A Forrester Total Economic Impact™
Study Commissioned By Microsoft
August 2019

The Total Economic Impact™ Of Microsoft Azure IaaS

Cost Savings And Business Benefits Enabled By Azure Infrastructure-As-A-Service (IaaS)

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ABOUT FORRESTER CONSULTING

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Benefits

Increased online B2C orders:
By 83% to 167%

Net profit from incremental online sales:
$2.8 million

Reduced infrastructure on-premises in data center:
90% by Year 3

Avoided infrastructure and FTE costs:
$10.3 million

Executive Summary

Microsoft Azure provides the infrastructure-as-a-service (IaaS) platform as a suite of computing, storage and networking resources, which customers can provision and manage over the internet. IaaS quickly scales up and down with demand, letting customers pay only for the resources that they use, including the ability to turn services on and off rapidly so that a process incurs charges only when it is actively operating.

Microsoft commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study to examine the ROI enterprises may realize by shifting from on-premises operations to Azure's IaaS offering. The purpose of this study is to give readers a framework to evaluate the potential financial impact, or ROI, of leveraging Azure IaaS for their organizations.

Forrester interviewed nine customers with years of experience with Azure. The ease of development and management meant that many workloads, including some lighter SAP applications as well as disaster recovery, were a simple rehost (i.e., lift and shift) to Azure.

Forrester interviewed the VP of product development at an IT services company who summarized, "I could never build a services infrastructure on site as fast as I can built it on Azure." The company leverages Azure services such as Compute, Storage, Networking, Management, Security, StorSimple, and Azure Active Directory. Other organizations have implemented Azure Hybrid solutions by migrating workloads to Azure that are securely connected to on-premises applications and data.

Customers found that reducing their data center footprint freed up IT staff for higher level business initiatives. Another customer, the senior manager of advanced technology services for a construction company further explained: "In the past, business units did not consider IT people as anything other than a cost. Today, we're bringing business value by taking advantage of the resources and skills we have to become a revenue contributor for the company with what we're doing on the internet-of-things (IoT) front, the analytics front, and the opportunities those are bringing to the table. That's a game changer. And if we hadn't really moved to the cloud, adopted Azure, and embraced what it's allowed us to do, we wouldn't be able to deliver like we do."

Key Findings

Quantified benefits. The following risk-adjusted present value (PV) quantified benefits are measured over a three-year investment period and representative of those experienced by the companies interviewed:

- **Avoided on-premises infrastructure costs of 90%, which are valued at savings of $7.3 million.** Servers were previously deployed on site or hosted with a partner. Migrating these workloads to Azure reduced the cost for servers, databases, operating systems, and data center space.
- **Avoided on-premises FTE costs of $3.0 million.** Migrating to Azure IaaS enabled significant reallocation of FTEs who had supported data center infrastructure. None of the interviewed companies eliminated the headcount, but rather they refocused employees onto higher-value tasks. For example, interviewee explained how a previous data center manager turned out to be a superb business analyst at their company.

ROI
478%

Benefits PV
$13.1 million

NPV
$10.8 million

Payback
<3 months

- **Income from new and larger online B2C sales, increasing annual order volume between 83% and 167%, and increasing order size between 20% and 27%.** Improvements in global scale (such as faster page load times in China), the ability to stand up services in new countries more rapidly, and improved site performance all combined to produce increased volume of purchases and higher average sales prices that generated an additional $1.9 million of income.
- **Income from new online enterprise sales generated $927,081 in additional income from improved processes, global reach, and better customer service.** In addition to online sales, some interviewed companies also measured an increase through traditional sales channels. One new enterprise offering, built on Azure, improved time-to-market and predictability of product delivery, which resulted in an improvement in the customer experience and a boost in sales from existing customers.

