

A Forrester Total Economic Impact™
Study Commissioned By Pivotal
October 2017

The Total Economic Impact™ Of Pivotal Cloud Foundry

Cost Savings And Business Benefits
Enabled By Pivotal Cloud Foundry

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October 2017

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Benefits And Costs



Operations productivity improvement:

\$5.8M



Developer productivity improvement:

\$31.2M



PCF platform cost:

\$16.4M

Executive Summary

Pivotal provides a Cloud Foundry solution that helps its customers speed application delivery, called Pivotal Cloud Foundry (PCF). PCF is an application platform-as-a-service (PaaS) that enables developers to create and deliver software faster by automatically deploying application code to an elastic, scalable, and fully managed cloud infrastructure platform, either on-premises or in a public cloud. The automation, security, and scalability features not only shorten software release times but simplify and automate technology operations as well.

Pivotal commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying Pivotal Cloud Foundry. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of PCF on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed several customers with multiple years of experience using PCF. Prior to using PCF, customers struggled with long and expensive release cycles and complex infrastructure operations. These in turn led to a host of other challenges related to developer, operations, and customer satisfaction. These organizations had several manual processes associated with application delivery, which, in addition to slowing down processes, required an excessive amount of infrastructure resources to be overprovisioned, as well as labor costs. Additionally, the interviewed companies needed to improve responsiveness to customer demands. The combination of these drivers led these organizations to look for a platform to help speed up and modernize their application delivery methods.

Key Findings

Quantified benefits. The following risk-adjusted present value (PV) quantified benefits are representative of those experienced by the companies interviewed:

- › **Operations productivity improvement.** Interviewed organizations reported a reduction in resources allocated to development operations (DevOps) due to the implementation of PCF. This is due in part to PCF's deployment automation, which eliminates the manual tasks associated with code deployment, in addition to overall improved, more efficient software life cycle processes. After implementing PCF, organizations required DevOps personnel to spend less time provisioning, patching, and scaling applications. The operations resource reduction resulted in discounted cost savings of \$5.8 million over three years.
- › **Developer productivity improvement.** PCF's self-service environment allowed application developers to spend more time on coding new features and updating existing features. With PCF, developer wait time was significantly reduced (due to improvements related to slow system performance, wait times for environment setup, or wait times for code to be promoted to production). This decrease in time-to-production led to a significant increase in the number of releases per year. Our analysis estimates the value of this productivity increase at \$31.2 million over three years.



ROI
135%



Benefits PV
\$38.4 million



NPV
\$22 million

- › **Reduction in environments and associated software costs.** Before PCF, interviewees maintained several nonproduction staging environments for each application stack. With PCF, they told us they need only maintain two environments: nonproduction and production. With PCF, they eliminated many unnecessary and duplicative environments. The three-year present value of this cost savings is approximately \$1.4 million.

Unquantified benefits. The interviewed organizations experienced the following benefits, which are not quantified for this study. These benefits were significant to the interviewees; however, due to lack of measured metrics associated with the improvements, we were not able to include them in the financial analysis.

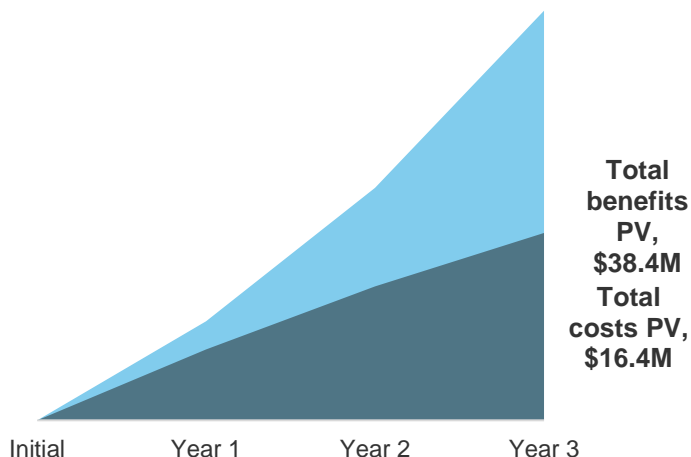
- › **Shortened release cycles.** All the companies interviewed experienced significantly shorter release cycles by utilizing PCF and adopting a continuous integration/continuous delivery (CI/CD) development approach. While release cycles were previously on the order of weeks or months, interviewees reported release cycles of several days with PCF.
- › **Improved customer satisfaction.** Interviewed organizations observed increased customer satisfaction as a result of using PCF, which increased customer retention rates. This was driven by improvements in the time required to deliver both fixes and new features.
- › **Improved customer service.** Interviewees were able to reduce customer service costs and downtime, thereby also reducing the number of missed revenue opportunities. Indirectly, this also contributed to an improvement in customer satisfaction.
- › **Increased revenue streams.** With PCF, interviewed organizations were able to bring products and features to customers faster, capitalizing on both existing and new customer opportunities to increase sales revenue.
- › **Software quality improvement.** Interviewees experienced a significant reduction in the number of deployment errors and code defects once apps were deployed to production. This significantly reduced debugging and rework time and further reduced downstream delays.
- › **Reduction in downtime.** The interviewed organizations reported reductions in both unplanned and planned downtime. Eliminating defects reduced unplanned outages that affected customer experience and business operations. Also, continuous one-touch deployment of code to production significantly reduced planned downtime.
- › **Cost avoidance of in-house development.** Developing an in-house solution would have come at a significant cost to the interviewed organizations in the form of additional internal labor, hardware costs, training costs, and integration time. In addition, the investment in Pivotal can potentially avoid an investment in existing software infrastructure and middleware through its integrated platform.

