

Location Selection Risks for Life Sciences Investments



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Introduction

Companies choose to deploy assets in a location for a variety reasons; decision drivers range from arbitrary personal preferences to calculated business needs. In the life sciences industry, making informed research decisions is critical, given the time and cost associated with the design, build-out and validation of a manufacturing site or the ecosystem needed for research and development (R&D) success.

Decisions on where to place life sciences assets should be approached with serious analytical rigor to minimize risk and avoid failure. There have been recent reports of plant closures and R&D footprint realignments as companies jockey to meet market demands, capacity constraints and cost pressures. With hundreds of millions in potential investment and years of design construction and validation, these investment decisions can affect an organization for decades. It is important for corporate executives to understand the factors that affect a location decision, as a deeper understanding talent, costs, infrastructure, government support and logistics help ensure the fitting approach to a location decision. This report provides a high-level executive overview to those issues and risk considerations. We use U.S. metro area data to illustrate differences among locations and regions, though these same risk factors can be applied globally.

The U.S. constitutes a major part of the \$1.4 billion global life sciences industry, with 43% of all biotechnology operations and 38% of pharmaceutical production.¹ Because of the potential customer base, the market continues to grow; 36% of companies identify proximity to markets and customers as their most important investment decision factor. Since 2003, there have been more than 2,000 life sciences capital investment projects in the U.S. with an estimated capital expenditure of nearly \$56 billion. The projects range from new manufacturing facilities to expanding headquarters to relocating R&D operations. For these investments, 33% of companies identify talent availability as their most important decision factor and 23% cite the existence of an industry cluster as their top decision factor.² This provides insight into the risks that life sciences companies prioritize with regard to investment decisions. Identifying these risks and mitigating them through strategic location selection helps position companies for long-term success. Key risks generally fall into these areas:

Primary		Talent Acquisition & Retention		Costs
Secondary		Logistics		Regional Infrastructure
		Government Support		

¹ IBIS World 2013: Global Pharmaceutical & Medicine Manufacturing and IBIS World 2013: Global Biotechnology

² FDImarkets 2003-2013: Life Sciences Investment Projects



Talent Acquisition & Retention

Key Risks	Consideration
Availability of relevant labor	<ul style="list-style-type: none">• Presence of other life sciences companies and institutions
Talent pipeline	<ul style="list-style-type: none">• Proximity to universities and technical institutes with strong science, research and training programs
Labor turnover	<ul style="list-style-type: none">• Concentrated clusters experience higher flows of labor in and out of organizations
Compensation inflation/escalation	<ul style="list-style-type: none">• Locations with high demand for labor can face wage inflation and high competition to retain a quality labor force• For manufacturers, strong labor-management relations keep labor costs competitive
Character of life	<ul style="list-style-type: none">• Urban center options with access to airports and public transportation, as well as a manageable cost of living

Manufacturing Employment

Locations with vocational and technical schools along with life sciences industry-focused training programs provide strong talent pools for skilled manufacturing positions. Ideal locations have talent ranges from executive management through 2-year degree holders, both experienced and trained. An existing talent base with transferrable GMP skills is valuable if competition is manageable. Locations with strong labor management relations face lower risks of work stoppages and wage inflation.

Good Manufacturing Practice (GMP) refers to a set of FDA health and safety guidelines to which food and drug manufacturers must adhere.