Unquantified benefits. The interviewed organizations experienced the following benefits, which are not quantified for this study:

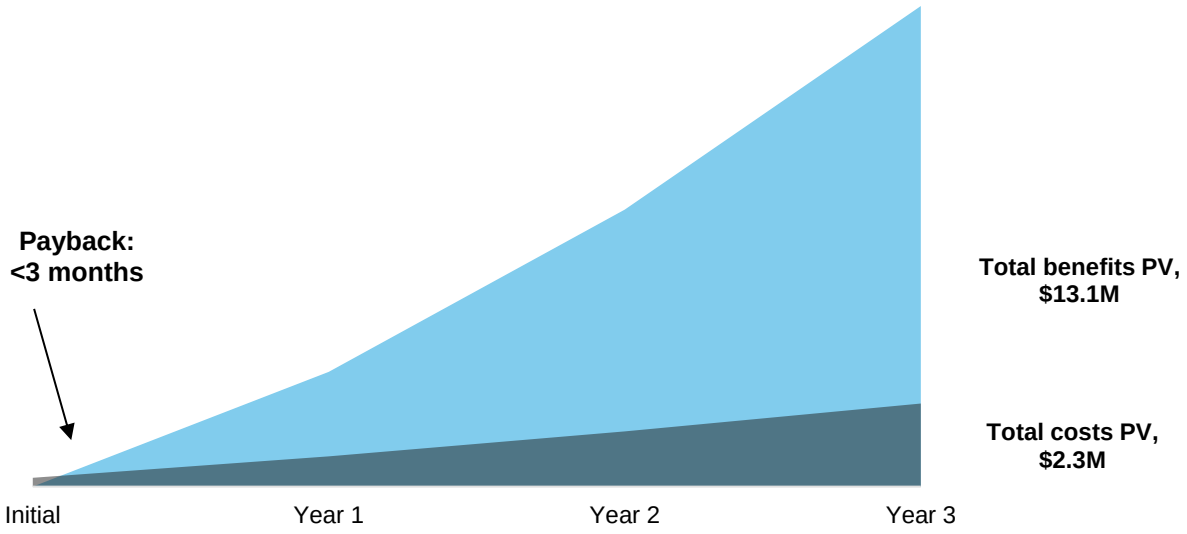
- **Flexibility of the migration path provided by Azure's Hybrid capabilities.** For the companies interviewed, migration took place over several years and became a journey more so than a single event. Azure enables customers to move from on-premises to the cloud in a timeline that meets business needs.
- **Value of Azure tools in improving business operations.** New data tools such as the Data Lake Analytics , event services, and other Azure tools help organizations enhance their business performance.
- **Easier access to new technologies.** IT managers can test out and pilot new technologies such as Hadoop or high-performance computing (HPC) more quickly with virtualized environments on Azure, significantly shortening the time to evaluate and deploy at a lower cost.
- **Developer and tester process improvements.** Developers and testers saw improvements in tasks such as setting up a new server environment (or turning it off when done); simulating real-time scale scenarios; and standardizing test, development, and production environments.
- **Streamlines the organization's journey toward Azure platform-as-a-service (PaaS).** Future plans include rearchitecting some applications or interfaces for Azure PaaS that are expected to create new benefit opportunities and save time and costs.

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

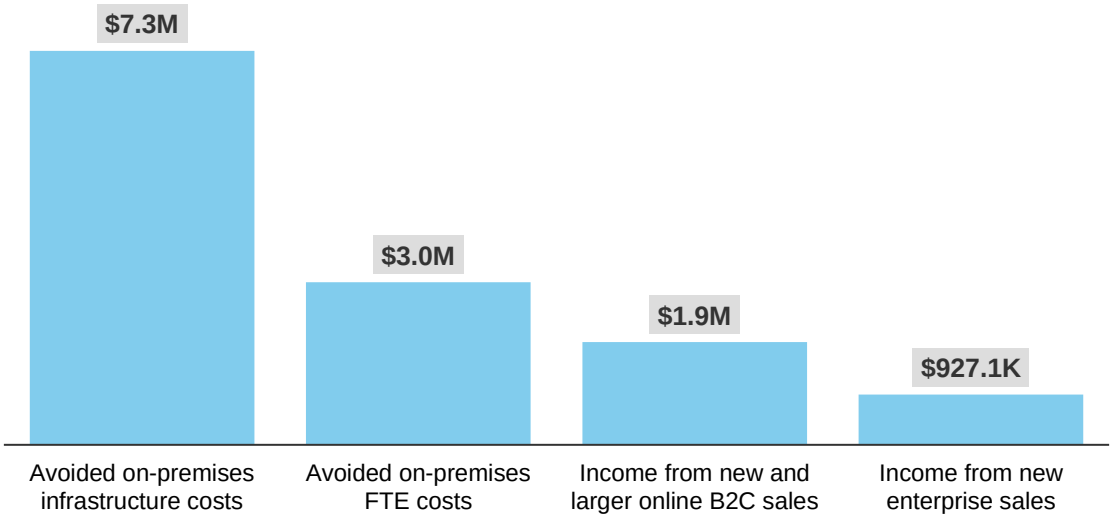
- **Costs for Azure implementation and initial workload migration of $239,800.** Many workload migrations were lift-and-shift migrations, meaning that the initial implementation was relatively quick and simple.
- **Ongoing Azure costs and additional workload migration costs of $2.0 million.** Azure license costs are estimated for a composite organization to start at $290,950 in the first year and grow to $454,609 by Year 3. As more workloads are migrated in later years, additional costs are included for additional migration effort as well as expected new hires.

