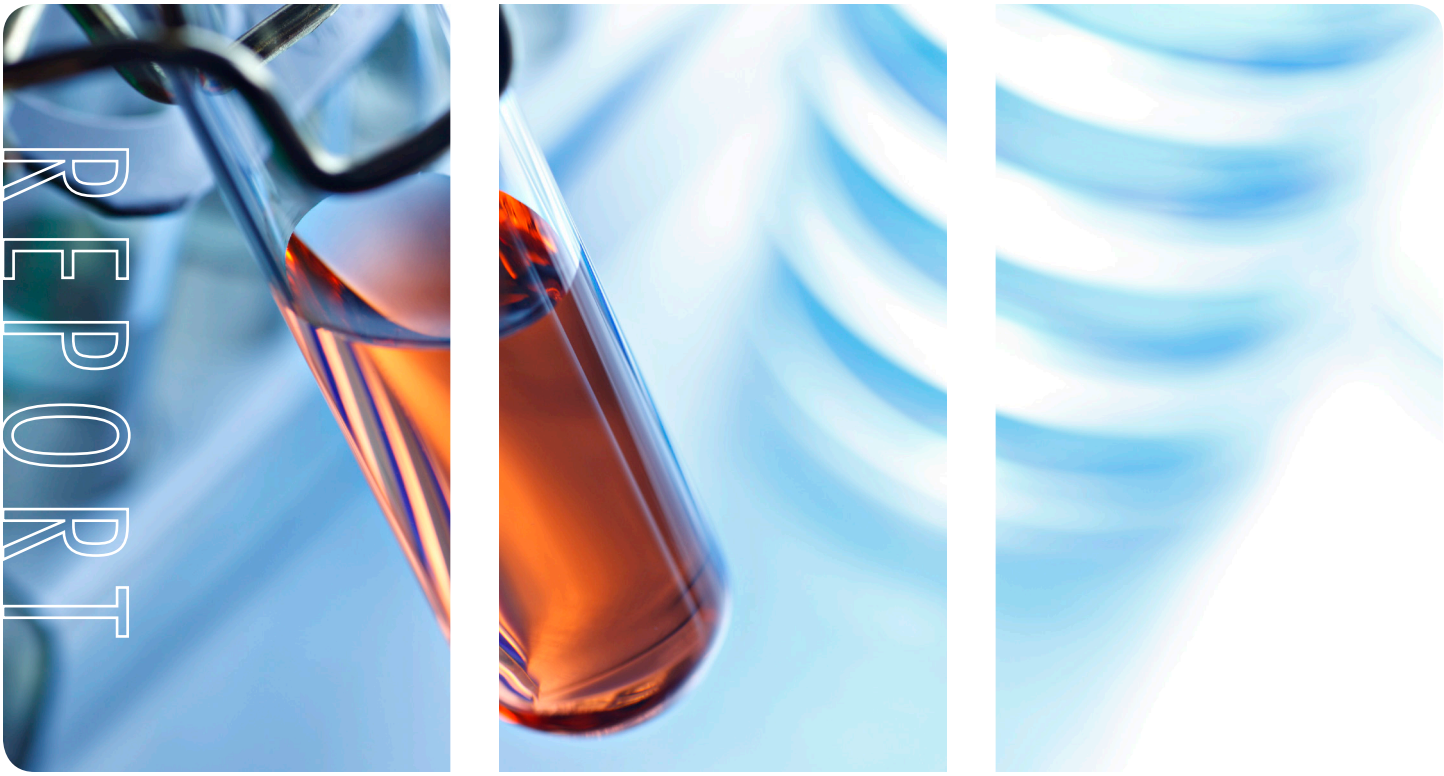


State of Life Sciences Entrepreneurship in Louisiana

BAKER DONELSON

LOUISIANABIO

WELCOME

We at Baker Donelson and LouisianaBIO are pleased to present this report on the state of life science entrepreneurship in Louisiana. This report offers data about the startup climate for entrepreneurs in the life sciences. It further identifies the challenges as well as opportunities faced by life sciences professionals working to commercialize scientific discoveries, secure public monies, raise capital, and build a quality workforce. We gathered feedback from Louisiana's life sciences community for this report through a written survey disseminated across the State of Louisiana. We hope you find this report as meaningful and interesting as we do.

David Rieveschl
Shareholder
Baker Donelson

Paula Estrada de Martin, Ph.D.
Registered Patent Attorney
Baker Donelson

Rhonda Melancon
Executive Director
LouisianaBIO

Baker Donelson is the nation's 64th largest law firm, with more than 650 attorneys and policy advisors across the Southeast providing informed guidance in more than 30 different practice areas, including experience that focuses on the life sciences sector and emerging companies.

LouisianaBIO is a member-driven state trade organization dedicated to supporting biotechnology growth in Louisiana, and being the voice of Louisiana bioscience. They are the official affiliate in the State of Louisiana of the world's largest biotechnology trade association, the Biotechnology Industry Association (BIO), and are a member of the Council for State Bioscience Associations.

Sometimes referred to as biosciences, the life sciences are an industry cluster that applies knowledge of the ways in which plants, animals and humans function. The sector is consistently evolving to address the very latest research and scientific discoveries applicable to agriculture, health, and human/animal disease.

SUMMARY

The life sciences entrepreneurial environment in Louisiana has seen significant growth and success in recent years. The future for this sector continues to gain steam, and it is a focal point for continued growth throughout the State of Louisiana. Both startups and established companies are creating jobs in all regions of the state, and these include Louisiana-based ventures as well as those attracted to Louisiana from other regions of the country.

The importance of life science companies for the state's economy and for society cannot be overstated. Through cutting-edge innovation, Louisiana's life sciences industry is improving the quality of life as well as diversifying the state's economy.

The state has made financial investments in startup companies over recent years, but more support is needed in this industry. State-led incentive programs have been especially helpful in providing vital seed monies to life sciences entrepreneurs throughout the state. However, to commercialize a product, life sciences businesses face unique regulatory and developmental timeline challenges, which can often make it difficult to secure early-stage capital.

Unfortunately, funding for these state incentive programs, such as R&D tax credits, has now been reduced, and the likelihood of an additional injection of state support for similar incentives is not expected at this time. The impact of this change could hamper enthusiasm and slow progress for life sciences startups and corporations.

Louisiana's life science community has numerous strengths, including its highly regarded academic research universities, a non-profit research center, primate research centers, and one of the premier lab animal veterinary programs in the country. Louisiana is also one of only a few states with at least two medical schools in a single city, and a very active and growing biomedical training program in a community college. Louisiana is also one of the top 12 states in the country for research and development in the agricultural biotechnology realm. Louisiana's life sciences assets also include several very active business incubators that play a significant role in the creation of new biotech companies and the commercialization of new technologies.

Capitalizing on Louisiana's range of assets, however, can be challenging for life sciences entrepreneurs and corporations. For example, much can be done to improve interactions between academic research institutions and their aspiring faculty and student entrepreneurs. Though a slight influx into the state of skilled scientists has occurred, Louisiana continues to lose much of its young talent, who often go on to launch and/or grow their companies, or work elsewhere.

The purpose of this report is to share data and information about the startup climate for entrepreneurs in the life sciences industry in the State of Louisiana. Incorporating regional nuances, it further identifies the challenges as well as opportunities faced by life sciences professionals working to commercialize scientific discoveries, secure public monies, raise capital, and build a quality workforce.

Feedback from the life sciences community in Louisiana was gathered for this report through a written survey disseminated across the State of Louisiana, as well as discussions with strategic partners around the state.

The Baker Donelson and LouisianaBIO 2016 Life Sciences Survey was completed by more than 75 professionals representing a wide-range of industry sectors, companies, academic research institutions and venture capital firms from all regions of Louisiana as well as economic development and incubator organizations.

RECOMMENDATIONS

Access to Capital

Recommendations:

- Continue to support pitch competitions and other programs that attract and connect funders from outside Louisiana with Louisiana-based life sciences companies and local potential co-investors, such as Innovation Louisiana, the Louisiana University Technology Showcase and the BioChallenge.
- Increase the number of forums and networking opportunities throughout Louisiana for those who develop/commercialize technology in order to connect with sources of funding and provide more education for local venture capital firms to gain an understanding of life sciences funding dynamics, returns and timelines.
- Work with state and parish actors on supporting publicly funded incentives.
- Better publicize sources of capital and research funds at the state and federal levels.
- Work to create an online inventory of sources of capital and granting agencies.
- Provide SBIR (Small Business Innovation Research) and grant-writing training in targeted markets where start-up services are less available.

Incubator Programs

Recommendations:

- Continue to advocate for state support for early-stage incubation programs.
- Continue to advocate for state support of successful incubators that are creating Louisiana-based start-ups.
- Work to create an online inventory of existing incubators and accelerators.

Mentoring

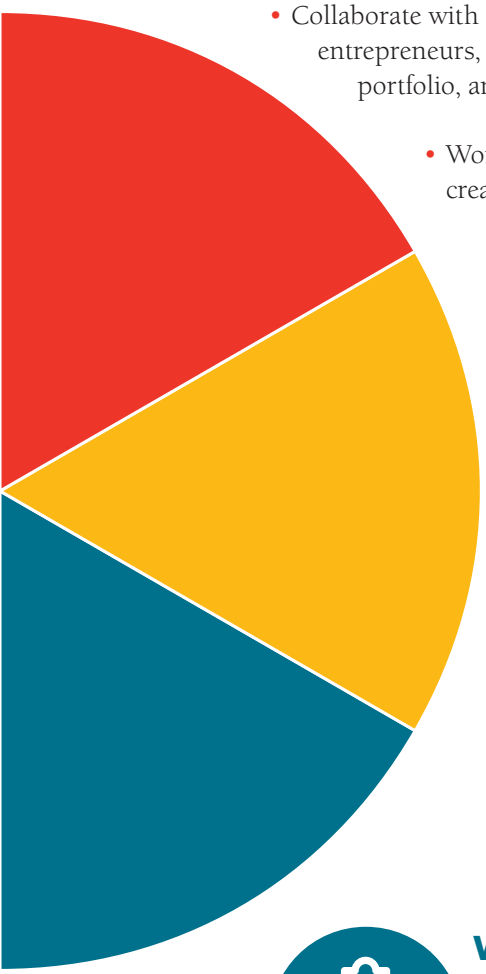
Recommendations:

- Create an online inventory that identifies quality mentors and their areas of expertise.
- Create structured mentoring initiatives across the state that endorse best practices and utilize all disciplines of experienced life sciences mentors.
- Create growth-development programming across the state.

Commercialization and Technology Transfer

Recommendations:

- Have universities hold and/or participate in roundtable discussions for entrepreneurs and investors on how to work with universities to help commercialize life sciences-based research.
- Conduct annual symposia highlighting commercialization-ready, academic research such as the Louisiana University Technology Showcase.
- Continue working with universities to find ways to effectively translate the investment of ongoing research, into businesses.
- Continue working with academic institutions to allow researchers additional time outside of the university, such as to engage in industry activities by expanding formal release time programs.
- Collaborate with tech transfer offices to provide training programs for faculty and student life sciences entrepreneurs, including how to negotiate term sheets, how to develop and manage an intellectual property portfolio, and how to listen to customers and bring a product to market.
- Work to create an online directory of university technology commercialization offices as well as create an index of the technology that is ready for licensing.



