

FORRESTER®

The Total Economic Impact™ Of AWS Modern Data Strategy

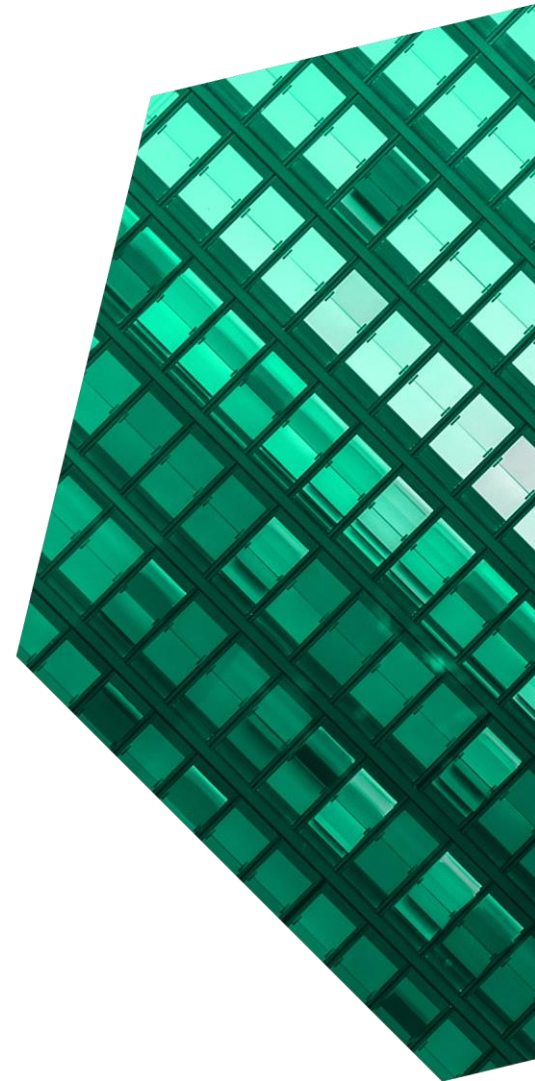
Cost Savings And Business Benefits
Enabled By Amazon Web Services Modern Data
Strategy

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ABOUT FORRESTER CONSULTING

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Executive Summary

The inflexibility of on-premises architectures has failed to deliver on the needs of modern businesses in a cost-effective manner. In such environments, data and analytics costs soar as the business's appetite for data and demand for speed increase. By introducing more cost-effective consumption-based pricing with flexible cloud-based infrastructure, businesses can adopt modern data strategies that enable their teams to leverage data to reach business insights faster and more cheaply than before.

Amazon Web Services enables organizations to adopt a [Modern Data Strategy](#) with its cloud-based data and analytics services that are flexible to scale and easy to integrate. By combining up to exabytes of data with advanced analytics tools, automation, new technologies, and broader access to data, AWS improves operational and customer-oriented insights and decision-making.

AWS commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying AWS Modern Data Strategy.¹ The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of AWS Modern Data Strategy on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed one representative each from four organizations running an AWS Modern Data Strategy. For the purposes of this study, Forrester aggregated the interviewees' experiences and combined the results into a single [composite organization](#) which is a global business with \$1 billion in annual revenues and 1,750 total employees.

Prior to using AWS Modern Data Strategy, the interviewees' organizations leveraged inflexible on-premises architectures and technologies to run their data and analytics practices, experiencing long lead

KEY STATISTICS



Return on investment (ROI)

162%



Net present value (NPV)

\$5.29M

times for analytics, staleness of data, high costs, and data silos.

After the investment in AWS Modern Data Strategy, the interviewees' organizations reduced infrastructure costs, scaled more efficiently, improved the productivity of data professionals, and gained additional income from better customer analytics.

KEY FINDINGS

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

- **Reduced costs of infrastructure, management, and downtime valued at \$1.3 million.** By migrating its data and analytics infrastructure from an on-premises data center to AWS, the composite organization saves \$1.5 million in annual infrastructure costs, \$480,000 in annual management costs, and \$22,000 in time costs from downtime.

