

The Economic Impact of Ben Franklin Technology Partners



SIXTH EDITION

Five-Year Report, 2017-21

Ben Franklin helped to create 16,006 high-paying jobs, generated \$400 million in tax receipts for the state, and boosted the commonwealth's overall economy by \$6.1 billion between 2017 and 2021. Every dollar invested by the commonwealth into Ben Franklin generates \$4 in additional state taxes.

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Executive Summary

The Pennsylvania General assembly created the Ben Franklin partnership in 1982 to spur economic growth and prosperity in the Commonwealth through technological innovation. Subsequently, through a series of legislative acts, the organization took its present form as the Ben Franklin Technology Partners (BFTP). Beginning in 1999, BFTP began to supplement its annual performance assessment with in-depth analysis of the impact of the program, completed at multi-year intervals. With the availability of several additional years of data since the last study—which was completed in 2017 and examined the period 2012 through 2016—BFTP commissioned another independent, in-depth evaluation of the impact of its funding and services on individual companies and the overall Pennsylvania economy. This study continues BFTP's efforts to objectively measure program impacts and gather information useful for planning. It covers the five-year period, 2017 through 2021.

Rather than rely on client reported impacts, the methodology used in this study compares the performance of BFTP clients directly to a comparison group of similar companies that did not receive BFTP assistance. This study design attempts to isolate program impacts from other factors affecting company performance. It is also the basis for estimating the additional value added, employment and tax revenues across the Commonwealth as a result of program investments from 2017 to 2021.

BFTP has, among its objectives, the improvement of the business environment in which technology-based companies operate in the Commonwealth. It works to achieve those objectives by providing capital and access to technical expertise and other business assistance. BFTP has invested in more than 5,100 companies across Pennsylvania since its creation, through its four independent non-profit affiliates. It also provides technical assistance to those companies, in addition to providing access to other resources, such as additional capital, professional and technical expertise. Many of the companies are at the earliest stages of development when BFTP first engages with them—the period when companies (technology-based and otherwise) are most vulnerable and when outside intervention is likely to be most important.

This study attempts to answer two questions:

- How do companies that receive BFTP funding perform with respect to job formation, relative to a comparable group of peers that do not receive BFTP intervention?
- How does the additional incremental economic and fiscal impact of BFTP intervention affect the Commonwealth of Pennsylvania's overall economy? This is measured as the additional Gross State Product (GSP) and tax revenue that would not exist except for the activities and investment of BFTP.

Key Findings: Program Impacts

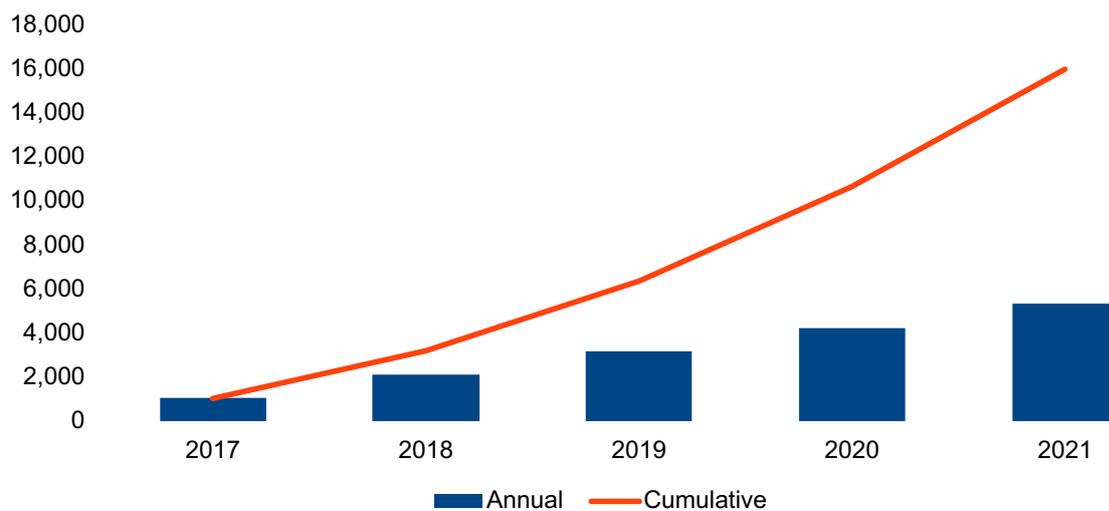
To determine BFTP's impact on funded client firms, the average change in employment performance was compared with the change in a comparison group of companies that did not receive assistance. To the extent that the two groups—funded and unfunded companies—are similar, estimated differences in performance can be attributed to BFTP program interventions.

The current analysis found that on average, BFTP clients employed 2.9 more people in each year following funding than they would have in the absence of such investment. In aggregate, the BFTP program generated almost 5,900 additional jobs in client firms between 2017 and 2021. Those jobs are in industries that pay annual salaries roughly 29 percent higher than the average private sector salary in Pennsylvania.

Client impacts rippled throughout the Pennsylvania economy, contributing to higher gross state product and additional employment across the state. From 2017 through 2021, BFTP generated an additional 10,132 jobs in Pennsylvania beyond those in client firms. The result was that BFTP produced a total of 16,006 jobs in the Commonwealth between 2017 and 2021 that would otherwise not have existed.

Figure 1

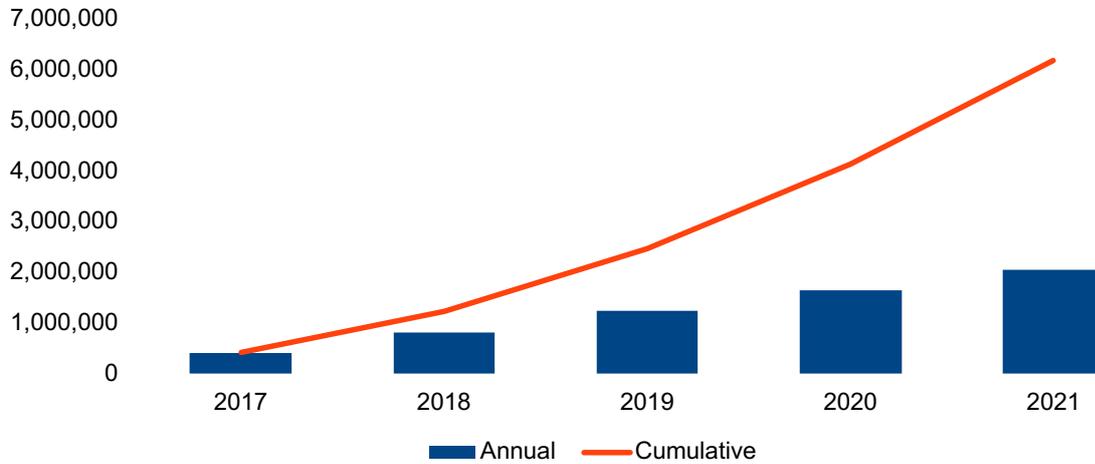
Impact of Ben Franklin Technology Partners on Statewide Employment, 2017-2021



Gross State Product (GSP), a measure of the value of total economic activity was boosted by \$6.2 billion between 2017 and 2021, as a result of the direct impacts on client firms and subsequent multiplier effects due to BFTP client-related investments during the period.