Access to Services

Recommendations:

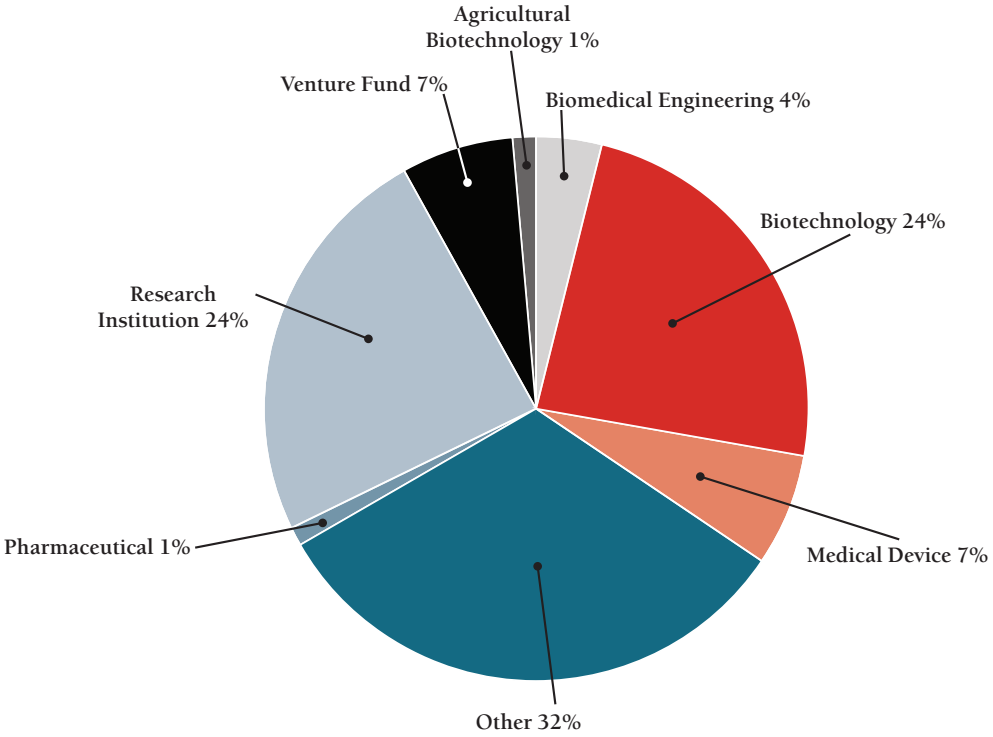
- Support the continued development of life sciences campuses throughout the state with access to services and mentorship support.
- Work to create an online directory of service providers, providing an option to leave feedback and ratings for the services rendered.

Workforce Development

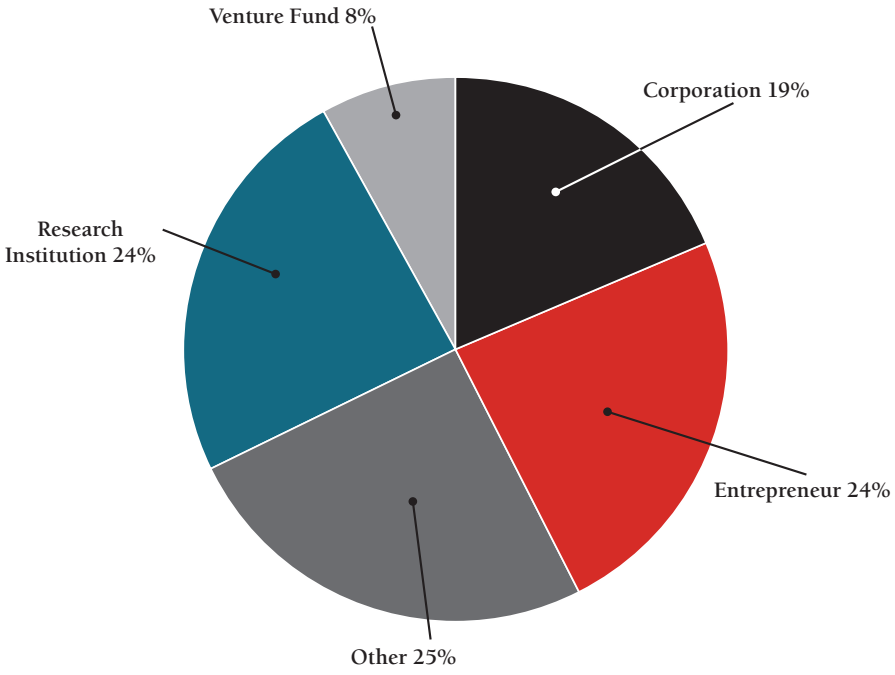
Recommendations:

- Create a clearinghouse that identifies leadership and growth-development programming across the state for mid- to low-level employees as well as executive level professionals.
- Provide networking opportunities, open houses and roundtable discussion forums for special interest groups so people in certain specialties from different companies can come together to share knowledge and resources.
- Provide support for technical training and quality systems programs at the secondary and community college levels.
- Provide support for business programs for Ph.D.- and M.D.-level scientists.
- Work to create an online listing of individuals who successfully finish technical training certification programs.

Survey Respondents by Sector



Size and Type of Business Surveyed



This report describes the challenges those active in the life sciences sector face and identifies strategies for improving the entrepreneurial environment here in Louisiana. However, as an initial matter, it is important to recognize the growth and success Louisiana has had in launching and supporting the burgeoning life sciences ecosystem and business environment. Every region of the state has an active life sciences community, members of which are launching and running significant companies that improve not just our wellbeing, agricultural output, and quality of life, but also provide Louisiana with clear economic benefits.

"Louisiana is ... leading many other states in fostering an environment where [the] biotech industry can thrive," said one Louisiana research institution. However, "the state ... should also take a longer term approach to investing its own limited resources so that the slower but potentially larger economic benefits of technology-based growth can take root and grow here," said a participant involved in technology transfer.

Despite the obstacles investigators in the life sciences must overcome to find (and retain) a trained work-force, license a technology, obtain seed and series funding, and commercialize a product, the potential for the life sciences industry still remains very positive at this time.

"The greatest asset we have for biotech growth is in the creative minds of the professors and professionals in our midst," said an established life sciences corporation.

Another corporation agreed with the following caveat: "The young entrepreneurial spirit is a very positive aspect of New Orleans biotech future."

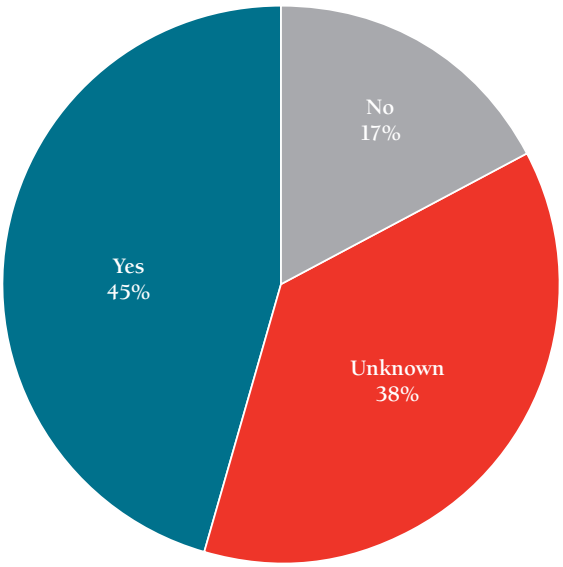
In fact, the life sciences have been earmarked as a strategic focal point at the state level and throughout many of Louisiana's parishes. About 45 percent of Louisiana's life sciences employers have plans to hire new employees in the next 12 months. This is a promising avenue for diversifying Louisiana's economy.

"We can't live off of seafood and tourism forever," noted a Covington-based start-up.

The life sciences sector here in Louisiana is an industry that is undoubtedly blossoming. This report highlights the current state of the life sciences industry here in Louisiana, and the excitement that participants in the industry are experiencing. It further shows the positive steps that this industry has taken in recent years to help establish a firm footing from which to grow the life sciences for years to come.

Industry Employers Anticipate Hiring This Year

Total: 75



CAPITAL

Access to Capital

Much of the significant growth that Louisiana's life sciences community has experienced in recent years can be attributed to state capital formation programs, such as R&D tax credits and Angel Investor tax credits, coupled with a renewed spirit of innovation and entrepreneurism.

For example, the New Orleans BioFund has provided nearly $3 million in funding since 2012 to 15 emerging companies in Louisiana Parishes impacted by Hurricanes Katrina and Rita. The Louisiana Fund I has invested in 13 companies primarily based upon technologies licensed from Louisiana academic institutions. Such programs have sparked numerous venture deals in the area of life sciences in Louisiana. Although, a number of home-grown life sciences start-ups still indicate that they are seeking capital sources outside of Louisiana.

"Of the services and resources we have needed and obtained to drive our startup forward, 90% have come from our personal networks outside of LA," said a start-up participant.

"Restoration of research and development incentives plus adopting bio as target industry" should be a focus locally and state-wide according to a participant involved in economic development.

Various incubator organizations and venture investors indicated that Louisiana should "reinstate the refundability of the R&D tax credit." One incubator organization further suggested that the state should "create a match to federal SBIR/STTR grants."

A participant who is in technology licensing at a state research institution said it "support[s] the current R&D tax credits, but would like to see these better advertised."

"The state needs to commit to providing programs to incentivize investment in target industries such as biotech. The ratcheting down of R&D and Angel tax credits will be a major negative... [Furthermore,] additional capital programs will be necessary to fill the funding gap that currently exists for pre-seed and early stage companies in Louisiana," said a New Orleans-based venture capitalist.

For example, changes to the R&D tax credit in Louisiana's 2015 Legislative Session will limit a company's ability to convert the credit to cash, potentially make obtaining the credit more costly and may call into question the long-term survival of the credit. These changes include:

- The credit is no longer refundable if claimed on any return originally filed on or after July 1, 2015.
- Expenditure verification report of accountant or tax attorney chosen by Louisiana Economic Development (LED) is required for companies with less than 50 employees that have not filed for federal R&D credits for Increasing Research Activities or that are not applicants for either the Small Business Technology Transfer Program or the Small Business Innovation Research Program. The company pays actual cost of expense verification report with a maximum fee of $15,000 for qualified expenditures up to $1 million ($7,500 deposit required) and a maximum fee of $25,000 for qualified expenditures in excess of $1 million ($25,000 deposit required).
- The credit will be reviewed no later than January 31, 2016, to determine if the economic benefit outweighs the loss of revenue. Further, no later than March 1, 2017, a recommendation shall be made to either continue the credit or terminate the credit.

The R&D tax credit still provides up to a 40% credit on qualified research expenditures incurred in Louisiana with no cap and no minimum requirement. (*See* eligibility and application requirements on the Louisiana Department of Economic Development's website at http://www.opportunitylouisiana.com/incentives/research-and-development-tax-credit.)

For those companies developing software in the life sciences space, in some cases the Digital Interactive Media and Software Development Incentive may be a more lucrative alternative.

- Offers a 25.2% tax credit on qualified payroll for in-state labor and 18% for qualified expenditures through June 30, 2018, and a 35% tax credit on qualified payroll for in-state labor and 25% for qualified production expenses for expenditures on or after July 1, 2018.
- There is no cap and no minimum requirement.
- The credit is 100% refundable, or applicants can receive 85% of the value earned as a rebate any time during the year.

(*See* more detailed eligibility and application requirements on the Louisiana Department of Economic Development's website at http://www.opportunitylouisiana.com/incentives/digital-interactive-media-and-software-development-incentive.)

Changes to the Angel Investor Tax Credit Program in Louisiana's 2015 Legislative Session similarly reduced benefits.