- **Reduced costs of scaling and integration worth \$3.2 million.** With the flexible scalability and integrations of AWS, the composite reduces the cost of scaling and integrating infrastructure by up to \$550,000 annually while reducing the productivity cost of employees waiting for additional infrastructure to complete data and analytics workloads.
- **Improved productivity of data analysis by between 10% and 20%.** With near instantaneous scaling, automation, and built-in models and algorithms, AWS improves the productivity of the composite's data scientists by 20% and its business analysts by 10%, providing a total three-year net present value of \$3.8 million.
- **Improved income from better analytics of 25%.** By combining larger amounts of more integrated data with more timely delivery of information to customers, the composite improves its marketing yield by 25%, gaining a similar improvement in annual income.

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

- **Improved internal customer service for IT.** AWS enables the composite organization's IT department to provide added value and better customer service to its internal customers by making the IT department's work easier with better and more up-to-date analytics and automations.
- **Governance and compliance.** AWS also helps the composite to meet a variety of different compliance needs depending on its business needs, for example by being Sarbanes-Oxley approved or Federal Risk and Authorization Management Program (FedRAMP) approved.
- **Employee satisfaction.** AWS improves the morale of the composite's data professionals by enabling them to do their work faster and more

efficiently while also putting them on a positive career arc, enabling them to grow by learning and finding new capabilities.

- **Improved security.** AWS improves the composite's security posture by providing security at every layer baked into its services, which frees security personnel to do higher-value work.
- **Adoption of new technologies.** AWS also enables the composite to more easily adopt new technologies by providing services developed and maintained by its internal experts, allowing the composite to avoid hiring and onboarding specialists for every new service it wants to adopt.

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

- **Cost of migration.** The one-time cost of migration will vary with the size and complexity of the data environment, but the composite spends \$660,000 in internal employee time and professional services to migrate its environment in about four months.
- **AWS fees.** AWS fees will also vary with size as well as intensity of usage, but the composite pays \$990,000 annually for its AWS usage.
- **Cost of training and ongoing management.** The composite trains employees on new services several times a quarter at a time cost of 8 hours each. Ongoing management costs the composite 200 hours of time for three employees each year.

The representative interviews and financial analysis found that a composite organization experiences benefits of \$8.56 million over three years versus costs of \$3.27 million, adding up to a net present value (NPV) of \$5.29 million and an ROI of 162%.



ROI
162%



BENEFITS PV
\$8.56M

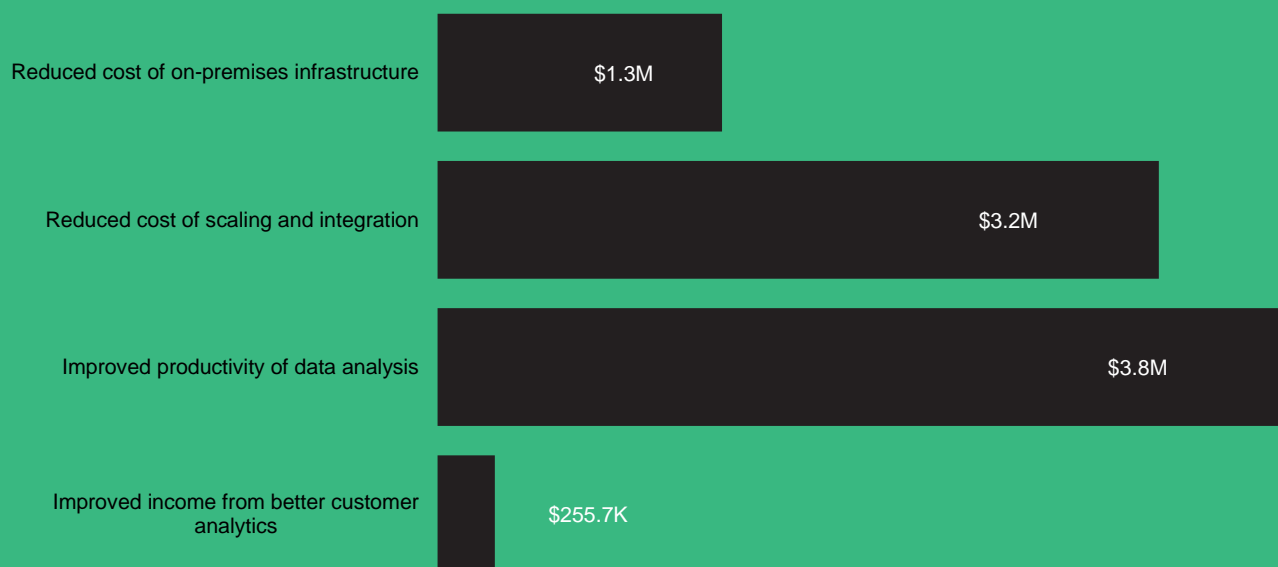


NPV
\$5.29M



PAYBACK
<6 months

Benefits (Three-Year)



“The value of AWS is vast. We ask more questions, are more adaptable, and learn more quickly. AWS moves our data science forward in a manner impossible to do on-premises.”

