

THE VELOCITY PLAN: TRANSFORMING THE WORLD AND GREATER PHOENIX ECONOMY THROUGH IMPACT COLLABORATION

The Partnership for Economic Innovation (PEI) was founded to strengthen the Greater Phoenix economy through job creation and diversification, bringing an end to 30 years of limited growth for the region's advanced technology jobs. Central to Velocity (PEI's plan to transform the region into an innovation economy) are a series of innovation and commercialization centers, programs, and ventures.

This paper introduces the Impact Collaborative, a hybrid model for the translational research, innovation, and commercialization of advanced technologies targeting social and economic problems of national or global scale. It summarizes funding opportunities and details the plan to meet Velocity's goals via the initial beachhead within behavioral health. It builds upon the foundation established in the following documents that are available upon request:

- "Impact Investments: An Emerging Asset Class" prepared by JP Morgan Global Research in collaboration with the Rockefeller Foundation and Global Impact Investing Network (GIIN) in 2010
- The "Innovation and Commercialization for Advanced Manufacturing Business Plan" developed by Stanford Research Institute (SRI) in 2014
- "Velocity: A Blueprint for Transforming Greater Phoenix" prepared by Greater Phoenix Economic Council (GPEC) in collaboration with the Brookings Institute in 2015
- The "Sensor Collaborative Development Plan" prepared by GPEC in 2016
- "Greater Phoenix Innovation Ecosystem Assessment" prepared in partnership between Greater Phoenix Economic Council and Partnership for Economic Innovation in 2017

OBJECTIVES

This paper summarizes the plan to achieve Velocity, but to understand the approach, one must first understand the objectives.

The following excerpts from "Velocity: A Blueprint for Transforming Greater Phoenix" best describe the key objectives for the Velocity programs:

*"Velocity ... represents a major milestone for the Greater Phoenix region, an unprecedented collaboration among business, civic and university leaders and elected officials convinced that **our region must become a global innovation leader** to ensure a strong economy for the long term."*

"A key objective of the Blueprint for Transforming the Greater Phoenix Region into an Innovation Economy is to move the region from the ranks of 'fast followers' in technology

into the league of ‘early adopters’ by expanding its capacity for innovation to revitalize its core industry strengths. Pursuing that objective will generate new opportunities for firms of all sizes, while simultaneously building the skills and talent necessary to reposition the region.”

The following excerpt from the 2014 SRI report best describes the key objectives for the Innovation and Commercialization Center proposed by SRI:

*“The objectives of the proposed Innovation & Commercialization Center for Advanced Manufacturing, or ICCAM, is to **facilitate and accelerate the commercial introduction of innovative technologies**, regardless of their source (university, start-ups, or established firms). The demands of the next economy require an **open, cooperative approach to commercialization**. Technology development inside a single corporate silo is too rigid and slow to be competitive with the pace of change and innovation in global markets. **Mechanisms for greater collaboration and so-called open innovation are needed.**”*

INNOVATION AND COMMERCIALIZATION MODELS

PEI conducted a thorough evaluation of transformational growth models to identify the model best suited to the mission and local ecosystem of Greater Phoenix.

SEMATECH Model (Austin, TX)

SEMATECH was a not-for-profit consortium that performed research and development to advance chip manufacturing. SEMATECH began operating in Austin, Texas in 1988 as a partnership between the United States government and 14 US-based semiconductor manufacturers.

SEMATECH was funded with \$68 million from The City of Austin, \$848 million from the U.S. Department of Defense, and a total of \$863 million from industry members. While SEMATECH is credited by many experts for playing a critical role in saving the US semiconductor industry, local job creation within Austin is estimated at a modest 5,000 new jobs, well below the long-term goals for advanced job creation in Greater Phoenix.

The level of funding that SEMATECH received from the federal government is not available today to support specific technology consortia or industry sectors in a single location on the scale of SEMATECH. Interviews and research of current programs at NSF, NIH, and NIMH indicate a desire to remain technology and sector agnostic, focusing on commercializing existing research to drive solutions with a potential for significant positive social impact.

The level of funding support SEMATECH received from its industry members does not presently exist in Greater Phoenix. Interviews with prospective industry members for a local consortium are mixed, ranging from mild interest to strong opposition. They do, however, show stronger and

more uniform interest in a collaborative model that provides access to strategic licensing, investment, and acquisition opportunities in innovation projects and early-stage companies commercializing advanced technologies.

Building a consortium on the scale of SEMATECH in Greater Phoenix seems improbable. However, there may be adequate support for a series of smaller consortia focused on advancing technologies and research that align with federal agency interests in social impact and industry interests in economic opportunities. These consortia could play an important role in local cluster formation and innovation activities, but they are not expected to drive commercialization, venture creation, or significant job growth on their own. Accordingly, other models were considered that might offer better solutions to achieve Velocity's job creation goals.

500 Startups Model (Mountain View, CA)

500 Startups is a startup accelerator that runs a seed and a Series A program. 500 Startups seeks to provide services and support that the chosen startups would otherwise be unable to obtain. One of the key services offered is help from product distribution experts. All the startups also operate in the same co-working space, allowing for the crossover of ideas, methods, and general creativity. These program attributes contrast with other accelerators that focus on accepting startups that are further developed.

500 Startups seed program runs for four months and includes mentorship, hands-on sessions with startup experts, and office space to work with other founders. Each company receives a \$150,000 convertible security in exchange for 6% equity and is charged a \$37,500 participation fee. For the duration of the program, startups move their operations to a co-working space with other participants.

500 Startups also runs a Series A program that targets startups who are further developed. This program includes a \$150,000 - \$250,000 investment for an equitable stake in each firm with a \$25,000 - \$50,000 participation fee depending on location. This includes access to a vast network of investors, partners, and founders.