Figure 2

Impact of Ben Franklin Technology Partners on Gross State Product, 2017-2021 (\$000)



From 2017 through 2021, the Commonwealth received \$352 million in additional state tax receipts as a direct result of BFTP investments in client firms. Another \$48 million in state tax receipts flowed from related BFTP client services, for a total increase of \$400 million in state revenue due to BFTP. New state tax revenue generated because of BFTP represents a 4 to 1 payback to the Commonwealth on its \$101 million investment during that period.

Cumulatively, since 1989, BFTP has generated 58,000 additional jobs in client firms and 101,000 additional jobs beyond those in client firms. The result has been 159,000 additional jobs in Pennsylvania that would not exist were it not for the activities of BFTP.

Section One: Introduction

This study is intended to quantify the economic impact to the Ben Franklin Technology partners (BFTP). This report is divided into seven sections. Following this introduction, Section Two reviews the mission of the BFTP. Section Three describes the types of companies that comprise the BFTP investment portfolio. Section Four presents an analysis of the impact of the program on BFTP clients during the period from 2017 to 2021, focusing on the degree to which BFTP clients increased employment as a direct result of financial and technical assistance provided by BFTP. Section Five presents an assessment of the impact of BFTP on the overall economy of the Commonwealth of Pennsylvania during the period 2017 to 2021. Section Six describes the cumulative impact of the BFTP since 1989. The final section summarizes the principal conclusions of the study. The Appendix provides a description of the methodology employed for this analysis.

In 1982 the Pennsylvania General Assembly established the Advanced Technology Centers of the Ben Franklin Partnership to promote technological innovation and economic growth in the Commonwealth. Since then, through subsequent legislation, the organization took its present day shape as the Ben Franklin Technology Partners (BFTP). The BFTP accomplishes its mission through a broad range of activities, including investments in technology-based companies, provision of business and technical assistance, support to university-based centers of excellence, development of business incubators and research parks and the promotion of greater collaboration between businesses, academia, investors and government.

BFTP has retained independent, outside consultants to evaluate the economic impact of its program five times in the past. Similar methodologies were used each time (i.e., 1999, 2003, 2009, 2012, 2017). The first study considered the period 1989 to 1996. The next report furthered the analysis by including new data and extending the study period through 2001. The third study examined the period 2002 to 2006. Interim studies covered the periods 2007 to 2011 and 2012 to 2016, leading to this study, which covers the period 2017-2021. As with earlier analyses, this report covers two interrelated impacts of BFTP's financial and technical intervention:

- The impact that BFTP has on companies that receive support;
- The impact that BFTP-funded clients have across the aggregate Pennsylvania economy.

This study compares the performance of BFTP funded clients to a group of similar companies that did not receive assistance from BFTP. This approach tries to isolate program impacts from other factors affecting company performance—such as firm size, industry trends and general economic conditions. This comparative analysis provides a basis for estimating the additional value-added, employment and tax revenues accruing to Pennsylvania as a result of the BFTP program. This analysis examines the impact of the BFTP's new client company investments from 2017 to 2021. It also considers the cumulative programs impact since 1989, the earliest year for which data are available.

As has been the case each time this study has been conducted, the unique economic conditions in place in the Commonwealth and across the United State played a role in the results. In this case, the COVID-19 pandemic was a significant background event, creating extraordinary economic conditions, for the last third of the period under examination (March, 2020 through December, 2021).

Section Two:

Program Background

The Ben Franklin Technology Partners (BFTP) was established to promote technological innovation and economic growth in the Commonwealth of Pennsylvania. The BFTP consists of four independent, nonprofit affiliates established to serve different regions of the state:

- **Ben Franklin Technology Partners of Central and Northern Pennsylvania (BFTP/CNP)**, headquartered in University Park;
- **Ben Franklin Technology Partners of Northeastern Pennsylvania (BFTP/NEP)**, headquartered in the Lehigh Valley;
- **Ben Franklin Technology Partners of Southeastern Pennsylvania (BFTP/SEP)**, headquartered in Philadelphia;
- **Innovation Works, the Ben Franklin Technology Partner of Southwestern Pennsylvania (BFTP/IW)**, headquartered in Pittsburgh.

Together, these organizations' provide comprehensive coverage across the Commonwealth. BFTP undertakes a wide range of initiatives in areas related to its core mission and relevant to the needs of each region. While subject to statutory requirements and program guidelines, each of the independent affiliates is responsible for setting its own strategic agenda, defining specific activities and managing its own investment portfolio. The common goal of BFTP is to spur the growth of companies in technology-based industry sectors, leading to job creation and retention, and an increase in Gross State Product in the Commonwealth. BFTP accomplishes its goal through three primary activities:

Financial investment. Statewide, BFTP makes investments in technology-based companies, primarily to help cover costs associated with commercialization activities. BFTP investments serve as a bridge between personal, friends and family funding and third-party capital. The spectrum of financial investment activities includes: identification of potential investment opportunities; proposal review; selecting promising projects and/or companies for investment; monitoring progress toward identified milestones; and identifying opportunities for follow-on or supplemental investment through outside investors.

Business and technical assistance. BFTP also provides business and technical assistance to technology-based companies, spanning a wide range of service offerings, from short-term technical problem solving to ongoing business counseling over extended periods. Assistance may be provided by BFTP staff based on their own expertise and experience or through appropriate third-party service providers. The offices of BFTP draw on an extensive network of contacts within state and local economic development agencies, financial institutions, academic institutions and private consultants to provide needed clients services. The BFTP regional organizations operate across the Commonwealth in a space to which they are uniquely suited and that is largely ignored by other organizations. It is likely that no other single

institution has the reach nor the collective institutional knowledge of technology-based entrepreneurship that BFTP has in the Commonwealth.

Regional infrastructure building. The regional offices of the BFTP organizations promote the development of the infrastructure needed to grow and sustain technology-based companies within those respective regions and the Commonwealth. These efforts include (but are not limited to) the establishment or support of university-based centers of excellence, business incubators and research parks, venture capital funds, angel investor networks and other initiatives designed to address particular issues that may constrain the growth of technology-based companies within the Commonwealth.

Changes in behavior and actions within firms are necessary ingredients for improved performance. In return for the assistance it provides, BFTP expects that companies will modify their strategic and operating plans, make necessary investments in R&D and capital equipment, upgrade worker skills and modify certain critical processes as necessary. In return, such actions are intended to yield a variety of performance improvements and thereby aid in increasing value added, sales and profitability. As a corollary, BFTP expects that growth in innovative, high performance client companies will produce broader economic benefits across the Commonwealth of Pennsylvania, including increased employment in high wage jobs.

The BFTP regional organizations are regarded as crucial elements of the business, academic and economic development ecosystems in their respective coverage areas. Over the years, they have helped identify specific needs within their respective regions and have launched various initiatives designed to promote innovation in the growth of technology-based businesses. BFTP helps build and strengthen Pennsylvania's innovation economy through its impacts on regional infrastructure and the expansion of financial, human and physical capital available to technology-based companies across the Commonwealth.