— Head of advanced analytics, pharmaceutical

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 AWS Modern Data Strategy.

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 AWS Modern Data Strategy can have on an organization.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by AWS 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 AWS Modern Data Strategy.

AWS 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.

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



DUE DILIGENCE

Interviewed AWS stakeholders and Forrester analysts to gather data relative to AWS Modern Data Strategy.



INTERVIEWS

Interviewed four representatives at organizations using AWS Modern Data Strategy to obtain data with respect to 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 AWS Modern Data Strategy Customer Journey

■ Drivers leading to the AWS Modern Data Strategy investment

Interviews				
Role	Industry	Region	Revenue/Budget	Employees
CIO and CISO	Financial services	Global	Revenue: \$900 million	1,300
Senior director of IT architecture	Internet	Global	Revenue: \$3 billion	4,000
Head of advanced analytics	Pharmaceutical	Global	Revenue: \$30 billion	18,000
CIO	Government	North America	Budget: \$3 trillion	60,000

KEY CHALLENGES

Before investing in AWS to improve their data environments, the interviewees' organizations had long-established on-premises architectures running data and analytics workloads. Some had started updating these environments by making a shift to open source solutions, but all eventually saw the need to migrate to AWS to improve data and analytics processes and outcomes.

The interviewees noted how their organizations struggled with common challenges, including:

- **Lack of flexible scalability.** The interviewees' primary challenge with their on-premises environment was the lack of flexible scalability. The need to provision additional infrastructure any time larger workloads needed to be run added both cost and delay to data and analytics work streams. To avoid delays, some interviewees sought to predict infrastructure needs, overprovisioning infrastructure and inflating costs.
- **High cost of on-premises architecture.** As just alluded to, the interviewees also faced the challenge of on-premises infrastructure costs. Aside from periodic new infrastructure provisioning, and the need to overprovision this, the interviewees' organizations had to pay for storage, compute, hardware and software

“Our on-premises infrastructure couldn’t scale as we needed, meaning our analytics just weren’t performing. We were handcuffed.”

CIO and CISO, financial services

maintenance fees, utilities, network bandwidth, real estate costs, etc. Furthermore, they had to maintain high levels of staff dedicated to managing these on-premises data centers.

- **Lack of integration.** Lastly, the interviewees contended with a lack of integration, despite being in nearly full control of their environments. For example, some pursued best-in-class strategies, mixing and matching solutions from various vendors that added cost to integrations and vendor management. Some also lacked global, centralized data repositories, where regulations permitted, suffering from data siloes between geographies and separate internal organizations.

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 four interviewees' 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 is a global organization with \$1 billion in revenues and 1,750 employees. It has 100 data scientists, 280 business analysts, and 700 business users as it relates to its data and analytics function. It uses its data and analytics function primarily to better understand and improve organizational efficiency and better understand customer behavior and sentiment with the aim of improving revenues.

Deployment characteristics. The composite has historically struggled to make the most use of the copious amounts of data it gathers, mostly due to the cost it takes to run an adequately sized data center to run the analytics it needs. It has done its best to predict needs, suffering from overprovisioning while also failing to meet all needs, requiring additional investment in more infrastructure every quarter. In response to feedback from its internal data and analytics stakeholders, the composite has decided to migrate its on-premises data center to AWS, not only to reduce infrastructure costs but also improve the efficiency and effectiveness of its data analytics work.

Key Assumptions

- **\$1 billion in revenues**
- **1,750 total employees**
- **100 data scientists**
- **280 business analysts**
- **700 business users**

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	Reduced cost of on-premises infrastructure	\$169,552	\$529,504	\$906,456	\$1,605,512	\$1,272,779
Btr	Reduced cost of scaling and integration	\$1,191,348	\$1,326,348	\$1,393,848	\$3,911,544	\$3,226,418
Ctr	Improved productivity of data analysis	\$1,530,000	\$1,530,000	\$1,530,000	\$4,590,000	\$3,804,884
Dtr	Improved income from better customer analytics	\$93,750	\$103,125	\$113,438	\$310,313	\$255,682
	Total benefits (risk-adjusted)	\$2,984,650	\$3,488,977	\$3,943,741	\$10,417,369	\$8,559,763

REDUCED COST OF ON-PREMISES INFRASTRUCTURE

Evidence and data. By shifting their data and analytics environments to AWS, the interviewees' organizations saved on a number of costs associated with their on-premises infrastructure, including annual infrastructure costs, the cost of managing this infrastructure, the costs of overprovisioning infrastructure, and costs associated with downtime.