Costs. The interviewed organizations experienced the following risk-adjusted costs:

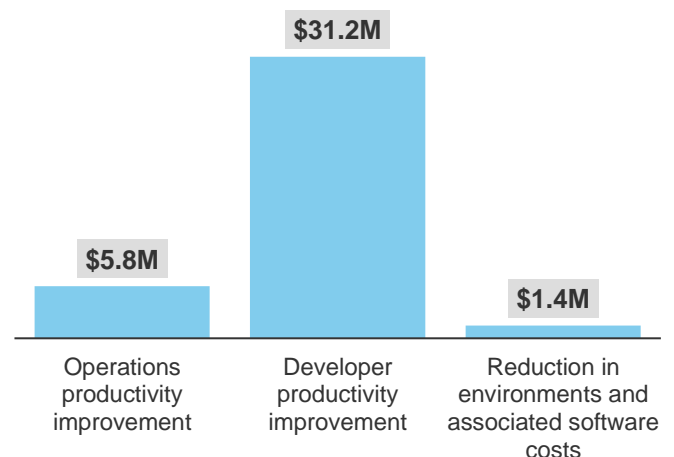
- › **PCF cost.** Customers interviewed paid an annual subscription for their use of PCF. Subscription costs were calculated based on the total number of application instances running on the PCF platform, the standard Pivotal pricing model.
- › **Professional services.** Pivotal offers a consulting service called Pivotal Labs. Pivotal Labs provides an immersive environment to help its customers successfully implement continuous delivery and other DevOps practices to promote and ensure more successful outcomes from using PCF. Most interviewees worked with Pivotal Labs to learn valuable DevOps practices and ensure successful adoption of the PCF platform.
- › **Internal resources.** We have included the costs associated with two different kinds of resources associated with the use of PCF. The first is IT infrastructure and operations professionals dedicated to the management of PCF. Additionally, the interviewed organizations utilized change agents: internal PCF specialists who run minilabs and foster the organizational changes required to take full advantage of PCF. We have also included costs associated with these resources.
- › **Training.** Interviewed organizations spent about six months ramping up with PCF; we have included costs associated with this initial training period as well as a few employees dedicated to training others to use PCF on an ongoing basis.

Forrester's interviews with four existing customers and subsequent financial analysis found that an organization based on these interviewed organizations experienced benefits of \$38,402,799 over three years versus costs of \$16,365,665, adding up to a net present value (NPV) of \$22,037,134 and an ROI of 135%.

Financial Summary



Benefits (Three-Year)



The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

TEI Framework And Methodology

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ (TEI) framework for those organizations considering implementing Pivotal Cloud Foundry.

The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the impact that Pivotal Cloud Foundry can have on an organization:



DUE DILIGENCE

Interviewed Pivotal stakeholders and Forrester analysts to gather data relative to Cloud Foundry.



CUSTOMER INTERVIEWS

Interviewed four organizations using Cloud Foundry to obtain data with respect to costs, benefits, and risks.



COMPOSITE ORGANIZATION

Designed a composite organization based on characteristics of the interviewed organizations.



FINANCIAL MODEL FRAMEWORK

Constructed a financial model representative of the interviews using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewed organizations.