BFTP helps clients grow by providing them with capital as well as technical and business assistance. While BFTP's involvement in various regional initiatives is significant, the bulk of organizational effort is focused on making investments in individual companies and providing related business and technical assistance.

Each BFTP regional affiliate's office staff conducts extensive outreach to ensure that companies in its region are aware of the programs that are available. BFTP staff meets with individual entrepreneurs and representatives of existing firms to review needs and discuss potential funding opportunities. If warranted, companies are encouraged to submit proposals. Funding awards are often provided in stages, corresponding to project milestones. Many companies are eligible for follow-on funding if they achieve satisfactory progress toward agreed-upon milestones.

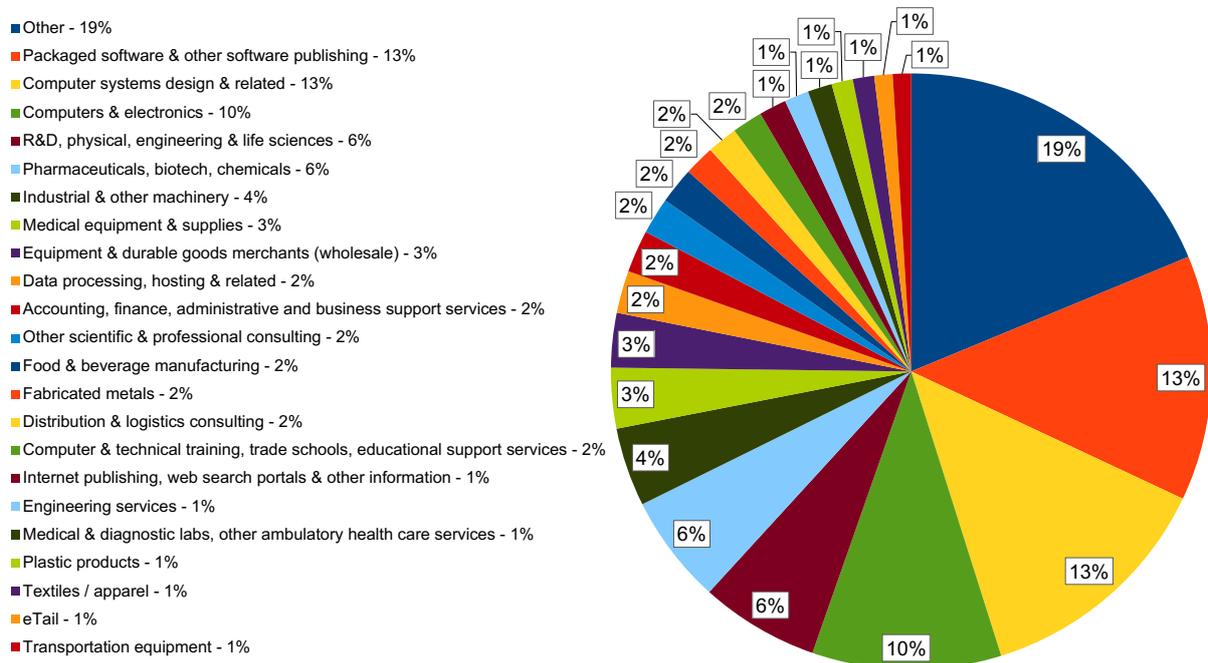
BFTP investments are made through a process that includes both staff and peer review, with considerable due diligence of the proposals that are submitted. While there is regional variation in the process, in most cases third-party experts identified by the respective regional affiliates also review the proposals submitted by applicants to assess the technical, business and commercial merits of proposed projects. Where necessary, companies are asked to clarify or elaborate further on different aspects of their proposals and, if necessary, to resubmit.

Applicant companies are asked a series of questions concerning the objectives of the project, specific tasks and milestones, roles and responsibilities of participating organizations, qualifications of key personnel and expected results. Investments are made based on the recommendations of BFTP staff with input from the reviewers, and are subject to the availability of funds and final regional board approval. Regardless of funding decisions, all applicants are provided with feedback and recommendations regarding potential next steps.

Section Three: BFTP Investment Portfolio, 2017-2021

It is important for BFTP to maintain a large and diverse investment portfolio and to provide sufficient investment in every case to successfully achieve program goals. BFTP works with individual entrepreneurs, early-stage and established companies in a wide range of technology-based industry sectors. BFTP clients come from a variety of industries—from computer software, hardware, telecommunications, Internet publishing and eTail firms, to a variety of industrial machinery, fabricated metal and plastics manufacturers, to life science companies, including pharmaceutical manufacturers, biotech firms, instrumentation, robotics, medical device and diagnostic companies companies. BFTP clients in these industries are innovative and technology-intensive, investing in research and development, intellectual property, capital equipment and highly skilled labor. According to data maintained by the centers, BFTP invested over \$76 million in 612 companies between 2017 and 2021 and \$101 million overall. In other words, some funding was provided to community colleges, universities and local economic development organizations for economic development infrastructure initiatives—but the majority of funds went directly to entrepreneurs in early-stage as well as established companies.

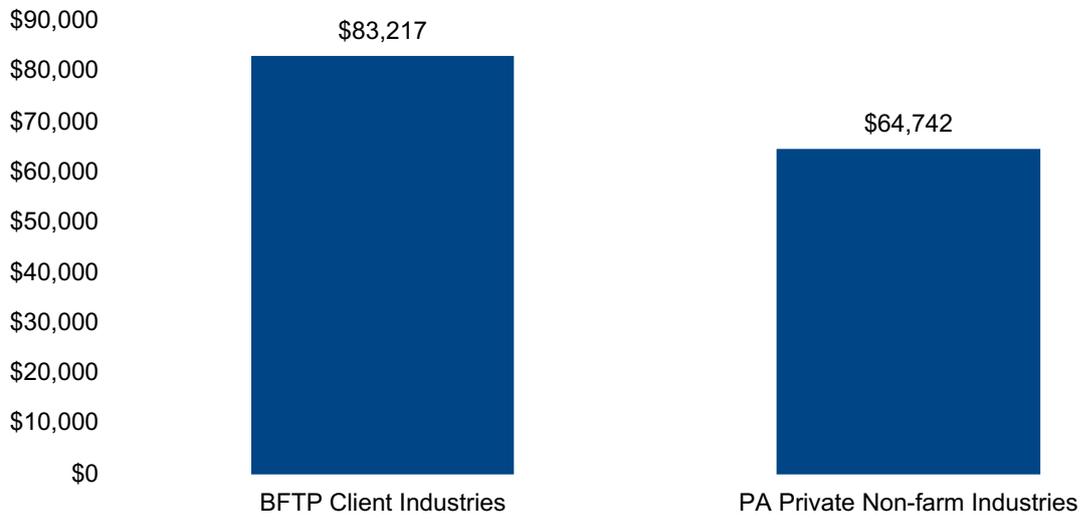
Figure 3



BFTP clients are in industries that pay relatively high annual salaries and wages. Given the client industry profile of BFTP funded companies, the weighted average annual salary for client industries is \$83,217, or 29 percent higher than the average for all private nonfarm industries in the Commonwealth (\$64,742; 2021 data).

