



2017 Greater St. Louis Venture Capital Overview

Supplemental Report: The Emerging Agtech Boom

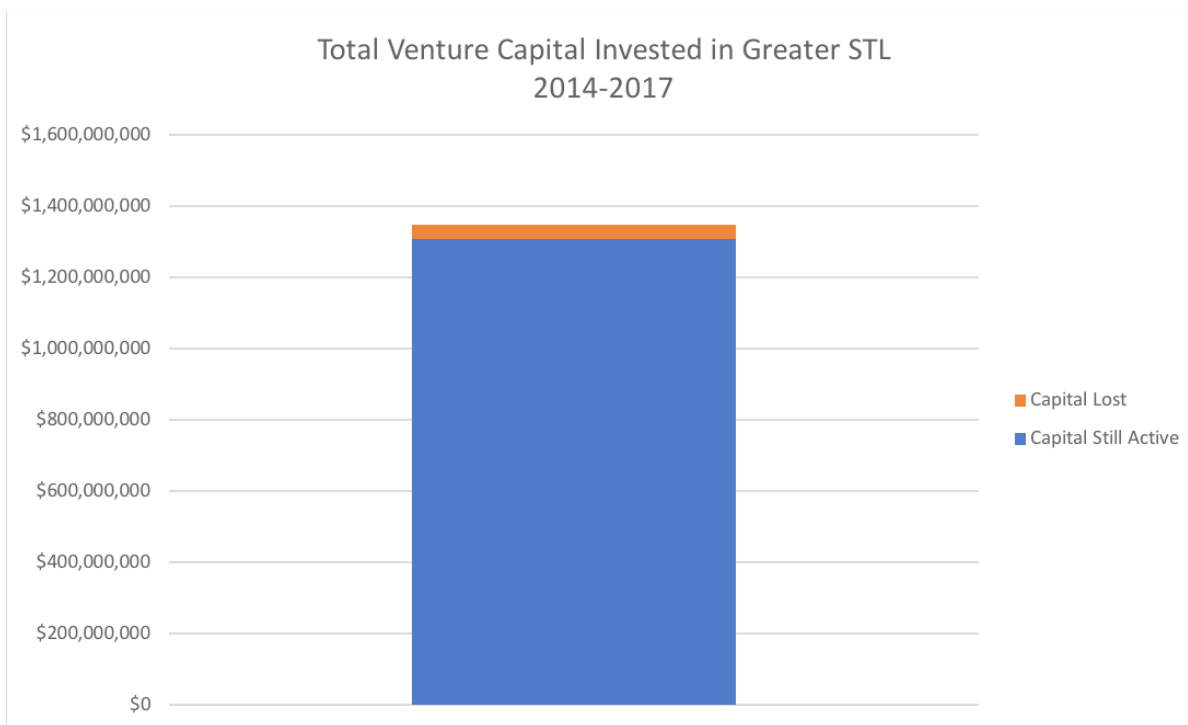
Andrew G. Smith, VP Entrepreneurship & Innovation

Overview

A few weeks ago, the St. Louis Regional Chamber released its most detailed report to date on the state of venture capital in the region. The key finding in that report was that, having now deployed over \$1 billion in venture capital in just the last 5 years, the St. Louis entrepreneurial ecosystem is fast approaching an inflection point. If the companies that have received a portion of that \$1 billion in investment continue to scale—and ultimately generate exits for founders and investors—we could potentially double our annual risk capital and establish St. Louis as a true national innovation hub.

On the other hand, if our startups fail to thrive and exit, we could see an erosion of investor confidence and a dangerous depletion of risk capital for entrepreneurs. For the next 3-5 years, it is “all about the exits.”