CASE STUDY

Employed four fundamental elements of TEI in modeling Pivotal Cloud Foundry's impact: benefits, costs, flexibility, and risks. Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves to provide a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Pivotal and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.

Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the report to determine the appropriateness of an investment in Pivotal Cloud Foundry.

Pivotal reviewed and provided feedback to Forrester, but Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.

Pivotal provided the customer names for the interviews but did not participate in the interviews.

The Pivotal Cloud Foundry Customer Journey

BEFORE AND AFTER THE CLOUD FOUNDRY INVESTMENT

Interviewed Organizations

For this study, Forrester conducted four interviews with Pivotal Cloud Foundry customers. Interviewed customers include the following:

INDUSTRY	REGION	INTERVIEWEE	NUMBER OF APPLICATIONS/DEVELOPERS
Telecommunications	Headquartered in United States	VP, application and platform services	1,500 developers and 400 applications
Consumer electronics	Headquartered in United States	Director, technology and application development	350 developers and around 250 major applications
Financial services	Headquartered in United States	Chief information officer	100 developers and 300 applications
Wireless telecommunications	Headquartered in United States	VP, IT	200 developers and 300 applications

Key Challenges

- › **Long release cycles.** Release frequency for the interviewees prior to implementing PCF was at most one to two releases per month — and every interviewee cited this as being too long. Universally, the interviewed organizations reported dissatisfaction with release frequency and cited this as a primary problem they sought to address with PCF.
- › **Developer and operations inefficiency.** With many manual, time-intensive steps required to move code into production prior to using PCF, developers were often held up and unable to focus on writing code (wait times were too long). Also, prior to PCF, operations teams were strained with creating and tearing down development and production environments; companies had to keep expanding the size of the ops team to handle the demand.
- › **Market pressure to improve customer experience.** The interviewed organizations were under pressure to deliver new apps and new features smoothly to their customers and to improve the overall experience for their internal developers. One interviewee put it, “We needed to improve our ability for apps not to bog down, so we can serve customers better; the software can’t fail and break.”

“Customers care a lot about responsiveness. . . . Roughly \$20 to \$30 million in revenue was at risk if we didn’t respond with a new technology.”

Chief information officer, financial services



Solution Requirements

The interviewed organizations searched for a solution that could:

- › Smooth deployment processes and speed up release cycles.
- › Simplify both developer processes and platform operations processes at the same time.
- › Provide developer and operations productivity improvements while lowering the costs associated with managing multiple dev, test, and production environments.
- › Improve customer experience and satisfaction by decreasing downtime and reducing feature defects.

After evaluating multiple vendors, the interviewed organizations chose Pivotal Cloud Foundry and began deployment:

- › Most interviewees initially worked with Pivotal Labs to learn the most effective use of the platform and for help moving their first applications to PCF.
- › Over the first three years of use, interviewees planned to move between 15% and 50% of their total application portfolio to PCF. The planned migration percentage varied widely depending on the interviewee's current application mix.
- › Migrating applications to PCF took significant time and effort, but interviewees were all in agreement that it was well worth it. One interviewee said, "I wish I had started a year earlier; we should have just tried it!"

Key Results

The interviews revealed that key results from their Pivotal Cloud Foundry investment include:

- › **A combination of platform and process changes, which led to substantially reduced release cycles.** Every interviewed customer cited a dramatic reduction in the length of their release cycles (much faster release frequency), with many moving from monthly releases to weekly or even daily.
- › **Productivity gains for both developers and operations staff.** Due to automation and the elimination of several manual processes formerly required to move code to production, both operations staff and developers saw productivity gains. For operations staff, many of their former manual infrastructure provisioning, scaling, or maintenance tasks were no longer required, and companies were able to downsize the operations team dedicated to supporting development. Developers, in turn, were able to eliminate many noncoding admin tasks and focus instead on development of new features.
- › **Cost savings associated with streamlined environments.** By eliminating many of steps associated with moving applications to production and moving to automated self-service environment creation, interviewed companies saw savings by eliminating duplicate or unneeded static environments and their associated software and hardware costs.

"There are other platforms out there, but the reality is they couldn't do the automation that PCF would allow me to do."

Director, tech and app development, consumer electronics



"On the operational side, with patching there was always a much higher margin for error when you're touching servers. With PCF, we don't have those type of errors."

VP of IT, wireless telecommunications



"Having technologies in place like PCF will . . . change the landscape of how IT and business operate together."

