

The Total Economic Impact™ Of IBM Turbonomic Application Resource Management

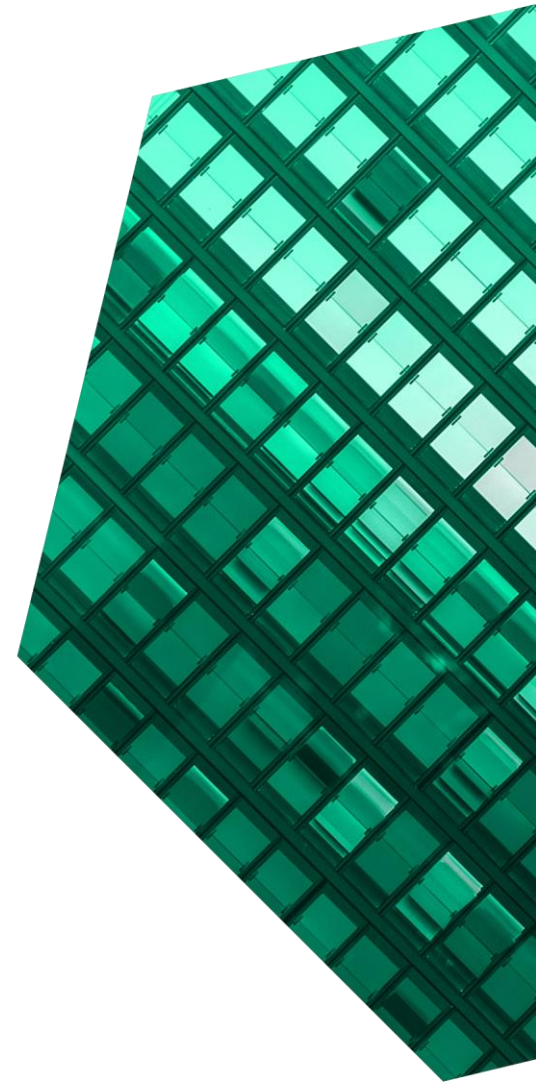
Business Benefits And Cost Savings
Enabled By IBM Turbonomic Application Resource
Management

JANUARY 2022

Table Of Contents

Consulting Team: Richard Cavallaro
Sam Sexton

Executive Summary	1
.....	2
Key Findings.....	2
The IBM Turbonomic Customer Journey	6
Key Challenges	6
Investment Objectives	6
Composite Organization.....	7
Analysis Of Benefits	8
On-Premises Infrastructure Savings	8
Public Cloud Consumption Cost Savings.....	10
IT Administrator Productivity Savings	11
End-User Business Benefits From Improved Application Performance	14
Unquantified Benefits	15
Flexibility	16
Analysis Of Costs	17
License Fees Paid To ibm Turbonomic.....	17
initial And Ongoing Management And Training Personnel Costs	18
Financial Summary	20
Appendix A: Total Economic Impact	21
Appendix B: Endnotes	22



ABOUT FORRESTER CONSULTING

Forrester Consulting provides independent and objective research-based consulting to help leaders succeed in their organizations. For more information, visit forrester.com/consulting.

© Forrester Research, Inc. All rights reserved. Unauthorized reproduction is strictly prohibited. Information is based on the best available resources. Opinions reflect judgment at the time and are subject to change. Forrester®, Technographics®, Forrester Wave, RoleView, TechRadar, and Total Economic Impact are trademarks of Forrester Research, Inc. All other trademarks are the property of their respective companies.

Executive Summary

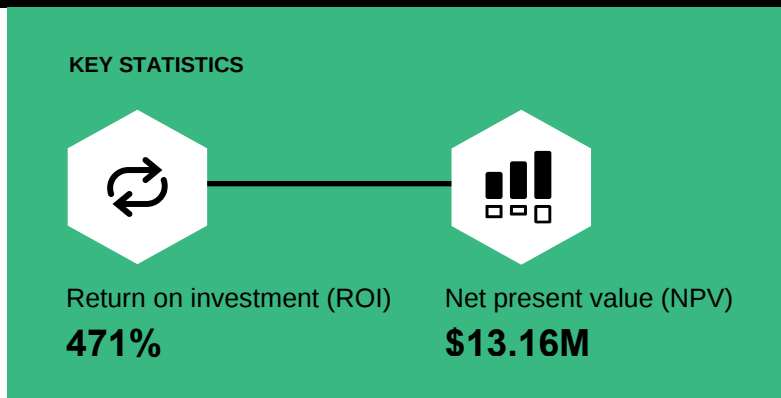
IBM Turbonomic dynamically resources and optimizes applications for performance in real-time taking into account demands of the business. This ensures cost efficiency in both the datacenter and public cloud while alleviating the burden on the organization's scarce IT talent to balance application performance, cost and compliance. Through better resourcing, better performing applications directly improves IT staff efficiency, customer experience, and business outcomes.

Organizations must take application resourcing automation seriously in order to deliver faster, more reliable experiences to their internal and external customers while also optimizing operations and reducing costs.¹ Modern, resilient operations builds on established operations practices and improves them with data, automation, and a focus on the customer. This new orientation is necessary to ensure technology operations become a recognized component of business success.²

Turbonomic and 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 [IBM Turbonomic Application Resource Management](#).³ The purpose of this study is to provide readers with a framework to evaluate the potential financial impact IBM Turbonomic can have on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed five customers with experience using IBM Turbonomic. For the purposes of this study, Forrester aggregated the experiences of the interviewed decision-makers and combined the results into a single composite organization.