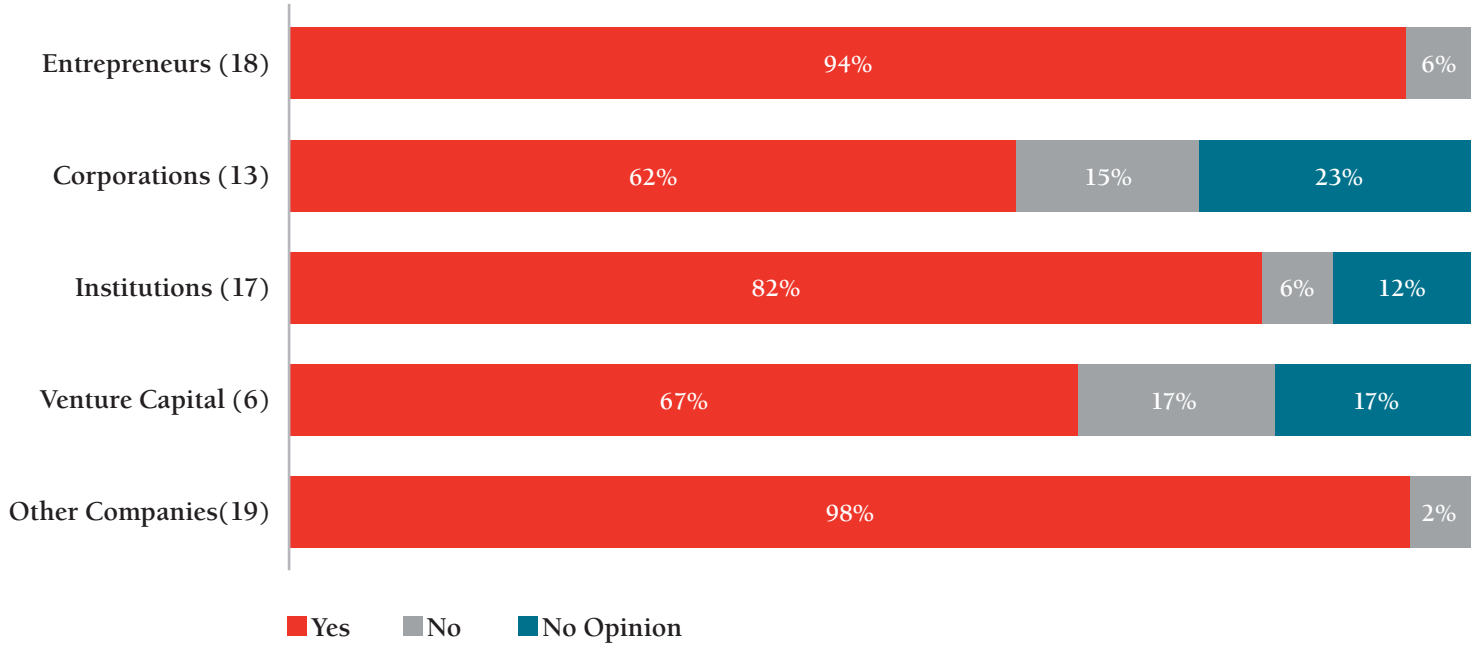
- Annual cap reduced from $5 million to $3.6 million.
- Maximum annual investment reduced from $1 million to $720,000 and maximum eligible investment in any one business reduced from $2 million to $1.44 million.
- Credits previously granted at the rate of 35% of eligible investment are now granted at the rate of 25.2% of eligible investment.
- The program sunsets on July 1, 2017.

(*See* eligibility and application requirements on the Louisiana Department of Economic Development's website at http://www.opportunitylouisiana.com/incentives/angel-investor-tax-credit.)

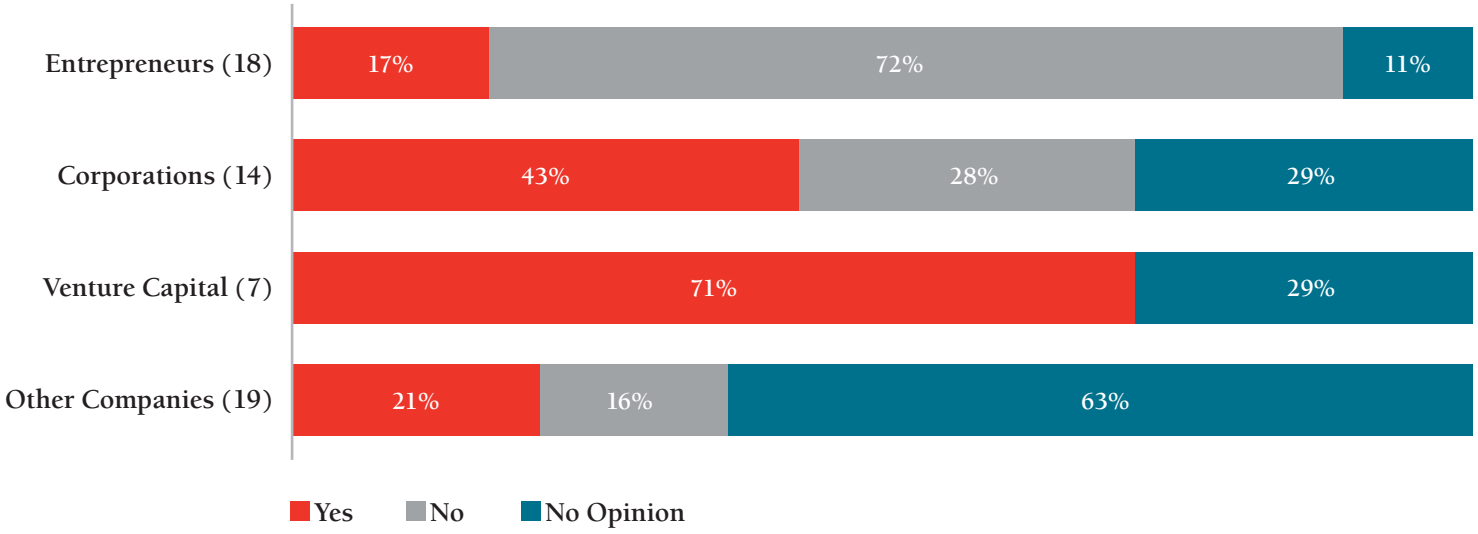
In light of the heavy investment required on the front end for any life sciences startup facing expensive laboratory, patenting, and regulatory work before commercialization can take place, members of Louisiana's life sciences ecosystem strongly and wholeheartedly support state incentive and capital formation programs. Some 94 percent of entrepreneurs and 67 percent of venture capitalists support the programs, which also gain strong support from established corporations (62 percent) and academic research institutions (82 percent).

The saturation rate for having participated in such programs is about 17 percent for entrepreneurs, almost 43 percent for corporations, and 71 percent for venture capitalists. The gap between those entrepreneurs voicing support for state-led incentive programs and their participation indicates a very strong potential for participation, should entrepreneurs be easily introduced and directed to such programs, and should the state be in a position to reinvest in these ways in the future, for example by increasing R&D tax incentives.

Do You Believe State Incentive and Capital Formation Programs are Effective in Driving Growth for Life Sciences in Louisiana



My Company or I Have Taken Advantage of State-Provided Incentives or State-Led Capital Formation Programs



All sectors of the life sciences ecosystem were concerned with "the R&D and angel investor tax credit programs, which were modified in the last [government] session and which are no longer as attractive." With the decrease of these state funding sources (e.g., R&D tax credits), early-stage life sciences entrepreneurs must look to alternate sources for seed funding. Many are also concerned that the private sector may not be able to sufficiently fill the gap, and are aware of the absence of big East Coast and West Coast investors.

Louisiana entrepreneurs in the life sciences sector are currently funding their companies from a variety of sources; and more than half of these funds come from personal financing, friends and family (about 52 percent). One participant from an academic institution indicated "[t]his greatly speaks to the early-stage nature of most Louisiana companies, underscoring how this industry is in its infancy."

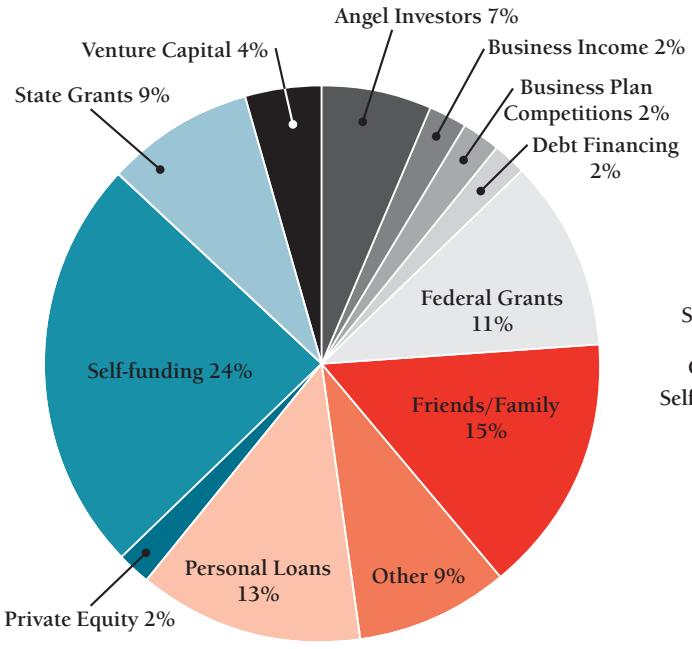
An additional 9 percent and 11 percent in funds are secured through state and federal grants, respectively. These are primarily obtained through the Small Business Innovation Research (SBIR) program, which offers grant support to small businesses conducting research and development that has the potential for commercialization.

"R&D tax credits and SBIR matching funds would make Louisiana highly competitive for keeping technology in state and would go miles towards increasing the likelihood of success for current Louisiana startups," a New Orleans-based start-up indicated.

However, the picture of how entrepreneurs plan to support their ventures in the near term is quite different and, not surprisingly, includes heavier support from private equity, venture capital/angel investors, corporate partners, and federal grants.

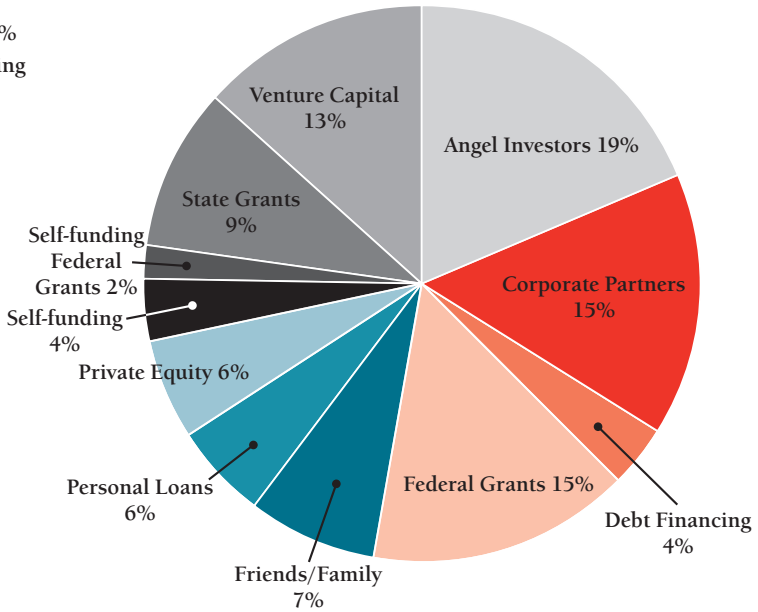
Entrepreneur Funding Sources

Total: 46



Funds Entrepreneurs Plan to Secure

Total: 53



Accessing private funding can be particularly challenging for entrepreneurs in the life sciences due to the longer investment time frame, the significant amount of capital needed before commercialization, in addition to the scientific unpredictability and regulatory risks. Many entrepreneurs have met with several potential investors for whom the entrepreneur's proposal ended up outside the scope of the fund.

It is also more difficult for startup companies to find capital (such as seed funding) than it is for established companies that have seasoned management teams and an established operational track record. The first round of funding is typically the most difficult to secure and requires intense networking and research.

Despite there being private groups in Louisiana that enthusiastically invest in early-stage life sciences companies, there are not yet enough of these investors in the state. The majority of seed capital for these companies is not located in Louisiana. Life sciences entrepreneurs must often travel extensively out of state to seek out support (e.g., to Boston, New York, Chicago, and the Bay Area). Notably, participants from all sectors echoed the sentiment that more investment sources are needed in the state to support the number of life sciences start-ups that are springing up throughout Louisiana.

"The biggest hurdle to startup development in Louisiana is lack of capital," said one research institution.

"Attracting additional industry and investor presence in Louisiana, even if just at events showing off our companies/ technologies would be hugely helpful," indicated a start-up participant.

One life sciences entrepreneur indicated that the state should establish proper funding so that there is an "incentive to stay in LA versus moving to other states," to find the necessary resources, such as capital.

"We are trying to stay in Louisiana, but we are getting a lot of encouragement, advice, expertise, and investment centered around Chicago and New York," shared by a Shreveport-based start-up.

Another entrepreneur suggested that government actors and members of the life sciences ecosystem should "look to models provided by successful state enterprises (North Carolina's Research Triangle Park, for example) and determine which components best suit the Louisiana landscape" in order to develop similar programs in this state.

While entrepreneurs are eager and motivated to secure early-stage financing, the life sciences industry in Louisiana is also looking for appropriately staged funding for all companies, including those that have secured seed monies and are ready to take their companies to the next level.