Director, tech and app development, consumer electronics



- › **Improved customer satisfaction.** With the ability to deploy application changes more rapidly, both internal and external customers saw improved experiences due to enhanced functionality, reduced downtime, and faster delivery of new application features.

Composite Organization

Based on the interviews, Forrester constructed a TEI framework, a composite company, and an associated ROI analysis that illustrates the areas financially affected. The composite organization is representative of the four companies that Forrester interviewed and is used to present the aggregate financial analysis in the next section. The composite organization that Forrester synthesized from the customer interviews has the following characteristics:

Description of composite. The multibillion dollar telecommunications company provides services, products, and customer support, in high volume. The organization has a strong brand, a large customer base of about 20 million customers, and a strong online and offline presence.

Deployment characteristics. The organization has approximately 500 developers across departments, as well as 50 operations staff. The organization has approximately 5,000 applications, 25% of which are planned to move to PCF.



Key assumptions

Industry: Telecom

Developers: 500

Apps: 5,000

Financial Analysis

QUANTIFIED BENEFIT AND COST DATA AS APPLIED TO THE COMPOSITE

Total Benefit						
REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Atr	Operations productivity improvement	\$1,200,000	\$2,400,000	\$3,600,000	\$7,200,000	\$5,779,113
Btr	Developer productivity improvement	\$8,750,000	\$12,250,000	\$17,500,000	\$38,500,000	\$31,226,521
Ctr	Reduction in environments and associated software costs	\$256,500	\$513,000	\$984,960	\$1,754,460	\$1,397,164
Total benefits (risk-adjusted)		\$10,206,500	\$15,163,000	\$22,084,960	\$47,454,460	\$38,402,799

Benefit 1: Operations Productivity Improvement

Interviewed organizations experienced significant cost savings related to operations productivity. This is mainly due to PCF's automated deployment functionality, which relieves DevOps personnel from having to perform manual tasks to push code through the pipeline to deployment. Processes that were previously manual, like provisioning physical hardware, setting up networks, regression testing, patching, and application scaling are now automated. One customer stated that, with PCF, "once DevOps checks the code in and it passes its unit test, the code is driven through the pipeline to integration testing. Once that goes green, a human presses the 'go' button and it deploys directly into production." Thus, organizations have seen their time-to-deployment decrease from months to weeks or even days.

For the composite organization, Forrester assumes that:

- › Prior to implementing PCF, the composite organization had 50 operations staff working on development operations tasks.
- › Since Pivotal Cloud Foundry automates many operational tasks related to deployment, the composite organization could repurpose several of these development operations staff members.
- › The model below assumes that the composite organization will be able to repurpose 10 of these development operations staff members each year over the next three years.
- › At a fully loaded pay rate of \$150,000, this results in discounted savings to the composite organization of about \$7.2 million over the next three years.

The time it takes for organizations to fully adopt the new PCF platform, continuous integration, and continuous delivery may vary. To account for this risk, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted total PV of \$5,779,113.

The table above shows the total of all benefits across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total benefits to be a PV of more than \$38 million.



Organizations require fewer development operations resources with Pivotal Cloud Foundry.

Operations Productivity Improvement: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Operation resources without PCF		50	50	50
A2	Operation resources with PCF		40	30	20
A3	Fully loaded rate		\$150,000	\$150,000	\$150,000
At	Operations productivity improvement	$(A1-A2)*A3$	\$1,500,000	\$3,000,000	\$4,500,000
	Risk adjustment	↓20%			
Atr	Operations productivity improvement (risk-adjusted)		\$1,200,000	\$2,400,000	\$3,600,000

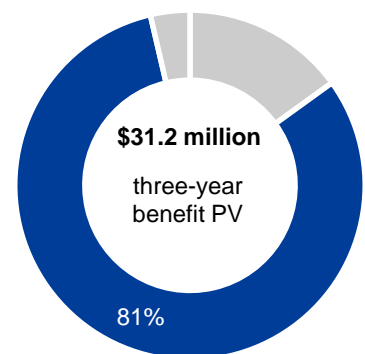
Benefit 2: Developer Productivity Improvement

Prior to implementing PCF, the composite organization's developers were getting bogged down with administrative tasks and spent a significant amount of time waiting for activities to be completed that were outside of their control, including system performance remediation, server setup, and lines of code to be promoted. With PCF, the developers are able to focus on producing code for deployment, thereby allowing them to develop more applications, plug-ins, and pieces of code to be tested and eventually released.

