firms (entrepreneurship). Translation of research into viable technologies, products and services that meet market needs is a complex and iterative process.

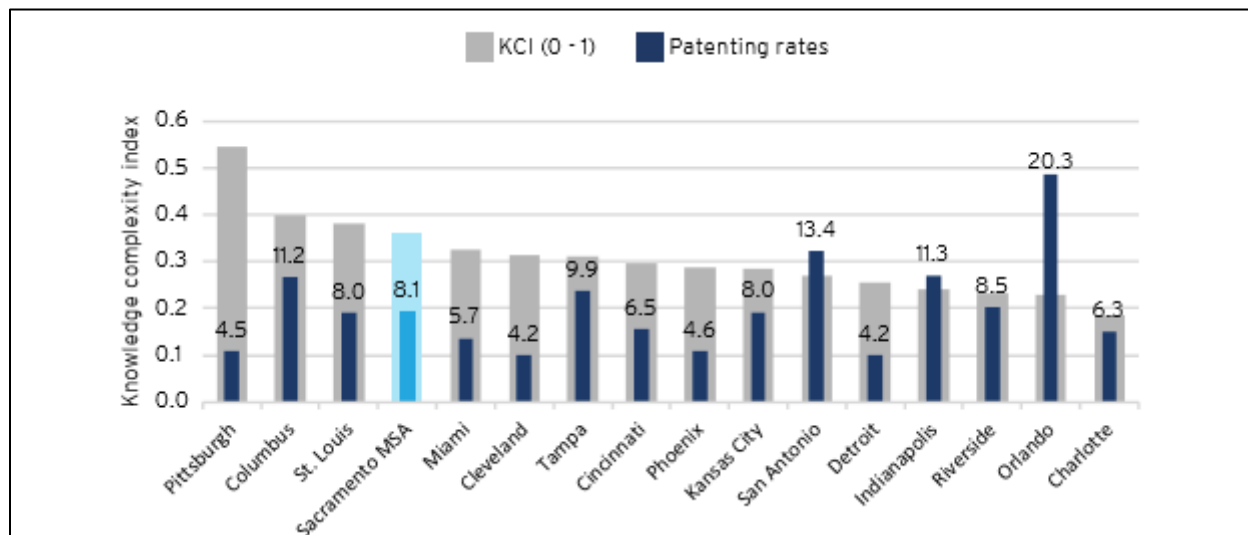
Commercialization often requires the protection of intellectual property (IP), so patenting activity is a useful proxy for measuring the connection between knowledge and

<sup>272</sup> UC Davis Office of Research, *Research Engaged*, Online Publication: 2019, <https://research.ucdavis.edu/wp-content/uploads/OR-Annual-Report-2017-18-FINAL-3.15.19.pdf>

<sup>273</sup> Note, though, that this is with reference just to comparable regions. Parilla et al., *Charting a Course to the Sacramento Region’s Future Economic Prosperity*.

commercialization. The Sacramento region’s patenting activity resembles similar regions – it generated 8.1 patents per 1,000 employees between 2000 to 2015 – but still lags behind high-patenting advanced manufacturing centers like Detroit, Cincinnati and Cleveland (see Figure 13).

**Figure 13: Average annual number of patents per 1000 workers (2000-2015) and Knowledge Complexity Index**



Source: Brookings analysis of USPTO data, Kogler and Rigby

Patents in the region concentrate in biotechnology, computer technology, basic materials chemistry and IT methods for management. Large patentees include major biotechnology and agricultural technology firms like Novozymes, AgraQuest (now Bayer CropScience) and Marrone Bio Innovation, as well as major manufacturers such as Intel and Hewlett Packard. UC Davis is also a major patentee, receiving 98 patents in 2018. Some technologies invented at UC Davis have substantial commercial promise, such as brexanolone, the only drug to date approved for women with post-partum depression.

UC Davis has employed two major pathways to commercialize its technology: by licensing its technology for established firms to use or to start-ups that are specifically formed to commercialize the technology. UC Davis completed a total of 55 license agreements, along with 212 combined option and letter agreements in 2018. It also generated more than \$10 million in royalties and fees from licensing agreements. Per UC Davis, this is a higher return per \$1 million in research funding than is generated anywhere else in the University of California system. Gross licensing revenues were higher than those received by UC Berkeley, as of 2016.<sup>274</sup> In 2018, UC Davis generated 14 spinouts, of which 9 were in therapeutics or medical devices, 3 were in data management, and 1 was a new research tool.<sup>275</sup>

<sup>274</sup> IPIRA, *Overview of IPIRA*, Online Publication: 2018, <https://ipira.berkeley.edu/sites/default/files/shared/docs/IPIRA%202018%20Faculty%20Brochure%20v7.pdf>.

<sup>275</sup> One did not disclose.

The UC Davis licensing system appears to be working reasonably well (even if, as discussed below, it is not yet translating to many firms staying in the region), comparably with Berkeley and better than some other public universities such as the University of Maryland, which generated only about \$1 million in licensing revenues.<sup>276</sup> There are universities with larger revenue streams, though – for example, the University of San Francisco generated about \$36 million in licenses in 2018.<sup>277</sup>

## Entrepreneurship: From Start-up to Scale-up

### *Start-ups*

Start-ups 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 start-up, so generating enough start-ups for some to become substantial firms is critical for long term growth.<sup>278</sup>

“Business dynamism” measures the rate at which new firms are created. While dynamism has been declining nationally,<sup>279</sup> it has slowed more than the national average in the Sacramento region. A Kauffman Foundation study ranked Sacramento 13<sup>th</sup> out of 16 comparable regions for business dynamism.<sup>280</sup> A 2018 Brookings study of the Sacramento region also concluded that “(t)he region trails its peers on measures of business dynamism.”

That said, these low rates of firm formation may, to some extent, be out of date. Anecdotal evidence and the burgeoning network of incubators and entrepreneurship organizations suggests that more start-ups have been forming recently, and more entrepreneurs are being attracted to the Sacramento area, although this activity is not yet reflected in the available data.

To the extent that low rates of firm formation continue to be a problem, they likely derive in part from the traditional business climate. An environment dominated by government<sup>281</sup> 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.

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<sup>276</sup> UM Ventures, “Reports,” accessed November 1, 2019, <http://otc.umd.edu/about/statistics>

<sup>277</sup> UC San Francisco, “Office of Technology Management,” accessed November 3, 2019, <https://innovation.ucsf.edu/venture/office-technology-management>

<sup>278</sup> As noted at the outset of this section, innovation doesn’t only happen in startups. Established firms have much more resources, so most innovation also takes place within established firms. This is reflected in patent data, for example, and in the dominant share of private sector R&D spending that is done by established firms. This kind of innovation is outside the startup culture and is discussed further in the context of industry and cluster discussions and initiatives.

<sup>279</sup> Haltiwanger, John C., Hathaway, Ian and Javier Miranda, “Declining Business Dynamism in the U.S. High-Technology Sector,” Kauffman Foundation: 2014, <http://dx.doi.org/10.2139/ssrn.2397310>

<sup>280</sup> Morelix, Arnobio and Josh Russell-Fritch, “Growth Entrepreneurship: Metropolitan Area and City Trends,” Kauffman Foundation: 2017.

<sup>281</sup> On the other hand, as discussed elsewhere, being close to the center of government can be leveraged to create advantages. Autonomous vehicles, for example, will be highly regulated, and being close to the regulators has distinct advantages. As Dan Morash of the start-up Safe Soil observed, “Sacramento is where the regulators are and if you’re going to build any kind of plant, you better know your way around regulations.”

Overall, evidence from several directions, especially the emergence of new institutions and programs (see below), suggests that the traditional business culture in Sacramento is changing, to better reflect the ambitions of start-ups and, as discussed later, scale-ups.

### *Start-up Supports*

Start-ups need access to a range of supports – such as mentoring, office space, and access to basic business services – to get going. Without the relevant supports, start-ups will likely struggle, and entrepreneurs will move to more hospitable environments.

Several start-up support initiatives have emerged in Sacramento over the last few years. In addition to StartupSac (see *Culture*, below), other initiatives include:

- **The Entrepreneurs Resource Finder** is currently being designed as an online resource locator for services that support the region’s entrepreneurs, similar to Kansas City’s SourceLink Resource Navigator.<sup>282</sup>
- **Startup Hustle** is a training course for company founders modeled after Steve Blank’s Lean Launchpad<sup>283</sup> and is similar to programs available in Silicon Valley. Operated by Hacker Labs, its 9<sup>th</sup> cohort entered the program in 2019.
- **FourthWave**,<sup>284</sup> which supported one cohort in 2017, and **The Power of SHE** (Shaping & Honing Entrepreneurs), an incubator program for women of color from Willow Tree Roots, offer start-up support to woman-led companies.<sup>285</sup>
- **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.<sup>286</sup> The Founder Institute is the local chapter of a global franchise, started in Silicon Valley, which offers potential firm founders a 4-month curriculum designed to work through details of their project and eventually leading to the formation of a new firm.

Other incubators and accelerators in the region include Hacker Lab, which operates out of two regional locations and is an inexpensive place to test new product ideas and progress them toward the prototype stage. Hacker Lab holds more than 100 classes/month and has more than 700 members, bringing “people, training, and advanced prototyping equipment together under one roof.”<sup>287</sup> Its maker-space has more than \$500,000 worth of equipment available to members.

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<sup>282</sup> KCSourcelink, “Resource Navigator,” accessed October 10, 2019, <http://www.kcsourcelink.com/resource-navigator>

<sup>283</sup> Lean LaunchPad is an entrepreneurship methodology created by Steve Blank to test and develop business models based on querying and learning from customers. It is taught as a curriculum to potential and current entrepreneurs.

<sup>284</sup> FourthWave, “About Us,” accessed October 10, 2019, <https://fourthwave.io/about/>

<sup>285</sup> Willow Tree Roots, “The Power of SHE,” accessed October 10, 2019, <https://www.willowtreeroots.org/the-power-of-she?fbclid=IwAR2LvxEqj067ZTMJqUjW8oPRfRIPVDDYn3pPqbQQwMUOXixLm7QZuWyBJFU>

<sup>286</sup> StartUp Sac, “Founder Institute Sacramento Graduates Its Inaugural Cohort,” accessed October 10, 2019, <https://startupsac.com/founder-institute-sacramento-graduates-its-inaugural-cohort/>

<sup>287</sup> Hacker Lab, “Hacker Lab,” accessed October 10, 2019, <https://hackerlab.org/en>.

More specialized supports for entrepreneurs have also emerged. Alchemy Kitchen is a business training program and incubator that serves aspiring food entrepreneurs from low-income populations.<sup>288</sup> MicroMentor is a Mercy Corps social enterprise initiative, a mentoring platform that connects entrepreneurs, experienced professionals and corporate employee volunteers with one-to-one mentoring relationships.<sup>289</sup> There are also nine coworking spaces in operation in Sacramento, with three more planned for 2019-2020, providing entrepreneurs with relatively inexpensive start-up space.

Additionally, local and regional institutions are preparing to invest in physical infrastructure that will support start-ups. The Sacramento Center for Innovation (SCI) adopted plans in 2013 for the 240-acre industrial area south of the Sacramento State campus. The city designated it as an area to foster the exchange of technical knowledge and expertise between students, faculty and innovative businesses and technology companies. However, SCI has moved forward slowly, without firm, funded plans for implementation.

The CMC (discussed in the Future Mobility section) is an initiative underway by SMUD and other partners to support the development of electric and autonomous vehicle technologies. The Center plans to provide space for start-ups and other firms to co-locate and create and test new mobility technologies. Reportedly, one of its potential locations is at SCI.

The UC Davis Aggie Square project (discussed in the Life Sciences section), in a sense, is also a direct physical response to the need for a more rich, networked and creative environment for start-ups. Aggie Square will offer research facilities, modern office and mixed-use space, and other amenities. It will specifically connect UC Davis innovation programs to the rest of the Sacramento start-up ecology. Aggie Square will focus primarily on activities related to UC Davis and its faculty and alumni, as well as the outcomes from and commercialization of early-stage research.

While start-up supports are still largely scattered and could be better organized, the breadth of these supports, as well as the emergence of new ones, suggests that Sacramento is on its way to cultivating a robust start-up environment. As the Rasmussen 2017 study noted, Sacramento has relatively strong early-stage support – but weaker later-stage support.<sup>290</sup>

### *Start-up Funding*

Few start-ups are immediately good candidates for venture capital funding. Venture capital funding typically focuses further downstream, after initial revenues have been achieved and when valuations support a substantial investment. Bay Area venture funds have been more

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<sup>288</sup> Alchemist, “Alchemy Kitchen,” Accessed October 10, 2019, <http://alchemistcdc.org/alchemykitchen/>

<sup>289</sup> MicroMentor, “Volunteer: Share your knowledge with a small business owner,” accessed April 27, 2020, <https://www.linkedin.com/jobs/view/volunteer-share-your-knowledge-with-a-small-business-owner-at-micromentor-1459952238/>

<sup>290</sup> Richard Rasmussen, “Startup Ecosystem for Greater Sacramento,” August 2017.



reluctant to fund Sacramento companies, as they have many investment opportunities in their immediate vicinity. That makes angel funding a critically important component in the regional innovation infrastructure.

There are three active angel networks in the region:

- **Sacramento Angels** brokers connections between entrepreneurs seeking funding and its group members. Investments are made by individual members, not the group itself. It appears that fewer than 10 companies are funded annually. However, a new LLC vehicle was recently created, allowing interested members to invest collectively and expanding funding options. The LLC structure should allow investors to reduce their commitment to individual companies and hence support more start-ups.<sup>291</sup> Sacramento Angels also has three VC members – Akers Capital, Moneta Ventures, and Medforce – that 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 have supported more than 60 companies in industries such as software, internet, wireless, social media, IT, health tech and clean tech.
- The **Davis Angels Network** appears to be in the early stages of development.

A 2017 report<sup>292</sup> concluded that the Sacramento region has significant lags and gaps in the earliest seed funding, which is often provided by friends, family, previous founders, accelerators, crowdfunding platforms and small angel investments. This initial funding of \$10,000 - \$500,000 is the oil that greases the initial idea to the point that it is fundable at a more substantial level. Its absence presents particular challenges to people of color, who often lack access to family and friends with wealth to invest.

As a major source of innovative ideas in the region, UC Davis and Sac State have developed programs that offer funding and advice to very early stage enterprises from within the university. UC Davis’ Venture Catalyst in particular, started in 2013, offers three main programs for entrepreneurs:

- **Science Translation and Innovative Research (STAIR)** (2013) provides proof-of-concept grants of \$25,000 to \$50,000 for faculty to prove commercial feasibility. STAIR has awarded over \$1.6 million to 30 recipients, supporting 11 UC Davis-associated start-ups, and funding is growing. In 2019, six recipients were awarded a total of \$409,000.<sup>293</sup>

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<sup>291</sup> Sacramento Business Journal, “Sacramento Angels group makes change to fund more startups,” January 25, 2019, <https://www.bizjournals.com/sacramento/news/2019/01/25/sacramento-angels-group-makes-change-to-fund-more.html>

<sup>292</sup> Richard Rasmussen, “Startup Ecosystem for Greater Sacramento.”

<sup>293</sup> UC Davis Office of Research, *Innovation & Technology Commercialization: Annual Report*, Online Publication: 2019, <https://research.ucdavis.edu/wp-content/uploads/2018-2019-ITC-Annual-Report.pdf>

- **Distributed Research, Incubation, and Venture Engine (DRIVE)** aims to replicate the Engineering Translational Technology Center campus wide (see below). It offers affordable, mixed office/lab business incubation spaces in Davis and Sacramento and connects UC Davis entrepreneurs to other incubators.<sup>294</sup>
- **Smart Toolkit of Accelerated Research Translation (START)** supports entrepreneurs with patent expense deferment, company incorporation, legal support, business and technology mentors, grant writing workshops and contract service providers.<sup>295</sup>

**DRIVE Incubators include:**

- UC Davis-HM.CLAUSE Life Science Innovation Center
- Area 52
- HackerLab
- The Urban Hive
- I/O Labs
- Inventopia
- R2B Catalyst
- MedCatalyst @UC Davis

In addition, several UC Davis schools have their own programs aimed at supporting potential entrepreneurs. For example, The Child Family Institute for Innovation and Entrepreneurship (CFI) operates in the Graduate School of Management, hosting an Entrepreneurship Academy and other events. Additionally, The Engineering Translational Technology Center (ETTC) in the engineering school is the only incubator hosted on campus. It has spun off two companies so far: headphone maker Dysonics and network management provider Ennetix.<sup>296</sup>

UC Davis also encourages start-ups to tap into other funding resources. For example, UC Davis start-ups received a total of \$18.1 million from Small Business Innovation Research (SBIR)/Small Business Technology Transfer (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,<sup>297</sup> which further underscores the biomedical tilt of UC Davis commercialization.

Sac State also has programming and resources to help entrepreneurs grow their business and connect to Sacramento's start up ecosystem led by the newly established Carlsen Center for Innovation and Entrepreneurship. The Carlsen Center serves as a regional hub and platform for providing approachable and accessible entrepreneurial education, community, and support to enable startup founders of all backgrounds to explore and launch their businesses.

The Sacramento City Council has also sought to address gaps in start-up funding, having created an Innovation and Growth Fund of \$10 million to promote regional technology growth and

<sup>294</sup> UC Davis Office of Research, "Venture Catalyst DRIVE Program," accessed October 10, 2019, <https://research.ucdavis.edu/offices/vc/start/drive/>

<sup>295</sup> UC Davis Office of Research, "START," accessed October 10, 2019, <https://research.ucdavis.edu/offices/vc/start/>

<sup>296</sup> Other examples include: 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. Seed Central is a joint initiative of UC Davis's Seed Biotechnology Center and SeedQuest, and appears to have gained significant traction within the seed industry.

<sup>297</sup> UC Davis, "Venture Catalyst", Online infographic: 2019, <https://itc.ucdavis.edu/wp-content/uploads/UCD-At-a-glance-infographic-V11.pdf>.

improve civic engagement. \$1 million supports SUTL Innovation Grants which focus efforts around ecosystem building, start-up challenges, and brand development for the city.<sup>298</sup> Originally a single program aimed at start-up enablers – organizations that support start-ups through the development of talent, programmatic support or space – the SUTL Innovation Grant program is being redesigned as a three-tier program. The first tier addresses start up enablers, the second tier addresses marketing and sharing Sacramento’s story as a place for start-ups to grow, and the third tier addresses scale-up support for companies ready to grow. Similarly, SMUD is seeking to raise capital to support start-ups developing new mobility technologies.<sup>299</sup>

Finally, though still early in their implementation, Opportunity Zones (OZs) create the potential to attract additional equity investors to qualified OZ businesses. This source may be particularly important in addressing inclusion more directly given the criteria for OZs.

Addressing funding gaps is important, as obstacles in the innovation pipeline have downstream ramifications. If the flow of start-ups is interrupted, those missing start-ups never become scale-ups and eventually large companies. These gaps, in part, could perhaps be filled by better organized and more extensive pursuit of additional funding from non-angel sources (e.g., from SBIR), as well as by the gradual development of a more risk-accepting business culture, in which individual and corporate investors are prepared to act as angels, accepting higher risk in pursuit of higher returns.

### *Scale-Ups*

Start-ups are a precondition for an environment in which firms eventually become big – after all, even Apple and Amazon started in their respective garages. It is among the start-ups and small and medium-sized businesses that the future gazelles – growth firms that will contribute most to Sacramento’s next economy – will be found. While start-up support is important, it’s not enough to drive growth in a regional economy. Job growth comes primarily from the expansion of existing firms.

According to the most recent SBA data there are about 3,000 mid-sized businesses in Sacramento county, accounting for about a quarter of total employment. These firms, along with firms emerging from incubators with products already in the market and small and mid-sized firms in transitioning industries poised for growth, are the drivers of growth in the economy. To fully maximize return on the innovation activity and entrepreneurship ecosystem, scale-ups are essential.

