



Emerging Trends in Technology Commercialization

Section 2: Case Study Profiles

For:
The Maryland Technology Development
Corporation (TEDCO)

By:
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Leadership and Vision

San Diego – Networked Leadership and CONNECT

Interview: Mary Walshok – Associate Vice Chancellor for Public Programs and Dean of Extension, University of California San Diego (author: Invention and Reinvention: The Evolution of San Diego's Entrepreneurial Economy, 2013); Jennifer Landress – Sr. Vice President and COO, Biocom San Diego; Sean Barr – Vice President, San Diego Regional Economic Development Corporation

Overview:

The story of how San Diego rose from a relatively unknown player in the R&D space 50 years ago, to a top U.S. metro today, is one of necessity, strategic investments and initiatives, a new approach to research, a highly collaborative culture, and leadership dedicated to creating a truly entrepreneurial ecosystem. Key to the region's success were individual leaders, notably Dwayne Roth, who, starting in 2004, became not only the leader for CONNECT, but the visible leader and “dot connector” of San Diego's innovation community. The San Diego region is now one of the nation's premier R&D and innovation hubs, anchored by major research institutes, including UC San Diego, Scripps Research Institute, Salk Institute for Biological Studies, Sanford-Burnham Medical Research Institute, West Health Institute, and J. Craig Venter Institute. This dense concentration of R&D has led to hundreds of new companies and established clusters in life sciences, communications, software, and clean tech.

Lead Organization: Multiple; historically CONNECT as “gel”

Geography and Population: San Diego metro area (3.3 million)

Description and Key Lessons:

In the 1960s, there was an increasing realization that San Diego's economy had to move beyond its base in the U.S. military and tourism. The military had made San Diego an emerging hub for wireless technology, enabling the region to value R&D early. While other cities, such as Detroit, focused on attracting unskilled labor for manufacturing, San Diego's economic development efforts were focused on talent attraction and research institutes. Local leaders realized that to build something from nothing, they would need to attract R&D talent. The City, backed by strong public support, donated 27 acres of land to establish the Salk Institute and zoned the Torrey Pines Mesa for the development of science and technology. UC San Diego was established on this site in 1960 and other new institutes followed. Scientists from around the country who wanted to solve problems, and who had grown tired of the traditional university environment, were drawn to the new, risk-taking, entrepreneurial environment forming in San Diego.

By the 1980s, San Diego had morphed into a robust R&D space. Whereas the Research Triangle Park (RTP) was a top down strategic effort, San Diego's was more bottom-up, led by entrepreneurial scientists and business developers. The region had established an informal, collaborative culture that was at the heart of its rising success. Companies such as Cubic, Linkabit (predecessor of Qualcomm), SAIC, and Hybritech were in the early stages of development and Torrey Pines was becoming an R&D center on a national scale.

As the pieces of the R&D puzzle began to converge in the mid-1980s, there was a realization that San Diego needed a catalyst to transform the region's growing research capabilities into a more cohesive effort. In 1985, UC San Diego, the San Diego Regional Economic Development Corporation (EDC), and private businesses partnered to form CONNECT, one of the nation's first start-up accelerators. CONNECT was established as a social platform to facilitate knowledge flows among all players in the R&D space. It was designed to be relational and highly collaborative, not transactional, and has been widely recognized as a national model. It has spun out highly successful industry cluster groups, such as Biocom, EvoNexus (formerly CommNexus), and CleanTech San Diego.

Key to the region's success, according to interviews, were its leaders, from the founding director, Bill Otterson, to Dwayne Roth, who, starting in 2004, became not only the leader for CONNECT, but the visible leader of San Diego's innovation community. This leadership is not top-down, but plays a more informal, connecting role. According to Mary Walshok, these leaders are, "the dot connectors, and you need people that are connectors". According to Sean Barr, "you need a champion, someone to coordinate." Unfortunately, Roth died suddenly in 2013, leaving CONNECT with what many describe as a crisis of identity. This led to debate about whether CONNECT has outlived its mission or if its current struggles stem from a lack of leadership. At the same time, it is widely recognized that a distributed network of leaders is critical. In San Diego, leaders of CONNECT, Biocom, EvoNexus, San Diego Regional EDC, and the Chamber, conduct regular joint meetings with the Mayor. The individuals are all community leaders in their own right, not just for the organizations they directly serve.

Local leaders interviewed shared key lessons that are relevant to Maryland and other technology hubs. Those are:

- There is temptation to make innovation efforts about creating the next big company when it should be more about creating an entrepreneurial ecosystem.
- It is not about the assets that you have, it is about entrepreneurship and collaboration. You must have the right type of people and challenge the status quo. San Diego does not have the major Fortune 500 assets of Minneapolis-St. Paul, but has performed far better on innovation. St. Louis offers an example of how not to create an ecosystem: their efforts relied on government officials, chambers, and Fortune 500 CEOs and failed to recognize the sociological dimensions. Other places could do what San Diego has done, but they are trying to replicate the wrong things.
- The ecosystem should be more organic and fluid, not one with a top-down umbrella organization. More organizations that cross boundaries are needed. You need continuous knowledge flows and to be nimble. Bureaucratic managerial systems work against all that. They are set up to eliminate risk. Innovators often get lost in places with big government and big companies.
- Regions don't just invent and reinvent one time; reinvention is a constant. You must be able to live with chaos and order and thrive in diversity.

Leadership and Vision

Indiana – BioCrossroads and the Central Indiana Corporate Partnership

Interview: David Johnson – President and CEO, CICIP and BioCrossroads; Betsy McCaw – Chief Operating Officer, CICIP (leader, 16 Tech project)

Overview:

BioCrossroads serves as the clear leader and catalyst for Indiana's life science community. It was formed in 2002 around a vision to do more with the state's admirable life sciences corporate and academic assets (which includes Eli Lilly, WellPoint, Cook Medical, and Roche) and is credited with driving Indiana's emergence as a nationally known life sciences hub, including raising over \$250 million for grant funds and capital investments to start and support life sciences opportunities, organizing four venture and seed funds, and launching new enterprises. David Johnson, who became CEO in 2005, not only oversees day-to-day management of the organization, but also has become a recognized local and national leader in the field of life sciences and in private sector initiatives. He credits research as being the foundation of all that BioCrossroads has accomplished during his tenure. BioCrossroads is one of six economic development initiatives sponsored by the Central Indiana Corporate Partnership, a CEO driven organization formed in 1999 (with major support from the \$13 billion Lilly Endowment) and dedicated to the region's prosperity and growth.

Lead Organization: BioCrossroads (501c3 nonprofit, 7 staff members) and CICIP

Geography and Population: Started as Central Indiana, but spread statewide (6.6 million)

Program Description:

BioCrossroads positioned itself as the driver and convener of Indiana's life sciences ecosystem by tapping into private sector leadership, securing a highly effective CEO, and placing a high priority on data to enable grounded strategies and build a compelling life sciences narrative for the state. BioCrossroads is entirely focused on filling market gaps and helping industry avoid long-term threats. The major threat facing the Indiana life sciences ecosystem has been its reliance on one large industry comprised of just a few key companies and generally lacking in talent, capital, start-ups, and visibility. Today, the threats have grown to include declines in NIH funding and the patent cliff. BioCrossroads considered its key early roles to revolve around bringing together corporate and academic people who knew each other socially and civically but didn't work together and to foster initiatives across siloed life sciences disciplines. It is not a policy shop and does not lobby.

The critical role of the private sector stems in part from the fact that the public sector in Indiana cannot go into debt, and therefore has limited ability to invest in economic development. BioCrossroads followed the basic model of its parent CICIP, which was formed based on the conviction among a set of CEOs that the region had not activated all the assets it had and that the private sector would need to own and drive key economic development initiatives. Prior to the formation of CICIP, Indianapolis had realized its greatest strategic success in sports, culminating in attraction of the NCAA headquarters to the region; however, there was recognition that the sports cluster was not enough. Local leaders became determined to develop a deliberate, well-funded private-sector strategy around

other initiatives. According to CACP and BioCrossroads CEO David Johnson, “there is an ‘if you build it they will come’ idea in cluster strategies, but opportunities are unorganized until someone takes the lead to organize them.”

David Johnson initially became involved as a volunteer and was hired as BioCrossroads CEO in 2005. A longtime business leader and lawyer (involved in municipal finance and private equity), Johnson is an honors graduate of Harvard College, Harvard Law School, and Oxford University, where he studied as a Rhodes Scholar. He stresses that cluster organizations are no longer an area for leaders with traditional economic development or public sector backgrounds, nor are any of his staff subject matter experts on the life sciences. He believes that businesspeople are the best drivers of cluster organizations because they bring strong project management, finance, analytical and leadership skills and experience as well as a certain level of impatience to set and achieve goals. The ability of BioCrossroads to take a long-term view, however, stems not just from the business acumen of its staff but also long-term financial commitments from major corporate donors – according to Johnson, it “has a set of sponsors to let you do what you’re doing”.

Johnson has established himself as a CEO who not only oversees the management of BioCrossroads, but who has become a state and national leader in the field of life sciences and in private-sector initiatives. He regularly engages with key leaders from around the country, from organizations such as the Brookings Institution to San Diego’s Connect (of which he is a member), to ensure he is on top of the latest trends and to keep Indiana top of mind as a life sciences hub. To succeed in these capacities and to be able to tell the story and do the right work, Johnson learned that two basic things are required: strong data and good people. Johnson states, “every good thing we’ve been able to get done has stemmed from our investment in data”.

Two recent and compelling examples of where BioCrossroads efforts are leading to major outcomes are the Indiana Biosciences Research Institute (IBRI) and 16 Tech. IBRI is a \$350 million initiative to recruit 150-200 world-class researchers and fund breakthrough research in metabolic diseases (such as diabetes and obesity) and nutrition. It was founded based on a finding that there were an enormous amount of expiring patents on the industry side and a general need for early stage research and talent. By February 2016, IBRI had hired a CEO and was halfway to its funding goal, driven by a \$100 million grant from Lilly. Further, a 2015 Battelle report commissioned by BioCrossroads concluded that an intentional and well-resourced public-private place-making strategy is critical for the Indianapolis region’s future growth. In November 2015, the City Council approved \$75 million in tax increment revenue bonds to enable infrastructure development for an innovation district at 16 Tech. 16 Tech is a 60-acre industry, residential, and retail site between the Indiana University-Purdue University Indianapolis (IUPUI) campus and downtown that will serve as the innovation hub for the region. Johnson confirms that these types of initiatives could never have happened without BioCrossroads.

Johnson is a strong believer in the importance of the private sector and has positioned the organization as distinct from trade associations. He states, “the ability of Biocrossroads to focus on aligning the local cluster with the long-term direction of the industry relies on

buy-in from membership and CEO support. Early on, Biocrossroads could have drifted towards hosting weekly bioscience events. But IBRI wouldn't have ever happened if they were focused on activating an event the next day. Trade associations can't do this. The state was the first funder in IBRI (\$25 million), but didn't mandate how it was done."

Leadership and Vision

Milwaukee – Water Council

Interview: Rich Meeusen – President/CEO/Chairman, Badger Meter and Co Chair of the Water Council board of directors; Dean Amhaus – President & CEO, The Water Council; Elizabeth Thelen – Director of Entrepreneurship and Talent, The Water Council

Program Overview:

The Water Council aims to establish the Milwaukee region as the world hub for water research, economic development, and education. It has gone a long way towards achieving this status in the few years since its official formation in 2009. The cluster consists of over 200 water technologies companies covering the entire spectrum of the business pipeline. It has a physical presence in the Global Water Center, a 98,000 square foot research and accelerator facility completed in 2013 and is located in the recently established Milwaukee Water Technologies District near downtown. It is further supported by the University of Wisconsin-Milwaukee's School of Freshwater Sciences, created in 2010. This effort was initially catalyzed by the private sector and is driven by intense collaboration and significant levels of commitment among business, academic, and public sector agents. The Water Council's budget is \$3.5 million, sourced from leasing at the Global Water Center, grants, membership, and fees.

Lead Organization: The Water Council (501c3 nonprofit, 11 staff members)

Geography and Population: Milwaukee metro area (1.6 million)

Program Description:

The Water Council, and the water technologies cluster it supports, provides an ideal example of the vital role of leadership and vision in identifying, developing, and championing a creative, new economic development initiative around a core strength. The cluster was not something that Milwaukee area leaders claim to have created, but something that they 'discovered'. The region was originally built around breweries, tanneries, and food processing operations and these 'wet industries' were served by a growing set of companies. Even as the larger industries declined, the companies that served them, and their water-based technologies, remained. The cluster's formation was driven by leaders from a few large, global companies in the region that realized they were not truly part of a scattered set of local industries as defined by their official NAICS codes (that related more to parts and instrument manufacturing), but were significantly connected by their focus on water technologies (which is not defined by any industry code). Today, the Water Council consists of 184 members and 21 global partners.

Less than 10 years in the making, this vertical cluster already fully covers the entire spectrum of the business pipeline, from pre-basic research to large firm. The concept emerged in 2007, the cluster was officially formed in 2009, a 98,000 square foot research and accelerator facility (GWC) was completed by 2013 and filled by 2015, a water technologies district was established and a second 46,000 square foot building secured, and new firms and organizations continue to be attracted to the district. In March 2016, the International Water Association (IWA) confirmed Milwaukee's status as a world water hub by selecting the Water District for its North American headquarters.

According to its champions, water technologies has taken rapid hold because it encompasses all the critical factors necessary for a robust cluster: leadership from existing firms in the industry itself, a large base of firms from start-ups to multi-nationals that strongly identify with the cluster, a physical presence where all engaged players can readily connect, significant investment from state government and universities, a strong economic history in the region related to water (including a location on the world's largest freshwater system), an annual summit, and a topic that is vital to the world today. To further confirm that the region was truly a globally relevant water center, the Water Council conducted a study of global water hubs, and found that only the nations of Israel, Singapore, and the Netherlands had anywhere near the concentration of water technology companies and assets as the metro area of Milwaukee. Combined, these findings have further cemented the region's global vision as a viable, near-term reality and provided a credible platform for growth.

The Water Council places emphasis on three primary areas, and it is proving successful in each of them: 1) start-ups, growth of existing firms, and attraction of new firms; 2) talent development; and 3) innovation, technology and research. It was started through significant seed funding from the state and 13 local companies that contributed \$50,000 each.