Prior to using Turbonomic, the interviewees struggled to find the balance between accurately resourcing their business-critical applications and keeping costs under control. Some organizations would over-resource their key workloads, driving inefficiencies



and excess costs, while others would underprovision their workloads to save on cost at the expense of the business. Caught in the middle were the organization's IT personnel, who would often be mandated by upper management to save on infrastructure and public cloud consumption dollars yet would deal with performance issues and constant complaints from end users and customers about underperforming applications.

After the investment in IBM Turbonomic the interviewees' organizations are able to optimize their key applications' resourcing levels while dynamically scaling with the demands of the business, automated in real time. This ensures cost efficiency in both the data center and public cloud while alleviating the burden on the organization's scarce IT talent to maintain this balance. Better resourcing and better performing applications directly improves IT staff efficiency, customer experience, and business outcomes.

Not only are we reclaiming resources and saving money with Turbonomic, but we're also making our key applications run better too. Apps we didn't even know were necessarily suffering before.

— Sr. technical architect, insurance

KEY FINDINGS

Quantified benefits. Risk-adjusted present value (PV) quantified benefits include:

- **Reduced on-premises infrastructure expenditure by nearly \$2.3 million annually.** By rightsizing oversized workloads and maintaining appropriate application resourcing levels thereafter, the interviewed organizations saved on infrastructure costs via avoided refreshes and more accurate (and less costly) infrastructure provisioning moving forward.
- **Avoided public cloud consumption cost by 33%.** By extending IBM Turbonomic deployments to their public cloud workloads, several organizations greatly reduced their consumption spend through dynamic scaling and more effective resource planning. Several organizations saved more than \$1 million annually on public cloud spend alone.
- **Reclaimed more than 50 hours of IT personnel time each month.** After deploying IBM Turbonomic, interviewees cited efficiencies for their heavily taxed IT personnel around

application resource planning, procurement, and support. Through improved visibility and automation capabilities on IBM Turbonomic, the organizations saved significantly on IT personnel hours while achieving results that would have been impossible at any level of IT staffing before.

- **Realized business benefits worth more than \$2.5 million annually.** By providing better-resourced and better-performing business-critical applications to the organizations' business users and external customers, business outcomes inherently improved with IBM Turbonomic.

Unquantified benefits. Current benefits that are not quantified for this study include:

- **Improved employee experience for IT personnel.** By automating many of the often-reactionary tasks that can only be executed by software at scale, IT personnel can spend more time innovating and launching services to market faster.
- **Time to market and revenue impact.** Some interviewees anecdotally noted the effect that improved application performance can have on

their organization's ability to drive revenue and time to market.

- **Improved visibility.** Every interviewee highlighted benefits pertaining to a better view into their organizations' application resourcing requirements with IBM Turbonomic.
- **Environmental sustainability.** Every organization interviewed by Forrester optimized their application resource consumption either in the datacenter, the public cloud, or both. Forrester's research notes that optimizations such as these impact an organization's long-term energy consumption profile.⁴

Costs. Risk-adjusted PV costs include:

- **License fees paid to IBM Turbonomic.** The interviewed organizations paid license fees to

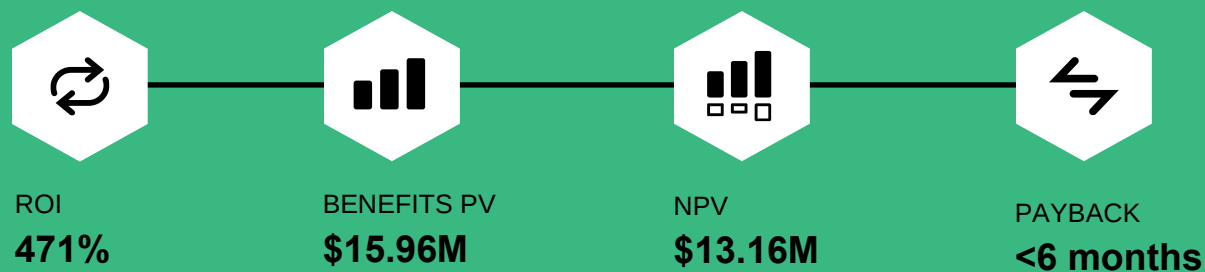
IBM Turbonomic based on the scope of the workloads on which it was deployed. Among the interviewees' companies, yearly license fees to IBM Turbonomic ranged from the low hundred thousands to more than \$1 million annually.

- **Initial and ongoing management and training personnel costs.** Interviewees detailed the initial and ongoing level of IT personnel effort required to get the most out of their organizations' IBM Turbonomic deployments. On the whole, implementation and oversight were characterized as minimal and intuitive.