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<sup>298</sup>2016 grant winners included: The Elevate Project, which mentors female tech entrepreneurs; Square Root Academy, which supports the next generation of scientists and engineers coming from underserved areas; and Code4Sac, which brings together teams to work on civic issues. <https://abhinemani.com/RAILS/2016/index.html#/11>

<sup>299</sup> Sacramento Business Journal, “SMUD to Seed Venture Fund in Connection with California Mobility Center,” accessed November 8, 2019, <https://www.bizjournals.com/sacramento/news/2019/10/04/smud-to-seed-venture-capital-fund-to-back-mobility.html>.

Scale-ups, however, can face significant challenges in trying to grow. Scale-ups are often at that moment of business growth where needs and opportunities far exceed working capital, as they do not yet have large revenues and are resource-constrained. They often need additional kinds of business services to grow to a qualitatively different scope and magnitude of operations. Scale-ups generally do not yet have an in-house division of market researchers, expensive product testbeds, or deep understanding of key regulations or IP options, and they often find the opportunities and challenges of a globalizing marketplace intimidating.

There is evidence to suggest that scale-ups struggle in Sacramento. The Kauffman Foundation Growth Entrepreneurship Index for 2017 found that Sacramento placed 30<sup>th</sup> out of 40 metro areas (although it had gained 7 places since 2016). Sacramento ranked 27<sup>th</sup> in the rate at which start-ups added employees over their first 5 years of operation; 23<sup>rd</sup> in the percentage of start-ups that scaled up; and 34<sup>th</sup> in the density of high growth companies.<sup>300</sup> In 2016, Sacramento ranked near-last in terms of density of high growth companies.<sup>301</sup>

While scale-up activity in Sacramento is low, one precondition for high tech scale-ups does initially appear to be in place: STEM workers. STEM workers are critical to applied R&D and commercialization activities and are well represented in the Greater Sacramento workforce. The Sacramento metro area has 73 STEM employees per 1,000 jobs in 2015, considerably higher than California as a whole.<sup>302</sup> The STEM jobs in Sacramento pay an average salary of \$85,120.

Interest in STEM careers among college students in Sacramento is also expanding, particularly among people of color students. UC Davis is graduating a growing number of people of color STEM majors. As of 2015, over 15% of UC Davis graduates with a STEM degree were underrepresented people of color, up from about 10% 15 years previously (see Figure 14). The growth in people of color STEM graduates is a key metric for the talent pipeline, given the changing demographics of college overall in the region. In all, 56% of UC Davis and 35% of Sac State students are enrolled in STEM majors.

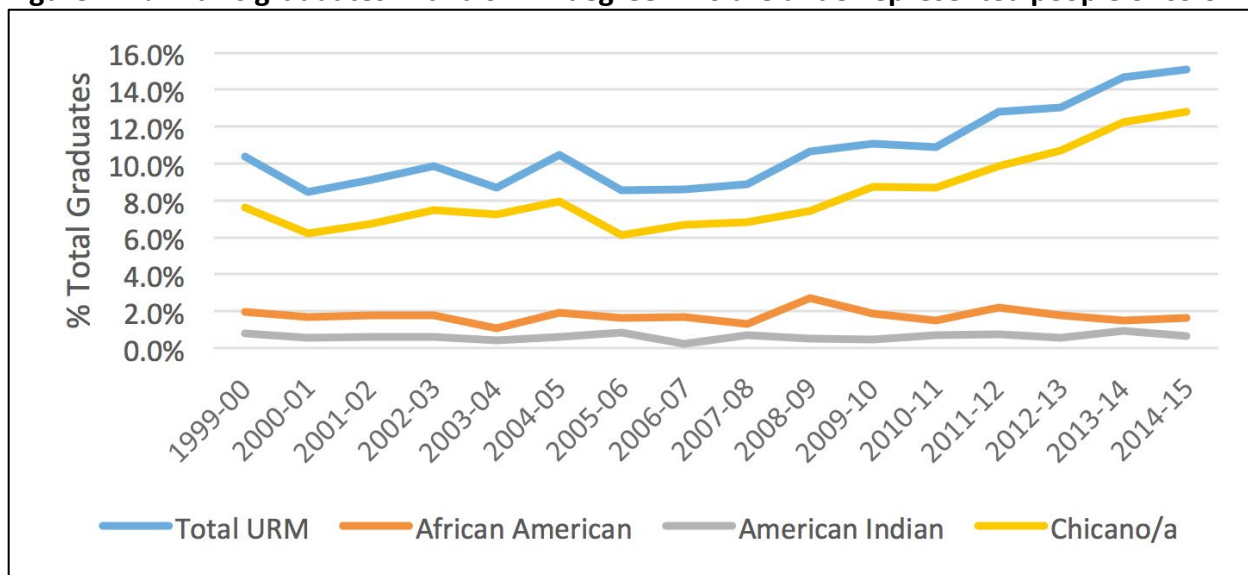
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<sup>300</sup> High growth companies are defined as companies that generate at least \$2 million in revenue and grow at least 20% annually for 3 years.

<sup>301</sup> Kauffman Foundation, *The Kauffman Index: 2016 Growth Entrepreneurship*, Online Publication: 2016, [https://www.kauffman.org/wp-content/uploads/2019/09/kauffman\\_index\\_growth\\_entrepreneurship\\_metro\\_report\\_6\\_2016.pdf](https://www.kauffman.org/wp-content/uploads/2019/09/kauffman_index_growth_entrepreneurship_metro_report_6_2016.pdf)

<sup>302</sup> NSF, "Science and Engineering Indicators," accessed October 10, 2019, <https://www.nsf.gov/statistics/seind/>

**Figure 14: % Davis graduates with a STEM degree who are underrepresented people of color**



Source: UC Davis STEM Facts, University of California Infocenter

Further downstream, data are inconclusive about the role of people of color-owned businesses in the emerging Sacramento growth economy. Between 2007 and 2012, the number of firms in the Sacramento Metro area (with or without employees) grew only 1%; however, people of color-owned firms grew 30%, and women-owned firms grew 14% over the same period. By 2012, people of color-owned businesses accounted for about 27% of all firms with employees. However, those enterprises accounted for only 6% of revenues, suggesting that most were small or not in high-value sectors. Looking only at high tech sectors, people of color-owned firms accounted for 3% of firms in the information sector, and 16% of the firms providing professional and scientific services – both figures being far below their share of the population (nearly 50%).<sup>303</sup>

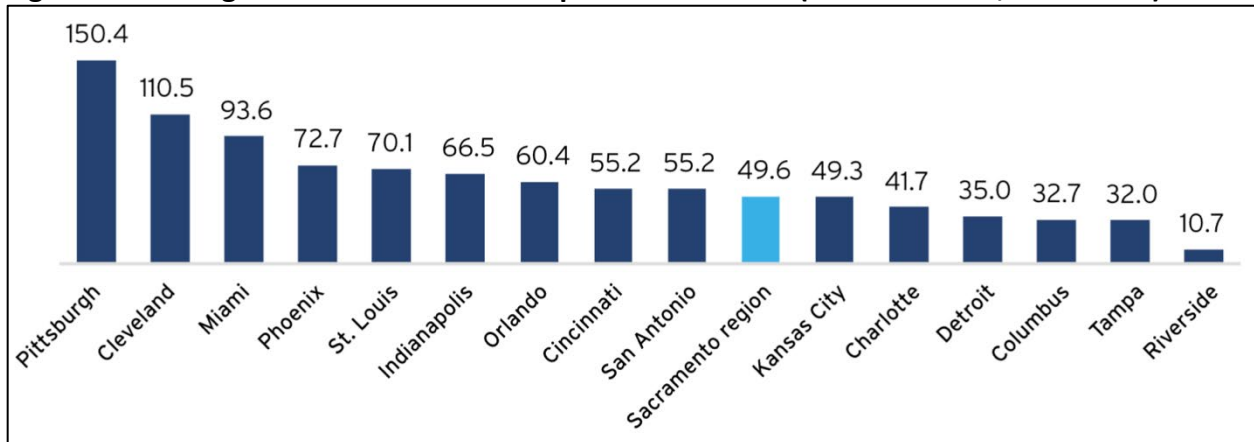
### Scale-Up Financing

Angel funding, bootstrapping, funding from industrial partners and government support such as SBIR can all play a role in supporting start-ups. But once the seed stage is complete, and companies are either start-ups entering the growth phase, or more established companies seeking to undertake a significant growth initiative, different kinds of funding are needed. VC is one key source, as these funds can provide substantial capital at the scale necessary. But Sacramento compares poorly against peer regions, which excludes the venture capital centers on the coasts (see Figure 15). Sacramento ranked 10<sup>th</sup> 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.<sup>304</sup>

<sup>303</sup> American FactFinder, “Statistics for All U.S. Firms by Industry, Gender, Ethnicity, and Race for the U.S., States, Metro Areas, Counties, and Places: 2012,” 2012 Survey of Business Owners, accessed October 12, 2019

<sup>304</sup> Parilla et al. *Charting a Course to the Sacramento Region’s Future Economic Prosperity*.

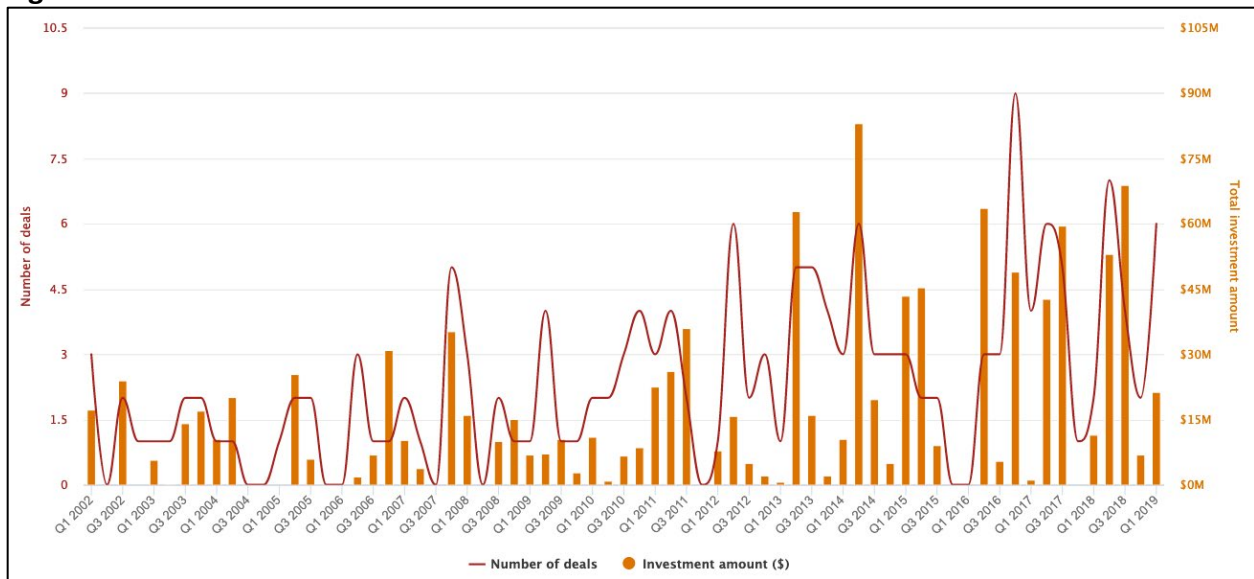
**Figure 15: Average annual VC investment per 1000 workers (thousand USD, 2011-2016)**



Source: Brookings's analysis of Pitchbook data

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 16).<sup>305</sup> In comparison, Pittsburgh firms raised about \$190 million in venture funding in 2018. The trend for Sacramento is positive, with the size of the 2018 deals suggesting that venture funds are seeing more opportunity in Sacramento.<sup>306</sup>

**Figure 16: VC deals in Sacramento**



Source: PWC MoneyTree

<sup>305</sup> PWC, "Technology: investments and deals," accessed October 10, 2019, <https://www.pwc.com/us/en/industries/technology/moneytree/explorer.html#/>.

<sup>306</sup> Note that this data covers only the Sacramento metro area, not the entire 6 county region.



## Scale-up Supports

Like start-ups, scale-ups need a variety of support. However, their needs differ substantially from start-ups and are often unique to the industry and even the individual scale-up company.<sup>307</sup> As a firm “breaks through” – moving from having a product to proving a market to being a small business to substantial growth – it has to address an entirely different set of management, talent, production, market access and other issues. For example, a scale-up may need to know how to source a specific technology, cut their costs by 30% for a specific product line, apply ITAR regulations for international trade to their specific facilities or know the state of the market for data services in Kazakhstan. As a result, scale-up support generally requires more specialized engagement with the firm and is often best delivered through cluster-specific interventions.

The most substantial support currently available to help established businesses innovate focuses on manufacturing, through the National Institute of Standards and Technology (NIST) Manufacturing Extension Partnerships program (MEP).<sup>308</sup> The state’s MEP affiliate, California Manufacturing Technology Consulting (CMTC), established California’s Manufacturing Network to coordinate the varied support services provided to manufacturers. In the Sacramento region, these partners include SVMi, Valley Vision, Sierra College Training and Development, Manex and Small Business Development Center (SBDC) Northern California Region.

MEP projects are fundamentally organized to provide bespoke consulting for each company. However, the main 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.<sup>309</sup> Typically, MEP funding is used to match funding raised by the company to pay jointly for improvement initiatives at the company. MEP is limited to manufacturing and focused primarily on process improvements.

Outside of manufacturing, the Commerce Department’s International Trade Administration (ITA) has an office in Sacramento whose mission is to help firms expand their international trade and specifically boost exports.<sup>310</sup> ITA offers substantial technical information on exporting, as well as connections to further resources. Still, the kind of detailed information firms often need – specific to their product type and international market opportunities – can be difficult to find.

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<sup>307</sup> As a general rule, the kind of support needed becomes more sophisticated and bespoke as the size and maturity of the company grows. Start-ups need generic supports, whereas scaleups need more unique help.

<sup>308</sup> The local franchise holder is Manex, which is the MEP franchisee for the Bay Area and Sacramento.

<sup>309</sup> National Academies, *21st Century Manufacturing: The Role of the Manufacturing Extension Partnership Program*, National Academies Press: 2013.

<sup>310</sup> International Trade Administration, “Sacramento: Contact Us,” accessed October 10, 2019, <https://2016.export.gov/california/sacramento/contactus/index.asp>



The City of Sacramento has focused and led the charge on improving the innovation ecosystem. In addition to programs mentioned above, the Office of Innovation and Economic Development has also released the SUTL framework to position the “city as a living laboratory.” SUTL aims to partner with companies to drive testing and piloting of new technologies in real communities in the region. Planned events and activities include two initiatives focused on scale-up activities:

- A Start-up/Scale-up Growth Competition is planned for early 2020. This program is designed to help high growth scale-ups locate and grow in Sacramento and targets IoT, Cybersecurity, Mobility, Health IT, and Life Science industries.
- An Economic Gardening 2.0 pilot is designed to help companies with five to 99 employees and revenues of \$1M to \$50M to scale. After an initial pilot, budgeted at just under \$500,000, the City is seeking addition outside financial partners.<sup>311</sup>

Outside of these supports, support for scale-ups is limited in the Sacramento region. For example, there is no single program or entity tuned specifically to helping firms turn themselves into gazelles: firms that grow at least 20% annually for at least 3 consecutive years. Additionally, Sacramento scale-ups lack enough industry and product-specific supports, such as specialized assistance on product development, testing, financing, talent acquisition, partnering, marketing and sales, as well as access to and partnerships with larger industry-leading firms.

While start-ups are important and a key step from research to commercialization, scale-up is where the payoff for all of the start-up activity can be found. Sacramento is doing reasonably well in supporting start-ups. The next step of taking the high potential start-ups to scale is what needs attention.

## *Culture*

Start-ups, in particular, benefit from a highly networked environment. This is an acknowledged strength of Silicon Valley, where potential entrepreneurs, investors, experts, lawyers, mentors, technical talent and potential partners rub together closely. The friction provides both the creative spark for new ideas and quickly helps turn those ideas into new companies. This fertile broth of cross-pollination has not been as strong in Sacramento –due to its more traditional business culture – but that is changing. Several network-building initiatives are gaining traction, with a focus on start-ups over scale-ups. These particularly include StartupSac, a nonprofit aimed at accelerating Sacramento’s start-up and innovation ecosystem, and HackerLab. StartupSac is primarily focused on entrepreneur educational and networking. It runs StartupSac Happy Hour, a monthly ‘Ask Me Anything’ Q&A event for Sacramento start-up founders, entrepreneurs and innovators; Warmup Pitch, a competition to help entrepreneurs hone presentation skills and teach them what investors want; and 1 Million Cups, the local chapter of a national education and networking program with weekly presentations and

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<sup>311</sup> To date, SUTL has announced two major demonstration partnerships with Verizon and Electrify America (a Volkswagen subsidiary). Verizon will roll out 5G networks and Electrify America will invest \$44 million by 2020 to support its Green City zero-emission vehicle initiative.

monthly entrepreneurship happy hours.<sup>312</sup> StartupSac also offer training programs for potential entrepreneurs at Sierra College (which has also partnered with HackerLab to establish a maker and co-working space in Rocklin).

This growing level of activity is encouraging for start-ups. In 2017, a report concluded that “[t]he area has too few events with too much time between them to keep a connective network of ideas to stimulate the ecosystem.”<sup>313</sup> Those conclusions are less evident today, as there are multiple events weekly, but there is still much to be done, particularly for scale-ups.

## Firm and Cluster Based Innovation

This third critical pathway to innovation (in addition to commercialization and entrepreneurship) is addressed in the cluster sections above.

## Assessment: Sacramento’s Opportunities

Sacramento’s innovation and entrepreneurship environment is transitioning, shifting from a traditional business culture centered around government and larger firms, to a more fluid and diverse culture focused on supporting start-ups and their emerging networks. In this transition moment, there is some natural tension between the cultures and priorities of the traditional firms and the emerging ones, and insufficient connection of larger firm-based innovation with entrepreneurial-driven innovation. As the transition continues, the two will begin to align: start-ups and scale-ups (as well as research) need to be connected to large companies and industry leaders, and in this economy larger firms are discovering the benefits of joining and even driving the “ecosystem” for their own innovation and growth.

Indeed, support for new firms is expanding rapidly. New major nodes have emerged recently in StartupSac and HackerLab, and there is much more entrepreneurial energy and connection than was previously the case. Several angel networks exist, and UC Davis has also developed a considerable portfolio of support for university-related entrepreneurs, some campus-wide and others specific to individual schools and disciplines. The city is driving major new programming. 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 important gains.

What is sorely missing in Sacramento is a substantial set of initiatives to support scale-ups. Scale-up support would take the most promising start-up entrepreneurs to the next stage, and also support existing firms and new firms migrating to Sacramento with strong growth potential. Too many business ideas are invented in Sacramento, and then move elsewhere when they start growing. Focusing on building the array of supports that will make Sacramento a value-added competitive place to be a larger business – that will make it the place where

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<sup>312</sup> 1 Million Cups, “Events,” accessed October 10, 2019, <https://www.1millioncups.com/sacramento/events/17894>

<sup>313</sup> Richard Rasmussen, “Startup Ecosystem for Greater Sacramento.”

scale-ups want to be and succeed – will build on and strengthen the existing ecosystem for start-ups, and will position Sacramento to grow in the next economy.



## *Spatial Efficiency*

### *Overview*

The shift toward a more dynamic, knowledge-intensive economy favors a new urban growth form, as the demand for rapid exchange of goods and ideas, face-to-face interactions, physical density of economic assets, and co-location of employment and residential activities lead to more demand for urban density and new types of “economic placemaking.” As a result, mixed-use and inclusive communities with strong transportation connections are best positioned to flourish in the new economy.

The concept of “spatial efficiency” refers to the relative location of businesses, suppliers, workers, and consumers within a region and the physical and virtual infrastructure that connects them. These two features – co-location and connecting infrastructure – determine transportation and transaction costs for the movement of goods, people, and ideas, magnifying or diminishing the many economic benefits of agglomeration (such as shared labor pools and knowledge spillovers).