Fortunately, there is good reason to be optimistic about our prospects. **A deeper dive into the numbers reveals that over 95% of total invested capital since 2014 is either still “active”** (meaning that the companies are still doing business or have already generated an exit):

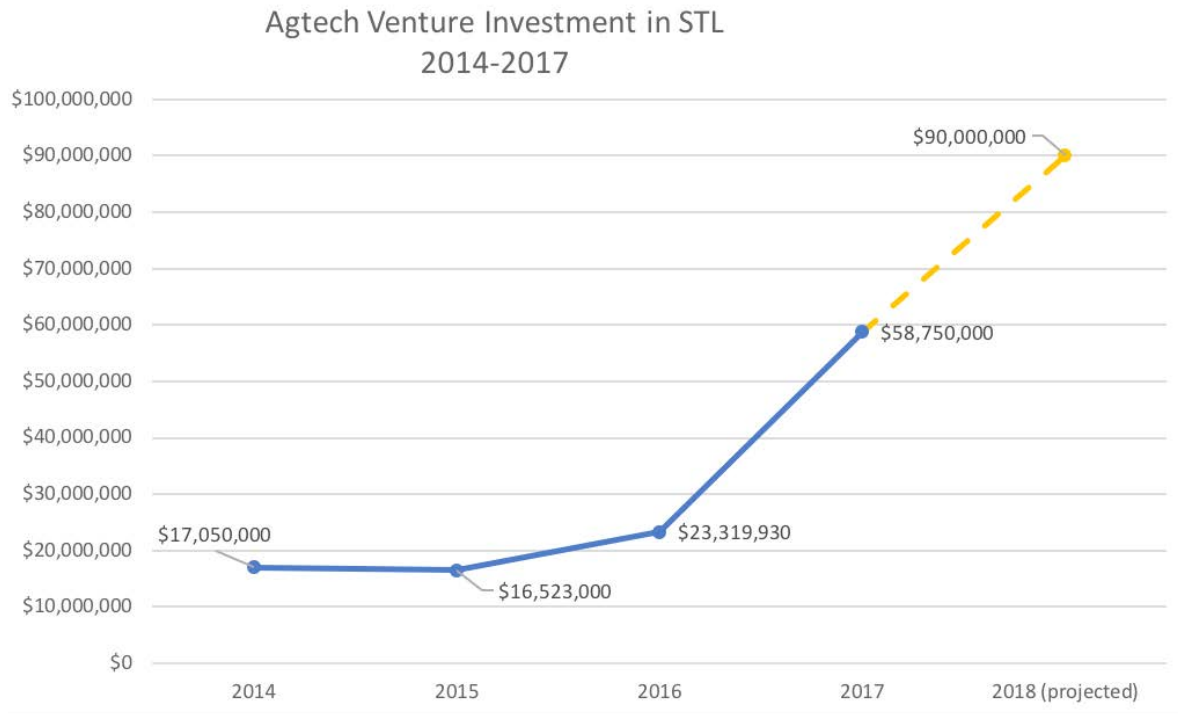


In fact, during that time period, there has been only one high-profile company failure—Norse Cybersecurity. Norse alone is responsible for more 80% of lost capital over the last 4 years. Put another way: if you remove that single failure from the calculations, less than one half of one percent of total venture dollars have been lost.

That is an astonishing rate of success. Despite the perception of venture investment as high risk, it suggests that the “trusted referral network” our region has built over the last decade is doing an outstanding job of connecting investors with high performing companies and founders. Given the success rates of groups like Arch Grants, Arch Angels, Biogenerator, the Yield Lab, and Six Thirty, regional venture investors can reasonably expect an attractive return on capital without gut-wrenching losses along the way.

As impressive as the topline results have been, national and regional observers focus on the underlying, structural trends within the ecosystem. What are our areas of particular strength? How sustainable is our momentum? What will drive increased investment in the coming years?

If current trends continue to hold, Agtech will be a central pillar of venture investment in St. Louis:



Since 2014, regional investment in Agtech has increased by nearly 250%, to \$60MM. Based on deals the Chamber is tracking and feedback from key players in the Agtech ecosystem, we are projecting total investments in this sector to increase to approximately \$90MM in 2018, a more than 400% increase over 2014 levels. This is what an emerging Agtech boom looks like. St. Louis is staking its claim to being the global epicenter of Agtech innovation.

A note on biotech

In the initial Greater St. Louis Venture Capital Overview, we noted the primacy of biotech investment within the regional ecosystem. The Chamber views Agtech as a subset of Biotech, which encompasses both plant and animal science as well as human bioscience and medical/pharmaceutical. As such, biotech is and will remain a larger category of investment in St. Louis. Globally, investors deployed over \$10bn into biotech in 2017, with the St. Louis region collecting nearly \$240MM of that total, or over 2.3%.