Y Combinator's Model (Mountain View, CA)

Y Combinator is an accelerator that focuses primarily on application software startups. They fund two portfolios of startups a year, with each company in the portfolios receiving a \$120,000 investment. Founders relocate to the Bay Area for a three-month period. There they receive access to Y Combinator's vast network of program graduates, investors, and other resources in the startup world. This access allows startups to further develop and refine their investor pitch. The program culminates in Demo Day, where startups pitch to a group of investors selected by Y Combinator.

Ohio Third Frontier 'Open Innovation' Model

Successfully commercializing advanced technologies fails most of the time, even in large corporations ... especially in larger corporations. That's why many of the largest technology companies are increasingly investing and engaging in open innovation to drive immediate revenue growth and preserve or create value for shareholders. As corporate funding for R&D decreases and internal product pipelines thin, budgets for M&A and corporate venture have risen, infusing capital into the open innovation ecosystem.

Open innovation is a collaborative model merging internal company resources and knowledge with external resources and knowledge at varying degrees. More formally, it is the use of "purposeful inflows and outflows of knowledge to accelerate innovation internally while also expanding the markets for the external use of innovation."

The State of Ohio knew it had to grow revenue. Targeting companies with revenues from \$10 million to \$1 billion, the State decided to provide funds to enable these companies to have access to technology that would push products under development to market faster. Finding innovative technologies that they could buy or license would jump start growth.

According to their website, "Ohio Third Frontier is committed to transforming the state's economy through the accelerated growth of diverse startup and early-stage technology companies throughout Ohio." Their portfolio of diverse, high-potential companies is making major contributions to the Ohio economy through the attraction of investment capital, sales/revenue, and the creation of well-paying jobs.

Ohio Third Frontier was created with initial funding of \$2 million to accelerate the adoption of open innovation. The open innovation process allows specialized research companies to bid on providing solutions to identified technology gaps.

NineSigma was selected by Ohio Third Frontier as an open innovation intermediary to work with participating companies to assist in project development and execution. NineSigma's needs articulation process and methodology was used to identify solutions across industries.

Ohio Third Frontier discovered that when searching for a technology solution, 60% of the solutions came from industry (two thirds of which are small businesses), 30% came from universities and 10% from independent labs.

To date, 330 companies have benefited from the program generating some \$1.6B in product sales/revenue and creating 3,074 jobs. Initial investment in these companies totaled near \$175 million (half from the State and the balance from private matching funds). Follow-on equity investment exceeds \$1.6B.

This type of collaborative model is catching on across the country. In a 2015 study by Harris Poll, over 300 executives at companies with \$1 billion or more in revenues were polled. Some highlights of the findings include:

- 85% say their company has the resources and capabilities to leverage innovations from external partners.
- 72% expect their company's investment in projects with outside innovation firms to increase.
- 85% say their company effectively leverages innovation to stay ahead of competitors.
- 77% of corporate executives expect their company to increase its budget for innovation programs.

Georgia Research Alliance (GRA) Open Innovation Model

An independent nonprofit closely aligned with Georgia's Department of Economic Development, GRA expands research and commercialization capacity in Georgia's universities to grow the state's technology economy.

Since its formation in 1990, GRA has leveraged just over \$600 million of state funding into \$4 billion of direct federal and private investment in Georgia. This investment has supported the creation of more than 170 companies and more than 6,400 high-skill, high-value jobs.

GRA's investment and involvement has ensured that science and technology breakthroughs consistently emerge from Georgia Tech, University of Georgia, Emory University, Clark Atlanta University, Medical College of Georgia, Georgia State, Morehouse School of Medicine, and Mercer University. GRA's work is accomplished in four interrelated ways:

- Recruiting world-class scientists to Georgia universities as GRA Eminent Scholars
- Investing in state-of-the-art research technology for university labs
- Fueling the commercialization of university-based discoveries and inventions
- Forging and strengthening alliances among universities and industry to make Georgia more economically competitive

GRA has benefited from a unique balance of private and public support. Private funding — from individuals, companies, foundations and partner universities — supports 100% of GRA's operations and management. Public funding, through State of Georgia appropriations, is invested directly into core programs, such as GRA Eminent Scholars and GRA Ventures. Every public dollar invested in these programs is further leveraged in some way. Through such leverage, GRA has turned \$595 million in state investment into more than \$3 billion of additional outside investment in Georgia.

By providing seed grants and loans to start-ups through GRA Ventures, the alliance spurs outside venture capital investment into newly-launched Georgia enterprises.

Since 2002, GRA Ventures has accelerated the formation and launch of university-based startups by:

- Evaluating more than 1000 proposals for more than 400 unique university technologies and inventions
- Advancing to market 300 distinct university technologies with multi-phase commercialization grants totaling \$22 million
- Providing \$10 million in low-interest loans to 42 of the most promising companies

To date, 150 active university-based companies have received crucial support from GRA Ventures. These enterprises have brought to Georgia more than a billion dollars in equity investment. They have also generated more than \$140 million in revenue, and today, they employ more than 1300 professionals.

The above models are among the few capable of supporting the transformational level of funding contemplated in SRI's plan. While the 500 startups and Y Combinator model demonstrate significant and rapid job creation, which aligns with the Velocity timeline and objectives, the **open innovation models** (Ohio Third Frontier and Georgia Research Alliance) are better suited to commercialize advanced technologies, highly-regulated biomedical technologies, and integrated hardware-software technologies driving the Internet of Things (IoT), a market projected to reach \$19T by 2020.

Ultimately, the ideal program would integrate aspects of all models presented above.