"The specific type of capital we have difficulty obtaining is in the pre-seed and Series-A range," said an incubator participant and consultant to numerous emerging life sciences companies. It is the pre-seed funding as well as the 'post' seed money necessary for starting the business and scaling up that is next needed.

Recommendations:

- Continue to support pitch competitions and other programs that attract and connect funders from outside Louisiana with Louisiana-based life sciences companies and local potential co-investors, such as Innovation Louisiana, the Louisiana University Technology Showcase, and the BioChallenge.
- Increase the number of forums and networking opportunities throughout Louisiana for those who develop/commercialize technology in order to connect with sources of funding and provide more education for local venture capital firms to gain an understanding of life sciences funding dynamics, returns and timelines.
- Work with state and parish actors on supporting publicly funded incentives.
- Better publicize sources of capital and research funds at the state and federal levels.
- Work to create an online inventory of sources of capital and granting agencies.
- Provide SBIR (Small Business Innovation Research) and grant-writing training in targeted markets where startup services are less available.

TRANSFER

Commercialization and Technology Transfer

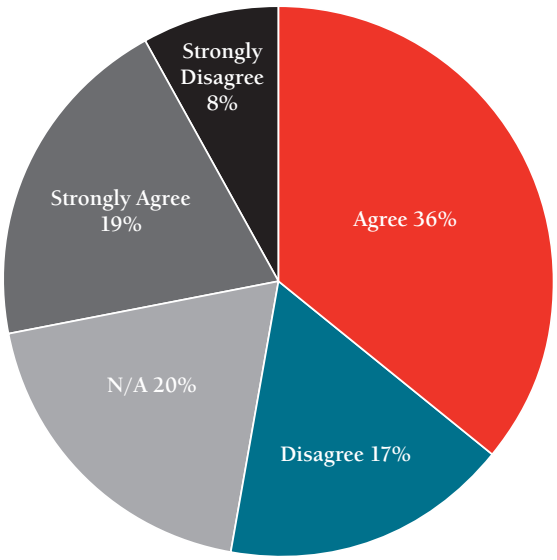
Louisiana has extensive intellectual assets and is one of only a handful of states in the country with at least two medical school campuses in a single city. Tulane University is nationally renowned as a research center and institution of higher education; the Louisiana State University system -Baton Rouge, LSU Ag Center and the Health Science Centers at New Orleans and Shreveport and Pennington Biomedical Research Center – are premier public research institutions; Ochsner and University Medical Center hospitals are recognized for their medical research; and the University of Louisiana System (at Lafayette and Monroe), Louisiana Tech University, Xavier University and various private universities are all highly-respected institutions of higher learning here in the state.

The myriad academic institutions provide an incredible opportunity for the development of the life sciences ecosystem here in Louisiana. These institutions are the foundation required before capitalizing on any research and intellectual property that academic researchers generate. However, some actors in the life sciences community feel that the path to commercializing university-based innovations is disjointed in Louisiana, whereby the availability of commercial-ready university technologies needs to be more centralized so as to allow the public more ease of access. It is noted that the academic community in the State of Louisiana is addressing this particular issue by creating a landing page with links to all of the tech transfer offices with technologies available for commercialization. This will be an invaluable tool in the future to the life sciences ecosystem in Louisiana.

Venture investors would like to " improve technology transfer at universities," so as to allow for increased likelihood of commercializing home-grown discoveries. In fact, nearly 55 percent of life sciences entrepreneurs and corporations surveyed, as well as 50 percent of venture capitalists, agree that Louisiana's academic research institutions have strong research capabilities and support the commercialization of technologies. The life sciences community, for the most part, feels that the research capabilities and commercialization abilities are well synergized here in the state. Although the university philosophy and goal of teaching and training are sometimes at odds with the business-driven purposes of the investor(s) and entrepreneur(s), academic institutions are implementing policies to efficiently transfer technology from the academic lab to the commercial lab, which will no doubt be a boon to the anticipated future growth of the life sciences industry in this state.

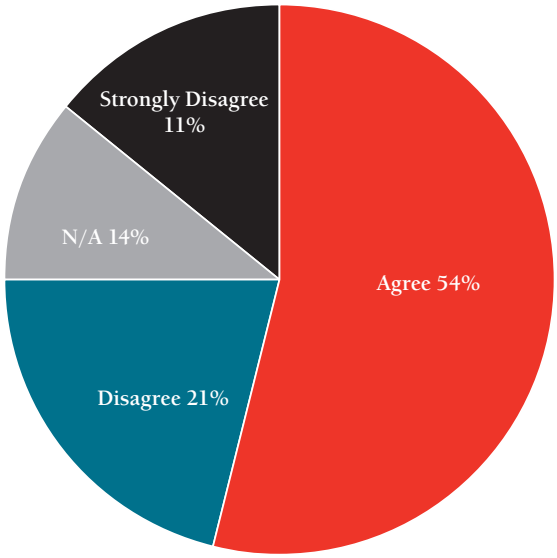
Entrepreneur Response: Do Louisiana Research Institutions Have Strong Research Capabilities and Support the Commercialization of Technologies?

Total: 36



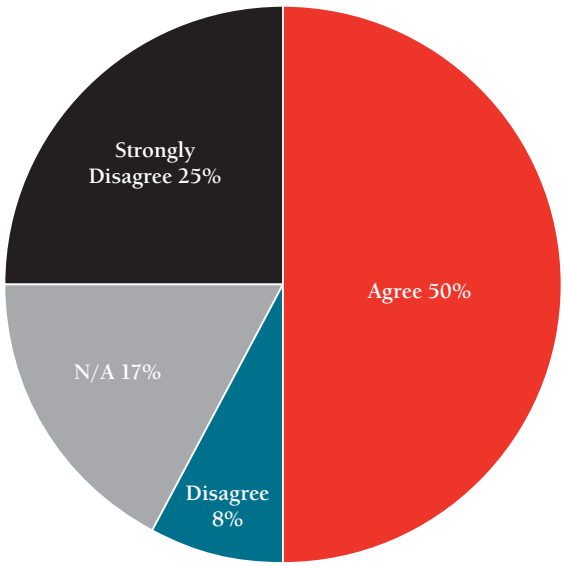
Corporation Response: Do Louisiana Research Institutions Have Strong Research Capabilities and Support the Commercialization of Technologies?

Total: 28



VC Response: Do Louisiana Research Institutions Have Strong Research Capabilities and Support the Commercialization of Technologies?

Total: 12



Each academic research institution has its own unique commercialization process. Interestingly, a tech transfer professional from a Louisiana research institution indicated that there is a "need [to] consolidate tech transfer services for universities that do not have strong tech transfer units."

Some members of the life sciences ecosystem in Louisiana feel commercialization and economic development are of secondary importance, and that the culture and infrastructure are not always in place to maximize chances of success. One economic development consultant stated that the "infrastructure for commercialization still has some strong improvement needed." A professional who advises life sciences entrepreneurs said there is a "need to open up academic institutions to commercialization with [the] local entrepreneur community more." A life sciences entrepreneur expressed the sentiment to "keep supporting academic research programs that focus on technology commercialization. Too often, science and engineering departments only focus on students who want to become tenure-track professors, and those who want to enter the commercial sector are largely ignored, leaving students unprepared for industry." The results of this dynamic are regrettable.

Commercialization involves moving the discovery rights out of a university research laboratory and into the marketplace. The research institution typically seeks patent protection for the technology innovation, which then can be licensed to an entrepreneur for the creation of a company. A license to the technology is obtained through negotiation of business terms between the life sciences entrepreneur and the research institution. However, the negotiation process can be streamlined to increase efficiency of executing the license and to arrive at fair terms.

All sectors of the life sciences community strongly encourage the state's university systems to implement policies and practices that allow university-developed technologies to be brought to the marketplace. Research institutions should be encouraged to view expenses associated with technology transfer offices as a long-term investment with the potential to bring in a stream of steady revenue rather than an operating cost.

Increased access to specialty and regulatory expertise for entrepreneurs in the life sciences ecosystem would also improve the conflicts of interest and licensing procedures that arise for life sciences professionals at academic institutions. "The state university system needs to better integrate the concept of start-ups into its culture and legal framework. Under the current system, conflict of interest rules present a perceived road block," said a start-up entrepreneur.

Recommendations:

- Hold roundtable discussions for entrepreneurs and investors on how to work with universities to help commercialize life sciences-based research.
- Conduct annual symposia highlighting commercialization-ready, academic research such as the Louisiana University Technology Showcase.
- Continue working with universities to find ways to effectively translate the investment of ongoing research into businesses.
- Work with academic institutions to allow researchers time outside of the university, such as to engage in industry activities.
- Collaborate with tech transfer offices to provide training programs for life sciences entrepreneurs, including how to negotiate term sheets, how to develop and manage an intellectual property portfolio, and how to listen to customers and bring a product to market.
- Work to create an online directory of university technology commercialization offices as well as create an index of the technology that is ready for licensing.

SERVICES

Access to Services

Professionals in the life sciences ecosystem in Louisiana who participated in the survey and ad hoc discussions provided detailed feedback on the services that are or are not available in the State of Louisiana. All life sciences practitioners representing all entities and life sciences disciplines (exclusive of established corporations but inclusive of incubator and economic development organizations) reported access to staged funding as their greatest area of need.

After staged funding, entrepreneurs in the life sciences also cited accessing corporate partners and regulatory experts as the second most difficult resource to obtain, followed by access to provider partners, skilled workers, and skilled marketers. Entrepreneurs expressed a desire to work with Louisiana-based suppliers and partners, but were often not able to identify suitable in-state options. "There are lots of resources that are simply not available to startups in [Louisiana] that can be found in other states," said a life sciences start-up participant.

Other entrepreneurs are struggling to find available and/or affordable laboratory or work spaces. A public research institution acknowledged a need for "wet labs for commercial use." One life sciences entrepreneur indicated that "laboratory space [should be created] that startups can afford." For burgeoning life sciences companies, there is a shortage of laboratory spaces across the state to meet their needs as well as a shortage of skilled technicians.

The perception from some of the life sciences entrepreneurs, investors, and corporations surveyed is that the campuses such as the New Orleans BioInnovation Center (NOBIC), Louisiana Emerging Technology Center (LETC), Cohab, and Entrepreneurial Accelerator Program (EAP) are either full, not built to handle the existing demand, or do not contain the resources or equipment and instrumentation required for specific studies or scaling-up processes.

Notably, Louisiana Tech University Technology Incubator (LTTI) "is affordable and has an academic environment that can support technology development. There is no such program in Shreveport," said a Shreveport-based start-up. In addition, Tulane University is developing "Maker Row," the campus home for design ideation and prototype development that will comprise five contiguously located component facilities. Some of the facilities are currently open while others will open during the 2015-16 academic year. The overwhelming consensus among all sectors of the life sciences community is that the State of Louisiana must sufficiently fund and continue supporting these incubators across the state. This will ensure that the necessary resources to grow the ecosystem are available to entrepreneurs and corporations, which will ultimately contribute to a flourishing life sciences industry.