Achieving these outcomes entails:

- Aligning land use, transportation, and economic regulation with incentives and activities to foster a more compact, well-connected pattern of development.
- Providing transportation and other infrastructure to move people, goods and ideas around efficiently, with particular attention to reducing segregation and isolation of geographic areas or populations by better connecting job and housing locations. This also entails investing in next-generation energy, data, and other forms of infrastructure to support inclusive economic growth.

### *Market Observations*

#### *Traditional Suburban Growth Patterns*

The Sacramento region has traditionally focused new population and housing growth in outlying suburban areas. Between 1950 and 1970, Sacramento’s downtown area shrunk from 58,000 to 27,000 full-time residents, as businesses and residential development moved to the suburbs and the city core became desolate after government workers left for home. Since 2001, the six-county SACOG region has added approximately 460,000 new people, with the largest supply of new housing development occurring in the outlying suburbs of Roseville, Rocklin, Lincoln, Folsom and Elk Grove. Most of this housing production has been single family, supported by suburban-style commercial centers and office parks.

## *Jobs-Housing Mismatch*

Businesses that locate in the region's most accessible and connected job hubs – particularly those in the core and near transportation corridors – have advantages in the number of workers that can reach them in a reasonable commute. Therefore, from a spatial efficiency perspective, it makes sense to prioritize business development in these more accessible nodes.

Job access varies significantly across the Sacramento region's 14 job hubs. Downtown Sacramento, Rancho Cordova, Power Inn/Sacramento Center for Innovation and Roseville are the region's four largest job hubs, together concentrating 21% of the region's employment. These hubs significantly differ in accessibility within a reasonable commute time (under 30 minutes for drivers and under 45 minutes for transit). For instance, about 69% of workers can reach Downtown Sacramento within 30 minutes by car and 6% within a 45-minute transit commute. This is a higher share than those who can access jobs in Rancho Cordova (65 % via car; 3% via transit), Power Inn (63%; 3%), and Roseville (43%; 1%).<sup>314</sup>

Overall, the number of jobs near the average resident of the metro area declined by about 7% between 2000 and 2012, as employment opportunities sprawled to outlying areas. This job sprawl reflects the importance of land use decisions in determining where jobs and housing locate, and how workers travel from home to work and other activities. These dynamics matter for businesses as well: locating in the core – where densities are higher and transit mode options are better – offers access to a greater share of the regional labor force than in the peripheral job hubs.

Because of these job access dynamics, the Sacramento region's workforce commutes mainly via automobile, although the region has a higher share of non-driving commuters than its American peer regions of similar size. In 2016, most workers drove alone to work (77%) and about 10% carpoolled. The remaining 13% either worked from home or commuted to work by biking, walking, or transit. Most residents live in households that have access to a car (93%), but these shares differ by race. 12% of black residents live in households without access to a car, as compared with 5% of white residents and 7% of both Asian and Hispanic residents.<sup>315</sup>

The mismatch between Sacramento's areas of residential growth and job growth can impact households through higher transportation costs, as measured in time or money. This effect is exacerbated by the fact that, while home prices in the region have increased by 86% (to \$387,000) since their lowest point in March 2012 and rents have increased by 30% from 2011

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<sup>314</sup> Parilla et al., *Charting a Course to the Sacramento Region's Future Economic Prosperity*.

<sup>315</sup> As another metric - In 2018, approximately 38% of the Sacramento region's population lives in defined Environmental Justice Communities. People in the EJ Communities are nearly twice as likely to be classified as low income as people in other areas. Households in EJ Communities tend to use transit, walking and bicycling at significantly higher rates than Non-EJ households – more than twice the rate for transit use and a 65% greater rate for walking and bicycling region-wide. Part of the reason for this is because households in EJ Communities have less auto ownership or access to a vehicle. According to most recent ACS data, almost 11% of households in EJ Communities do not have a vehicle available, compared to about 4% of households in Non-EJ areas without a vehicle available. This also indicates that, while less than Non-EJ Communities, the large majority of EJ Area residents use personal vehicles for transportation.

to 2018 (to \$1,871/month), median wages have failed to keep pace. Between 2011 and 2016, median wage growth was only 6%, suggesting that even as the labor market improves, it has not delivered middle-income wage gains to offset rising housing prices. These factors increase inequality, which hinders economic growth.

### *Connectivity and Mobility*

The decline in job accessibility between 2000 and 2012 has made the issue a central concern of the region’s transportation planners. The next economy demands investments in transformative infrastructure that increase the productivity and efficiency of businesses and households. This aspect of spatial efficiency focuses on infrastructure to move goods, people and ideas efficiently into, within and out of the region. The analysis encompasses business-to-business, business-to-consumer and worker-to-job connectivity. Worker-job connectivity is particularly important to enable deploying the labor force’s skills into the most productive jobs and to help employers find and use the workers they need. Two factors limit the quality of this connectivity: the transportation available to residents and the proximity of relevant job centers.

The Sacramento region has largely grown around a “radial” transportation network that radiates from one main point: Downtown Sacramento. A radial network design ensures that anyone looking to travel Downtown can make their trip without the need to transfer between routes. Anyone wishing to travel to another outlying neighborhood makes a transfer between routes downtown. As the region has grown, these radial networks have become less practical because the out-of-direction travel required to get between two non-Downtown points has significantly increased.<sup>316</sup> In turn, many suburban neighborhoods (both older and newer) are not well connected by transit to existing employment centers throughout the region.

As noted above, the region suffers from significant dispersion and distance between job centers and residential centers, particularly for disadvantaged populations, putting additional pressure on having a robust transportation network. The region’s primary transportation systems and connecting infrastructure include:

- **Freeway System** – The system of freeways<sup>317</sup> handles the bulk of the long-distance trips that cross through the Sacramento region en route to other destinations, but it also handles large volumes of truck freight moving to, within and out of the region.<sup>318</sup>

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<sup>316</sup> SacRT, *Forward Network Plan: Transit Choices Report*, Online Publication: 2018.

<sup>317</sup> Two major interstate highways converge in Sacramento: Interstate 5 (I-5), a north-south highway running from Canada to Mexico, and Interstate 80 (I-80), an east-west highway running between San Francisco and the New York City metropolitan area. Two other major freeways, State Route 99, which runs north-south, and U.S. Highway 50 (US 50), which runs east-west, also converge within the city. The Capital City Freeway and State Route 160 (SR 160) round-out the city’s network of freeways.

<sup>318</sup> City of Sacramento, *2035 General Plan Background Report*, Online Publication: 2015.

- **Transit Service** – The Sacramento region has an integrated bus<sup>319</sup> and light rail transit<sup>320</sup> system that connects many parts of the community. This original transit system focused on moving riders to and from Downtown Sacramento. More recently, through Sacramento Regional Transit’s (SacRT) SacRT Forward initiative, bus lines have been added and rerouted to better connect all neighborhoods with light rail and other main bus lines. Bus service is much less expensive to operate than rail, as bus vehicles are cheaper and easier to procure than rail vehicles, and bus service does not require lengthy and costly construction projects.<sup>321</sup>
- **Amtrak Commuter Rail** – Within the broader Northern California Megaregion, the Sacramento region is connected by commuter rail to the San Francisco Bay Area and the Central Valley through two Amtrak lines: Capitol Corridor and San Joaquin.<sup>322</sup> The Capitol Corridor route has experienced steady growth in the past 10 years, has been a key link connecting businesses commuters between the Bay Area and Sacramento and has been particularly successful due to increased congestion on Interstate 80. The San Joaquin line runs from Sacramento to Bakersfield and connects major communities and employment centers throughout the Central Valley.<sup>323</sup> The San Joaquin Regional Rail Commission is currently in the design and environmental review phase of the Valley Rail Sacramento Extension Project, which will expand commuter rail service from Stockton north to Sacramento (through Elk Grove and Lodi) with five stations planned in within Sacramento.<sup>324</sup>
- **Port of West Sacramento** – The Port of West Sacramento is an inland seaport accessible by the deep-water channel connecting West Sacramento to the Delta and ultimately the San Francisco Bay. The Port does not receive the high volume of ships that other California ports handle, largely because it is a “non-container” port (most shipping worldwide is done by container ships). The Port’s cargo is mainly of the agricultural, industrial and heavy equipment type, and the port specializes in bulk cargo (including

<sup>319</sup> The SacRT bus network provides more than two thirds of all transit service in the Sacramento area. More than a third of all light rail trips include a transfer to or from a bus line. SacRT, *Forward Network Plan: Transit Choices Report*,

<sup>320</sup> The SacRT light rail system, which opened in 1987, is an integral part of the Sacramento region’s transportation infrastructure. The 42.9-mile line links both the eastern and northeastern suburbs with Downtown and south Sacramento and carries 35,000 passengers on a typical weekday. During Fiscal Year 2015, RT light rail vehicles carried 12.8 million passengers. SacRT, *Sacramento Regional Transit Light Rail Fact Sheet*, Online Publication: 2014.

<sup>321</sup> The bus network, however, does need to change and be improved; routes and service patterns need to be better aligned to meet the region’s goals.

<sup>322</sup> The Capitol Corridor line runs between Auburn to San Jose, connecting major cities and employment centers and is one of the fastest growing Amtrak routes in the United States (7.2% ridership growth between January 2018 and March 2019). Capitol Corridor Joint Powers Authority, “Capitol Corridor Ridership Up For 18th Consecutive Month,” accessed October 15, 2019, <https://www.capitolcorridor.org/whats-new/capitol-corridor-ridership-up-for-18-th-consecutive-month/>.

<sup>323</sup> Unlike Capitol Corridor, the San Joaquin has seen ridership steadily drop over the past five years from a high point of 1.2 million passengers in 2012-13 to a current 1.1 million passengers in 2017-2018. The main issue the San Joaquin line has faced compared to the other lines is that it is dependent on leisure markets and is not used as a major intra-city commuter route. The Fresno Bee, “Valley’s Amtrak Grappling with Ridership Declines Despite Earlier Times,” accessed October 5, 2019, <https://www.fresnobee.com/news/local/article221902900.html>

<sup>324</sup> ACE, “Notice of Preparation of an Environmental Impact Report: Valley Rail Sacramento Extension Project,” accessed November 7, 2019, <https://acerail.com/wp-content/uploads/Valley-Rail-Sac-Extension-NOP-091219.pdf>.



rice, fertilizer, lumber and cement).<sup>325</sup> The Port is also set up to handle heavy machinery such as wind turbines, steel, generators and transformers.<sup>326</sup>

- **Sacramento International Airport (SMF)** – The airport, which is owned and operated by Sacramento County, is one of the top growing mid-sized airports in North America. Sacramento ranked seventh among the top 50 mid-sized airports in passenger growth in 2018 and recently added service from Spirit and Sun Country airlines. The airport posted 10% passenger growth year-on-year in 2018, to reach a record of 12 million passengers, surpassing airport projections. It is one of five California airports listed on OAG Aviation Worldwide’s top 50 mid-sized North American airports in 2018.<sup>327</sup>
- **Telecommunications Infrastructure** – Access to critical digital infrastructure varies across neighborhoods throughout the region. For instance, low broadband subscription rates (under 40%) are visible on the outer fringes of the region as well as in a cluster of neighborhoods in South Sacramento. Subscription rates in disadvantaged communities (South Sac, Del Paso, etc.) hover around 20-50%, as compared to more affluent parts of Sacramento (Midtown, East Sacramento, Land Park) where they are around 75-100%.<sup>328</sup> Without access to broadband, the individuals living in these communities are less prepared for a labor market that is increasingly demanding digital skills.

### *State and Regional Sustainable Growth Coordination*

While compact urban development is critical for businesses and people in the new economy, it is also required to be addressed under California law. In 2008, the California Legislature passed the Sustainable Communities and Climate Protection Act (SB 375) to recognize the critical role of integrated transportation, land use and housing decisions to meet State climate goals. The law requires each of California’s 18 regional Metropolitan Planning Organizations (MPOs) to include a Sustainable Communities Strategy (SCS) in their long-range regional transportation plans. SACOG – the Sacramento region’s MPO – identifies strategies to reduce greenhouse gas emissions from driving, which can also foster healthier and more equitable and sustainable communities.

Under the current 2040 RTP/SCS that was released in November 2019, SACOG estimates that nearly two-thirds of the region’s new housing and 85% of its job growth is expected to be in Centers and Corridors, and Established Communities (i.e., existing suburbs, downtowns, commercial corridors, and the buildout of today’s existing suburbs). The remaining third of new housing and 15% of job growth is expected to be in more than two-dozen new Developing Communities (i.e., greenfield areas), mostly located at the edge of established communities and in scattered rural residential areas (see Table 9 for data; see Figure 17 for community types).

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<sup>325</sup> SSA Marine, “Port of West Sacramento,” available at: <https://www.ssamarine.com/locations/port-of-west-sacramento/>.

<sup>326</sup> Caltrans, *Freight Planning Fact Sheet for Port of West Sacramento*, Online Publication: 2012.

<sup>327</sup> The Sacramento International Airport recently underwent a major expansion with the creation of the \$1 billion Terminal B in 2011; CAPA Centre for Aviation, “Sacramento Airport: Record Passenger Levels and More ULCCs,” accessed October 5, 2019, <https://centreforaviation.com/analysis/reports/sacramento-airport-record-passenger-levels-and-more-ulccs-481286>

<sup>328</sup> Tomer, Adie, Kneebone, Elizabeth and Ranjitha Shivaram, *Signs of Digital Distress: Mapping Broadband Availability and Subscription in American Neighborhoods*, Brookings: 2017.

New suburban development will occur more slowly in the next 20 years compared to the last 40 years.<sup>329</sup>

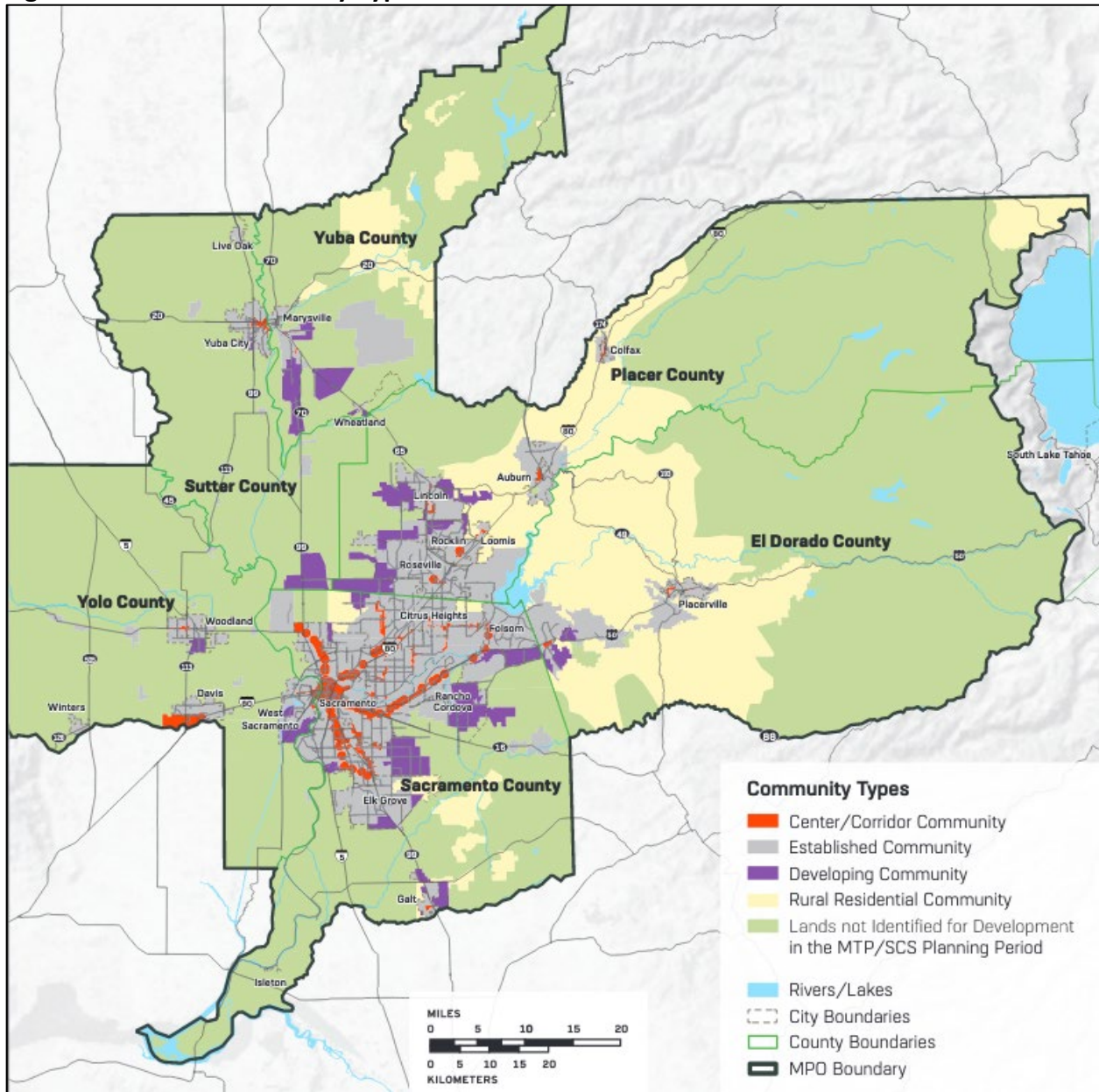
**Table 9: Summary of Expected Housing and Employment Growth by Community Type**

Community Type	2016		2016 to 2040		2040	
	Dwelling Units	Employees	Dwelling Units	Employees	Dwelling Units	Employees
Center and Corridor Communities	113,880	370,890	86,661	82,850	200,541	453,739
Established Communities	712,012	645,326	81,365	146,053	793,377	791,379
Developing Communities	20,793	12,339	89,313	39,754	110,106	52,093
Rural Residential Communities	74,438	32,196	2,789	1,405	77,227	33,601
Lands Not Identified for Development in the MTP/SCS Planning Period	n/a	n/a	n/a	n/a	n/a	n/a
Region Total	921,123	1,060,751	260,128	270,062	1,181,251	1,330,813

Source: SACOG Proposed MTP/SCS Land Use Forecast for 2040, June 2019 adopted in 2020 MTP/SCS

<sup>329</sup> SACOG, 2020 Metropolitan Transportation Plan/Sustainable Communities Strategy, Online Publication: 2019, [https://www.sacog.org/sites/main/files/file-attachments/2020\\_mtp-scs.pdf?1580330993](https://www.sacog.org/sites/main/files/file-attachments/2020_mtp-scs.pdf?1580330993)

Figure 17: SACOG Community Types



Source: 2020 Metropolitan Transportation Plan/Sustainable Communities Strategy, SACOG, November 2019

## Assessment: Sacramento's Opportunities

The Sacramento region's current urban form is not well aligned with the type of dense, mixed-use, well-connected built environment that will support growth in the new economy. Most of the focus over the past 60+ years has been on greenfield and suburban development, except for concerted efforts to create more infill development in the past two decades that largely started with SACOG's 2004 Regional Blueprint process. Much of the existing urban form in the region is a legacy of post-war suburban growth and population booms of the 70s, 80s, and 90s. This has resulted in both jobs and housing being

decentralized from the urban core, physically disconnecting residential areas from employment hubs and increasing auto dependence.

The region is also not efficiently utilizing its human capital assets to foster inclusive economic growth. People of color and low-income populations are particularly isolated from economic opportunities: existing transit systems are limited and do not sufficiently connect these populations to employment centers. Recent trends of people and firms seeking to move back to the Sacramento urban core create the opportunity to bring jobs back by creating and enhancing strategic nodes of economic activity – mixed-use infill development that leverages existing transportation and other infrastructure. Along with increasing affordable housing near transit-oriented developments and suburban employment centers (or enhancing access between the two, when co-location is not feasible) and improving transit networks throughout the region, recognizing and responding to these shifts in residential and business location preferences can begin to productively reshape the region’s built environment.