Figure 4

Average Annual Wage (2021): BFTP Client Industries, PA Private Non-farm Employment



Section Four:

Program Impacts, 2017-2021

Given the interests of stakeholders and the availability of data, analysis was conducted to determine the impact of BFTP on employment within client firms. The analysis examined whether the number of employees from 2017 through 2021 in companies that received initial BFTP funding in 2017 or later, grew more than for similar companies in the Commonwealth of those that received funding. For this study, client firms were compared with other companies in the Commonwealth in similar industries. To the extent that the two groups have similar characteristics, differences in performance can be attributed to BFTP's intervention.

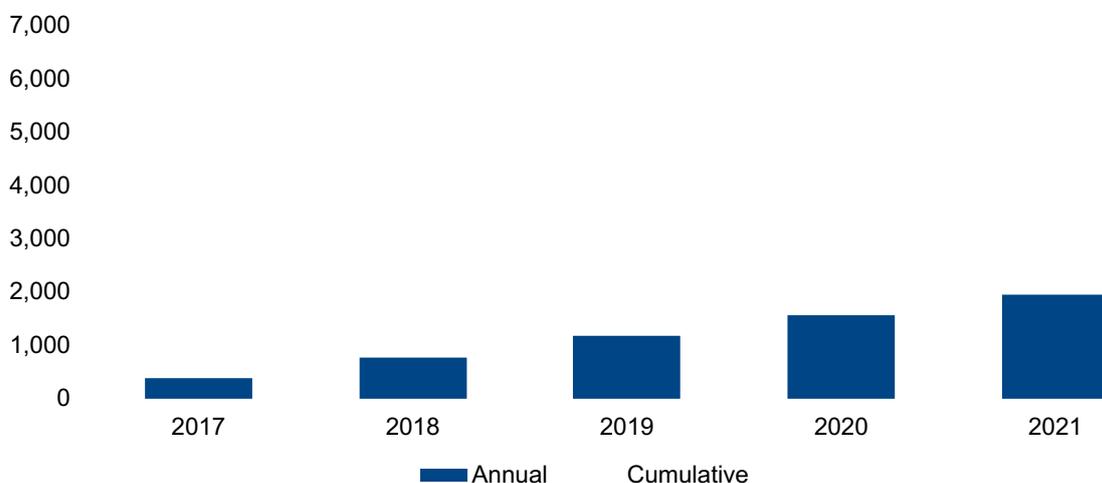
The results demonstrate that BFTP has a direct, positive impact on employment within client firms. Using this design, it was determined that:

- **On average, for the period 2017 through 2021, BFTP client firms employed 2.9 more people in each year following funding than they would have in the absence of BFTP investment.**
- **In aggregate, BFTP generated 5,874 jobs in client firms between 2017 and 2021 as a result of new investment during the period.**

These are jobs in client firms that would likely not have existed except for the BFTP intervention and investment. Employment gains increase each year as new companies are added to the roster of BFTP clients and as existing client companies continue to retain and create new jobs due to the BFTP investment in earlier years. As a result, there were more jobs in BFTP-funded companies at the end of the period than at the beginning.

Figure 5

Impact of BFTP Program on Employment in Client Firms, 2017-2021

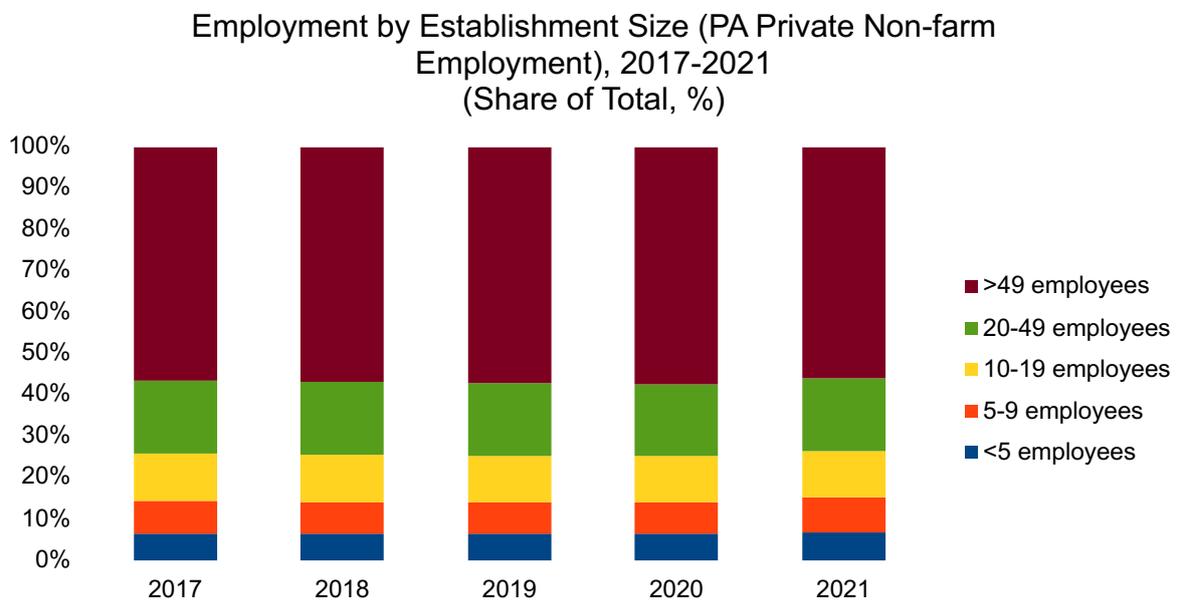


Impact of BFTP on Employment in Client Firms, 2017-2021	
Additional jobs (direct)	5,874

While the majority of BFTP clients added employees, a smaller group accounted for the bulk of the gains. The concentration of employment growth among a subset of firms is not surprising. History has shown that a relatively small percentage of firms and innovations achieve dramatic success. This demonstrates the skewed nature of returns to innovation and also highlights some of the risks associated with venture investing.

While the methodology employed here is similar to that employed for earlier studies of BFTP's economic impact, there have been changes to the labor force which may affect direct employment in BFTP client firms. Changes in skill levels, educational attainment, use of contract consultants and outsourced labor, are among the many factors that affect company employment nationally and in the Commonwealth. In particular, the use of outsourced labor and contract workers may not be captured in this analysis. In the economic data, such workers are called either nonemployer workers (and nonemployer firms) or contingent workers. Labor and occupational data agencies continually find it difficult to quantify how large these components of the workforce are. Those efforts have been further hampered by the onset of the COVID-19 pandemic, which covered one-third of the period under examination here (March, 2020 through December, 2021). Employment trends were abruptly interrupted when the pandemic struck.