The GWC houses 40 occupants in space that includes water-centric research facilities for universities, an accelerator (BREW) for 25 start-ups, a lab, and offices. BREW (Business. Research. Entrepreneurship. In Wisconsin.), is focused on innovation driven start-ups determined to solve global freshwater challenges. The University of Wisconsin-Milwaukee (UWM) occupies the entire 7th floor of the GWC with these facilities dedicated to the commercialization of new water technology solutions. In 2010, UWM announced a \$53 million investment to create the nation's first School of Freshwater Science. A unique aspect is that GWC is owned by the Water Council, allowing it to earn revenue to cover some of its own costs through leasing of the building.

The Water Council provides specific programs designed for start-ups. BREW Corporate partners with global corporations looking for new technologies to solve a specific challenge. Start-ups compete around areas of interest determined by the corporation. The Water Council is also developing a \$5 million seed fund that will invest in promising water technology start-ups and has received \$1 million from the Wisconsin Economic Development Corporation to get started.

By establishing and investing in a truly unique and relevant cluster, with a full range of support and assets, the Milwaukee region's water technologies cluster is poised to be a driver of the region's economy and an agent for global change. Larger firms, such as Badger Meter and Rexnord, have offices in GWC and have acquired some of the start-ups in the accelerator. The cluster serves as a magnet to draw new firms to the region, as evidenced by Zurn's recent move of its corporate headquarters from Pennsylvania to the new business park in the Water District. And the growing stream of international delegations to Milwaukee signifies that by 'owning' their strength, the region can rightfully stake its claim as the global water hub.

Leadership and Vision

Minnesota – Medical Alley Association Cluster Research

Interview: Dr. Cheryl Matter – Vice President of Intelligence and Research

Overview:

The Medical Alley Association, the industry group for Minnesota’s health technology cluster, has created a lean but effective research operation over the past several years that supports the association’s public policy efforts, provides local firms with actionable industry intelligence (around such topics as supply chains, product approvals and investment trends), and promotes Minnesota’s cluster assets and specialized expertise nationally and globally. In just one year and with two staff, the Medical Alley research team released more than 20 reports on the cluster. Medical Alley’s research expertise has allowed it to form effective partnerships with other economic development organizations.

Lead Organization: Medical Alley Association (12 staff members)

Geography and Population: State, primarily focused on Minneapolis-St. Paul (3.5 million)

Background:

Minnesota’s health technology cluster is led by major global firms and institutions such as 3M, Medtronic, and the Mayo Clinic. It is a major employer and the dominant driver of exports from Minnesota, as well as a magnet for foreign direct investment. Nationwide, Minnesota is a leader in medical devices and a top-10 center for life sciences overall. The Medical Alley Association was originally formed in 1984. In 2005, Medical Alley merged with MNBIO (the Minnesota chapter of the Biotechnology Industry Organization) to form a broader organization called LifeScience Alley. In 2016, it rebranded as Medical Alley and adopted a renewed, exclusive focus on the state’s key industry subsectors: medical devices, pharmaceuticals, diagnostics, and digital health. Within these industries, Medical Alley leads public policy advocacy efforts for its 700 members and acts as a neutral convener that delivers events and training. Further, as part of its reorganization and in response to member request, Medical Alley committed to creating a significantly stronger research program. One year into this new phase, Medical Alley has generated a significant quantity of industry-specific research, and early feedback has been “wildly positive”.

Program description:

Medical Alley’s reorganization in 2015 was largely driven by the recognition that firms in its core industries have highly specific public policy and business development needs. Medical Alley’s member companies directly shape its research portfolio, through regular informal outreach as well as the formal participation of top member companies on its research and intelligence advisory board. As a result, Medical Alley’s research products are sophisticated, targeted by industry sub-sector, and revolve around drivers of innovation. Medical Alley’s research products come in several forms:

- **Sector Landscapes:** in-depth analyses of specific sub-sectors in the health technology cluster, drawing on local experts in industry and academia. Reports in 2015 covered the following industries: research tools, tissues and biologics, neuromodulation, and animal health. Reports cover global industry trends including regulatory and research activity, the position of local firms/industry including

supporting infrastructure, and industry forecasts. Each contains a resource directory that profiles relevant companies, university facilities, and incubators.

- **Quarterly Reports:** track industry performance indicators on investment (deals by source, company, and deal size), innovation (patent activity by subsector), workforce (job openings by company, wage trends, skills demand), and approvals (premarket and 510k approvals by subsector with specific product detail). These reports are more holistic and locally relevant than standard data – investment trends reflect data from federal sources such as SEC filings, national organizations such as PWC and BioEnterprise, and local press releases and news publications.
- **Special Reports:** cover topics such as SBIR/STTR trends by region and industry, salary surveys, profiles of companies that have secured major investments, and analysis of factors contributing to faster 510k clearance times.

An internal team of just two full-time staff leads these research efforts. The principal researcher is Dr. Cheryl Matter, who has a PhD in Molecular and Medical Pharmacology from UCLA, where she also held a postdoctoral fellowship in technology-based entrepreneurship and co-founded a technology transfer and entrepreneurship center. A key to the team's success is Dr. Matter's approach of "leveraging as many people as possible" to contribute directly to projects. A typical report pulls together a team of PhD students along with industry mentors. Besides being resource-efficient, this approach ensures that Medical Alley's research reflects the latest developments in industry and academia. Recent reports have covered topics such as the implications of the Affordable Care Act on the process of new product introduction into provider systems, and trends in early stage investment activity by angel and strategic investors in the Minnesota medical device field. Only in rare cases does Medical Alley engage outside consultants for research.

Medical Alley's in-depth industry knowledge enables it to effectively forge connections between local firms and outside investors. As a follow-up to its Sector Landscape report for neuromodulation, Medical Alley conducted research and outreach with its membership to create a directory of relevant companies in Minnesota. It then contacted investors across the U.S. with a specific interest in the sector – including managing directors of VCs, strategic investors, and corporate venture arms – to share the report and company list, and made a concerted effort to connect with them at industry conferences.

Finally, Medical Alley's robust research program and clear industry focus has helped to better define and boost its role relative to other EDOs in the state. Though recent state efforts to create an overarching "science and technology authority" have faltered, Medical Alley's research and partnerships have ensured that the medical technology cluster at the center of the state's economic development activities. While the state Department of Employment and Economic Development and the Minneapolis-St. Paul region's main EDO (GreaterMSP) continue to act as the "front door" for investors, Medical Alley is a crucial partner in recruitment efforts. It attends global conferences and client meetings with GreaterMSP to provide detailed sector expertise to potential investors, including specialized workforce, supply chains, and research assets.

Leadership and Vision

Austin – Dell Medical School Innovation Zone

Interview: Sandy Guzman – Legislative Director, State Senator Kirk Watson; Christie Garbe – VP & Chief Strategy Officer, Central Health; Dr. Maninder “Mini” Kahlon – Vice Dean for Strategy & Partnerships, Dell Medical School

Overview:

The Innovation Zone, a 14-acre site in downtown Austin centered on the University of Texas’s new Dell Medical School and teaching hospital, represents both a new model for collaboration between public, private, and academic institutions and a good example of the potential linkages between university technology transfer and community inclusion. The Innovation Zone aims to help bridge Austin’s tech and start-up community with a new model for health care delivery. Not only is the Dell Medical School the first new medical school built alongside a tier one research university in the country in the last fifty years, it is also the first to focus all its clinical, teaching, and research assets around new clinical care models that improve the overall quality and cost of care—not just the use of new technologies. In particular, the school has the explicit goal of pursuing comprehensive value-based care (reimbursements based on patient outcomes, not simply the amount of procedures done). UT has partnered with a number of community organizations, created research areas, and attracted faculty aimed at achieving this mission.

Lead Organization: The University of Texas Dell Medical School

Geography and Population: Austin metro area (2 million)

Background:

Austin is a well-known hub of software and semiconductor technology and UT-Austin is a tier-one research institution with strengths in engineering, design, business, and computer science. However, the university system’s only medical schools have been in Galveston and Houston. The development of the new medical school and surrounding innovation zone is a novel model of public and private leadership and vision. In 2011, State Senator Kirk Watson laid out 10 Goals in 10 Years, a strategy for health care and economic prosperity. The following year, voters in Travis County passed a property tax increase to invest in community health – with the new medical school receiving some of the revenue. In 2013, Austin mayor Lee Leffingwell and Senator Watson created a working group to ensure a cross-section of the community was involved in development of the district, including representatives from the city government, the university, Central Health (the landowner of the 14 acres where the medical school will be located), economic development organizations, members of the tech and entrepreneur community, homeless advocates, and others. In June 2016, the Dell Medical School will accept its first cohort of students.

Program description:

The Innovation Zone and the corresponding medical school will include three buildings located in the heart of downtown Austin and directly south of the University of Texas and will include a teaching hospital, medical school, and research building making up nearly 4 million square feet. In addition, the zone will include over 60,000 square feet of wet lab space for entrepreneurial researchers, startups, and academic research. The entire parcel is

owned by Central Health, a public entity that provides health care services to low income families in Travis County. While Central Health will use the land lease to drive revenue to its service mission, they are also an integral part of the governance model for the Innovation Zone and will ensure activities and investments are linked to community health.

Central to the Innovation Zone is Dell Medical School's unique mission to develop new models of clinical care driven by outcome-based medicine. On a number of levels this is a substantial departure from the model employed by the majority academic medical centers.

Most schools see their teaching hospitals as revenue generators for the university system and rely heavily on fee-for-service care to bring in funds. Therefore, according to Dr. Kahlon, Dell Medical School needed to develop funding streams outside of clinical services. Instead of relying on drug development and fee-for-service patient care, the school is leveraging its strengths in data analytics and design to create a business model around research and discovery of new high value, low cost health care operations. For example, the new Department of Public Health is working with Seton (a corporate partner) and other community care facilities, along with the city of Austin's robust software sector, to research and disseminate novel approaches to health data. Everything from nurse optimization to aggregative personalized patient data offer commercial opportunities for the school.

The school has also developed its academic programming and commercialization activity around value-based care. According to Dr. Kahlon, the school's leadership wants to make sure that research matches the Austin economy's competitive advantages, which in the near term will not lie in pharmaceuticals. Therefore, unlike most medical schools, the bulk of research will be focused on health IT (in collaboration with the computer science and engineering departments) rather than traditional life sciences. For example, several senior faculty members have worked for Medicare and Medicaid and are experts at bundled payments, a rapidly growing segment of value-based care. A potential source of revenue may be supporting health entities better manage bundled payments. All departments in the new school are tasked with taking on interdisciplinary collaborations to create new clinical methods, research, and commercial products and services. For example, the Department of Neurology has developed basic and clinical research programs that create breakthroughs in imaging technologies with partnerships with UT's Cockrell School of Engineering and the College of Natural Sciences.

Funding for the new school comes from a variety of public, private, and philanthropic sources. To begin with, the city passed a referendum to increased property taxes by .05 cents on every \$100 in real estate value to raise funds for the new school. The Proposition was sponsored and organized by Central Health and strongly endorsed by Senator Watson and the Mayor. The public funding not only helped fund the school and relieved pressure to charge higher rates for patients as under a fee-for-service model, but also requires the new school to service community health needs. On top of this public funding, the Dell family donated \$50 million with another \$35 million coming from a variety of sources. In addition, the medical school received \$8 million to hire star faculty over the next five years.

The Innovation Zone is supposed to be not only a medical school, but also a new “center of gravity” for community health and economic development, according to Clay Johnson, the dean of the medical school. Along those lines, a number of programs are being developed to further connect with the surrounding community. For example, the medical school and Central Health have partnered with the Rocky Mountain Institute help create a novel approach to urban transportation—including ways UT and its partners can make the neighborhood around the medical school link to the broader city through public transportation and strategies for street traffic including pedestrians and cars. They are also working with the Project of Public Space (PPS) to help create a public market adjacent to the medical school.

To oversee activity within the Innovation Zone and ensure alignment with community and university interests, stakeholders created a nonprofit organization called Capital City Innovation Inc. Initial funding for the organization will come from Central Health, the Seton Healthcare Family, and the medical school. Each of these organizations will have one seat on the nonprofit’s board with four other slots to be held by community members. Mayor Steve Adler and Travis County Judge Sarah Eckhard will serve as advisory member. Currently, Capital City Innovation, Inc. is working with a number of community-based institutions outside the Zone, including Austin Community College, to create broader cross-city relationships.

Leadership and Vision sidebars:

- **Virginia Commonwealth Center for Advanced Manufacturing (CCAM)**
CCAM was created in 2011 with the goal of translating basic research into commercial technologies by enabling firms to pool R&D efforts and advance the research of Virginia universities. Based in Prince George County, CCAM partners with five universities and 28 industry members including Rolls-Royce, Siemens, and Alcoa. The 62,000 square foot facility contains research labs, production space, and specialized equipment. In 2015, CCAM signed a collaborative agreement with the Korean government to provide up to \$1 million per year for next five years for Korean companies that engage in research via CCAM.

- **San Antonio Cyber Cluster**
In 2015, the City of San Antonio and Bexar County funded a cybersecurity initiative led by a full-time economic development executive at the San Antonio Chamber of Commerce. This executive is charged with telling the story of the industry within the region and serving as a “dot connector” between Air Force and NSA cybersecurity operations, UT-San Antonio’s Institute for Cybersecurity, and the 60-80 local companies in the field. A key early goal is to develop an incubator, based in an existing Rackspace-backed facility, to help veterans launch firms, find talent, and access enterprise customers willing to test new software products.

Other Leadership and Vision examples:

- Innovation Districts
 - Atlanta – Midtown and Georgia Tech
 - Pittsburgh – Oakland Neighborhood
 - Philadelphia – University City
 - St. Louis – Cortex District

- Global Engagement
 - Canadian Technology Accelerator in New York City
 - BioSTL – St. Louis-Israel Innovation Connection
 - Ontario Centers of Excellence – China Angels Mentorship Program

- Research and Narrative
 - San Diego – Regional EDC (economic value of research institutions report)

Pre-Pipeline

Portland – Startup PDX Challenge and Inclusive Startup Fund

Interview: Chris Harder – Director of Business Oregon (state EDO), former Economic Development Director at Portland Development Commission; Nitin Rai – Managing Director, Elevate Capital and President, TIE Oregon

Summary:

The Startup PDX Challenge, run by the city of Portland’s economic development agency and targeted at minority entrepreneurs, awards six early-stage startups a one-year platform to set them up for later investment. Each company receives up to \$25,000 in the form of two-year low-interest loans or convertible debt, free office space in a city-owned building, in-kind business services (HR, accounting, marketing), and memberships to relevant industry organizations. The Inclusive Startup Fund is a new venture fund that is exclusively targeted at minority entrepreneurs, which has been capitalized with \$1.25 million from public sources to be matched with \$1.75 million in private funding.