Regarding infrastructure, the CIO and CISO from the financial services firm shared: "We've reduced the infrastructure costs associated with our on-premises environment like licensing and security, and we've shifted this to AWS to enable faster, more repetitive analytics. We can do so much more at the same cost." The CIO from the government organization specifically noted saving on "expensive flash storage" that they had previously invested in and even overprovisioned. Lastly, the senior director of IT architecture at an internet organization said, "Although we're not saving on net costs at the moment, as we're investing in AWS while decommissioning our on-premises infrastructure over time, we do expect to see a 25% decrease in comparative spend once we fully optimize."

"With AWS, we're processing more data, this data is more accurate, and we're reducing the impact of downtime. Combined, we're getting a better ROI than when we were running on premises."

Senior director of IT architecture, internet

Regarding infrastructure management, the interviewees noted reducing the time spent patching and upgrading servers and software. The CIO from the government organization noted: "Teams previously spent about 25% to 30% of their time on infrastructure management like upgrades. We're now down to about 5% of their time spent on this thanks to AWS."

The interviewees also noted saving costs associated with overprovisioning their on-premises infrastructure. They shared the following rates of overprovisioning:

- 10% (Head of advanced analytics, pharmaceutical)
- 25% (CIO, government)
- 25% (Senior director of IT architecture, internet)
- 40% (CIO and CISO, financial services)

Despite overprovisioning, the interviewees noted finding themselves frequently underprovisioned. For example, the CIO and CISO from the financial services firm said, “We regularly overprovisioned our on-premises data center by 40%, but if we were actually going to keep ahead of our needs, we needed to be at closer to 70%.”

Finally, the interviewees noted that migrating to AWS saved on the costs of downtime associated with their on-premises data and analytics infrastructure. For example, the senior director of IT architecture from the internet firm said: “We previously experienced two outages every month that took between 2 and 4 hours to resolve. Now, it maybe happens twice a year for 15 to 30 minutes each. We’ve estimated that an outage can cost us up to \$2 million each minute.”

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

- A total annual cost of on-premises infrastructure of \$1.5 million annually, including servers, software, utilities, and real estate.
- A total of three IT professionals needed to manage this infrastructure in Year 1 with four needed in Years 2 and 3 due to infrastructure procurements modeled in Benefit B (see Benefit Table B, Row B1). These IT professionals earn

an average fully burdened annual rate of \$120,000 each.

- The five IT professionals that handle downtime events save 71 hours annually on these at a fully burdened hourly rate of \$60 each.
- Downtime impacts 30 general employees at a fully burdened hourly rate of \$49 each.
- Productivity for these employees from reduced downtime is recaptured at a rate of 25%.
- All benefits accrue as on-premises infrastructure is decommissioned at a rate of 10% in Year 1, 30% in Year 2, and 50% in Year 3.

Risks. The reduced cost of on-premises infrastructure will vary with:

- The total annual cost of on-premises infrastructure.
- The total number of IT professionals managing this infrastructure and their rate of growth as more infrastructure is added.
- The fully burdened rate of IT professionals.
- The amount and cost of downtime.
- The impact of downtime on general employees.
- The rate of decommissioning.

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 \$1.3 million.

Reduced Cost Of On-Premises Infrastructure					
Ref.	Metric	Source	Year 1	Year 2	Year 3
A1	Total cost of on-premises infrastructure for data analytics	Composite	\$1,500,000	\$1,500,000	\$1,500,000
A2	FTEs needed to manage infrastructure	Interviews	3	4	4
A3	Fully burdened annual rate of IT professionals	TEI standard	\$120,000	\$120,000	\$120,000
A4	FTEs needed to resolve downtime	Interviews	5	5	5
A5	Reduction in hours resolving downtime events	Interviews	71	71	71
A6	Fully burdened hourly rate of IT professionals	A3/2,000	\$60	\$60	\$60
A7	FTEs with productivity impact from wait times	Composite	30	30	30
A8	Fully burdened hourly rate of impacted employees	TEI standard	\$49	\$49	\$49
A9	Productivity recapture rate	TEI standard	25%	25%	25%
A10	Rate of decommissioning	Composite	10%	30%	50%
At	Reduced cost of on-premises infrastructure	$(A1+(A2*A3)+(A4*A5*A6)+(A5*A7*A8*A9))*A10$	\$188,391	\$588,338	\$1,007,173
	Risk adjustment	↓10%			
Atr	Reduced cost of on-premises infrastructure (risk-adjusted)		\$169,552	\$529,504	\$906,456
Three-year total: \$1,605,512			Three-year present value: \$1,272,779		