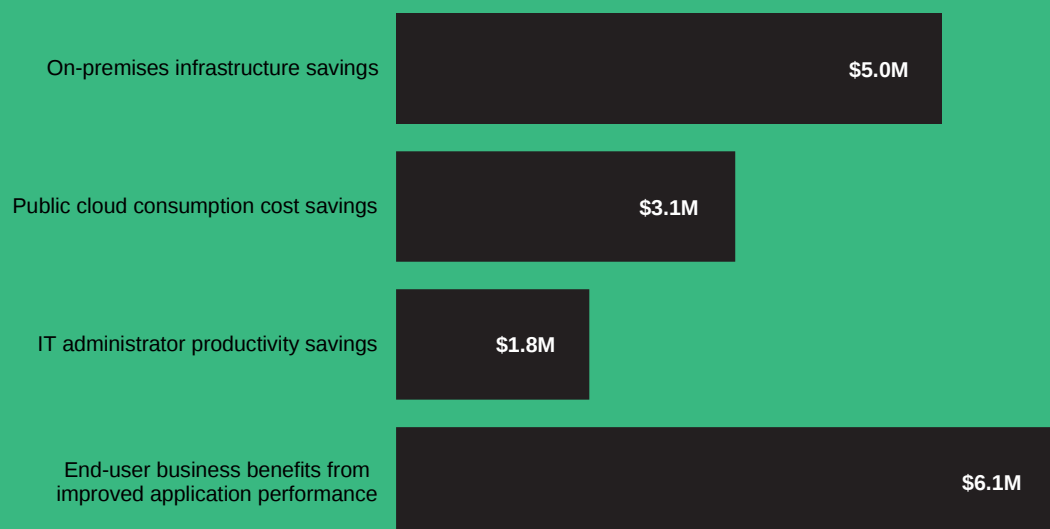
The customer interviews and financial analysis found that a composite organization experiences benefits of \$15.96 million over three years versus costs of \$2.80 million, adding up to a net present value (NPV) of \$13.16 million and an ROI of 471%.

I didn't anticipate Turbonomic's impact on our business because I was an infrastructure guy looking at infrastructure and was happy when the infrastructure didn't look busy. Now, my context has shifted. If we need to throw more infrastructure on it, we will — because it's not about infrastructure, it's about the business results. Turbo has given us that context."

— Manager, storage and compute, banking



Benefits (Three-Year)



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 IBM Turbonomic Application Resource Management.

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 IBM Turbonomic can have on an organization.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Turbonomic and IBM 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 study to determine the appropriateness of an investment in IBM Turbonomic.

IBM Turbonomic 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.

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



DUE DILIGENCE

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



CUSTOMER INTERVIEWS

Interviewed five decision-makers at organizations using IBM Turbonomic 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 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 IBM Turbonomic investment

Interviewed Decision-Makers			
Industry	Industry	Region	Revenue
Manager, storage and compute	Banking	Europe	~\$15 billion
Senior manager, engineering	Insurance	United States	~\$7 billion
Senior technical architect	Insurance	Canada	~\$1.5 billion
Senior architect	Software	United States	~\$1.5 billion
Senior expert software engineer	Transportation	United States	~\$9 billion

KEY CHALLENGES

The interviewees described their organizations' struggles with common challenges, including:

- **On-premises infrastructure and public cloud consumption costs escalated.** Each of the interviewees runs their business-critical application estate across an on-premises, public cloud, container pod, and/or hybrid environment. As application estates and the resulting resourcing requirements grew, the interviewed customers cited a sharp increase in cost to maintain application performance. The US-based insurance interviewee summarized this challenge in their organization's "self-service" resourcing requests, noting: "Users and developers can come in and request their virtual machines with specific resources, and nine times out of 10, they hit the drop box, go all the way to the bottom, and they select the biggest number they see there. It really drove costs."
- **Application performance often suffered.** Business-critical applications frequently felt the effects of these expanding costs at the interviewees' organizations as under-resourced applications affected end users, end customers, and the related business outcomes. A lack of

visibility into application resources also meant that some workloads remained overprovisioned, further contributing to the cost problem. Despite the best efforts of IT personnel, there were simply too many resource provisioning and scaling actions required to maintain optimized performance across the application estate. IT was overwhelmed, and application inefficiencies reigned.

- **Short-staffed IT teams struggled to keep up.** Despite the best efforts of the interviewees' IT personnel, escalating infrastructure and cloud provisioning tasks, application resourcing, and related support tasks often overwhelmed these teams. A short supply of talent with these skills in the labor market necessitated efficient usage of existing personnel resources, as help was not readily available.

INVESTMENT OBJECTIVES

The interviewees searched for a solution that could:

- Be deployed across a hybrid cloud environment.
- Provide rapid time-to-value.
- Enable automation of key application resourcing and scaling tasks.

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 five companies whose decision-makers Forrester interviewed and 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 \$3 billion, 10,000-employee software organization with 80% of its total workforce being knowledge workers. These employees rely on the organization's ever-increasing portfolio of applications to drive day-to-day activities, revenue, and customer experience. Seamless and uninterrupted application performance is necessary for the organization to operate at its best, yet resourcing these applications has come at an increasingly heavy cost. The organization has historically been required to grow physical infrastructure by 15% (or \$1.5 million on average annually) to maintain application performance, in addition to an annual public cloud consumption spend. While many applications perform well, a lack of visibility results in frequent overprovisioning. Applications that are underprovisioned suffer in performance, resulting in diminished employee effectiveness as IT personnel investigate and troubleshoot these resourcing issues on a case-by-case basis.

Deployment characteristics. The composite organization deploys IBM Turbonomic both on-premises and in the public cloud to ensure consistent performance at an optimal level of spending. The organization runs 5,000 virtual machines (VMs) across its on-premises infrastructure and 3,000 VMs in its public cloud of choice. Twenty IT administrators work to support the organization's application estate and its related resourcing.