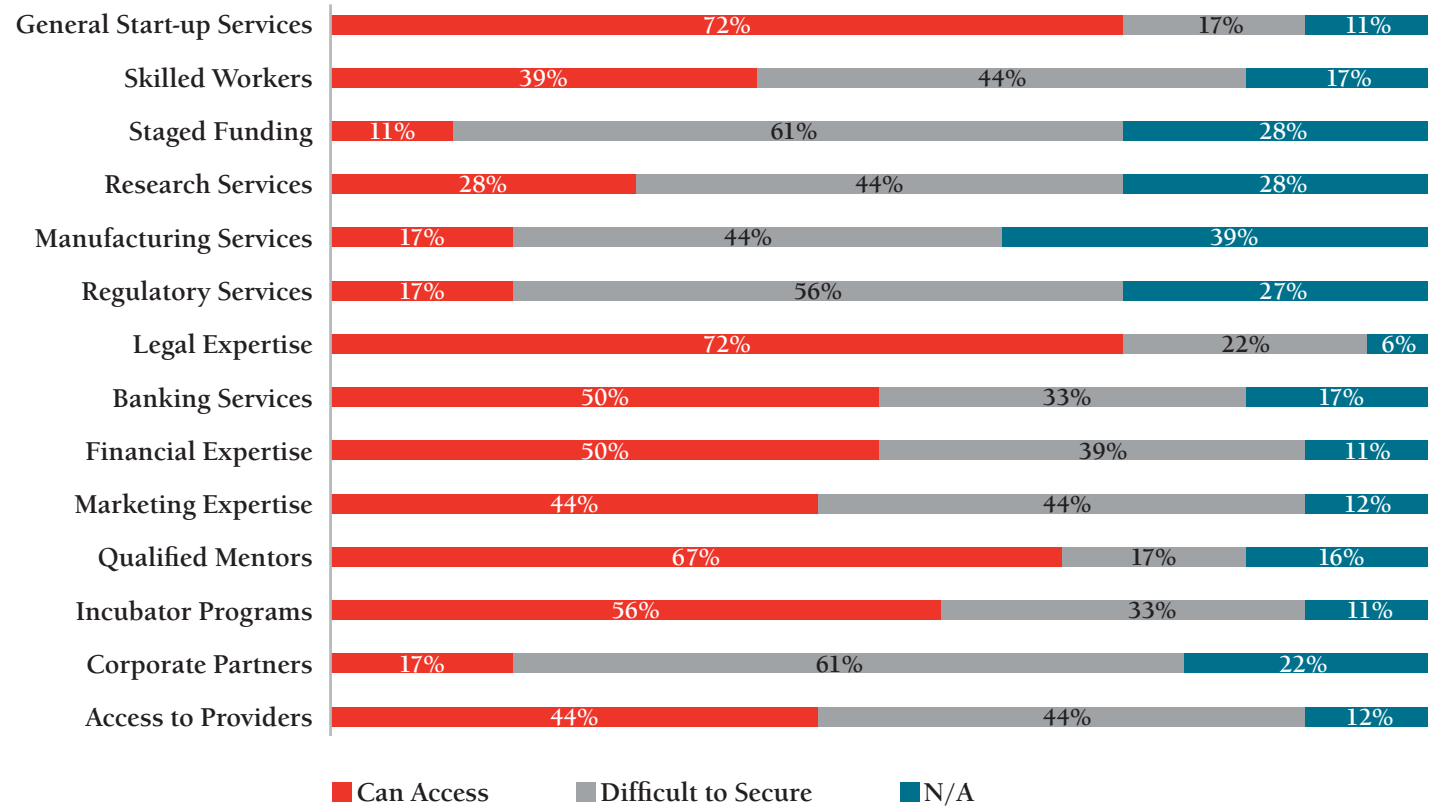
Recommendations:

- Support the continued development of life sciences campuses throughout the state with access to services and mentorship support.

- Work to create an online directory of service providers, providing an option to leave feedback and ratings for the services rendered.

Entrepreneurs on Availability of Services

Total: 18

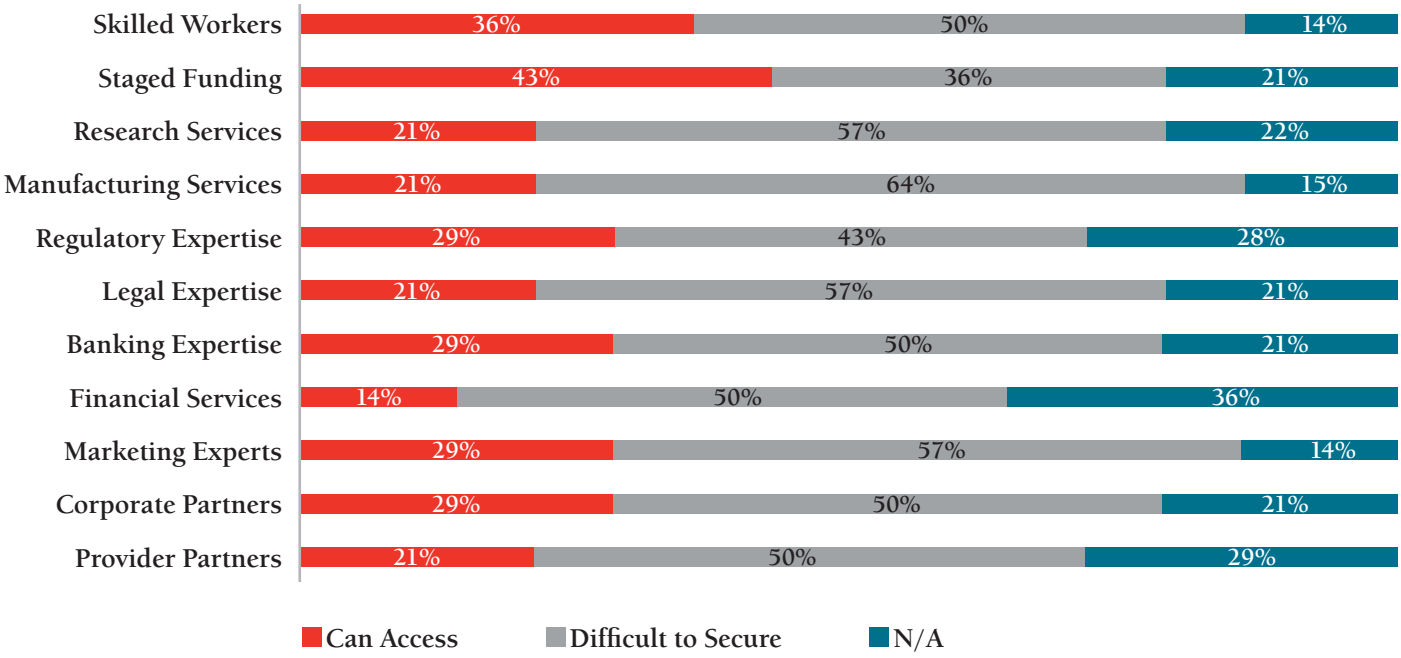


Significant service gaps also appear to exist for those established Louisiana life sciences corporations that participated in the survey ranging from banking and legal expertise to manufacturing and research services to obtaining access to corporate and provider partners. About half of the corporate respondents noted gaps in regulatory expertise in addition to the need for staged funding.

Established life sciences corporations expressed difficulty in obtaining a properly trained and skilled work force. "If the State is going to be successful, you will have to import human resources from the West Coast or North Eastern states where experience in the medical device field is common. It is easy to find people who want to work here in Louisiana with Doctorate Degrees and Master Degrees from our universities. None have any experience in the medical device industry," said a life sciences corporation.

Corporations on Availability of Services

Total: 14

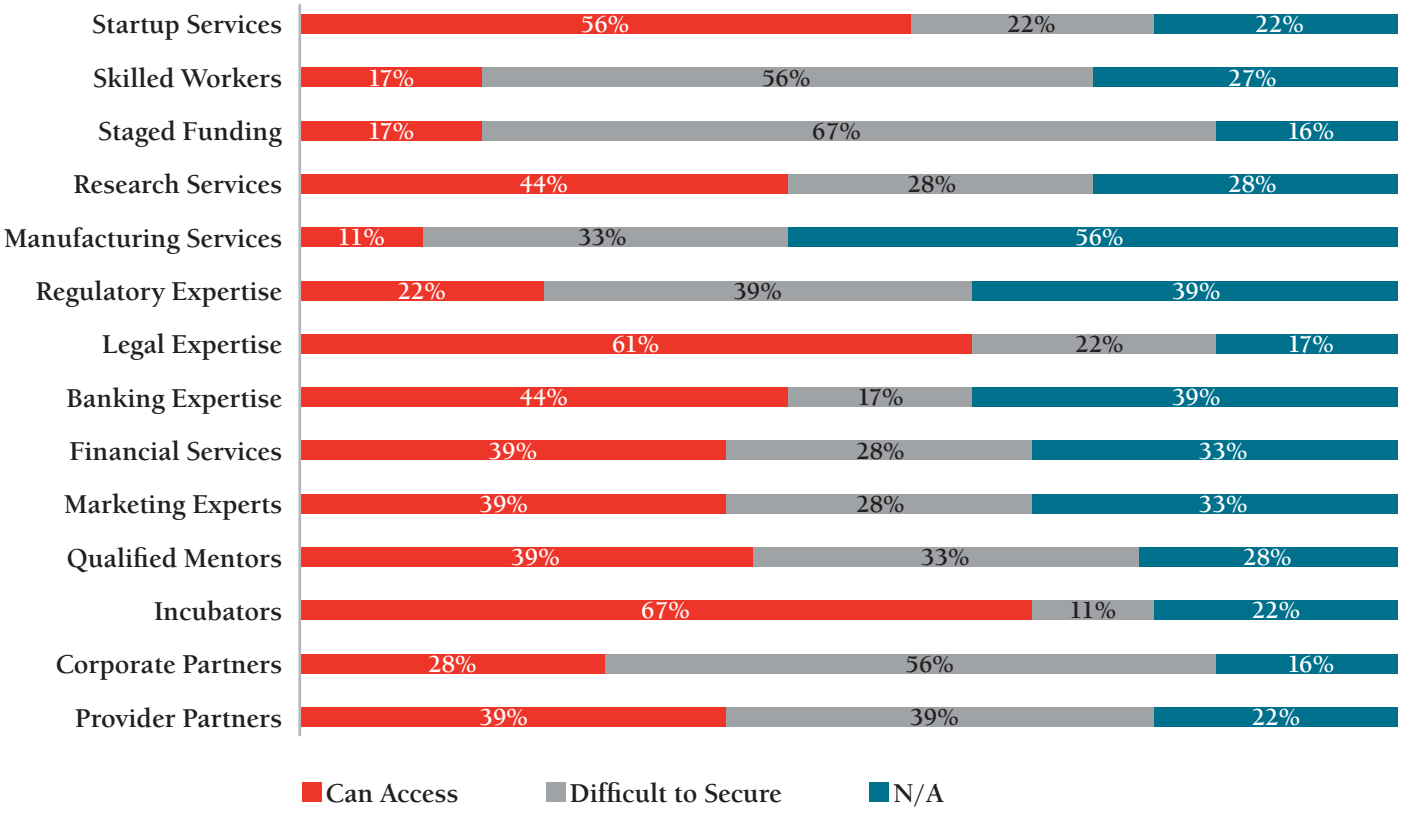


The Louisiana research institutions surveyed share similar sentiments as the life sciences business leaders about the availability of services for life sciences startups. A majority of Louisiana's academic institutions reported a lack of access to regulatory expertise, corporate partners, manufacturing services, and skilled workers.

"The state needs to advocate for better ecosystem support services, and should also take a longer term approach to investing its own limited resources so that the slower but potentially larger economic benefits of technology-based growth can take root and grow here," stated a technology transfer professional in one of Louisiana's public academic institutions.