REDUCED COST OF SCALING AND INTEGRATION

Evidence and data. The interviewees shared that the flexibility of AWS’s cloud-based infrastructure enabled them to reduce their costs previously associated with scaling and integrating their on-premises infrastructure associated with data and analytics.

On scaling, the senior director of IT infrastructure from the internet firm shared: “Before we would scale monthly, and it would take us a full month to achieve the new scale with two weeks spent waiting and two weeks of 12 team members installing. Now, it’s instantaneous; we’re scaling up and down three times daily.” The CIO and CISO shared spending six to eight weeks total to get and install the necessary

infrastructure, stating, “We now have the instant ability to scale up or down, and we’re doing it daily.”

Regarding integrations, the senior director of IT from the internet organization shared: “We previously spent about two to three weeks planning and integrating new sources every month with two or three people needed for this. That’s all gone away with AWS, really.”

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

- An annual cost of new on-premises infrastructure to scale of \$300,000 with 50% of these costs recurring.

- Five IT professionals spend 90 hours monthly scaling at a fully burdened hourly rate of \$60 each.
- Fourteen general employees are impacted by the total 170 hours of combined procurement waiting and infrastructure installation time at a fully burdened hourly rate of \$49.
- These employees improve their productivity by 50% once scaling becomes nearly instantaneous with AWS.
- The total time waiting for additional infrastructure and the number and cost of employees whose productivity is impacted by this.
- The rate at which this productivity is recaptured in the new environment.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of \$3.2 million.

Risks. The total reduced cost of scaling and integration will vary with:

- The total cost of new infrastructure needed to scale and the percentage recurring cost of this.
- The total time needed to scale and integrate, and the number and cost of IT professionals needed to do so.

Reduced Cost Of Scaling And Integration					
Ref.	Metric	Source	Year 1	Year 2	Year 3
B1	Cost of additional infrastructure	Interviews	\$300,000	\$450,000	\$525,000
B2	Average hours spent scaling and integrating per month	Interviews	90	90	90
B3	FTEs needed to scale	Composite	5	5	5
B4	Fully burdened hourly rate of IT professional	TEI standard	\$60	\$60	\$60
B5	Infrastructure procurement waiting hours per month	Interviews	80	80	80
B6	FTEs with productivity impact from wait times	Composite	14	14	14
B7	Fully burdened hourly rate of impacted employees	A8	\$49	\$49	\$49
B8	Productivity recapture rate	TEI standard	50%	50%	50%
Bt	Reduced cost of scaling and integration	$B1+B2*B3*B4*12+((B2+B5)*B6*B7*12*B8)$	\$1,323,720	\$1,473,720	\$1,548,720
	Risk adjustment	↓10%			
Btr	Reduced cost of scaling and integration (risk-adjusted)		\$1,191,348	\$1,326,348	\$1,393,848
Three-year total: \$3,911,544			Three-year present value: \$3,226,418		

IMPROVED PRODUCTIVITY OF DATA ANALYSIS

Evidence and data. The interviewees also shared that utilizing AWS for their data and analytics improved the productivity of data analysis workstreams. They noted that in addition to the ability to scale much faster, AWS provided their data scientists and business analysts with better, more up-to-date analytics tools; broader data sources; better data; prebuilt algorithms, and pre-trained models.

This led interviewees to estimate that data scientists' work improved between 10% and 30%, while business analysts' work improved 10%. This had an additional, unquantified impact on those teams. The CIO and CISO from the financial services firm noted: "There's definitely better morale among the data science and engineering teams now. They can get their jobs done more effectively and meet the demands of business requests without constantly feeling behind schedule."

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

- One hundred total data scientists improve their work by 20% at an average fully burdened annual rate of \$200,000.
- Two hundred and eighty business analysts improve their work by 10% at an average fully burdened annual rate of \$100,000.
- These employees' productivity is recaptured at a rate of 25%.