Key assumptions

- **Software organization**
- **\$3 billion revenue**
- **8,000 affected end users**
- **20 affected IT administrators**
- **8,000 total VMs on-premises and public cloud**

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	On-premises infrastructure savings	\$2,295,000	\$1,845,000	\$1,845,000	\$5,985,000	\$4,997,333
Btr	Public cloud consumption cost savings	\$1,248,826	\$1,248,826	\$1,248,826	\$3,746,477	\$3,105,644
Ctr	IT administrator productivity savings	\$711,360	\$711,360	\$711,360	\$2,134,080	\$1,769,047
Dtr	End-user business benefits from improved application performance	\$1,857,600	\$2,786,400	\$2,786,400	\$7,430,400	\$6,085,001
	Total benefits (risk-adjusted)	\$6,112,786	\$6,591,586	\$6,591,586	\$19,295,957	\$15,957,025

ON-PREMISES INFRASTRUCTURE SAVINGS

Evidence and data. Prior to investment in IBM Turbonomic, the interviewees' organizations struggled with escalating infrastructure costs to resource their growing estate of business-critical applications. Infrastructure was refreshed annually based on utilization levels that were suboptimal and often over-resourced, driving excess cost. The organizations' growing application portfolio also demanded net-new infrastructure purchases to resource these applications, also at suboptimal and static levels.

By investing in IBM Turbonomic, the organizations improved on current infrastructure utilization for existing applications, allowing for consolidations at each annual refresh to save on cost. In addition, better visibility into future application resourcing requirements allowed the organizations to save on infrastructure procurements in the subsequent years, saving additional costs on an annual basis.

- The senior technical architect from a software organization cited a significant initial consolidation of on-premises hosts with IBM Turbonomic within the first year of deployment, improving host utilization by more than 60% and

saving nearly \$3 million on infrastructure refreshes.

- By rightsizing overprovisioned workloads across the organization with IBM Turbonomic, the banking interviewee cited consolidation savings across more than \$24 million in infrastructure investments by between 15% and nearly 60% per container pod, resulting in several million dollars in savings annually. Not only did the organization avoid costs via avoided hardware refreshes but it also avoided net-new purchases through "growing into" some applicable infrastructure. The same interviewee cited an additional licensing savings of approximately \$1.5 million in avoided infrastructure at the software layer.
- The transportation interviewee explained the importance of the visibility IBM Turbonomic brings to their application resource planning, as well as the related annual savings, noting: "Turbonomic showed us that we had a lot of workloads that were frankly oversized. Once we scaled down, we were able to move VMs and avoid additional host purchases. More so, [Turbonomic] gave us good visibility into the utilization and health of our clusters, which has

been a big help in saving on purchases and forecasting. Now that we're using Turbonomic, we actually have real numbers that we can show to our management, which facilitates acquiring the budget."

- Application resourcing scalability was cited by every interviewee as a source of major cost savings with IBM Turbonomic. The interviewee at the US-based insurance company summarized: "Turbonomic just helps us with rightsizing in general. We can scale application resourcing based on what is needed. We can scale down; we can scale up. And we can do all of this in the background, automated. We're not wasting resources in our environment with [Turbonomic]."

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

- A total on-premises infrastructure deployment worth \$10 million across all data centers. Across the interviews, organizations with larger infrastructure deployments experienced greater benefit in this category and may realize higher return on investment as a result.
- A five-year refresh cycle for infrastructure (\$2 million in refresh spend per year for hardware and related software licensing).
- An avoidance of 75% of this refresh spend in Year 1 of the analysis and 50% savings for subsequent years. This is a conservative estimate based on the savings of the interviewees' organizations.
- A growth requirement of 15% across the organization's infrastructure to support new applications and applications that require additional resourcing per current business demands.
- An avoidance of 70% of the required annual growth spend on IBM Turbonomic due to clearer visibility in application resourcing planning and

"We've saved \$3 million on hosts, and that's not even including the software licensing. Turbo has paid for itself and at this point, everything else that we're doing is just gravy."

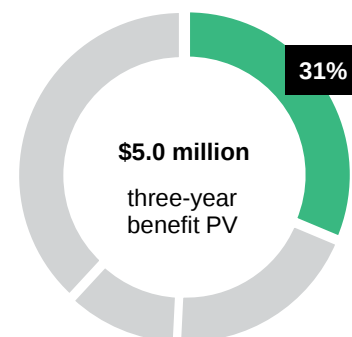
Senior technical architect, software

growing into reclaimed hosts as opposed to newly purchased infrastructure.

Risks. This benefit will vary among organizations based on:

- The size and specifics of an organization's IBM Turbonomic-enabled infrastructure deployment(s).
- The business requirements of an organization, as they affect required application resourcing and the related current and future infrastructure utilization.

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 nearly \$5 million.



On-Premises Infrastructure Savings					
Ref.	Metric	Source	Year 1	Year 2	Year 3
A1	Total on-premises infrastructure spend	Composite	\$10,000,000	\$10,000,000	\$10,000,000
A2	Annual infrastructure refresh costs (percentage of total infrastructure)	Interviews	20%	20%	20%
A3	Total annual infrastructure refresh costs	A1*A2	\$2,000,000	\$2,000,000	\$2,000,000
A4	Avoided annual refresh costs with IBM Turbonomic	Interviews	75%	50%	50%
A5	Subtotal: avoided annual infrastructure refresh costs	A3*A4	\$1,500,000	\$1,000,000	\$1,000,000
A6	Annual capex net-new infrastructure growth/spend	Interviews	15%	15%	15%
A7	Total annual required infrastructure growth spend	A1*A7	\$1,500,000	\$1,500,000	\$1,500,000
A8	Avoided annual required infrastructure growth spend (percentage)	Interviews	70%	70%	70%
A9	Subtotal: avoided infrastructure/software licensing growth spend	A7*A8	\$1,050,000	\$1,050,000	\$1,050,000
At	On-premises infrastructure savings	A5+A9	\$2,550,000	\$2,050,000	\$2,050,000
	Risk adjustment	↓10%			
Atr	On-premises infrastructure savings (risk-adjusted)		\$2,295,000	\$1,845,000	\$1,845,000
Three-year total: \$5,985,000			Three-year present value: \$4,997,333		

PUBLIC CLOUD CONSUMPTION COST SAVINGS

Evidence and data. Some of the interviewed organizations also deployed IBM Turbonomic across their public cloud workloads to extend efficiencies, rightsize, and dynamically scale their public cloud consumption.