HYBRID COMMERCIALIZATION MODEL: IMPACT COLLABORATIVE

There are more than 10 million issued patents in the US alone, many of these sit alongside shelved technologies and research in the labs and archives of universities and corporations awaiting development. Without a clear path to commercialization, additional research will simply bloat this stockpile of idle assets. To unlock the potential social benefits and economic impact of past, present, and future research, a greater focus on commercialization is needed.

Impact Collaborative is a hybrid model that integrates many of the best features from the SEMATECH, 500 Startups, Y Combinator, and **open innovation models** to enable coordinated and sector-focused venture creation and development using a proven commercialization process that identifies unmet industry, consumer, or social needs, matches them with idle technology or intellectual property, and collaborates with researchers where specific technology or manufacturing gaps are impeding immediate commercialization.

Impact Collaborative is an open innovation and venture creation, incubation, and acceleration model that aligns academic, entrepreneur, investor, and industry partners committed to solving important social and economic problems using innovative advanced technologies, such as sensors.

The model's venture creation and development programs provide access to the capital, people, programs, and other resources necessary to evolve their advanced technologies into products, and grow those products into sustainable businesses. The programs span the commercialization process, breaking the early stages of the business lifecycle into three phases: Innovation, Incubation, and Acceleration.

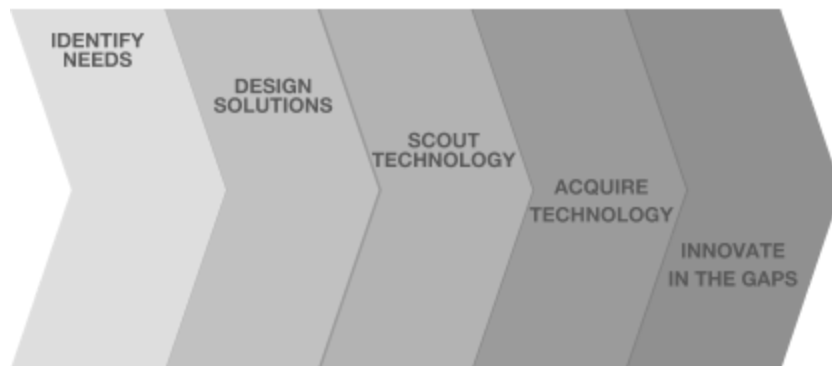
COMMERCIALIZATION PROCESS



Innovation

Built around a proven discovery and product design process, the Innovation Program connects innovators, entrepreneurs, intellectual property, and capital to address problems that represent larger market opportunities. The Innovation Program methodology is detailed in the Collaborative Operating Plan and includes the following major components:

INNOVATION PROGRAM



- **Identify Large Unmet Market Needs.** The Impact Collaborative’s innovation team conducts market research and produces an Opportunity Statement identifying, analyzing, and validating market need, market size, and market readiness. The team includes a General Manager who supports the Innovation Program Manager and Innovation Project Managers, who lead each project and are supported by a team of external resources that includes academic researchers, subject matter experts (SMEs), business professionals with relevant experience, and other contributors critical to each stage of the innovation process. Tasks and assignments to identify unmet market needs include:
 - The Project Managers (PM) are responsible for identifying potential unmet market needs through primary and secondary research and sourcing them from SMEs, users, or other stakeholders.
 - The PM qualifies market ideas through innovation project personnel and receives and reviews responses utilizing a scorecard.
 - The PM holds a meeting of the innovation project team to review all responses with scorecards.
 - The PM prepares a preliminary version of the Opportunity Statement.
 - The PM or the other assigned person conducts research to determine and factually justify scores for each question on the scorecard.
 - The PM investigates the opportunities, which the team feels have the most promise or assigns investigations to project team members.
 - The PM proposes a budget and timeline for these activities and submits it to the Innovation Program Manager seeking approval to proceed into the solution design stage.
 - The PM holds meetings of the innovation project team(s) to review all active projects and scorecards.
 - The Innovation Program Manager maintains a Product Opportunity Inventory list and Development Pipeline report.
 - The General Manager and Innovation Program Manager select the best opportunities to move into solution design based on the scoring system maintained by the Project Manager. A final version of the Opportunity Statement is produced by the team.

- **Design Solutions.** The Opportunity Statement drives the innovation team’s ideation and business model conceptualization process. Under the direction of the General Manager and Innovation Program Manager, the project managers and innovation team conduct searches across research publications, intellectual property databases, and labs throughout the global innovation ecosystem to identify ingredient components, resources, people, supply chain, and document use-cases, design specifications, and technical requirements needed to produce and test future prototypes. The output is a Solution Statement identifying target market, value proposition, features, functions, and approximate cost. The General Manager and Innovation Program Manager select the best

solutions to move into technology scouting based on the scoring system maintained by the Project Manager.

- **Scout Technology.** The innovation team sources the enabling technology from universities, corporations, or national labs to meet the design specifications in the Solution Statement and identifies technology gaps that may exist. Technical due diligence and demonstrations ensure that ingredients sourced perform as expected. Integration planning prepares for the aggregation of multiple technologies into a whole solution. The General Manager and Innovation Program Manager select the best technologies to move into technology acquisition based on the scoring system maintained by the Project Manager.
- **Acquire Technology.** Technology transfer begins with the structuring of licensing agreements with IP owners. In many cases, the license accompanies the purchase of technology from existing suppliers. The General Manager and Innovation Program Manager select the most critical gaps to address and technologies to be diverted for further innovation based on the scoring system maintained by the Project Manager.
- **Innovate in the Technology Gaps.** Research partners are engaged to address any technology gaps identified by the innovation team. Area universities and corporate R&D departments work together through a joint venture to develop new knowledge and solutions to address technology gaps.