Forrester's interviews with nine existing customers and subsequent financial analysis found that an organization based on these interviewed organizations experienced benefits of $13.1 million over three years versus costs of $2.3 million, adding up to a net present value (NPV) of $10.8 million and an ROI of 478%.

Financial Summary



Benefits (Three-Year)



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TEI Framework And Methodology

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

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 Microsoft Azure IaaS can have on an organization:

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

DUE DILIGENCE
Interviewed Microsoft stakeholders and Forrester analysts to gather data relative to Azure IaaS.

CUSTOMER INTERVIEWS
Interviewed nine organizations using Azure IaaS 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 Microsoft Azure IaaS' impact: benefits, costs, flexibility, and risks. Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves to provide a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

The Azure IaaS Customer Journey

BEFORE AND AFTER THE AZURE IAAS INVESTMENT

Interviewed Organizations

For this study, Forrester conducted nine interviews with Microsoft Azure IaaS customers. Interviewed customers include the following:

INDUSTRY	REGION	INTERVIEWEE	DETAIL
Trade association	Headquartered in North America	Director, product development and IT	Providing value-added online services to both its 125,000 members and consumers.
Construction	Headquartered in North America	Sr. manager of advanced technology services	4,000 full-time staff and 10,000 hourly employees delivering $7 billion of infrastructure and industrial projects worldwide, with a presence in 31 major centers.
Restaurant chain	Headquartered in Europe	IT director	Fast casual restaurant group operating globally with 14,000 employees and $685 million revenues.
Software and services	Headquartered in Europe and North America	Product director	5,000 employees and $1 billion in revenue for software and services primarily for financial services.
Manufacturing	Global conglomerate	Director of IT and chief architect	Organization with shared IT services across large equipment and vehicle manufacturing subsidiaries, totaling 50,000 employees and $15 billion in revenue.
Sporting equipment manufacturing and sales	Headquartered in the North America	Manager of web technologies	2,000 employees and $300 million in revenue. Sporting goods manufacturer selling through distributors as well as direct online sales.
Professional services	Headquartered in Europe	Exec. director of IT operations	150,000 employees and $20 billion in revenue for professional services firm delivering projects worldwide.
Textiles manufacturing	Headquartered in Europe	CIO	2,600 employees and $400 million in revenue from B2B textiles manufacturing.
Software hosting, development, and services	Headquartered in the North America	VP of product development	Small but highly skilled services firm delivering Microsoft-focused consulting, IT services, and hosting.

Key Challenges

Interviewed organizations had primarily implemented on-premises workloads, either through onsite, co-location, or outsourced services. These inflexible created the following scale and resource issues:

- **Expensive IT costs showed no sign of change.** Customers reported that both internal and outsourced IT costs were expensive, with expected increases coming for new planned data centers and outsourced IT growth needs. On-premises development and QA tasks were inefficient and error prone. Infrastructure capacity was maintained at a constant level despite fluctuating needs.