Further, the region’s infrastructure is under increased pressure to keep up with changes in the nature and level of demand from businesses and workers. Key systems must be continually and critically examined to ensure that they are enough to meet the evolving needs of the economy, and to enable strategic, value-added investments that will lay the foundation for new-economy growth.

A challenge facing the Sacramento region over the coming decades is that there are large amounts of new development “planned” by cities and counties in the region in largely suburban areas. In fact, planned growth far exceeds the amount of land required to accommodate projected business and residential growth. The challenge then is to manage where future growth occurs to ensure it is focused on infill areas and close to existing or planned transit. SACOG is leading the effort to coordinate managed growth as part of its 2020 MTP/SCS Update process. If successful, SACOG estimates that by 2040 there will be 500,000 more people living close to major job centers compared to today.<sup>330</sup>

In order to improve the economy in an inclusive manner, the region will need to develop land more efficiently in the next 20 years compared to the way it developed over the last 60 years. More compact development will help keep agricultural land in production to power agricultural and food industries, protect communities from worsening air pollution, conserve water, efficiently deliver public and transportation services and provide a more reliable and affordable system for people to get to their daily destinations.<sup>331</sup> As SACOG notes, no matter how much

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<sup>330</sup> In addition, SACOG’s goals state:

- 18 acres of farmland developed for every 1,000 new residents, compared to historic conversion rates of 242 acres for every 1,000 new residents.
- 490,000 homes and 658,000 jobs close to high-frequency transit service.
- Less traffic congestion per capita even as the region grows by 620,000 more people.

<sup>331</sup> SACOG, *2020 Metropolitan Transportation Plan/Sustainable Communities Strategy*.

money is spent on transportation infrastructure, it will not reduce congestion, make travel more reliable or improve the economy without a more compact development pattern.

Therefore, regional planning and coordination will need to focus attention on more infill development – supported by more accessible and efficient infrastructure – to ensure growth occurs in areas that best serve Sacramento and the region.

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## *Governance*

Governance’s role in fostering economic growth is distinct from (though related to) that of the government. *Government* shapes and enables market activity and provides critical public goods from roads to education. *Governance* refers not only nor even primarily to government, but also to the civic, business and cross-sector institutions that create the environment and culture for economic growth, by enabling the connections and transactions that drive economic activity in the next economy.

Examining these issues falls into three broad categories:

- **Fragmentation** – the proliferation of units of government, both vertically and horizontally, and their effects on firm efficiency, productivity and the costs of doing business
- **Tax-value proposition** – the value that firms and households receive in the form of public goods and services, relative to the amount of tax dollars paid
- **Cross-sector institutional environment and culture** – the extent to which public, private and civic stakeholders coordinate and collaborate, and the norms of local business culture (e.g., openness, flexibility, etc.)

## *Fragmentation*

As the earlier Brookings work reported, the region suffers from high levels of fragmentation, including many special districts and smaller jurisdictions. This creates inefficiencies which increase actual and transaction costs flowing from multiple governments, in turn increasing costs to residents and businesses. Fragmentation can be addressed through consolidating governments (which is often politically very difficult), and through intergovernmental cooperation initiatives that range from formally consolidating certain public functions (e.g., regional transit authorities) to shared services. Successful regions also frequently have regional organizations to collaborate on economic development, rather than primarily competing amongst themselves.

While the region’s fragmentation issues deserve attention, this Action Agenda is focused on economic development strategies for the City of Sacramento. Therefore, it does not attempt to analyze or address regional fragmentation.

### *Tax-Value Proposition*

Regions must strategically determine the combination of taxes (e.g., property, user fees, etc.), and public goods and services (e.g., infrastructure, human capital, research centers, etc.) that will make their location most attractive and productive for their residents, firms and industries.

It is fortunate for Sacramento that this economy increasingly rewards regions that compete on high value, not low cost – because that is its only option. The Sacramento region is operating in a higher-tax, higher-regulation environment, largely determined by state policy. While attention can be paid to minimizing taxes and regulatory burdens, measuring a region’s tax-value proposition is more complex than the many simplified and self-serving “best business location” indices would suggest. That question is whether residents and firms are getting their money’s worth and a value commensurate with the taxes and regulations they must navigate.

In some ways, this whole Action Agenda relates to this fundamental question. Sacramento in fact decided to raise taxes – in the form of Measure U – to increase investment in its economy. It is critical that those dollars deliver a real return in inclusive economic growth for residents and firms. The City of Sacramento will need to increasingly make strategic investment in specialized initiatives, products and services (see the Initiatives section for examples) that reposition the city’s economy to become a place where scale-up firms in key clusters thrive, and all of the residents and neighborhoods participate in and drive that new economic growth.

### *Cross-sector institutional environment and culture*

The increasingly dynamic economy places a premium on rich formal and informal networks that enable exchange of ideas and facilitate relationships, transactions and coordination across the public, private and civic sectors. Regions that enable the ready entry of new people and firms and the fluid development of the relationships, deals and activities that drive innovation and economic activity are the ones that are succeeding. Facilitating this type of environment requires a new form of governance – a constellation of public, private and civic institutions that fosters open, adaptive and flexible cross-sector networks.<sup>332</sup>

Sacramento is transitioning in these respects. Its business engagement and culture are shifting from a fairly closed, top-down and risk-averse traditional culture well-suited to the old industrial economy and a town dominated by government, to one that is more open, flexible

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<sup>332</sup> See: RW Ventures, LLC, *New Institutions for a New Economy*, Online Publication: 2018, available at <http://rw-ventures.com/new-institutions-for-a-new-economy/>.



and able to meet the needs of the more fluid and dynamic economy that is emerging.<sup>333</sup> The City government, which in the context of a traditional business culture had disproportionately “owned” and driven economic development activities, is deliberately engaging in collaborative, cross-sector efforts. The City needs to continue to pay careful attention to its critical but defined role in enabling economic growth, and to support a shift towards more private sector engagement, ownership and driving of inclusive economic development through more cross-sector institutions that the City participates in and supports, but does not lead.

Substantial progress has been made, and new institutional infrastructure is arising. GSEC creates a critical new platform for business engagement. The regional collaboration of the Metro Chamber, Valley Vision, SACOG, GSEC and others is advancing new cross-sector platforms and activities. From SVMII to the advisory groups of Project Prosper to the Measure U Investment Committee to the expanding network of incubators, new vehicles are arising for cross-sector collaboration. If still emerging and somewhat fragmented, they reflect a genuine and critical new will to collaborate, to open more pathways to economic actors and activity, and to reap the benefits of pulling together.

Of course, additional work remains in several areas. The private sector is increasingly finding greater alignment of its business interests with engagement in broader economic development activities. Corporations are individually and through collaboratives investing in workforce development,<sup>334</sup> entrepreneurship and innovation, their industries (e.g., through cluster organizations) and the economic health of their regions (through an array of regional economic growth organizations).<sup>335</sup> These companies are also forming and driving more private sector led and cross-sector institutions and activity. More broadly, leading corporations are understanding the inclusive growth paradox (discussed in the Economic Framing section), and new business models are needed for the next economy.<sup>336</sup> The trend of greater private sector engagement in Sacramento needs to continue and accelerate.

It also cannot be emphasized enough that inclusion is critical. One key form of inclusion is participation – who sits at the key tables that provide networks, access, decision- and deal-making opportunities? Attention continually needs to be paid to assuring broad and diverse

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<sup>333</sup> This is not an easy transition to make, and Sacramento evidences some of the tensions we see throughout regions making it, between an established “old guard” of business leaders and an emerging, younger entrepreneurial sector. Ultimately, these two groups don’t compete but complement each other as they establish new connections and networks to collaborate in this economy. The shift towards more collaborative and networked innovation throughout the economy provides one illustration.

<sup>334</sup> An increasingly knowledge-intensive economy leads companies to an increased focus on developing, attracting and retaining talent – from the collaboration on workforce initiatives mentioned above to “full lifecycle” investment in employee development to broader interest in local amenities. In addition, it turns out that the next generation workforce – particularly millennials – appears to care more about meaning and mission in their work, driving more companies to engage in economic development activities aligned with their business interests as a strategy for attracting talent.

<sup>335</sup> For extensive analysis of this trend, and case studies, see: Mass Economics and RW Ventures, LLC, *Evolving Corporate Business Engagement in Community and Economic Development*, Robert Woods Johnson Foundation, forthcoming.

<sup>336</sup> See, e.g., Blackrock CEO Larry Fink’s recent 2019 letter to CEOs; and the recently “modernized” principles on the role of the corporation from The Business Roundtable, shifting from an exclusive focus on shareholder value to a broader focus on stakeholder value (which in the long term will also drive greater shareholder value).



participation in the new institutional infrastructure and initiatives (including the process of creating and implementing the Action Agenda).

The Sacramento region has fewer of certain types of organizations that are often critical to this mix, particularly public and private philanthropic institutions and CDFIs. Hopefully, as the economy resets and new economic activities and opportunities arise, new institutions will emerge or old ones will further engage. At least two of the proposed Initiatives could become CDFIs: ScaleUp Services and Diversity Management & Ownership Services.

Overall, Sacramento is making huge progress on governance, and the Action Agenda creates further opportunities for greater collaboration and engagement, through the continually management and updating of its initiatives and implementation.

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### *Linking to Neighborhood Development*

ScaleUP Sacramento focuses on the regional economy, and how it informs opportunities to drive inclusive growth for Sacramento. This work inherently relates to the city's neighborhoods, as they are home to the people, businesses and places that participate in the regional economy. That said, creating neighborhood-specific development plans that connect each area to their unique economic opportunities is beyond the scope of this Action Agenda. It would also be duplicative of the city's efforts through Project Prosper, a community engagement initiative launched in 2017, and other neighborhood-specific planning.

The city is currently reevaluating how it supports the growth of its neighborhoods and surrounding commercial districts. The Neighborhood Development Action Team (NDAT) is a cross-department group, co-led by the city's Office of Innovation and Economic Development and the Community Development Department. This team will collaborate with Sacramento's historically disenfranchised and disinvested commercial districts and surrounding neighborhoods to increase quality of life and economic growth by strengthening the capacity of people, businesses and places. The NDAT's leading strategies are to 1) align and coordinate resources to support neighborhood economic development; 2) drive neighborhood business growth; 3) build local capacity of people and businesses to achieve economic development outcomes; and 4) implement community-driven transformative development projects in particular places. To successfully achieve neighborhood development through these strategies, it will be critical to link Sacramento's neighborhoods to the initiatives outlined in this Action Agenda.

A central tenet of inclusive neighborhood development is that neighborhoods do not have their own economies. Their success or failure is determined by their relationship to, and participation in, broader marketplaces (i.e., regional economic opportunities that best link to and leverage, their many assets). This concept works in reverse – for the city and the region as a whole to be successful and achieve sustainable growth, they must aspire to have **all** of their neighborhoods

fully engaged in the economy, finding the opportunities that maximize their potential and provide higher incomes and greater wealth. This is especially crucial for those communities that have traditionally been left out of the economy. (Additional information related to Sacramento’s neighborhoods, including analysis of their trajectories through the Dynamic Neighborhood Taxonomy (DNT) Typology, can be found in Appendix 9).

Determining where and how the Action Agenda will connect with Sacramento’s neighborhoods requires first understanding that successful neighborhoods simultaneously play two roles:

- (1) as “Communities of Opportunity,” neighborhoods create wealth by developing their human, business and real estate assets and connecting them to larger, generally regional labor, business, real estate and other markets; and
- (2) as “Communities of Choice,” neighborhoods create packages of housing, retail, recreation and other amenities to attract and serve particular population segments.

While the “Choice” and “Opportunity” roles reinforce each other in a cycle that can be virtuous or vicious, how well a neighborhood performs as a Community of Opportunity is the primary driver in the cycle. The neighborhoods whose businesses and residents successfully generate and capture economic value become home to the income and wealth of those companies and workers. This in turn helps create demand for the local amenities that attract, retain and support current and future residents.

While the Action Agenda is not addressing neighborhood plans, it is deliberately being coordinated with and will inform such plans. The economic opportunities described here – strong and emerging clusters, trends in skills demand, potential for scale-up activity – can guide neighborhood-level programs and investments. For example, the growth potential in the region’s food manufacturing cluster, especially for high-growth small firms and established mid-sized firms, has developed into a proposed initiative for a Food Manufacturing Innovation Park. The choice of where to locate this park should take into account where the potential workforce currently lives, to maximize job access for those workers, and should align with the neighborhood plans that seek out greater industrial development. At a neighborhood level, planning can identify companies that may be good candidates to connect with or locate in the Park – for instance, by building clear pipelines from shared kitchens and incubators to the Park or liaising with more established companies in need of more innovative processes. Neighborhoods can also assess the potential to create workforce training programs for residents who, with targeted, industry-specific training, would be well prepared for roles at the Park’s tenants.



### III. Transformative Strategies

#### Vision

Sacramento’s roots of development and discovery can be tapped and revived to deliberately transition Sacramento’s legacy economy into a dynamic center for high-tech, high-growth emerging industries. Building from the city’s unique assets and location, Sacramento will become known for its quality as a place to inclusively work in and grow next economy businesses – supported by human capital, finance, facilities, private sector partners, and amenities – as well as for the quality of life that flows from economic growth. The city will be an innovative next-economy hub that enables wealth creation for all.

#### MANUFACTURING COMPETITIVENESS

A fundamental question to realizing this vision concerns what it will be competitive to manufacture in Sacramento. What parts of the biosciences, future mobility, clean energy and food supply chains will be competitive to make locally? Manufacturing remains critical to economic growth,<sup>337</sup> and dramatic changes in manufacturing are favoring competing on high value/productivity rather than low costs. As labor costs go up in developing countries, and new hardware and software technologies are driving advanced and specialized manufacturing,<sup>338</sup> selected parts of manufacturing can thrive in places like Sacramento. Ultimately, the market will figure out what it’s cost-effective to make locally. Yet, attention to the changing factors driving these decisions – from developing an advanced workforce and specialized support and networks for high-tech firms to reducing regulatory burdens – will help shape this market. The strategies and initiatives below are intended in part to influence this market calculation – to make Sacramento a productive place to be for key parts of the value/supply chains in these emerging industries. It is not likely, for example, that autonomous and electric vehicle OEMs will locate final assembly car plants in Sacramento, but many of the key components should become competitive to make here.

<sup>337</sup> Manufacturing continues to play a critical role in growing economies. From its influence on exports and its high multiplier effect, to its disproportionate contribution to innovation, a strong manufacturing sector drives economic prosperity.

<sup>338</sup> Industry 4.0, for example, encompasses a promise of a new industrial revolution – one that marries advanced manufacturing techniques with the Internet of Things to create manufacturing systems that are not only interconnected, but communicate, analyze, and use information to drive further intelligent action back in the physical world. Deloitte, “Industry 4.0,” accessed October 15, 2019, <https://www2.deloitte.com/us/en/insights/focus/industry-4-0.html>.

## *Aligned Strategies for Sacramento's Growth*

To realize this vision, a set of high level, mutually re-enforcing strategies are presented below, designed to focus Sacramento's resources on new opportunities and guide its transition into a center for next-economy, high-tech, high-growth emerging industries. In conjunction, these strategies are also intended to ensure that inclusion is inherent in and drives all of the growth activity. Practically, in every growth activity, attention must be paid to inclusion across four dimensions: employment, ownership, location (e.g., whether new growth is in or accessible to disadvantaged communities) and participation (in formal and informal organizations that drive growth).

### **STRATEGY 1 [Clusters]:**

#### **Become a global center for firms and labor force in food manufacturing.**

In the context of dramatic changes in the food manufacturing industry, Sacramento has the key competitive "ingredients" – from agricultural inputs to workforce – to do much larger scale and more value-added food manufacturing. This strategy will enable the growth of start-ups and SMEs through investment in co-packing and co-production facilities, shared logistics, technology, workforce and business services, and support for new product development aligned with other clusters.

### **STRATEGY 2 [Clusters]:**

#### **Become a global center for firms and labor force in selected bio- and agricultural sciences.**

The region has strong Life Sciences and Ag-Tech institutions, businesses and networks – but early stage invention is not translating to major firm and industry growth in Sacramento commensurate with the potential. This strategy will create manufacturing and other support for scale-ups, strengthen collaborations and strategic partnerships, and build synergies between these two clusters. This strategy will lead to new business models to redefine the way innovation and growth occur in these clusters and will facilitate the growth of high-tech skill sets within these sectors.

### **STRATEGY 3 [Clusters]:**

#### **Become a global center for firms and labor force in future mobility.**

The planned CMC will catalyze growth in Future Mobility, and this strategy will leverage this momentum to provide aligned initiatives in human capital, business support services, and shared space models to enable new companies coming out of the CMC to scale-up operations in Sacramento.

### **STRATEGY 4 [Aligned Human Capital]:**

**Move labor markets and workforce system towards demand-driven, sector-based workforce development aligned with sector opportunities: develop and deploy an inclusive future workforce for future work.**

Cutting across each priority cluster and critical to increasing regional productivity, this strategy will align workforce skills with demand-driven occupations in high-growth, high-tech emerging industries. It will increase avenues for labor force participation and develop clear paths for upward mobility.

**STRATEGY 5 [Innovation Infrastructure]:**

**Build a scale-up ecosystem – become the place to be for growing firms in emerging advanced industries.**

The region provides strong research support and networks to grow start-ups into SMEs. This strategy will provide sophisticated business and finance support services to firms – as well as shared infrastructure and resources – to enable them to scale-up their operations in Sacramento and grow into established companies in high-tech, emerging industries. In addition, this strategy will increase cross-sector partnerships and technological adoption in new industries to spur innovation.

**STRATEGY 6 [Governance]:**

**Expand cross-sector - and particularly private sector - engagement and institutional capacity to conceive, prioritize, coordinate and implement economic growth activities.**

As the state capital, Sacramento has strong public-sector engagement. This strategy develops stronger networks to build private-public partnerships and in particular strengthens private sector leadership in economic growth initiatives.

**STRATEGY 7 [Spatial Efficiency]:**

**Target real estate and infrastructure development to improve density and access.**

This strategy will improve the physical and virtual infrastructure of the region to enable increased accessibility and increased growth in priority clusters. Key elements of the strategy include improving density and access, by focusing major market-making and job creating development near or with good transit availability from underdeveloped neighborhoods; improving transportation connections for spatially disconnected neighborhoods,<sup>339</sup> and improving broadband connections to accelerate ag-tech innovation and AV testing.

**STRATEGY 8 [Clusters]:**

**Develop a concentration of business services firms – building from the firms currently serving government – to meet the needs of high-growth, high-tech scale-up firms.**

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<sup>339</sup> Appendix 2 provides a summary of example infrastructure projects envisioned in the region that may help improve intra-regional connectivity, including projects designed to connect employment centers to the region (new I Street Bridge, electric shuttles, bus rapid transit, etc.) and specific projects focused on improving connections between Environmental Justice Communities (which are twice as likely to be classified as low-income) and existing/future employment centers (Franklin Boulevard, Stockton Boulevard, Del Paso Boulevard Complete Streets and transit improvements).

This strategy will leverage one of Sacramento’s breadth of business services that support the public sector to adapt their services to support high-growth, high-tech, particularly scale-up firms, further building the wrap-around services and ecosystem that will make Sacramento the place to do business for these firms.

**STRATEGY 9 [Branding and Attraction]:**

As the other strategies take hold, and quality of life amenities continue to grow in Sacramento, it will be time for Sacramento to re-brand itself as a “right sized city” for growing next economy firms and the people who work in them, and to tactically attract firms to locate in and build Sacramento’s targeted, emerging high-growth clusters.

As all of the other strategies and their implementing initiatives (see below) begin to take effect – and Sacramento indeed becomes the place to be for high growth, high tech firms and the people who work in them – it will be time to rebrand and market Sacramento. For example, this strategy might lead to industry-specific branding and marketing campaigns to attract firms and talent, particularly from the Bay area, by highlighting the high-tech specializations growing in Sacramento whose presence in Sacramento will accelerate growth and further build the region’s global brand.