- The Canadian insurance organization's initial IBM Turbonomic deployment in the public cloud yielded nearly \$1.5 million in public cloud consumption savings in the first year, with more to come in subsequent years. Based on this savings alone, the senior manager of engineering estimated a 500% return on investment for their IBM Turbonomic deployment, with additional upside to be realized.
- After success with IBM Turbonomic for its on-premises workloads, the transportation organization realized an additional savings of an estimated \$3 million by deploying across its public cloud workloads.
- The interviewed US-based insurance organization is about to enter a proof of concept for IBM Turbonomic in the public cloud and expressed confidence around controlling cloud consumption spend on the migrated workloads: "In the public cloud, we're charged by the minute for the resources that we utilize. If we can complete a successful rightsizing exercise, we can have confidence that workloads we're moving are resourced optimally. This way we're not paying substantially more money in the public cloud for overconsumption of resources."

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

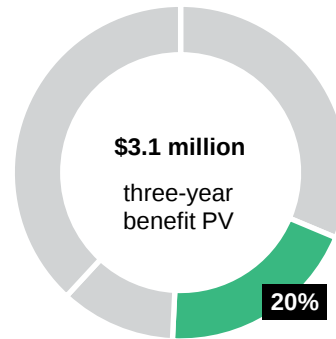
- A \$4.2 million average annual spend in the public cloud based on 3,000 VMs at an average cost of 16 cents per hour.
- A 33% reduction in annual public cloud consumption spend due to dynamic scaling and workload rightsizing with IBM Turbonomic, a conservative estimate based on the results of the interviewees.

Risks. This benefit will vary among organizations based on:

- An organization's current public cloud consumption.
- The business requirements of an organization, as they affect required application resourcing and

the related current and future public cloud consumption requirements.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of \$3.1 million.



Public Cloud Consumption Cost Savings					
Ref.	Metric	Source	Year 1	Year 2	Year 3
B1	Average annual public cloud consumption	Calculated at \$0.16 per VM per hour	\$4,204,800	\$4,204,800	\$4,204,800
B2	Reduction with IBM Turbonomic	Interviews	33%	33%	33%
Bt	Public cloud consumption cost savings	B1*B2	\$1,387,584	\$1,387,584	\$1,387,584
	Risk adjustment	↓10%			
Btr	Public cloud consumption cost savings (risk-adjusted)		\$1,248,826	\$1,248,826	\$1,248,826
Three-year total: \$3,746,477			Three-year present value: \$3,105,644		

IT ADMINISTRATOR PRODUCTIVITY SAVINGS

Evidence and data. Before deploying IBM Turbonomic across their respective organizations' workloads, IT personnel struggled to keep up with key tasks related to their organization's application resourcing. Application resource planning often involved time-consuming guesswork and resulted in excessive infrastructure or public cloud spending. Resource scaling tasks were almost always

reactionary after complaints from internal or external customers. After deploying IBM Turbonomic, interviewees cited the efficiencies for the following tasks for their IT personnel through increased visibility, automation, and dynamic scaling (not limited to):

- Application resource and infrastructure planning.
- Application resource scaling tasks.

- Support of related infrastructure.
- Responding to tickets from internal or external customers and diagnosing related issues.

The senior technical architect for a software organization spoke of facilitated infrastructure planning cycles given the visibility from IBM Turbonomic amid a major technology refresh to support new customers: “The whole implementation and planning took six months. Without Turbo, it probably would have taken us a year to a year and a half since there are just so many moving pieces.”

The same interviewee cited significant savings in diagnosing and triaging application performance degradation tickets from the organization’s end users, noting that application performance-related tickets dropped by more than 70% once IBM Turbonomic was deployed. This saved each IT staff member more than 20 hours per month diagnosing and resolving these resourcing issues.

IBM Turbonomic allowed the interviewed organizations to automate actions related to scaling their on-premises and cloud workloads (driving cost savings noted in benefits A and B). The senior manager, engineering for a Canadian insurance firm noted that they have automated nearly 8,000 resource scaling actions, alleviating this burden from their IT personnel. The interviewee continued: “Not only does this level of automation completely save a full IT headcount, but the important thing to recognize is we would not have been able to do those 8,000 scaling actions at all. We would’ve done a couple hundred throughout the year on a reactionary basis, but at no level of IT staffing would we have been able to all that we’ve done with [Turbonomic].”

The IT efficiency gains provided by IBM Turbonomic to the storage and compute manager’s banking organization mark a fundamental shift in thought about the role of the IT team. The manager noted: “We’ve saved headcount, and now our team needs to intervene on resourcing-related issues a mere

“I’m a huge Turbo fan. I find myself using it for everything that I can possibly use it for. I spend a ton of time in the planning section. It’s transformed the way we work. Prior to Turbonomic, we’d roll the dice and hope we were close. With Turbo, the hardware refreshes have been pretty much exactly spot-on. Host levels are exactly where we wanted to see them.”

Senior technical architect, software

fraction of the time we used to. Now with [Turbonomic], we’re not here to balance infrastructure, but we’re here to provide a more efficient business environment for our internal customers.”