For the composite organization, Forrester assumes that:

- › The composite organization has 500 developers.
- › Prior to using PCF, these developers were spending 20 hours per week coding. This is based on a 40-hour work week.
- › With PCF, developers are expected to spend 25, 27, and 30 hours per week coding over the next three years, respectively; this represents an improvement of 25% to 50% in time spent coding as adoption increases.

The benefits realized from developer productivity improvement may vary depending on how productively developers use the time that has been freed up to code. To account for this risk, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted total PV of about \$31.2 million.



Developer productivity improvement: **81%** of total benefits

Developer Productivity Improvement: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
B1	Number of developers		500	500	500
B2	Hours spent coding prior to PCF		20	20	20
B3	Hours spent coding with PCF		25	27	30
B4	Additional hours of coding per week	B3-B2	5	7	10
B5	Hourly rate	\$175,000/2080	\$84.13	\$84.13	\$84.13
Bt	Developer productivity improvement	B1*B4*B5*52	\$10,937,500	\$15,312,500	\$21,875,000
	Risk adjustment	↓20%			
Btr	Developer productivity improvement (risk-adjusted)		\$8,750,000	\$12,250,000	\$17,500,000

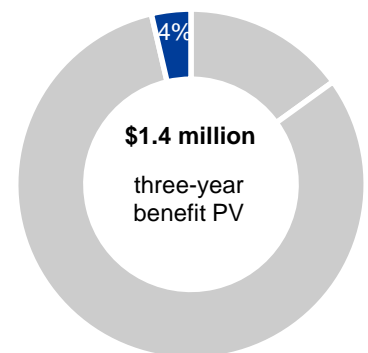
Benefit 3: Reduction In Environments And Associated Software Costs

After implementing PCF, the composite organization was able to consolidate its application development cycle by eliminating the need for several nonproduction phases like the test, stage, load, and demo environments. The composite organization has essentially broken this down into two phases: a production phase and a nonproduction phase. Therefore, the organization was able to reduce the number of the nonproduction environments and the virtual machines (VMs) associated with these environments. In addition, some of the servers that were utilized for nonproduction phases were no longer needed and could be repurposed to other areas of the organization. One interviewee noted: "With PCF, you can develop your code in nonprod, then push it in an 'off' position into prod to be able to test it. . . . Then you can just flip a switch and turn it on. That whole stack of old nonproduction stuff — you don't need it anymore."

For the composite organization, Forrester assumes that:

- › The composite organization, without PCF, would have 3,000 nonproduction environments next year. This amount would grow by 20% over the following two years.
- › This average annual cost of the VMs associated with nonproduction environments is \$300.
- › The number of environments is expected to decrease by 30%, 50%, and 80% over the next three years, respectively.

The percentage decrease in environments experienced by the composite organization may vary. To account for this risk, Forrester adjusted this benefit downward by 5%, yielding a three-year risk-adjusted total PV of \$1,397,164.



Reduction in environments and associated software: **4%** of total benefits

Reduction In Environments And Associated Software Costs: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
C1	Number of nonproduction environments		3,000	3,600	4,320
C2	Cost per environment (annual)		\$300	\$300	\$300
C3	Reduction due to PCF		30%	50%	80%
Ct	Reduction in environments and associated software costs	$C1 \times C2 \times C3$	\$270,000	\$540,000	\$1,036,800
	Risk adjustment	↓5%			
Ctr	Reduction in environments and associated software costs (risk-adjusted)		\$256,500	\$513,000	\$984,960

Unquantified Benefits

- › **Shortened release cycles.** Utilizing a continuous integration and continuous delivery approach to application deployment with PCF resulted in significantly shorter times from the time code is checked in to when it is deployed to production. One interviewee highlighted that their organization went from about 18 releases per year to about two per week. Moreover, it used to take this organization months to scale application deployment, but now it is seeing about a 90% decrease in time-to-scale. Many of the following benefits are driven by the shortened release cycles.
- › **Improved customer satisfaction.** Organizations' customers and end users have provided the interviewed organizations with feedback regarding the user experience. With PCF, organizations can take this feedback and deploy a successful feature update in a just days or weeks. Without PCF, this would have taken months. Furthermore, this rapid responsiveness to customer desires has helped interviewed organizations retain customers who otherwise may have left for competitors. Customers can evaluate the periodic financial impact of improved customer satisfaction by considering the reduction in churn and the lifetime value of the retained customers.
- › **Superior customer service.** Application downtime can lead to suboptimal customer service experiences. If call service agents, technicians, or other customer service personnel cannot properly service customers because one of their customer care apps is down, then resolving customer inquiries and problems will require more time and resources. With PCF, organizations can resolve these customer service problems more quickly. Potential savings associated with this improvement include decreased call center costs, greater technician productivity, fewer truck rolls, and increased availability of products on demand.