Research Institutions on Availability of Services

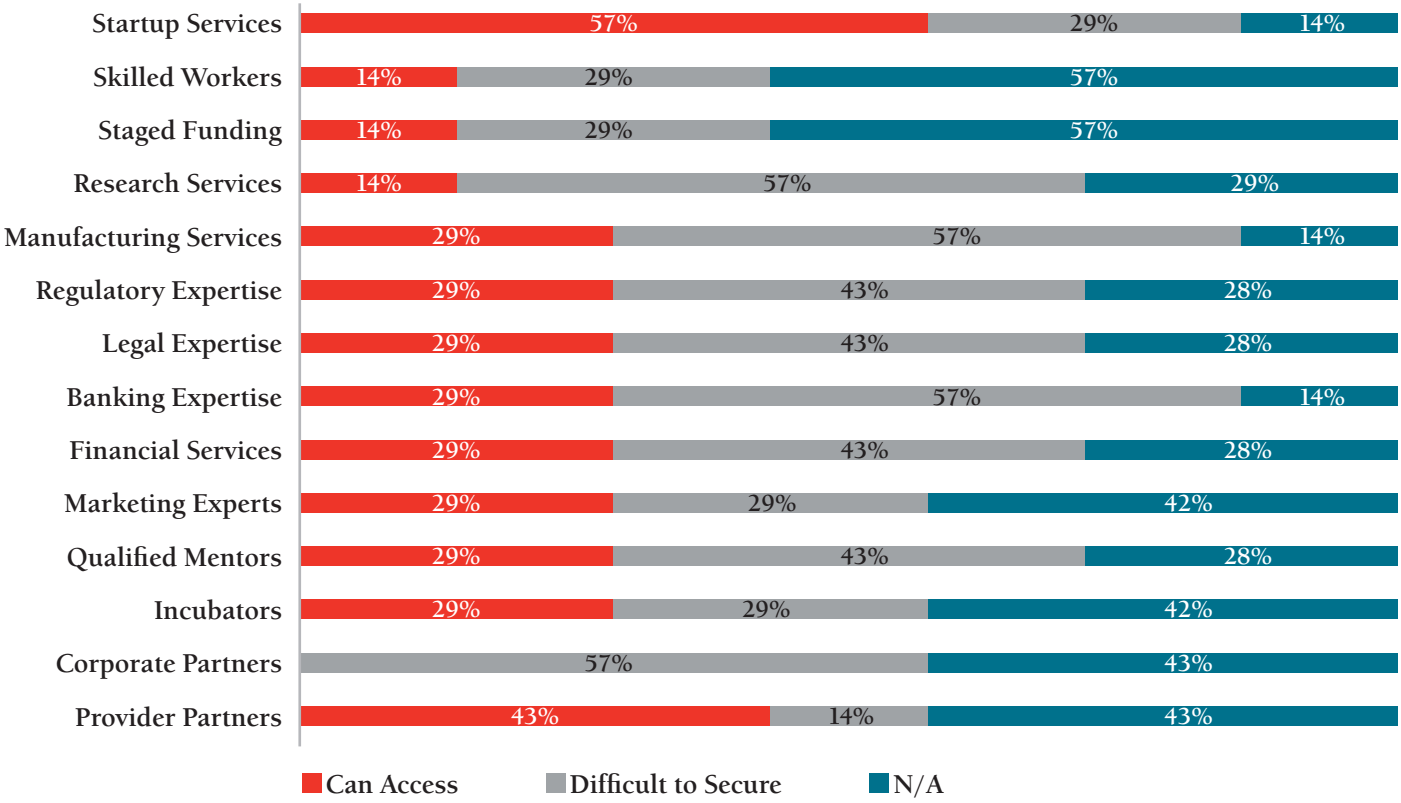
Total: 18



Finally, the majority of venture capitalists operating in the life sciences space reported a lack of access to skilled workers as well as manufacturing and provider services, in addition to regulatory expertise.

Venture Capital/Funders on Access to Services

Total: 7

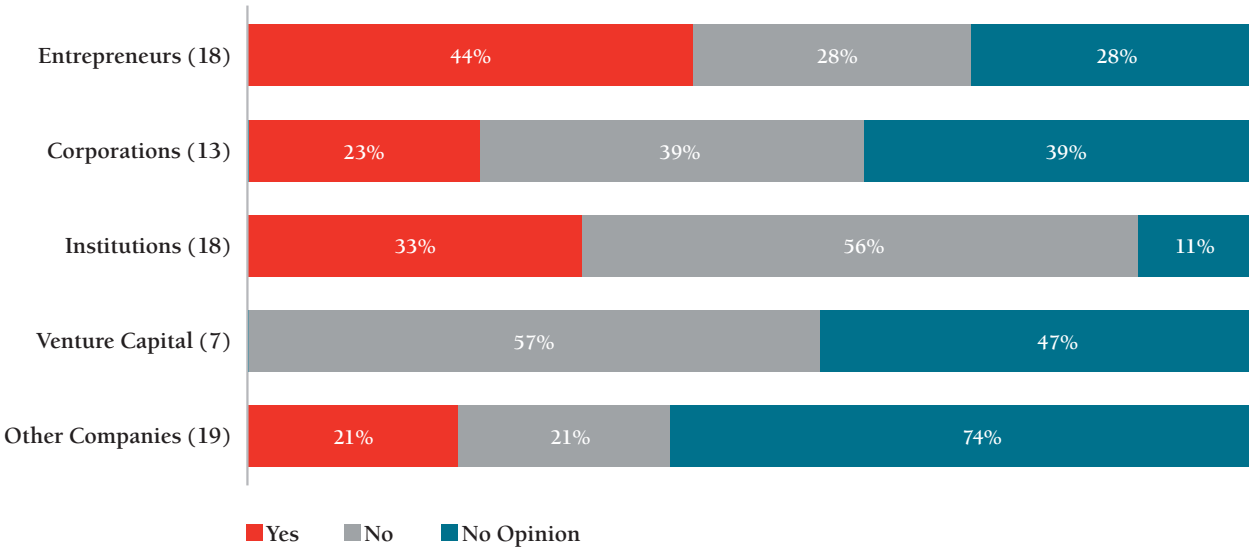


WORKFORCE

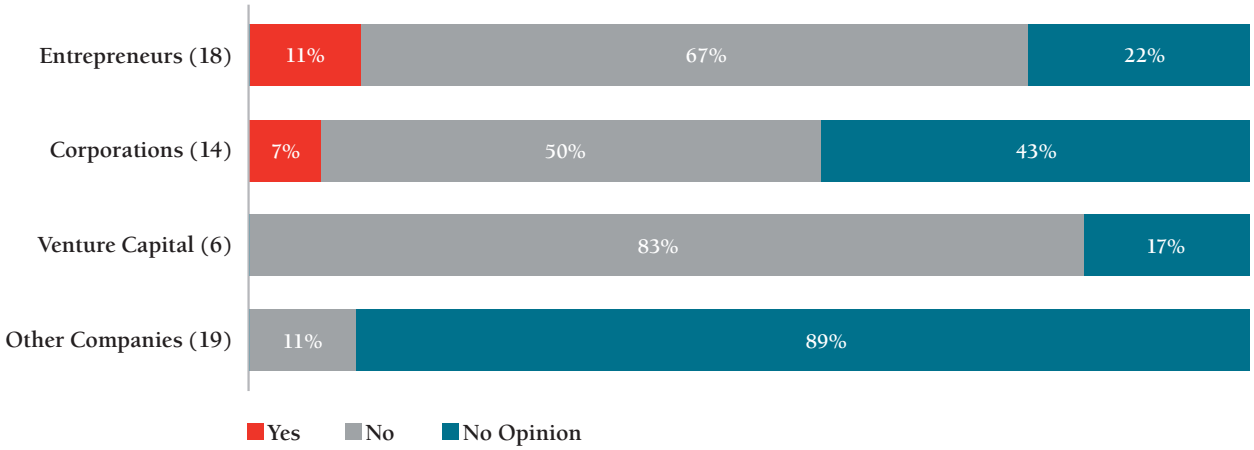
Workforce Development

About half of the life sciences community in Louisiana that participated in the survey considers state-incentivized workforce development programs to be effective. Some 44 percent of entrepreneurs voiced support for these services along with 23 percent of corporations, and 33 percent of institutional employees. Notably, the life sciences venture capitalists surveyed indicated that these programs were not effective. In contrast, actual participation in state-led workforce development initiatives stands at 11 percent for entrepreneurs and 7 percent for corporations. These data indicate that the respondents most likely are not aware of such programs. Once a centralized database is built that lists opportunities such as these programs, all participants in the life sciences ecosystem will have this information readily available.

Do You Believe Workforce Development Programs are Effective?



Have You or Your Company Taken Advantage of State-Incentivized or State-Led Workforce Development Programs?



Improving workforce gaps for life sciences entrepreneurs and corporations is a critical requisite that crosses the full spectrum of salaried and hourly employees. Positions difficult to fill include, for example, highly skilled engineers, pharma experts, experienced regulatory professionals, compliance practitioners, medicinal and clinical chemists, polymer scientists and engineers, instrument operators, project managers, and lower-level laboratory support/technicians. As a life sciences corporation previously noted, "it is easy to find people who want to work here in Louisiana with Doctorate Degrees and Master Degrees from our universities, [but n]one have...experience in the medical device industry."

Life sciences entrepreneurs and companies are particularly interested in hiring local workers who have the right skills. However, these groups have found that it is generally difficult to obtain the necessary skilled employees throughout Louisiana. Respondents indicated that the workforce is harder to find in some regions of the state than others, and these life sciences members are outsourcing to fill the gap.

"Most qualified individuals are out of state," said a Shreveport entrepreneur. Another life sciences start-up indicated that the life sciences community needs to "bring in talent from other states to help support LA startups" because the needed workers with the desired skill sets cannot be found in the state or the talent is leaving Louisiana.

"Development and enhancement of life sciences in this state is substantially hindered by the mass exodus of top flight young talent out of our state" said one life sciences participant. Another echoed similar sentiments: "Louisiana lost some key talent to Texas... Much of the best goes to San Fran or Boston." "There are very limited resources here in Louisiana... go to the West Coast, or the north eastern states and import [the people with experience]," said a corporation.

Although many of these workers need to be imported from other states to fuel the life sciences engine, many participants in the life sciences community echo the sentiment that attracting qualified talent is can be difficult. "The key element that makes it difficult to attract suitable employees from out of state is the perceived lack of good public schools from primary, secondary and university levels compared with other states. Young families would be willing to come to Louisiana if they are assured of good schools in the state. The argument that there are good private schools doesn't fly because there are families that believe in public school education for their children. Our company has been unable to attract good candidates for this particular reason," said an established life sciences corporation.

All sectors of the life sciences community agree that training programs should be implemented in Louisiana that teach interested workers technical laboratory skills. "Post high school institutions such as technical and community colleges should be funded at higher levels and [should be] more closely linked with industry to determine curriculum structure and degree programs that are in demand" noted an incubator organization. To address one aspect of the workforce piece, programs at the community college level are being developed to train and produce a pool of skilled technicians, such as at Delgado Community College.

"If you provide a 2 year training program in the same location as the jobs you wish to build, it brings workers already located and interested in staying in the city and looking for a local job," said a life sciences corporation. Furthermore, a life sciences entrepreneur states: "Developments at Delgado Community College to train research technicians are promising and merit support."

Another corporation agreed: "Training personnel in the key areas of pharmaceutical or medical device sciences at the junior college level – technician development." Some life sciences community members advocate exposure and training even earlier: "focus on Elementary-High School STEM education" and develop programs that offer "paid internships and apprenticeships for high school... students." The consensus from all sectors of the life sciences community is that Louisiana needs to focus more on science, technology, engineering and math (STEM) in schools.

As life sciences companies begin to mature, new workforce challenges are encountered centered around leadership and business management because it is difficult to find researchers who can take off the laboratory hat and step into the shoes of a highly-skilled corporate business leader.

"The biggest hurdle to startup development in Louisiana is... [the] lack of qualified research technicians, and [the] lack of qualified executive-level entrepreneurs to run a business," said one research institution. To address this issue, one research institution suggested that "programs be developed at local universities focused on the training of entrepreneurs and executive-level professionals." Another Louisiana incubator suggested that "attracting well established companies to the area will help develop the pool of experienced management."

With regional and sector-specific nuances, members of the Louisiana life sciences community need access to quality control and regulatory expertise to be able to navigate through FDA regulations and requirements, in addition to establishing quality control and manufacturing best practices. "While many of the experts (manufacturing, research services, quality, regulatory) can be found, usually they are located out of state," expressed an incubator organization.

Recommendations:

- Create a clearinghouse that identifies leadership and growth-development programming across the state for mid- to low-level employees as well as executive level professionals.
- Provide networking opportunities, open houses, and roundtable discussion forums for special interest groups so people in certain specialties from different companies can come together to share knowledge and resources.
- Provide support for technical training and quality systems programs at the secondary and community college levels.
- Provide support for business programs for Ph.D.- and M.D.-level scientists.
- Work to create an online listing of individuals who successfully finish technical training certification programs.

MENTORING

Mentoring

One key workforce development strategy to assist any business of any size is to provide an effective mentoring structure. Like other entrepreneurial and life sciences services across the state, mentoring programs are often fragmented throughout the state.