Risks. The total improvement to productivity of data analysis will vary with:

- The total number of data scientists.
- Their fully burdened annual rate.
- The prior efficiency of their work with on-premises infrastructure.
- The total number of business analysts.
- Their fully burdened annual rate.

- The prior efficiency of their work with on-premises infrastructure.
- The rate at which these professionals recapture productivity after migrating to AWS.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of \$3.8 million.

“Our data teams are no longer constrained by the infrastructure and resources needed to meet the internal business demand for their work.”

CIO and CISO, financial services

Improved Productivity Of Data Analysis					
Ref.	Metric	Source	Year 1	Year 2	Year 3
C1	Data scientists	Composite	100	100	100
C2	Fully burdened annual rate of data scientists	TEI standard	\$200,000	\$200,000	\$200,000
C3	Improvement to productivity for data scientists	Interviews	20%	20%	20%
C4	Business analysts	Composite	280	280	280
C5	Fully burdened annual rate of business analysts	TEI standard	\$100,000	\$100,000	\$100,000
C6	Improvement to productivity for business analysts	Interviews	10%	10%	10%
C7	Productivity recapture rate	TEI standard	25%	25%	25%
Ct	Improved productivity of data analysis	$((C1 \cdot C2 \cdot C3) + (C4 \cdot C5 \cdot C6)) \cdot C7$	\$1,700,000	\$1,700,000	\$1,700,000
	Risk adjustment	↓10%			
Ctr	Improved productivity of data analysis (risk-adjusted)		\$1,530,000	\$1,530,000	\$1,530,000
Three-year total: \$4,590,000			Three-year present value: \$3,804,884		

IMPROVED INCOME FROM BETTER CUSTOMER ANALYTICS

Evidence and data. The interviewees also noted that migrating their data and analytics from on-premises to AWS enabled them to enhance their customer analytics, resulting in added income. For example, the senior director of IT architecture from the internet organization said: “AWS has improved our marketing strategy and helped us understand the best areas for product introduction, enabling us achieve 10% improved penetration. We’ve also improved cross-selling by 50% by gaining a more 360-degree view of our customers.”

The CIO and CISO from the financial services industry shared: “Marketing has been the biggest beneficiary. Not only are we optimizing spend, but we’re also iterating faster on campaigns, which has improved yield by 20% to 25%.”

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

- Total annual revenues of \$1 billion that grow at 10% annually.

- Twenty percent of revenues are attributable to marketing.
- Marketing yield improves 25%.
- The composite has a net margin of 5%.
- Five percent of this benefit is attributable solely to AWS with the remainder attributable to people and processes.

Risks. The improvement to income will vary with:

- Total annual revenues and how much of these are attributable to marketing.
- Net margin.
- The percent improvement that is attributable to AWS rather than people and processes.

Results. To account for these risks, Forrester adjusted this benefit downward by 25%, yielding a three-year, risk-adjusted total PV of \$256,000.

Improved Income From Better Customer Analytics					
Ref.	Metric	Source	Year 1	Year 2	Year 3
D1	Total revenues	Composite	\$1,000,000,000	\$1,100,000,000	\$1,210,000,000
D2	Percentage of revenues attributable to marketing	Interviews	20%	20%	20%
D3	Improvement to marketing yield	Interviews	25%	25%	25%
D4	Net margin	Composite	5%	5%	5%
D5	Improvement due to analytics vs. human skill	Composite	5%	5%	5%
Dt	Improved income from better customer analytics	$D1 * D2 * D3 * D4 * D5$	\$125,000	\$137,500	\$151,250
	Risk adjustment	↓25%			
Dtr	Improved income from better customer analytics (risk-adjusted)		\$93,750	\$103,125	\$113,438
Three-year total: \$310,313			Three-year present value: \$255,682		