Venture Creation

Innovation projects are vetted by a selection committee comprised of industry leaders, investors, and market experts; expanding the collaborative network and increasing the probability of successful early-stage milestones such as fund raising, business development, strategic partnerships, and acquisitions.

Once approved, executive leadership is engaged to develop the business plan, raise capital, launch the product, and manage the newly-formed company through the incubation stage.

Incubation

For sector startups — including those graduating out of the Innovation Program, transferring out of corporations or universities, or relocating to Arizona — the Incubation Program provides guidance and support through formation, seed capitalization, product development, and business development as companies seek first customers, revenue, strategic partners, and workforce. The Incubation Program methodology is detailed in the Collaborative Operating Plan that is available upon request.

Acceleration

For early-stage sector companies, including those graduating out of the Incubation Program, the Acceleration Program provides guidance and support to get the company across the chasm and scale up revenues. Relatively few companies reach the Acceleration Program. For those that do, specific needs will vary, but companies will often require assistance with marketing, sales, strategic partnerships, operations, people (advisors, management, and workforce), or financing. The scope of each engagement is customized to the gaps identified.

Investment

The pipeline of early-stage advanced technology companies is thin because they require a significant amount of capital to develop, launch, and incubate. To fund these businesses, form an advanced technology sector, and catalyze the ecosystem, Greater Phoenix must generate a transformational level of investment by attracting outside capital and activating local investors.

No single source is expected to fund Velocity's significant capital needs. Rather, it is a collection of funding sources, including: Public, Corporate Venture, Venture Capital, Private Equity, Angel, and Impact Investors.

- **Public Funding.** Federal agencies such as NSF, NIH, NIMH, and DARPA remain viable funding sources for basic research and limited translation research that may be commercialized through the Impact Collaborative model. However, additional funding is required to develop, launch, and operate the model.

For municipal, county, and Arizona state governments, Velocity offers an opportunity to grow advanced technology jobs through venture creation and early-stage sector business attraction by funding the launch of the first collaborative. The Impact Collaborative model projects a \$10M public catalyst investment to support the development, launch, and operating expenses of the first collaborative could attract as much as \$90M in private investment. Velocity scales in years 3-10 with an additional \$300M in public funding to develop, launch, and support four additional collaboratives projected to attract more than \$3B in private capital.

- **Corporate Venture.** Seed and Series A strategic investments from corporate venture total approximately \$15B annually in the US, and the number of transactions and total investment dollars has consistently grown over the previous five years. While these investments are occasionally made directly into early-stage companies, they are more often made through early-stage venture funds. In either case, strategic investment can drive syndication from other capital sources as it often signals possible future follow-on investment, licensing, strategic partnerships, and acquisition.

Within Greater Phoenix, Intel's Chandler location provides connectivity to Intel Capital, historically one of the most active corporate venture groups. Medtronic's Tempe location

provides access to the world's most active acquirer of medical devices in the world. In fact, Medtronic's activity has even further increased with their 2015 acquisition of Covidien.

Engaging these and similar corporate venture groups, locally and outside of the region, will be critical to Velocity's success and must be a high priority.

- **Venture Capital Firms & Funds.** While venture capital activity is at or near historic highs around \$95B annually, seed and Series A investments - like those that will fuel Velocity - account for only half of deployed capital, at best. Historically, only a small fraction of venture capital has made its way into Greater Phoenix, with an estimated \$4.7 billion from 1993 - 2014, representing less than 1% of VC funding in the 20 most active regions for VC investment.

Attracting investment from established venture capital firms from outside of Arizona is more likely if they have an established relationship with a local VC leading the deal. Several local venture firms and funds have been established over the past several years, a critical step toward increasing the flow of venture capital into Greater Phoenix.

Within the region, a cluster of health-related venture firms and funds spanning much of the capital continuum are now active, including: Mayo Ventures, BioAccel, the Arizona Founders Fund, Whitehat Ventures, and Point B Capital. Velocity may accelerate its growth by partnering with these groups.

- **Private Equity.** Private equity groups are actively searching for investment and acquisition opportunities in Greater Phoenix. Because their investment criteria generally targets underperforming or distressed established companies with sizeable revenues beyond the early stage, they're not an obvious capital source for Velocity.

However, the private equity group's compulsion to maximize returns makes them potential strategic partners to jointly pursue business attraction within Velocity's target sectors, provided relocations yield cost savings, access to critical workforce, or other value gained from economies of scope, economies of scale, location, etc. These partnerships could be leveraged to defend Velocity's strategy, inhibiting the ability of other regions to attract or retain companies in the same sector. These partnerships can accelerate target sector formation and advanced job creation in Greater Phoenix.

Mature companies targeted by private equity often become early adopters of innovative technologies, solutions, and business services as they seek cost savings through operational efficiencies. This potential path to first revenues can provide an accessible beachhead for Velocity's early-stage ventures and increase their chances of raising capital from angel investors, impact investors, or friends and family.

- **Angel Investors.** Whether they are independent accredited investors or organized groups, like Desert Angels or ATI locally, angels have historically played a significant role in capitalizing early-stage ventures.

In Arizona, the recently refunded Angel Tax Credit Program (A.R.S. § 41-1518) plays an important role in activating local investors to fund early-stage companies like those contemplated in the Velocity plan. Passing HB 2191 should help capitalize the Velocity plan, but future legislation increasing the tax credit allocation by 10x - 20x would drive a much more meaningful level of investment.

With the majority of early-stage capital coming from outside of Arizona (approximately 90% of the capital and 80% of the investors), engaging regional and national angel investor communities will be critical to funding Velocity created and developed ventures over the first several years.

- **Friends, Family, and Self-Funding.** While most entrepreneurial ventures start with self-funding or capital provided by friends and family, advanced technologies are an exception. The complexity of the technologies and long product development and commercialization timelines, increase the amount of capital needed to launch and advance technology businesses. These businesses generally require \$2M - \$10M to make it through the early stages.