The strength of a formal mentoring program for the life sciences is based on the quality of the participating mentors who must know the life sciences space and understand how to run a startup business. "Attracting well established companies to the area will help develop the pool of experienced management," said one participant. A university official at a public research institution in Louisiana suggested having "mentor programs [led by] experienced people that have started and sustained businesses" in the life sciences.

The majority of life sciences professionals, particularly entrepreneurs (83 percent), corporations (50 percent) and those professionals at Louisiana's research institutions (72 percent), support formal mentoring programs. However, only about 16 percent of life sciences entrepreneurs and 14 percent of corporations are participating in them. This participation gap demonstrates the need to better publicize those programs that do exist as well as create a structured mentoring program for life sciences practitioners across the state.

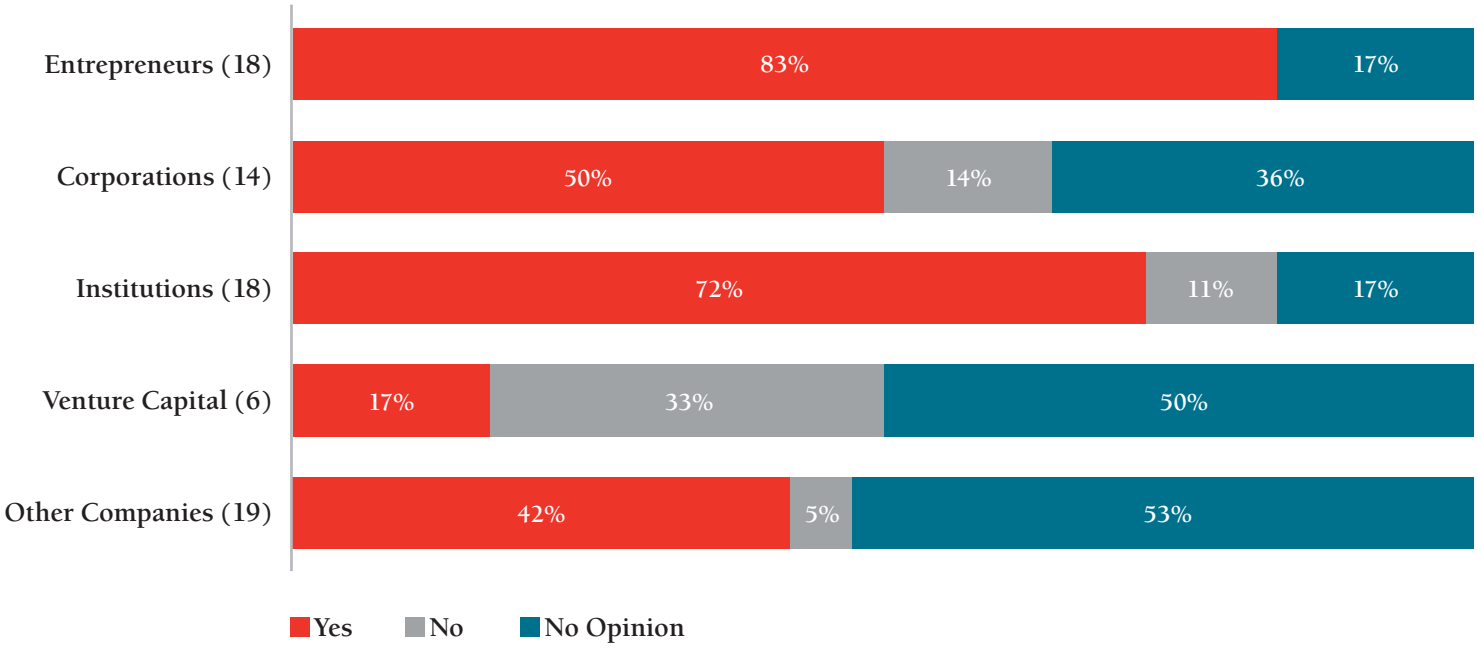
Though life sciences entrepreneurs often have mentoring support and some formal programming exists by way of the state incubators, there is a strong desire among life sciences professionals for structured and formal mentor programming. More than 39 percent of entrepreneurs reported that they already have a mentor, but about 86 percent also say they would really like another one. Some 58 percent of life sciences entrepreneurs surveyed who had no mentors as they founded their startups indicated they would like to have one. "I have never had a mentor, and I really wish I did," said one entrepreneur. Also of note, 50 percent of life sciences entrepreneurs are interested in serving as a mentor to others.

Corporate professionals have less exposure to mentoring programs, though nearly 36 percent are currently serving as a mentor. Some 43 percent of corporate professionals expressed the desire to have a mentor of their own.

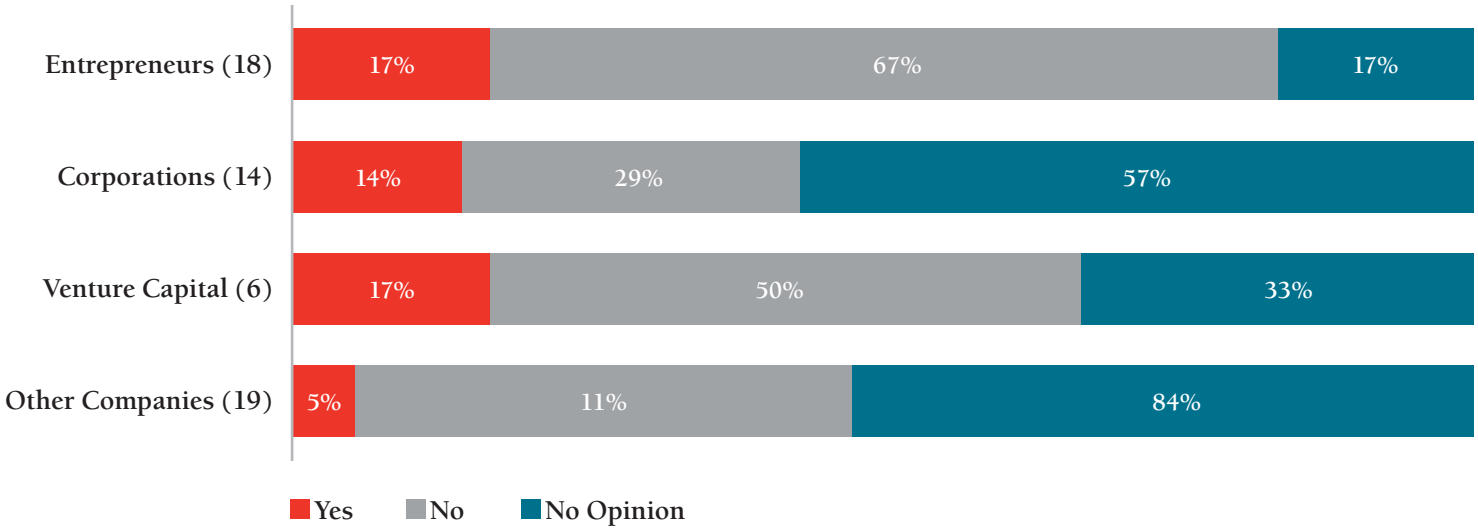
Recommendations:

- Create an online inventory that identifies quality mentors and their areas of expertise.
- Create structured mentoring initiatives across the state that endorse best practices and utilize all disciplines of experienced life sciences mentors.
- Create growth-development programming across the state.

Do You Believe Formal Mentoring Programs are Effective?



My Company or I have Participated in a Formal Mentoring Program?



INCUBATOR

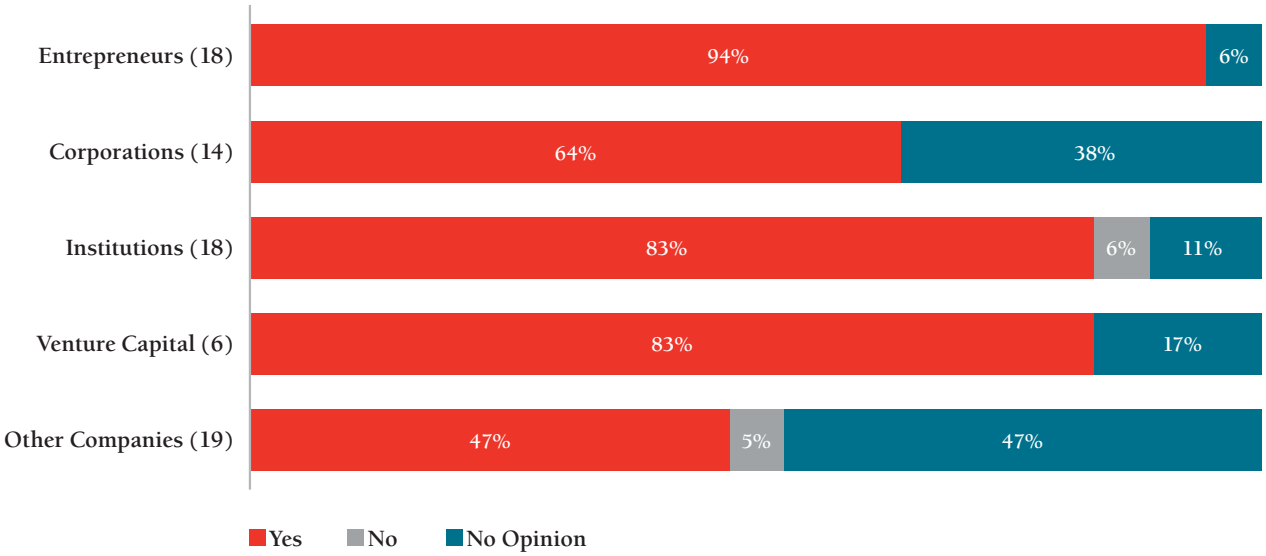
Incubator Programs

A very effective strategy supporting life sciences entrepreneurs here in Louisiana is incubator programs. Incubators, such as the New Orleans BioInnovation Center (NOBIC), the Southwest Louisiana Entrepreneurial and Economic Development Center, Louisiana Tech University Technology Incubator (LTTI) in Shreveport, and the Louisiana Emerging Technology Center (LETC) in Baton Rouge, have provided life sciences entrepreneurs in Louisiana with key services and resources to advance this ecosystem. The majority of the life sciences professionals surveyed universally believe incubators to be highly effective tools for growing their industry. In fact, more than 72 percent of entrepreneurs, 36 percent of corporations, and 80 percent of venture capitalists have participated in an incubator program.

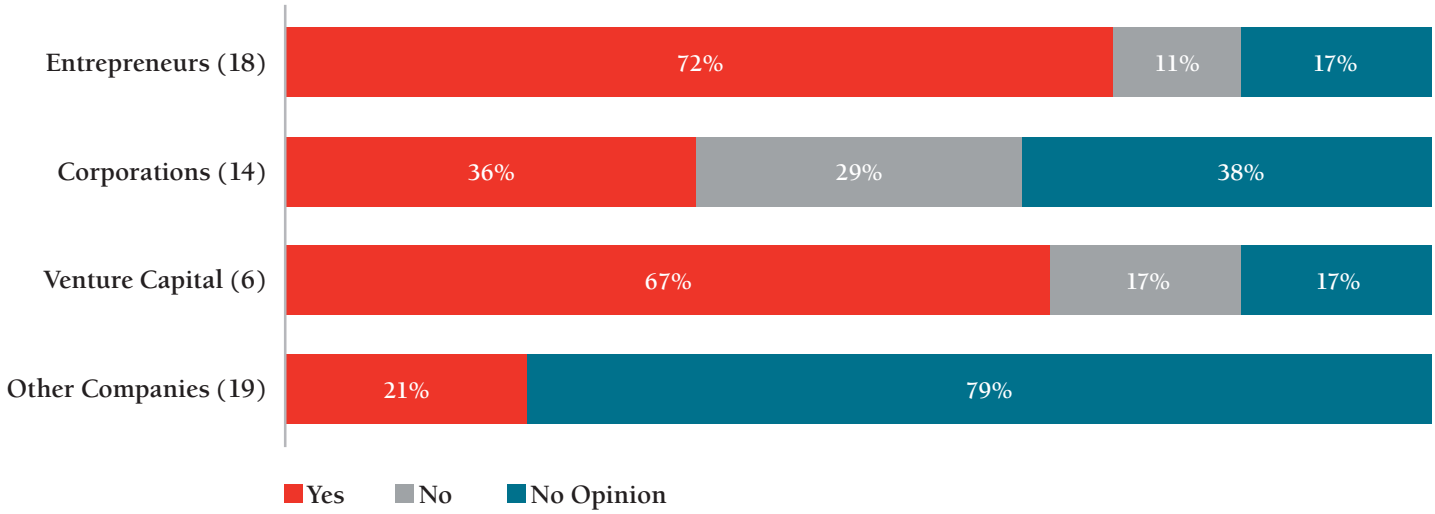
Incubators are especially helpful for startup companies that are not housed inside academic institutions and are currently available in most regions of the state. Incubator programs provide critical resources for entrepreneurs that can include office space, wet lab access, conference rooms, research farms, academic partners, financial and legal advisors, and shared services. The Louisiana incubators provide "mechanisms to link tenants with industry, federal, lab, and academic partners." These entities make life easier for entrepreneurs to transition from a university to private space, but many professionals feel "state-wide coordination of all incubators is needed as well as [continuous and direct state] funding [should be provided] for them."