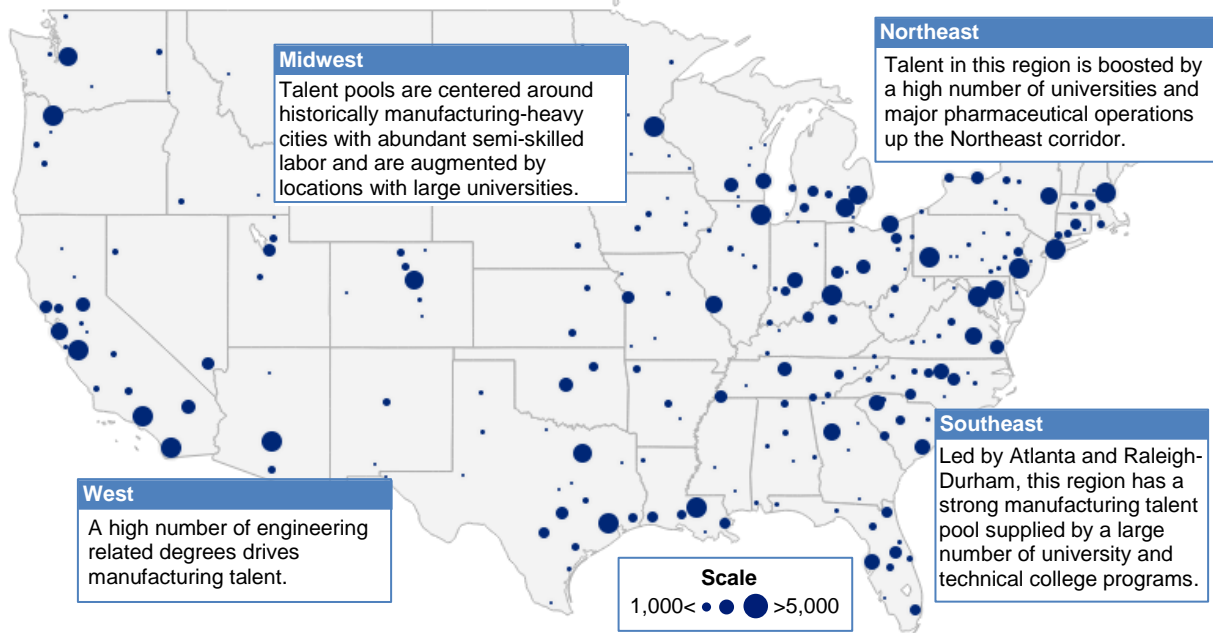
Research & Development Employment

Successful life sciences R&D functions need deep talent pools from academia and other companies. Generally, these talent pools are geographically clustered around urban areas that have an existing presence of life sciences companies, leading universities and research institutions. In developed clusters, competition for labor can inflate compensation and cause higher turnover, whereas growing clusters with significant institutional presence offer growing talent pools with lower risk of talent loss.

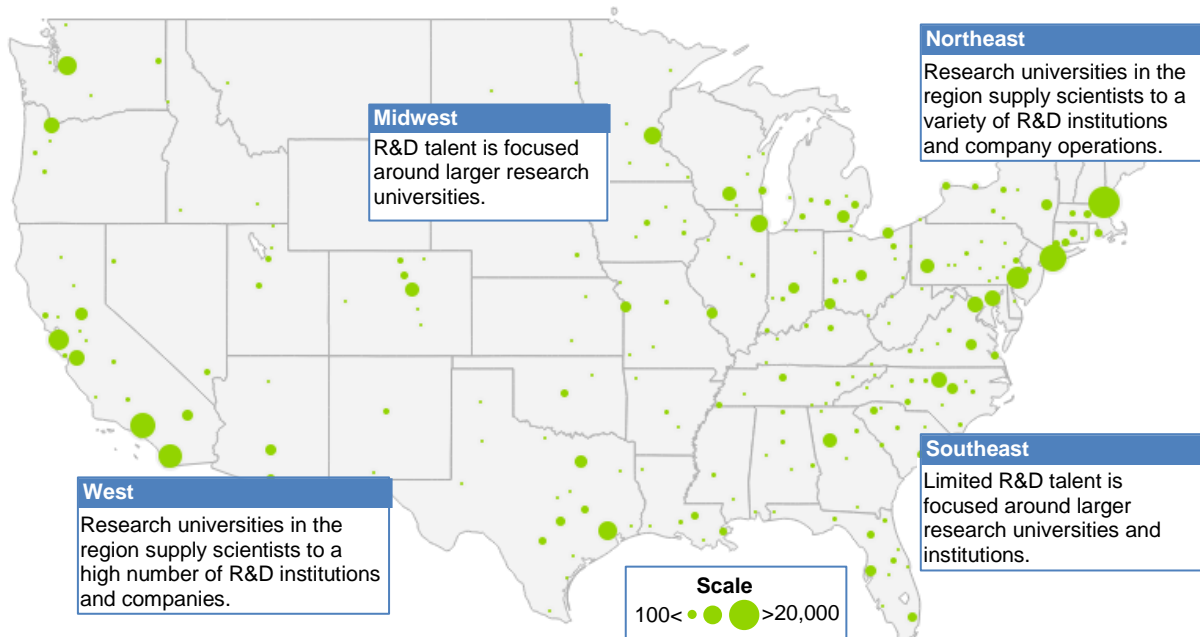


Talent Availability: Relevant Employment and Degree Conferences⁴

Manufacturing Talent



R&D Talent



³ R&D Talent Availability is a sum of Life Sciences industry occupations (BLS 2013) and biomedical science and engineering degrees (NCES 2012)