"Using PCF has raised the bar and changed the way that the business expects IT to deliver."

VP, app and platform devices, telecommunications



- › **Increased revenue streams.** The shorter release cycles associated with PCF allowed the composite organization to capitalize on customer opportunities that were not feasible prior to PCF. The ability to respond to customer desires quickly and efficiently proved critical in tapping into additional revenue streams.
- › **Software quality improvement.** One of the interviewed organizations noted a significant reduction in deployment defects since implementing PCF. Before PCF, when the organization detected defects, it would push out a patch or deploy a new release to mitigate the defect. This would occur on roughly a monthly basis. With PCF, these defects occur much less frequently — once or twice per year. Now this organization not only avoids the negative end user consequences associated with the defect but also does not need to spend as much time fixing it.
- › **Reduction in downtime.** With significantly shorter release cycles, the composite organization was able to reduce the downtime of its critical business operations. The inability to complete essential business transactions can have a substantial impact on the financial performance of the composite organization. With PCF, the extent to which these downtimes negatively affect the business are limited in time and scale.
- › **Cost avoidance of in-house development.** An alternative to purchasing Pivotal Cloud Foundry would be to develop a similar solution in-house. The internal labor, outside consulting services, software, cloud foundry expertise, and other costs associated with the internal development of a similar cloud foundry solution would have required a substantial outlay from the composite organization. Ultimately, the organization was able to avoid this outlay.



Pivotal Cloud Foundry customers observed numerous benefits as a result of the shortened release cycles.

Flexibility

The value of flexibility is clearly unique to each customer, and the measure of its value varies from organization to organization. There are multiple scenarios in which a customer might choose to implement Cloud Foundry and later realize additional uses and business opportunities, including:

- › **Additional use cases for PCF.** Interviewees stated that only a percentage of their applications were running on PCF (roughly 15% to 50%). The composite organization may wish to utilize PCF for a larger portion of its applications going forward. In this scenario, the composite may experience some of the same incremental benefits associated with application instances it has previously been running on PCF.
- › **Build new applications that were not previously feasible.** Allowing developers to spend more time on coding and less time setting up environments and waiting may result in more creative software features, which can ultimately drive revenue. Furthermore, the rapid responsiveness provided through PCF will allow the composite organization to address customer desires that could not be feasibly addressed prior to PCF.

Flexibility could be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for a future additional investment. This provides an organization with the "right" or the ability to engage in future initiatives but not the obligation to do so.

Total Cost

REF.	COST	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Dtr	PCF cost	\$5,000,000	\$5,000,000	\$5,000,000	\$15,000,000	\$12,434,260
Etr	Professional services	\$1,000,000			\$1,000,000	\$909,091
Ftr	Internal resources	\$1,155,000	\$1,155,000	\$1,155,000	\$3,465,000	\$2,872,314
Gtr	Training	\$165,000	\$0	\$0	\$165,000	\$150,000
Total costs (risk-adjusted)		\$7,320,000	\$6,155,000	\$6,155,000	\$19,630,000	\$16,365,665

Cost 1: PCF Cost

The composite organization paid a flat annual subscription for the Pivotal Cloud Foundry platform-as-a-service (PaaS). This subscription amount is based on the number of application instances the composite organization has running on PCF.

- › The composite organization has 5,000 application instances running on PCF.
- › The composite organization pays \$5,000,000 over a three-year period for the Pivotal Cloud Foundry PaaS.

These annual subscription costs resulted in a three-year total PV of \$12,434,260.

The table above shows the total of all costs across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total costs to be a PV of nearly \$16.4 million.

PCF Cost: Calculation Table

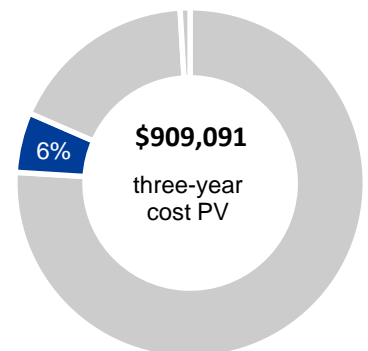
REF.	METRIC	YEAR 1	YEAR 2	YEAR 3
Dt	PCF cost	\$5,000,000	\$5,000,000	\$5,000,000

Cost 2: Professional Services

In addition to its platform, Pivotal offers professional services in the form of Pivotal Labs. With Pivotal Labs, experts from Pivotal worked alongside development operations personnel at the composite organization. In these Pivotal Lab dojos, experts from Pivotal taught employees at the composite organization best practices surrounding continuous delivery and ultimately how to maximize the benefits from its investment in PCF. Based on feedback from the interviewees, these sessions were imperative because investing in PCF requires not only a platform change, but a cultural change.