Figure 6



Section Five: Economic and Fiscal Impacts, 2017-2021

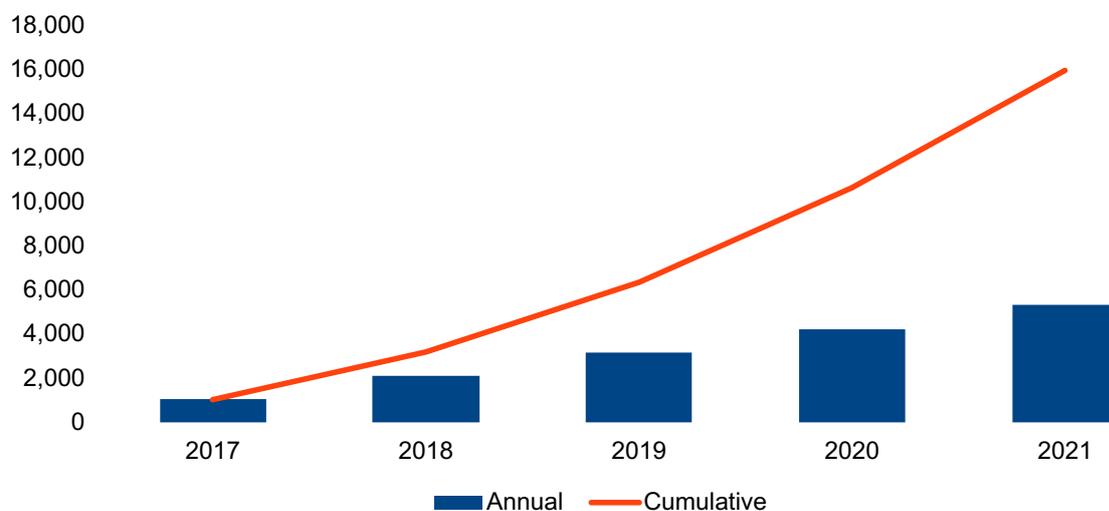
The performance of BFTP clients has consequences for the overall Pennsylvania economy. Impacts on client firms ripple throughout the economy, giving rise to additional added value and employment around the state. The operation of BFTP client firms (“direct impact”) requires the purchase of goods and services from other firms and those firms purchase additional goods and services, in turn. Each additional round of spending (“indirect impact”) also generates income for employees associated with the respective firms. Those employees make purchases such as food, clothing, housing (or rent), entertainment and personal services (“induced impact”) to supply their households. Each round of spending or recirculation is further removed from the initial, direct investment but multiplies its impact throughout the economy—by generating additional jobs and Gross State Product (GSP). Finally, all of the economic activity generated by BFTP’s programs affects state and local tax receipts in the Commonwealth, based on jobs created and goods and services purchased. The direct, indirect and induced multiplier effects as well as fiscal—tax—effects are calculated with the assistance of economic models.

- **Between 2017 and 2021, BFTP generated a total of 16,006 additional jobs in Pennsylvania from investment in client firms.**

As noted in the previous section, between 2017 and 2021, as a result of new company investments, BFTP generated 5,874 additional jobs that would not otherwise be in client firms. As the direct impacts ripple through the economy, an additional 10,132 jobs were generated in other companies and organizations across the state. A total of 16,006 jobs were created that would not otherwise have existed in the Commonwealth between 2017 and 2021 without the new investments in client firms made by BFTP.

Figure 7

Impact of Ben Franklin Technology Partners on Statewide Employment, 2017-2021



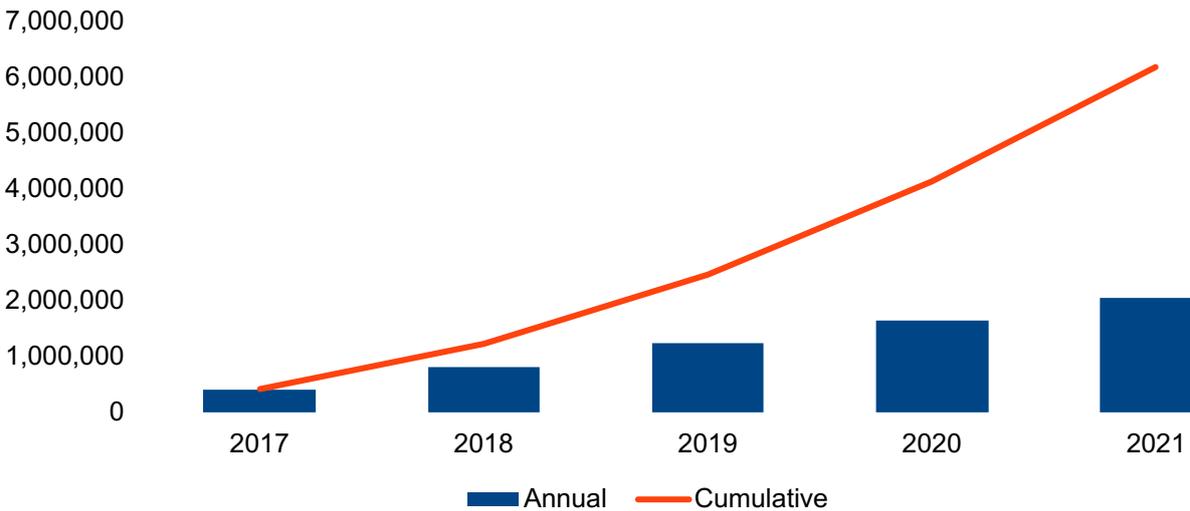
Total Statewide Employment Impact of BFTP Program, 2017-2021	
Total additional jobs in state (direct + indirect)	16,006

Gross State Product (GSP) is a measure of total economic activity in the state. It is equal to the total output produced in Pennsylvania less the cost of intermediate goods and services. As a gauge of value-added, GSP is roughly equivalent to employee compensation, business profits and other income in the state.

As a result of the direct impacts on client firms and subsequent multiplier effects due to BFTP client-related investments made during the period, BFTP boosted the Pennsylvania economy by \$6.2 billion between 2017 and 2021.

Figure 8

Impact of Ben Franklin Technology Partners on Gross State Product, 2017-2021 (\$000)



BFTP also had a positive impact on the state treasury during the period. The additional economic activity spawned by BFTP has an impact on the Commonwealth's fiscal situation. Between 2017 and 2021, the Pennsylvania Treasury received \$400 million in additional state tax receipts as a result of BFTP investment during the period—including \$352 million as a result of direct investment in client firms and \$48 million as a result of other BFTP client services and spending.

Fiscal Impact of BFTP Program, 2017-2021	
Additional state tax receipts	\$400 million

That represents a 4-to-1 payback to the Commonwealth on its \$101 million investment during the same period.

Section Six: Cumulative Economic Impact, 1989-2021

Given the interest of stakeholders and the availability of data, to this point the analysis and discussion within this report has been related to the period 2017 to 2021. The methodology for this study was essentially the same as was utilized during prior statewide BFTP economic impact studies (i.e., 1999, 2003, 2008, 2012, 2017). To review, the first study considered the period 1989 to 1996. The next report extended the study by including new data and analysis relating to the period 1997 through 2001. The third study included the period 2002 to 2006. In 2012, the study was updated to include the period 2007 through 2011, and in 2017, the period 2012 to 2016 was included. This study updated the analysis by looking at 2017 through 2021. The analysis that follows relates to the cumulative period, 1989 to 2021.