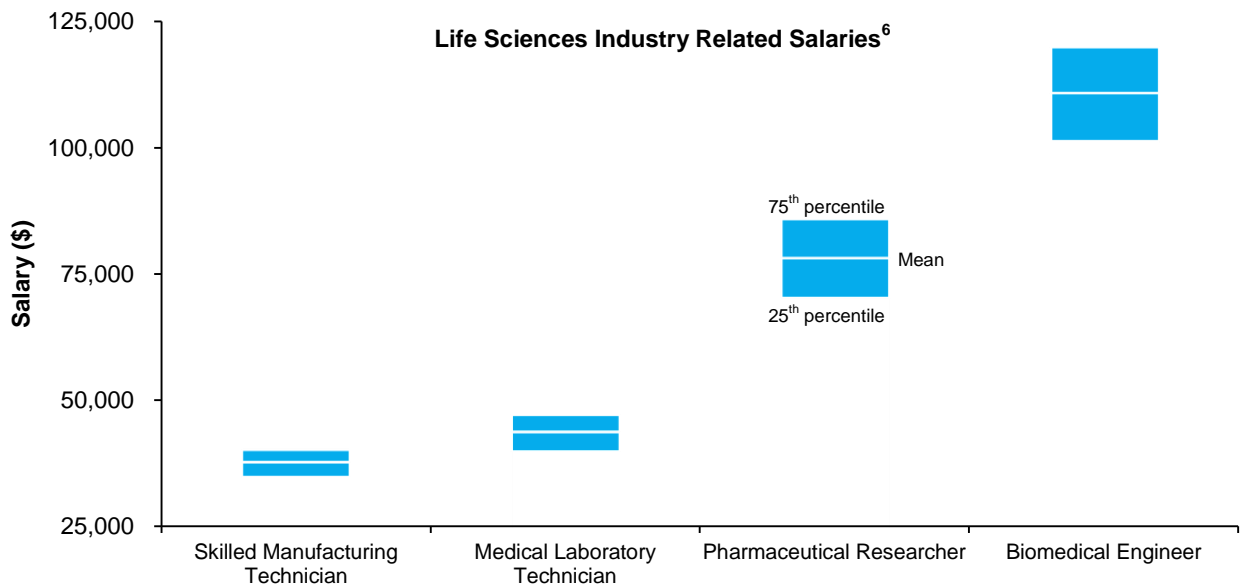
⁴ Manufacturing Talent availability is a sum of occupations and degree conferences relevant to life sciences manufacturing, e.g. Biological Technicians, Biology Technicians, Quality Control Technicians (BLS 2013 and NCES 2012)



Costs

Compensation is generally the largest location variable cost component for life sciences operations. Companies looking for favorable long-term labor markets will generally consider areas with large, stable supplies of labor and a relevant amount of similar companies to provide both a labor supply and limit unsustainable competition. In addition to favorable labor market conditions, a lower cost of living helps mitigate long-term inflation pressures and can positively affect recruiting and retention. This contrasts with the higher price-competitive and high cost of living markets in which some of the nation's top life sciences clusters have grown. In all, a company should expect to save around 20% on salaries by locating in certain markets (see "Premium" column in table below).