The consensus across the state is that incubators should continue to be supported, be better funded and expanded, but also be improved upon based on models of other incubators operating in already established life sciences hubs (such as Boston and Palo Alto). "There are all kind of incubators of varied quality in other states to use as models. We should model ours after those that have been successful using standard measures of success," said one entrepreneur. All in all, the incubators are essential for the further development of the life sciences industry, which ultimately will allow Louisiana to diversify its economy.

Do You Believe Incubators are Effective?



Have You or Your Company Participated in an Incubator?



Recommendations:

- Continue to advocate for state support for early-stage incubation programs.
- Continue to advocate for state support of successful incubators that are creating Louisiana-based startups.
- Work to create an online inventory of existing incubators and accelerators.

REMARKS

Concluding Remarks

This is an exciting time to be involved with the life sciences industry here in Louisiana. But, with all the excitement, members of the life sciences community recognize that much more work remains to be done.

"The ecosystem is in need of a major exit," said one life sciences member. "Marketing the region/ state as a BIO hub needs to grow hand in hand with having the services to take a company or BIO business plan from the startup phase through established business or program with opportunities to grow within the state and remain in the state," said an economic development professional.

"As no one source of funding can completely address the issues for a sustainable industry cluster over the long term, there would need to be a variety of programs including growing the angel investor programs, identifying specific bioscience needs and addressing those with incentives and possibly enacting special sales tax exemptions, expanding R&D incentives and carving out some hiring incentives for the biosciences that resonates with the BIO cluster" echoed by another economic development professional vested in the development of the life sciences industry.

To be a major player in the life sciences industry on a national level, one life sciences incubator professional urged that "[we need] more direct flights to/from major science hubs [as well as] more events to bring in innovation scouts and investors from [those] hubs." "The state needs to work on attracting more established companies that can contribute to the development of our startups. We need groups that can provide access to goods and services needed by startups but cannot be obtained locally," said one incubator group.

So what has worked for other key life sciences hubs to spur innovation, entrepreneurship, investment, and grow the ecosystem? In places like Boston and the Bay Area, there is an entrenched life sciences infrastructure as well as easy access to skilled talent and specialized services. Louisiana needs to continue building its infrastructure and pool of skilled workers.

Furthermore, the life sciences industries in areas like Boston and the Bay Area not only have close ties to leading research institutions, but they also have a heavy presence of mid-size corporations. The life sciences industry in Louisiana has good ties with its academic institutions and should continue to strengthen such relationships. As echoed by so many survey participants, Louisiana needs to attract a significant life sciences player here to set up shop either by offering extremely attractive and user-friendly tax credit incentives, inexpensive real estate for laboratory and manufacturing uses, or a combination of incentives. In addition, the top life sciences hubs around the country have high funding levels and sophisticated investor groups coupled with local economies intently focused on growing their life sciences industries. Louisiana indeed has the desire and interest to further grow its life sciences ventures; however, more private monies are needed. Louisiana has private wealth in its midst, but the challenge is to convince and encourage these individuals to invest in the future of their state.

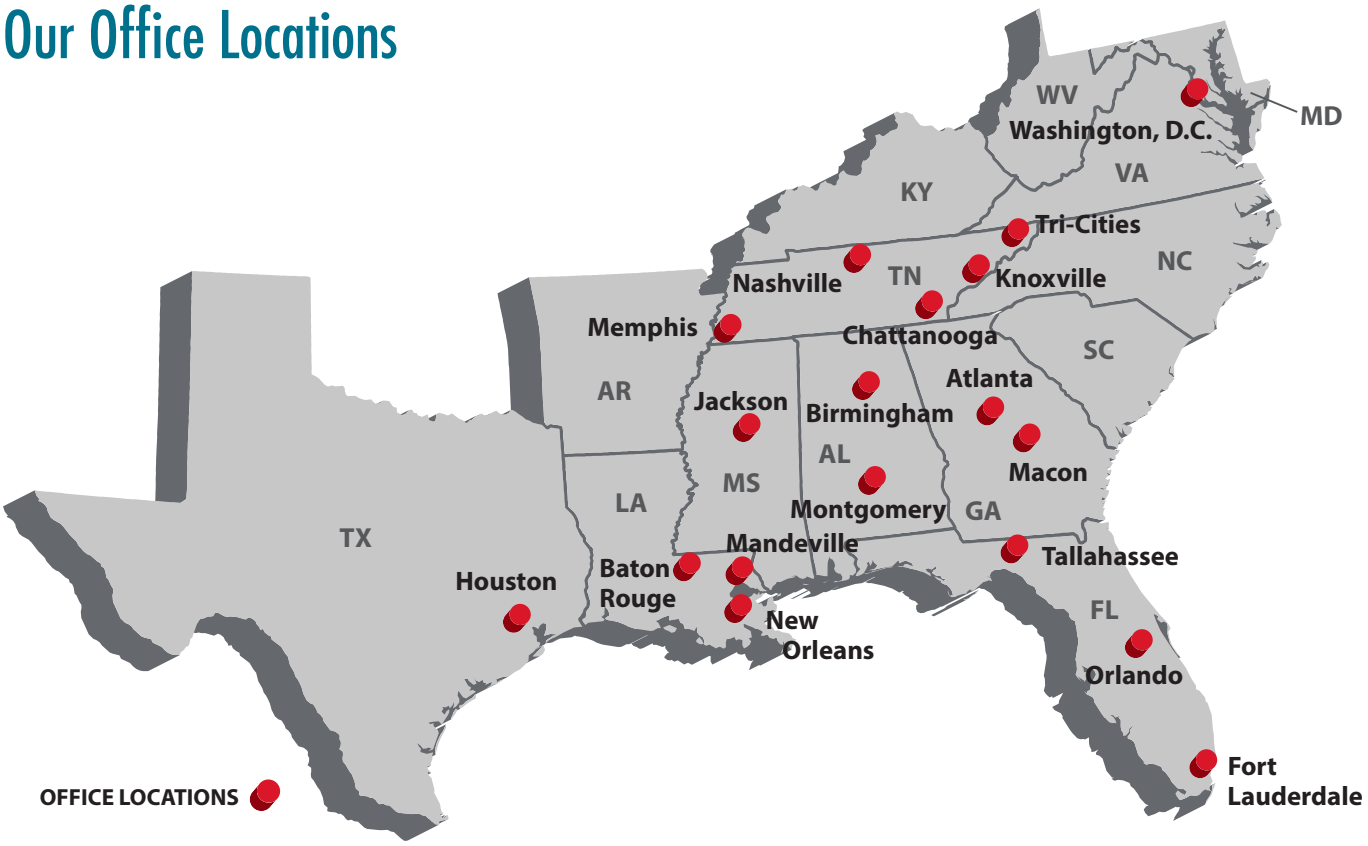
Finally, each of the established life sciences hubs in the United States, as well as emerging clusters in the New Haven and Cleveland areas, are located in states that have established state-sponsored incubators and economic development centers and/or dedicated state funds to support innovation in the life sciences. Louisiana has set itself on the right path by having the BioFund and Louisiana Fund. Louisiana now needs to invest in and fully support its currently existing incubators.

State and local officials want to see success in this industry and have designated the life sciences as an industry on which to focus. Research institutions are also following suit by investing in their own intellectual property capital. For example, research institutions are taking the steps of protecting their intellectual property assets (to ultimately capitalize on their commercialization) by filing nearly two-fold more patent applications this year as opposed to four years ago. The life sciences industry in Louisiana is experiencing significant growth, and enthusiasm for its future remains bright.

The preparation of this report would not have been possible without support from all the life sciences professionals across the state of Louisiana who shared their time, thoughts, feedback, and experiences with us. We are also grateful to NOBIC, LTTI, and LETC, and the large network of organizations across Louisiana, including Tulane University, Xavier University, Pennington Biomedical Research Center, the LSU system, the University of Louisiana system, Louisiana Tech, and the New Orleans Business Alliance, that have joined us in our work to develop high-growth life sciences companies. We look forward to continued partnerships, advocacy, and growth for our industry.

Notes:

Our Office Locations



Birmingham, Alabama
1400 Wells Fargo Tower
420 20th Street North
Birmingham, AL 35203
205.328.0480
Fax 205.322.8007

Montgomery, Alabama
614 South Hull Street
Montgomery, AL 36104
334.262.2000
Fax 334.263.0960

Washington, D.C.
901 K Street, N.W.
Suite 900
Washington, D.C. 20001
202.508.3400
Fax 202.508.3402

Fort Lauderdale, Florida
100 S.E. Third Avenue
Suite 1620
Fort Lauderdale, FL 33394
954.768.1600
Fax 954.333.3930

Orlando, Florida
200 South Orange Avenue
Suite 2900
Orlando, FL 32801
407.422.6600
Fax 407.841.0325

Tallahassee, Florida
101 N. Monroe Street
Suite 925
Tallahassee, Florida 32301
850.425.7500
Fax: none

Atlanta, Georgia
Monarch Plaza
3414 Peachtree Road, N.E.
Suite 1600
Atlanta, GA 30326
404.577.6000
Fax 404.221.6501

Macon, Georgia
Gateway Plaza
300 Mulberry Street
Suite 201
Macon, GA 31201
478.750.0777
Fax 478.750.1777

Baton Rouge, Louisiana
Chase North Tower
450 Laurel Street
20th Floor
Baton Rouge, LA 70801
225.381.7000
Fax 225.343.3612

Mandeville, Louisiana
3 Sanctuary Boulevard
Suite 201
Mandeville, LA 70471
985.819.8400
Fax 985.819.8484

New Orleans, Louisiana
201 St. Charles Avenue
Suite 3600
New Orleans, LA 70170
504.566.5200
Fax 504.636.4000

Jackson, Mississippi
Meadowbrook Office Park
4268 I-55 North
Jackson, MS 39211
601.351.2400
Fax 601.351.2424

Chattanooga, Tennessee
1900 Republic Centre
633 Chestnut Street
Chattanooga, TN 37450
423.756.2010
Fax 423.756.3447

Knoxville, Tennessee
265 Brookview Centre Way
Suite 600
Knoxville, TN 37919
865.549.7000
Fax 865.525.8569

Memphis, Tennessee
First Tennessee Building
165 Madison Avenue
Suite 2000
Memphis, TN 38103
901.526.2000
Fax 901.577.2303

East Memphis
6060 Poplar Avenue
Suite 440
Memphis, TN 38119
901.579.3100
Fax 901.579.3111

Nashville, Tennessee
Baker Donelson Center
Suite 800
211 Commerce Street
Nashville, TN 37201
615.726.5600
Fax 615.726.0464

Tri-Cities, Tennessee/Virginia
100 Med Tech Parkway
Suite 200
Johnson City, TN 37604
423.928.0181
Fax 423.928.5694

Houston, Texas
1301 McKinney Street
Suite 3700
Houston, TX 77010
713.650.9700
Fax 713.650.9701

ALABAMA • FLORIDA • GEORGIA • LOUISIANA • MISSISSIPPI • TENNESSEE • TEXAS • WASHINGTON, D.C.

www.bakerdonelson.com

BD_Louisiana_BIO_Report_Email
12.21.2015