**“RIGHT-SIZED CITIES”**

People and firms have been moving towards density to benefit from the heightened synergies of co-location in this economy, driving major shifts in population to metropolitan areas, and even greater shifts in economic outputs. This trend, however, is reaching its limits for the largest metros, as negative amenities like higher housing costs and commuting times begin to make them less attractive.<sup>340</sup> As a result, some – but not all – mid-sized cities are capitalizing on this trend by becoming increasingly attractive alternatives. These cities have the potential to still foster the increased productivity that results from the concentration of assets, while also providing a sense of community, decreased congestion, lower costs of living and other attractive livability characteristics.<sup>341</sup>

Few places provide a better example of this opportunity than Sacramento, whose assets and trends suggest that it can become a top right sized city, and that it can

<sup>340</sup> See, e.g., Progressive Urban Management Associates, “The Sizzling Second Tier City Advantage”, accessed October 9, 2019 [https://pumaworldhq.com/wp-content/uploads/2018/10/PUMA-Global-Trends-Update-Sizzling-Second-Tier-Cities\\_Oct-2018.pdf](https://pumaworldhq.com/wp-content/uploads/2018/10/PUMA-Global-Trends-Update-Sizzling-Second-Tier-Cities_Oct-2018.pdf); Fast Company, “The Four Trends that Will Change the Way We Work by 2021,” accessed October 9, 2019 <https://www.fastcompany.com/3054546/the-four-trends-that-will-change-the-way-we-work-by-2021>; Washington Post, “The New Boomtowns – Why More People are Relocating to Secondary Cities,” accessed October 9, 2019 [https://www.washingtonpost.com/realestate/the-new-boomtowns-why-more-people-are-relocating-to-secondary-cities/2018/11/07/f55f96f4-d618-11e8-aeb7-ddcad4a0a54e\\_story.html?utm\\_term=.b9835168eef7](https://www.washingtonpost.com/realestate/the-new-boomtowns-why-more-people-are-relocating-to-secondary-cities/2018/11/07/f55f96f4-d618-11e8-aeb7-ddcad4a0a54e_story.html?utm_term=.b9835168eef7)

<sup>341</sup> Curbed, “The new magnetism of mid-size cities,” accessed October 9, 2019 <https://www.curbed.com/2018/5/1/17306978/career-millennial-home-buying-second-city>

especially play that role in relation to the Bay Area, (which is the top metro in 2018 for net out migration, with the top destination for former residents being Sacramento<sup>342</sup>). With lower taxes and drastically lower costs of living,<sup>343</sup> a salary of \$100,000 in San Francisco could decrease to \$41,844 in Sacramento to experience the same lifestyle.<sup>344</sup>

A particularly relevant example of the right sized city trend is Austin – another government town that evolved to become a major tech center.<sup>345</sup> While each place is different, and Sacramento will be building from different assets, there are some striking similarities: a world class research institution; an active City partnership; focused investments in tech infrastructure; and so forth.

Taken together, this array of linked strategies and their implementing initiatives is designed to make Sacramento a place where people and growing firms in targeted emerging high-tech industries will stay and thrive. The combination of sophisticated cluster-based support, business and financial support for scale-up firms, aligned talent development, and rich institutional networks can position Sacramento as a major global center for inclusive next economy growth.

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<sup>342</sup>See, SF Gate, “Bay Area is top region for outward migration in the U.S.: Here's where people are going,” accessed October 9, 2019 <https://www.sfgate.com/expensive-san-francisco/article/Bay-Area-outward-migration-exodus-sf-redfin-12563337.php>;

Redfin, “Q2 2018 Migration Report,” accessed October 9, 2019 <https://www.redfin.com/blog/q2-2018-migration-report/>

<sup>343</sup> Median home sales price in September 2018 was about \$350,000 – a fraction of San Francisco’s \$1.5 million. Sperling Best Places, “Cost of Living Comparison,” accessed October 9, 2019 <https://www.bestplaces.net/cost-of-living/san-francisco-ca/sacramento-ca/100000>

<sup>344</sup> Sperling Best Places, “Cost of Living Calculator,” accessed October 9, 2019 <https://www.bestplaces.net/cost-of-living/>

<sup>345</sup> WalletHub lists Austin as the nation’s fastest growing city, Patch, “Austin Is America's Fastest-Growing City: Report,” accessed October 9, 2019 <https://patch.com/texas/downtownaustin/austin-americas-fastest-growing-city-report>; between 2010 to 2017 its labor force exploded by 24%, Wall Street Journal, “Second-Tier Cities Boast First-Rate Job Figures,” accessed October 9, 2019 <https://www.wsj.com/articles/second-tier-cities-boast-first-rate-job-figures-1543064400>; it tops the U.S. News and World Report 2018 ranking of best places to live, CNBC, “These are the 10 best places to live in the US in 2019,” accessed October 9, 2019 <https://www.cnbc.com/2019/04/15/us-news-world-report-best-places-to-live-in-the-us-in-2019.html>; and Magnify Money’s list of top boomtowns, Magnify Money, “America’s Biggest Boomtowns,” accessed October 9, 2019 <https://www.magnifymoney.com/blog/news/americas-biggest-boomtowns/>.



## IV. Potential Initiatives

The strategies above set priorities and begin to establish a roadmap. The exciting next step, of course, moves to implementation. While development of implementing initiatives is largely beyond the scope of this stage of the work, it has been hard to resist at least “penciling out” some possibilities: this is, after all, an “economic Action Agenda.”

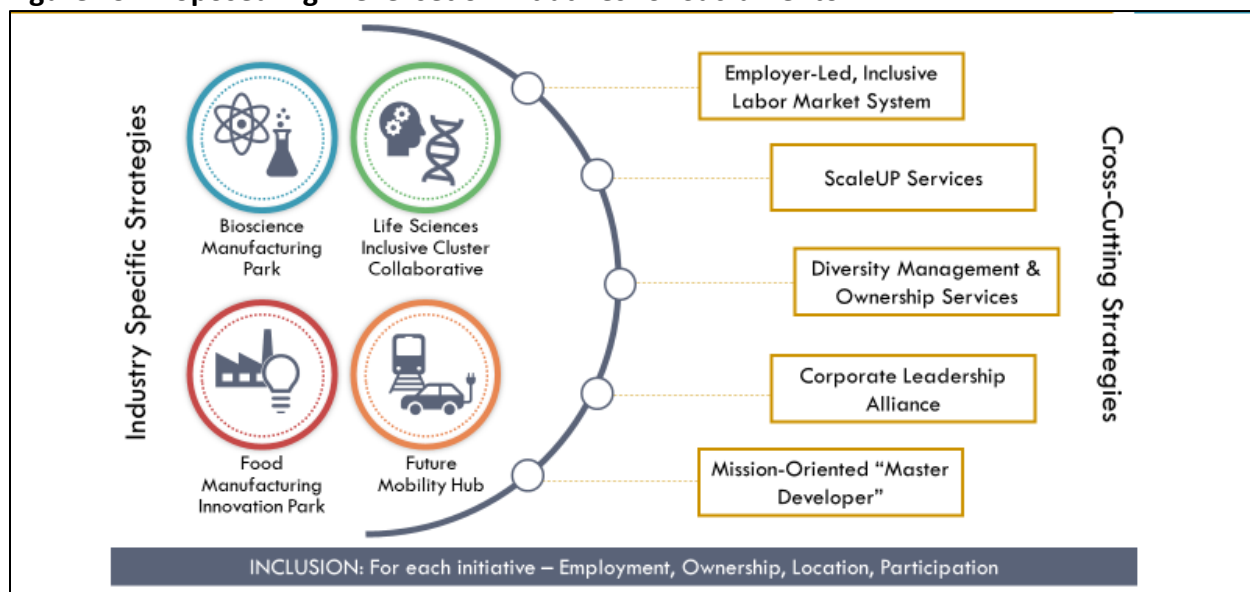
When drafting initiatives, the aims are as follows:

### Initiatives: What are we aiming for?

- **Transformative** – shift or accelerate the region’s transition toward the next economy
- **Systems Change** – aiming to make economy/markets work better, not just do deals (**economic development before business development**)
- **Whole Greater than the Sum of the Parts** – comprehensive, integrated & mutually reinforcing activities
- **North Stars** – signature themes, initiatives and branding (what will you be known for/great at/the place to be?) around which all work can align (trying to reduce fragmentation, not add to it)
- **New Way of Doing Business** – business-like, “ownership” by cross-sector stakeholders willing to drive cultural change, overcome risk-aversion
- **Start with a few “signature” initiatives:** potential to be transformative “big idea,” visible, manifesting key messages about priorities for your economy
- **Create and Capture Value** – business not charity; value capture for sustainability
- **Don’t over-plan: get to market!**

With these in mind, a high-level set of initiatives has been identified that would begin to define Sacramento as a hub for high-tech, high-growth emerging industries. They encompass a combination of cluster-based initiatives and cross-cutting, mutually-reinforcing initiatives addressing human capital, business services and finance, facilities, private sector partners, and amenities (see Figure 19).

**Figure 19: Proposed high-level set of initiatives for Sacramento**



This list is non-exhaustive; many additional concepts for implementing initiatives will surface as the transition envisioned by this Action Agenda moves forward and creates further opportunities for wealth creation in Sacramento. Finally, it bears emphasis that these are just at the concept stage of development; considerable further business and operational planning is necessary to confirm, refine and implement any of these.

## *Food Manufacturing Innovation Park*

Consider establishing a **food manufacturing innovation park**, focused on providing a suite of products and services for small, growing firms and established, mid-sized firms to make Sacramento a hub for food innovation and firm growth.

### *Overview*

While industry shifts create more opportunities for new and niche firms, the resources available to growing food firms in the region to adapt to changing market conditions are inadequate. Small, high-growth firms – approximately \$1M to \$5M in annual sales – are ready to scale but often cannot afford their own production space. Instead, they need co-packing and production facilities. They also need different kinds of business support and finance as they become much larger food processors. Established, medium-sized firms – approximately \$20M to \$300M in annual sales – have made a consistent set of products with generally the same processes for generations. The primary opportunities for these companies are to update their recipes and product offerings to move into new markets and incorporate new processing technologies to increase efficiency. However, the operations of these companies often are not nimble enough to pursue these opportunities.

The Park described below is designed primarily around the opportunities and barriers for these small, high-growth firms and established, medium-sized firms, providing the right mix of shared and individual product spaces and on- and off-site shared services to take these firms to the next stage of growth.

### *Recommendation, Relevant Models and Next Steps*

To accelerate food and beverage manufacturing, the region should develop a Food Manufacturing Innovation Park. This facility would leverage the assets in Greater Sacramento and create a hub for food innovation and firm growth. The Center would provide a suite of products and services primarily targeted to two customer segments: (1) small, growing food firms, and (2) established, mid-sized firms adapting to a rapidly changing food industry. Some of the facility's offerings will be place-based – dedicated, built-to suit production spaces; co-packing operations tailored to support production of smaller batches by emerging companies; shared back office and distribution services; etc.

An additional set of business support services would be delivered either on- or off-site, through the Park's staff or other partners, and may include prospective worker training on basic industry skills, incumbent worker training and education on advanced processing equipment as well as new food safety and health requirements, consulting services for technology adoption or operational improvements, and so forth. The Park's products and services will also draw tenants and customers beyond the two segments mentioned above, such as equipment manufacturers seeking small production facilities where potential customers can test new technologies.

Additionally, as certain processed goods in the region went out of favor (e.g., canned peaches), the facilities that once manufactured those goods have become abandoned or are being used to store cannabis stocks. These facilities might be repurposed to house certain functions of the innovation park, or to otherwise further its objectives. For example, the Park could take the lead in establishing a plant to convert specialty crops into lightly processed, frozen or dried goods (shelf-stable), moving the region further into the rapidly growing healthy eating space. Furthermore, food brands in Woodland could bolster this strategy by integrating products from the Park into their supply chain and brand portfolio.

A wide range of models are successfully helping food manufacturers adapt and grow in the rapidly changing industry. These include University-based innovation centers, such as the Rutgers Food Innovation Center, which provides business and technical mentoring, food safety training, product manufacturing and analytical chemistry services<sup>346</sup> across three New Jersey locations; as well as industry collaboratives, such as Chicagoland Food and Beverage Network, and Food and Beverage Wisconsin, a cluster organization that acts as a “one stop shop” by

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<sup>346</sup> Analytical chemistry and mass spectrometry services are often needed in the consumer-packaged goods industry.

offering talent development, accelerator programs, food safety training and space for food and beverage firms to co-locate.<sup>347</sup>

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## *Bioscience Manufacturing Park*

Consider establishing a **bioscience manufacturing park**, focused on next-generation therapies to accelerate commercialization of new products, help scale-up companies and make Sacramento a center for larger scale drug manufacturing.

### *Overview*

The proposed manufacturing park would benefit from including both contract manufacturing space and affordable wet lab space. CMOs and CDMOs often have long wait times,<sup>348</sup> and growing this capacity in Sacramento will speed the commercialization timelines for new products. CDMOs themselves are a high-growth industry, go through frequent mergers and acquisitions,<sup>349</sup> and have several business models: focusing on a specific aspect of drug development/clinical trials, active pharmaceutical ingredients (API), or finished dosage form (FDF). They are contracted by emerging biotechnology companies for preclinical and clinical phases (since they often lack in-house formulation and process development) and by large pharmaceutical companies for the entire value chain (through to FDF).<sup>350</sup> In addition, shared Good Manufacturing Practice (GMP) facilities can assist in developing and scaling up the manufacturing process for several different drugs, in order to support future production.

Manufacturing capacity is not the only challenge in scale-up. There is also a need for more flexible workspace models. Currently, shared spaces include university-led incubators (often reserved for start-ups from that institution) and privately-run co-working lab spaces that are often unaffordable to emerging companies not yet bringing in revenue.<sup>351</sup> As a result, affordable shared wet labs are emerging that provide access to lab infrastructure (e.g., freezers, hoods, purified water and gas), equipment (e.g., for microscopy and cell counting), and advisory services.<sup>352</sup>

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<sup>347</sup> More models can be found in the Chicagoland FOOD report and appendices. See: RW Ventures, LLC and IMEC, *Chicagoland FOOD: Seizing the Opportunity to Grow Chicagoland's Food Industry*.

<sup>348</sup> Deloitte, *2019 Global Life Sciences Outlook*.

<sup>349</sup> Research and Markets, "Biopharma Contract Manufacturing Market (3<sup>rd</sup> Edition), 2019-2030," accessed September 1, 2019, [https://www.researchandmarkets.com/reports/4773532/biopharma-contract-manufacturing-market-3rd?utm\\_source=GNDIY&utm\\_medium=PressRelease&utm\\_code=jkrqb4&utm\\_campaign=1266723+-+Biopharma+Contract+Manufacturing+Market%2c+2030&utm\\_exec=chdo54prd](https://www.researchandmarkets.com/reports/4773532/biopharma-contract-manufacturing-market-3rd?utm_source=GNDIY&utm_medium=PressRelease&utm_code=jkrqb4&utm_campaign=1266723+-+Biopharma+Contract+Manufacturing+Market%2c+2030&utm_exec=chdo54prd).

<sup>350</sup> EY, *The pharmaceutical industry is consolidating*.

<sup>351</sup> Sia, Samuel K. and Matthew P. Owens, "How the sharing economy is influencing biotech innovation and what it means for startups," *Nature Biotechnology*: 2015, doi:10.1038/bioe.2015.12

<sup>352</sup> Elie Dolgin, "Thanks for sharing," *Nature Medicine*, 19: 2013, <https://doi.org/10.1038/nm1213-1556>; Sia and Owens, "How the sharing economy is influencing biotech innovation and what it means for startups."

As companies outgrow incubation wet labs (such as Bayer's CoLaborator which houses ~3 companies and UC Davis' HM.CLAUSE Innovation Center which houses ~10-12 companies), wet lab space is scarce. Due to the long commercialization process in Life Sciences, after 1-2 years in an accelerator space, these companies are still in need of an affordable shared wet lab space to continue working towards revenue generation. As companies move on to manufacturing, UC Davis' GMP Laboratory can test and manufacture products for university investigators and academic/industry partners. Outside of that, products must be shipped to CMOs or CDMOs for large-scale manufacturing needs. For the most part, manufacturing is outsourced to other regions, as start-ups do not have facilities to manufacture themselves (and cannot afford to), and larger companies concentrate manufacturing in other locations (such as Novozymes' facilities in North Carolina and Nebraska).

### *Recommendation, Relevant Models and Next Steps*

Sacramento's Life Sciences cluster would benefit from a Bioscience Manufacturing Park, focused on next-generation therapies (primarily biologics), to assist emerging companies in developing and manufacturing their products – ultimately, to add greater commercialization to the research-intensive Sacramento-Davis region, and to build upon UC Davis' GMP laboratory to meet larger-scale manufacturing needs. A facility like this would not only assist SMEs in scaling up in Sacramento but also contract with larger companies within and outside of the region.

The facility could have three main components to assist companies in scale-up: (1) CDMO services; (2) shared wet lab space for SMEs; (3) advisory and consulting services. The CDMO and wet lab space can be incrementally funded and built in phases. Constructing wet lab space first may inform the design of a CDMO, as wet lab tenants can help identify the types of manufacturing equipment and processes needed to create a flexible biomanufacturing services adaptable to different clients.

Creation of a no-frills, low-cost wet lab (by upgrading an existing building)<sup>353</sup> would allow emerging companies to share warehousing, logistics, quality control, and office space. In addition, it could provide the consulting services needed for emerging companies (on an as-needed basis): marketing, sales, law, EPA regulation, IP negotiation, assessment and registration support, business development, and technology. Additional functions for the facility could include GMP workforce programs and product development funding.

A CDMO or GMP facility would assist companies in manufacturing their product for clinical trials and then commercialization. It may be possible for the City to recruit a well-established CDMO to expand their operations to Sacramento and locate adjacent to the shared wet lab space. Existing CDMOs will already have specifications for layout and equipment that can inform the design of a new facility in Sacramento. The presence of an established CDMO will also pave the

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<sup>353</sup> As an example of a repurposed building to develop affordable space for Life Sciences companies: the IndieBIO accelerator in San Francisco. See images here: <https://rmw.com/projects/indiebio-lab/>

way for new workforce collaborations; for instance, the Pharmaceutical Work Force Development and Manufacturing Center of Excellence in North Carolina was formed with a partnership between a CDMO and a local university and college, who train a qualified workforce to support the CDMO.<sup>354</sup>

An example of a well-established CDMO includes Patheon's facility in Greenville NC (manufactures ~1000 products) which manufactures both small and large molecule products and is one of 40 locations worldwide. Another is UPM Pharmaceuticals' facility in Bristol TN (manufactures ~80 products), a 500,000 square foot facility with testing as well as manufacturing and packaging services. There is potential to explore a more flexible manufacturing model for the CDMO, such as Amgen's new facility in Singapore with flexible, disposable vats that optimize space efficiency and allow varied types of drug products to be switched out more easily. Patheon's facilities offer this flexibility as well, providing a single use technology option to prevent cross-contamination and increase efficiency.<sup>355</sup>

Examples of wet lab spaces to support the scale-up of emerging companies include the Austin Community College Bioscience Incubator,<sup>356</sup> which provides leasable lab space ranging from single benches to full labs, as well as contract research services, and Harlem Biospace, a 2,300 sf affordable wet lab space for competitively-selected firms, developed in partnership with the New York City Economic Development Corporation (who provided financial support to offset the conversion of an existing office building into the wet lab).<sup>357</sup>

For a blended model that includes multiple bioscience (and tech) functions, see Wake Forest Innovation Quarter, an innovation district that includes affordable wet lab space, a mix of institutions and companies, and event space.