- › The composite organization will pay Pivotal \$1,000,000 in the initial year of the analysis.

This resulted in a three-year risk-adjusted total PV of \$909,091.



Professional services:
6% of total costs

Professional Services: Calculation Table

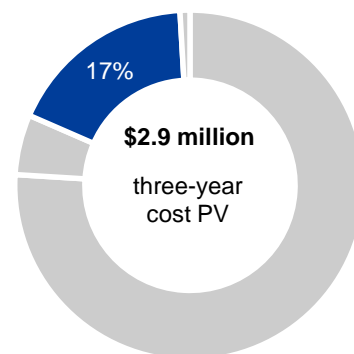
REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
E1	Professional services			\$1,000,000		
Et	Professional Services	E1	\$0	\$1,000,000		

Cost 3: Internal Resources

The composite organization employed professionals internally who are dedicated to the management and oversight of PCF. These PCF managers will utilize IT infrastructure and network staff members when necessary. The organization also utilized internal change agents who run minilabs to help foster the organizational change to PCF and increase internal adoption.

- › The composite organization has five full time employees (FTEs) dedicated to management and maintenance of the platform.
- › The composite organization also employs two “change agents” who support the usage of continuous integration and continuous delivery tools.
- › These FTEs have a fully loaded pay rate of \$150,000 per year.

Since the composite organization’s PCF resources may take longer than expected to implement the platform and move applications to PCF, Forrester adjusted this cost upward by 10%, yielding a three-year risk-adjusted total PV of \$2,872,314.



Internal resources: 17% of total costs

Internal Resources: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
F1	PCF management resources			5	5	5
F2	Change agents			2	2	2
F3	Fully loaded rate			\$150,000	\$150,000	\$150,000
Ft	Internal resources	(F1+F2)*F3	\$0	\$1,050,000	\$1,050,000	\$1,050,000
	Risk adjustment	↑10%				
Ftr	Internal resources (risk-adjusted)		\$0	\$1,155,000	\$1,155,000	\$1,155,000

Cost 4: Training

For the composite organization, training costs associated with the implementation of PCF were not very significant. This was partly due to the education provided by Pivotal to help customers get started. One interviewee explained: “Pivotal was very diligent about the 101 courses and getting customers started. . . . They trained our trainers.”

- › The composite organization employed two FTEs dedicated to training developers how to properly use Pivotal Cloud Foundry.
- › The two FTEs spent six months training developers.

Due to the risks associated with organizational adoption, the necessary time committed to train developers may vary. To account for this risk, Forrester adjusted this cost upward by 10%, yielding a three-year risk-adjusted total PV of \$165,000.

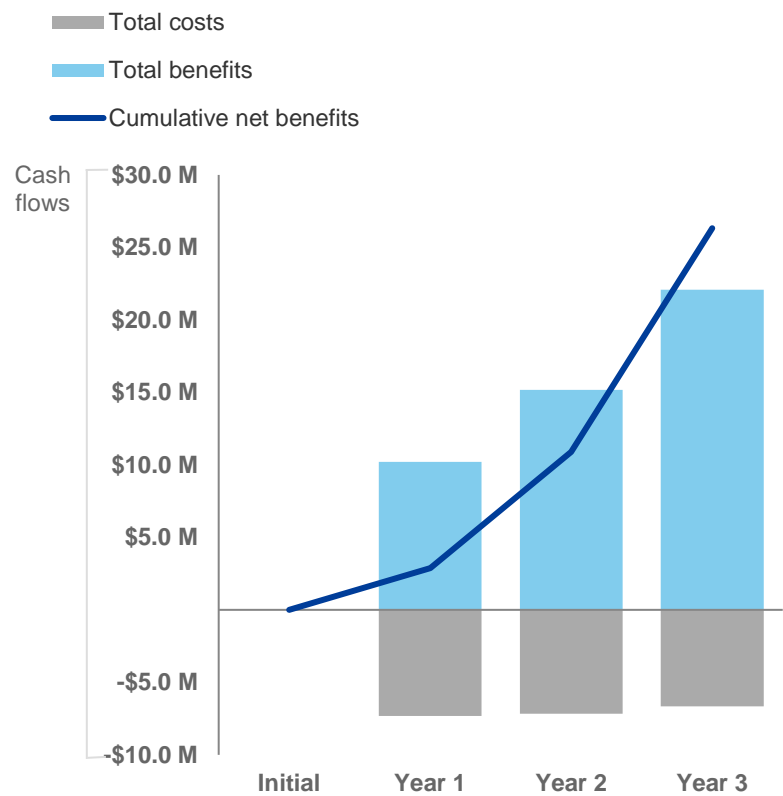
Training: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
G1	Training resources	2 FTEs for 6 months		1		
G2	Fully loaded rate			\$150,000		
Gt	Training	$G1 \times G2$	\$0	\$150,000	\$0	\$0
	Risk adjustment	↑10%				
Gtr	Training (risk-adjusted)		\$0	\$165,000	\$0	\$0