Is it Sustainable?

St. Louis clearly has momentum in its Agtech sector, but the question for investors, entrepreneurs, and civic leaders is: “**Is it sustainable?**” We believe the answer is “**yes.**”

The Emerging Agtech Boom, like the broader startup boom St. Louis is experiencing, is the result of more than a decade of deliberate infrastructure- and community-building around the region’s natural economic and cultural assets. Below, we examine key institutions that anchor our ecosystem and give us confidence that our momentum in Agtech is sustainable.

Ecosystem Overview

St. Louis has one of the densest and most mature Agtech ecosystems in the United States. Below are some of the key organizations within that ecosystem:

Large Incumbents

- **Bayer AG and Monsanto Co.** have closed a \$66 billion merger. The combined businesses are committed to retaining a strong presence in Missouri, which will be the home of their new Global Seeds & Traits and North American commercial headquarters. Industry experts estimate that the value of the company’s plant genomics assets exceeds that of Bayer’s entire global pharmaceutical enterprise.
- **Rabo Agrifinance** is a division of one of the world’s largest banks, with assets of over \$900 billion. The company provides financial services for agricultural producers and agribusiness in the United States, including loans, crop insurance, and risk management products through a nationwide network of relationship managers, crop insurance, and risk management specialists.
- **Millipore Sigma** is a life science and high technology company, develops, manufactures, purchases, and distributes various chemicals, biochemicals, and equipment products worldwide. The company provides chemical products, reagents, and kits and services are used in scientific research, including genomic and proteomic research, biotechnology, pharmaceutical development, and diagnosis of disease; and as key components in pharmaceutical, diagnostics, and high technology manufacturing.
- **Dupont Nutrition and Health** researches and manufactures food ingredient solutions for food, beverage, and dietary supplement industries. The company offers alginate, antimicrobials, antioxidants, betaine, carrageenan, cellulose gum, dairy cultures, dietary fibers, emulsifiers, food enzymes, guar gums, locust bean gums, meat cultures, medium-chain triglycerides, microcrystalline cellulose, pectin, probiotics, rare sugars, soy lecithin, soy protein, sweeteners, tailored ingredient systems, and xanthan.
- **Virbac** is the 8th[1] largest veterinarian pharmaceutical group in the world. Its product range is designed to cover the main pathologies in companion animals and livestock: internal and external parasiticides (collars and pipettes), antibiotics, vaccines, diagnostic tests, dog and cat nutrition, dermatology, dental hygiene, reproductive, aquaculture, anesthesia, geriatrics and electronic identification
- **KWS Saat’s Gateway Research Center** is the company’s latest North American research facility, the KWS Gateway Research Center is built to strengthen our position in the global plant research community and is an integral part of the KWS network of breeding stations and research activities.
- **Novus International**, headquartered in St. Charles, Missouri, creates animal nutrition solutions for livestock, poultry and aquaculture. Novus operations include corporate offices, research and development laboratories and manufacturing facilities in more than 35 countries, as well as smaller offices with field staff in an additional 60 countries
- **Purina** manufactures and distributes nutrition, health, and food products for cats and dogs worldwide. It offers dry dog food, wet dog food, dog treats, dog snacks, dog litter, dog training pads, wet cat food, dry cat food, cat treats, and cat litter.
- **Bunge North America** operates as an agribusiness and food ingredient company. The company offers agricultural commodities, such as soybeans, canola, corn, wheat, sorghum, and rice; and food and ingredients, such as grains, all-purpose and donut frying shortenings, batter and breading, corn and specialty ingredients, emulsified and flaked shortenings, extruded snacks, liquid butter alternatives, margarines and buttery spreads, specialty shortenings, trans fat free frying oils, wheat and specialty ingredients, cooking and pan sprays, expeller pressed

virgin oils, vegetable oils, mayonnaise, specialty baking products, and sugar

- **The Climate Corporation** provides a technology platform to farmers. The Company offers tools to farmers for weather monitoring, agronomic data modeling, and high-resolution weather simulations to improve their profits, offers insurance, and manages crops.