This initiative, when supported by the others recommended in this Action Agenda, will grow the Life Sciences sector inclusively, by increasing gender and racial diversity in the workforce (through new workforce partnerships and training programs initiated by the City or an established CDMO) and increasing diversity in ownership through recruitment of women- and people of color- owned companies to the wet lab space.

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<sup>354</sup> Pitt County Development Commission, "Collaboration and Partnership to Establish a Pharmaceutical Powerhouse," accessed November 8, 2019, <http://locateincarolina.com/news/collaboration-and-partnership-to-establish-a-pharmaceutical-powerhouse/>.

<sup>355</sup> Patheon, "Flexible Biomanufacturing Solutions," accessed November 8, 2019, [https://patheon.com/commercial-manufacturing-services/innovative-solutions/flexible-biomanufacturing-solutions/?KW=%2Bcdmo&AG=10422958675&CS=FM&gclid=CjwKCAiAwZTuBRAYEiwAcr67OSGgX\\_JY2LL9p5bg5DLchp29LL3DitqrH5j0v6nOAJAHRBj6yBggIhoClickQAvD\\_BwE](https://patheon.com/commercial-manufacturing-services/innovative-solutions/flexible-biomanufacturing-solutions/?KW=%2Bcdmo&AG=10422958675&CS=FM&gclid=CjwKCAiAwZTuBRAYEiwAcr67OSGgX_JY2LL9p5bg5DLchp29LL3DitqrH5j0v6nOAJAHRBj6yBggIhoClickQAvD_BwE).

<sup>356</sup> Although too new to demonstrate its success, press releases report the expansion of startups that have located there: <https://sites.austincc.edu/incubator/news/>

<sup>357</sup> Area Development, "New York City Economic Development Partners with Harlem Biospace to Assist Up To 20 Startup Biotech Firms," accessed November 8, 2019, <https://www.areadevelopment.com/newsItems/6-6-2013/harlem-biospace-nycdc-partnership2478924.shtml>.

## Life Sciences Cluster Collaborative

Consider establishing a **Life Sciences Inclusive Cluster Collaborative**<sup>358</sup> to enable strategic collaboration among industry stakeholders, including on workforce, supply chain and market development.

### Overview

There are many economic benefits of concentrating complementary economic assets in regions – of firms in an industry and related institutions “clustering” – including reduced transaction costs; shared inputs and labor pools; and knowledge spillovers. Dense, well-connected nodes of businesses, suppliers, workers, and consumers therefore emerge in regions, and build upon themselves. Once the core of such a cluster exists, regions can more deliberately grow these synergies through cluster collaboratives, through which leading firms, research institutions, and other industry stakeholders collaborate to grow the cluster as a whole and share costs of improving the productivity of its firms. Depending on industry needs and opportunities, cluster collaboratives undertake a wide range of activities, including specialized workforce development, supply chain capacity building, pre-competitive R&D and innovation centers, logistics, specialized finance, exports and other market development. They promote growth of a strong cluster, enable the continuous innovation needed to be competitive, and build the region as a global center for the industry. Sacramento has substantial Life Sciences activity, and building from the industry’s very strong foundations towards becoming a global economic center in Life Sciences requires systematically strengthening the collaborative networks and resources to assist early-stage companies in moving to commercialization; to grow and retain talent; and to more deliberately create the synergies that make clusters succeed by efficiently connecting researchers, entrepreneurs, firms, workforce organizations, investors, suppliers, supporting industries (e.g., shipping and logistics will become increasingly important as drug manufacturing grows), clinical trials, and data analytics. Connecting these resources will enable larger-scale and more strategic activities to grow Sacramento’s Life Sciences strengths, particularly around cell and gene therapy, synthetic biology, and Ag-Biotech.

The Life Sciences sector would benefit from greater connectivity, both spatially between Sacramento and Davis, and collaboratively in 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.

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<sup>358</sup> As discussed extensively throughout, inclusion is a basic business imperative for sustainable economic growth in the 21<sup>st</sup> century. For more information, see: Brophy et al., *Transformative Economies: Emerging Practices for Aligning Growth and Inclusion.*; New Growth Innovation Network, “About”, accessed April 1, 2019, [www.newgrowth.org/about](http://www.newgrowth.org/about).



### *Recommendation, Relevant Models and Next Steps*

The Life Sciences Inclusive Cluster Collaborative will be guided by the needs and interests of the region's Life Sciences firms, with a goal of improving their productivity and prosperity. Its mission will be to make Sacramento the "Silicon Valley" of life sciences (or targeted sub-sectors within Life Sciences). It will build upon the work of MedStart, which closed this past year<sup>359</sup> after serving as a mentorship and collaboration network for companies growing in the pharma, med-tech, and medical software solutions industries. The focus of this collaborative will shift to align with anticipated regional growth, emphasizing cell and gene therapy, synthetic biology, and Ag-Biotech.

An inclusive cluster collaborative would identify and deliver program activities to strengthen the overall innovation ecosystem for Life Sciences, building the overall capacities of Sacramento and the industry, with a particular focus on scaling up existing and attracting new firms. Leading corporations in the Sacramento region (Novozymes, Bayer, Stem Express, etc.), along with leading academic institutions (UC Davis, Sac State, Los Rios Community College District, etc.) could anchor a cluster collaborative. In particular, UC Davis' Aggie Square innovation district can physically anchor the cluster collaborative, as it will incorporate best practices from innovation districts around the country and aims to drive regional economic growth in several Life Sciences areas (one of which is cell and gene therapy).

A cluster collaborative could then collaborate to achieve key functions: firm and stakeholder networking and business relationship building; specialized information and training sessions (from regulatory to business issues); shared specialized workforce development; specialized finance for various stages of company growth; building supply chain capacity; and market and systems research and development (from logistics to clinical trials) to strategically grow the Life Sciences industry around key sub-sectors. The organizational network will naturally facilitate connections between complementary firms as well as with key business support services (marketing, sales, legal, etc.). A focus on increased entry pathways to Life Sciences – as well as clear associated job ladders, promoting entrepreneurship (in particular, increasing ownership for women and people of color), and intentionally growing the cluster to engage disconnected neighborhoods will lead to long-term, inclusive growth. Finally, the collaborative can better brand and market Sacramento's strengths to other regions.

Examples of cluster and cluster support collaboratives include the North Carolina Biotechnology Center, a state sponsored initiative that provides industry support, advocacy and strategic policy, as well as access to capital, co-working spaces, and lab spaces; and AgriNovus Indiana, an organization that promotes/accelerates ag-bioscience growth with career pathway development, entrepreneurship services, marketing, and network building. An example of an *inclusive* cluster is the Chicagoland Food and Beverage Network, which in addition to core cluster networking and informational services is developing tailored workforce programs and a

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<sup>359</sup> MedStart closed because it was underfunded and understaffed (volunteer-run) – not because of lack of interest or lack of need for the organization. Confidential interviewee, interview by RW Ventures, phone, August 15, 2019.

venture fund to support start-up and scale-up companies, with an explicit focus on inclusion.

Other initiatives in this Action Agenda, such as the Diversity management and Ownership Services and Employer-Led, Inclusive Labor Market System, should be executed in tandem with this collaborative to drive inclusive growth in the Life Sciences sector. Not only will this grow an inclusive Life Sciences cluster, but it will indirectly serve to combat many of the disparities in healthcare – by increasing the diversity of decision-makers and perspectives at the table.

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## *Building on the California Mobility Center*

Consider establishing a **Future Mobility Hub** to enhance existing initiatives and grow the economy by accelerating physical product innovation.

### *Overview*

Sacramento’s CMC is an exciting set of initiatives that will help establish Sacramento as a global hub for the emerging Future Mobility cluster. The CMC plans to grow the Future Mobility sector in Sacramento through applied research (to advance AV adoption), facilitating standards/policies for new technologies, product development support for EV and AV technologies (including a start-up fund), and a Ramp-Up Factory to make products. The Ramp-Up Factory will accelerate product development by guiding start-ups through design, prototyping, and testing of components/vehicles (which may require manufacturing up to 100 of a product). Alongside this, the CMC is initiating partnerships with UC Davis, Sac State, Los Rios Community College District, and others to train the future workforce that will both work at the CMC and accelerate the growth of Sacramento’s Future Mobility sector.

These CMC initiatives are primarily focused on R&D and early-stage product development – and they will serve to establish Sacramento as a center for innovation in Future Mobility. To grow this innovation into an established, growing Future Mobility industry, additional and different services may be needed to enable entrepreneurs and early stage companies who get their start with help from CMC to stay in Sacramento to scale-up and establish their operations. There is opportunity to tie new services – and physical spaces – to the CMC as the cluster emerges to further strengthen it. Growing companies will need a strong network, business services and funds, shared business spaces, contract manufacturing, and continued workforce development.

### *Recommendation, Relevant Models and Next Steps*

As a next step, Sacramento would benefit from a Future Mobility Hub that either augments the planned CMC and related initiatives or becomes its own entity to build upon the growth initiated by the CMC. Recommended components of the Hub are:

- **Collaborative network** – More formally establish the connections initiated by the CMC by creating an Inclusive Future Mobility Collaborative,<sup>360</sup> an entity to serve as a “center of gravity” for start-ups and SMEs that emerge from the CMC, building their connections to investors, partners, suppliers, and related firms. Knowledge spillovers are important both within a sector and between firms at similar stages of development in different sectors – and sharing lessons learned is increasingly important for underrepresented groups within future mobility, which include women and people of color. This collaborative will build the Sacramento network to not only provide greater support to emerging firms but also, over the long-term, establish Sacramento as a globally known hub for Future Mobility.
- **Business and finance support** – A next-step service to enable early stage companies to scale-up is sophisticated business support and finance programs, aimed at ensuring products have not only anticipated the market (in a rapidly changing environment) but that entrepreneurs developing products at the CMC go on to build successful companies, remaining in Sacramento. This entails developing a robust business plan as well as access to necessary support services. Growing businesses typically need management support (e.g., to transition from the role of the inventor/entrepreneur to business manager of a growing company), increased access to professional services (e.g., accounting, legal, regulatory and IP consulting, marketing, web support, etc.), increased funding more specifically aligned with opportunities being pursued (or, more flexible funding), and access to capabilities tailored to their stage of development (from research to testing to certification).<sup>361</sup> The ScaleUP Services and Diversity Ownership and Management Services initiatives could be partners in providing these services, tailored to emerging and growing Future Mobility firms.
- **Shared industrial facilities** – The services outlined above can be offered through a “virtual hub” – or, they can be part of a physical space where growing firms locate to share office spaces, business support services and other logistics (e.g., shipping). This facility can either be located in the planned CMC “campus,” which will likely include the CMC and Ramp-Up Factory, or in another site selected for inclusive economic development (see the Mission-Oriented Master Developer initiative). An example of a sector-specific hub that catalyzes product development is mHUB.<sup>362</sup>
- **Contract manufacturing** – The CMC will prototype efficient manufacturing processes and will be able to manufacture approximately 100 products for testing and validation – but, firms emerging from the CMC will need greater manufacturing capacity. Some may

<sup>360</sup> An example of an inclusive cluster collaborative is the Chicagoland Food and Beverage Network. In addition to core cluster networking and informational services, the organization is developing tailored workforce programs and a venture fund to support start-up and scale-up companies, both explicitly incorporating a focus on inclusion.

<sup>361</sup> An example of a program providing sophisticated business support is BREW Corporate Accelerator (<https://thewatercouncil.com/programs/brew-corporate/>). Developed by the Milwaukee Water Council, BREW Corporate connects corporate funders/resources with startups to assist them in optimizing their business models, speeding technology commercialization, and supporting the startup’s entry into the marketplace.

<sup>362</sup> An innovation center that accelerates growth of high-tech manufacturing. mHUB grows connections and synergies between manufacturers (SMEs and large firms), entrepreneurs, researchers and investors. They work together to enable greater product innovation, becoming a hub that functions as more than a cluster organization, by bringing together resources to enable collaborative projects and deals – and carry them out.

develop their own in-house manufacturing capabilities, but others may prefer specialized contract manufacturing services. It is not yet determined whether this facility or the shared industrial facilities proposed above should be incorporated into the CMC buildout, run by the Future Mobility Hub, or developed by a separate entity. This will be determined as the CMC business plan is developed in more detail and next-step needs are better defined.

- **Workforce initiatives** – Existing CMC initiatives will develop training programs with a series of universities, colleges, and partners. The Future Mobility workforce will eventually need more than one-off certificate programs to upskill workers for entry-level through executive-level jobs – in addition to greater employer involvement in identifying future skillsets needed. Employer-led, on-the-job training will likely be needed to create a workforce adept at using high-tech machinery and also at innovating both in product development and process development. As the Future Mobility cluster grows, there is potential to create an industry-led “Future Mobility academy,” offering training, certificates and degrees for all career levels. It could include skills-based training programs, stackable credentials, and innovative apprenticeship models<sup>363</sup> to assist in building Sacramento’s Future Mobility workforce into not only an asset for the region but an asset globally.<sup>364</sup> Examples of inclusive workforce models can be found in the Employer-Led, Inclusive Labor Market System initiative, and sector-specific examples include Lyft’s software engineering apprenticeships,<sup>365</sup> the Michigan Alliance for Greater Mobility Advancement (MAGMA) consortium,<sup>366</sup> and the Michigan Mobility Institute.<sup>367</sup>

The combination of collaborative network growth, shared product development space, contract manufacturing, business and finance support, and specialized workforce development – either run by the CMC or created as a separate but closely complementary set of initiatives – will form a Future Mobility Hub that assists early stage companies in developing roots and growing in Sacramento. The Future Mobility Hub can be developed in stages, complementing the CMC’s progress. The first phase may include formation of a Future Mobility Collaborative to build a network for firms emerging from the CMC – which will also provide insights on the right set of initiatives to launch in the next stage of Future Mobility Hub development. The goal of the

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<sup>363</sup> Apprenticeship models are recommended as a way to retrain drivers displaced by the growth of autonomy. Center for Global Policy Solutions, “Stick Shift: Autonomous Vehicles, Driving Jobs, and the Future of Work,” accessed November 8, 2019, <https://www.law.gwu.edu/sites/g/files/zaxdzs2351/f/downloads/Stick-Shift-Autonomous-Vehicles-Driving-Jobs-and-the-Future-of-Work.pdf>.

<sup>364</sup> Programs could include: (1) a master of mobility engineering degree; (2) in trade schools and community colleges, certificates in artificial intelligence, robotics, cybersecurity, AV/EV repair, etc.; (3) work with universities to establish classes or specializations in mobility in related fields, like law, computer science and cybersecurity, business, etc.; and (4) a template for career pathway development to make the education pipeline and workforce development programs nimble to skills needed by firms addressing rapidly advancing technology. 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.

1. Work with existing workforce development initiatives, like SVMIL, to ensure AV/EV skills are included and visible.
2. Offer ongoing education to senior leaders.

<sup>365</sup> For people with non-traditional educational backgrounds.

<sup>366</sup> Provides training to address skills gaps in the future mobility industry.

<sup>367</sup> Trains professionals and tradespeople to enter high-tech mobility careers.

Future Mobility Hub is to serve as a nimble organization that supports the growth of the Future Mobility industry.

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## *Employer-Led, Inclusive Labor Market System*

Consider building towards a **fundamentally different, integrated, aligned, next generation labor market system** by: (1) piloting aspects of the new approach in emerging sector-specific developments (such as Aggie Square and the CMC): and (2) leveraging the Corporate Leadership Alliance to form and scale employer-led collaboratives that will stage toward systems-level change in hiring and training practices.

### *Overview*

Economic transformation is dramatically impacting labor markets. New industries, occupations and technologies (particularly digitalization), along with shifts in how work is organized (for example, towards more outsourcing and independent workers), are requiring both new skills and, as importantly, more continuous skills upgrading. All labor market participants are struggling to adapt to these changes. Many employers lack a nuanced understanding of the skills they currently require and those they will need in the future. This leads to under-developed systems for efficiently upskilling incumbent employees, as well as a reliance on outdated credentials to assess potential employees that may not accurately reflect their skill sets. Workers are hampered in their ability to identify job opportunities that match their skills (or that they could be qualified for with targeted training), and to find the programs where they can learn the requisite skills to qualify for new and emerging occupations. Trainers and educators remain slow to respond to opportunities to teach in-demand skills in truly market- and employer-driven ways, still overly focused on legacy processes and programs. All these actors are insufficiently connected through systems and platforms that can collect, analyze and share skills data to inform the effective functioning of the labor market.

These labor market deficiencies have an outsized impact on traditionally disconnected populations for a host of reasons. People of color are more likely to have been or be currently employed in legacy industries that have experienced the most disruption in the new economy. This has driven greater under- and unemployment among these workers, and places them disproportionately in industries that are less likely to be employing sophisticated hiring practices. These workers also face more barriers to connecting with employment and training opportunities. Companies increasingly rely on online networks, such as LinkedIn, to source employees, and these networks have lower representation of people of color. In addition, people of color are less likely to hold academic credentials that employers tend to over-rely on. Disconnected populations regularly face challenges in accessing education and training opportunities, be it due to costs, physical proximity, finding childcare, etc. Reforming labor market systems to be more skills-based, responsive and targeted would lead to more inclusive

outcomes, and they must be designed with the specific opportunities and challenges for people of color in mind.

New frameworks and practices are emerging in response to these disruptions, including:

- **Changing HR Practices** such as evidence- and skill-based hiring and whole lifecycle management of talent,<sup>368</sup> building on the growing recognition of the business case to invest in strengthened, modernized labor market systems. (Note that many of these new practices have been shown to result in more inclusive hiring outcomes, and more effective hiring decisions with more productive employees and lower turnover rates,<sup>369</sup> as employers move away from outdated credential-based assessments and identify new sources of candidates beyond personal networks and platforms such as LinkedIn that can unintentionally bias against minority workers and applicants.)
- **Sector-Based, Industry-Led Employer Consortia** that collect market intelligence on talent demand, help design and lead responsive training programs and collectively develop means to update hiring practices. These collaboratives go beyond current practices around industry engagement in workforce development. They are fundamentally oriented around and led by industry, rather than trainers and educators, with companies at the head of the table defining the agenda and co-creating relevant programs. They also assemble a critical mass of employers in one place to generate momentum for systems-level change, going beyond the “usual suspects.”
- **Contextualized Training** with curricula tailored to specific industries and their demand for specialized skills. This practice is perhaps the most established and piloted, but still requires innovation around the engagement of industry. While the curricula for these programs may be informed by the private sector, they are often slow to develop and rely on a small set of employers willing to spend the time engaging on advisory boards. The next generation of this practice will coordinate with sector-based industry partnerships to align with other programs and aggregate and validate skills demand in one forum.

Sacramento has several programs and initiatives that are employing these new practices to varying degrees. SVMI represents a version of an employer-led consortium, and it is engaged in designing training and apprenticeship programs in line with manufacturers’ skills demands. Valley Vision is managing several initiatives – the Strong Workforce Program, Future of Work, ProjectAttain!, etc. – that are aiming to align training and education offerings around specific industries and in-demand skills. Several of the region’s higher education institutions have sector-specific training programs that involve local companies in the design of curricula.

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<sup>368</sup> See the U.S Chamber of Commerce Foundation Talent Pipeline Management Initiative (<https://www.uschamberfoundation.org/talent-pipeline-management>) and Metrics Reporting, Inc. (<http://www.metricsreporting.com/>) for more on the impacts of these approaches to talent management.

<sup>369</sup> Hoffman, Mitchell, Kahn, Lisa B. and Danielle Li, “Discretion in Hiring”, National Bureau of Economic Research: 2017, <http://www.nber.org/papers/w21709.pdf?sy=709>.



Each of these efforts is missing crucial elements of next-generation labor market design and practice. To achieve true transformation of regional labor markets, leading practices should not be applied piecemeal. Sector-specific programs that remain led by academia and training providers will still be rooted in their policies and practices, with at best limited industry “engagement,” rather than truly driven by changing industry practices. Business-led consortia need robust support to keep companies engaged deeply and consistently in order to adequately design and launch impactful initiatives. Companies are likely to need guidance and support on the practical steps to adapt their hiring practices to become more skills-based (e.g., job analysis and skills scoring of positions, adopting new hiring platforms).