Based on further analysis, BFTP generated 58,000 additional jobs in client firms over the period since 1989. These are jobs that would not have existed except for BFTP investment. Commonwealth employment grows as new companies are added to the roster of BFTP clients. As they mature, successful firms that received BFTP investments in earlier years “assimilate” into the macroeconomy, at which time other effects predominate to influence firm behavior.

In addition to the 58,000 additional jobs in client firms since 1989, as the impact rippled through the economy, an additional 101,000 jobs were generated in other companies and organizations across the Commonwealth. The total of 159,000 jobs that were created would not have existed in Pennsylvania without the new investments made by BFTP in client firms since 1989.

Gross State Product (GSP) measures total economic activity in the state. It is equal to the total output produced in Pennsylvania less the cost of intermediate goods and services. As a result of the direct impact on clients and subsequent multiplier effects beginning with BFTP client-related investments and services, BFTP boosted the Pennsylvania economy by \$30 billion since 1989.

Section Seven:

Conclusion

BFTP was established to promote technological innovation and stimulate job growth and economic well-being across the Commonwealth. This evaluation demonstrates that companies across Pennsylvania benefit from the assistance provided by BFTP. Individually, portfolio companies have developed new products and services, built management teams, established production capacity, identified new markets and increased sales as a direct result of BFTP investment programs. BFTP programs have generated substantial public benefits in terms of an increase in employment and income in Pennsylvania, along with an expansion of the state's tax base.

An analysis of economic impacts of the program for the years from 2017 to 2021 demonstrates that BFTP is fulfilling its mission as summarized below:

- The BFTP program boosted the Pennsylvania economy by \$6.2 billion.
- The Commonwealth received \$352 million in additional state tax receipts as a direct result of BFTP investments in client firms. Another \$48 million in state tax receipts flowed from related BFTP client services, for a total increase of \$400 million in state revenue due to BFTP.
- New state tax revenue generated because of BFTP represents a 4-to-1 payback to the Commonwealth on its \$101 million investment in BFTP.
- The BFTPs generated 5,874 jobs in client firms. These jobs are in industries that pay annual salaries 29% higher than the average private nonfarm salary in Pennsylvania.
- Client revenues, purchasing and investments rippled throughout the Pennsylvania economy, giving rise to higher employment across the state. BFTP generated an additional 10,132 jobs beyond those in client firms, for a total of 16,006 new Pennsylvania jobs.
- BFTP clients employed, on average, 2.9 more people in each year following funding than they would have in the absence of BFTP investment.

Cumulative impact of Ben Franklin Technology Partners, 1989-2021:

- BFTP boosted the state economy by more than \$30 billion.
- BFTP generated 58,000 jobs in client firms.
- BFTP generated 101,000 additional jobs as a result of increased purchasing and investment by client firms, yielding a total of 159,000 additional jobs attributable to BFTP's work.

BFTP continues to be a catalyst for technology-based entrepreneurship and technological innovation, as well as a driver of economic growth. BFTP is among the most widely known and emulated state technology-based economic development programs in the nation. By providing capital and expertise to early-stage startups and established companies, as well as promoting the development of a statewide infrastructure favorable to technology-based companies, BFTP generates immediate economic gains while strengthening the foundation for continued economic growth.

Appendix

The methodology used to obtain results for the period 2017 to 2021 consists of two parts:

- Part One: Microeconomic analysis—calculating client impacts
- Part Two: Economic modeling—calculating aggregate (statewide) impacts

The first part of the study used regression techniques to calculate the impact of the program on employment growth within client firms. The second part of the analysis used economic modeling techniques to calculate macroeconomic and fiscal effects resulting from client impacts and other expenditures by BFTP. The process steps are discussed in more detail below.

Microeconomic analysis—calculating client impacts

Regression analysis is the statistical procedure that explains the degree to which the variation of the dependent variable—in this case, company level employment—can be explained by the variation of one or more independent variables such as firm size, industry trends, general economic conditions and whether a company was a client of BFTP or not. Regression analysis provides an answer to the question: On average, have BFTP clients increased employment more than they would have in the absence of the program? The analysis focused on changes in employment given the nature the program, interests of stakeholders, availability of data and precedent established by earlier iterations of the study.

To create a comparison group, BFTP-funded company client record were compared with similar non-client companies operating in the Commonwealth. The goal was to develop a representative sample non-client comparison group.

Economic modeling—calculating aggregate (statewide) impacts

The regression analysis explains how many more employees per year the average BFTP client has than similar non-client companies. Additional jobs created as a direct result of the program can be said to be client impacts due to BFTP activity during the period 2017 through 2021.

BFTP client impacts ripple through the economy, giving rise to additional Gross State Product and employment across the state. BFTP funding has additional economic impact by creating demand and employment that would otherwise not exist in Pennsylvania. The new employment creates a larger impact on the Pennsylvania economy through economic multipliers and the so-called “multiplier effect.” Multipliers quantify the total impact within the Commonwealth of successive rounds of spending that occur as direct BFTP investments leading to new employment generate additional business for other firms and residents of the state. Those entities make even more purchases and generate additional rounds of economic activity.

Analysis of these multiplier effects is based on estimates derived from a regional economic model developed by the US Department of Commerce' Bureau of Economic Analysis (BEA). Known as the Regional Input-Output modeling System (RIMS II), the model estimates the impact of spending by a given industry on a region — in this case, Pennsylvania. Within a defined region, the RIMS II model measures the extent to which an investment in one industry affects all other industries in that region and, ultimately, the region's economy. Systematic analysis of economic impacts must account for the inter-industry relationships within regions because these relationships largely determine how regional economies respond to project and program changes.

Regional input-output (I/O) multipliers account for inter-industry relationships within regions, and are useful tools for conducting regional economic impact analysis. RIMS II multipliers have been used in a wide variety of studies to analyze the economic impact of projects and events on state and local areas. Users can be found inside government, the private sector and academia. The accuracy of RIMS II has been documented through a number of studies comparing RIMS II multipliers and analyses based on the RIMS II model with results from other economic models.

The RIMS II model allows for calculation of three economic impacts:

- 1. Economic output—the value of goods and services produced in the state (GSP)**
- 2. Employment—number of jobs in the state**
- 3. Employee earnings—wage and salary income associated with the affected jobs.**

Using the RIMS II model to calculate economic impacts of BFTP is a multi step process. Gross State Product is calculated for each year that BFTP clients add employment.

Cumulative economic impact for the BFTP program was computed using historic data combined with sensitivity analysis to account for the difference in direct impact on firms receiving BFTP funding, as documented by this and earlier studies. RIMS II was used to calculate current period analysis.

The RIMS II modeling system is meant to estimate demand shocks to the economy, not supply shocks, as the COVID-19 pandemic has created. Disruptions to supplies of goods and services, as well as non-economic changes to household and business behavior are not within the scope of the model.

Case Studies

As a statewide initiative serving all 67 counties through four regionally based centers in Pittsburgh, State College, Bethlehem, and Philadelphia, Ben Franklin Technology Partners has become one of the most widely known and emulated state technology-based economic development programs in the nation. The following case studies provide examples of how each of the Ben Franklin's investment strategies are helping early-stage technology firms and established manufacturers grow and thrive.