Innovation and Research Centers

- **BioGenerator**, the investment arm of BioSTL, creates, grows and invests in promising companies and entrepreneurs. It de-risks commercially-viable innovations; recruits and advises leadership teams; makes staged investments grounded in rigorous due diligence; and provides free access to wet lab space and research equipment in its BioGenerator Labs. BioGenerator's programming also provides a customized one-on-one business learning experience, including entrepreneurial coaching and resources for company founders from academic and industrial communities, at no cost. Nascent entrepreneurs learn to create a viable business and financial model; recognize, recruit and retain top talent for a company; incorporate and register a business; and effectively compete for national non-dilutive grants.
- **39 North** is Missouri's first agtech innovation district. 39 North covers nearly 600 acres in Missouri and includes many of the region's top agtech companies including Bayer, the Donald Danforth Plant Science Center, Bio-Research & Development Growth (BRDG) Park and the Helix Center Biotech Incubator. 39 North is geared toward providing the lifestyle often sought by today's highly skilled scientific workers, with a mix of retail, residential and office space connected by walking and biking trails.
- **Bio-Research and Development Growth (BRDG) Park** is adjacent to the Donald Danforth Plant Science Center and houses a variety of tenants in the bioscience industry including Evogene, Forrest Innovations, KWS, and New Leaf Symbiotics, which recently received \$24 million in funding led by California-based Otter Capital and Monsanto Growth Ventures (MGV)
- **The Center for Emerging Technologies** develops start-up companies in biotechnology, biomedical engineering, advanced materials, and electronics. Stereotaxis became the first of the center's companies to complete a public offering. In 2014, the Cambridge Innovation Center took over management of the Center for Emerging Technologies, creating their first location outside of Boston.
- **Helix Center Biotech Incubator** is a new small business

incubator providing office and laboratory space for startup companies in the plant and life sciences. Located near the Donald Danforth Plant Science Center and BRDG Park, the Helix Center offers start-ups ready access to expertise and facilities.

- **Donald Danforth Plant Science Center**, the world's largest independent research institute focused on plant science, conducts research targeted at increasing crop yields, their nutritional value and resistance to drought and disease. Their goal is to reduce the need for pesticides and fertilizers and develop sustainable sources of energy.
- **The Whitney R. Harris World Ecology Center** was founded more than 20 years ago by the University of Missouri-St. Louis (UMSL) in cooperation with the Missouri Botanical Garden. The facility has grown into one of the world's preeminent centers for education and research in tropical biology. UMSL is one of the country's leading universities in this area of study, drawing students from 38 countries.
- **Missouri Botanical Garden** conducts the most productive and diverse botanical research in the world, employing nearly 50 Ph.D. botanists. The Garden's Herbarium is one of the world's best resources for information on bryophytes and vascular plants, with over six million specimens.

National Associations

A number of agricultural associations have chosen to locate or headquarter in St. Louis, including:

- **American Soybean Association**
- **Farm Equipment Manufacturers Association**
- **International Fruit Tree Association**
- **National Corn Growers Association**
- **Pesticide Stewardship Alliance**
- **United Soybean Board**

Advocacy and Support Organizations

- **BioSTL** has laid the foundation for St. Louis' innovation economy with a comprehensive set of transformational programs that advance St. Louis' leadership in solving important world challenges in agriculture, medicine, health care, and other technology areas. Since 2001, BioSTL has introduced nationally-acclaimed initiatives in startup creation and investment (BioGenerator), strategic business attraction (GlobalSTL), physical environment (including the Cortex Innovation District and BioGenerator Labs), entrepreneur support, seed and venture capital, a diverse and inclusive workforce, and public policy.

- **GlobalSTL** BioSTL's international initiative, recruits high-growth companies from around the world that enrich and expand St. Louis' innovation economy and bring competitive advantage to local corporations and health systems. GlobalSTL focuses on companies that match St. Louis' strengths in food/agriculture, health care, and cybersecurity, financial, and industrial technologies. GlobalSTL serves as a navigator to St. Louis' world-class corporate and innovation ecosystem and introduces international companies to major customers and strategic partners to drive business growth in North America. The organization has had particular success in the agtech field, having successfully recruited Atomation, Kaiima, Evogene, and NRGene from Israel; Agldea from Argentina; and CTC from Brazil since its launch in 2014.