To overcome the inertia inherent in the present labor market and workforce systems, new practices need to be incorporated in an integrated manner, building upon the results that each practice produces. Most workforce development initiatives that are moving in this more sophisticated direction are focused on external program designs rather than internal company policy and procedure changes. These two types of changes need to be done in tandem to achieve transformative labor market change.

Realizing this foundational labor market reform is easier said than done and a long-term effort. Moving toward this ideal system requires a staged process, choosing the right initial steps and building upon promising, existing initiatives to generate momentum, demonstrate early wins and achieve broad buy-in. Approaching the final vision from multiple angles can help move the wide range of workforce development stakeholders toward a next generation labor market.

### *Recommendation, Relevant Models and Next Steps*

Sacramento’s various existing efforts to create a more employer-led, demand-driven labor market can be built upon, piloting programs that will move toward combining the full suite of next-generation practices into cohesive systems. This approach will have the most potential for success if implemented from two complementary pathways: from emerging, sector-specific initiatives and through the Corporate Leadership Alliance, recommended below.

The region’s two major, industry-targeted developments – Aggie Square and the California Mobility Center – are bringing considerable resources to bear in focused, place-based innovation centers. Each project has already identified workforce development as a crucial aspect of their programming, and relevant partners are already assembling to begin designing training programs (see, for example, the description of CMC’s training and education partnerships in Cluster Analysis). These centers and their associated resources (training-related and otherwise) also provide a tangible resource to encourage companies to come together on collaborative design on the workforce development programming, rather than having to build these programs from scratch.

As both projects already incorporate a sector focus, assembling industry-led consortia as co-collaborators is a natural complement. The Life Sciences Inclusive Cluster initiative could be the home and organizer for the industry consortium connected to Aggie Square. As the California



Mobility Center begins to assemble and grow companies in this industry, it could serve as an initial convener and manager of future mobility companies into an initial sector-based partnership, eventually ceding leadership to the local champions that emerge. These bodies can provide an ideal platform to gain industry participation and buy-in, and they can be the forum for companies to collectively move toward next generation hiring practices and engage deeply in the design of skills-based training programs.

Experience in the field has demonstrated the benefits to employers and the inclusive outcomes that can result from sector-focused, skill-based hiring and training practices. Mercy Health, a healthcare provider operating multiple campuses in western Michigan with over 8,600 employees, undertook a program to implement an Evidence-Based Selection Process (EBSP) in its HR processes. EBSP combined a deep quantitative breakdown of occupational job families and the required skills for those jobs ("Job Analysis and Validation")<sup>370</sup> with changes in the evaluation and hiring policies and procedures the hospitals used for internal transfers and external hires. The entire system, including its interactions with regional educators and trainers, was reoriented around a sophisticated understanding of relevant skills and how to assess applicants' skill sets.

Incorporating this new system resulted in general HR improvements: reductions in first-year turnover and time to fill positions. More interestingly, hiring diversity increased as well; the overall workforce went from 13% non-white to 20% over six years, due in part to the proportion of non-white hires more than doubling, from 18% to 38%.<sup>371</sup> The success of this pilot has helped seed the formation of the Talent Innovation Network of West Michigan (TalNet), bringing cohorts of area employers together to employ the EBSP model at scale.

The second avenue toward labor market reform would be through the Corporate Leadership Alliance potential initiative (see below for more detail). This model builds on the growing understanding by corporations of the alignment between their business goals and broader economic development. As a result, collaboratives of C-suite private sector leaders are forming and identifying ways to collectively support regional economic development. In Sacramento, the Corporate Leadership Alliance can provide a highly visible, region-wide forum to help transition the area's labor market and workforce system. While this Alliance's purview would mobilize the private sector broadly around many areas of economic development, workforce development regularly emerges as a place where employers' business concerns most directly align with regional and community development. Though the scope of this Alliance as currently envisioned cuts across all leading industries in the region, it can readily spin off industry-specific consortia as participation grows and reaches critical mass in specific clusters. As they launch, these groups can connect with the place-based pilots and bolster company participation.

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<sup>370</sup> Metrics Reporting, "Job Analysis and Validation," accessed October 1, 2019, [http://users.neo.registeredsite.com/8/1/5/12794518/assets/MRI\\_Research-Brief\\_Job-Analysis-Validation\\_2019-59701.pdf](http://users.neo.registeredsite.com/8/1/5/12794518/assets/MRI_Research-Brief_Job-Analysis-Validation_2019-59701.pdf).

<sup>371</sup> James Guest, "Using Evidence to Drive Hiring and Investment: How Mercy Health, West Michigan Is Making The Case for Investing in Frontline Workers' Skills and Careers," accessed October 1, 2019, [https://nationalfund.org/wp-content/uploads/2017/08/Mercy-Case-Study\\_Final\\_2017-08-02.pdf](https://nationalfund.org/wp-content/uploads/2017/08/Mercy-Case-Study_Final_2017-08-02.pdf).

Since improving the performance of labor markets requires dramatic shifts in how companies and trainers operate, it will likely require strong advocacy and leadership from the region’s major private sector employers to achieve real reform. The visibility of the Alliance and the C-suite level of membership could provide the momentum and business-led voice to encourage the systems level change – from companies, educators and trainers – that can truly create a demand-driven and responsive labor market system.

The sector-based consortia model has been in development for some time, with preliminary efforts to build upon. A leading force behind this framework is the U.S. Chamber of Commerce Foundation with its Talent Pipeline Management (TPM) Initiative. TPM is built on the perspective that companies should engage in whole lifecycle management of their talent, assembling in industry-led, sector-specific bodies to lead the charge on labor markets change. TalNet, as described above, is an emerging application of this model. Additional examples include the Talent-to-Industry Exchange (TIE), managed by the Mid-America Regional Council (MARC) in Kansas City, which has helped assemble collaboratives in Life Sciences, Architecture and Engineering and Skilled Trades, and the Manufacturing Roundtable in Milwaukee, a consortium of major regional manufacturers currently in the design phase of demand-driven workforce development programming.

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## *ScaleUP Services*

Consider creating a sophisticated **business and financial services company** targeting support to small and medium-sized firms seeking rapid growth. ScaleUP Services would identify firms with significant growth potential, and then provides tailored business growth and management services, finance, training, and market connections to support rapid growth.

### *Overview*

High growth firms – often referred to as “gazelles” – by definition, disproportionately create jobs. Yet the extent of their impact is surprising: 2.4% of firms accounted for 40% of new jobs from the mid-1990s to the late 2000s. These companies have high revenue or employment growth rates, make substantial contributions to aggregate productivity growth and tend to be small, young, and concentrated in knowledge-intensive industries like those found in Sacramento.<sup>372</sup>

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<sup>372</sup> See innovation market analysis section above; Brookings, “High-growth firms and cities in the US: An analysis of the Inc. 5000,” accessed October 30, 2019, <https://www.brookings.edu/research/high-growth-firms-and-cities-in-the-us-an-analysis-of-the-inc-5000/>; see also, Ladegard, Gro and Casper Rasmussen, Casper, “Governance Structures in High-Growth Firms: A Descriptive Study,” SSRN Electronic Journal: 2013.

While Sacramento has a great deal of start-up activity, it lags in high-growth firms.<sup>373</sup> The challenge, of course, is identifying the firms ready to scale up, and effectively providing the right combination of services and finance to support their growth. Most estimates suggest that only about 15% of small businesses are interested in growth, and that many of those are not qualified. Firms which are ready for rapid growth need an entirely different, more sophisticated and tailored set of services than start-ups. Providing these services could play a critical role in making Sacramento a place where gazelles stay and grow.

### *Recommendation, Relevant Models and Next Steps*

It is recommended that Sacramento establish a business and financial services company that engages small- and mid-sized firms that have high growth potential, are seeking to grow rapidly and have the capacity to do so. This company would provide (directly or through partners) top-level, tailored business consulting services (e.g., McKinsey) and financial services (investment banking and perhaps its own fund; e.g., Goldman Sachs) through one-on-one engagements with ready firms.

The city is exploring a model that bears some similarities to this approach, but also seems narrower. The Office of Innovation and Economic Development, in partnership with the National Center for Economic Gardening, is launching Economic Gardening 2.0.<sup>374</sup> This pilot program will build cohorts of “second stage growth companies,” which overlap with the gazelles population but with a looser set of criteria around the track record of recent growth (e.g., revenue growth in 2 of the last 5 years, versus 20% growth or more in the last three years for gazelles). The program will provide one-on-one business assistance in a discreet set of business support services focused on identifying, mapping and accessing new markets; website and search engine optimization; and competitor market insights. The approach appears broader in audience and narrower in product offerings than ScaleUP Services envisions being, but can provide useful insight on the market of high-growth potential companies.

Identifying and supporting gazelles is, of course, much easier said than done, and designing a business services company to effectively do this is well beyond the scope of this Action Agenda. It is nevertheless possible at this point to begin filling out the concept – identifying at a high-level key challenges and potential products and services to address them – with the understanding that full business planning will be necessary. Some key design dimensions, potential business features and relevant models are explored below.

#### Firm Selection

The focus here is on firms that are already succeeding in the marketplace – they have a product, a business model and sales – and are ready for a next stage of growth. The revenue

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<sup>373</sup>According to the Brookings Institute, the city ranks 48<sup>th</sup> out of 51 large metros for hosting the fastest-growing businesses in America.

<sup>374</sup> Sacramento Urban Technology Lab, “Economic Gardening 2.0,” accessed October 10, 2019, <https://innovatesac.org/pdf/economic-gardening.pdf>

threshold will vary by industry but will likely be at least \$3-5 million. The selected firms should otherwise have a proven track record, having been in business for several years. Potential for growth (including prioritizing firms in high growth sectors otherwise the focus of this plan), desire and capacity of management and other criteria will also be applied to assure that ScaleUP Services focuses on the firms with the greatest chance of success.

## Services

A start-up tends to have a product, service or technology; has begun testing a market; and may be starting to operate as a business. Moving from start-up to scale-up entails a whole new set of management challenges: expanding manufacturing or service delivery capacity; new market analysis and access; business planning; asset and financial management; IP and other legal services; talent acquisition and development; and so forth. Growth also requires more and different capital, particularly working capital to invest in new people, capacity, products, technologies and basic operations.

In this high growth context, scale-up managers are extremely busy – and constantly solicited by consultants. As a result, ScaleUP Services will have to offer clear and efficient value propositions tailored to where particular firms are in their growth stages and industry, with highly customized and professional services. Start-ups often need more “generic” help; as firms grow, their needs become more specialized and industry specific. ScaleUp Services should have capacity to deliver (again, directly or through partners) the following services, but will have to begin with deep assessment of the particular scale-up firm’s challenges and opportunities, and pick from and expand this “menu” based on that assessment.

- **Management Advising** – services to address the major management challenges presented by growth, from establishing human resources functions to finding new talent to separating and organizing diverse business functions.
- **Professional Services** – enhanced capabilities in financial management; legal and regulatory support; intellectual property; marketing and public relations; IT and web-based services; among others.
- **Market Analysis and Acquisition** – custom market research services, understanding relevant supply chains, understanding and targeting potential customers, etc.<sup>375</sup>
- **Product Development** – support for R&D, testing, certifications, etc.
- **Production** – support for the substantial re-working of production at much larger scale entailed by transition to scale-up: developing or expanding manufacturing capabilities and adapting new processes and technologies.
- **Finance** – all of this takes money: growing firms need varied forms of working capital. ScaleUP Services will help identify and find the funding they need, and may ultimately itself be an investor, acting as a first mover. In effect, by being close-in partners of

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<sup>375</sup> For examples: Supply Chain Visions’ work on understanding the supply chains in which companies operate; the iCorps program developed by Steven Blank at Stanford University, and deployed by NSF and NIH in their entrepreneur training programs, focused on understanding potential customers, and providing an appropriate conceptual and operational, framework through which firms can assess growth opportunities, could be adapted to scale-ups.

companies advising on their business plans and growth, ScaleUP Services will be positioned to efficiently underwrite, structure and broker or make equity, debt and specialized (e.g., tax credits, Opportunity Zone funds, etc.) investments.

- **Networks, Mentors and Partners** – growing firms need industry partners, mentors and networks of similar firms. ScaleUP Services can become a hub building on and connecting the start-up ecosystem to create a scale-up ecosystem, hosting events, online communities, marketplaces for services, and so forth.

### Business Model

ScaleUP Services is envisioned as a private, mission-driven company, striving to be as business-like and self-sustaining as possible. Given its need to provide extensive services beyond what its customer firms can afford, it will likely require subsidy (and so perhaps will be structured as a not-for-profit corporation). Revenues will come from service fees from participating firms, sponsorships from large companies interested in supporting (and potentially investing in) scale-ups innovating in their industries, return on investments made in the companies by ScaleUP Services (when it has its own fund), and government and philanthropic grant support. As an extremely rough estimate, \$2-3 million in grant funding should be sufficient to launch ScaleUP Services. More operational funding and particularly investment capital will be necessary as it grows.

### Inclusion

ScaleUP Services would have explicit inclusion objectives. It should work closely with the Diversity Management & Ownership Services Fund (the following initiative), which will create networks and specialized business and financial support tailored to managers of color. It should engage and coordinate with the local Black, Hispanic and Asian Chamber of Commerce organizations in identifying high growth firms, designing programming and advising. Inclusivity goals should be clearly identified and incorporated into firm selection, staff hiring practices, board membership, and HR training; and those goals should be promoted to the scale-up firms as well.

### Models

There's nothing quite like it! ScaleUP Services is modeled on combining two very different approaches:

- 1) **Incubators and accelerators** – these heavily subsidized, non-profit business assistance arose to support start-ups; some have been adapted to focus on scale-ups, but most are extending a start-up support model, and defining scale-ups as at earlier stages than proposed here. Promising models building from this first category include Scalerator Neo, in Northeast Ohio; Rock Health (industry-specific program focused on assisting gazelles in the healthcare industry), Mucker Lab (longer-term mentorship-intensive

focus), and Orange Fab (non-equity based focusing on connecting late-stage gazelles to large-scale corporations); and Manufacturing Extension Partnership programs.

- 2) **Scale-up venture/equity funds** – in the private sector, there are profitable businesses that identify, invest in (often acquire) and help manage underperforming potentially high growth companies. Examples that include more formal management mentoring programs include Search Fund Accelerator, Alpine Investors and Endeavor.

To move forward, further modest targeted market research is necessary to inform full business and financial planning. ScaleUP Services can start incrementally, working with a few firms, to test the model in the marketplace, and refine the business plan as it grows.

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## *Diversity Management & Ownership Services*

Consider establishing a **diversity management and ownership services investment company**, focused on sourcing firm opportunities; preparing women and professionals of color to be inserted into the opportunities; and brokering strategic deals and partnerships to ensure people of color play a leading role in managing and owning high-growth, next-economy firms and industries.

### *Overview*

Substantial entrepreneurship and management by people of color exists in the Sacramento region. The Black, Hispanic and Asian Chambers of Commerce include many prominent business executives, career professionals and entrepreneurs.<sup>376</sup> Similarly, people of color occupy high-level management positions in local corporations and government. While a network of diverse managers and professionals is emerging in the region, people of color, in particular women of color, are still badly under-represented in business ownership and, as importantly, tend to be in smaller and lower growth industries.

Upon executing the economic strategies outlined in the growth Action Agenda, the region will be on the path to realize major economic growth opportunities in several industries, including food manufacturing, life sciences, hardware associated with autonomous and electric vehicles, and more. This economic renaissance will support the creation and growth of firms in these industries, and in related industries serving them. The opportunity is to take advantage of the existing high-capacity diverse talent to ensure that the economic growth opportunity in the region is inclusive from the outset –that people of color play a lead role in growing these firms and industries. In addition to directly achieving inclusion goals through expanding management and ownership of high growth firms by women and people of color, it is well established that

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<sup>376</sup> Note the Chambers are collectively creating a fund to invest in enterprises run by people of color. This initiative needs to be carefully aligned and coordinated with that fund.

firms owned by people of color tend to hire more people of color and otherwise benefit communities of color, further advancing inclusion goals.<sup>377</sup>

### *Recommendation, Relevant Models and Next Steps*

The solution is a company that supports women and people of color, as well as businesses owned by women and people of color, in seizing opportunities in the next economy across various industries. This organization and provide many of the services described above in the ScaleUP Services initiative (and would be closely coordinated if not operating under the same organizational umbrella), from sophisticated business support services to finance. It differs, however, in its singular focus on assuring that people of color are supported in their own scale-up companies and, more importantly, in acquiring high-growth companies. This difference entails some additional services, particularly: (1) developing networks of high capacity entrepreneurs and managers of color to place into firms and provide mutual support; (2) identifying underperforming potentially high growth firms which can be acquired or are open to additional management, to be matched with the entrepreneurs and managers of color; and (3) providing and brokering additional types of finance, particularly for acquisitions and patient working capital (in recognition that entrepreneurs of color often have much less access to capital).

The company would target emerging firm opportunities and high-capacity entrepreneurs and managers of color; effectively “match” them; and combine nimble, efficient, sophisticated business expertise and finance. Diverse businesses and individuals would themselves be included in the growth strategy: in sourcing opportunities to acquire high-growth firms; providing targeted training and mentorship to support people of color to be inserted into the opportunities; and brokering deals and partnerships between businesses owned by people of color and mature and growth companies in the region.

For professionals of color, the company would provide business consultancy services to help them acquire and manage high-growth companies. It would provide mentorship by connecting them with leaders in high-growth industries, contacts that they may not have access to otherwise. It would also provide specialized training for managerial roles in non-traditional, high-growth firms; as well as relevant business services. An additional benefit is that enabling more people of color to own and manage high growth companies will also catapult them into broader leadership positions in the business community.

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<sup>377</sup>Extensive evidence demonstrates that increasing diverse ownership results in a multiplier effect by creating additional business and employment opportunities for people of color and strengthening diverse communities. Black-owned businesses, for example, tend to hire diverse employees. See: Timothy Bates, “Do Black-Owned Businesses Employ Minority Workers? New Evidence,” *The Review of Black Political Economy* 16(4): 1988, <https://doi.org/10.1007/BF02892165> and NMSDC. “Economic Impact Report Shows Pivotal Role of Minority-Owned Businesses In U.S. Economy.” *National Minority Supplier Development Council* (blog), August 31, 2015. <http://nmsdc.org/economic-impact-study-shows-pivotal-role-minority-owned-businesses-u-s-economy/>.



For businesses, the entity would provide technical assistance to entrepreneurs of color and women, helping them transact business in fast-growing areas of the economy that require specialized knowledge and skillsets. In addition, the entity would source (and ultimately provide its own) patient capital. Because of historical racial wealth gaps, this capital is crucial for diverse businesses to launch, grow and weather through market troughs.

Like the ScaleUP Services initiative, this one flows from combining “soft” entrepreneurship support models with for-profit venture capital models. The models discussed in that initiative are relevant here as well, particularly the scale-up funds. Ideally, this company will essentially be a scale-up venture fund with a twist: instead of the typical stable of managers to put into investee companies, this company will have a stable of managers of color, and the specialized additional services and finance to support them. Several additional models are relevant to this twist. Metropolitan Economic Development Association’s (Meda) program helps diverse firms and individuals scale and create wealth through acquisitions of established businesses. Living Cities and its new Start Up, Stay Up, Scale Up Initiative is working to close the ecosystem gaps for entrepreneurs of color in three test cities. Next Street’s Shift Program in Buffalo specifically addresses the needs of growing small to mid-sized manufacturers in four steps: assessment; workshops (technology, innovation/manufacturing process, general business topics); a review of their manufacturing operations; and customized advisory services.<sup>378</sup> In some instances, this initiative may help connect promising diverse business professionals with franchising opportunities, similar to Chicago TREND.