Cost of Living ⁵ (U.S. avg = 100)	
Atlanta	94
Raleigh	102
Chicago	105
DC	143
Boston	149
San Francisco	199

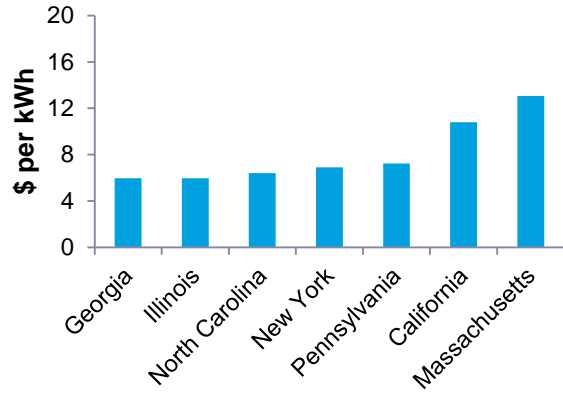


Position	Mean	25th percentile	75th percentile	Premium
Skilled Manufacturing Technician	37,990	35,094	40,280	15%
Medical Laboratory Technician	43,993	40,210	47,292	18%
Pharmaceutical Researcher	78,315	70,510	85,857	22%
Biomedical Engineer	110,901	101,424	119,877	18%

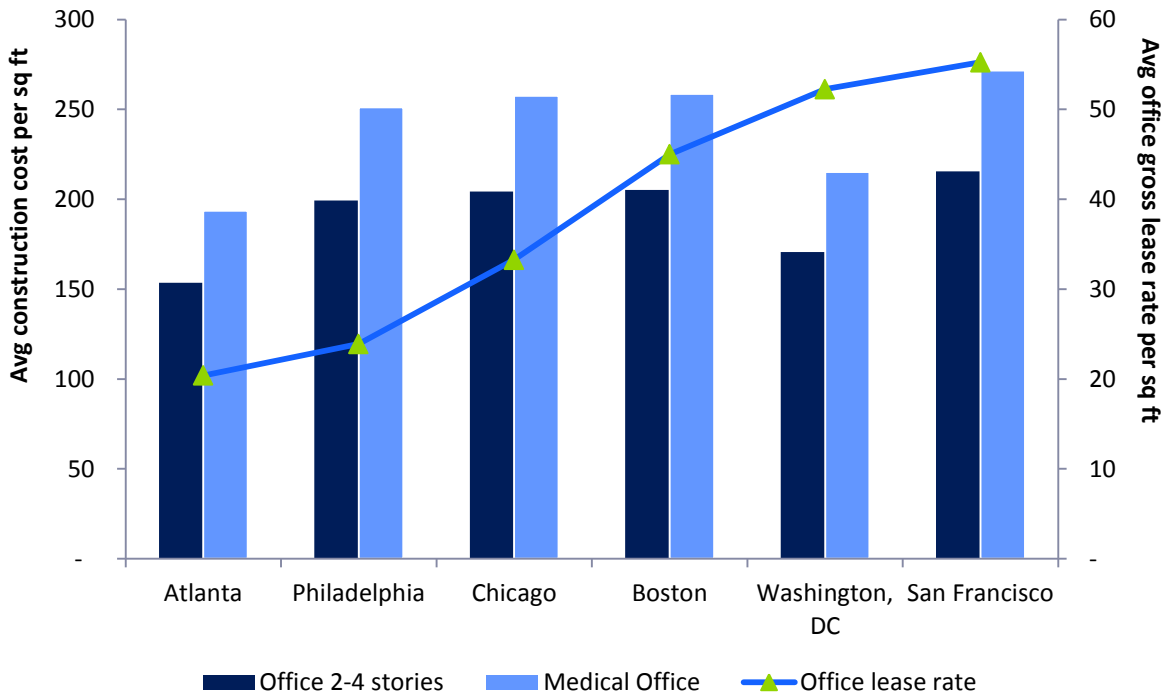
⁵ Sperling's, 2013

⁶ ERI, Companies with Revenue > \$100 million

Utility costs are generally more relevant for manufacturing operations. Power and water costs can vary by location, being particularly higher in some clusters, like Massachusetts, and lower in others, such as Georgia. For example, the average industrial electricity rates in Georgia are 5.96 cents per kWh and reach 13.05 cents per kWh in Massachusetts.⁷ Commercial water usage rates vary even more so in potential life sciences markets, ranging from \$2.95 per CCF with a monthly service charge of \$495 to \$4.65 per CCF with a monthly service charge upwards of \$1,900.⁸



Real estate costs can have a relevant impact whether a company chooses to own or lease. Higher population densities and limited land availability will drive up construction and lease rates by up to 30%, relative to less dense urban areas. This results in incremental capital expenditures and annual expenses in the millions, as seen in the table below. These figures should not preclude any location from consideration. Some states and localities will sometimes offer land grants and other construction incentives that provide compelling one-time and recurring cost savings.