Biomeme (Southeastern Pennsylvania)

Biomeme is a biotechnology developer whose portable platform can transform a smartphone into a mobile lab for advanced DNA diagnostics and real-time disease surveillance. Their system includes a docking station, a mobile app to control the system and analyze results, and test kits for identifying pathogens or diseases by their specific DNA or RNA signatures. The cutting-edge platform performs to the gold standard used by the world's most advanced central labs, without the need for lab equipment or specialized experience.

Since 2013, BFTP Southeastern PA has supported Biomeme with investments totaling \$2.28 million, along with mentorship, technical assistance, access to resources, and more.

Quick Facts

Philadelphia

County of Operation

**Biotechnology/
DNA Diagnostics**

Industry

400

Number of Employees

2012

Year Established



Solving Wicked Problems through Diagnostic Testing

Biomeme was co-founded ten years ago by Marc DeJohn (an engineer), Max Perelman (a business leader), and Jesse vanWestrienen (a biologist). With a vision to empower anyone, anywhere with the kind of capabilities of the molecular lab in the palm of their hand, the team grew exponentially during the course of the COVID-19 pandemic.

There isn't a company that's seen more change over the last few years than Biomeme, according to Marketing and Product Manager, Tom Cook. The company recently opened a new HQ that hosts laboratories, testing, manufacturing, office administration, operations, and more, bringing all of Biomeme's work under one roof.

COVID-19 wasn't the first viral outbreak that originated in an animal species, nor will it be the last. Cook referred to instances like this as "wicked problems"—problems that have interdependent factors that can make them seemingly impossible to solve. The team hopes to hit the quadruple aim: improve outcomes, decrease costs to the health system, improve the patient experience, and improve the physician experience.

Cook explained that Biomeme intends to roll out a range of diagnostics over the next few years, including waterborne pathogen panels, foodborne pathogen panels, mosquito vector-borne pathogen panels, and respiratory panels.

Ben Franklin Technology Partners Economic Impact Update Case Study
produced by Econsult Solutions, Inc.

Ben Franklin Tech Partners Engagement

BFTP Engagement Facts

Date of first engagement	2013
Total investment to date	\$2,280,000

From Prototype to Pandemic

The Biomeme team was able to successfully raise \$1.9 million within its first few years. “That early funding [\$400,000 from BFTP] was really key in giving Biomeme the confidence that helped other investors come on board,” explained Tom Cook, who now heads the Marketing and Product Management team. “It allowed them to expand the team and their equipment, and rapidly achieve product development from proof of concept in a garage, to an actual prototype, and then eventually to a product that was delivered to the market.”

While Biomeme was well-suited for growth during a pandemic, the company acknowledges the value BFTP has continued to provide, and how that’s helped the team stay successful. BFTP helped track down critical equipment amid a global supply chain breakdown. Support also came in the form of additional funding. Through its Global Opportunity Philadelphia Fund I, BFTP was able to get additional funding to Biomeme during the pandemic. An additional investment of \$1.5 million helped the team to scale up manufacturing in order to meet the high demand of COVID-19 testing, as well as open a new HQ and hire enough employees to support the growth.

Types of Engagement:



Fundraising support



Mentorship



Hiring / HR support



Technical Assistance



Networking



Access to resources

Econsult Solutions, Inc. is a Philadelphia-based economic consulting firm that provides businesses and public policy makers with economic consulting services in urban economics, real estate economics, transportation, public infrastructure, development, public policy and finance, community and neighborhood development, planning, as well as expert witness services for litigation support.

Custom Processing Services (Northeastern Pennsylvania)

Custom Processing Services is a custom toll processing technical master, helping clients around the world fast-track projects, exceed business goals, and drive overall success. Their mission is to be the foremost global contract manufacturer for any processing solution: milling, contract drying, blending, extraction, extrusion, or specialty processing.

Since 2000, BFTP Northeastern PA has invested in Custom Processing Solutions seven times for a total of approximately \$358,000. BFTP first worked with CPS as an early-stage firm, and currently supports them as an established manufacturer.

Quick Facts

Berks

County of Operation

Nanotechnology Research & Manufacturing

Industry

200

Number of Employees

2000

Year Established



Helping Customers Develop New and Efficient Processing Solutions

Founded in 2000 by President Gregg Shemanski and Vice President Jeff Klinger, Custom Processing Services has been meeting customers' toll processing needs for over 20 years. Shemanski and Klinger worked closely with BFTP and within six months of opening their doors, the company was cash flow positive. Since then, the company has experienced double-digit growth year after year.

Much in the way that Ben Franklin provides guidance to startups, Custom Processing Services provides guidance to their customers. They can process materials to a customer's specifications, but they've found in their two decades years of business that customers often get stuck, unable to

process or find a way to process items into the form that they need. Their team of engineers work with customers as an extension of their R&D department to help develop new processes, and often, more efficient processes.

What sets them apart from the competition is their scalability to move from pilot to commercial, their short lead times, and the wide variety of processing solutions they offer. Because many customers require multiple steps to get to the end product, they can streamline their processes by working with CPS. By having total control over the multiple processes, CPS is able to provide a much better end-result for customers.

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produced by Econsult Solutions, Inc.

Ben Franklin Tech Partners Engagement

BFTP Engagement Facts

Date of first engagement	2000
Total investment to date	\$358,000

Commitment to Partnership

The team credits much of their early success and ongoing growth to the support of BFTP. “Ben Franklin gave us a lot of help, especially when we were small,” the cofounders explained. The team at Ben Franklin supported them early on, asking the right questions to keep their business on the right path. “They helped us focus on what we had to do, and we had a plan,” said Shemanski. While he admitted that many businesses don’t always go as planned, Shemanski explained that they looked back at their plan three years later and realized they only missed their income targets by one-half of a percent and their interest expense by \$111.

One of the earliest recommendations from Ben Franklin was to focus on their core business—which paid off. Without that laser-focus on their core business, the team admits they likely would have overextended themselves. The difference between other sources of funding and BFTP is that Ben is truly a partner. “Ben Franklin personnel believed in us. That goes a long way,” Shemanski explained. Ben Franklin Technology Partners doesn’t just give money, they continue to work with companies to ensure they are successful and continue to stay in touch as companies grow and expand.

Types of Engagement:



Fundraising support



Financing



Hiring / HR support



Technical Assistance



Networking



Access to resources

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RE2 Robotics (now Sarcos) (Innovation Works)

Located in Pittsburgh, RE2 Robotics was a spin-off of the Carnegie Mellon National Robotics Engineering Center. Jorgen Pedersen created the company to develop intelligent mobile manipulation systems that could enable robot users to remotely interact with the world (whether on the ground, in the air, or underwater), improving worker safety and productivity. RE2 Robotics was founded with a vision to make the world a safer place using robotics. Though the company was acquired by Sarcos Robotics and Technology Corporation in 2022, the team continues to carry that mission forward as Sarcos, with Pedersen as Chief Operating Officer.