National Events

- **The World Agricultural Forum (WAF)** concentrates on the lives and livelihood of the world's population and its growing need for food, fuel and fiber. On a global stage, the WAF hosts one of the largest biennial gatherings of leaders to implement positive changes in both developed and developing nations.
- **Ag Innovation Showcase** is the leading annual global event for agricultural technology industry leaders, entrepreneurs, venture capitalists and investors. Held in St. Louis at the Donald Danforth Plant Science Center, the showcase features innovative approaches for advancing productivity and sustainability in agriculture. Leading-edge technology sectors presented include: ag-biotech, food and nutrition, alternative energy, informatics, animal health and sustainable materials.

Funders

- **Lewis & Clark Ventures** is a venture capital firm focused on funding for high growth companies in sectors that include agtech, digital healthcare and software, serving markets such as financial, agricultural, healthcare, and business enterprise solutions. Lewis & Clark has a \$25MM fund dedicated to Agtech investments.
- **Yield Lab** is a new agriculture technology accelerator that began funding its first group of startups in early 2015 and now has operations in Ireland and Argentina.
- **BioGenerator**, the investment arm of BioSTL, is an ever-green investor that creates, grows, and funds innovative companies and talented entrepreneurs in the St. Louis region. The U.S. Economic Development Administration (EDA) recently awarded the BioGenerator a \$300,000

grant to help support area startups. (See Innovation and Research Centers above for more)

- **Cultivation Capital** announced the launch of its Health and Life Sciences fund in 2013. The fund is dedicated to investing in healthcare information technology and related mobile health platforms, medical devices, compound and drug discovery and plant/seed or biosciences technology. Cultivation Capital was recognized for being among the nation's most active seed investors in 2015
- **TechAccel** provides grants of \$250k to researchers and entrepreneurs to demonstrate proof-of-concept or commercial feasibility studies with principal investigators at or affiliated with the Donald Danforth Plant Science Center. Projects under this program will be expected to produce license-ready technology, processes or products, or new spin-off companies, and TechAccel will share any investment returns with the Donald Danforth Plant Science Center.
- **Helix Fund** supports entrepreneurship in the plant and life science sector by providing early stage capital and other financial support for advancing the commercialization of technology and innovation.

New and growing companies

- **Lacgene Technologies**, an India-based agtech company focused on providing innovative, natural, agricultural products and solutions using genetics, chemical processes and nanotechnology, established its U.S. headquarters in Missouri in 2015.
- **NRGene**, an Israeli agtech company that develops advanced computational tools and uses big data to identify genetic traits to improve yield, environmental tolerance and disease resistance, was recruited by GlobalSTL and has announced its plans to open its U.S. headquarters in Missouri's Cortex Innovation Community in St. Louis.
- **SyMyco Inc.**, an India-based agtech company, announced it was expanding in Missouri's BRDG Park in 2015. The expansion was expected to triple the company's research and production capabilities.
- **Evogene**, an Israeli-based agtech company recruited by GlobalSTL focusing on crop productivity and economics for the food, feed and biofuel industries, announced its plans to expand in St. Louis in 2015.
- **Agldea**, an Argentinian agricultural analytics, research, and strategy firm recruited by GlobalSTL, opened its US headquarters in St. Louis in 2017.

Venture-Backed Companies to Watch

The ultimate measure of success in St. Louis' Emerging Agtech Boom will be the number of new companies birthed by the ecosystem. **Below is a partial list of some of the top Agtech prospects the Chamber is currently monitoring:**

Benson Hill Biosystems

Founders: Matthew Crisp, Todd Mockler, Tom Brutnell

Total Capital Raised: \$94,000,000

of Employees: 75-100

Date Founded: 2012

www.bensonhillbio.com

Benson Hill Biosystems' CropOS™ is a cognitive engine that provides decision support to accelerate crop improvement and enhance the sustainability of food, feed, fiber and fuel production. The company's platform focuses on discovering traits that would improve photosynthesis and therefore yield in crops, as well as offers a cognitive engine to help guide discovery by predicting outcomes in crops from certain traits, enabling breeders to acquire information on crosses they want for certain crop traits.