7 EIA, 2013

8 Deloitte Research and Analysis

9 R.S. Means, 2012

10 CBRE, 2013

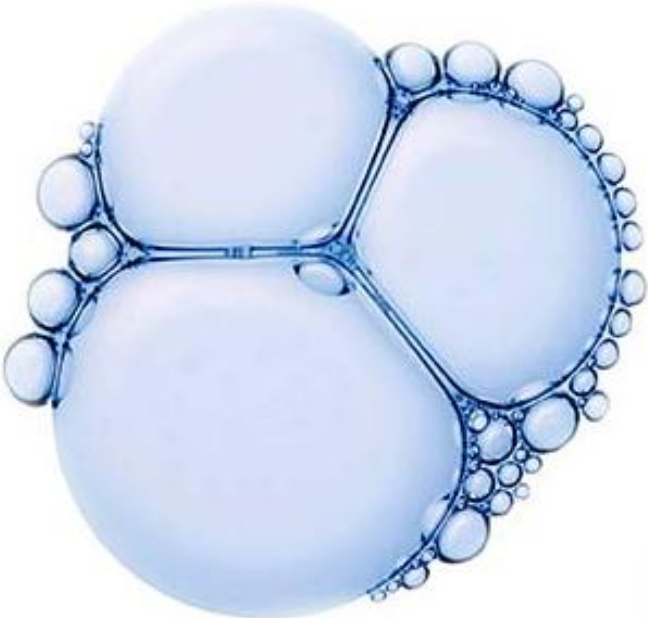
The tax climate of a U.S. state can have minimal to significant impact on a company depending on its tax structure, operations, margin and footprint.

At times, tax credits for companies go unrealized because R&D or manufacturing operations are cost centers and do not always recognize significant revenue. States that offer R&D tax credits and other related incentives, which are refundable or are credited against payroll taxes, can provide actual value for a business. The same rationale applies to companies that manufacture and realize revenue in a different state or simply operate at a loss, which is not uncommon, particularly in startup years.

Headquarters or manufacturing operations for companies with a diverse geographic footprint should also consider tax apportionment. “Single sales factor” states – those that only tax based on where a product is sold – will generally be preferable to states that look at in-state investment, headcount and sales in assessing taxes. It is important to note again that relevant impact can vary by company and tax structure.

Finally, a state’s fiscal health should be considered in order to assess the potential for long-term tax increases and volatility. State debt often leads to increased and creative taxation, especially if that state is facing stagnant population growth.

State	Corporate Income Tax	Apportionment
Georgia	6.0%	Single Sales
North Carolina	6.9%	Double-Weighted Sales
Massachusetts	8.0%	Sales or Double-Weighted Sales
California	8.8%	Single Sales
New Jersey	9.0%	90% Sales, 5% Payroll, 5% Property
Illinois	9.5%	Single Sales





Logistics

Large manufacturing operations rely heavily on proximity and accessibility to raw material suppliers and global destination markets; expedited shipping can be necessary due to customer need and limited product shelf life. Thus, manufacturing locations should ideally satisfy the following characteristics:

- Proximity to a large proportion of the U.S. population
- Easy air access to reach international locations
 - Europe currently is the second largest life sciences market to North America
 - In the near-term Latin America will be the most important developing market for U.S. life sciences companies
 - Over the long-run East and Southeast Asia present massive market opportunities

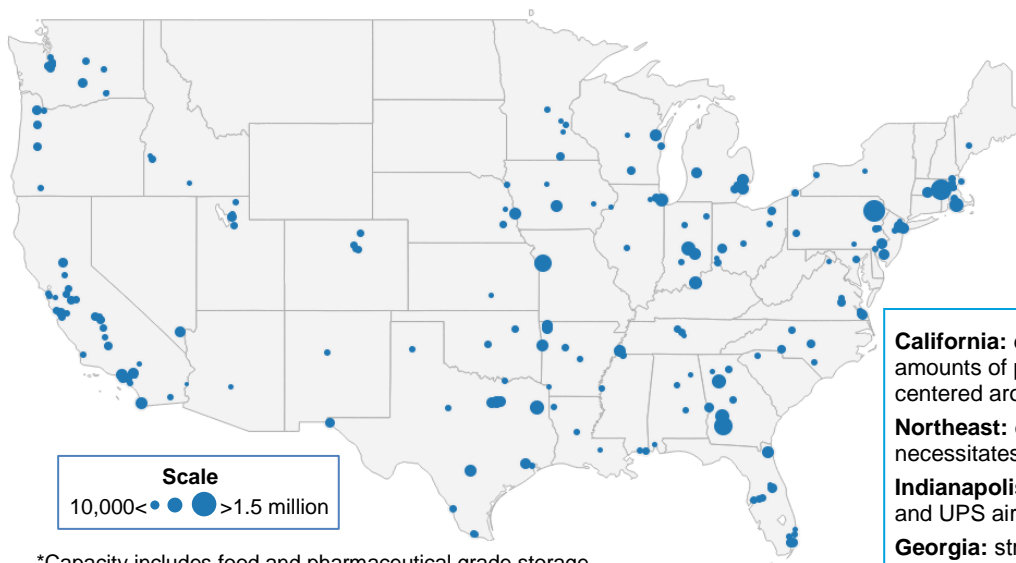
Percent of U.S. population within 1-day drive (500mi radius)¹¹

Atlanta	26%
Boston	22%
Chicago	27%
Philadelphia	33%
San Francisco	14%

Cold Chain

Pharmaceutical products requiring a temperature-controlled supply chain are costly and risky to store and transport. Installing and maintaining cold storage capabilities across the supply chain is expensive, and can be a problem at airports and ports with inadequate refrigerated cargo space. Companies that do not secure a total cold chain network before starting or increasing manufacturing operations are forced to spend additional time and resources on building those capabilities.

Cold Chain Storage Capacity, sq. ft.¹²



California: draws on massive amounts of produce transport centered around LAX and SFO

Northeast: dense population necessitates high capacity

Indianapolis / Louisville: FedEx and UPS airport hubs

Georgia: strength due to airport's domestic and international access

*Capacity includes food and pharmaceutical grade storage, indicative based on publically available information

11 Deloitte Research and Analysis

12 Hoovers



Regional Infrastructure

Manufacturing

The level of development and support of a location's physical infrastructure is crucial in determining suitable locations for manufacturing facilities. Regional entities that understand and support the long-term ROI of manufacturing projects create a stable manufacturing environment.

Utilities and Site Availability

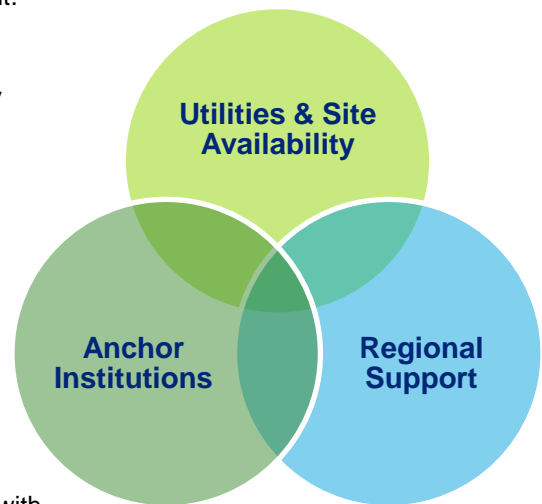
To be considered a viable candidate, a location must have readily available real estate that can provide power and water, and have accessible transportation infrastructure.

Anchor Institutions

Large companies, universities and training institutions create the diverse, stable labor force required to run a successful manufacturing operation.

Regional Support

Support for manufacturing from local and regional governments, as well as regional institutions such as manufacturing organizations, can help mitigate implementation risks associated with capital expenditures, training and integration into the regional ecosystem.



Research & Development

To launch a successful R&D facility, companies must understand how a region can or cannot sustainably support innovation. In this sense, a company should be less concerned with physical infrastructure than with the ideas and support that utilize it.

Novel Research

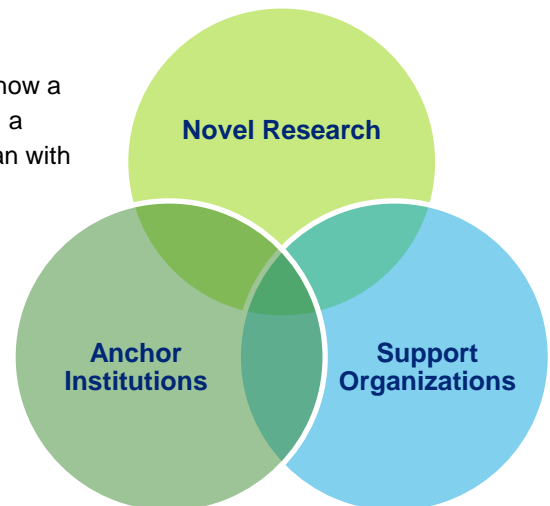
Academic and other research institutions create a culture of novel thinking around them, and support for academic-industry collaboration results in the development and commercialization of new ideas and products.

Anchor Institutions

Large companies, government entities or large hospital systems, help attract and maintain a stable talent pool. They also facilitate idea sharing.

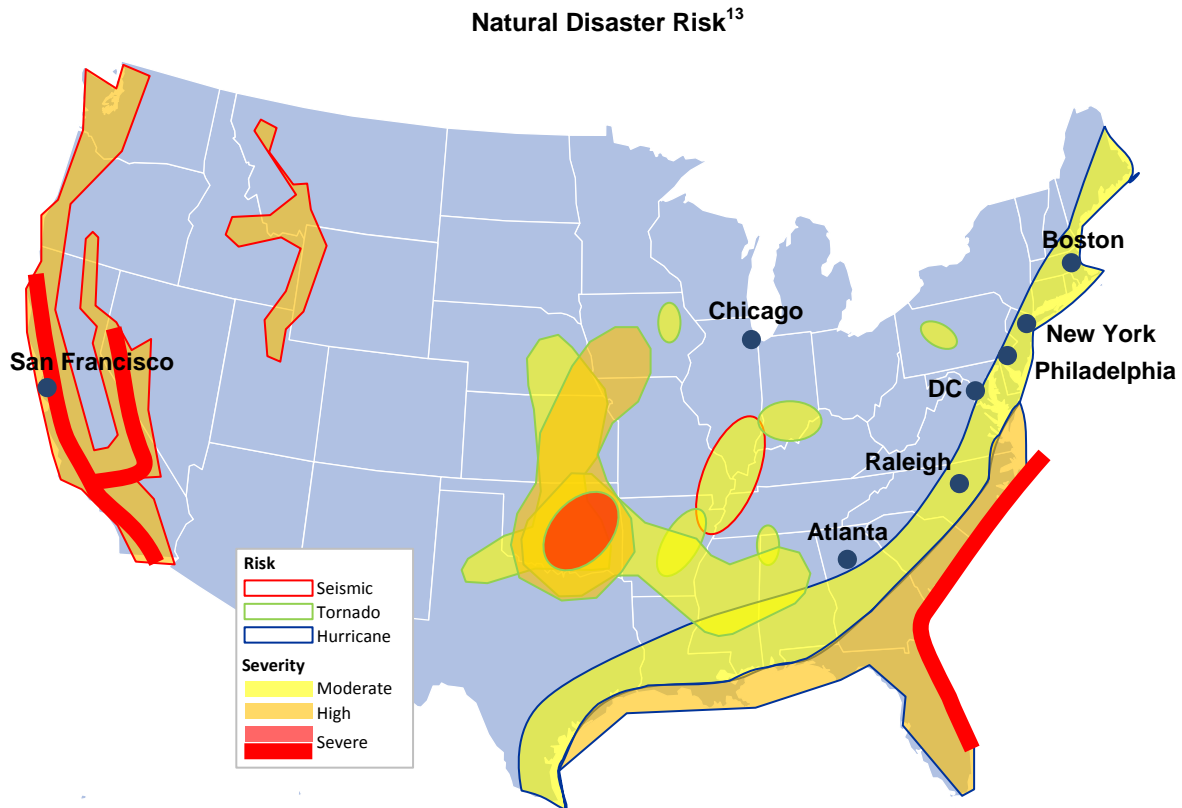
Support Organizations

Contract research organizations and contract manufacturing organizations provide external resources that R&D centers can utilize to mitigate the risk involved with larger capital expenditures that support riskier research and development.



Business Disruption Risk

In the U.S., natural disasters are some of the most significant business disruptors – unpredictably raising costs and lowering productivity. For life sciences manufacturing in particular, hurricanes, tornadoes and earthquakes can cause damage to power and transportation infrastructure, and stop or stifle regular production operations for extended periods of time. This can leave products, for which timely delivery is crucial, stuck in transport. Thus, both coasts and the central U.S. become less desirable than locations with low risk of experiencing disaster conditions – the west coast for seismic activity, the east coast for hurricanes and the central U.S. for tornado activity.



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Government Support

Given the complexity of the industry, dedicated government support to life sciences can positively impact a company's bottom line by improving the ease of doing business and providing cost-saving incentives. States and regions that understand how and why the life sciences industry is different than traditional industries can help significantly mitigate implementation risks.

For example, the complexity of regulations a company must address in order to establish a new manufacturing plant creates a longer ROI timeline for both private and public stakeholders relative to other industries.

Supportive government agencies design flexible programs that understand the ramp-up timeline of the life sciences industry, and some go as far as investing in industry labor training centers. Such flexibility and industry understanding should also have a range of tangential benefits such as proactive investments in the infrastructure needs of the life sciences companies it seeks to attract.

In addition to increasing market presence in a given location, government support can increase industry collaboration within a market by facilitating relationships throughout the life sciences value chain, which can significantly impact growth and innovation. Governments that support and interact with local businesses can provide visibility to local market needs, which companies often address through industry collaboration. Successful partnerships and other collaborative efforts initiated by government facilitation increase resource sharing that fosters new approaches to industry issues.

Bioscience Investment in Georgia

The support provided by the state of Georgia for a major bioscience investment near Atlanta in 2012 is a strong example of customized support for the industry. The company received headcount based tax credits, credited against payroll and waste water treatment infrastructure, to treat high Biological Oxygen Demand. Georgia also designed training programs specifically for this project at a state-of-the-art training center to be built for the bioscience industry.

In Summary

Identifying the right location for a biologics, pharmaceutical, medical device or related life sciences operation requires consideration of the above risks before making an investment decision. An effective decision will generally address two major risks: implementation timing and long-term sustainability.

Implementation Timing

Mitigating investment delays allows companies to avoid cost overruns associated with delays and, more importantly, to get their products to market more quickly and begin recognizing revenues. Timing delays are often impacted by the following reviewed risks:

- **Talent:** ability to find qualified labor and institutions to train personnel
- **Infrastructure:** access to robust utilities and industry services can mitigate significant cost overruns and time delays when building out a manufacturing or R&D site

- **Government Support:** a strong regional economic development network can help mitigate the above risks as well as provide fiscal support to accelerate investment times and reduce up-front investments

Long-Term Sustainability

The appropriate regional support, talent pool and cost structure will allow a company's operation to be viable for the long-term. Therefore, it is critical that companies conduct an informed analysis of relevant risks before making a significant long-term decision.

- **Talent:** a strong sustainable workforce with well-developed skills and manageable turnover reduces long-term disruptions and is critical in maintaining a high standard of quality
- **Costs:** baseline wages, utility costs, real estate and related overhead and subsequent inflation can put significant long-term pressures on operations, particularly with respect to manufacturing
- **Logistics:** regional infrastructure for cold chain (biologics and some pharma), air access and market access will be critical to meeting distribution needs for manufacturing operations, while the ability to access a location for key management and executives will be influential for R&D and related operations
- **Government Support:** strong government support should extend beyond operations ramp-up in areas such as talent training programs, expansion assistance, infrastructure issues and other regional business environment concerns

While some of these location and deployment risks may seem like common sense, companies often lose sight of them or fail to adequately compare tradeoffs to benefits. There are a wide range of professionals and organizations which can help provide valuable data and information to make a more informed decision, starting with the economic development agencies (ED) of the potential locations. A state or regional ED should understand the unique nuances of the industry such as GMP skills and validation timelines, small vs. large molecules, etc. and be able to address how their agency can help mitigate associated risks.

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