This initiative is intentional about engaging entrepreneurs that are women and entrepreneurs and managers of color in the opportunities identified and created by implementation of this economic growth Action Agenda, particularly enabling participation in the high-growth, scale-up companies. It is designed to complement those initiatives, enabling business professionals of color to build business ownership and fully participate in shaping economic growth and ensuring that economic growth in the region is inclusive and so sustainable.

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## *Corporate Leadership Alliance*

Consider establishing a **major corporate collaborative** to lead and partner in a wide array of strategies and initiatives implementing the economic growth Action Agenda.

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<sup>378</sup> The program was supported by a \$35 million, Phase II, capital injection by the Governor of New York State, through the state’s Buffalo Billion program. The program has already proven effective: in five years, membership has grown to 45 companies across various industries with more than 225 initiated or completed projects for 132 companies representing nearly \$150 million in economic impact.

## Overview

The economic growth Action Agenda reflects that the economy is dramatically changing, and no longer “takes care of itself.” The most successful places are more deliberately figuring out what they will be good at and known for – what targeted firms, industries and people will co-locate because they will be most productive there. Being more deliberate requires new institutional platforms, and new leadership, from the business community.

Indeed, the next economy is changing how corporations engage in economic development as their business interests better align with broader economic development goals, including strong industries and regional economies.<sup>379</sup> Corporations are coming together to identify and train hidden labor pools for unfilled jobs; build the capacity of small businesses to meet their supplier needs; invest in accelerators; strengthen communities that are markets for their products or residences for their employees; and launch and manage large scale economic development institutions, such as regional development authorities, to invest in common infrastructure and industry-building capacity.<sup>380</sup> Similarly, corporations are shifting their Corporate Social Responsibility (CSR) strategies to support their business operations – for example, creating apprenticeship programs to diversify and expand their labor pools – leading to more sustained and vested corporate engagement in economic development.<sup>381</sup>

Additionally, many corporations are pursuing these economic development strategies through formal collaboratives in which local corporations, foundations, government, anchor institutions (such as hospitals or universities), community groups or other partners come together to identify and address regional economic development priorities collectively.<sup>382</sup> In Kansas City, for example, several industry and workforce partners are collaborating through the MidAmerica Regional Council to create a supply chain sector initiative that prepares high school students for careers in supply chain and logistics and deploys strategies to attract freight-based companies

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<sup>379</sup> Many chambers of commerce, for example, are shifting from more traditional activities, such as lobbying or advocacy, to prioritize economic development. The Indiana Chamber of Commerce (“Indy Chamber”) is one such example – the chamber is spearheading “Accelerate Indy”, a regional economic development effort that includes workforce development, entrepreneurship, quality of life improvement, and other strategies.

<sup>380</sup> Exemplars of these strategies include: WorkTrain, a workforce development collaborative in central New York that works with area employers, workforce developers, and other partners to provide industry-driven workforce training to un- and underemployed residents and expand the available labor pool for employers; TiletownTech, a partnership between Microsoft and the Green Bay Packers that seeks to develop new digital technologies and jumpstart the Northeastern Wisconsin economy through an innovation lab, venture studio, and venture fund; Prudential Financial, which has invested over \$1 billion in residential and commercial projects in Newark, New Jersey, where it is headquartered; and Menomonee Valley Partners, a redevelopment agency for Milwaukee’s Menomonee River Valley, that includes private sector leaders among its board members.

<sup>381</sup> Overall, these changes reflect an increasing alignment of corporate business interests with engagement in economic development. See, for frameworks and further discussion, Porter, Michael E., and Mark R. Kramer. “Creating Shared Value.” *Harvard Business Review*, January 1, 2011. <https://hbr.org/2011/01/the-big-idea-creating-shared-value/>; Mass Economics and RW Ventures, LLC, *Evolving Corporate Business Engagement in Community and Economic Development*

<sup>382</sup> There is a rich history of anchor collaboratives – typically composed of education and medical institutions – engaging in economic development strategies for the benefit of their community and the institution. See: Democracy Collaborative, “Anchor Collaboratives: Building Bridges With Place-Based Partnerships and Anchor Institutions,” accessed October 15, 2019, <https://democracycollaborative.org/content/anchor-collaboratives-building-bridges-place-based-partnerships-and-anchor-institutions>.

to the region. The corporate partners represent different industries but have a shared interest in further developing the region's strength in transportation and logistics operations; the collaborative provides them with a vehicle to shape, participate in, invest in and benefit from the development. While collaboratives often require dedicated staff and resources to manage operations and initiatives, they also offer scale, credibility and capacity.<sup>383</sup>

Corporate engagement in economic development has been limited in Sacramento, as Sacramento's economy has been dominated by government, but is beginning to transition to the more collaborative, networked, cross-sector institutional structures that emerge as the economy diversifies and centers in next economy industries. As noted in the Governance market analysis, there is limited large corporate (and philanthropic) presence in Sacramento, and much of it is reportedly at least historically a bit risk averse.

Corporations inherently drive economic growth, and if Sacramento is going to deliberately and strategically "reset" to compete in the next economy, the corporate community needs a strong vehicle for collaboratively investing in everything from new initiatives like the Diversifying Management and Ownership Services to branding and recruitment strategies for the region.

### *Recommendation, Relevant Models and Next Steps*

As mentioned, corporation-driven economic development is increasing and broadening in scope in the leading regions, taking many collaborative forms: The ITASCA Project in Minneapolis, MN; CenterState CEO in Syracuse, NY; M7 in Milwaukee; MidAmerica Regional Council in Kansas City; The Newark Anchor Collaborative led by Prudential; and World Business Chicago (WBC) are among many relevant models. As the economic growth Action Agenda moves forward, and its many initiatives get underway, consideration should be given to designing a corporation-driven alliance tailored to implementing the plan – creating a nimble, flexible, well-staffed vehicle to engage corporate leadership where it can add value aligned with the relevant business expertise, resources and interests.

Companies in the region are already demonstrating increased interest in collaborating on economic issues, particularly around emerging industries, as evidenced by the establishment and rapid growth and accomplishments of GSEC, including its Competitiveness Council; the Sacramento Metro Chamber of Commerce; the Sacramento Valley Manufacturing Initiative; the BioAg Alliance between Monsanto and Novozymes; among many other activities. Building upon and expanding these efforts to create a larger scale corporate-driven alliance would enable more deliberate and efficient activity across a wide range of activities where economic development and business goals intersect.

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<sup>383</sup> Exemplar corporate-driven collaboratives include: ITASCA Project in Minneapolis, Minnesota, which is led by private-sector CEOs and assembles task forces on various economic issues, such as housing affordability, college and career readiness and workforce development, among other issues; Newark Anchor Collaborative in Newark, New Jersey, which is driven by Prudential Financial and engages corporate, public and philanthropic partners to support more local purchasing, hiring, and investing; and CenterState CEO in central New York, which is led by business and community members and implements a wide range of regional economic development initiatives, including accelerators, venture funds, and workforce development programs, among initiatives.

Activities of collaboratives vary by regional context, but can include employer-driven training programs for un- and under-employed residents; venture funds, in which partners pool funds to invest in high-potential firms;<sup>384</sup> supply chain development, in which partners build the capacity of people of color and women-owned small businesses to meet their procurement needs;<sup>385</sup> accelerators or incubators to support local innovation; and investments in residential and/or commercial development, among others. A Corporation Leadership Alliance would enable corporations to engage in and help implement many aspects of the economic growth Action Agenda – such as ScaleUp Services, the Diversity Management and Ownership Services, and the demand-driven, sector-based workforce development strategies – and provide the corporations with a collaborative vehicle to identify and launch new initiatives.

Establishing a Corporate Leadership Alliance requires engaging key institutions and leadership – institutions should include leading employers in the region and representatives should be C-suite level and able to make decisions without outside approval. Programmatic starting points and priorities will have to be defined, which can be done through a series of focused, well-organized meetings with a small group of business leaders. Organizational structure will also need to be determined – some collaboratives have dedicated staff and resources, while others engage pro-bono services to manage the work.<sup>386</sup> Collaboratives often receive financial support from members (particularly from corporations and anchor institutions), philanthropy, and/or the public sector. This initiative could be launched as part of a new organization or within an existing one.

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### *Mission-Oriented “Master Developer”*

Consider establishing a **mission-driven, market-making, non-profit “master developer”** to conceive major industrial development projects, do pre-development business planning and work, and partner with developers to execute, bringing patient capital and other resources to enable more market-making and inclusive development.

#### *Overview*

The economy is changing in ways which create the potential to identify market-leading commercial and industrial real estate development opportunities that stem from and tie regional economic growth to inclusive district and community development. In particular, the combination of the revaluing of center cities and the proliferation of new mixed-use

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<sup>384</sup> CenterState CEO, for example, has launched venture capital funds that provide capital to targeted, early stage companies in the central New York region.

<sup>385</sup> Chicago Anchors for a Strong Economy (CASE), for example, prepares small to medium-sized businesses to service large contracts and connects the businesses to procurement opportunities.

<sup>386</sup> For example, CenterState CEO has a 13-member team dedicated to economic inclusion efforts (such as Work Train), while The ITASCA Project is a “virtual” organization with no staff or physical presence. The ITASCA Project relies on the pro-bono services of McKinsey & Company to support operations and logistics.

development forms creates a prime opportunity to generate and capture new economic value through strategic redevelopment of urban real estate. Industrial and commercial place-making both leverage existing infrastructure, firms and institutions and has the potential to anchor and catalyze new high-growth, next-economy industries and supply chains in the heart of urban neighborhoods. Integrated corridor-, district- and neighborhood-level development can create a whole greater than the sum of its parts, building momentum and improving the prospects of broader communities and regions.

To take full advantage of these opportunities, specialized local development capacities are needed to provide:

- **Market-making analysis** – Generate optimal development scenarios by conducting market analyses for each corridor and district, identifying the intersections between: (1) regional economic strengths and growth opportunities; (2) corridor/district site opportunities and constraints; and (3) neighborhood and economic assets and development in the surrounding communities;<sup>387</sup>
- **Sophisticated knowledge of deal flow / assembly** – Work with a range of partners (public agencies, other developers, brokers, capital providers, potential tenants) to move from speculative development scenarios to real transactions.
- **Patient, complex capital** – Identify and assemble a complex capital stack (grants, tax credits, debt, equity) that enables the long-range, strategic development scenarios to come to fruition.

Sacramento has both a comparatively large amount of land available for redevelopment (compared to other major cities) and a suite of strategic economic development initiatives that could use this real estate for initiatives such as a food innovation park, contract manufacturing facilities, shared lab space, or workforce training spaces. While Sacramento has a few CDFIs and CDCs, it currently does not have a mission-oriented master developer combining all of these capacities and capabilities.

### *Recommendation, Relevant Models and Next Steps*

Sacramento would benefit from a mission-oriented master developer to optimize the utilization of its available land for inclusive economic development activities. As people and firms move back towards density, and mixed uses are more attractive as industrial production is more compatible with other uses, urban industrial real estate is offering new opportunities. These are particularly attractive as they naturally achieve inclusion and spatial efficiency goals. This kind of market-making development, however, often takes greater strategic commitment, requires

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<sup>387</sup> For an example of market making urban industrial development, see: Mass Economics, Noell Consulting Group, RW Ventures, Stoss Landscape Urbanism, and TWS, “Strategic Development Scenarios for the Annie E. Casey Foundation’s University Avenue Site,” PowerPoint presentation: 2014, available at <http://rw-ventures.com/strategic-development-scenarios-for-the-annie-e-casey-foundations-university-avenue-site/>.

more planning and pre-development work and costs, and so requires more subsidy or patient, higher risk capital. A master developer can play these roles.

A key goal and capacity of the master developer will be to further inclusion and spatial efficiency by driving major job and amenity-creating developments located near and designed to benefit less developed communities. Chicago Neighborhood Initiatives (CNI) is one relevant example of a mission-oriented developer. Structured as a nonprofit with CDFI status, it also has strong connections to a place-based investor (US Bank) and sophisticated capacity to use its existing capital commitments to leverage other more complicated transactions (including Opportunity Zones) within the frame of a long-range, strategic master plan for a major industrial region (Chicago’s Pullman neighborhood and environs).

As identified in the Spatial Efficiency section, regional planning and coordination in Sacramento will need to focus attention on more infill development – supported by more accessible and efficient infrastructure – to ensure growth occurs in areas that best serve Sacramento and the region. In addition to the functions outlined above, the master developer will present an opportunity to move beyond land transactions to include ancillary outcomes (e.g., workforce development, digital infrastructure) and prioritize related benefits (e.g., climate resilience). In addition, the developer can explore new models for community wealth creation alongside major development projects (e.g., value capture, shared ownership models). To enable these innovations, partnerships with regional institutions, workforce development boards, industry associations, and firms will be important.

Considerable work has been done to identify pending and potential industrial and mixed-use developments, their suitability for the various initiatives being contemplated and particularly their impact on inclusion and spatial efficiency. Please see Appendix 3 for that analysis, including illustrative recommendations for potential developments.<sup>388</sup>

In addition to further inventorying promising parcels of urban land that are best positioned to be leveraged for inclusive redevelopment, next steps include business planning to detail specific capacities, services, staging of activities and financials for launching a master developer – and identifying potential deals (many of which flow from other initiatives) and their site requirements.

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### *Potential Initiatives: Conclusion*

These initiatives, of course, are meant to fit together, be mutually reinforcing and collectively “ScaleUP Sacramento.” Each of them, however, must be further vetted, built out with partners into business plans, and operationalized. Also, many other potential initiatives have surfaced which deserve attention – to build Sacramento’s clusters (e.g., Clean Energy Cluster Alliance),

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<sup>388</sup> It is anticipated that the specific uses for these sites will be explored in more detail by the Neighborhood Development Action Team.

develop additional mutually-reinforcing human capital and innovation programs, and further support growth with targeted spatial efficiency and governance activities. It will be critical to start with a manageable number of “signature” initiatives that are synergistic and deliberately move Sacramento’s economy forward towards long-term, inclusive growth – strengthening the local economy while defining a global ‘brand’ of economic strengths. This will attract people and firms that further reinforce Sacramento’s transition into a global hub for high-tech, high growth industries.



## Conclusion

The end of this Action Agenda is just the beginning of the exciting work to ScaleUP Sacramento. The city and region are at a key moment of challenge but also of enormous opportunity: doing nothing risks stagnation, while getting the strategic direction and implementation capacity right could make Sacramento a leading global hub of innovative firms in growing industries, and of the vital communities that economic growth enables. The Action Agenda offers a starting point for new collaborations, transformative initiatives, and major investments in transitioning to an inclusive and prosperous future for all of the people, businesses and communities of Sacramento. The time for analysis and planning has now passed: it is time for action!

# Acknowledgements

Many thanks to the hundreds of individuals and organizations from across the region who participated in the creation of this Action Agenda through interviews and meetings, and who otherwise engaged in brainstorming, analysis, strategy discussion and identification of promising initiatives. A special thank you to our regional partners – Sacramento Area Council of Governments (SACOG), Valley Vision, Sacramento Metro Chamber of Commerce and Greater Sacramento Economic Council – who are simultaneously developing the Prosperity Strategy, an inclusive economic growth strategy for the Sacramento region. The Prosperity Strategy and this Action Agenda have been developed in partnership, and are closely aligned. Special thanks also to the team of local and national experts, led by RW Ventures, LLC, who staffed this extensive process. Their expertise in applying asset- and market-based business planning to the task of regional economic growth has provided this roadmap to transition the region into a vibrant, diverse and inclusive economy, creating opportunities for all people and places.

ScaleUP Sacramento drew from the insights and expertise of hundreds of interviewees from across the city, region and country. Rather than list every individual who contributed to this work (and risk accidentally missing people), following are the many organizations whose employees and members participated in group or one-on-one interviews or otherwise contributed to the Action Agenda. The team is grateful to all of these organizations and individuals – ScaleUP Sacramento could not have come to be without them.

## Organizations

- AgTech Innovation Alliance
- AgTech Innovation Partners
- Bayer CropScience
- Best Company Consulting
- California Capital
- California League of Food Processors
- California Life Sciences Association
- California Life Sciences Institute
- California State University, Sacramento, Department of Public Policy and Administration
- California State University, Sacramento, Office of Research, Innovation and Economic Development
- Center of Excellence, Los Rios Community College District
- City of Sacramento, City Council
- City of Sacramento, Convention and Cultural Services
- City of Sacramento, Office of Innovation and Economic Development
- City of Sacramento, Planning Division
- City of Woodland, Community Development
- Clark Pacific
- CleanStart
- Crocker Art Museum
- Daimler Mobility Services
- Dignity Health
- Downtown Sacramento Partnership

- Florin Road Partnership
- Genentech
- Generative Futures Lab
- Golden Sierra Workforce Board
- Greater Sacramento Economic Council
- Hacker Lab; Code for Hood
- Harvard, Kennedy School, Ash Center for Democratic Governance and Innovation
- Highlands Power, Inc.
- Holt of California
- HP Hood, LLC
- Incumetrics
- Innovations Strategies, Inc.
- Land & Ladle
- LDK Ventures
- LearnSkin
- Lepore Development
- Los Rios Community College District, Workforce and Economic Development
- North Central Counties Consortium
- Novozymes
- PEM Motion
- Pheronym
- Power Inn Alliance
- Raley's
- RePurpose Energy
- Rhombus Systems
- Sacramento Area Council of Governments
- Sacramento Asian Pacific Chamber of Commerce; CalAsian Chamber of Commerce
- Sacramento City Unified School District
- Sacramento Employment and Training Agency
- Sacramento Hispanic Chamber of Commerce
- Sacramento Metropolitan Air Quality Management District
- Sacramento Metropolitan Chamber of Commerce
- Sacramento Municipal Utility District
- Sacramento Valley Manufacturing Initiative
- Saturas
- Siemens
- Social Venture Partners
- Square Root Academy
- StartupSac
- StemExpress
- The Shop @ VSP Global
- The VINE
- ThinCl
- Tri Tool
- UC Davis, Aggie Square
- UC Davis, Agriculture and Natural Resources
- UC Davis, Center for Regional Change
- UC Davis, Department of Chemistry
- UC Davis, Finance, Operations and Administration
- UC Davis, Government and Community Relations
- UC Davis, Health
- UC Davis, Innovation and Technology Commercialization
- UC Davis, Sociology

- UC Davis, Venture Catalyst
- UC Santa Cruz, Sociology
- University of Southern California, College of Letters, Arts and Sciences
- Unleashed Productions
- Valley Vision
- Vanguard FX Studio
- Verge Center for the Arts
- Yolo County Workforce Innovation Board
- Yuba Community College District, Agriculture

## B. Project Team

The work overall was led by RW Ventures, LLC, which assembled a project team of leading national consultants. Working in close collaboration with the city throughout more than a year, this team gathered and organized enormous amounts of research and data, led interviews and focus groups, undertook analysis and strategy development, and otherwise did whatever was necessary to produce this Action Agenda. It has been an extremely productive partnership, and the city is grateful to the entire team.

### **RW Ventures, LLC – Staff**

- Zach Addy
- Ashley Bakelmun
- Charu Gupta
- Alaina Harkness (former)
- Hannah Loftus (former)
- Matt Schuneman
- Robert Weissbourd

### **RW Ventures, LLC – Consultants**

- Dan Amsden – MIG, Inc.
- Rebecca Bagley – Independent Consultant
- Chris Benner – UC Santa Cruz, Sociology
- Genevie Coady – Consultant
- Deborah Cummings – TEconomy Partners, LLC
- Robin Gaster – Incumetrics
- Thom Goff – Mass Economics
- Darrene Hackler – Independent Consultant
- Mitchell Horowitz – TEconomy Partners, LLC
- Kate Joncas – MIG, Inc.
- Ric Kolenda – Independent Consultant
- Charles Laven – Forsyth Street
- Teresa Lynch – Mass Economics
- Jeff Margolis – Innovations Strategies Inc.
- Nitika Nautiyal – Independent Consultant
- Manuel Pastor – University of Southern California, College of Letters, Arts and Sciences
- Stuart Rosenfeld – Independent Consultant