UNQUANTIFIED BENEFITS

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

- **Improved internal customer service for IT.** The interviewees shared that migrating to AWS enabled IT departments to provide higher-value and better customer service to their internal customers. For example, the CIO and CISO from the financial services organization said, “We’re making work easier for our [internal] customers by providing better and more up-to-date analytics related to their daily work.” The CIO from the government organization shared: “AWS enabled us to offer better and quicker customer service by providing better and quicker operational analytics and automations.”
- **Governance and compliance.** Interviewees also noted how migrating to AWS for data analytics improved governance and compliance. The CIO and CISO from the financial services industry said, “AWS was an easy choice for us as a regulated business, because their environment meets all the compliance requirements we need it to.” The CIO from the government organization shared: “AWS has been a player in the space for a long time, so it has all the public sector approvals like FedRAMP already in place. It’s been proven in the public sector.”
- **Employee satisfaction.** In addition to the improved morale among data scientists noted in Benefit C above, the interviewees shared that employee satisfaction improved with AWS by putting employees on a positive career arc, enabling them to grow by learning and finding new capabilities.
- **Improved security.** Interviewees noted security posture also improved once migrated to AWS. The head of advanced analytics from the pharmaceutical industry said: “AWS brings security at every layer. Its services have security

baked in, freeing up personnel and capabilities to look at more advanced questions.”

- **Adoption of new technologies.** AWS also made it easier for the interviewees’ organizations to adopt new technologies. For example, the head of advanced analytics from the pharmaceutical organization said: “No one person can know the ins and outs of every service that AWS offers and offer a level of expertise to our company. So, rather than going out and hiring 20 to 30 people, each with a specific specialization, we can rely on AWS and its experts who built the services.”

FLEXIBILITY

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

- **Better decision-making.** Interviewees noted AWS helped their organizations’ teams make better decisions. The senior director of IT architecture from the internet organization explained: “Faster data, availability, and better tooling doesn’t directly impact our general business users, but they do benefit from improved data accuracy, which allows them to make much better decisions in their daily work. We can’t quantify that, but it is still important for us.”
- **Improved innovation.** AWS also helped the interviewees’ organizations to improve their innovation efforts. The head of advanced analytics from the pharmaceutical industry explained: “AWS allows us to do better investigation and experimentation. We have the flexibility to use the right tool for the right question. And we don’t have to predict months and years ahead of time the questions we’ll ask. All of that means better innovation at speed.”

- **Improved resilience to market changes.** Lastly, the interviewees shared that migrating data and analytics to AWS added resilience to their organizations in the face of unforeseen market changes. For example, the CIO from the government organization said: “When we were doing the COVID-19 vaccine rollout, we did analyses on different regions to ensure needs were met. We got shots in arms much faster than without AWS. Furthermore, with AWS we saw no impact when the global chip shortage hit. It has made us much more resilient.”

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	Cost of migration	\$660,000	\$0	\$0	\$0	\$660,000	\$660,000
Ftr	AWS fees	\$0	\$990,000	\$990,000	\$990,000	\$2,970,000	\$2,461,983
Gtr	Cost of training and ongoing management	\$0	\$58,608	\$58,608	\$58,608	\$175,824	\$145,749
	Total costs (risk-adjusted)	\$660,000	\$1,048,608	\$1,048,608	\$1,048,608	\$3,805,824	\$3,267,732

COST OF MIGRATION

Evidence and data. Interviewees shared experiencing costs of migration to AWS that varied in accordance with the size and complexity of their data and analytics environments. Regarding smaller environments, the CIO and CISO of the financial services organization shared spending approximately \$200,000 on professional services and an additional \$300,000 on internal employees and other costs to complete their migration in three to four months.

Regarding larger environments, the senior director of IT architecture shared spending between \$20 million and \$30 million to migrate, leveraging 40 IT professionals full-time and some time from up to 1,200 people from across all the organization's divisions for the one-year process.

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

- Six FTEs are needed for 15 weeks at a fully burdened hourly rate of \$100.
- An additional \$240,000 is needed for consultants and professional services.

Risks. The cost of migration will vary with:

- The size and complexity of the data and analytics environment.

- The need to hire professional services to augment internal staff.

Results. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of \$660,000.

Cost Of Migration						
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
E1	Total FTEs needed for migration	Composite	6	0	0	0
E2	Hours needed for migration	Composite	600	0	0	0
E3	Average fully burdened hourly rate for migration work	Composite	\$100	\$0	\$0	\$0
E4	Professional services fees	Composite	\$240,000	\$0	\$0	\$0
Et	Cost of migration	$E1 * E2 * E3 + E4$	\$600,000	\$0	\$0	\$0
	Risk adjustment	↑10%				
Etr	Cost of migration (risk-adjusted)		\$660,000	\$0	\$0	\$0
Three-year total: \$660,000			Three-year present value: \$660,000			

AWS FEES

Evidence and data. The interviewees also incurred costs associated with the use of the AWS cloud platform for their data and analytics. As with the migration costs, these varied widely depending on size and usage. Shared annual costs for AWS ranged from \$750,000 on the low end to hundreds of millions of dollars on the high end.