New Leaf Symbiotics

Founder: Tom Laurita

Total Capital Raised: \$54,000,000

of Employees: 25-50

Date Founded: 1999

www.newleafsym.com

Based out of BRDG Park, NewLeaf Symbiotics is a bioagriculture company dedicated to sustainable agriculture, innovative research and product development. The company's proprietary platform, called the Prescriptive Biologics™ Knowledgebase, identifies M-trophs that are especially important for strengthening plants, increasing root mass, improving plant growth and enhancing nutrient uptake for higher yield and better crop quality. It's Terrasym™ technology infuses plants with M-trophs that improve nutrient uptake, making crops stronger, more stable, and more tolerant of stress up until the day they're harvested.

Arvegenix

Founder: Dennis Plummer, Michael Roth, Vijay Chauhan

Total Capital Raised: \$5,000,000

of Employees: 10-25

Date Founded: 2013

www.arvegenix.com

Arvegenix Inc engages in developing, genetically improving, and commercializing field pennycress as an oilseed crop that is used to produce oil for industrial and renewable fuels, and meal for nutritious livestock feed.

Nanoguard

Founder: Mark Hochwalt

Total Capital Raised: \$2,000,000

of Employees: 1-10

Date Founded: 2014

www.f6s.com

Nanoguard Technologies is developing cold plasma technology for the treatment of grains. Its cold plasma technology facilitates food sanitation technology which is designed to preserve the freshness and wholesomeness of food while improving its safety from food borne illness.

S4

Founders: Cesar Belloso, Laura Lukasik, Mariano J. Tamburrino, Rodrigo Ramirez Crouchett, Santiago Gonzalez Venzano, Tomás Peña

Total Capital Raised: \$3,400,000

of Employees: 25-50

Date Founded: 2011

www.s4agtech.com

One of the earliest successes coming out of the Yield Lab Agtech Accelerator, S4 provides risk management solutions to ensure food production.

Agrivida

Founders: Jeremy Schley Johnson, R. Michael Raaber

Total Capital Raised: \$64,800,000

of Employees: 25-50

Date Founded: 2002

www.agrivida.com

Agrivida is developing and commercializing a new generation of enzyme solutions that incorporate novel, regulated proteins precisely engineered for specific applications. Enzymes — biological molecules that catalyze chemical reactions — are used throughout industry and agriculture to increase production yields, enhance product performance, and reduce processing costs. Agrivida's proprietary INzyme™ technology precisely controls enzyme activity to drive these natural catalysts to deliver unparalleled performance.

RNagri

Founders: Dr. Juan Arhancet

Total Capital Raised: \$1,600,000

of Employees: 1-10

Date Founded: 2011

www.rnagri.com

RNagri (formerly known as Apse) is a startup making huge progress in RNA production and RNAi products. RNAi, which is an abbreviation for RNA interference, is a technology that relies on gene regulation without the heritable effects on DNA. Because RNAi works downstream from DNA, it is not genetic modification and therefore is non-GMO. RNagri has developed technology that will allow the cost-efficient production of RNA for topical RNAi uses in broad acre agriculture and in urban-structural pest control. Other high use rate applications for RNA such as for RNAi in aquaculture or animal husbandry could also benefit.

Aggio.io

Founders: Dimitri Popov,
Saurabh Bharadwaj

Total Capital Raised: <\$1,000,000

of Employees: 1-10

Date Founded: 2016

www.aggio.io

Aggio aspires to Transform the Agriculture Industry by developing a specialized SaaS business platform which turns data into action.

Agrela

Founders: Nadia Shakoor, Todd Mockler

Total Capital Raised: <\$1,000,000

of Employees: 1-10

Date Founded: 2016

www.agrelaeco.com

Agrela has developed PheNode is an energy efficient, 'smart', field-deployable, solar-powered environmental sensor and phenotyping station. PheNode is a tool for researchers, farmers and horticulturists that can monitor environmental conditions and transmits the data to the cloud where growers can track their plants in real-time in order to facilitate data-driven decision support.

What it means for St. Louis

The Emerging Agtech Boom represents a unique opportunity for St. Louis: **the opportunity to establish a global identity.**

According to Chris Fair, CEO of Resonance, a leading international city branding consultancy — “**place branding**” is an increasingly important factor in the economic and cultural vitality of a region:

“As the mobility of global talent, tourism, and capital grows each and every day, the perceived identity or “brand” of a city increasingly determines where that talent, tourism, and investment flow.”