Friends, family, and self-funding are not expected to be a significant capital source to fund Velocity.

- **Impact Investors.** In 2010, JP Morgan, the Rockefeller Foundation, and the Global Impact Investing Network (GIIN) published a research paper proposing the creation of a new alternative asset class: Impact Investments.

*“While certain types of impact investments can be categorized within traditional investment classes (such as debt, equity, venture capital), **some features dramatically differentiate impact investments.** We argue that **an asset class is no longer defined simply by the nature of its underlying assets,** but rather by how investment institutions organize themselves around it. Specifically we propose that an emerging asset class has the following characteristics:*

- *Requires a unique set of investment/risk management skills*
- *Demands organizational structures to accommodate this skillset*
- *Serviced by industry organizations, associations and education*
- *Encourages the development and adoption of standardized metrics, benchmarks, and/or ratings*

*These characteristics are present for such asset classes as hedge funds or emerging markets, which channel significant capital flows as a result. With each of these indicators having materialized, we argue that **impact investments should be defined as a separate asset class.***

The authors identified the impact investor market as, “philanthropic foundations to commercial financial institutions to high net worth Individuals.”

What they could not anticipate at that time was the introduction of the JOBS Act in 2012, which would open impact investing up to the US retail investor market that holds more than \$25T in retirement assets, of which more than \$7T are housed in IRAs that may be eligible for self-direction. There are currently an estimated 53 million self-directed investors in the US, a market that is growing approximately 5% each year. Among accredited investors, an estimated 30% identify as self-directed. These impact investors could help fund Velocity.

The movement has been led by impact investment visionaries like Bill Gates and Warren Buffet, who created the Giving Pledge in 2010 with nearly \$750B in funding pledges. Their leadership has inspired a market of smaller accredited investors to seek high-impact, high-return alternative investments. In the coming years, this asset class will reach the retail market and provide access to a new type of investor: the retail impact venture capitalist.

Velocity Funds

The Impact Collaborative model will be driven by a translational research fund and a family of impact venture funds, owned and operated by approved investment partners, that capitalize the research, innovation, incubation, and acceleration activities.

1. **Research Funds.** Translational research projects are funded by privately-managed research funds capitalized through grants, sponsorship, and charitable donations from foundations and individual donor campaigns operated by the individual collaboratives. Qualified translational research projects may receive up to \$150,000 in funding.
2. **Innovation Funds.** Each of the Velocity funds provides investors with an opportunity to diversify their risk across a portfolio of carefully vetted impact investment opportunities. Innovation funds target impact investors capable of accepting the exceptionally high risk along with potentially high returns associated with pre-seed investment in advanced technology companies. Qualified innovation projects may receive up to \$350,000 to identify a potentially large unmet market need within Velocity’s target sector and propose to investigate the problem, conceptualize products or solutions, research the competitive landscape, identify existing technology for licensing or report gaps, develop a

comprehensive business plan, package the opportunity for investment, and participate in the seed capital raise.

3. **Incubation Funds.** Velocity’s Incubation funds target impact investors suited to the high risk associated with seed investments in advanced technology companies. Qualified ventures that successfully raise 50% of their required seed investment may qualify for a matching equity investment up to the remaining 50% from Velocity Incubation Funds, up to a maximum of \$1,250,000.

4. **Acceleration Funds.** The Acceleration funds target early-stage and impact investors suited to the risk associated with Series A investments in advanced technology companies. Qualified ventures that successfully raise 50% of their required seed investment may qualify for a matching equity investment up to the remaining 50% from Velocity Acceleration Funds, up to a maximum of \$4,250,000.

The plan is to design and implement the following funds to support the venture creation capital needs of the Impact Collaborative model. It is anticipated that a series of funds will be created in each category over time. Each fund will be professionally managed with investments made by selection committees comprised of members from industry, research, and capital.

Each fund will target different investors based on risk tolerance. Some investors may participate in more than one fund based on their investment profile.

<i>Fund Name</i>	<i>Type</i>	<i>Total Funding</i>
Velocity Translational Research Fund	Research Fund	\$620 Million
Velocity Innovation Funds	Equity Fund	\$360 Million
Velocity Incubation Funds	Equity Fund	\$655 Million
Velocity Acceleration Funds	Equity Fund	\$1.08 Billion

Achieving the 20:1 leverage of private/public funding will require strategic alliances with capital partners across the entire capital continuum. In addition to the Velocity Funds, each collaborative will identify other private equity, venture capital, and corporate venture sources to syndicate and make direct investment into its portfolio companies.

KEY PERFORMANCE METRICS

Some of the key performance metrics that will be tracked include the number of ventures created, jobs created, and the economic impact to the community.

Venture Creation

The following table summarizes the projected number of ventures created, incubated, and accelerated.

	Year 5	Year 10	Year 15
<i>Innovation Projects</i>	483	2,739	7,555
<i>Ventures Created</i>	48	366	479
<i>Incubated Ventures</i>	25	183	548
<i>Accelerated Ventures</i>	15	110	329

Job Creation

The following table summarizes the aggregate value of direct contracts and total number of direct jobs created at years 5, 10, and 15.

	Year 5	Year 10	Year 15
<i>Direct Contracts</i>	2,930	9,444	18,628
<i>Direct Jobs</i>	80	12,592	66,554
<i>Indirect Jobs</i>	TBD	TBD	TBD
<i>Induced Jobs</i>	TBD	TBD	TBD

Each collaborative will use independent contractors in the early stages of the commercialization process and transition to full-time employees during the incubation and acceleration phases.