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

- Twenty IT administrators are affected by efficiency gains on IBM Turbonomic.
- An IT FTE has a \$52 average hourly compensation rate.
- Each FTE reclaims 20 hours per month on infrastructure planning and procurement tasks.
- Each FTE reclaims 25 hours per month on application resourcing, scaling, and troubleshooting tasks.
- Each FTE reclaims 15 hours per month on infrastructure and public cloud migration support tasks. This and the above efficiency gains are conservative estimates for the composite

organization based on the results of the interviewed customers.

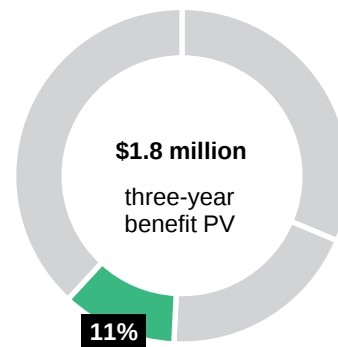
“From admin’s perspective, we don’t have time to always monitor every application’s level of resourcing. There are too many other things going on that we can’t maintain our environment to that level. But Turbo can. On the fly, Turbo has been able to determine these things, correct them, even rebalance workloads.”

Sr. technical architect, insurance

Risks. This benefit will vary among organizations based on:

- The scope of an organization’s on-premises and public cloud workloads as it relates to required IT support.
- An organization’s business specifics as it pertains to required IT application support.
- The skill and capacity of an organization’s IT personnel.

Results. To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV of \$1.77 million.



IT Administrator Productivity Savings					
Ref.	Metric	Source	Year 1	Year 2	Year 3
C1	Affected IT administrators	Composite	20	20	20
C2	Average hourly rate	Assumption	\$52	\$52	\$52
C3	Monthly hours saved on infrastructure planning tasks	Interviews	20	20	20
C4	Monthly hours saved on cloud application resourcing tasks	Interviews	25	25	25
C5	Monthly hours saved on infrastructure support	Interviews	15	15	15
Ct	IT administrator productivity savings	$C1 \times C2 \times ((C3 + C4 + C5) \times 12)$	\$748,800	\$748,800	\$748,800
	Risk adjustment	↓5%			
Ctr	IT administrator productivity savings (risk-adjusted)		\$711,360	\$711,360	\$711,360
Three-year total: \$2,134,080			Three-year present value: \$1,769,047		

END-USER BUSINESS BENEFITS FROM IMPROVED APPLICATION PERFORMANCE

Evidence and data. Before implementing IBM Turbonomic across on-premises and public cloud workloads, the interviewees' companies struggled to maintain optimal levels of application resourcing given current demands from the business. Key business-critical internal or customer-facing applications were often under-resourced, resulting in performance degradation, lost revenue, and frustration. Through better application resourcing with IBM Turbonomic, every interviewee's organization achieved better application performance given the current demands from internal users and external customers, yielding improved end-user productivity and better business results.

- By driving application support ticket volumes down by 70% after implementing IBM Turbonomic, the senior architect for a software organization noted that business continuity and end-user effectiveness were greatly (positively) impacted as a result. The interviewee added: "Some more vocal end users are going need to find another scapegoat for performance issues because with Turbonomic, they can no longer tell us this is a resourcing issue."
- Several interviewees, including the senior technical architect for a Canadian insurance company, noted that application efficiencies gained from IBM Turbonomic helped reduce key application outages altogether, improving business efficiency: "We have some critical systems that turned out to be underpowered. Turbonomic recognized that, added resources, and improved their performance and prevented outages. That's one of the biggest advantages to Turbo."
- The senior expert software engineer from a transportation organization echoed the sentiments of the other interviewees, noting that IBM Turbonomic has greatly improved the

performance of several key applications, providing a better working experience for the business users who rely on them.

"Turbonomic easily highlighted performance issues across many of our applications, so we've automated scaling to rectify this. The feedback that we're getting from end users is very positive. Applications are running a lot better and a lot smoother. Just getting this validation from our end users for those applications has definitely shown the power of Turbonomic."

Senior expert software engineer, transportation

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

- Eight thousand employees (80% of the composite organization's 10,000 total employees) are knowledge workers who interact with the organization's IBM Turbonomic-enabled application estate.
- Each user historically experiences 12 hours of application performance degradation per year, which is avoided with IBM Turbonomic.
- On average, performance degradation results in a 50% decrease in end-user effectiveness.
- The average rate across all end users is \$43 per hour.
- Forrester chose to calculate this benefit for the composite organization based on end-user

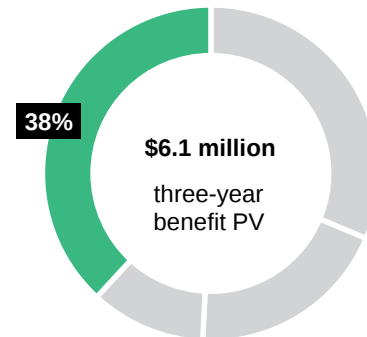
effectiveness. However it should be noted that IBM Turbonomic may bring business value to an organization in other ways (e.g., improving customer experience through improving external application performance, increasing uptime for additional revenue, etc.) depending on the nature of an organization's business.

Risks. This benefit will vary among organizations based on:

- The nature of an organization's business as it relates to the business value achieved through better application performance with Turbonomic.
- The number of end users or external customers who interact with an organization's Turbonomic-enabled applications.

- Historic performance of key applications as it relates to the level of improvement achievable with IBM Turbonomic.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of nearly \$6.1 million.



