A Forrester Total Economic Impact™ Study

Commissioned By Pivot3

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The Total Economic Impact™ Of Pivot3 Hyperconverged Infrastructure

Cost Savings And Business Benefits Attributed To Pivot3 HCI

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Executive Summary

Pivot3 commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study to examine the potential return on investment (ROI) organizations may realize by deploying the Pivot3 hyperconverged infrastructure (HCI) platform. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Pivot3 HCI within their organizations.

Quantified Benefit Categories Of Pivot3 HCI
(Risk- and present value-adjusted over three years)

The total benefits of $1,380,110 are as follows:

- **Hardware cost avoidance savings — $1,182,554.**
- **Labor cost savings — $111,473.**
- **Data center cost savings — $86,083.**

To better understand the benefits, costs, and risks associated with an investment in Pivot3 HCI, Forrester conducted in-depth interviews with six Pivot3 HCI customers. For a brief description of each customer, see the Analysis section. According to Pivot3, its HCI platform combines storage, networking, and compute to provide maximum resource utilization and deliver high availability with ongoing performance to the applications that matter most. For more details on the Pivot3 HCI solution, see Appendix A.

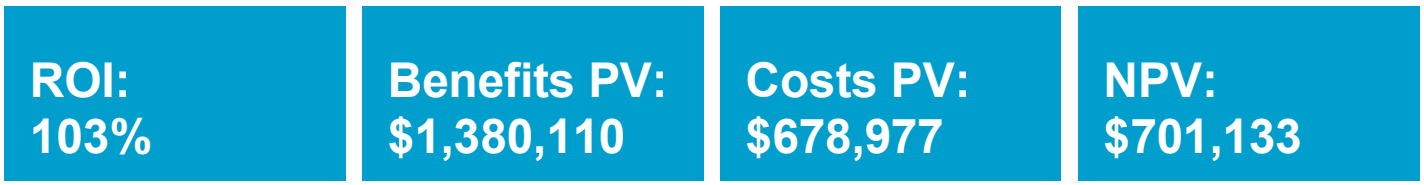
For this TEI study, Forrester has created a composite *Organization* to illustrate the quantifiable benefits and costs of investing in Pivot3 HCI. Based on characteristics of the interviewed customers, the *Organization* is a national, midsize services organization. It has been using Pivot3 HCI for three years to support a VDI deployment and one year as the infrastructure for its video surveillance workloads. For more information, see the section titled: The Composite *Organization.*

PIVOT3 HCI DELIVERS PERFORMANCE AND EFFICIENCY WITH SIGNIFICANT COST SAVINGS

Prior to implementing Pivot3 HCI, the interviewed organizations faced expensive upgrades to their legacy server and storage infrastructure. With each upgrade and expansion came increased complexity and resource demands, with reduced resiliency and performance. By replacing its legacy assets with the Pivot3 HCI hyperconverged infrastructure, each IT department delivered more storage and compute power to its users, while saving on hardware and reducing the resources required to manage.

Our interviews and subsequent financial analysis found that the composite *Organization* experienced the risk-adjusted ROI, benefits, and costs shown in Figure 1 for the Pivot3 HCI solution. The analysis points to risk-adjusted benefits of $1,380,110 over three years versus hardware and labor costs of $678,977, equating to a net present value (NPV) of $701,133. The risk-adjusted ROI was a very favorable 103%, and the payback period was a quick seven months.

FIGURE 1
Financial Summary Showing Three-Year Risk-Adjusted Results — Pivot3 HCI Solution



Source: Forrester Research, Inc.

The following are the benefits quantified in this case study:

› **Total benefits associated with Pivot3 HCI — $1,380,110.** The *Organization* experienced the following benefits (risk- and present value-adjusted) over three years (further detailed in the Benefits: Quantified section):

- Hardware cost avoidance savings — $1,182,554.
- Labor cost savings — $111,473.
- Data center cost savings — $86,083.

The interviewed customers identified the following *qualitative* benefits of using Pivot3 HCI:

› **Improved performance**. One interviewee reported that Pivot3 HCI's performance was two to three times faster than the legacy server and storage area network (SAN) infrastructure that it replaced. This increased speed allowed his organization to access data and retrieve backups significantly faster.

› **Reduced unplanned downtime.** Pivot3's technical capabilities, specifically the high availability, factored heavily into each interviewee's decision to abandon its legacy environment in favor of Pivot3 HCI. None were disappointed: Each interviewed customer experienced increased availability, and none experienced unplanned downtime. However, the interviewees were not able to provide a clear cost of unplanned downtime associated with their legacy infrastructure, so no cost savings comparisons could be made. As a result, the quantification of this benefit has been excluded from the analysis. Readers are encouraged to apply their own cost per unplanned downtime period.

The following are the costs quantified in this case study:

› **Costs associated with the Pivot3 HCI solution— $678,977.** The *Organization* experienced the following costs (risk- and present value-adjusted) over three years (further detailed in the Costs section):

- Labor to plan, deploy, and manage Pivot3 HCI ongoing — $22,734.
- VMware license fees — $16,324.
- Pivot3 hardware, maintenance, and support costs — $639,919.

If the risk-adjusted ROI and NPV of costs and benefits still demonstrate a compelling business case, it raises confidence that the investment is likely to succeed because the risks that threaten the project have been taken into consideration and quantified. The risk-adjusted numbers should be taken as "realistic" expectations, as they represent the expected values considering risk. Assuming normal success at mitigating risk, the risk-adjusted numbers should more closely reflect the expected outcome of the investment.

Disclosures

The reader should be aware of the following:

› The study is commissioned by Pivot3 and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.

› Forrester makes no assumptions as to the potential return on investment that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the study to determine the appropriateness of an investment in Pivot3 HCI.

› Pivot3 reviewed and provided feedback to Forrester, but Forrester maintained editorial control over the study and its findings and did not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.

› The interviewed customers' names were provided by Pivot3. Pivot3 did not participate in the interviews.

TEI Framework And Methodology

INTRODUCTION

From the information provided in the interviews, Forrester has constructed a Total Economic Impact (TEI) framework for those organizations considering investing in Pivot3 HCI. The objective of the framework is to identify the benefits, costs, flexibility, and risk factors that affect the investment decision.

APPROACH AND METHODOLOGY

Forrester employed four fundamental elements of TEI in modeling Pivot3 HCI: benefits, costs, flexibility, and risks.

Forrester took a multistep approach to evaluate the impact that Pivot3 HCI can have on the composite *Organization* (see Figure 2). Specifically, we:

- Interviewed Pivot3 marketing, sales, and product management personnel to better understand the value proposition for Pivot3 HCI. We also interviewed Forrester subject matter experts to better understand hyperconverged infrastructure solutions.
- Conducted in-depth interviews with six customers to obtain data with respect to costs, benefits, flexibility, and risks.
- Designed a composite *Organization* based on characteristics of the interviewed customers.
- Constructed a financial model representative of the interviews using the TEI methodology. The financial model is populated with the cost and benefit data obtained from the interviews.
- Risk-adjusted the financial model based on minor issues and concerns the customers raised in the interviews. Risk adjustment is a key part of the TEI methodology. While the interviewed customers provided cost and benefit estimates, some categories included future projections or a broad range of responses, or had a number of internal or external forces that might have raised costs or lowered benefits. For that reason, select costs and benefit categories have been risk-adjusted and are detailed in the Benefits: Quantified section.

Given the increasing sophistication that enterprises have regarding ROI analyses related to technology investments, Forrester's TEI methodology serves to provide a complete picture of the total economic impact of purchase decisions. Please see Appendix B for additional information on the TEI methodology.

FIGURE 2
TEI Approach

Source: Forrester Research, Inc.

Analysis

INTERVIEWED CUSTOMERS

Forrester derived its conclusions in large part from information received in a series of in-depth interviews conducted with personnel at six Pivot3 HCI customers. The customers had an average of 18 months' experience with the solution. The following is a brief description of the interviewed customers, each of which was promised anonymity:

- A US government office with over 500 employees, responsible for safeguarding over 1 million citizens. It operates over 2,400 24-hour video feeds and 80 virtual desktops. Its first adoption of Pivot3 solutions supported its surveillance needs, but it has since expanded its environment to include VDI, with further plans to expand into disaster recovery.
- A UK government hospital with over 8,000 staff members, 1,000 beds, and 600,000 patients each year. Pivot3 plays a critical role in its VDI system, which provides over 400 clinicians with remote access to patient files.
- A US international airport serving 18 million passengers each year. It monitors airport activity with over 850 cameras, storing the recordings for 30 days and accumulating over a petabyte of storage capacity — all of which sits on a Pivot3 hyperconverged infrastructure. It is considering adding disaster recovery to its workloads.
- A UK IT managed services company that provides disaster recovery and backup services to local small and medium-size businesses on a Pivot3 hyperconverged infrastructure. It hopes to expand into VDI in the near future.
- A US hospital with over 600 beds and over 150,000 patient visits each year. Its IT leadership team recently implemented Pivot3 HCI as the two-terabyte platform for a new data warehouse initiative. It is considering expanding its use of Pivot3 for backup and disaster recovery needs.
- A US utility company with 600 full-time employees working out of 19 remote offices. Its 1,000-user VDI deployment sits on three Pivot3 nodes.

THE COMPOSITE *ORGANIZATION*

For this TEI study, Forrester created a composite *Organization* to illustrate the quantifiable benefits and costs of investing in the Pivot3 hyperconverged infrastructure. The *Organization* is a national services organization in North America with over 1,000 employees. It runs a 500-user virtual desktop infrastructure that enables customer-facing employees to deliver services to customers in real time, and it monitors its offices with a 2,000-camera video surveillance system. Its data center is onsite at its headquarters and managed by in-house engineers.

Three years ago, the *Organization* replaced the traditional SAN infrastructure behind its business-critical applications with Pivot3, hoping to improve both the performance of the VDIs and the simplicity of its infrastructure. Pleased with the outcomes, the *Organization* expanded its Pivot3 infrastructure to accommodate its video surveillance workload.

For its initial investment in Pivot3, the *Organization* conducted an extensive evaluation process and proof of concept. Ultimately, the *Organization* selected not to upgrade its legacy environment, instead opting to shift to hyperconverged infrastructure with Pivot3 HCI. The *Organization* believed it could satisfy the following business goals and objectives with Pivot3 HCI:

- Build an infrastructure capable of delivering high-demand applications to remote employees, with no performance issues.
- Secure a cost-effective solution that is both easy to manage and expand.

With this initial investment, the *Organization* was hoping Pivot3 HCI could mitigate the following challenges and pain points:

- The *Organization* was outgrowing the capacity of its existing disk storage system.

- The *Organization*'s existing SAN storage infrastructure was nearing end of life and would be costly to replace.
- Users were struggling to access business-critical applications, and the business was growing frustrated with the lack of availability.

When the *Organization* expanded its Pivot3 environment to include its video surveillance workloads, it expected the hyperconverged infrastructure to:

- Provide the storage capacity for the significant — and growing — video feeds required for video surveillance.
- Increase confidence that data would never be lost, and that it could always be accessed quickly.
- Ensure a streamlined implementation and ongoing management process.

Based on its investment in Pivot3 HCI, the *Organization* experienced improved:

- **Simplicity and efficiency.** The Pivot3 hyperconverged platform reduced the *Organization*'s rack space, cabling, power, and cooling requirements. One principal infrastructure engineer touted: "Regarding the simplicity benefit: I've acquired not just storage, but virtualization and compute capability. When I put three of them together it takes up less rack space." The simplicity of the solution drives efficiency: Interviewees unanimously agreed that their hyperconverged infrastructure required less time to implement and manage day to day than their legacy environments.
- **Resiliency.** Prior to implementing Pivot3 HCI for VDI, the *Organization* experienced frequent availability issues: Complaints from end users about slow or missing access were commonplace. With the team's reputation on the line, the director of IT promised to improve delivery. When he selected Pivot3 HCI over an upgrade for his legacy environment, he expected — and gained — technology that could withstand routine failures, delivering undisrupted availability and performance to users. Most interviewees shared stories of how Pivot3 delivered on its promise of resiliency. For example, about a year into one interviewee's tenure with Pivot3, his organization suffered a water leak and damaged a storage array. Not only did Pivot3 quickly send a replacement that was easy to swap out for the damaged one, but the built-in redundancies meant no loss of data or disruption to users.
- **Scalability.** The *Organization* was searching for a single-vendor solution that could expand quickly and easily as its needs changed. As one infrastructure engineer said: "We've already expanded the Pivot3 environment by adding more appliances to the stack. We found this to be a pretty straightforward and quick process: just ordering the equipment and getting it delivered and installed."

BENEFITS: QUANTIFIED

Hardware Cost Avoidance Savings

Three years ago, the *Organization* was staring at an end-of-life SAN array. It considered two options: Upgrade the traditional SAN environment or invest in a hyperconverged infrastructure. Ultimately, the *Organization* chose the hyperconverged solution and purchased several appliances for its VDI deployment. A second investment followed in Year 2, adding enough capacity to accommodate its video surveillance workloads. (See the Costs section for more information about Pivot3 HCI costs). This decision to select a simpler infrastructure, with storage, networking, and compute power in one appliance, led to significant hardware cost savings over the three-year analysis.

Each interviewee cited significant cost savings with Pivot3 HCI over its traditional infrastructure, with estimates averaging around 50% less than an equivalent storage capability with servers and SANs. Given the interviewees' inconsistency in citing hardware cost savings, this benefit has been risk-adjusted (reduced) by 5%, resulting in a three-year risk- and present value-adjusted benefit of $1,182,554. See Table 1 and the section on Risks for more details.

TABLE 1
Hardware Cost Avoidance Savings

Ref.	Metric	Source Or Calculation	Year 1	Year 2	Year 3	Total	Present Value
A1	Fees to Pivot3 — VDI	Pivot3	$192,750	$0	$0		
A2	Fees to Pivot3 — video surveillance	Pivot3	$0	$541,075	$0		
A3	Total fees to Pivot3	A1+A2	$192,750	$541,075	$0	$733,825	
A4	Percent saved using Pivot3 vs. upgrading legacy environment	Interviews	50%	50%			
At	Hardware cost avoidance savings	A3/A4	$385,500	$1,082,150	$0	$1,467,650	$1,244,793
	Risk adjustment	↓5%					
Atr	**Hardware cost avoidance savings (risk-adjusted)**		**$366,225**	**$1,028,043**	**$0**	**$1,394,268**	**$1,182,554**

Source: Forrester Research, Inc.

Labor Cost Savings

The *Organization* required less time to both implement Pivot3 and manage it day to day than it would have with its legacy infrastructure. Interviewees estimated that when compared with the traditional server/SAN infrastructure, Pivot3 HCI required roughly half the time to implement (see Table 2, row B1), and half the time to manage day to day (see Table 2, reference B2).

In addition to the simplicity-driven labor cost savings, the *Organization* realized labor cost savings from improved resiliency. With its legacy environment, help desk engineers serviced many tickets a week from end users with access issues. With the

improved availability from Pivot3 HCI, the *Organization* eliminated VDI-related availability tickets, saving the help desk the number of hours indicated in Table 2, reference B5.

Finally, interviewed customers predicted future attrition savings, i.e., future replacements of IT administrators could be more junior than predecessors due to the simplicity of Pivot3 HCI, saving up to $40,000 annually in salary and benefits per administrator. Forrester assumed the attrition labor savings of one IT administrator would begin halfway through Year 2 (see Table 2, reference B8).

Varying complexity in legacy environments and capacity to redeploy resources quickly will have an impact on an organization's ability to realize these benefits. Therefore, the labor cost savings have been risk-adjusted (reduced) by 10%, resulting in a three-year risk- and present value-adjusted benefit of $111,473.