Project managers will be assigned by the collaborative to shepherd projects through the innovation phases.

Total Economic Impact

The following table projects the total economic impact at years 5, 10, and 15.

	Year 5	Year 10	Year 15
<i>Indicator #1</i>	TBD	TBD	TBD

Indicator #2	TBD	TBD	TBD
Indicator #3	TBD	TBD	TBD

A detailed financial model has been prepared in support of this plan and is available upon request.

MARKET FOCUS

The business plan developed by SRI in 2014 recommended an initial focus on the healthcare sector. What follows is an excerpt from the plan.

“The healthcare market is an enormous source of demand, shows signs of sustained growth, and leverages local assets in the Phoenix area.

The global market for healthcare products and services reached \$6 trillion in 2012 and is expected to double to \$12 trillion by 2022. The U.S. is estimated to produce 40 to 45 percent of devices by market value. Sensors represent a growing technology base for the healthcare market, and are driving significant revenue growth in the sector as embedded components to medical devices and equipment, driven by applications in monitoring, therapeutics, diagnostics, surgery, and home care and wellness. The consumer healthcare sensor market alone is estimated to reach \$47 billion by 2020. Rapid development of sensor technology now makes it possible to use them on-skin and even in vivo (within the human body) for a range of medical applications, including consumer use without the presence of health professionals. Sensor demand will rise with the overall demand for healthcare services worldwide, brought by advances in medicine, increasing longevity of humans, and technologies to improve human capabilities.

Healthcare also represents an area of technical competence for Phoenix. One third of ASU research facilities are devoted to biological and biomedical sciences, and more than one quarter of the STEM degrees the school awards each year are in the biological sciences. The University of Arizona College of Medicine has a campus in Phoenix, collocated with the University’s Translational Genomics Research Institute (T-Gen). ASU’s Biodesign Institute focuses on fields of research in biomedicine and health outcomes, and encompasses 350,000 square-feet of building space. Both universities’ labs are working in healthcare applications where sensors can play a key role. The Mayo Clinic’s presence in Phoenix is cooperating with faculty at ASU on new types of biosensors to enable early detection of diseases and to monitor vital health indicators, such as blood glucose levels.

There are also a large number of health-related companies operating and/or based in the area, including important healthcare system integrators and strong healthcare

networks and hospital systems, such as Banner Health, Dignity Health, Phoenix Children's Hospital, Cancer Treatment Centers of America, Banner-MD Anderson Cancer Center and the Mayo Clinic."

The major innovation initiatives of the impact collaboratives will focus on the most pressing social and economic issues facing federal and state governments, employers, families, and individuals.

PEI's first mission will focus on impacting mental health, applying advanced technologies, including sensors, to empower individuals to more effectively self-manage their own health, wellness, and wellbeing. It's the foundation for a sustainable partnership to improve health outcomes, reduce healthcare costs, and increase quality of care and quality of life.

There are several attractive potential beachhead markets within mental health that PEI could target, like depression. The economic burden of depression in the United States -- including major depressive disorder (MDD), bipolar disorder, and dysthymia -- was estimated at \$83.1 billion in 2000. This total was comprised of \$26.1 billion in direct medical costs, \$5.4 billion in suicide-related mortality costs, and \$51.5 billion in indirect workplace costs (absenteeism from work and presenteeism while at work).

HEALTH COLLABORATIVE

ASU, PEI, industry partners, and investors will develop a collaborative model to fund and manage scalable venture creation in Greater Phoenix. Health Collaborative was identified as the first of five planned innovation and commercialization centers from three market candidates: Automation, Sustainability, and Health.

Health Collaborative is an advanced technology research, development, and commercialization center focused on enabling products, services, and solutions in the healthcare industry. It is a collaboration between university researchers, innovators, entrepreneurs, investors, corporate partners, and government agencies around a mission to address population health by empowering consumers to better manage their own health, healthcare, and wellness.

Innovation initiatives focus on health and wellness applications and are driven by our proprietary commercialization process, engaging industry clients and consumer populations to identify major pain points, resource draining inefficiencies, and critical problems that can be solved using readapted, un-commercialized, or newly-developed advanced technologies.

Because funding is such a critical part of the commercialization process, Health Collaborative is paired with an exclusive online funding platform and the Velocity investment funds, offering investors from Wall Street, Sand Hill Road, and Main Street all the same opportunity to invest in Health Collaborative's startup, early-stage, and growth-stage companies.

The Health Collaborative ecosystem includes a robust network of local and national researchers, engineers, advisors, consultants, service providers, and manufacturing partners necessary to move rapidly through product concept, capitalization, development, and launch. Health Collaborative plays a critical role in matching talent to technology and companies.

Strategically located in Phoenix, Health Collaborative has direct access to key industry partners, strong research connections at ASU, UA, and NAU, and a workforce motivated to build the future of technology. Arizona's unique population demographics make it an ideal test market for health, healthcare, and wellness applications.

PLAN TO IMPLEMENT THE HEALTH COLLABORATIVE IN GREATER PHOENIX

Following is the plan to launch Velocity's first collaborative:

Phase 1: Commit to a Market

1. **Choose the Beachhead.** Concurrent with the development of the Impact Collaborative model, PEI is conducting an investigation to identify and validate large unmet market needs within behavioral and mental health, a potential beachhead for Velocity and the Health Collaborative. The study's thesis claims that advanced technologies, such as sensors and artificial intelligence, can play a critical role in improving outcomes, increasing access, and reducing cost for adult, adolescent, criminal offender, and veteran populations with depression by empowering users, providers, payors, and policy makers to make better informed and more timely health and lifestyle decisions.