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)



The financial results calculated in the Benefits and Costs sections can be used to determine the ROI and NPV for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.



These risk-adjusted ROI and NPV values are determined by applying risk-adjustment factors to the unadjusted results in each Benefit and Cost section.

Cash Flow Table (Risk-Adjusted)

	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Total costs	\$0	(\$7,320,000)	(\$6,155,000)	(\$6,155,000)	(\$19,630,000)	(\$16,365,665)
Total benefits	\$0	\$10,206,500	\$15,163,000	\$22,084,960	\$47,454,460	\$38,402,799
Net benefits	\$0	\$2,886,500	\$9,008,000	\$15,929,960	\$27,824,460	\$22,037,134
ROI						135%

Pivotal Cloud Foundry: Overview

The following information is provided by Pivotal. Forrester has not validated any claims and does not endorse Pivotal or its offerings.

Pivotal's mission is to transform how the world builds software. Pivotal partners with Global 2000 companies to introduce a sustainable, agile approach to application development, while offering the technologies needed to build and run software at scale. Pivotal's flagship products, Spring and Pivotal Cloud Foundry, form the foundation of this business transformation. Spring Boot has quickly become the de facto tool used by developers to build Java applications. And Pivotal Cloud Foundry is trusted by companies like Comcast, Allstate, The Home Depot, Liberty Mutual, and Allianz as the secure backbone of their cloud strategy. Supported on public or private cloud, Pivotal Cloud Foundry runs Java, .NET, Node.js, Ruby, Python, Go, and PHP applications on a highly available platform.

Cultural transformation happens for Pivotal customers through consultative services offered by Pivotal Labs. These engagements instill proven approaches to scoping, development, testing, and deployment. The adoption of modern development practices is sustained through ongoing training and collaboration with Pivotal's partner ecosystem. In addition to selling Pivotal Cloud Foundry, Pivotal offers commercial software such as Gemfire, Greenplum, Pivotal Tracker, and more. The company also contributes heavily to open source by maintaining or employing primary committers to various open source projects including Spring, RabbitMQ, Concourse, Tomcat, and Cloud Foundry.

Appendix A: Total Economic Impact

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

Total Economic Impact Approach



Benefits represent the value delivered to the business by the product. The TEI methodology places equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization.



Costs consider all expenses necessary to deliver the proposed value, or benefits, of the product. The cost category within TEI captures incremental costs over the existing environment for ongoing costs associated with the solution.



Flexibility represents the strategic value that can be obtained for some future additional investment building on top of the initial investment already made. Having the ability to capture that benefit has a PV that can be estimated.



Risks measure the uncertainty of benefit and cost estimates given: 1) the likelihood that estimates will meet original projections and 2) the likelihood that estimates will be tracked over time. TEI risk factors are based on "triangular distribution."

The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1 that are not discounted. All other cash flows are discounted using the discount rate at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value calculations of the Total Benefits, Total Costs, and Cash Flow tables may not exactly add up, as some rounding may occur.



PRESENT VALUE (PV)

The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total NPV of cash flows.



NET PRESENT VALUE (NPV)

The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.



RETURN ON INVESTMENT (ROI)

A project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits less costs) by costs.



DISCOUNT RATE

The interest rate used in cash flow analysis to take into account the time value of money. Organizations typically use discount rates between 8% and 16%.



PAYBACK PERIOD

The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost.