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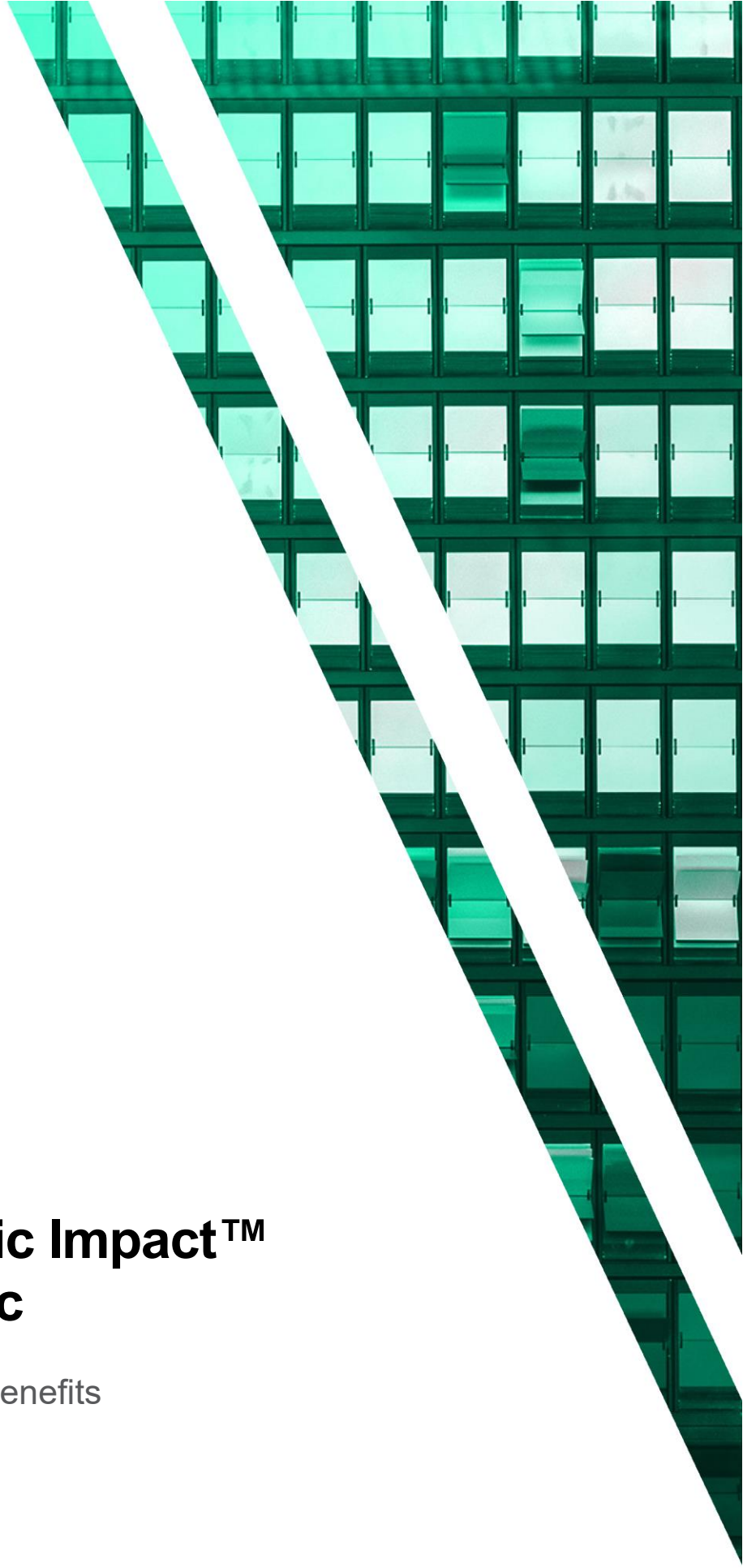

The Total Economic Impact™ Of IBM Turbonomic

Cost Savings And Business Benefits Enabled By Turbonomic

JANUARY 2024

Table Of Contents

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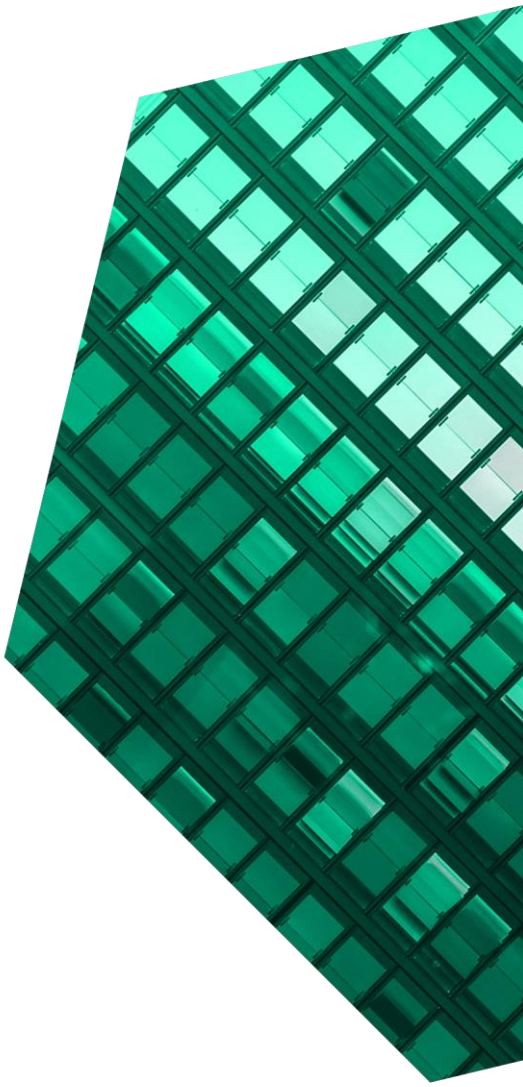


ABOUT FORRESTER CONSULTING

Forrester provides independent and objective research-based consulting to help leaders deliver key transformation outcomes. Fueled by our customer-obsessed research, Forrester's seasoned consultants partner with leaders to execute on their priorities using a unique engagement model that tailors to diverse needs and ensures lasting impact. For more information, visit forrester.com/consulting.

Executive Summary

IBM Turbonomic's role in IT automation strategy provides organizations with easy policy creation and management, migration planning, rightsizing, and automation policies. Turbonomic brings cost efficiency to organizations' on-premises data centers as well as public cloud. Organizations also experience improved IT administrators' productivity, increased cost savings, and improved business outcomes.

A recent Forrester Cloud survey shows that the average public cloud spend of enterprises is $35 million per year.[1] Thirty-seven percent of companies plan to increase their spend by 5% or more over the next 12 months.[2] However, in the middle of an economic slowdown marked by uncertainty and the need to justify investments, tech leaders are intensely evaluating and optimizing their cloud spend. This motion has led to considerable interest in cloud cost management and optimization (CCMO) tools.[3] IBM Turbonomic is a performance and cost optimization platform for applications in on-premises and public cloud environments. The platform ensures adequate compute, storage, and network resources while maintaining performance.

IBM commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying Turbonomic.[4] The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Turbonomic on their organizations.

Public cloud consumption cost savings

35%

KEY STATISTICS

Return on investment (ROI)
247%

Net present value (NPV)
$9.86M

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed six representatives across four organizations with experience using Turbonomic. For the purposes of this study, Forrester aggregated their experiences and combined the results into a single composite organization that has a cloud-first strategy with $4 billion in annual revenue and 10,500 employees.

Prior to using Turbonomic, the interviewees noted that their organizations struggled with escalated infrastructure costs to support business growth. While handling an increasing percentage of applications in the cloud and migrating their infrastructure from on-premises to cloud, interviewees' organizations tried to use other cost optimization tools as well as some cloud-native tools to cut costs. However, the tools they deployed before didn't actually help right-size workloads. Meanwhile, IT administrators found themselves expending significant time configurating different tools and manually implementing changes.

After the investment in Turbonomic, the interviewees' organizations were able to right-size workloads automatically. The refresh cost of the on-premises infrastructure and the consumption costs of the cloud reduced without degraded application performance. The productivity of IT administrators also improved.

KEY FINDINGS

Quantified benefits. Three-year, risk-adjusted present value (PV) quantified benefits for the composite organization include:

- **Reduction of annual cloud consumption costs by 35% with Turbonomic.** The shift from on-premises pricing (fixed capital expenditure) to consumption-based pricing (variable operational expenditure) leads to unpredictable financial management. The inherent self-service and dynamically scalable capabilities of public cloud can easily lead to unfettered rising costs. The composite organization uses Turbonomic to scale its visibility and resource planning to stay abreast of costs. Over three years, the composite organization saved $7.7 million on public cloud consumption.
- **Avoided annual refresh cost of on-premises infrastructure of 75% in the first year of implementation.** IBM Turbonomic rightsized on-premises workloads, enabling longer infrastructure lifespans. This meant a refresh 75% cost avoidance in the first year using Turbonomic and 50% cost avoidance in the second and third years. Over three years, the on-premises infrastructure savings is over $3 million.
- **Saved 30% of effort for IT administrators on monitoring, management, and infrastructure planning.** Turbonomic automatic rightsizing means the composite organization's IT administrators spend less manual time on infrastructure monitoring and management. Over three years, with improved visibility and automation, the composite organization saves $1.8 million on IT administrator productivity.
- **Decrease of 75% in number of application-performance-related tickets with Turbonomic.** Turbonomic ensures optimal performance by automatically scaling workloads for the composite organization. In doing so, the composite organization decreases the number of performance-related tickets. Over three years, the composite organization saves $975,000.
- **Saved 50% of IT administrators' time related to managing a legacy system.** With Turbonomic, the composite organization can monitor infrastructure through a centralized dashboard; previously, IT admins switched between different monitoring systems to maintain whole-system visibility. The composite organization also saves on licensing fees for one legacy system. Over three years, the composite organization saves $267,000 due to retiring legacy systems.

Unquantified benefits. Benefits that provide value for the interviewees' organization but are not quantified in this study include the following:

- **The migration from on-premises to the cloud was eased with Turbonomic.** The solution's recommendations and capabilities eased cloud migration efforts.
- **Employee experience improved**. Interviewees described reduced stress on the IT team after Turbonomic automated a portion of their workloads.
- **The IBM Turbonomic team provided exceptional support.** Interviewees reported a patient and responsive team that provided great support.
- **Environmental sustainability with extended lifespan of on-premises infrastructure and reduced cloud consumption.** Interviewees' organizations were able to optimize their application resource consumption, leading to an extended lifespan of on-premises infrastructure

and reduced cloud consumption. Avoided hardware refreshes meant lower waste and a higher positive environmental impact.

Costs. Three-year, risk-adjusted PV costs for the composite organization include:

- **License fees paid to Turbonomic of $3.87 million.** The total cost of license fees paid to Turbonomic varies based on scope. The composite organization pays $135 per virtual machine (VM).
- **Initial and ongoing management and training personnel costs of $126,000.** The composite organization has minimal ongoing management of the Turbonomic deployment as well as initial training for IT administrators.

The representative interviews and financial analysis found that a composite organization experiences benefits of $13.8 million over three years versus costs of $4.0 million, adding up to a net present value (NPV) of $9.9 million and an ROI of 247%.

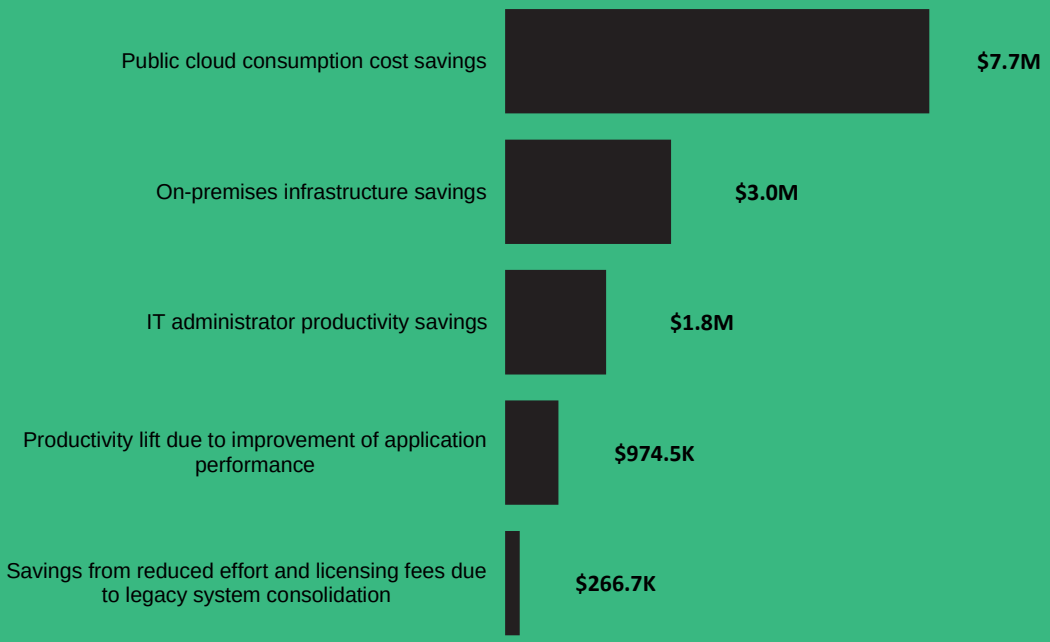
ROI
247%

BENEFITS PV
$13.85M

NPV
$9.86M

PAYBACK
<6 months

Benefits (Three-Year)



“Our company runs leaner than it should. If you look at comparable companies with the same organizations, they have more headcount. One of the only reasons we’re able to do a lot of the work we do is because of the tools that we have. ... If we didn’t have Turbonomic, we would need more employees, or we would do what the company was doing before Turbonomic but with zero cost optimization.”

— Senior development operations specialist lead, financial services

TEI FRAMEWORK AND METHODOLOGY

From the information provided in the interviews, Forrester constructed a Total Economic Impact™ framework for those organizations considering an investment in Turbonomic.

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 Turbonomic can have on an organization.

DUE DILIGENCE

Interviewed IBM stakeholders and Forrester analysts to gather data relative to Turbonomic.

INTERVIEWS

Interviewed six representatives at four organizations that use Turbonomic to obtain data on costs, benefits, and risks.

COMPOSITE ORGANIZATION

Designed a composite organization based on characteristics of the interviewees' 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 interviewees.

CASE STUDY

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

The IBM Turbonomic Customer Journey

Drivers leading to the Turbonomic investment

Interviews

Role	Industry	Region
Infrastructure architect	Machinery	North America
• Director of monitoring, finance operations • Manager, cloud operations, finance operations • Senior development operations specialist lead	Financial services	Canada-based, global operations
Technical manager of cloud infrastructure operations	Financial services	United States
Senior manager of solution architecture	Professional services	Europe-based, global operations

KEY CHALLENGES

Interviewees noted that their organizations struggled with sunk productivity due to absence of automated action following recommendation; improperly used resources; and lack of skills, all of which acted as major drivers to adopting a solution. The interviewees noted their organizations struggled with the following common challenges:

- **On-premises infrastructure costs were escalating.** As time approached for refreshes and renewals, interviewees considered where to invest their resources. The senior development operations specialist lead in the financial services industry said, "Our reason for purchasing Turbonomic was a general right-sizing of our entire on-prem environment." This interviewee continued to explain that their organization's on-premises hardware was coming up for renewal: "[The hardware was] at the end of its capex lifecycle and we need to determine whether we invest more on-prem. How much do we invest versus moving things to the cloud? How much more hardware do we need to buy? That's the initial reason we brought in Turbonomic."

  The senior development operations specialist lead also expressed the expectation that as their organization migrated to the cloud, the machines would be right-sized on-premises, thus saving money in course of the cloud migration "as opposed to getting to the cloud and rightsizing in the cloud."

- **Previous tools did not reduce infrastructure costs.** Some interviewees noted that their prior tools only provided a report or dashboard with no following action. The senior manager of solution architecture at a professional services organization said: "We used [a tool] for reporting.

> **"We are a cloud-first initiative, so everything we build, deploy, and host has a cloud-first strategy. We are continuously migrating workloads off of our on-premises states to the cloud. And so with that comes the need and the play for IBM Turbonomic within our infrastructure."**
>
> *Infrastructure architect, machinery*

So, we would tell people what they were spending via email, full report, or dashboard. There are many ways we could get that [report] in front of whoever was owning a product or a whole subscription or an account, [for] whatever they wanted to do, for taxes or audits." This interviewee explained that the product, subscription, or account owners would have the reports, but emphasized they were merely that — reports. The interviewee said: "If you don't do anything with the report, what [outcome is there of] the report? And so Turbonomic was the differentiator. [With Turbonomic,] I can take actions."

"[Turbonomic] is much more robust on cost savings, recommendations, plus the ability to automate those [recommendations] with the click of a button and additional features."

Technical manager of cloud infrastructure operations, financial services

- **Lack of built-in automation resulted in a need for developers with expertise.** Interviewees commented that the environment before their Turbonomic deployment required highly skilled developers, creating a need for resources that were unavailable. The infrastructure architect in the machinery industry said, "Without using Turbonomic, the automation often requires a lot of scripting, coding, custom in-house skills that may not be available, whether [developers] have to know PowerShell or Python."

INVESTMENT OBJECTIVES

Interviewees searched for a solution that could:

- Reduce the infrastructure costs, especially cloud consumption costs.
- Right-size the workload without a risk to performance.
- Save on IT resources (both infrastructure and human resources).
- Provide good customer, professional, and vendor service.

COMPOSITE ORGANIZATION

Based on the interviews, Forrester constructed a TEI framework, a composite company, and an ROI analysis that illustrates the areas financially affected. The composite organization is representative of the six interviewees across four organizations, and it is used to present the aggregate financial analysis in the next section. The composite organization has the following characteristics:

Description of composite. The composite organization is a global, 10,500-employee organization, with an annual revenue of $4 billion. Twenty IT administrators work to support the composite organization's application management and resourcing. The team has some visibility into workloads and usage due to its prior use of reporting

Key Assumptions

- **20 IT administrators**
- **5,000 VM on-prem in Year 1**
- **5,000 VM in the cloud in Year 1**
- **10% infrastructure growth with a cloud-first strategy**

tools before the Turbonomic deployment. However, the composite organization has been unable to execute actions that would prevent overprovisioning for various reasons, ranging from performance risk aversion to lack of developer expertise. This results in diminished employee effectiveness and hours lost to troubleshooting. Resourcing applications is becoming increasingly costly for the organization.

Deployment characteristics. For reliable performance and optimized spending, the composite organization deploys IBM Turbonomic on-premises and in the public cloud. The composite organization has a cloud-first strategy, running 5,000 virtual machines (VMs) on-premises and 5,000 VMs in the cloud in Year 1; its on-prem infrastructure spend decreases by 70% in Year 2 and 40% by Year 3 as its cloud-first strategy is implemented with a 10% year-over-year increase in cloud spend.

Analysis Of Benefits

Quantified benefit data as applied to the composite

Total Benefits						
Ref.	**Benefit**	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present Value**
Atr	Public cloud consumption cost savings	$2,428,272	$3,156,754	$3,885,235	$9,470,261	$7,735,442
Btr	On-premises infrastructure savings	$2,025,000	$945,000	$540,000	$3,510,000	$3,027,611
Ctr	IT administrator productivity savings	$741,312	$741,312	$741,312	$2,223,936	$1,843,533
Dtr	Productivity lift due to improvement of application performance	$391,875	$391,875	$391,875	$1,175,625	$974,535
Etr	Savings from reduced effort and licensing fees due to legacy system consolidation	$107,237	$107,237	$107,237	$321,710	$266,682
	Total benefits (risk-adjusted)	$6,040,592	$5,793,142	$6,220,693	$16,701,532	$13,847,803

PUBLIC CLOUD CONSUMPTION COST SAVINGS

Evidence and data. Interviewees from all four organizations described deploying Turbonomic across their public cloud workloads to right-size, scale, and gain efficiencies in their public cloud consumption.

- The senior development operations specialist lead at the financial services organization explained that one goal of deploying Turbonomic at their organization was right-sizing the entire on-premises environment, with cloud migration assistance as an added benefit. The interviewee stated, “As we’ve implemented our additional cloud footprints, we’ve slowly brought them on board into Turbonomic.” The manager of cloud and finance operations at the same organization added: “Last year, in cloud alone, we saved about $300,000. This year, we’re on the cusp of tripling that.”
- The interviewees’ organizations also sought to increase efficiency and avoid risks to performance. The senior manager of solution architecture in the professional services industry said: “The primary goal is to reduce cloud cost without risks to performance. With Turbo, it would resize based on usage, making it either smaller or bigger. So, it’s not just a cost savings tool — it’s an efficiency tool.” The interviewee further emphasized the importance of performance to their organization’s customers, adding: “You want guaranteed performance. Not only are we going to reduce spend, but we’re also going to win with a guarantee of performance of our critical applications. If you’re running an app that generates data for clients, they care. That has to run, be efficient, and not ever have performance problems.” For interviewees, performance of business-critical applications had a recognizable impact on customer experience and the bottom-line.
- The senior manager of solution architecture in the professional services industry reported saving costs by locating orphaned accounts: “[Turbonomic] is going to resize things; it’s going to remove orphan storage accounts. They get

orphaned a lot. They're $10, $15 a month but when you're a large firm like ours, I found $50,000-worth of orphaned accounts. The orphaned accounts were discovered within the first two weeks. They could have been orphaned for weeks or months, even years."

- All interviewees noted their organizations experienced reduced spending. The technical manager of cloud infrastructure operations in the financial services industry said: "I know that for 2022, we were able cut approximately $20 million of annual spending in indirect savings. Approximately half of that is directly related to recommendations from Turbonomic. The bottom line is about $10 million for the year is indirectly related to the Turbonomic recommendations."
- The infrastructure architect in the machinery industry said: "To break even [with the term agreements] year by year, we are going to have to save over $150,000. By April of this year, we've essentially recouped our one-year term license. So we were already moving forward in the green pastures of breaking even in less than six months. Year-to-date numbers, we've already surpassed $380,000 in savings."

Modeling and assumptions. For the composite organization, Forrester assumes the following:

- The composite organization spends $0.16 per VM per hour with 10% growth in annual capex net-new cloud spend.
- With IBM Turbonomic, the composite organization reduces cloud spend by 35% each year.

Risks. Results may not be representative of all experiences and the benefit will vary based on the following variables:

- An organization's current public cloud consumption and future cloud-first strategy.
- An organization's required application resourcing to support its future public cloud consumption requirements.
- An organization's culture, procedures, or corporate policies.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $7.7 million.

Public Cloud Consumption Cost Savings

Ref.	Metric	Source	Year 1	Year 2	Year 3
A1	Average annual public cloud consumption	Composite	$7,708,800	$10,021,440	$12,334,080
A2	Reduction with IBM Turbonomic	Interviews	35%	35%	35%
At	Public cloud consumption cost savings	A1*A2	$2,698,080	$3,507,504	$4,316,928
	Risk adjustment	↓10%			
Atr	Public cloud consumption cost savings (risk-adjusted)		$2,428,272	$3,156,754	$3,885,235
	Three-year total: $9,470,261			**Three-year present value: $7,735,442**	

ON-PREMISES INFRASTRUCTURE SAVINGS

Evidence and data. All interviewees' organizations operated in hybrid environments. Two of the four organizations operated in sizeable on-cloud environments, while the other two interviewees' environments were heavily on-premises but with cloud-first strategies. A key driver for the interviewees deploying Turbonomic was to maintain appropriate application resourcing levels after right-sizing workloads on-prem, therefore saving on hardware and other infrastructure costs and ultimately working toward transitioning to the cloud.

- The senior development operations specialist lead in the financial services industry said: "We haven't bought new hardware since bringing in Turbonomic. At that time, we had chopped off 79 hosts running at $60,000 each." This amounted to a total of $4.2 million in savings for the interviewee's organization.
- The deployment of Turbonomic better equipped the interviewees' organizations for cloud migration of previously on-premises infrastructure. The manager of cloud and finance operations at a financial services organization added: "Then we just ended up in the cloud. It was significant savings. It also brought with it a bunch of other side benefits in terms of productivity increases that we didn't have without the tool in place." Right-sizing on-premises prepared their organization to move to the cloud with the expectation that savings would be optimized in the migration to cloud from day one, as opposed to right-sizing in the cloud.
- The senior manager of solution architecture in the professional services industry expanded on the visibility that Turbonomic offered: "It pulls back the covers of whether or not you deployed your infrastructure efficiently. Over-provisioning is very common because the on-prem mindset was to get as much infrastructure as you can because you may not get anymore. With the cloud, it doesn't work that way."

> **"If you're doing an on-prem move to the cloud, you can have [Turbonomic] pointing at your on-prem environment if you so choose. And you can say, 'I want to take this application and move to the cloud,' and [Turbonomic] will give you recommendations on the resources it should be using in the cloud."**
>
> *Senior manager of solution architecture, professional services*

Modeling and assumptions. For the composite organization, Forrester assumes the following:

- The composite organization's hybrid environment begins to transition more and more to the cloud over the course of three years. Its on-premises infrastructure has a lifespan of four years, amounting to 25% of refresh costs.
- The composite organization avoids 75% of these on-premises infrastructure refresh costs in Year 1 and 50% in Years 2 and 3 as cloud usage increases.

Risks. Results may not be representative of all experiences and the benefit will vary based on the following variables:

- The size and specifics of an organization's infrastructure deployments enabled by Turbonomic.

- The complexity of internal processes to retire applications, including management by vendors and external parties.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $3.0 million.

On-Premises Infrastructure Savings

Ref.	Metric	Source	Year 1	Year 2	Year 3
B1	Total on-premises infrastructure spend	Composite	$12,000,000	$8,400,000	$4,800,000
B2	Annual on-prem infrastructure refresh costs (percentage of total infrastructure)	Interviews	25%	25%	25%
B3	Total annual on-prem infrastructure refresh costs	B1*B2	$3,000,000	$2,100,000	$1,200,000
B4	Avoided annual on-prem refresh costs with Turbonomic	Interviews	75%	50%	50%
Bt	On-premises infrastructure savings	B3*B4	$2,250,000	$1,050,000	$600,000
	Risk adjustment	↓10%			
Btr	On-premises infrastructure savings (risk-adjusted)		$2,025,000	$945,000	$540,000
	Three-year total: $3,510,000			**Three-year present value: $3,027,611**	

IT ADMINISTRATOR PRODUCTIVITY SAVINGS

Evidence and data. Interviewees noted that Turbonomic provided recommendations based on workload and that there was no need for administrators to constantly monitor the infrastructure. Instead, Turbonomic could automatically execute recommendations without intervention, resulting in IT admin productivity savings.

- The senior manager of solution architecture in the professional services industry said, "Turbonomic can fix performance issues, since it is also monitoring." This effectively freed up IT resources.
- In addition to reduced monitoring, interviewees noted that Turbonomic does not require code to run. The interviewees' organizations didn't need high-level IT administrators or long developers hours. The infrastructure architect in the machinery industry said: "Within Turbonomic, it is really simple. There's no coding required. Basically, I can use a couple of checkboxes and dropdowns and click a button, and it is pretty much turnkey from there. I select a workload, I specify the type of action to take and when, and it just does it." The interviewee explained that with other tools, the team would have needed to build an automation solution with scripted syntax and resource deployment configuration.
- The infrastructure architect in the machinery industry also added that their organization would have needed 10 additional engineers without Turbonomic: "We talk about maybe a need of having 10-plus people to realistically having one person running the entire automation, and potentially maybe three actively in their spare time digging into Turbonomic." The interviewee summarized: "We talked about the number of recommendations, the executions, year-to-date savings. But when you factor in the headcount that is participating, then you can really understand the scale of what's been done versus what could be done. There's a huge value — a lot of capabilities, functionality, huge opportunity on a table."

> **"I don't want to tie up an IT resource at 2 a.m. to take action. I can just get the approval, create the automation policy, and let Turbonomic do it for us. That's a huge value in of itself for us."**
>
> *Infrastructure architect, machinery*

Modeling and assumptions. For the composite organization, Forrester assumes the following:

- The composite organization employs 20 IT administrators at an hourly fully burdened rate of $88.
- The IT administrators reduce their efforts by 30%, with a 75% productivity recapture rate.

Risks. Results may not be representative of all experiences and the benefit will vary based on the following variables:

- Expertise and skill of an organization's IT administrators.
- Scope of an organization's on-premises and public cloud workloads as related to IT support needed.
- Interviewees reported that there are still some manual processes involved due to company policy or culture.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $1.8 million.

IT Administrator Productivity Savings					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
C1	Affected IT infrastructure administrators	Composite	20	20	20
C2	Average fully burdened hourly salary for IT administrators	TEI standard	$88	$88	$88
C3	Percentage of effort saved	Interviews	30%	30%	30%
C4	Percentage of productivity recapture	Assumption	75%	75%	75%
Ct	IT administrator productivity savings	C1*2,080*C2*C3*C4	$823,680	$823,680	$823,680
	Risk adjustment	↓10%			
Ctr	IT administrator productivity savings (risk-adjusted)		$741,312	$741,312	$741,312
	Three-year total: $2,223,936			**Three-year present value: $1,843,533**	

PRODUCTIVITY LIFT DUE TO IMPROVEMENT OF APPLICATION PERFORMANCE

Evidence and data. Interviewees saw fewer performance-related tickets with the Turbonomic deployment. They reported their teams' IT administrators spent less time on ticket resolution, freeing up time to focus on other strategic tasks.

- The infrastructure architect in the machinery industry said: "Before Turbonomic, we would get five to 10 performance-related tickets a week. At that point, it was completely reactive support, because we didn't have the time to even analyze and solve for why the issues were happening in the first place. With Turbonomic, we get conservatively 10 tickets per month, and it's probably even significantly less than that, because I've only seen one ticket in the last couple of months." That was an estimated 80% reduction in performance-related tickets with Turbonomic.
- Workflow remediation patterns were also changed. The infrastructure architect in the machinery industry noted that Turbonomic provided recommendations for performance optimization issues before most tickets were submitted: "If someone does have a performance issue ... we pull up Turbonomic and we see if it is providing a recommendation for that workload. And almost every single time, it is providing a recommendation. And a good majority of the time, we have been able to actually resolve the performance impact within minutes while saving money, because we've scaled from one SKU into another SKU that we already have reserved capacity. That alone saves us a ton of money."

Modeling and assumptions. For the composite organization, Forrester assumes the following:

- Before Turbonomic, the composite monitored 1,000 applications and experienced 50 performance-related tickets per application per year.
- Turbonomic reduces performance-related support tickets by 75%.
- The average time to resolve each ticket is 15 minutes, with an $88 average hourly fully burdened rate for IT admins and a 50% productivity recapture rate applied.

Risks. Results may not be representative of all experiences and the benefit will vary based on the following variables:

- Previous application performance before Turbonomic as related to level of improvement achievable with Turbonomic.
- Varying business value achieved through improved application performance.

Results. To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV of $975,000.

Productivity Lift Due To Improvement Of Application Performance					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
D1	Total number of applications monitored by Turbonomic	Composite	1,000	1,000	1,000
D2	Number of performance-related tickets per application per year before Turbonomic	Interviews	50	50	50
D3	Percentage reduction of application support tickets (performance related)	Interviews	75%	75%	75%
D4	Average time to solve each ticket (in hours)	Composite	0.25	0.25	0.25
D5	Percentage of productivity recapture	Assumption	50%	50%	50%
D6	Average fully burdened hourly salary for IT administrators	TEI standard	$88	$88	$88
Dt	Productivity lift due to improvement of application performance	D1*D2*D3*D4*D5*D6	$412,500	$412,500	$412,500
	Risk adjustment	↓5%			
Dtr	Productivity lift due to improvement of application performance (risk-adjusted)		$391,875	$391,875	$391,875
	Three-year total: $1,175,625			**Three-year present value: $974,535**	

SAVINGS FROM REDUCED EFFORT AND LICENSING FEES DUE TO LEGACY SYSTEM CONSOLIDATION

Evidence and data. Some interviewees used a third-party CCMO tool in conjunction with the native cloud management tools before using Turbonomic. In this prior scenario, administrators split focus and attention across these different tools. With Turbonomic, teams gained efficiency with its automation capabilities.

- The technical manager of cloud infrastructure operations in the financial services industry said: "We started looking at cost savings efforts, at the cloud-native tools, the reporting tool, and Turbonomic. And I'm sure you can imagine that trying to make heads or tails out of what [infrastructure vendors] are telling you compared to [reports] compared to Turbonomic — they each use different formulas for determining their recommendations and do vary. It quickly became apparent that from the perspective of a company that's trying to save money, you could waste a lot of money trying to figure out what recommendations to use."
- The technical manager of cloud infrastructure operations in the financial services industry elaborated: "I can absolutely see a situation where a lot of manual effort is spent looking at cloud recommendations [across different tools]. ... I was extracting the information manually a couple times a week and that would take 2 hours a day. So I was looking at it much more frequently at that time. But once we got that automatically going into a database, then I just look at it on demand as needed. So lately, for me, it has been maybe once or twice a month."
- Interviewees related that Turbonomic made the most sense for the environment. The technical manager of cloud infrastructure operations concluded: "So from our perspective, since we do have a significant presence in each of the main public clouds, we prefer using Turbonomic as a single-pane-of-glass type of approach. … It helps us save money across our three public clouds, and it gives us one tool to look at instead of having to deal with cloud-native tools in each environment."
- Turbonomic also provided more cost-effective recommendations compared to previous tools. The infrastructure architect in the machinery industry said: "From what we've seen based on actually using the products, is that the data is more enriched from the Turbonomic side. We know what the analysis is both pre- and post-execution. So there's no guesswork on if it's going to break anything. And then typically the recommendations are a lot more cost effective on the Turbonomic side in terms of constraining this workload to this size and saving a few more dollars by doing so."

Modeling and assumptions. For the composite organization, Forrester assumes the following:

- Before Turbonomic, IT administrators spent 208 hours a year in the legacy systems.
- Turbonomic reduced 50% of this effort, saving 104 hours per year.
- The average hourly fully burdened rate for the IT admins is $88.
- The composite organization also retires a legacy system that cost $110,000 a year in licensing fees.

Risks. Results may not be representative of all experiences and the benefit will vary based on the following variables:

- The variety of different tools used prior to the Turbonomic deployment.
- The number of legacy systems retired with the Turbonomic deployment.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $267,000.

Savings From Reduced Effort And Licensing Fees Due To Legacy System Consolidation					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
E1	Hours IT administrators spent on legacy systems per year before IBM Turbonomic	Interviews	208	208	208
E2	Reduction in effort with IBM Turbonomic	Interviews	50%	50%	50%
E3	Hours saved per year with IBM Turbonomic	E1*E2	104	104	104
E4	Average fully burdened hourly salary for IT administrators	TEI standard	$88	$88	$88
E5	Subtotal: Savings from reduced effort due to legacy system consolidation	E3*E4	$9,152	$9,152	$9,152
E6	Licensing fees savings from retired legacy systems	Composite	$110,000	$110,000	$110,000
Et	Savings from reduced effort and licensing fees due to legacy system consolidation	E5+E6	$119,152	$119,152	$119,152
	Risk adjustment	↓10%			
Etr	Savings from reduced effort and licensing fees due to legacy system consolidation (risk-adjusted)		$107,237	$107,237	$107,237
	Three-year total: $321,710			**Three-year present value: $266,682**	

UNQUANTIFIED BENEFITS

Interviewees mentioned the following additional benefits that their organizations experienced but were not able to quantify:

- **The migration from on-premises to the cloud is better planned with Turbonomic.** Interviewees said they better planned their migration to the cloud and expect to see more benefits using Turbonomic for the cloud.

  The manager of cloud and finance operations in the financial services industry said: "It would be longer term more beneficial in the cloud. I think it's an excellent tool for bringing your on-prem into better alignment and making sure that you're getting the best value out of your sunk costs instead of purchasing more. But I think the value of it will really shine in the near-real-time scaling capabilities, so you're optimized in the cloud all the time."

  The infrastructure architect in the machinery industry said: "The desire at this point is for anything that's net new in the cloud to be container-based, microservices based on workloads. So all the effort really is focused on making sure that our environment is ready for that growth." The interview also remarked on needing to be proactive to achieve savings with cloud being pay-as-you-go: "Our Turbonomic tool clearly shows we have a million and a half dollars a month of potential savings. So that's $18 million a year, just there."

- **Employee experience is improved.** The senior manager of solution architecture at the professional services organization said: "You wouldn't have to add headcount to do it. The reality is the same people that do the DevOps work today can use this product to reduce their stress, to reduce their time that they're constantly tweaking and manipulating, and work on other things. Therefore, [reduced] headcount is a good thing a lot of times. That's money, that's vacation time."

- **The IBM Turbonomic team provides exceptional support.** Interviewees also remarked that the Turbonomic team provided great support and was reliably available. The senior manager of solution architecture in the professional services industry said of the Turbonomic support team: "They're fantastic. Absolutely, they're fantastic to work with. They're great. They're patient. They understand, but again, they're also in the same position that I am, as they can't tell people what to do — they know it's not their company, it's not their firm. But the people I have dealt with there have been absolutely wonderful. Responsive, smart, reactive — all those things. I mean, I couldn't say enough good things about the people I've dealt with there."

- **Environmental sustainability with extended lifespan of on-premises infrastructure and reduced cloud consumption.** With Turbonomic, interviewees' organizations experienced reduced cloud consumption, an extended lifespan of on-premises infrastructure, and an opportunity to avoid hardware refreshes, leading to a positive environmental impact.

FLEXIBILITY

The value of flexibility is unique to each customer. There are multiple scenarios in which a customer might implement Turbonomic and later realize additional uses and business opportunities, including:

- **Improvements to technology with integrations and merged reporting functions.** The product's modern technologies management, systems integration, and compatibility with other systems enabled the interviewees' organizations to achieve higher levels of technological performance. Interviewees reported that integrations worked well, even out of the box.

- **Productivity lift for end users.** Interviewees' organizations saw fewer performance issues with business-critical internal and customer-facing applications. This enabled time savings and an overall better experience for employees and customers, fostering customer retention and impacts to the bottom line.

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

Analysis Of Costs

Quantified cost data as applied to the composite

Total Costs							
Ref.	**Cost**	**Initial**	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present Value**
Ftr	License fees paid to Turbonomic	$0	$1,417,500	$1,559,250	$1,715,175	$4,691,925	$3,865,909
Gtr	Initial and ongoing management and training personnel costs	$66,528	$24,024	$24,024	$24,024	$138,600	$126,272
	Total costs (risk-adjusted)	$66,528	$1,441,524	$1,583,274	$1,739,199	$4,830,525	$3,992,181

LICENSE FEES PAID TO TURBONOMIC

Evidence and data. Depending on their environments and scope, interviewees noted their organizations paid license fees ranging from around $150,000 to $1 million annually.

Modeling and assumptions. For the composite organization, Forrester assumes the following:

- The composite organization has 10,000 VMs in Year 1; 11,000 VMs in Year 2; and 12,100 VMs in Year 3 at a licensing cost of $135 per VM.
- Pricing may vary. Contact IBM Turbonomic for additional details.

Risks. Results may not be representative of all experiences and the cost will vary based on the following variables:

- Workload scale in which IBM Turbonomic is deployed, which affects licensing costs.
- Growth of an organization's enterprise workloads.

Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $3.7 million.

License Fees Paid To Turbonomic						
Ref.	**Metric**	**Source**	**Initial**	**Year 1**	**Year 2**	**Year 3**
F1	Total VMs (on-premises and cloud)	Composite		10,000	11,000	12,100
F2	Price per VM	Assumption		$135	$135	$135
Ft	License fees paid to Turbonomic	F1*F2	$0	$1,350,000	$1,485,000	$1,633,500
	Risk adjustment	↑5%				
Ftr	License fees paid to Turbonomic (risk-adjusted)		$0	$1,417,500	$1,559,250	$1,715,175
	Three-year total: $4,691,925			**Three-year present value: $3,865,909**		

INITIAL AND ONGOING MANAGEMENT AND TRAINING PERSONNEL COSTS

Evidence and data. Interviewees in the study mentioned the ongoing management included periodic meetings with the Turbonomic support team, as well as daily monitoring of the system. Overall, interviewees reported minimal required oversight.

Modeling and assumptions. For the composite organization, Forrester assumes the following:

- Two FTEs are assigned to manage Turbonomic, spending 130 hours on ongoing management. One administrator manages the on-premises system, and another administrator manages the cloud infrastructure.
- Twenty IT administrators took the Turbonomic training at the time of deployment, spending 36 hours on training.
- The average fully burdened hourly salary for IT administrators is $88.

Risks. Results may not be representative of all experiences and the cost will vary based on the following variables:

- The scope of an organization's Turbonomic deployment and its required initial and ongoing effort.
- The expertise of the organization's IT personnel.

Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV of $126,000.

"Our team is primarily responsible for infrastructure and servers. [...] They're able to provide value and assist in closing gaps [in their depth and expertise] using Turbonomic, because Turbonomic takes away the need to have depth in areas that traditionally a person would need to have. And it helps them do it at much faster."

Infrastructure architect, machinery

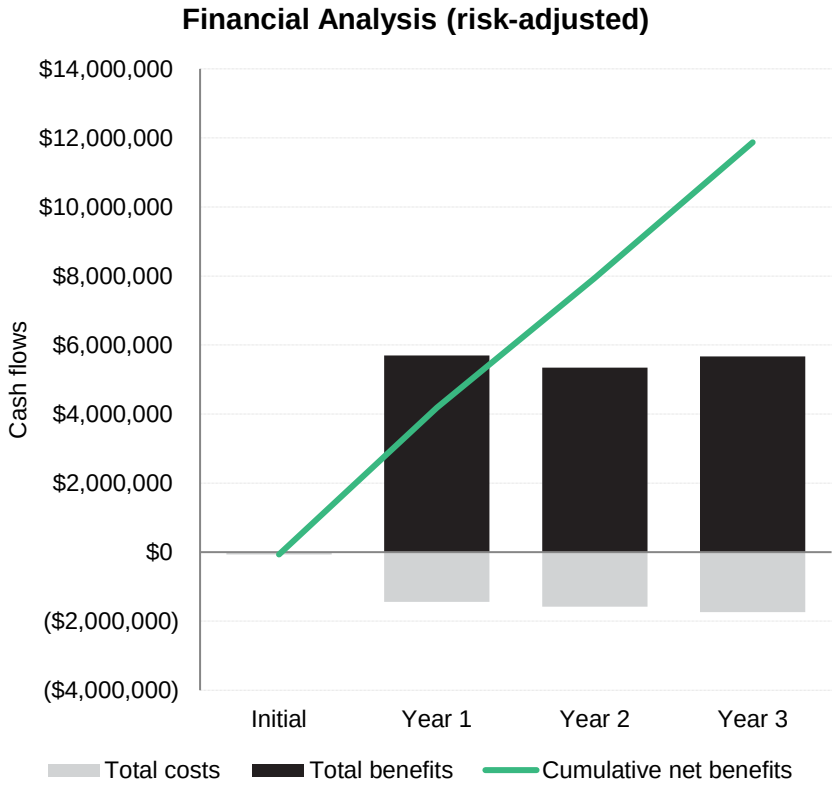
"The return on investment is about reducing cloud spend, optimizing on-prem, and the potential for reducing production problems in our daily lives."

Director of monitoring, finance operations, financial services

Initial And Ongoing Management And Training Personnel Costs						
Ref.	**Metric**	**Source**	**Initial**	**Year 1**	**Year 2**	**Year 3**
G1	FTEs assigned to manage Turbonomic deployment	Composite		2	2	2
G2	Hours per year spent on ongoing management	Composite		130	130	130
G3	Average fully burdened hourly salary for FTEs	TEI standard		$88	$88	$88
G4	Subtotal: Ongoing management personnel cost	G1*G2*G3		$22,880	$22,880	$22,880
G5	IT administrators trained on Turbonomic	Composite	20			
G6	Hours spent on Turbonomic training	Composite	36			
G7	Average fully burdened hourly salary for IT administrators	TEI standard	$88			
G8	Subtotal: Training personnel cost	G5*G6*G7	$63,360	$0	$0	$0
Gt	Initial and ongoing management and training personnel costs	G4+G8	$63,360	$22,880	$22,880	$22,880
	Risk adjustment	↑5%				
Gtr	Initial and ongoing management and training personnel costs (risk-adjusted)		$66,528	$24,024	$24,024	$24,024
	Three-year total: $138,600			**Three-year present value: $126,272**		

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS



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

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

Cash Flow Analysis (Risk-Adjusted Estimates)

	Initial	Year 1	Year 2	Year 3	Total	Present Value
Total costs	($66,528)	($1,441,524)	($1,583,274)	($1,739,199)	($4,830,525)	($3,992,181)
Total benefits	$0	$5,693,696	$5,342,177	$5,665,659	$16,701,532	$13,847,803
Net benefits	($66,528)	$4,252,172	$3,758,903	$3,926,460	$11,871,007	$9,855,622
ROI						247%
Payback						<6 months

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.

Appendix B: Endnotes

[1] Source: "Public Cloud Market Insights, 2023," Forrester Research, Inc., November 27, 2023.
[2] Ibid.
[3] Source: "Forrester's Cloud Cost Management And Optimization (CCMO) Buying Guide, 2023," Forrester Research, Inc., May 18, 2023.
[4] 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.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