Research to identify Velocity's first mission is already under way. A study sponsored by the Arizona Community Foundation is identifying opportunities for advanced technologies to improve outcomes, reduce cost, and increase access to care for adolescent, geriatric, and criminal offender populations with anxiety and depression. According to data compiled by the Substance Abuse and Mental Health Services Administration (SAMHSA), nearly 1 in 5 Americans suffer from some mental illness. The annual cost of depression alone totals some \$83.1 billion. In Arizona, the population that suffers from some type of mental illness ranges from 1.24 to 1.32 million, based on the SAMHSA data.

A key premise in the study proposes that a lack of objective tools for assessing, monitoring, and managing mental health are responsible for not only the poor outcomes, limited access, and high cost, but are the greatest impediments to improvement. Early findings support that premise, the study thesis, and suggest that this could be a viable beachhead market for the Health Collaborative.

Next Steps: Review final results and recommendations of PEI's mental health monitoring study scheduled for completion in July 2017; evaluate fit with Velocity and Health

Collaborative; commit to the behavioral health crisis mission or investigate alternative beachheads.

2. **Identify the Entry Point.** Target select established firms in the local health, wellness, and wellbeing ecosystem that are poised for rapid growth and embrace the Health Collaborative's open innovation model, such as Connections AZ.

Located in Phoenix and Tucson, Connections AZ is a 9-year-old physician-led behavioral health company that provides emergency/crisis psychiatric services available 24/7/365. As a nationally recognized leader in this space, Connections advises and consults hospital systems across the country on behavioral health management and turnarounds. Members of the Connections management team are also nationally recognized thought leaders, published authors, and speakers leading the behavioral health crisis conversation, identifying the performance metrics for industry organizations, defining the outcomes and standards for regulatory authorities, and developing and adopting innovative solutions. Connections is preparing to announce a major capital raise to expand their unique model for substance abuse treatment and opiate care across Arizona, and preparing for a larger fund raise to support national expansion.

Connections represents a path to market for a vast array of biomedical, digital health, wellness, and advanced technology enabled applications. As an early adopter of innovative technologies, Connections provides a unique opportunity for early-stage companies to scale alongside them in a rapidly growing and high value market.

Next Steps: Identify prospective firms in the selected beachhead; select the one most strongly committed to partnering with the Health Collaborative for at least two years as it launches and as the partner's business scales.

3. **Build the Innovation Team.** Health Collaborative will hire a General Manager and Innovation Program Manager to launch the Health Collaborative. Other staff will include a Technology Scout, Market Research Manager, and Business Services Coordinator. The Business Service Coordinator serves to interface with the various external contractors assigned to work on the first projects. The team will identify and recruit the first of many contract Project Managers described above.

Next Steps: Identify General Manager candidates; present finalists to PEI Board for review; and hire General Manager.

Phase 2: Connect the Ecosystem

1. **Integrate Early-Stage Companies.** A portfolio of early-stage technology companies has been identified that could be integrated into a 'whole solution' to deliver a significant impact in behavioral health. Local companies include: OptimumHQ, MIMS, Cactus

Materials, Medical Memory, Epifinder, iTether, Catalytic Health Partners, LightSense, These 3 Medical, and Breault Research Organization. Companies with local investors or customers include: Casetabs, Tiatros, and Tiny-Kicks.

Currently, these early-stage companies operate independent of each other and are generally disconnected from the other critical parts of the ecosystem that they need to succeed, such as access to early-stage investors and companies like Connections AZ or even larger enterprises. Similar to the support provided by 500 Startups and Y Combinator, The Health Collaborative Incubation and Acceleration programs should identify these potential connection points, facilitate introductions, and guide the formation of strategic partnerships, among other activities.

Next Steps: Perform a national search for strategically aligned incubation and acceleration stage ventures for relocation or expansion in Greater Phoenix; develop a behavioral health technology integration and implementation roadmap in collaboration with 'entry point' partner and strategic partners identified below.

2. **Align Research Activities.** Arizona's state universities have a trove of research, intellectual property, talent, and TRIF funding that could be integrated into Health Collaborative's commercialization activities, particularly related to optical and chemical sensors for health, wellness, and environmental monitoring. Within Greater Phoenix, Arizona State University's BRAIN Center offers a promising connection point to engage in open innovation through tech-transfer (outbound) and (inbound) tech-development. As a federally funded Industry-University Cooperative Research Center (IUCRC), BRAIN provides a conduit to industry partners, like Health Collaborative and its partners, to conduct research at costs that match those of other public research universities in the region such as University of California, Irvine.

Next Steps: Work with the BRAIN Center's leadership to align with fast-paced industry timelines and intellectual property terms and conditions, positioning ASU to become Health Collaborative's key research partner; engage strategically aligned industry partners to formalize bi-directional open innovation relationships managed through Health Collaborative.

Phase 3: Organize the Capital

1. **Engage Strategic Partners.** Enterprise organizations, whether local or outside of Greater Phoenix, play a critical role in the ecosystem and Health Collaborative's open innovation model because they represent the most probable and significant exit opportunities for early-stage companies and their investors. Accordingly, enterprises engaged in the open innovation model willing to offer guidance on their innovation and growth strategies are offering a roadmap for the entire ecosystem to follow. Additionally, as investment by

corporate venture continues to rise, these partners represent a strategic investment that can be leveraged to syndicate participation from follow-on investors.

Next Steps: Identify and engage enterprise partners; identify and engage private equity groups actively investing/ acquiring healthcare businesses.

2. **Build the Global Community.** Though SRI recommended Greater Phoenix move from being fast-followers to early-adopters, Velocity’s visionary founders mandated, “our region must become a global innovation leader.” It’s an important distinction recognizing Greater Phoenix must be at the absolute forefront of some technology life cycle, at the origin point of a market, and the leaders of a global community. This leadership is critical to attracting investment capital to the region.