- **International expansion was difficult.** Opening operations in a new country often required new or expanded data center footprints that were expensive and complicated. Data center investments are governed by data privacy requirements, and take longer to plan, deploy, and implement.
- **Business growth was delayed due to the inability to rapidly scale infrastructure.** The speed of business unit growth strained the ability of the online infrastructure to scale. Merely provisioning and deploying new hardware often required weeks, if not months.
- **Lacking time to focus on higher-value initiatives**. Organizations felt that the effort needed to maintain data centers prevented IT staff from addressing more strategic needs. As one director noted: "Prior to our journey to the cloud, we had to maintain, update, and patch all those servers. We wanted to focus on providing value-added services to our members and consumers, not on running the infrastructure."

> "We were regularly running out of capacity, and when we ran out of capacity it affected our ability to deliver."
>
> *Senior manager of advanced technology services, construction company*

Solution Requirements

The interviewed organizations searched for a solution that could:

- **Enable a smooth and phased transition to the cloud** by delivering a consistent experience across varied environments (e.g., on-premises, cloud, or edge).
- **Support global reach** to meet country-specific data privacy and management regulations and support last-mile performance.
- **Scale both up and down** to meet current and future needs for internal and online applications.
- **Remain flexible** to support several scenarios with one solution tool set, such as internal application development, enterprise collaboration, web hosting, and integration with current applications and systems.
- **Provide opportunities for piloting and experimenting** with new solutions without major planning, deployment time, or data center costs.

> "I wanted to change the focus of the team to revenue and customer experience initiatives. The on-premises stuff was giving us too many headaches, from both a support and security point of view. We saw an opportunity to get rid of time-consuming tasks, while putting data somewhere safe and secure where we know it will be well looked after."
>
> *IT director, restaurant chain*

Key Results

The interviews revealed that key results from the Azure IaaS investment include:

- **Reduced data center infrastructure and IT labor costs.** With Azure IaaS, organizations were able to reduce onsite or co-location data center costs by lifting and shifting many workloads to Azure, and also by refactoring applications. As a result, their data center infrastructure and IT labor costs dropped by as much as 90% over three years. The senior manager of advanced technology services for a construction company noted: "We still have a data center, but the footprint is a lot smaller. It kind of sits there and manages itself."
- **Increased business-critical workload migrations.** Many business-critical workloads can benefit from Azure IaaS' ability to reduce costs and improve scale, performance, and mobility. These are planned for later years, since more time and resource involvement is required, but they are expected to provide significant benefits. "Not every workload is suited for cloud deployment today, based on network utilization or other issues," said the director of IT at a global conglomerate, but they highlighted that many are planned for later migration.

- **Scaled infrastructure up or down as needed.** The IT director for a restaurant chain described the ability to triple the compute power for an application during a marketing promotion, then turn off that increased capacity when it is not needed.
- **Freed up time of IT staff for higher-value efforts instead of managing infrastructure**. Interviewed organizations described how IT staff who no longer needed to support data center infrastructure could instead contribute to strategic corporate initiatives such as big data, IoT, automation, and improving business unit operational systems. The senior manager of advanced technology services for a construction company indicated: "We've been able to refocus IT staff on other areas that provide more business value than infrastructure maintenance. We were able to start focusing on the future, on emerging areas like IoT, machine learning, analytics, artificial intelligence, virtual construction, and open API management."
- **Enabled greater agility and faster time-to-market.** The ease and flexibility of spinning up new IT efforts with Azure improves overall organizational agility and accelerates time-to-market. The director of product development and IT for a trade association noted: "Our time-to-market has improved drastically. A lot of this comes with the flexibility provided by Azure IaaS. Innovating, or failing fast and moving on, is so much easier now."
- **Increased profit through higher enterprise and B2C sales.** With applications and websites deployed to Azure IaaS, organizations can leverage Azure's scale and reach to better meet global needs and seasonal business bursts. The manager of web technologies at a sporting goods manufacturer highlights the issues their organization has now resolved, using Azure: "As our site grew and our traffic grew, we ran into a lot of problems. We're in a market where we have busy seasons, and we had issues with scale."
- **Improved development and test productivity.** IT and development managers can speed up processes such as quickly setting up and turning off new server environments (that exactly match production). They can easily pilot a new Azure service, such as Hadoop or HPC, that before would have required significant investment, planning, and data center buildout to even try out. The IT director for a restaurant chain indicated: "Azure has made our development cycles a lot more effective because we're able to stand up test environments on almost an ad hoc basis. So, it allows me to have multiple projects running at the same time. In my old world, I would have needed more of a sequential approach."
- **Azure also reduced the cost and effort of disaster recovery capabilities.** The director of product development and IT for a trade association explained: "Building a full disaster recovery capability with the old approach would have required us to double the investment and the IT resources by building a second data center, replicating all the services, and making sure that was always up to date and ready to use. In the Azure cloud, that secondary site is active, not passive. It's serving traffic to users yet giving us the assurance that we are compliant with business continuity requirements."

> "The real win for us was to deliver projects and services faster. Our average turnaround time on projects that had server-based resources had been four to eight weeks. Today we can build a server to our specs in 15 minutes."
>
> *Senior manager of advanced technology services, construction company*

- **Flexibility of the migration path provided by Azure's Hybrid capabilities.** Azure IaaS Hybrid capabilities enabled the interviewed organizations to progress from on-premises to the cloud on whatever path and timeline that best suits their needs. Some organizations transitioned entirely over several years, while others moved most workloads to the cloud while maintaining select business processes on-premises. According to the director of product development and IT for a trade association: "Our main reason to use a Hybrid approach was the risk factor. We were exploring a completely new environment and wanted to minimize the risk by deploying to the cloud gradually. With a Hybrid approach we could migrate in phases, keeping the original infrastructure and data center until we were comfortable with the new quality of service."

Composite Organization

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

- **Organization profile.** A global, multibillion-dollar conglomerate with manufacturing and services business units, the composite organization has a strong brand, 20,000 employees, and around $4 billion in annual revenue. It leverages Azure IaaS in varied ways, such as improving development and test for software development, internal application operations, management and flexibility, and customer-facing website management and scale during busier or slower times.
- **Deployment characteristics.** The composite organization has primarily implemented Azure IaaS compute and storage workloads, including virtual machines and enterprise integration services. It also uses Azure's hybrid cloud capabilities to leverage some elements of IaaS while maintaining critical components of on-premises operations.
- **Technical specifications.** The organization purchased and implemented:
  - Sixty core virtual machines, primarily general purpose D-series Azure virtual machines.
  - Block blob storage of 100 terabytes (TBs).
  - Professional Direct support.

Key assumptions:

- 20,000 employees
- $4 billion annual revenue
- Multinational conglomerate
- Many workloads available for lift-and-shift migration
- Other workloads require more development or rearchitecting for migration planned in later years.

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	Avoided on-premises infrastructure costs	$2,025,000	$2,910,938	$4,017,094	$8,953,031	$7,264,745
Btr	Avoided on-premises FTE costs	$801,900	$1,225,125	$1,670,625	$3,697,650	$2,996,665
Ctr	Income from new and larger online B2C sales	$382,500	$826,200	$1,147,500	$2,356,200	$1,892,671
Dtr	Income from new enterprise sales	$229,500	$382,500	$535,500	$1,147,500	$927,081
	Total benefits (risk-adjusted)	$3,438,900	$5,344,763	$7,370,719	$16,154,381	$13,081,162

Avoided On-Premises Infrastructure Costs

The composite organization was able to easily migrate server workloads to Azure and reduce both the data center space in its own offices and the amount of space leased from hosting vendors. Many workloads were easily migrated using a lift-and-shift strategy. “Really, we just took all of those environments and moved it directly into the cloud,” said the project director at a software and services vendor.

The organization was able to expand capacity and scale globally without having to invest in additional data center space, e.g., opening new data centers or significantly building out existing space. In some cases, these were large projects that would have cost millions of dollars; other locations needed only a few servers to support a smaller client base or specific solution. The manager of web technologies for a sporting goods manufacturer reported, “When someone says, ‘We need another 100 gigs,’ we can just add it.” The composite organization was also able to procure local resources to be available in specific regions, allowing them to maintain speed and reliability and also adhere to data and compliance requirements (e.g., GDPR) within certain regions or countries.

In recent years, Forrester observed a rapid acceleration in the adoption of IaaS and consequently as shift in the type of on-premises activities being migrated. In a similar study in 2017, Forrester observed larger-scale migrations that included customers that closed data centers and eliminated outsourcing agreements, which is indicative of larger customers and more wholesale migrations.[1] In this 2019 study, Forrester observed an ongoing shift as customers reported migrating additional workloads and servers, but the customers were more moderate-sized companies that were continuing their journey in migrating to the cloud.

In addition to the ease of migrating workloads, Azure enabled the organization to adapt the infrastructure capacity to the performance and workload requirements. The senior manager of advanced technology services for a construction company explained, “We’re a lot more aware of where our money’s being spent, what we can do to optimize costs, and catching the outliers quickly so we don’t have cost overruns, without anyone [in our business units] noticing.”

The table above shows the total of all benefits across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total benefits to be a PV of $13.1 million.

“We started with over 1,200 servers on-premises. Today, we have less than a hundred in production running in our data center. When people ask me today, ‘Where is your data center?’ I just tell them it’s ‘west US region in Azure,’ because that’s where 93% or 94% of our IaaS-based workloads operate from now.”

Senior manager of advanced technology services, construction company

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The chief architect at a global manufacturer further highlighted the scalability and pay-as-you-go ability of Azure: “Not only could we quickly turn on a workload, but on the flipside, we are able to spin down a workload when we’re through with it. As opposed to a traditional on-premises, where you’re stuck with an asset, we can simply turn it off when we’re finished.”

For the financial model, Forrester assumes that the composite organization spent an average of $5 million in the first year, through a combination of leased equipment, depreciation on capex assets, and maintenance costs. Additional costs included operating systems (usually a form of Linux), databases, security tools, and backup/disaster recover platforms. Forrester also assumed that additional factors, such as server consolidation and other best practices, also helped reduce data center space and support requirements. To be conservative, only 75% of the avoided costs are attributed to Azure IaaS.

Avoided on-premises infrastructure costs will vary based on costs in a particular region, computing power required, employees or clients nearby, and other factors. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $7,264,745.

Impact risk is the risk that the business or technology needs of the organization may not be met by the investment, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for benefit estimates.

Avoided On-Premises Infrastructure Costs: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Annual on-premises infrastructure costs prior to Azure	Composite; 15% annual	$5,000,000	$5,750,000	$6,612,500
A2	Reduction in on-premises infrastructure costs (cumulative)	From interviews	60%	75%	90%
A3	Percentage of infrastructure reduction attributed to Azure	From interviews	75%	75%	75%
At	Avoided on-premises infrastructure costs	A1*A2*A3	$2,250,000	$3,234,375	$4,463,438
	Risk adjustment	↓10%			
Atr	Avoided on-premises infrastructure costs (risk-adjusted)		$2,025,000	$2,910,938	$4,017,094

Avoided On-Premises FTE Costs

With less on-premises infrastructure to support, organizations could reallocate IT staff who previously managed and maintained that infrastructure. Interviewed organizations typically redeployed that staff to higher-value activities supporting strategic business initiatives, as detailed below in the Unquantified Benefits section.

The senior manager of advanced technology services for a construction company explained: “The number of people working on traditional IT workloads, which is what IaaS typically supports, dropped from around 24 to three or four. It’s like getting new staff without having to add headcount. Our ability to deliver more projects more rapidly, yet with the same number of people, was huge.”

- Data center support needs reduced 90% by Year 3.
- FTE costs reduced by $3.0 million.

For the composite organization, Forrester models the avoided FTE costs as:

- Eighteen FTEs in Year 1 and growing to 25 FTEs by Year 3 as increasing amounts of infrastructure are migrated to Azure.
- Average fully loaded FTE salary is $110,000.

Avoided on-premises FTE costs will vary based on infrastructure scope, local labor costs, and other factors. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $2,996,665.