End-User Business Benefits From Improved Application Performance

Ref	Metric	Source	Year 1	Year 2	Year 3
D1	Total affected end users	80% of total employees	8,000	8,000	8,000
D2	Reduction of application support tickets (per user, per year)	Interviews	2	3	3
D3	User downtime/performance degradation duration per ticket (hours)	Composite	6	6	6
D4	User effectiveness during performance-degrading events	Assumption	50%	50%	50%
D5	End-user average hourly loaded rate	Assumption	\$43	\$43	\$43
Dt	End-user business benefits from improved application performance	$D1 \times D2 \times D3 \times D4 \times D5$	\$2,064,000	\$3,096,000	\$3,096,000
	Risk adjustment	↓10%			
Dtr	End-user business benefits from improved application performance (risk-adjusted)		\$1,857,600	\$2,786,400	\$2,786,400
Three-year total: \$7,430,400			Three-year present value: \$6,085,001		

UNQUANTIFIED BENEFITS

Additional benefits that customers experienced but were not able to quantify include:

- **Improved IT personnel experience.** By automating many of the often-reactionary, tedious tasks that represented an increasingly disproportionate percentage of the IT FTE's day-

to-day responsibilities, these employees may be more likely to experience satisfaction in their positions, which may allow the organization to avoid competitive hiring cycles through increased retention.

- **Time to market and revenue impact.** Some interviewees anecdotally noted the effect that

improved application performance can have on their organization's ability to drive revenue and time to market. The banking interviewee explained to Forrester: "We make money at the bank by having more efficient applications running faster, doing more transactions, and calculating risk faster. With Turbonomic, our applications run faster than ever before while our virtual machines are better resourced than ever before."

- **Improved visibility.** Every interviewee highlighted benefits pertaining to a better view into their organizations' application resourcing requirements with IBM Turbonomic. This visibility manifests in easier budget approvals, improved executive confidence, and a general rethinking of the role of IT in supporting cloud transformation. "If we weren't using Turbonomic, our cloud spend would be a lot higher and would probably be spiraling out of control. Meanwhile, our executives would be second-guessing being in the cloud," noted one interviewee.
- **Environmental sustainability.** Every organization interviewed by Forrester optimized their application resource consumption either in the datacenter, the public cloud, or both. Forrester's research notes that optimizations such as these impact an organization's long-term energy consumption profile.⁵

FLEXIBILITY

The value of flexibility is unique to each customer. There are multiple scenarios in which a customer might implement IBM Turbonomic and later realize additional uses and business opportunities, including the downstream benefits of scalability. Interviewees expressed optimism toward the future given IBM Turbonomic's ability to automatically scale their on-premises and public cloud workloads to match current demand, keeping costs optimized. Over time, the interviewees collectively expect the value IBM Turbonomic brings in this regard to expand as demands on the organization's ever-increasing application estate continue to increase.

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
Etr	License fees paid to IBM Turbonomic	\$0	\$1,080,000	\$1,080,000	\$1,080,000	\$3,240,000	\$2,685,800
Ftr	Initial and ongoing management and training personnel costs	\$0	\$51,660	\$40,110	\$40,110	\$131,880	\$110,248
	Total costs (risk-adjusted)	\$0	\$1,131,660	\$1,120,110	\$1,120,110	\$3,371,880	\$2,796,048

LICENSE FEES PAID TO IBM TURBONOMIC

The interviewees' organizations paid license fees to IBM Turbonomic based on the scope of the workloads on which it was deployed. Among these companies, yearly license fees to IBM Turbonomic ranged from the low hundred thousands to more than 1 million annually. Organizations on the higher end of yearly licensing spend had larger application estates on which to achieve efficiencies with IBM Turbonomic; therefore, these organization reported higher benefits and return on investments than those at lower annual spends.

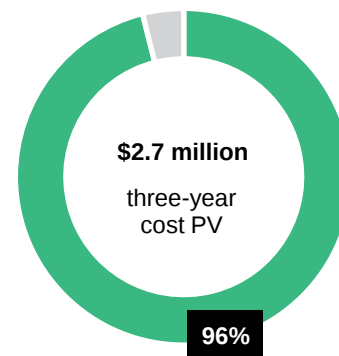
Modeling and assumptions. For the composite organization, Forrester assumes:

- Eight thousand VMs (5,000 on-premises, 3,000 in the public cloud) supporting the organization's key applications.
- A yearly IBM Turbonomic license fee of \$135 per VM.
- This pricing was provided by IBM Turbonomic based on the specifics of the composite organization. For pricing specific to your organization, please contact IBM Turbonomic.

Risks. This cost will vary among organizations based on:

- The scale of the workloads on which IBM Turbonomic is deployed as it relates to licensing cost.
- The growth of an organization's enterprise workloads as it relates to annal spend increases.

Results. Forrester did not risk-adjust this cost as it was provided for the composite organization by IBM Turbonomic. IBM Turbonomic licensing costs the composite organization a three-year, risk-adjusted total PV (discounted at 10%) of \$2.7 million.



License Fees Paid To IBM Turbonomic						
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
E1	Total VMs (on-premises and cloud)	Composite		8,000	8,000	8,000
E2	Price per VM	Assumption		\$135	\$135	\$135
Et	License fees paid to IBM Turbonomic	E1*E2	\$0	\$1,080,000	\$1,080,000	\$1,080,000
	Risk adjustment	0%				
Etr	License fees paid to IBM Turbonomic (risk-adjusted)		\$0	\$1,080,000	\$1,080,000	\$1,080,000
Three-year total: \$3,240,000			Three-year present value: \$2,685,800			

INITIAL AND ONGOING MANAGEMENT AND TRAINING PERSONNEL COSTS

Evidence and data. The interviewees detailed the initial and ongoing level of IT personnel effort required to get the most out of their organization's IBM Turbonomic deployment. On the whole, implementation was characterized as minimal and intuitive, as IBM Turbonomic's support team and clear dashboards were cited as key supporting features. Once deployed, maintaining IBM Turbonomic requires minimal oversight and training for new IT personnel.