Next Steps: Organize local thought leaders and facilitate participation in global events and media opportunities to promote Greater Phoenix as the center of behavioral health innovation and early adoption; execute targeted informational (“content marketing”) and influencer campaigns amplified through paid media campaigns to build the global behavioral health innovation community; identify and support a local champion to lead federal legislation that will incentivize individual and corporate investment in health innovation.

3. **Create the Fund.** Leverage public funding to catalyze the formation of Velocity Health Impact Fund I with a \$50M to \$100M raise to capitalize the first two years of innovation, venture creation, incubation, and acceleration for the Health Collaborative. Seed the Fund through a local campaign raising \$5M in equity investment, raise the remaining \$95M through a national campaign, and deploy the capital through Velocity’s Research, Innovation, Incubation, and Acceleration Funds.

Next Steps: Select fund development partners and managers; obtain conditional funding commitments from public partners, contingent on securing private capital; identify and engage the 100,000 plus accredited investors in Greater Phoenix; identify and engage angels (individuals and groups) actively investing in health related ventures throughout the US; identify and engage corporate venture, venture capital firms, and early-stage venture funds actively investing in health innovation; identify and engage foundations and individuals investing in impact oriented ventures; and identify and engage foundations and individuals sponsoring health innovation research, including behavioral health and major diseases such as diabetes, cancer, and cardiac disease with significant behavioral health comorbidities.

Phase 4: Test the Model

1. **Launch the Health Collaborative.** Launch and operate the Health Collaborative throughout year 1 and 2. In year 2, identify the focus of Velocity’s four remaining

collaboratives, adapt the model to their missions, and prepare for their development and launch.

Next Steps: Form the Health Collaborative operating company; establish the Board of Directors, establish the Advisory Board, establish project and investment selection committees, recruit the management team, identify a physical location, and finalize commercializations programs.

2. **Converge PEI Initiatives.** The Impact Collaborative model is an important part of Velocity and PEI, but it’s not the only piece of the puzzle. PEI’s AZ Pipeline workforce development initiative will play a critical role in building the workforce for the entire portfolio of ventures created and developed through the Health Collaborative. The Health Collaborative may partner with StartUpAZ, or other organizations supporting entrepreneurs interested in creating their own health innovation ventures that might enter the Collaborative’s Incubation or Acceleration programs as they mature. Many of the Health Collaborative’s ventures will be physical products or biomedical devices requiring multiple manufacturing partners as they ramp and scale, the MPEXA initiative could be an important resource for near-sourcing that work.

Next Steps: Design PEI’s AZ Pipeline, StartUpAZ, and MPEXA initiatives into the Health Collaborative’s Innovation, Incubation, and Acceleration programs.

RESOURCES NEEDED TO EXECUTE PLAN

Capital

The capital needs to launch and support Health Collaborative for the first three years are outlined in the following table:

Source	Type of Fund	Total Funding
Startup Funding	N/A	\$750,000
Velocity Translational Research Fund I	Research Fund	\$15.3 Million
Velocity Innovation Fund I	Equity Fund	\$18.4 Million
Velocity Incubation Fund I	Equity Fund	\$27.7 Million
Velocity Acceleration Fund I	Equity Fund	\$47.1 Million

The use of funds for the initial \$750,000 investment is as follows:

<i>Use</i>	<i>Total Funding</i>
Phase 1: Commit to a Market	\$25,000
Phase 2: Connect the Ecosystem	\$50,000
Phase 3: Organize the Capital	\$550,000
Phase 4: Test the Model	\$125,000

Human Resources

Health Collaborative will recruit its core management team and identify independent contractors that can work on individual projects and companies spawned by Health Collaborative. An emphasis will be placed on using contractors in the innovation and incubation phases of the commercialization program. As ventures move through the commercialization process, full time employees will be added as needed.

Facilities

Find a location and building suitable for Health Collaborative. During the first two years of operation, the Health Collaborative facility needs to house its staff and portfolio ventures are modest. During the first several years few companies, if any, are expected to require full-time specialized lab, manufacturing, or other specialized facilities. As such, offices can be located in existing coworking, incubator, and accelerator centers throughout Greater Phoenix, such as SkySong, Center for Entrepreneurial Innovation at Gateway Community College, or Galvanize.

As Velocity scales, increasingly complex advanced technologies requiring specialized prototyping, testing, and small scale manufacturing facilities will be needed. To serve those needs the Velocity plan calls for beginning the development in year three of **Velocity Center**, a 10.7 million square-foot, mixed-use complex on approximately 170 acres. The Velocity Center will play an important role in attracting outside capital by concentrating sector workforce, co-locating near strategic partners and vendors, providing shared access to specialized manufacturing facilities, and reside in a Foreign Trade Zone. Together, these factors help to mitigate the high risk of early-stage ventures and support the case to prospective investors and shareholders for creating, expanding, or relocating sector ventures within Greater Phoenix.

CONCLUSION AND RECOMMENDATIONS

Velocity, PEI’s applied research initiative, impacts the Greater Phoenix economy by commercializing advanced technologies to address global problems, focusing first on the behavioral health crisis.

For the regional economy, Velocity forecasts the creation of more than 85,000 high-wage jobs over 15 years, generating an economic impact estimated at over \$35B. For investors, Velocity provides access to nearly \$3B+ of professionally managed high-growth investment opportunities in advanced technology ventures with the potential to transform our lives and our world. For the millennial workforce seeking to balance purpose oriented careers with active lifestyles, Velocity clusters more than 1,000 impact mission-oriented ventures into one of the most desirable places to live in the country.

Recommendations:

With the analysis, design, and planning work for Velocity's first impact collaborative complete, it's time to execute the plan.