TABLE 2
Labor Cost Savings

Ref.	Metric	Source Or Calculation	Year 1	Year 2	Year 3	Total	Present Value
B1	Hours saved in initial planning and deploying Pivot3 HCI vs upgrading legacy SAN	Interviews	48	80	0		
B2	Annual hours saved in ongoing management of Pivot3 HCI vs. legacy infrastructure	Interviews	96	96	240		
B3	Average hourly FTE cost for SAN engineer	$140,000/(2080 hours)	$67.31	$67.31	$67.31		
B4	SAN engineer savings	(B1+B2)*B3	$9,692	$11,846	$16,154		
B5	Annual help desk hours saved after replacing legacy infrastructure with Pivot3 HCI	Interviews	360	360	600		
B6	Average hourly FTE cost for help desk technician	$90,000/(2080 hours)	$43.27	$43.27	$43.27		
B7	Labor cost savings from help desk	B5*B6	$15,577	$15,577	$25,962		
B8	Cost savings of more junior administrator — simplicity of Pivot3 HCI	Interviews	$0	$20,000	$40,000		
Bt	Labor cost savings	B4+B7+B8	$25,269	$47,423	$82,115	$154,808	$123,859
	Risk adjustment	↓10%					
Btr	**Labor cost savings (risk adjusted)**		**$22,742**	**$42,681**	**$73,904**	**$139,327**	**$111,473**

Source: Forrester Research, Inc.

Data Center Cost Savings

The Pivot3 HCI appliances utilize significantly less rack space than the *Organization*'s legacy servers and SAN infrastructure. When it replaced its legacy VDI environment with Pivot3 HCI, the *Organization* was able to move its data center into a smaller location onsite and reduce its power and cooling requirements, resulting in a 50% cost savings over its legacy storage and server infrastructure.

Before it made the decision to move the video surveillance workloads to Pivot3 HCI, the *Organization* earmarked budget to expand data center infrastructure (air conditioning and power) to accommodate new servers. By replacing the legacy environment with Pivot3 HCI instead of expanding it, the *Organization* reduced its space requirement and avoided the additional expenditure of $74,000 in Year 2.

To reflect regional KWH rate and data center infrastructure differentials, the benefit has been risk-adjusted (downward) by 7%. The three-year risk- and present value-adjusted benefit from data center cost savings is $86,083.

TABLE 3
Data Center Cost Savings

Ref.	Metric	Source Or Calculation	Year 1	Year 2	Year 3	Total	Present Value
C1	Estimated legacy power and cooling costs — SAN	Interviews	$19,000	$19,000	$34,000		
C2	Estimated power and cooling costs — Pivot3	Interviews	$9,000	$9,000	$15,300		
C3	Power and cooling savings	C1-C2	$10,000	$10,000	$18,700		
C4	Cost avoidance from not having to expand data center infrastructure	Interviews	$0	$74,000	$0		
Ct	Data center cost savings	C3+C4	$10,000	$84,000	$18,700	$112,700	$92,562
	Risk adjustment	↓7%					
Ctr	**Data center cost savings (risk-adjusted)**		**$9,300**	**$78,120**	**$17,391**	**$104,811**	**$86,083**

Source: Forrester Research, Inc.

BENEFITS: UNQUANTIFIED

The interviewed customers identified the following *qualitative* benefits of using Pivot3 HCI:

- **Improved performance.** One interviewee reported that Pivot3 HCI's performance was two to three times faster than the legacy server and SAN infrastructure that it replaced. This increased speed allowed his organization to access data and retrieve backups significantly faster.
- **Reduced unplanned downtime.** Pivot3's technical capabilities, specifically the high availability, factored heavily into each interviewee's decision to abandon its legacy environment in favor of Pivot3 HCI. None were disappointed: Each interviewed customer experienced increased availability, and none experienced unplanned downtime. However, the interviewees were not able to provide a clear cost of unplanned downtime associated with their legacy infrastructure, so no cost savings comparisons could be made. As a result, the quantification of this benefit has been excluded from the analysis. Readers are encouraged to apply their own cost per unplanned downtime period.

FLEXIBILITY OPTION BENEFITS

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

Forrester asked each interviewed customer the following question: "Now that you have invested in Pivot3 HCI, what other features or functionality can your organization take advantage of?" The following represents the future options available to the *Organization*, or any Pivot3 HCI customer:

- According to Pivot3, its acquisition of NexGen Storage, a provider of flash storage arrays (hybrid and all-flash) based on a multitier PCIe flash architecture and quality of service (QoS) capabilities, means that Pivot3 can deliver a more complete set of dynamic hyperconverged solutions. Enterprise and midmarket companies will have access to a suite of solutions that will allow them to apply the right infrastructure and priority to each workload, application, or business service according to business value.
- By adding NexGen's strengths in accelerated all-flash and hybrid storage, Pivot3 is expanding the traditional notion of hyperconvergence. Customers can have implementation flexibility and QoS management, so IT no longer has to overprovision resources for peak workloads. Instead, it can classify applications into service levels based on business priorities and dynamic provision performance and data protection to deliver on SLAs. Pivot3 intends to market and enhance all current and planned NexGen products.
- Finally, this functionally will allow organizations to realistically colocate apps and workloads on the same infrastructure and manage the contention for resources.

The value of flexibility is clearly unique to each customer, and the measure of its value varies from organization to organization. For the purpose of this analysis, we have assumed that the *Organization* sees future value in being able to take future advantage of the above Pivot3 HCI features and functionality. The value of the flexibility option is based on the Black-Scholes Option Pricing model. (For information regarding the flexibility calculation, please see Appendix B.)

TOTAL BENEFITS

Table 4 shows the total of all benefits as well as present values discounted at 10%. Over three years, the *Organization* expects risk-adjusted total benefits to be a PV of $1,380,110.

TABLE 4
The *Organization* — Total Quantified Benefits

Ref.	Benefit Category	Year 1	Year 2	Year 3	Total	Present Value
Atr	Hardware cost avoidance savings	$366,225	$1,028,043	$0	$1,394,268	$1,182,554
Btr	Labor cost savings	$22,742	$42,681	$73,904	$139,327	$111,473
Ctr	Data center cost savings	$9,300	$78,120	$17,391	$104,811	$86,083
	Total benefits (risk-adjusted)	**$398,267**	**$1,148,843**	**$91,295**	**$1,638,405**	**$1,380,110**

Source: Forrester Research, Inc.

COSTS

Costs Associated With The Pivot3 HCI Solution

The *Organization* incurred costs in the following categories associated with an investment in Pivot3 HCI:

- **Labor to plan, deploy, and manage Pivot3 HCI ongoing — $22,734.** Due diligence for the initial VDI investment required 60 hours, followed by 24 hours for planning and deployment. When the *Organization* expanded its Pivot3 environment to include its video surveillance system, it incurred another 20 hours of due diligence and 40 hours for planning and deployment. In addition to these resource costs incurred upfront and in Year 2, respectively, the *Organization* spends 4 hours a month managing the VDI environment and 6 hours a month managing the video surveillance environment. Planning and deployment tasks for the initial investment included:
  - Spending time with Pivot3 to understand how the solution could replace its existing infrastructure.
  - Working with Pivot3 on requirements, configuration setups, data conversion, analysis and modeling, and training.
  - Assembling and launching the appliance.

  The average annual fully loaded cost of a SAN engineer is $140,000, with help desk technicians averaging $90,000, for a total labor cost of $22,734. There was some variation from interviewees' reported labor costs; therefore, this cost has been risk-adjusted up 10%.

- **VMware licenses — $16,324.** Pivot3 HCI for VDI requires VMware licenses. The *Organization* contracts with VMware separately, paying one-time upfront fees for each appliance, and then 15% maintenance in each consecutive year. Licensing fees can vary based on existing agreements with VMware; therefore, this cost has been risk-adjusted (upwards) by 10%.

  Note to the reader: VMware base licenses are included in video surveillance solutions at no cost. While the *Organization* chose not to upgrade, some customers do choose to upgrade to vSphere Enterprise.

- **Pivot3 hardware, maintenance, and support — $639,919.** The *Organization* purchased three appliances upfront for VDI, followed by 22 appliances in Year 2 for its video surveillance upgrade. Fees to Pivot3 include hardware, software, maintenance, professional services, installation, and training.

  Forrester chose not to risk-adjust hardware costs because the composite organization had received fixed price quotes for Pivot3 fees.

Table 5 shows the total costs of the Pivot3 HCI solution as well as associated present values discounted at 10%, over three years. The *Organization*'s total risk-adjusted costs for the Pivot3 HCI solution are $777,639, with a present value of $678,977.

TABLE 5
The *Organization* — Total Costs Associated With The Pivot3 HCI Solution (Risk-Adjusted)

Ref.	Cost Category	Initial	Year 1	Year 2	Year 3	Total	Present Value
Dtr	Labor: planning, deployment, and ongoing management	$6,219	$3,554	$7,996	$8,885	$26,654	$22,734
Etr	VMware licenses	$13,200	$0	$1,980	$1,980	$17,160	$16,324
Ftr	Pivot3 hardware, maintenance, and support	$192,750	$0	$541,075	$0	$733,825	$639,919
	Total costs (risk-adjusted)	**$212,169**	**$3,554**	**$551,051**	**$10,865**	**$777,639**	**$678,977**

Source: Forrester Research, Inc.

RISKS

Forrester defines two types of risk associated with this analysis: "implementation risk" and "impact risk." Implementation risk is the risk that a proposed investment in Pivot3 HCI may deviate from the original or expected requirements, resulting in higher costs than anticipated. Impact risk refers to the risk that the business or technology needs of the customer may not be met by the investment in Pivot3 HCI, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for cost and benefit estimates.

While the interviewed customers provided cost and benefit estimates, some categories included future projections or a range of responses, or had a number of internal or external forces that might have raised costs or lowered benefits. However, the interviewed customers had a solid average 18 months' experience with the Pivot3 HCI solution. For that reason, selected costs and benefits have been conservatively risk-adjusted as detailed in the Benefits and Costs sections as well as Table 6.

TABLE 6
Benefit And Cost Risk Adjustments

Benefit Categories	Adjustment
Hardware cost avoidance savings	↓ 5%
Labor cost savings	↓ 10%
Data center cost savings	↓ 7%

Cost Categories	Adjustment
Labor: planning, deployment, and ongoing management	↑ 10%
VMware license fees	↑ 10%
Pivot3 hardware, maintenance, and support	Not risk-adjusted

Source: Forrester Research, Inc.

Highlighting risk by adjusting the benefits and costs produces more meaningful and accurate estimates and a more accurate projection of the ROI. In general, risks affect costs by raising the original estimates, and they affect benefits by reducing the original estimates. The risk-adjusted numbers should be taken as "realistic" expectations since they represent the expected values considering risk.

Although Forrester did not risk-adjust Pivot3 quoted fees, other organizations' costs may vary due to different needs and variable discounts from Pivot3.

The following risk surfaced in the analysis but did not affect the cost and benefit risk adjustments:

- Several interviewees mentioned HCI's low adoption and awareness in the marketplace as a risk. Interviewees mitigated this risk by running proof of concepts prior to committing to purchase. However, those customers that later added other workloads and/or additional Pivot3 HCI appliances saw no reason to do proofs of concepts, as they were fully comfortable with Pivot3 HCI.

Table 6 shows the values used to adjust for risk and uncertainty in the cost and benefit estimates. The TEI model uses a triangular distribution method to calculate risk-adjusted values. To construct the distribution, it is necessary to first estimate the low, most likely, and high values that could occur within the current environment. The risk-adjusted value is the mean of the distribution of those points. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

Financial Summary

The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the *Organization*'s investment in Pivot3 HCI.

Table 7 shows the risk-adjusted ROI, NPV, and payback period values for the Pivot3 HCI solution. The benefit and cost values are from summary Tables 4 and 5.

TABLE 7
Cash Flow — Pivot3 HCI (Risk-Adjusted)

	Initial	Year 1	Year 2	Year 3	Total	Present Value
Total costs	($212,169)	($3,554)	($551,051)	($10,865)	($777,639)	($678,977)
Total benefits	$0	$398,267	$1,148,843	$91,295	$1,638,405	$1,380,110
Net benefits	**($212,169)**	**$394,713**	**$597,792**	**$80,430**	**$860,767**	**$701,133**
ROI						**103%**
Payback period						**7 months**

Source: Forrester Research, Inc.

The ROI for the Pivot3 HCI solution was a **very favorable 103%, and the payback period was a quick seven months**.

If risk-adjusted costs, benefits, and ROI still demonstrate a compelling business case, it raises confidence that the investment is likely to succeed because the risks that threaten the project have been taken into consideration and quantified. The risk-adjusted numbers should be taken as "realistic" expectations, as they represent the expected values considering risk. Assuming normal success at mitigating risk, the risk-adjusted numbers should more closely reflect the expected outcome of the investment.

Appendix A: About The Pivot3 HCI Solution

The following information is provided by Pivot3. Forrester has not validated any claims and does not endorse Pivot3 or its offerings

Pivot3's HCI solution helps IT organizations to efficiently consolidate and operate multiple virtualized workloads in a scalable, hyperconverged infrastructure (HCI) model. This reduces complexity and cost while at the same time maximizing performance and availability to meet multiple workload requests. Effectively consolidating multiple workloads on a single infrastructure requires efficiency, resiliency, scalability, performance, and the ability to prioritize what applications matter most during contention for resources.

With Pivot3 patented erasure coding, companies can utilize up to 94% of total capacity without sacrificing availability. They can also have the security of 99.9999% availability with half the nodes and at lower costs than replication-based HCI systems. Pivot3's distributed, scale-out architecture aggregates all compute and storage resources into a common pool available to all VMs, which enables the HCI to support four times the number of VMs as traditional infrastructures. Performance and capacity are scaled linearly by adding nodes to the cluster. With vSTAC SLX, Pivot3 combines the simplicity and economics of hyperconverged infrastructure with the predictable performance of a flash array and advanced QoS in a single integrated solution. With vSTAC SLX, applications can be assigned to service levels on the flash array tier. When multiple applications contend for storage resources, the applications that matter maintain guaranteed service levels.

Appendix B: Total Economic Impact™ Overview

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 technology initiatives to both senior management and other key business stakeholders.

The TEI methodology consists of four components to evaluate investment value: benefits, costs, flexibility, and risks.

BENEFITS

Benefits represent the value delivered to the user organization — IT and/or business units — by the proposed product or project. Often, product or project justification exercises focus just on IT cost and cost reduction, leaving little room to analyze the effect of the technology on the entire organization. The TEI methodology and the resulting financial model place 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. Calculation of benefit estimates involves a clear dialogue with the user organization to understand the specific value that is created. In addition, Forrester also requires that there be a clear line of accountability established between the measurement and justification of benefit estimates after the project has been completed. This ensures that benefit estimates tie back directly to the bottom line.

COSTS

Costs represent the investment necessary to capture the value, or benefits, of the proposed project. IT or the business units may incur costs in the form of fully burdened labor, subcontractors, or materials. Costs consider all the investments and expenses necessary to deliver the proposed value. In addition, the cost category within TEI captures any incremental costs over the existing environment for ongoing costs associated with the solution. All costs must be tied to the benefits that are created.

FLEXIBILITY

Within the TEI methodology, direct benefits represent one part of the investment value. While direct benefits can typically be the primary way to justify a project, Forrester believes that organizations should be able to measure the strategic value of an investment. Flexibility represents the value that can be obtained for some future additional investment building on top of the initial investment already made. For instance, an investment in an enterprise wide upgrade of an office productivity suite can potentially increase standardization (to increase efficiency) and reduce licensing costs. However, an embedded collaboration feature may translate to greater worker productivity if activated. The collaboration can only be used with additional investment in training at some future point. However, having the ability to capture that benefit has a PV that can be estimated. The flexibility component of TEI captures that value.

RISKS

Risks measure the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: 1) the likelihood that the cost and benefit estimates will meet the original projections and 2) the likelihood that the estimates will be measured and tracked over time. TEI applies a probability density function known as "triangular distribution" to the values entered. At a minimum, three values are calculated to estimate the underlying range around each cost and benefit.

Appendix C: Glossary

Discount rate: The interest rate used in cash flow analysis to take into account the time value of money. Companies set their own discount rate based on their business and investment environment. Forrester assumes a yearly discount rate of 10% for this analysis. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult their respective organizations to determine the most appropriate discount rate to use in their own environment.

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.

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.

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.

Return on investment (ROI): A measure of a project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits minus costs) by costs.

A NOTE ON CASH FLOW TABLES

The following is a note on the cash flow tables used in this study (see the example table below). The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1. Those costs are not discounted. All other cash flows in years 1 through 3 are discounted using the discount rate of 10% at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations are not calculated until the summary tables are the sum of the initial investment and the discounted cash flows in each year.

TABLE [EXAMPLE]
Example Table

Ref.	Metric	Calc./Source	Year 1	Year 2	Year 3

Source: Forrester Research, Inc.