- Several organizations went through a short (two- to three-month) proof of concept with IBM Turbonomic prior to full deployment, requiring the partial effort of multiple IT and business stakeholders.
- The interviewees' organizations often phased their rollout of IBM Turbonomic, opting to deploy either on-premises or the public cloud first, before expanding to the other workloads.

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

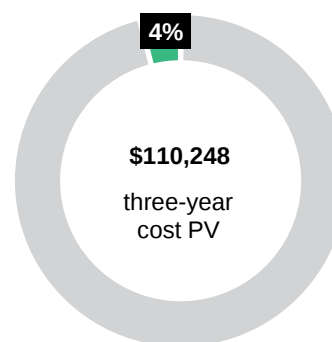
- Forty percent of one full FTE's worth of personnel effort to oversee initial deployment.

- Thirty percent of one full FTE worth of personnel required to manage IBM Turbonomic in the subsequent years of the analysis.
- An average annual salary of \$110,000 for IT personnel managing IBM Turbonomic.
- Five hours of training on IBM Turbonomic annually for the composite organization's 20 IT personnel.
- A \$52 average hourly rate for IT personnel training on IBM Turbonomic.

Risks. This cost will vary among organizations based on:

- The scope of an organization's IBM Turbonomic deployment as it relates to required initial and ongoing personnel effort.
- The skill and capacity of an 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 \$110,000.

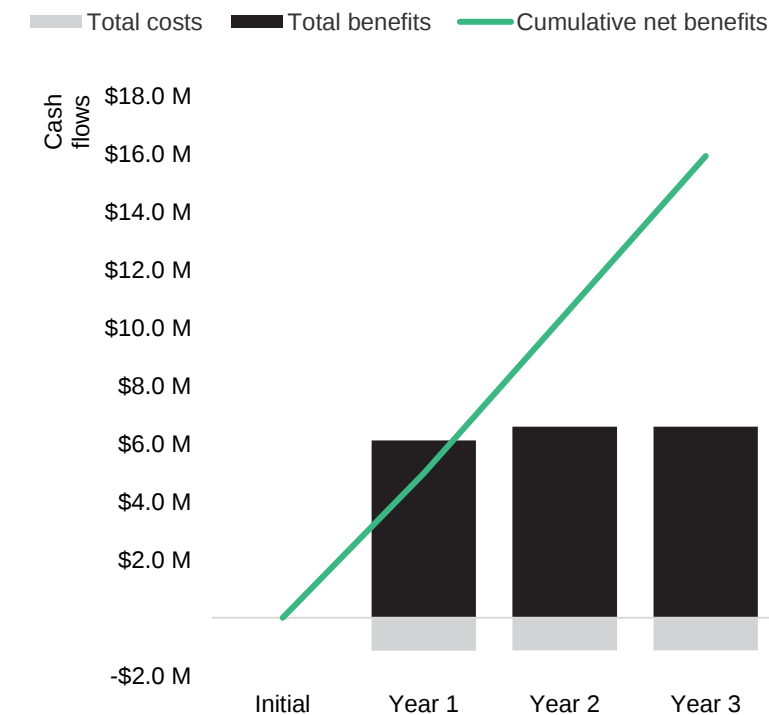


Initial And Ongoing Management And Training Personnel Costs						
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
F1	FTEs assigned to oversee IBM Turbonomic deployment	Composite		1	1	1
F2	Percentage of time spent on oversight	Composite		40%	30%	30%
F3	Average FTE salary	Assumption		\$110,000	\$110,000	\$110,000
F4	Subtotal: ongoing management personnel cost	$F1 \times F2 \times F3 \times F8$		\$44,000	\$33,000	\$33,000
F5	IT administrators trained on IBM Turbonomic	Composite		20	20	20
F6	Hours spent on IBM Turbonomic training (annually)	Composite		5	5	5
F7	Average hourly rate (rounded)	Assumption		\$52	\$52	\$52
F8	Subtotal: training personnel cost	$F5 \times F6 \times F7$		\$5,200	\$5,200	\$5,200
Ft	Initial and ongoing management and training personnel costs	$F4 + F8$	\$0	\$49,200	\$38,200	\$38,200
	Risk adjustment	↑5%				
Ftr	Initial and ongoing management and training personnel costs (risk-adjusted)		\$0	\$51,660	\$40,110	\$40,110
Three-year total: \$131,880			Three-year present value: \$110,248			

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, 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	\$0	(\$1,131,660)	(\$1,120,110)	(\$1,120,110)	(\$3,371,880)	(\$2,796,048)
Total benefits	\$0	\$6,112,786	\$6,591,586	\$6,591,586	\$19,295,957	\$15,957,025
Net benefits	\$0	\$4,981,126	\$5,471,476	\$5,471,476	\$15,924,077	\$13,160,977
ROI						471%
Payback (months)						Less than 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 Sources are calculated for each total cost and benefit estimate. NPV Sources in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value Sources 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: “Gauge Your Infrastructure Automation Maturity,” Forrester Research, Inc., July 17, 2020.

² Source: “Build The Business Case For Modern, Resilient Operations,” Forrester Research, Inc., August 2, 2021.

³ 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.

⁴ Source: “The Forrester Technology Sustainability Framework,” Forrester Research, Inc., July 26, 2021.

⁵ *ibid*

FORRESTER®