Lead Organization: Portland Development Commission (approximately 100 staff)

Geography and Population: Portland metro area (2.3 million)

Background:

In the decade from 2004-2014, according to the Brookings Metro Monitor, the Portland metro area ranked 2nd among the largest 100 metro areas in terms of growth in a combination of “prosperity” metrics including average wage and output per capita. One driver of this is Portland’s emergence as a burgeoning tech market in the post-recession years. The technology workforce in Multnomah County has grown 82 percent since 2010, compared to 29 percent growth nationwide.¹ Major firms such as eBay and Airbnb have opened satellites. The sale of major homegrown tech firms such as GlobeSherpa and Elemental Technologies has injected more capital into regional funders such as the Oregon Angel Fund.²

The Portland Development Commission (PDC), the city’s economic development agency, recognizes that certain communities have been largely excluded from the benefits of the city’s growth. This includes the city’s minority community, of which nearly 50% of the population under the age of 25 is a part. In response, PDC has taken a lead in implementing several programs dedicated to fostering entrepreneurship – primarily in the form of traded-sector startups – in under-represented populations.

Program description:

After the PDX Startup Challenge successfully launched in 2013 with 240 applicants, the subsequent two rounds have focused exclusively on entrepreneurs with diverse founding teams. These firms do not have to be tech companies, but they do have to be in high growth traded sector industries and have the intention to scale nationally or globally. This shift in focus was motivated by the recognition that of 114 venture capital deals in Portland over

¹ Peter Robinson. “The Software Industry’s Cabin in the Woods.” Bloomberg (February 18, 2016).

the course of two years, only 19% included a female founder and 2% or less included an African American or Latino founder.

Perhaps the biggest impact of the Startup PDX Challenge was to raise awareness of the extent of under-representation in the startup funding system. According to Chris Harder the Challenge brought forth “tons of qualified applicants from target populations, and funders said that they didn’t even realize that these businesses existed”. PDC also realized that the reach of its own programs was less extensive than it had assumed. As Harder put it, “if you’re from a privileged background, you know who to talk to – communities of color weren’t in those circles, didn’t know where to go, and didn’t know about programs that PDC thought everyone knew about”.

This realization catalyzed the creation of the Inclusive Startup Fund, which is dedicated to founders from underrepresented communities. (At least one member of the founding team must be a woman, minority, or veteran that owns at least 10% of the company.) At first, PDC faced some scrutiny for creating a fund that was exclusive on the basis of race and gender, but they were prepared to defend the program and welcomed the challenges as a means of bringing more attention and driving involvement in the program. PDC had previously launched the \$3M Portland Seed Fund – a standard fund not dedicated to minority-led firms – with the City of Hillsboro and the state of Oregon, which ultimately funded 56 companies and attracted \$100M in outside capital. For the Inclusive Startup Fund, PDC invested \$500,000 and secured investments of \$500,000 (funded by lottery money) from Multnomah County and of \$250,000 from the state. The remaining \$1.75 million of the fund will come from private investors. Public funds are granted to a nonprofit set up by PDC, the Portland Economic Investment Corp., which are then invested into the Inclusive Startup Fund.

PDC led the competitive process to identify a fund manager, choosing Elevate Capital from a pool of six firms. Elevate Capital is run by Nitin Rai, who was already highly involved in tech entrepreneurship among minority groups through his involvement with TIE Oregon. Elevate’s 4-person team is diverse itself: besides Rai, who is Indian-American, it includes a female venture advisor and an African-American fund manager and “community director” who previously worked with minority-owned firms at PDC and as the market manager of a local bank. Elevate is reaching different minority communities in different ways. Women, says Rai, have already “crossed the chasm” and account for 60% of the firms he interacts with, even outside the Inclusive fund. The firm’s community director is effective at reaching the black community, and Elevate is working with Latino chambers of commerce to reach that community. Rai expects that he will have to attract some entrepreneurs from outside the region to fill the pipeline, but expects to encounter little difficulty doing so.

The Fund will primarily provide first seed round investments of \$25-\$75 thousand and intensive growth mentoring to a group of up to 30 startups over five years, with the possibility of follow-on capital in the range of \$200,000. (Elevate is managing a separate \$10 million fund on behalf of an institutional investor and plans to continue to fund the best startups from the Inclusive fund from that pool.) Firms will apply for funding through an online application process, after which they will pitch to investors. As of April 2016, 70

had already applied. PDC and Elevate agreed on general targets for the share of founders that it will fund from specific backgrounds (e.g., women, black, Latino). The Inclusive Fund is expected to break even, though this modest performance relates more to the fact that it is a seed fund rather than its minority focus – Rai, like Rodney Sampson of Opportunity Hub (below), notes that firms with minority founders tend to outperform others.

A few key lessons have emerged from Elevate’s experience with the fund to date:

- It is extremely challenging to raise private money for these initiatives, regardless of how well connected the manager is. Other entrepreneurs are not stepping up, and institutional investors don’t think there is enough of a pipeline given the minority focus. The state should have put in the entirety of the money and stipulated that the fund at least earn its money back, or helped to find foundation money. PDC is allowing Elevate to make some early investments before it has received matching private funds to prove success, which should help.
- If the fund were state wide, it would be easier to raise money, as a lot of communities outside of the Portland metro area are eager to participate.
- It would be extremely difficult to be truly inclusive if the fund could only focus on tech firms: “all of the entrepreneurs will end up being Asian and Indian”. You have to look broadly and focus on areas of excellence in the region. In Portland, that includes footwear and outdoor apparel, as well as food-related business (traded sector).
- The manager of the fund needs to be a minority themselves, and have significant connections within the minority community, and experience making investments.

While the monetary resources provided by the Startup Challenge and Inclusive Startup Fund are meaningful, one of the most important outcomes is a more enduring change in dialog and awareness. As a government agency, PDC used its bully pulpit to change the conversation in the local startup scene. During the recent startup week, seven events were focused on, and organized and led by, people of color – without the involvement of PDC.

Pre-Pipeline

Atlanta – Opportunity Hub and TechSquare Labs

Interview: Rodney Sampson – Chief of Diversity and Inclusion at TechSquare Labs, Founder and CEO of Opportunity Hub

Overview:

Opportunity Hub is a co-working space and set of training resources, embedded within a larger incubator in Atlanta, that operates as a “platform to start, accelerate, incubate, and fund” technology companies with founders from under-represented populations.

Opportunity Hub operates early in the pipeline, helping to build talent and connections to help minorities access local tech firms or start their own. Key programs include a pre-accelerator, coding school, and a yearlong intensive programming and entrepreneurship training program for inner-city youth. Across all of its programs, Opportunity Hub maintains a consistent focus on bringing minority entrepreneurs into mainstream spaces to interact with funders and corporations.

Lead Organization: Opportunity Hub, within Tech Square Labs (6 staff members)

Geography and Population: Atlanta metro area (5.7 million)

Background:

Atlanta entrepreneur Rodney Sampson created Opportunity Hub in 2013 with an eye towards bridging the divide between Atlanta’s struggling inner city population and its successful tech industry. In the wake of the 2015 riots, Baltimore has been in the spotlight for its challenges with inequality and racial tensions, however, Atlanta’s urban economic challenges are in some ways even starker. According to a 2015 Brookings analysis, of the 100 largest U.S. cities, Atlanta had the third largest income gap between households at the 95th and 20th income percentiles. The gap in Baltimore was the 25th largest. Between 2007 and 2015, household incomes for those at the 20th percentile fell by 18% in Atlanta, compared to 11% in Baltimore. Yet at the same time, Atlanta is also a major and thriving hub of technology and innovation. It is anchored by Georgia Tech, which ranks 15th among all universities for federal R&D expenditures, boasts one of the oldest and best incubators in the country, and has generated significant corporate R&D activity in its Tech Square development.³ The region is a center of corporate activity in IT industry sectors, chiefly financial technologies, mobility and wireless technologies, and cyber security.

Program description:

From its founding through 2015, Opportunity Hub operated as an independent organization financed through a standard membership model. In those two years, it accelerated 25 startups that raised \$5 million in pre-seed and seed-stage capital, ran hundreds of events and conferences, and operated two co-working campuses (near Georgia Tech and Atlanta Clark University). In late 2015, Opportunity Hub merged with TechSquare Labs, an incubator and seed fund started in 2014 by two Atlanta entrepreneurs. As part of Tech Square Labs, Opportunity Hub aims to break even. Short-term costs are covered by co-working memberships, rentals of corporate innovation labs, and educational

³ Scott Andes and Bruce Katz. “Why Today’s Corporate Research Centers Need to Be in Cities.” Harvard Business Review (March 1, 2016).

programming. Longer-term, most revenue will come from seed-stage investments (Tech Square Labs just closed on a \$25 million seed fund), as well as corporate sponsorships.

Opportunity Hub was built on the philosophy that succeeding with under-represented populations requires building the talent and culture from the ground up. Under-represented populations, by definition, haven't been exposed to the tech world and lack connections that those from wealthier communities draw upon. The standard accelerator model, in which a company is expected to reach the capital stage in three months, doesn't fit this reality. Sampson describes his work as "remedial entrepreneurship", which means eliminating the knowledge gap in the basics of entrepreneurship, finance, and technology.

Three specific accelerator and training programs aim to address this gap:

- **Pre-accelerator:** This program is focused on early stage startups or recent/upcoming college grads, as well as businesses looking to boost internal innovation capacity. It provides training on developing a minimum viable product, forming a business model, pitching, and entrepreneurial fundamentals (legal, HR, taxes). The theory is that even for under-represented populations, there is no shortage of capital (Sampson is contacted every day by angels and VCs), but there is a dearth of startups with solid business fundamentals. This training is followed by a deep dive into a specific industry. The pre-accelerator costs \$10,000, but \$60,000 in scholarships were awarded pre-merger.
- **Opportunity Code & Co-founders College:** A partnership between Opportunity Hub and Iron Yard, this program is designed "for minorities, women and underserved students to learn to code and launch a career in technology". This begins with an immersive 3-month program run by Iron Yard that provides students with the skills of a junior-level programmer, after which the cohort of students goes through Opportunity Hub's pre-accelerator program. There is no cost to students, though they are encouraged to make donations upon completion.
- **CodeStart:** A first of its kind partnership between TechSquare Labs and the Atlanta Workforce Development Agency (AWDA), this program began with its first cohort of 15 students in February 2016. It adapts the above curricula for inner-city Atlanta residents between 18–24 years old (either with a GED or high school degree, but no college education) to develop basic programming skills and gain employment in the tech industry. Students complete a series of interviews and tests with AWDA to gain admission. The curriculum is three months of coding (similar to the Iron Yard program), one month of career readiness training, and nine months of entrepreneurship training (similar to the pre-accelerator). Participants live in school-sponsored housing throughout the program and participate in therapy sessions with a licensed counselor. The program cost \$750,000, of which \$250,000 was covered by AWDA. Another \$100,000 was funded by a private donation, and a number of startups have made smaller donations. CodeStart projects that 10 of the 15 students will complete the entire program and be placed in jobs with average salaries of \$62,500.

Opportunity Hub's impact extends beyond the programs that it runs. As reflected by the merger with TechSquare Labs, Opportunity Hub seeks to fully integrate diversity and inclusion initiatives with the existing tech ecosystem. While Sampson believes in the importance of programs focused on under-represented populations, he thinks that it is critical that they do not exist in separate, parallel universes. For example, while HBCUs are important concentrations of minority talent in both Atlanta and Baltimore, Sampson feels strongly that separate facilities for under-represented groups at such institutions are inadequate. Young minority entrepreneurs need to be in the spaces where mainstream investors spend time. Creating a separate black tech ecosystem is unrealistic and counterproductive, because investors fund companies based on the expectation that others will make further investments, so successful minority entrepreneurs will inevitably work their way up the food chain where "it becomes whiter and whiter and more and more male-dominated".

The location of TechSquare Labs immediately adjacent to Georgia Tech's Tech Square innovation district is a crucial enabler of this integration, because it brings Opportunity Hub firms into contact with funders as well as the corporations that are starting innovation labs within the incubator (Black and Decker is the first). It's also in an environment with 30,000 students at Georgia Tech, Morehouse, and Spelman, which provides a rich base of minority talent. TechSquare Labs has an informal but strong relationship with Georgia Tech, which was initially competing to buy the old Office Depot building that TechSquare Labs now occupies, but withdrew in support of TechSquare Labs. The dean of Georgia Tech's engineering school, who is African American, is highly supportive, and is in early stages of discussing more formal partnerships with TechSquare Labs.

But full integration requires more than physical proximity – it requires proactively creating an inclusive culture. Sampson, one of the first prominent African-American tech entrepreneurs in Atlanta, has strong perspective on the role that culture and mindset play in helping under-represented populations access the tech ecosystem. As the face of Opportunity Hub, Sampson has to maintain a high level of visibility in order to attract minorities to "white spaces" and help them overcome concerns about ongoing "conscious and unconscious bias" that complicates the already-difficult task of building a company. He spends a considerable amount of time building "white allies" and having candid conversations. He gains support by making an argument from an economic rather than philanthropic perspective – diverse co-founding teams perform better. In his view this is because for many of them, it's a matter of survival and there is intense family pressure to succeed for first-time college graduates.

According to Sampson, Opportunity Hub is nationally unique in that it runs actual programs targeted at minorities. He says "folks are getting tired of funds holding meetups and summits at South by Southwest". Given the nationwide interest in developing more targeted programs for under-represented populations, Sampson is also positioning Opportunity Hub as a service to assist technology organizations – co-working spaces, incubators and accelerators such as TechStars, firms, and coding schools – to create diversity initiatives. As part of this effort, he has already met with Governor Hogan's staff (Sam Malhotra, Secretary of Human Services).

Pre-Pipeline

Ohio – JumpStart Inclusion and Diversity Tech Fund

Interview: Ray Leach – CEO, Jumpstart Inc; Norm Chagnon – Deputy Chief, Office of Small Business and Entrepreneurship, Ohio Development Services Agency

Overview:

To a greater degree than most tech-based economic development organizations, Jumpstart has made inclusive entrepreneurship a central element of its support for startup firms. The most recent manifestation of this is a \$10 million seed fund called the Focus Fund.

Launched in 2016 with the encouragement and financial support of the state as well as matching funds from the Case Foundation, the Focus Fund will invest exclusively in women and minority-led tech startups. It will fund both Ohio-based entrepreneurs as well as startups from across the U.S. that have a business relationship within Ohio and are willing to relocate. This effort stems from Jumpstart's outward orientation and mission of not only mentoring and funding startups, but also building public-private-institutional ecosystems.

Lead Organization: Jumpstart (50 employees)

Geography and Population: Northeast Ohio (approximately 3.5 million)

Background:

Jumpstart is a nonprofit founded in 2004 that “combats community deterioration and lessens the burden on government in the Northeast Ohio area” by delivering a broad set of services, including business assistance and mentoring for entrepreneurs through scaleup firms, talent acquisition services, and seed and venture funding (initial investments are typically in the \$250,000 range). Jumpstart also consults with communities outside of Northeast Ohio. Its spending is approximately equally split between services to entrepreneurs and funding. State funding, primarily through Ohio Third Frontier, has accounted for approximately 45% of Jumpstart's funding since its founding.

Jumpstart serves what is undeniably one of the most economically troubled regions in the U.S. From 2004 to 2014, the region's primary metro areas – Akron, Cleveland, and Youngstown – ranked 88th, 95th, and 98th, respectively, among the top 100 metro areas on measures of job growth. (Cleveland and Youngstown actually experienced significant job declines.) Youngstown experienced the largest annual population declines of any large U.S. metro in seven of the ten years between 2006 and 2015. Yet the region also has a strong core set of innovation assets: Case Western Reserve University, the University Hospitals complex, Cleveland Clinic, and the National Additive Manufacturing Innovation Institute.

Program description:

Over the course of three years, the Focus Fund will fund a total of 20 tech firms, ideally very early stage with fewer than five employees. It will provide investments of \$250,000 to \$600,000 for founders that are female or of African American or Latino descent. Within the first few months of announcing the fund, which was featured in four national publications including the Wall Street Journal, Jumpstart had received over 350 applications. Based on early review by Jumpstart staff, this initial pool of business plans will lead to in-depth analysis and discussions with approximately 20 firms, and ultimately result in 10 deals.

Notably, Jumpstart decided to make the Focus Fund national in scope. This decision relates to a tension that also emerged in Portland's inclusive entrepreneurship effort, and that likely exists in most regions: the relatively small pool of minority entrepreneurs involved in truly tech-based businesses means that inclusive entrepreneurship efforts can either focus exclusively on the region and relax industry definitions (as Portland did to include traded-sector food and apparel firms) or stay exclusively focused on tech industries and relax the geographic definition (as Jumpstart did). According to Leach, the fund had to be national in order to generate quality deal flow given Jumpstart's constraints.

It remains to be seen whether the Focus Fund will be successful in encouraging entrepreneurs to relocate to Ohio, Leach acknowledges, but he points out that Jumpstart will only invest in startups that have an existing business relationship in the state. Jumpstart does not want firms to move to Ohio simply for the money, especially because there is no official requirement that the firms stay in Ohio for a particular length of time. He is, however, confident that the state's resources and entrepreneurial ecosystem will be attractive enough to retain those that do relocate. Leach expects that half of the first round of 10 firms to receive investment will come from within Ohio and half will come from outside. The next round of 10 will likely be more skewed towards outside firms. Jumpstart expects the fund will leverage \$100 million in private investment in 3 years and \$250 million in five years. Jumpstart also has plans to launch a much larger inclusive fund that is also national in scale but will make larger, \$3 million to \$5 million investments.

While the Focus Fund may be the most concrete example of Jumpstart's inclusion efforts, it is just one of several related programs and initiatives. Through its Core City: Cleveland program, for example, Jumpstart holds office hours three days a week during which firms in underserved areas can make appointments with Jumpstart staff for advice. Overall, 30% of companies that Jumpstart has advised or invested in since 2004 have been owned or led by women or minorities.

Jumpstart's efforts on inclusiveness are not just a series of siloed initiatives; they are part of a broader emphasis on outward orientation and commitment to ecosystem-building. Jumpstart directly supports 15 other related non-profits in the area, and dedicates 25% of its budget to building the local ecosystem. Leach spends more than half of his time building relationships within the region and nationally. He is active nationally as chair of a task force on diversity at the National Venture Capital Association. Among other benefits, this orientation helped generate support for the Focus Fund – the \$5 million contribution from the Case Foundation stems from a connection that Leach formed with Steve Case when both served on the National Advisory Council on Innovation and Entrepreneurship. Jumpstart is engaged with a number of minority business organizations such as the National Black MBA Association and the United Negro College Fund. Jumpstart has recently begun making concerted efforts to position itself as a national thought leader on the topics of tech, economic development, and inclusiveness. Staff write blogs and contribute to podcasts that tackle highly relevant and relatively controversial economic development topics – recent articles are titled “Is your EcDev Board Room Filled with Old White Men?” and “Stop Fighting To Attract New Businesses And Start Helping The Ones You Already Have”.

Theme: Inclusive Entrepreneurship

- **St. Louis – Launchcode**
Launchcode is a nonprofit organization founded in 2013 by the co-founder of Square. It is based in St. Louis but expanding nationally (beginning with Miami, Kansas City, and Rhode Island). It aims to offer people without college degrees or technological expertise an alternative pathway into full-time programming careers by offering mentorship, in-person and online training, access to paid apprenticeships, and connections with over 300 partner companies. In its first year, Launchcode placed 140 people into computer programming jobs in St. Louis. Those that participated in apprenticeships were offered a job 90% of the time with \$50,000 average salaries.
- **Charlotte – City Startup Labs**
City Startup Labs was formed in 2014, and 30 entrepreneurs (18- to 24-year-old black males) have graduated from its six-month training program, which culminates in a pitch competition and free space at a co-working hub. In 2015, the program was embedded into the University of North Carolina at Charlotte’s incubator and accelerator program, Ventureprise. As with Opportunity Hub, this partnership will allow graduates of the training program to immediately integrate into mainstream funding and support networks, and to access “intrapreneurial” opportunities within Charlotte-based corporations.

Other Inclusive Entrepreneurship examples:

- New York State – Minority- and Women-Owned Enterprises Investment Fund
- Pennsylvania – AWE Ventures and Ben Franklin Technology Partners
- Nationwide – Google Code2040
- Indiana – Purdue Foundry WomenIN
- Pittsburgh – Urban Innovation 21
- Silicon Valley – Avion Ventures

Theme: Pre-Accelerators

- **Pennsylvania – TechCelerator @ State College**
A Ben Franklin Technology Partners project, the TechCelerator is based at Penn State’s innovation park. It received a \$500,000 EDA i6 Cluster Grant for Seed Capital Funds in 2015 and began offering classes in January 2016. TechCelerator offers two key early-stage entrepreneurship training programs, each of which takes place once a week. One is a 10-week program for community members and university students that want to launch a technology-based startup within the next year. The other is an 8-week program for faculty, graduate students, and post-docs and is designed for potential university spin-outs. Both programs offer a similar set of courses focused

on the basics of intellectual property, legal and financial issues, and business model development.

- **London – FastForward London**

An initiative of City University and The Accelerator Network launched in January 2014, FastForward is designed to fill the gap between short-term events such as hackathons and full accelerators. The program runs twice a year and takes the form of one-day “sprints” over the course of six weeks, wherein 25 participating startups define minimum viable segments and products, develop a value proposition, design marketing channels, create a financial plan, and hone their pitches. Most are seeking entry into leading UK accelerators, so FastForward prefers co-founding teams rather than single entrepreneurs. Applicants do not need to be working full-time on their startup but are expected to do so within 3-6 months.

- **Northwestern University – the Garage**

The Garage at Northwestern University is a less formalized form of support for “stage zero” startups than other pre-accelerators. It functions as a free incubator and co-working space that is designed to encourage collaboration between students from across the university, especially the business, engineering, and communication programs. Its aim is to be a place “where students can try many times and fail and try again”, according to Alicia Loffler, the executive director of Northwestern’s Innovation and New Ventures Office. The Garage currently houses 52 student teams working on innovation and entrepreneurship projects, of which 60 percent are software-related and 40 percent are hardware-related. Northwestern conducted a national search for an executive director of the garage in 2015, choosing a Silicon Valley veteran with experience at Google, IBM, and three startups.

Other pre-accelerator examples:

- North Carolina – Groundwork Labs/NC IDEA
- University of Houston – RED Labs spring semester pre-accelerator
- TechStars and Google – Startup Next
- Microsoft – Microsoft Innovation Centers Pre-Accelerator Program
- Virginia Commonwealth University – Pre-Accelerator Program

Theme: STEM Outreach to K-12

- **San Diego – Qualcomm Thinkabit Lab**

The Thinkabit Lab is a classroom for middle-school students within Qualcomm’s headquarters facility, designed to expose students of all socioeconomic backgrounds to STEM careers. It served 3,000 students in 2014-2015 with free programs centered around mini-lectures and team-based engineering projects led by Qualcomm engineers. The Mayor of San Diego released a workforce development strategy in 2016 that proposes replicating the Thinkabit model to create five regional learning centers embedded in major companies in other priority sectors.

- **South Carolina – CU-ICAR K-12 outreach**

Clemson University's International Center for Automotive Research (CU-ICAR) has several programs designed to build the pipeline of students that are prepared for STEM careers. The "engineering encounter" offers tours and workshops for 6th to 9th grade students in the region (similar to the Qualcomm Thinkabit Lab). A day-long event is held twice a year that exposes 300 female students to automotive engineering professions. And CU-ICAR offers year-long mentorship programs for 40 students at a science, technology, engineering, arts, and math (STEAM) curriculum middle school adjacent to the campus.

- **Philadelphia – FirstHand Program at The Science Center**

The Science Center in Philadelphia is the largest and oldest urban research park in the U.S and supports technology start-ups from prestigious universities including the University of Pennsylvania. Located in the University City neighborhood, the Science Center's many co-working labs are also adjacent to some of the city's poorest neighborhoods. In order to be a stronger partner with underprivileged residents, the Center created the FirstHand program, an educational initiative that allows middle school students at under-served schools in the area to work alongside scientists and educators in the STEAM disciplines. Through the program students not only learn academic science but also workforce skills. "Students have a much better appreciation for note taking when they see a PhD entrepreneur diligently taking notes on her experimental product," says Sal Behar, Vice President and General Council for the Science Center. Through sponsorships, the program is free of charge for most students.

Current Pipeline

New Mexico – NMSBA National Lab Vouchers

Interview: Mariann Johnston – Project Manager, Los Alamos National Laboratory

Tennessee – ORNL RevV Vouchers

Interview: Tom Rogers – Director, Industrial Partners and Economic Development, Oak Ridge National Laboratory; Drew Bond – Vice President of Public Policy, Battelle; Craig Blue – Director, Manufacturing Development Facility

California – CalCharge Tech Assessment & Acceleration

Interview: Jeff Anderson – Director, CalCharge

Innovation Vouchers – Helping small businesses work with national labs

While national labs primarily serve the mission of their respective funding agency, they also have a mandate to transfer technology to private companies. Despite this requirement, rarely do the labs work with small companies because the contracting period takes too long and the research labs are accustomed to projects that are more sophisticated than what most small businesses need. Large Fortune 500 companies often sign onto multiyear agreements with the labs and have complicated intellectual property arrangements. Small companies, on the other hand, need assistance solving smaller technology problems (such as new processes, not new products). Most innovation occurs more through process innovation – new operating procedures, better equipment, more efficient production lines – rather than through new products. In order to meet the needs of small in-state companies, several states have joined with their national labs to create Innovation Vouchers, a method to provide small and medium-sized grants to small companies in order to “buy” researcher hours at national laboratories. Currently Tennessee and New Mexico have innovation voucher programs with their national laboratories (Oak Ridge in TN and Sandia and Los Alamos in NM).

In 2015 Governor Haslam created a \$2.5 million voucher program called RevV! with Oak Ridge National Laboratory (ORNL) in East Tennessee. ORNL is a \$1.2 billion DoE lab focused on material science, computational analysis, environmental science, and advanced engineering. But based on extensive interviews, the lab historically has had very little economic impact on the state and few connections to small-and-medium-sized businesses. The voucher program aims to address some of these issues and is run by ORNL, the University of Tennessee (UT), and the Tennessee Office of Community and Economic Development. Funding comes from a state tax credit to ORNL and both ORNL and UT jointly review applications. Voucher amounts range from \$10,000 to \$50,000 and are targeted to in-state manufacturers facing specific technical constraints that ORNL researchers can assist with in a short timeframe. To be eligible, firms must have at least 10 employees, be a manufacturer, and be able to articulate job creation, energy savings, or other economic benefits to the state of Tennessee.

New Mexico’s innovation voucher is similarly structured to the Tennessee voucher but has been around since 2000, so impact analysis is more readily available. The New Mexico Small Business Assistance Program (NMSBA) is financed by the state (with a \$4.8 million

budget in 2015) and run by Sandia National Laboratory and Los Alamos National Laboratory. Voucher amounts are smaller than in Tennessee – \$10,000 for firms located in Bernalillo County (Albuquerque) and \$20,000 for those located elsewhere. Since its creation in 2000, the program has assisted 2,500 small businesses to access technical assistance at the state’s two largest laboratories. For example, Los Alamos National Laboratories helped a group of ranchers in rural Eastern New Mexico understand how to assess, site, construct, and monetize wind turbines on their land by developing models of regional wind patterns and the ability to generate and transmit renewable energy to various markets.

The program offers three forms of vouchers: individual, leveraged, and contract projects. Individual projects support small businesses with testing, product design or configuration, or access to technical equipment. Individual project applications are accepted throughout the year on a rolling basis. Leveraged projects are larger in scope and allow multiple New Mexico small business that share technical challenges to collectively access competitive grants worth \$20,000 to \$100,000 per laboratory. Finally, the NMSBA program also contracts with entities with the capabilities to support small businesses outside of the national lab system but that are either state or national organizations positioned to help firms access resources, technologies, and skills. Current contracts exist with the New Mexico Manufacturing Extension Partnership, New Mexico Institute of Mining and Technology Department of Management, and New Mexico State University Arrowhead Center.

Innovation vouchers don’t necessarily have to be tied to national laboratories. Similar to the contracting model in New Mexico, Connecticut has an innovation voucher that can be used at any technology consultancy, university, or lab within the state and in late 2015 Rhode Island passed a similar voucher program. Internationally, innovation vouchers have been more commonplace than in the United States with many countries in Europe offering voucher programs.

“Micro” Labs – Connecting national labs to metropolitan economies

A second problem of national laboratories is their location. Because a large proportion of federal laboratories were created to develop weapons or vaccines, isolation and secrecy were paramount concerns. As such, too few of the nation’s leading technical facilities are located within (or even near) major metropolitan areas that house much of the state’s private sector. Moreover, for security reasons, many national labs are “behind a fence”- offering little opportunity for interaction with the private sector. While states have little ability to move national labs, they can work with federal agencies to relocate particular assets into areas of regional economic activity. “Micro” labs, the creation of new labs or movement of existing lab facilities “outside the fence”, provide one mechanism for rectifying this issue.

For example, the Manufacturing Development Facility (MDF) at Oak Ridge National Lab is located off the main (highly rural and secure) campus and closer to Knoxville, TN. The MDF serves as ORNL’s storefront for private sector collaboration. The facility focuses on additive manufacturing, battery technologies, and carbon fiber and utilizes the equipment and

research expertise of ORNL to support regional businesses. For example, the Carbon Fiber Testing Facility is a 42,000 square foot at-scale operation where large companies like Boeing and Ford test new composites before deployment. However, the MDF also works with a host of small companies. For example, Local Motors, a small, custom off road automobile manufacturer, recently worked with the MDF to create the first line of completely 3D printed carbon fiber cars. The partnership was so successful, CEO Jay Rogers moved the company's manufacturing facility to Knoxville, TN, less than two miles from the MDF. According to Craig Blue, Director of MDF's Advanced Manufacturing Center, "being outside of ORNL's main campus and a mission to support the private sector, allows MDF to be a much stronger player in the regional economy than the lab ever could be on its own."

Argonne and Fermi provide additional examples of national labs that have recently opened satellite offices, in these cases, in downtown Chicago to be located at the Chicago Innovation Exchange—the commercialization arm of the University of Chicago (CIE is profiled in detail below). Both labs see the CIE as an opportunity to better link with the entrepreneurs and firms locating around the University of Chicago and the private sector activity in downtown Chicago.

Creative contracts – Reforming CRADA's to work for regional companies

Small firms and start-ups represent the majority of technology companies, yet these firms rarely work with in-state national laboratories because the contracting period and process is too long and expensive. SMEs, particularly SME manufacturers, operate contract-to-contract and rely on near-term contractual requirements to cover business expenses. However, the average CRADA (lab contract) takes 110 days for the lab to process. SMEs simply cannot wait this long to address technological difficulties. Large companies, on the other hand, work on longer contract timelines and generally have sufficient liquidity to handle long contracting periods. The federal funding agencies have experimented with quicker agreements (such as ACT agreements), but states can do so as well.

For example, CalCharge is a public-private industry association in California developed through a partnership between the state of California and Lawrence Berkeley National Laboratory. In 2013, CalCharge developed a one-size-fits-all lab CRADA with Berkeley so any member company can automatically become part of it. The blanket agreement with the lab reduces the contracting time for these small firms from over 100 days to several weeks and substantially reduces the legal fees for both the lab and the businesses. Calcharge is a statewide public-private partnership originally created by the California Clean Energy Fund and focused on bolstering the California battery industry.

Current Pipeline

Chicago – Innovation Exchange

Interview: John Flavin – Director, Chicago Innovation Exchange

Overview:

The Chicago Innovation Exchange (CIE) is the University of Chicago's (U Chicago) complex that supports researchers and entrepreneurs translate scientific and academic research into new technologies and businesses. The goal of CIE is to support firms in the hard sciences within the first year of life. While the CIE is run by U Chicago, it brings together public and private institutions including Fermi and Argonne national laboratories, the University of Illinois, the Marine Biology Lab, as well as private firms. The on-campus incubator hosts 10-20 start-ups at a time but also includes 1,900 members who use the co-working space. CIE currently occupies three buildings near U Chicago's Hyde Park campus.

Lead Organization: University of Chicago, numerous public and private sector partners
Geography and Population: Chicago metro area (9.7 million)

Background:

Beginning six years ago leadership at the University of Chicago began to emphasize applied and commercialization of research far more than the past. The CIE is the physical and programmatic outcome of that effort. The first physical location of the CIE was the 100-year old Harper theater that houses the incubator; now there are three locations and mixed use retail and housing along 53rd street where CIE is located. Phase one of CIE was initiated in 2014, with the second phase beginning in 2015.

Program description:

CIE is different than most start-up accelerators and university co-working spaces in that its focus is on the commercial application of complex R&D in the hard sciences — not just software companies—in a central location. Most universities do elements of this, but CIE is unique in creating a holistic system from academic research to start-ups attracting corporate clients. These types of companies are generally highly regulated, and fail early in their life cycle. CIE focuses specifically on the first 12-18 months, with a goal of providing the necessary conditions for young start-ups to succeed: capital, mentorship, and attractive intellectual property (IP) agreements with the university.

The university believes Chicago has a competitive advantage at the intersection of computer science and the hard sciences in part because of the growing cluster of software entrepreneurs in Chicago and the region's academic strengths and legacy industries in advanced manufacturing and medical technology. To further this advantage, CIE recruited the former Dean of Cal-Berkeley's Computer Science Department and has developed a partnership with the University of Illinois engineering program to create a satellite location on CIE's campus. According to John Flavin, this partnership "is somewhat rare but we identified early on without a strong engineering school present (U Chicago doesn't have one) the companies we're trying to build were at a substantial disadvantage." CIE has also developed partnerships with Argonne and Fermi national laboratories, which have office

space at CIE and are engaging in joint research, to build its concentration of expertise in the hard sciences.

University of Chicago Innovation Fund

In order to support the CIE, the University created the University of Chicago Innovation Fund, a \$20 million fund run out of the CIE that supports university start-ups for early round capital. The goal is to support young companies in the hard sciences with proof-of-concept and pre-series A round financing.

Mentorship

The CIE was one of the first participants in the Department of Energy's Lab Corp program—a program that pairs scientists with proven entrepreneurs to help them with first-time business creation based on their academic research. Also, Booth Business School runs a program called CEO Academy that takes Booth graduates that have 5-10 years post-MBA experience and helps develop them into CEOs that can work with university researchers who want to commercialize their research but do not have the business acumen to do so.

Licensing Platform

A major barrier to commercialization of university research has always been intellectual property disputes. This is particularly true in the medical and hard sciences where patent protection and licensing is often the primary avenue for revenue generation. In order make the licensing process easier, U Chicago has developed the UC Go licensing platform. UC Go standardizes the IP (with some necessary case-by-case customization) to substantially reduce the licensing process for researchers and firms seeking licensing agreements.

Physical Location

CIE has helped U Chicago push beyond its Hyde Park campus into the city, beginning with the renovation of the 100-year old Harper Theater's second floor that now serves as co-working space for up to 100 people. The first floor has retail and a restaurant. The second building contains the High Seed Prototyping lab (equipped with laser cutters and 3D printers) and Argonne. The third building is a conference space with offices for 500 university employees. According to Flavin, "all three buildings are highly visible spaces with 24-hour activity. We estimate that 100 people cycle through the open workspace and lecture halls daily." Every Friday, start-ups host a happy hour to network, share product ideas, milestones, and challenges. "The goal is to get the many entrepreneurial and research elements of the university and community to actually interact", says Flavin.

Inclusion

While a university-run endeavor that serves faculty, staff, and students, CIE is located in the Southside in a largely African American community. Some programming does exist to support the community, including the Exchange Program, which aims to support Southside business owners learn how to scale family-run businesses. There is also a program run by the on-campus coffee vendor, Greenline Coffee, to train neighborhood youth to become baristas. However, to date, more could be done to connect with Chicago community colleges and non-bachelor job training programs.

Current Pipeline

Pittsburgh – Life Science Greenhouse

Interview: John W. Manzetti – CEO and President, The Pittsburgh Life Science Greenhouse

Overview:

The Pittsburgh Life Science Greenhouse (PLSG) is one of three state-sponsored institutions in Pennsylvania (the others are in Harrisburg and Philadelphia) that support early-stage life science and health IT companies with seed capital and mentorship. PLSG serves as an intermediary between academic research at both Carnegie Mellon University and the University of Pittsburgh and startups that follow from research. To support the creation and development of startups, the organization not only funds early stage companies but connects academic entrepreneurs with professional CEOs with the business acumen to bring technology to market. Since its inception, PLSG has invested in over 50 life sciences companies and has attracted more than \$300 million in follow-on funding.

Lead Organization: Pittsburgh Life Science Greenhouse (12 staff including advisors)

Geography and Population: Pittsburgh metro area (2.4 million)

Background:

PLSG was created in 2001 through the state of Pennsylvania's tobacco settlement. PLSG grew out of BioVenture, a life science research commercialization program co-managed by Carnegie Mellon University (CMU) and the University of Pittsburgh (U Pitt). It aims to create jobs and new businesses from the therapeutic, health IT, and biotechnology research in the region. The venture fund operated by PLSG is funded through a partnership between the state, the local Pittsburgh philanthropic community (particularly the Heinz Foundation) and CMU and U Pitt. At its genesis, the state funded \$33 million (to each of the three greenhouses in the state) from the tobacco fund and the Heinz foundation allocated two grants of \$6.5 million each to PLSG for staff and to support engagement with the University of Pittsburgh and Carnegie Mellon University as well as overall programming.

While many cities have accelerators, mentorship programs, and local venture funds, PLSG is different in that all of its efforts are tied to the goal of local economic development. For example, the Technology Development Fund (discussed in detail below) is the Greenhouse's venture fund but investments are made based on the likelihood a startup will benefit the regional economy. Keeping firms in the Pittsburgh area as they grow is a pillar of PLSG.

Program Description:

PLSG programming efforts are designed to support startups at the concept, formation, and early growth phases in three areas. At the concept phase, PLSG works with researchers and their respective universities to support technology transfer efforts such as IP protection and eventually SBIR application assistance.

Once a company has been formed, PLSG supports young firms with capital support designed to provide short-term funding when a startup has exhausted university-based, SBIR, or other early stage funding, but has not yet acquired venture funding. This stage is

particularly important for companies that require FDA approval because there is often a gap between when venture capital firms are willing to fund a start-up (once initial clinical trials have been achieved) and when initial stage zero or seed funding runs out due to the high costs of wet lab space, clinical trials, and other activities associated with life science companies.

Three capital support mechanisms exist at PLSG: the Technology Development Fund, Early Stage Fund, and connections to venture investors.

The Technology Development Fund specifically supports technology firms as they verify the technical and commercial feasibility of inventions such as testing and prototyping, in vivo testing, side-by-side comparisons of technologies, and development of competitive market or technical assets. The Early Stage Fund is also for very early stage life science companies, but does not have the technical discovery component and looks similar to other early stage venture funds. It helps companies between discovery research and pre-seed/seed funding and acts as a launch ramp to the region's other commercially oriented funding opportunities. Applications are accepted on a rolling basis. In order to be eligible firms must be an early-stage company within the 20-county region of western Pennsylvania that has raised less than \$2.5 million outside of federal and state grants. Typical investments range from \$50,000 to \$250,000 with a 1:1 match requirement. The match can either come in the form of cash or in-kind (such as personnel time, equipment use, software, and overhead). Additionally, PLSG offers personalized consultations to venture capital firms, angel investors, and others seeking investment opportunities in the Western Pennsylvania. Because of its strong partnerships with CMU and U Pitt, PLSG is well positioned to help venture capitalists and angel investors (particularly those that aren't local) access and assess potential investment opportunities within these universities.

Finally, one of the more novel activities at PLSG is its effort to attract management talent from around the country to manage research-based start-ups. Research by Battelle from 2002 indicated that not only was venture capital funding low in Pittsburgh, given the number of patents and academic research, but also that this was in part due to the existence of too few individuals with management experience that could support research entrepreneurs and academics bring their life science products to market. PLSG's Executives-in-Residence program attracts former CEOs from life science companies from around the world to Pittsburgh and puts these individuals through an extensive training program to better understand the technology capabilities of the Pittsburgh area. Executives-in-Residence then either serve as mentors to young companies or actually join the leadership team of the company as a professional manager. Given the number of start-ups that come out of CMU and U Pitt (over thirty-five in 2013 alone), and the desire of some academic researchers to find good commercial applications of their research then return to academia, constructing a pipeline of professional managers that can take the reins of young life science start-ups is critical to the success of Western Pennsylvania's life science industry.

Current Pipeline

Providence – BetaSpring Non-Venture Based Accelerator

Interview: Allan Tear – Co-Founder and Managing Director of BetaSpring

Overview:

BetaSpring, is among the top-ranked accelerator by MIT, located in Providence, R.I. Between 2009 and 2015 BetaSpring operated under a standard accelerate model that sought an equity stake in start-ups in exchange for mentorship through its three month training program. However, in part due to the proximity to Boston, Co-Founder and Managing Director Allan Tear decided BetaSpring needed to distinguish itself. In 2015 BetaSpring became the first accelerator to attract “revenue-first” companies with the goal of acquiring customers and creating revenue (by contrast, software-oriented accelerators rarely seek revenue). BetaSpring’s goal is to attract firms more reflective of the Providence economy, like advanced manufacturing, rather than compete with nearby Boston for software entrepreneurs.

Lead Organization: Betaspring Accelerator

Geography and Population: Providence, RI metro area (1.6 million)

Background:

Over the last half decade BetaSpring has consistently ranked in the top 10 accelerators internationally by MIT’s global accelerator rankings. The institution oversees \$50 million in funding and has supported over 90 companies. The start-up community in Providence is diverse, supporting niche industries like food and design. Given the proximity to Boston, it’s difficult for an accelerator in Providence to compete in medical technologies and software. As Alan Tear, Director of Betaspring, puts it, “it’s hard to look a software entrepreneur in the eye and say ‘you’d be better off locating in Providence than Boston’.” Given the need to distinguish itself from the Boston start-up scene, in 2015 BetaSpring created RevUp—the country’s first “revenue-first” accelerator, where the goal is for companies to grow through revenue rather than venture capital.

Program description:

With nine of the ten fastest growing private companies growing by revenue, not equity finance, Alan Tear thinks that revenue-based firms represent a substantially under-served market. These companies fall in between traditional private equity because banks think they are too risky and venture capitalists see them as “unexitable” in the timeframes acceptable to venture funding. Part of the goal is to identify specific areas where Rhode Island has unleveraged strengths. This simply is not in consumer-driven internet applications or in highly regulated industries, such as medical devices and life sciences. Instead RevUp is seeing significant interest in product-driven companies in areas like fashion; niche, high-margin food; and marine manufacturing (in part because of the Naval Underwater Warfare Center located in Newport, RI).

Companies in the RevUp program receive \$75,000 in cash and an intense three-month program focused on increasing customer acquisition and revenue. The primary difference between RevUp and virtually every other accelerator in the country is that it works with

companies that are already generating revenue. Companies are accepted on a quarterly basis (around 12 per year) and work intensely with BetaSpring's mentorship network, including its alumni.

BetaSpring does not take equity stakes in companies it supports but instead companies sign a royalty contract that aligns to the company's revenue growth. Companies pay 4-8 percent of their monthly revenue for 36 months.

Finally, BetaSpring helped create "Founders League" in 2012. Founders League is a co-working/meeting space that helps Providence-based entrepreneurs access mentors and workers. Unlike many similar initiatives, Founders was based on "the love of RI" according to Tear, and targeted university students who were interested in starting a business in RI. The goal was to find young people with connections to the area that might otherwise be drawn to Boston or New York if they didn't have a local support network.

Theme: Accelerators

- **Des Moines – Global Insurance Accelerator**

The Global Insurance Accelerator, which began operating in 2015, is another example of an accelerator tailored to the needs of local industry – Des Moines has 81 insurance company headquarters and three times the employment concentration as the national average. The accelerator is the creation of these large insurance companies, eight of which made initial investments of \$100,000 each. Each accelerator cohort includes six startups from around the country and world (Germany, Brazil, Canada, and Ireland), lasts 100 days, and includes a \$40,000 seed investment for each firm. The firms that invested in the accelerator receive a stake in each startup, and provide intensive mentoring throughout. At the end of the accelerator process, each firm makes a pitch to an international audience of more than 300 insurance executives at the region’s annual Global Insurance Symposium.

Theme: Intellectual property access

- **University of Minnesota – Minnesota Innovation Partnerships**

In 2011, the University of Minnesota launched Minnesota Innovation Partnerships (MN-IP) to reduce reliance on federal grants, streamline the process of sponsoring university research, and make it easier to access unused intellectual property. One initiative, MN-IP Create, simplifies and de-risks university-business collaboration. The firm sponsoring a research project receives a worldwide exclusive license for any technology developed, and the project comes with simple pre-set licensing terms (a one-time fee of up to \$15,000 plus royalties of 1 percent that only apply for sales of greater than \$20 million). This program has resulted in over 80 corporate and startup partnerships to date. A second initiative, Try and Buy, allows firms to test the viability of existing, unlicensed technologies developed by the university (there are more than 300 such technologies). It enables firms to analyze a technology during a trial period for a small fixed fee, with no patent costs due until a patent issues and no royalty payments required for the first \$1 million in sales. The program offers reduced fees and royalty rates for Minnesota companies.

Other intellectual property access examples:

- Indiana – Purdue Innovation X-License

Theme: Translational research and university-driven entrepreneurship

- **Minnesota – University of Minnesota Entrepreneurial Leave Program**

In 2013 the University of Minnesota launched this program to encourage faculty to provide temporary assistance to firms that are commercializing faculty-developed products and services. Tenured and tenure-track faculty can leave for 12 months

with an optional six-month extension. The program enables faculty to retain their benefits while on leave, and reduces potential conflicts of interest for faculty. No formal evaluation of the program has been made, but Sandia National Laboratory offers a similar program (Entrepreneurial Separation to Transfer Technology) for its researchers – they are allowed to leave for two years to pursue entrepreneurial ventures with the knowledge that they can return to the lab if the company doesn't work out. In its 20-year history, approximately 100 companies were impacted and close to 30% of researchers ultimately returned to the lab.

Other translational research and university-driven entrepreneurship examples:

- South Carolina – SmartState Endowed Chairs and Centers of Excellence
- Cleveland – BioMotiv/University Hospitals Case Medical Center
- Alberta – Alberta Innovates (rural technology focus – environment/energy)

Post-Pipeline

Virginia – Trade Development for Mid-Market Firms

Interview: Paul Grossman – Vice President of International Trade, Virginia Economic Development Partnership

Overview:

Established in 2002, Virginia Leaders in Exports Trade (VALET) is the Virginia Economic Development Partnership's flagship international trade program. It is a cohort-based export accelerator that provides high potential mid-sized firms with business planning guidance, capital, and expert research resources for entering global markets and expanding exports. Recently, the core elements of the VALET program have been modified to help defense contractors diversify into global markets. Another related program enlists universities, chambers, and industry organizations to drive increased usage of VEDP export resources.

Lead Organization: Virginia Economic Development Partnership (20 export-focused staff)
Geography and Population: State of Virginia (8.3 million)

Background:

Virginia is a leader among U.S. states in its commitment to international trade. The VEDP International Trade Division has 20 staff dedicated to exports, including seven regional trade managers with significant international experience in the private sector. Over the past three decades, VEDP has developed and implemented innovative trade programs that are widely considered best practices in the United States, that other states seek to replicate, and that local firms find highly valuable. In recognition of its success, the Virginia State Legislature recently signed a bill that will move the state's international trade operations to a new International Trade Corporation and increase its budget by \$650,000 annually to \$3.5 million.

Program description:

As Virginia's main trade development program, VALET is the state's primary vehicle for supporting the growth of high potential mid-sized firms in both goods and services industries. VALET is a two-year program that provides companies with expert assistance in developing a global sales plan, access to a network of private sector service providers, and \$15,000 in capital from the state to spend on export efforts (including trade missions, web translation, tax assistance, and market research). Further, it offers a structured environment in which executives in fast-growing firms can step away from the daily challenges of running a business to focus on developing long-term strategic plans.

Twelve companies enter the two-year program every six months, so close to 50 companies are actively involved in VALET at any given time. A crucial driver of VALET's success is that VEDP is dedicated to "picking winners". In order to apply, companies must be nominated by regional trade managers, who typically have close relationships with the nominated firms. There are no industry restrictions (though many VALET companies have unique technologies), but all companies must have "firmly established" domestic operations and a demonstrated commitment to international exporting. The majority of participating firms

are in the middle market, averaging 111 employees and \$36 million in annual sales. While VALET is primarily focused on these relatively well-established high-growth firms, there is still considerable participation from smaller, tech-oriented firms. The smallest firms have 20 employees, and historically 25% of participants have had between 20 and 25 employees. Only 9% of participants have been in business for less than five years. Roughly 30% are considered technology companies, and 12% are technology companies that started and grew organically in Virginia.

VALET brings its client companies a level of flexibility, expertise, and intensive counseling that is rare in trade assistance programs, whether at the federal, state or local level. This is clear in the program's results: on average, companies experience a 54% increase in international sales during their time in VALET. Some have also entered into international joint ventures or acquired foreign firms. The success of the program has also positioned the International Trade division as the go-to resource for "sustained growth" firms in the state, even beyond export assistance. Companies value the expertise and support they receive from VALET and many come to rely on the international trade division's support over time.

Recently, key elements of the VALET program have been repurposed to specifically target defense contractors. Virginia, like Maryland, is highly reliant on federal government expenditures – 16 percent of state GDP and 19 percent of state jobs are related to Department of Defense spending. In the wake of sequestration, the McAuliffe administration has made it a priority to help these firms diversify. Since 2012, VEDP has secured over \$5 million in grants from the Department of Defense to assist over 250 defense contractors (which, on average, relied on U.S. defense agencies for 70% of total sales) in entering international markets, using much of the same research expertise and private sector network as VALET.

In 2015, VEDP created the Virginia International Trade Alliance (VITAL) initiative, a network of 14 regional partners designed to double the number of companies that receive assistance from the VEDP International Trade Division. These partners include public universities, industry associations, and the Virginia Chamber of Commerce. VEDP provides each partner with \$10,000 for promotional costs, and each partner's member companies receive a discount on fees for trade missions and market research. The universities also receive \$3,000 from VEDP for each international market research project that they complete for firms (done by student teams). VITAL, which received \$1 million on top of the International Division's normal budget, aims to create \$1.6 billion in additional export sales and 14,000 trade-supported jobs over five years.

Post-Pipeline

Illinois – Illinois Corporate Startup Challenge

Interview: David Machajewski – Program Director, Innovation Initiatives at Illinois Science and Technology Coalition

Overview:

The Illinois Corporate Startup Challenge, started in 2013, aims to build the capacity of the Illinois tech and innovation ecosystem by addressing the inefficiencies that prevent corporations and startups from productively collaborating. The program is essentially a highly curated matchmaking process between corporations in need of innovation and startups working on relevant technologies. It is designed to create real, tangible business partnerships in the form of pilot engagements, joint ventures, or investments.

Lead Organization: Illinois Science and Technology Coalition (8 staff members)

Geography and Population: State of Illinois (12.9 million)

Background:

The Chicago region is rich with Fortune 500 headquarters and contains a wealth of top universities (Northwestern University, University of Chicago, and the University of Illinois). The Chicagoland Entrepreneurial Center, which later created the 1871 incubator, led early efforts in the region to forge connections between large firms, universities, and the startup community, but had little success in creating real business partnerships.

The Illinois Innovation Council (IIC) was created in 2011 by Governor Quinn to lead cluster initiatives and set statewide innovation strategy. A 2013 effort led by the chair of the IIC (Chicago entrepreneur and venture capitalist Brad Keywell, co-founder of Groupon) created the pilot phase of the Illinois Corporate Startup Challenge. The program was run in coordination with the Illinois Science and Technology Coalition (ISTC), a member organization (including universities, fed labs, Fortune 500 firms, civic groups) that cultivates technology-based economic development, often in alignment with the state. The IIC was transformed into a new organization after Quinn's administration left office, and since then the ISTC has run the Challenge independently without state support.

The program:

The Corporate Startup Challenge operates in a cohort model with 3 to 5 new corporations beginning every six months. The corporations are recruited based on pre-existing relationships with ISTC, rather than an open application process. Each corporation pays a \$35,000 program fee to participate. (The challenge results in a small net financial gain for ISTC.) Client corporations have included Caterpillar, Allstate, Microsoft, John Deere, and Walgreens. Each corporation is represented throughout the program by a high-level team comprised of VP-level staff, either from an internal innovation team (e.g., Caterpillar's data analytics team) or whichever department is seeking new technologies (e.g., the Allstate claims group).

The program begins with a “discovery session” in which ISTC staff (with assistance from Freshwater Advisors, a local innovation consulting firm) work with the corporate team to define what their innovation needs are and how their current innovation system works. This process results in an anonymized “shopping list” for each corporation, which ISTC distributes to a network of 30-50 referral partners in order to surface startups working on relevant technologies. These referral partners include universities, venture groups, accelerators and incubators, industry groups, and civic associations. (The universities tend to be the most active referral partners.) For a typical cohort of 3-5 corporations, ISTC receives referrals for 200 startups. Depending on the corporation’s request, these startups range anywhere from academic stage (two investigators in a university lab) to emerging growth companies. The largest companies that they consider are approximately 5 years old or \$10 million in revenue. Startups do not have to be based in Illinois, but must have some connection, such as having received investment from an Illinois-based venture fund.

Following the “discovery session” ISTC spends several months working through the 200 referrals to create a curated portfolio of startups that match each corporation’s needs. This involves meeting with a smaller group of approximately 85 startups and creating an online dashboard for each corporation with detailed reports on each startup, modeled after Morningstar investment reports. Each corporate team then reviews the portfolio of startups and selects the 10 most promising, which then participate in a demo day at the corporation’s headquarters. The demo day involves a 10-minute pitch by a C-level employee of each startup followed by a 5-minute Q&A session, with judges from the corporation in the room.

Since the first cohort in 2013, 120 individual startups have attended at least one demo day (some startups have attended multiple, so the actual number of total startup presentations is 169). Of these startups, 77 received some sort of follow-on engagement, and 50 are currently still actively exploring opportunities for collaboration. ISTC tracks post-demo engagements with the corporations via a shared online document and has calls with each corporation every 4-5 months to evaluate progress. ISTC asks the corporations to commit to following up with at least half of the companies that attend demo day (even if just to provide one-time feedback). But outside of these measures, ISTC largely allows the corporations and startups to proceed independently.

One of the program’s biggest successes to date is the partnership of Molex and NuCurrent. NuCurrent was started in 2009 at an innovation program at Northwestern and develops high-efficiency antennas for wireless power products. It was chosen to pitch to both Motorola and Molex (a manufacturer of electrical connections) at a 2013 Challenge event. In late 2014, Molex ultimately became a strategic partner and minority investor in NuCurrent. This will enable NuCurrent to leverage Molex’s multinational manufacturing footprint and sales channels. Concurrent with this deal, NuCurrent raised a \$3.5 million Series A round. ISTC attributes the success of this engagement to the strength of Molex’s internal corporate development group, which has experience and processes in place to vet early stage companies, as well as its strong relationship with a local VC firm that helps them identify promising technologies and develop investment proposals.

There have been lessons for both ISTC and the participating corporations when the Challenge doesn't lead to deals. Corporations increasingly enter the program with a real appetite to make deals happen, but they often realize that they are held back by a risk-averse culture and lack of precedent for partnering with startups. In some cases, the lead on the Challenge team was not empowered to actually sign deals, or the corporation as a whole lacked the necessary procedures, processes, and legal documents to enable external innovation. In response, ISTC is considering several changes. One is working with corporations before the process begins to help build the internal infrastructure required to collaborate with startups. ISTC is also considering adopting a more prescriptive approach to follow up, pushing corporations to engage following the demo day events.

Post-Pipeline

Upstate SC – Mid-Market Innovation through Corporate R&D Commercialization

Interview: Elizabeth Feather – Director of Research, Upstate SC Alliance

Overview:

The Upstate region of South Carolina, in partnership with Clemson and the state, is creating ways for small and mid-sized companies to commercialize new and underutilized R&D in the region's major corporations, primarily in the advanced materials cluster. This initiative will take the form of an open innovation platform, IP collaboration toolkit, and supportive efforts by EDOs. It is designed to have impact beyond the direct benefits of commercialization. First, by developing a more collaborative ecosystem through connections between major corporations and smaller firms, the Upstate Alliance aims to attract foreign investment from manufacturers that value such collaboration. Second, by helping smaller firms gain credibility and exposure through innovation partnerships with larger firms, the Upstate Alliance aims to drive global venture capital and M&A activity towards companies that may not previously have been on the radar.

Lead Organization: Upstate SC Alliance (9 staff members)

Geography and Population: Greenville and Spartanburg metro areas (1.2 million)

Background:

The Greenville-Spartanburg region of South Carolina (Upstate) has one of the largest concentrations of foreign-owned and export-intensive manufacturing firms, relative to its size, of any U.S. metro area. This is the result of an intentional long-term strategy to recruit foreign investment – most notably BMW, followed by many suppliers – to diversify a region that was almost entirely dependent on a declining textile industry. The subsequent advanced manufacturing growth has prompted an evolution from the region's former value proposition as a low-cost, low-wage location for manufacturing. Wages are rising and the region faces significant workforce constraints. Furthermore, national trends point to fewer and fewer potential large greenfield investments, because manufacturing is becoming more productive, and foreign firms are entering more often through mergers and acquisitions (M&A). As a result of these changing market forces, the region's EDOs are turning to innovation and technology commercialization, especially in the small and mid-sized firms in the supply chains of major manufacturers, as a means of remaining competitive. Some recent strides have been made, in the form of SmartState Centers of Excellence and endowed chairs, several new innovation campus locations affiliated with Clemson University, the NEXT co-working space in Greenville, and The Iron Yard coding school.

Project description:

The Upstate Alliance has identified the advanced materials cluster as the region's top opportunity for tech commercialization and global engagement. The cluster includes plastics, chemicals, metals, and textiles, and has a local employment concentration that is 77% higher than the national average. It contains a number of major firms that are investing heavily in R&D. However, local leadership suspects that a significant portion of this R&D has never been commercialized. The Upstate Alliance believes that helping smaller firms tap into this underutilized technology through partnerships with

corporations represents a significant market opportunity. For example, large firms often develop technologies that have a \$10 million market, and deem them not worth commercializing or not related to a core business function. But for a small or mid-sized firm, a market of that size is a major opportunity. The Upstate Alliance is committed to creating an ecosystem that encourages more open collaboration between these firms – in large part because, as Elizabeth Feather says, “companies are already going in this direction, and we’re not doing our job if we’re not helping them.”

While the region’s strategy has yet to be put into action (it was first articulated in a plan released in March 2016), the Upstate Alliance has plans to launch two specific programs. The first is an online platform for local companies to exchange intellectual property. For that purpose, the Alliance is currently researching a platform created by Nine Sigma, an open innovation services provider based in Cleveland. Their global marketplace provides a way for companies to post innovation “problems” and to request “solutions.” (Nine Sigma provides similar platforms for Ohio Third Frontier and the Metro Atlanta Chamber – see sidebar.) The second is an “IP collaboration toolkit”, modeled off of one used in Queensland, Australia (a sister state) that was developed by the Australian government.

While these two specific programs are not entirely unique, there are a number of characteristics of the overall initiative that stand out. First is its focus on specific firms in a single cluster. Rather than creating or assisting startups, it is aimed at helping established, entrepreneurial mid-sized firms in the advanced materials industry become more innovative and globally engaged. Second, these programs are designed to achieve a secondary goal of driving more foreign venture capital to the region, which compared to its peers lacks connections to domestic venture capital. By linking small to mid-sized firms to much larger corporations with global networks, the Upstate Alliance believes those firms will have credibility and access to financing that they would otherwise lack. Third, these are not short-term, transactional efforts. They are an integral part of a broader, long-term global vision for the region, which entails creating a more R&D-intensive economy with a stronger services base. Fostering collaboration on innovation will not only help existing firms, but also differentiate the Upstate as a place where other companies can link into global value chains.

A final differentiator is that these initiatives are being executed with a rare degree of collaboration. The state of South Carolina’s new innovation department is welcoming the efforts. Clemson interns will work with Upstate Alliance on building lists of promising mid-sized companies that have innovation capacity and the desire to reach global markets. And InnoVision, a local entrepreneurial support organization, will provide a connection to the entrepreneur landscape (and may ultimately lead the whole effort). This collaborative approach is a hallmark of South Carolina’s economic development system as a whole. As explained by Elizabeth Feather, “as a relatively small state with few major funders or foundations, South Carolina has no choice but to be highly efficient – on projects like this, we just work together; we don’t have to break down too many siloes.” This familiarity and comfort with a team approach to getting things done is a characteristic that is more and more in demand by industry, and is a key strategic advantage for South Carolina.

Post-Pipeline

San Diego – M&A Matchmaking and Aftercare

Interview: Jennifer Landress – Senior Vice President and Chief Operating Officer, Biocom; Sean Barr – Senior Vice President of Economic Development, San Diego Regional Economic Development Corporation

Overview:

Biocom and the San Diego Regional EDC both work to shape M&A by making connections and then providing aftercare services post-transaction. A main area of focus for Biocom is “capital development” for member firms. This revolves around events that enable large pharmaceutical firms from across the U.S. and world to make connections with local startups in order to invest in them or acquire them. The San Diego Regional EDC led the development of a regional foreign direct investment (FDI) strategy, a major component of which is to proactively respond to M&A activity and ensure that San Diego is well-positioned for further investment and expansion.

Lead Organization: Biocom, San Diego Regional EDC (approximately 40 staff total)

Geography and Population: San Diego and Los Angeles metro areas (17 million)

Background:

San Diego has one of the largest biotech and life sciences clusters in the world. It is relatively rich in venture capital, attracting \$609 million in biotech and biomedical investment in 2012. Yet it still lags significantly behind other life sciences hubs such as the San Francisco Bay Area (which attracted over \$2.1 billion in those industries) and Boston (\$1.4 billion). Like most regions, San Diego lacks the capital necessary to maximize the commercial potential of the research being generated by its universities and research institutions (which ranked 8th for NIH funding among all metro areas in 2014 and helped San Diego generate the third highest rate of patents per capita). Biocom was founded in 1991, has 750 members, and is the largest regional life sciences association in the world. It was originally focused exclusively on San Diego, but recently began to expand into the Los Angeles metro area to unify and organize both metros’ life sciences clusters. Its members include the region’s major research institutions. The San Diego Regional EDC is the region’s lead EDO, and has led efforts on global engagement since 2012. In 2015, the region began implementing its M&A aftercare strategy.

Program description:

Biocom’s capital development efforts fall into two general categories: venture capital and M&A. In both cases, Biocom sees its function as pulling together a curated group of companies and funders, and providing a structured environment in which deals can take place. It does not broker deals or operate its own funds, and has no plans to do so.

The fact that Biocom places equal emphasis on venture capital and M&A is itself unique. While venture capital investments tend to be celebrated by EDOs, mergers and acquisitions are often perceived as losses. Companies, however, are “looking for whatever capital they can find, and if they have compelling technology, they are going to get acquired”, according to Jennifer Landress. And the results of M&A are often positive, as the founders go on to

become angel investors or start new firms in the region. Therefore, Biocom has resisted pressure to focus exclusively on growing the next Fortune 500 firm in the region and has instead “embraced the R&D machine” in San Diego and the M&A activity that it spurs. This outlook stems from San Diego’s understanding of its position in the life sciences industry: it has the capacity to generate early-stage life sciences technologies but lacks the workforce and expertise to support very large life sciences companies.

Biocom connects firms to potential acquirers through its Partner Days and its Global Partnering Conference. Partner Days began in 2012 and are held 2-3 times per year. Local startups are selected through an application process and chosen in consultation with the participating large pharmaceutical firm to ensure that the startup matches the firm’s partnering strategy. Biocom relies on its committee members to bring in the right speakers and companies (including, at the last conference, a delegation of French firms). Biocom tries to restrict the event to 300 participants, and ensures that most are life sciences companies rather than service providers (law firms and accountants). The event is structured around panel presentations, formal one-on-one partnering meetings, and plenty of time for informal meetings and conversations. Biocom does not charge members to attend these events, as they see them as a core service for members – “our driver is getting our companies to connect with the right people that can accelerate their business”, says Landress. As a result, they are more low-key than those hosted by other industry associations, such as MassBio, which charges upwards of \$10,000 for members. The Global Partnering Conference, which began in 2010, follows a similar structure but occurs just once per year and draws a global audience.

While Biocom takes a positive view of M&A, the benefits to the region of a given transaction are not assured. In response, the San Diego Regional EDC, in collaboration with Biocom and other local economic development actors, is leading an effort to provide more effective and timely “aftercare” for acquired firms. This effort was motivated by the realization that most foreign investment in San Diego’s priority industries is driven by M&A, and that when a firm is acquired, it has to compete with other establishments within the same company. Local executives have to justify to the foreign parent why the San Diego operation should receive ongoing investment. The EDC’s strategy involves tracking firms that are acquired and carrying out a “rapid response” process, in which the EDC will provide necessary services locally and connect with the new foreign owners to make the case for San Diego. The mayor has committed to meeting with a set number of acquired firms each month.

Biocom is also active in connecting firms with venture capital. Beginning in the mid-2000s, Biocom provided office space so that funders could “hotel” while in the region. Results were positive, but during and after recession, travel slowed down and Biocom started making more intentional efforts to forge connections. At first, much of this happened organically through personal relationships that members of Biocom’s capital development committee had with VCs across the country. Now, like the M&A partnering events, they have grown into full-scale conferences that occur 4-5 times per year. Last year, in order to connect earlier-stage firms with investors, Biocom held a “super angels” event, in which 40 pre-identified companies did 3-minute pitches with three of the region’s most active angel investors.

Post-Pipeline

Chicago – UI Labs City Digital

Interview: David Leopold – Director, Project Management, UI Labs

Overview:

City Digital is a collaborative partnership that brings together corporations, academic research institutions, and the city government to test and commercialize new solutions in areas such as physical infrastructure, energy management, transportation, and water and sanitation. City Digital works by running pilot programs that define an area of need for infrastructure innovation with city partners, identify appropriate technologies being developed in Illinois startups and academic institutions, and then enable researchers and entrepreneurs to use the city as a test facility and first major customer.

Lead Organization: UI Labs (approximately 25 staff members)

Geography and Population: City of Chicago (2.7 million)

Background:

UI Labs (“university + industry”) is a Chicago-based research and commercialization collaborative, created in early 2014 with a \$70 million federal grant to form the Digital Manufacturing and Design Innovation Institute (DMDII). City Digital was started in March 2015 as the second project of UI Labs with a goal of becoming the global hub for urban infrastructure innovation. City Digital is privately funded, with Microsoft, Accenture, Commonwealth Edison, HBK Engineering, and Siemens as the primary funders. Its key academic partners include the University of Illinois, Illinois Institute of Technology, Northwestern University, and Argonne National Laboratory. City Digital’s work is also supported by the City of Chicago’s 2013 commitment to open its assets and infrastructure for urban technology experimentation, and more broadly to become “the most data-driven government in the world” (an effort advanced by a \$3.1 million National Science Foundation grant in 2015 to install an Array of Things, or network of sensors, around the city).

Program description:

City Digital’s main function is to be a neutral broker between entities that rarely talk to one another, despite the obvious opportunities for collaboration. As David Leopold of UI Labs said, “academics only talk to corporations when asking for money, and corporations only talk to the city when they’re trying to get a contract.”

City Digital provides a platform for these actors to come together through its pilot programs. A pilot program begins with a lengthy and intensive process of pulling together entrepreneurs, researchers, corporations, and city departments in order to clearly define a problem facing the city. Pilots are also designed so that the resulting projects have the potential to generate a proven case study and eventually scale to other markets. This is not a simple task. The problems that city staff perceive are often symptomatic of broader, systemic issues. Meanwhile, the “tech folks tend to want to jump straight to solutions” and are unaccustomed to the extensive stakeholder engagement that’s required to establish a

clear problem statement and desired outcome. In effect, City Digital's role at this stage is connecting data scientists and "the guys at the water district that flip the switches".

The City of Chicago plays a role throughout the pilot: enabling use of assets and data, access to pilot sites, coordinating across departments, and ultimately serving as a reference customer. Only with the city's active engagement, for instance, could City Digital pull together the 30 utility agencies in one room to define the problem statement that led to the underground mapping pilot described below. Besides addressing infrastructure issues, the city's long-term interests lie in fostering a startup culture and retaining students.

City Digital ran two projects as part of its first round of pilots. One involved a university researcher taking a one-year sabbatical to commercialize a technology that enables cell phone cameras to be used for mapping underground infrastructure. This technology would enable improved coordination and greater efficiency for construction crews working on underground projects. The other first round pilot project, led by a University of Illinois engineering civil and environmental engineering professor in collaboration with Microsoft, involved a series of sensors that analyzed and reported on the performance of green infrastructure installations in managing urban storm water runoff.

In its work thus far, City Digital has primarily partnered with university researchers in the early product development phase of research. However, City Digital has considered the possibility of working more closely with university technology transfer offices to shape and encourage earlier-stage research that relates to its focus areas.

City Digital does not provide any seed money for these efforts. UI Labs member corporations (such as Microsoft) have provided some direct funding (in addition to membership fees) and in-kind assistance, and university researchers leverage their existing funding. The lack of city funding enables projects to shift direction more easily mid-pilot.

Three key questions face City Digital going forward. One is whether it can help harness venture capital for pilot projects to speed scale across Chicago or more broadly. Along these lines, City Digital is exploring whether it can tap into the resources available through the Chicago Infrastructure Trust, created in 2012 to harness private financing for transformative infrastructure projects. Another is whether it can effectively tap into other city governments to help foster adoption of the technologies that have been implemented in Chicago. Lastly, there are lingering questions about how to handle the intellectual property developed as part of City Digital pilot projects – arrangements that are currently being made on a project-by-project basis.

Overview:

FastFWD is a 12-week business accelerator that connects entrepreneurs with staff from eight city departments in Philadelphia to collaboratively develop new approaches to city problems. Unlike City Digital, FastFWD has focused on “social entrepreneurship” technologies to address issues such as public safety, housing, and community stability, rather than infrastructure. Its first two cycles have included a total of 18 startups. The process is run according to an accelerator curriculum developed by GoodCompany Ventures, enhanced by the active involvement of city officials and research support from Wharton’s Social Impact Initiative. The program also facilitates connections with funders that can help finance and scale those approaches to other cities.

Lead Organization: City of Philadelphia, GoodCompany Group
Geography and Population: City of Philadelphia (1.55 million)

Background:

FastFWD was developed under former mayor Michael Nutter’s administration as an initiative of the Office of New Urban Mechanics, which was created in 2012 as a “civic innovation office” meant to connect government with its constituents, entrepreneurs, and non-profits. (It is modeled after a similar office in Boston). FastFWD was motivated primarily by the administration’s desire to make the city a better market for startups to form. The city realized that doing so would require changes to its procurement process to make it easier for entrepreneurs to test ideas and technologies. Thus FastFWD inspired, and ultimately benefitted from, a broader procurement reform effort. This is an issue facing many cities – a recent survey showed that 75 percent of municipalities ranked procurement reform as a high or medium priority. FastFWD launched in May 2014 after it won a \$1 million dollar implementation grant from Bloomberg Philanthropies via the inaugural round of its Mayors Challenge in 2013.

Program description:

While the accelerator is the heart of FastFWD, it is just one part of a larger process that prepares startups to respond to a city-issued RFP, and ultimately scale to other cities.

- **Identify and define:** the process begins with a “challenge definition” period led by the Wharton School’s Social Impact Initiative in consultation with industry leaders and academic experts. The criteria for choosing the challenge topic includes both the city’s internal capacity and the external market opportunity, as defined by internal expenditures, internal interest, internal ability to execute, external regulatory environment, and absence of external competition. From this process, public safety emerged as the best opportunity for entrepreneurial solutions in the first round.
- **Open call:** the challenges are then packaged as market-based opportunities for for-profit startups as well as corporate innovation teams. For example, the Wharton researchers produced profiles that outlined the challenges and scale of the market

related to reducing recidivism. FastFWD staff then used those materials to conduct a broad outreach effort, making intentional efforts to reach new companies – such as posting in online forums and visiting co-working spaces. This produced 137 applications from around the world. From this pool, 18 entrepreneurs were selected for the first two accelerator classes based on their potential for impact, team leadership, level of innovation, scalability, and relevance to the defined focus area.

- **Accelerate:** the GoodCompany Ventures accelerator provides a structured 12-week curriculum designed to help social entrepreneurs develop a scalable business model. It also provides access to mentorship and subject matter expertise, city partners, \$10,000 in non-equity stipends, and introductions to funders.
- **Pilot and fund:** graduates have the opportunity to pitch the City of Philadelphia, business leaders, and venture and angel communities. All graduates have the opportunity to reply to the city’s RFP (seven of ten did in the first cycle), and the top proposals are awarded pilot contracts or early stage funding (three were chosen for pilot contracts in the \$30,000 to \$35,000 range from the first cycle). Examples of pilot contracts include “text-messaging-based outreach” for prisoner reintegration (which improved meeting attendance by 40%) and tablet-based education opportunities for jail inmates (2,100 online courses completed in one year).
- **Replicate and share:** FastFWD pitches successful solutions to other cities, and collect data, conduct evaluations, and report findings to share practices and models.

The procurement reform effort that took place alongside FastFWD was an integral part of the program and represents one of its biggest impacts. FastFWD inspired a new form of RFP, in which the city presents a challenge and invites entrepreneurs to propose innovative responses. This differs radically from the typical procurement process in which the city both defines the problem and dictates what the solution should look like. FastFWD also streamlined the RFP itself, from 47 pages to 18. Other changes to the city’s approach to procurement followed. Philadelphia now plans to create an online registry through which entrepreneurs can share successes from pilot projects and ideas for future pilots. The city also formed a partnership with CityMart, a procurement company that will support additional problem-based procurement processes (five more are planned for 2016).⁴

Several lessons emerged from the first cycle. First, the risk-ready grant funding from Bloomberg Philanthropies was crucial in allowing the city to take on more innovative pilots than traditional procurement would allow for. Second, the partnership with Wharton enabled the solid research needed to identify problem areas that were relevant to the city but also represented a significant market for entrepreneurs. Third, the program works best when pilots are designed to use the city as a place to test a business concept, rather than just win a city contract. Lastly, because many of the proposed solutions do not relate to a single city agency, there often isn’t one clear customer within the city. In the second cycle, FastFWD is pairing each startup with a single city employee to act as a point of contact.⁵

⁴ Stephen Goldsmith. “Engaging Entrepreneurs to Solve Urban Problems.” *Governing* (April 7, 2016).

⁵ Juliana Reyes. “FastFWD, Philly’s Public Safety Accelerator, Rethinks Itself.” *Technically Philly* (October 1, 2014).

Theme: Global Engagement

- **Colorado – Advanced Industries Accelerator**
Since 2013, the state of Colorado has been orienting a core set of economic development resources around “advanced industries”. These are high-skill, R&D-intensive goods and services industries (i.e., bioscience, aerospace, and information technology) that have an outsized economic impact. One of the key forms of support for firms in these industries in Colorado is the Advanced Industries Export Grant, which provides \$15,000 grants for international business activities for advanced industries companies with fewer than 200 employees. Firms can be exporting for the first time or expanding to a new market, and must have a commercialized product and two years of domestic sales experience. This grant program is part of the broader Advanced Industries Acceleration Program, which includes three other funding sources: proof of concept grants for university researchers, early stage capital for start-ups, and workforce development. The positioning of an export program as part of this suite of services recognizes the fact that global sales are often a key step for high-tech firms in the post-commercialization stages of growth.

Other global engagement examples:

- University of Texas – Global Commercialization Group
- Toronto Region Board of Trade – Trade Accelerator Program

Theme: External Innovation

- **Ohio Third Frontier and Metro Atlanta Chamber – Nine Sigma Platform**
Nine Sigma is an open innovation services provider based in Cleveland. Ohio Third Frontier and the Metro Atlanta Chamber (MAC) are the two largest economic development organizations to have contracted with Nine Sigma to create open innovation platforms for local firms. In Ohio, the goal is to help mid-market firms (\$10m to \$1b in revenue) within the state access technologies and innovation partners across the world. Ohio pays half of Nine Sigma’s \$25,000 fee for local mid-market firms to work with Nine Sigma to define an innovation challenge (an in-depth process with extensive consultation) and post it on its global marketplace. MAC’s approach is similar, but its focus is on connecting the region’s major corporate headquarters with its burgeoning startup ecosystem as well as local researchers. When an Atlanta-based corporation posts an innovation challenge (which MAC also subsidizes), MAC reaches out to its network to find a local startup or researcher that can solve the problem (the ideal outcome), while Nine Sigma simultaneously reaches out to its global network to find other startups. In the first year, 12 challenges were posted and two ongoing local connections were formed.

- Pennsylvania – Innovation Works Innovation Adoption Grant**
 Innovation Works developed the Innovation Adoption Grant as part of an effort to focus on technology development in the eight rural counties of Southwestern Pennsylvania that, to a greater degree than the Pittsburgh metro area, rely on a base of small manufacturers that are under significant pressure from low-cost global competition. The program connects small manufacturing firms (less than 250 employees) to the resources available at the region’s centers of excellence (such as Penn State’s Plastics Technology Center). Grants are worth up to \$50,000 and are matched by firms. Since 2004 the program has served 150 companies, generated \$2 million in matching R&D funds, helped prototype and commercialize 30 new products, and implement 75 new manufacturing processes.
- Milwaukee – Water Innovation Platform and Corporate Challenge**
 The Water Council (profiled in detail in the Leadership and Vision section) has two programs dedicated to external innovation. One, the Global Water Port, is analogous to the Nine Sigma programs profiled above, with some key differences. It is a global platform customized for the water industry, available to entrepreneurs, government, academia, researchers, and nonprofits (it is included in Water Council membership). It is also less focused on specific firm-level innovation challenges and more focused on making connections between researchers and firms. This is accomplished with sophisticated software that scans the Internet to identify associations between patents and research papers. Another program, BREW Corporate, launched in 2015 as a program of the Council’s BREW accelerator, helps global corporations identify startups that can solve their innovation challenges. Unlike Nine Sigma’s relatively hands-off approach, BREW Corporate brings promising startups into a formal program in which each receives funding as well as access to executive mentors and corporate R&D offices.

Other external innovation examples:

- DreamIt Ventures – national programs, including DreamIt Health in Baltimore
- TechStars Accelerators – national programs and corporate accelerators
- Georgia Tech – Office of Industry Collaboration
- Johnson & Johnson – Jlabs (San Francisco, San Diego, Houston, Boston, Toronto)

Theme: Mergers and Acquisitions

- Korea – KOTRA Global Mergers & Acquisitions Support**
 KOTRA, the Korean government’s trade promotion agency, was established in 1962 and is regarded as one of the top organizations of its type. Korea has a relatively small domestic consumer market and few natural resources, and has therefore relied heavily on exports and foreign direct investment for economic growth. In 2013, KOTRA launched a new program designed to help Korean firms enter global markets via mergers and acquisitions (M&A). The goal of the effort is to address a gap in the market: small to mid-sized Korean firms see M&A as a preferred way to enter the U.S. (and other markets) and acquire technologies, but do not have the

resources to secure representation from an investment bank. KOTRA aims to use its connections in overseas offices (8 of which are in the U.S.) to build relationships with local companies, as well as venture capital and private equity firms, on behalf of Korean firms interested in M&A.

Theme: Business Expansion Services

- **Ohio – Jumpstart Scaleup and Talent Services**

The challenges facing tech-based startups do not end after a firm has received seed funding or secured its first customers, which is why Jumpstart offers scaleup services alongside a standard suite of startup services. Jumpstart defines scaleup firms as those that have 10 to 100 employees, \$2 million in revenue, and are cash flow positive. Its services are designed to help such firms achieve 10% annual revenue growth. They include sales and marketing support (lead generation, websites, and digital campaigns), ongoing funding connections, and growth planning. Another key offering is talent assessment, recruiting, and retention. Jumpstart helps small, high-growth tech-based firms make initial hires by creating job descriptions, onboarding plans, and retention and compensation strategies. Jumpstart provides these services with a flexible fee structure that enables startups to spend less up front and delay payment until success milestones are met.

Other business expansion services examples:

- Pennsylvania – Innovation Works talent services

Interviews Completed*

	Organization	State or Metro	Person Interviewed	Title
1	Battelle	Tennessee	Drew Bond	VP of Public Policy
2	BetaSpring	Providence	Allan Tear	Co-Founder and Managing Director
3	BioCom San Diego	San Diego	Jennifer Landress	Sr. VP and COO
4	BioCrossroads/CICP	Indiana	David Johnson	President and CEO, CICP
5	BioCrossroads/CICP	Indiana	Betsy McCaw	Chief Operating Officer, CICP
6	Business Oregon	Portland, OR	Chris Harder	Director
7	CalCharge	California	Jeff Anderson	Director
8	Chicago Innov. Exchange	Chicago	John Flavin	Director
9	City of Bellevue, WA	Seattle	James Henderson	Economic Development Director
10	Dell Medical School	Austin	Sandy Guzman	Leg. Dir., State Sen Kirk Watson
11	Dell Medical School	Austin	Christie Garbe	VP & Chief Strategy Officer, Central Health
12	Dell Medical School	Austin	Dr. Maninder Kahlon	Vice Dean for Strategy & Partnerships
13	Elevate Capital	Portland, OR	Nitin Rai	Managing Director
14	IL Sci. & Tech. Coalition	Illinois	David Machajewski	Program Dir., Innovation Initiatives
15	Jumpstart, Inc.	Ohio	Ray Leach	CEO
16	Korea Bus. Dev. Center	Los Angeles	Min Kang	Marketing Consultant
17	Lifescience Greenhouse	Pittsburgh	John Manzetti	CEO & President
18	Los Alamos National Lab	New Mexico	Mariann Johnston	Project Manager
19	Medical Alley	Minnesota	Dr. Cheryl Matter	VP of Intelligence & Research
20	Metro Atlanta Chamber	Atlanta	Jennifer Sherer	VP of Innovation & Entrepreneurship
21	Oak Ridge National Lab	Tennessee	Tom Rogers	Dir., Industrial Partners & Econ. Dev.
22	Oak Ridge National Lab	Tennessee	Craig Blue	Dir., Manuf. Demonstration Facility
23	OH Dev. Services Agency	Ohio	Norm Chagnon	Dep. Chief, Small Bus. & Entrepreneurship
24	Opportunity Hub	Atlanta	Rodney Sampson	Founder & CEO
25	San Antonio Chamber	San Antonio	Will Garrett	Director, CyberSecurity San Antonio
26	San Diego Regional EDC	San Diego	Sean Barr	Vice President
27	UC - San Diego	San Diego	Mary Walshok	Assoc. Vice Chancellor & Dean of Extension
28	UI Labs - City Digital	Chicago	David Leopold	Director, Project Management
29	UI Labs - DMDII	Chicago/U.S.	Haley Stevens	Assoc. Dir., Workforce Dev. & Ed. Outreach
30	UI Labs - DMDII	Chicago/U.S.	Mary Kate Love	Asst. Mgr., Membership Engagement
31	Upstate Alliance	Greenville, SC	Elizabeth Feather	Director of Research
32	Virginia EDP	Virginia	Paul Grossman	Vice President
33	Water Council	Milwaukee	Rich Meeusen	Co-Chair, Board of Directors
34	Water Council	Milwaukee	Dan Amhaus	President & CEO
35	Water Council	Milwaukee	Elizabeth Thelen	Dir. of Entrepreneurship & Talent

*Note: while not every interview resulted in a profile or sidebar, every profile (and many sidebars) was informed by an interview – the one exception is Philadelphia Fast Forward.