Between 2006 and the acquisition in 2022, BFTP Innovation Works and Riverfront Ventures (Innovation Works' for-profit fund) invested over \$266,000 in RE2.

Quick Facts

Allegheny

County of Operation

**Robotics
Technology**

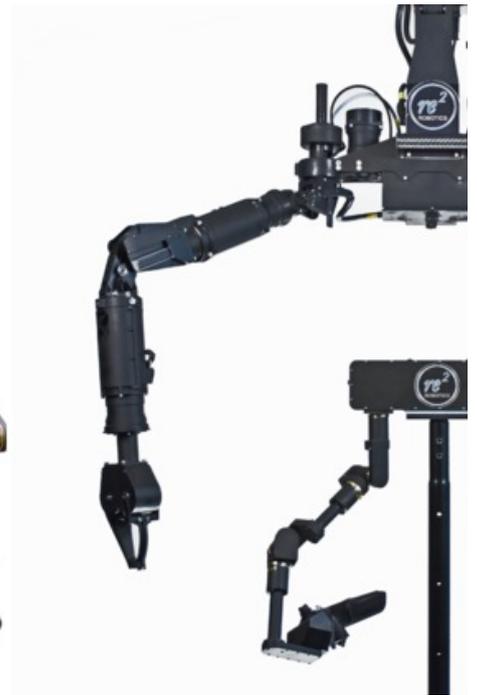
Industry

100

Number of Employees

2001

Year Established



An Early Leader in Robotics Technology

RE2 was a success long before the company was acquired by Sarcos. Founded in 2001, RE2 was one of the region's early robotics companies and helped create Pittsburgh's reputation as a robotics hub. Pedersen was instrumental in helping nurture the peer-to-peer group that became the Pittsburgh Robotics Network, an influential trade organization that globally touts the area for partnerships, customers, and the growth of the robotics cluster.

Industries typically engage RE2 technology (now Sarcos) because businesses may be looking to reduce the risk of injury for workers or may be trying to overcome widespread labor shortages.

Over the past two decades, as the robotics industry has flourished, RE2 set their technology apart with a 20-year track record of developing robotics for the U.S. military, which must meet critically high standards.

While most robotic arms are designed to be stationary, RE2's were designed from the ground up for mobile, outdoor applications, which require compact, lightweight, power-efficient, weather-hardened designs. There are few companies that can provide this capability. There are even fewer that can perceive (computer vision) and reason (AI) in unstructured, outdoor environments.

Ben Franklin Tech Partners Engagement

BFTP Engagement Facts

Date of first engagement	2006
Total investment to date	\$266,000

Leveraging IW's Full Suite of Resources

RE2 incubated in the National Robotics Engineering Center (NREC) at Carnegie Mellon University from its founding until 2006. When RE2 moved out of the NREC into its own space, its founder, Jorgen Pedersen, knew that he needed support. Innovation Works already had a strong reputation at that time for truly aiding entrepreneurs and reached out for guidance.

Pedersen leveraged the full suite of resources that Innovation Works provided. "Innovation Works supported the company at a critical time in its history," Pedersen explained. "They provided us with not only the capital, but also business guidance to allow us to successfully enter commercial markets. As a result, we experienced tremendous growth to include the expansion of our engineering, testing, and production facilities in Pittsburgh."

RE2 is one of only half a dozen companies in the Innovation Works portfolio to go on to receive investment from Riverfront Ventures, the for-profit fund linked to Innovation Works to further the growth of high-potential companies. In total, Innovation Works invested over \$266,000 in RE2, including investment from Riverfront Ventures.

Types of Engagement:



Fundraising support



Mentorship



Hiring / HR support



Technical Assistance



Networking



Access to resources

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ApexDrop (Central and Northern Pennsylvania)

ApexDrop is a growth marketing firm that develops and offers cutting-edge marketing services that produce quality long-term results for their partner brands. The full-service agency offers campaign partnerships between brands and their network of ApexDrop Creators. Creators get networking opportunities and free samples to try and discover new products, while brands get authentic online reviews, license-free creative assets, and increased brand awareness, social media engagement, and ultimately greater sales.

Since 2015, BFTP Central and Northern PA has supported ApexDrop with resources, including mentorship support and investments totaling \$179,000.

Quick Facts

Erie

County of Operation

**Influencer
Marketing/
Digital Marketing**

Industry

40

Number of Employees

2015

Year Established

gram

Search



uniquelycrea
Charlotte, North

uniquelycreatedblog
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blame it on the weath
You can save 20% off
any pair of the Kat Gra
using code KAT20 on

You can instantly shos
following me on the LI
<http://liketk.it/2ydoK> @

#fostergrant #fosterg
#katgraham #FGShad
#KatGrahamXFosterG



Growing Brands through Influencer Marketing Campaigns

Zak Stahlsmith launched his marketing firm in 2015, after a year of entrepreneurship classes and practicing his pitch at the Erie Technology Incubator at Gannon University. It was through the Gannon coworking space that Stahlsmith first got connected to BFTP and learned about the Ben Franklin BIG IDEA Contest. Stahlsmith was a finalist in the competition, and from there received a small loan from BFTP, allowing him to hire his first employee.

After launching a local competition for Most Stylish, ApexDrop started gaining popularity. The company then shifted gears to recruiting micro-influencers via direct messaging on Instagram.

Eventually, the team built the Drop Shop, a website for brands to connect with the influencer network, and a revenue source for ApexDrop. Their success was bolstered by additional financial support from BFTP.

While the COVID-19 pandemic created its own challenges, ultimately the boon in social media usage contributed to the growth of ApexDrop. Now a team of 40 managing Instagram and TikTok campaigns for big-named brands like iHome and Russell Athletic, ApexDrop has made a name for themselves as a leader in the influencer marketing space, earning a spot on Inc.'s 5000 Fastest-Growing Private Companies in America list in 2021.

Ben Franklin Technology Partners Economic Impact Update Case Study
produced by Econsult Solutions, Inc.

Ben Franklin Tech Partners Engagement

BFTP Engagement Facts

Date of first engagement	2015
Total investment to date	\$179,000

Tough Love from Ben Franklin

The small loan received following the BIG IDEA Competition was a boost of confidence for Stahlsmith to continue moving forward with his idea. Along with a loan, BFTP provided support to fill in gaps where Stahlsmith wasn't as strong.

Seed funding from BFTP allowed Stahlsmith to hire his first employee, which – in his mind – made it a real company. “Without that funding, I probably wouldn't have the courage to bring somebody on and know that I would be able to pay them.”

Through the years, Stahlsmith leaned on mentors Roy Campbell and Mike Wahlster, who provided him with encouragement and support, mixed with a healthy dose of tough love. Stahlsmith recalled a particularly tough moment, when Campbell cautioned him that not everyone is cut out for entrepreneurship—the exact push Stahlsmith needed to continue forging forward.

Within a few years, ApexDrop seemed to explode, with dozens of paying customers. The success sparked another investment from BFTP. As ApexDrop continued to grow, Stahlsmith reinvested profits to support the company, following the advice of his mentors.

Types of Engagement:



Fundraising support



Mentorship



Hiring / HR support



Technical Assistance



Networking



Access to resources

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