Modeling and assumptions. For the composite organization, Forrester models total AWS fees of \$900,000 annually.

Risks. The total annual fees for AWS will vary with:

- The amount of data ingested.
- The number of AWS services utilized.
- The frequency and intensity of use.

Results. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV of \$990,000.

AWS Fees						
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
F1	AWS fees	Composite	\$0	\$900,000	\$900,000	\$900,000
Ft	AWS fees	F1	\$0	\$900,000	\$900,000	\$900,000
	Risk adjustment	↑10%				
Ftr	AWS fees (risk-adjusted)		\$0	\$990,000	\$990,000	\$990,000
Three-year total: \$2,970,000			Three-year present value: \$2,461,983			

COST OF TRAINING AND ONGOING MANAGEMENT

Evidence and data. Lastly, the interviewees noted that they incurred internal costs associated with training in new services and on ongoing management. In terms of training, it took about 8 hours per day for two to three days to train employees on a new service two to three times a quarter. For ongoing management, time spent dropped from about 80% of time to about 10% of time for teams that varied in size by the size of the environment.

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

- Three IT professionals spend 96 hours annually on training.
- Three IT professionals spend 200 hours on ongoing management.
- The fully burdened hourly rate per IT professional is \$60.

Risks. The cost of training and ongoing management will vary with:

- The number of new services adopted.

- The size and complexity of the AWS environment.

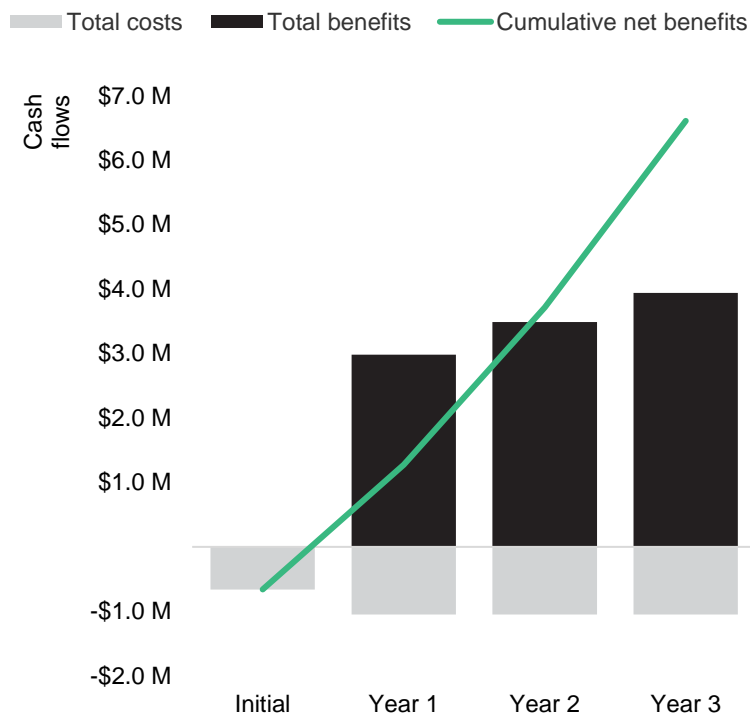
Results. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV of \$146,000.

Cost Of Training And Ongoing Management						
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
G1	Number of employees needing training on new services	Interviews	0	3	3	3
G2	Annual hours of training	Interviews	0	96	96	96
G3	Hours spent on ongoing management	Interviews	0	200	200	200
G4	Fully burdened hourly rate	TEI standard	\$0	\$60	\$60	\$60
Gt	Cost of training and ongoing management	$G1*(G2+G3)*G4$	\$0	\$53,280	\$53,280	\$53,280
	Risk adjustment	↑10%				
Gtr	Cost of training and ongoing management (risk-adjusted)		\$0	\$58,608	\$58,608	\$58,608
Three-year total: \$175,824			Three-year present value: \$145,749			

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	(\$660,000)	(\$1,048,608)	(\$1,048,608)	(\$1,048,608)	(\$3,805,824)	(\$3,267,732)
Total benefits	\$0	\$2,984,650	\$3,488,977	\$3,943,741	\$10,417,369	\$8,559,763
Net benefits	(\$660,000)	\$1,936,042	\$2,440,369	\$2,895,133	\$6,611,545	\$5,292,031
ROI						162%
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 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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