City branding must be credible, organic, sustainable, and differentiated. Building a narrative on inauthentic or merely aspirational brand attributes is a recipe for failure. Focusing too narrowly on “nice features” of a city (i.e., “low cost of living,” “great parks,” or “excellent food scene”) can make for effective PR, but it is unlikely to differentiate that city from its peers or establish it as a nationally or globally recognizable center of excellence. Rather, the cities with the best brands “own” their space. *New York is* global finance. *Boston is* educational excellence. *The Bay Area is* innovation. *Las Vegas is* carefree fun. *Nashville is* music city. *Hong Kong is* trade. *Paris is* romance. *What is St. Louis?* Yes, we are innovative, inexpensive, and chock-full of fun things to do. What we lack is “ownership” of a key brand category.

Agtech is still blue ocean territory when it comes to city branding. No city has yet claimed it, and no city has a better opportunity to do so than St. Louis. This is an arena in which St. Louis can be truly world class, if not the global leader.

Last year, St. Louis attracted 4% of total Agtech venture dollars invested around the world. If the Chamber’s best-case scenario projections for 2018 hold, that share could increase to 5%. By contrast, the greater St. Louis region captured just .2% of global venture capital in 2017. In other words, our relative share of Agtech dollars is 20 times higher than our share of general venture dollars. Our position in the world of Agtech is roughly equivalent to the position New

York City holds in the world of venture tech. As yet, there is no “Bay Area” equivalent in Agtech, though St. Louis may well achieve that status within the next 5-10 years.

The implications for the regional economy should St. Louis succeed (or, more accurately, should the companies representing St. Louis succeed) are profound. Leaving aside the amount of capital that would be returned to investors and entrepreneurs—which could be in the billions of dollars — becoming the global leader in Agtech would elevate St. Louis’ brand. It would allow us to attract even more investment and talent. It would give the city a globally recognized calling card in one of the fastest growing innovation sectors.

Above all, it would be a sustainable win. Agriculture is in our region’s DNA. St. Louis is located within 500 miles of more than 40% of all US crop production. We have one of the highest concentrations of plant science PhD’s in the world. We have a long history of creating and attracting world class agricultural science companies, like Bayer AG and Monsanto Co., Bunge, and Novus. And St. Louis also serves as “America’s Agriculture Coast,” a center for grain-handling for transit and export, where the Corps of Engineers has documented the Port of Metropolitan St. Louis, a 70-mile system, as the country’s most efficient inland port district.

St. Louis Regional Chamber Policy Principles on Agtech

- Increase level and percentage of MTC funding for Agtech-related startups.
- Encourage investment in Agtech innovation, research, and development by aligning tax and regulatory policy.
- Increase education funding for programs that will contribute to the Missouri’s Agtech workforce.
- Ensure that Agtech features prominently in state and regional branding efforts.
- Collaborate effectively with regional and state partners on Agtech business attraction.

The recent announcement that the USDA will be moving 700 high paying jobs out of Washington DC ups the pressure on St. Louis. Unlike the Amazon HQ2 competition, in which St. Louis was at a significant disadvantage in terms of its available tech workforce, the USDA project appears “tailor made” for the Gateway City, given the powerful ecosystem assets laid out earlier in this report. Failing to land the headquarters of The Economic Research Service (ERS) and the National Institute of Food and Agriculture (NIFA) would therefore be a setback to St. Louis’ efforts to position itself as a global Agtech hub. Clearly, the assets and results are in place to win the deal. The outcome will likely depend on more effective regional collaboration during the proposal development process.

Ideally, an entity with deep history and expertise in the development of St. Louis Agtech ecosystem, such as BioSTL, will serve as the primary convener, with support from other leading civic and economic development organizations.

Sources: “Missouri, The Global Leader in Agtech,”
The Missouri Partnership
Crunchbase 2018 data
“Major Trends in Agtech for 2018,” TechCrunch
Bloomberg Company Profiles

Special thanks to: Tim Alexander
Larry Page
Donn Rubin
Eric Gulve
Vijay Chauhan
Brian Matthews
Thad Simons
Adrian Aquilino