Avoided On-Premises FTE Costs: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
B1	FTEs supporting on-premises infrastructure prior to Azure	Composite	18	22	25
B2	On-premises FTE reduction (cumulative)	From interviews	60%	75%	90%
B3	Percentage of infrastructure reduction due to Azure	From interviews	75%	75%	75%
B4	Average fully loaded salary	Market data	$110,000	$110,000	$110,000
Bt	Avoided on-premises FTE costs	B1*B2*B3*B4	$891,000	$1,361,250	$1,856,250
	Risk adjustment	↓10%			
Btr	Avoided on-premises FTE costs (risk-adjusted)		$801,900	$1,225,125	$1,670,625

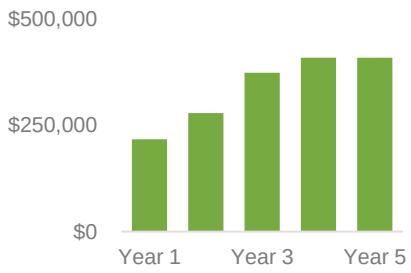
Income From New And Larger Online B2C Sales

A division of the composite organization took advantage of the Azure IaaS platform to rearchitect its customer-facing website and improve the online customer experience, including the eCommerce platform where it can directly sell finished products. Hosting the site on Azure returned immediate results. The manager of web technologies for a sporting goods manufacturer explained, “When we moved, we saw some page loading time improvements in the US. But in China, we had huge improvements. We went from about 18 seconds on the previous site down to about 6 to 8 when we went live on Azure.”

This, along with Azure’s global reliability and scale, plus the ability to instantly grow (or shrink) the service to meet demand with Azure’s per-second billing, led to significant improvement in performance and growth in both the number and size of direct-to-consumer online B2C sales. Annual order volume increased between 83% to 167%, while average order size increased 20% to 27%.

For the composite organization, Forrester models the income from new and larger online sales as:

- Thirty thousand online orders each year before Azure.
- Fifty-eight thousand to 80,000 annual orders with Azure IaaS.
- A $40 average order size before Azure.
- A $50 to $55 average order size since Azure.
- Not every dollar from every sale is attributable to Azure, so a 75% benefit factor has been applied.



Additional income from new and larger online B2C sales

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Since it is difficult to predict how customers will react to increased global scale and speed, Forrester adjusted this benefit downward by 15%, yielding a three-year, risk-adjusted total PV of $1,892,671.

Income From New And Larger Online B2C Sales: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
C1	Online B2C orders each month before Azure	From interviews	30,000	30,000	30,000
C2	Average order size before Azure	From interviews	$40	$40	$40
C3	Online B2C orders each month since Azure	From interviews	55,000	75,000	80,000
C4	Average order size since Azure	From interviews	$50	$52	$55
C5	Percentage of new and larger online B2C orders attributed to Azure		75%	75%	75%
C6	Income margin for online B2C sales		20%	20%	20%
Ct	Income from new and larger online B2C sales	((C3-C1)*(C4-C2))*C5*C6*12	$450,000	$972,000	$1,350,000
	Risk adjustment	↓15%			
Ctr	Income from new and larger online B2C sales (risk-adjusted)		$382,500	$826,200	$1,147,500

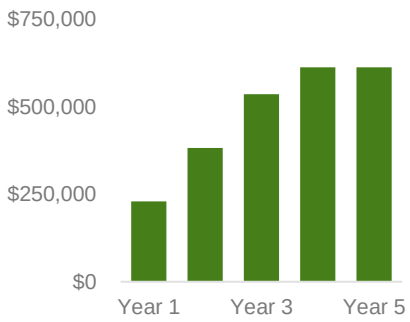
Income From New Online Enterprise Sales

Due to better prototyping and faster time-to-market for textiles manufacturing, as well as improved scale, availability, and reliability across manufacturing, product development, or sales divisions, the composite organization has seen increased sales from its enterprise customers. The executive director explained, “We have a solution that we developed that is a good example of one new offering we deliver on Azure.”

Forrester models the benefits for the composite organization’s manufacturing department as:

- Three to seven new orders each year are enabled by greater global reach and reliability from workloads hosted on Azure IaaS.
- Each new order brings in an average of $100,000 in revenue.
- Not every dollar from every sale is attributable to Azure, so a 75% benefit factor has been applied.

Since it is difficult to predict new sales related to increased global scale and speed, Forrester adjusted this benefit downward by 15%, yielding a three-year, risk-adjusted total PV of $927,081.



Additional income from new online enterprise sales

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Income From New Enterprise Client Sales: Calculation Table					
REF	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
D1	New enterprise client orders each month		3	5	7
D2	Value of each order (average)		$100,000	$100,000	$100,000
D3	Income margin for enterprise sales		10%	10%	10%
D4	Percentage of new enterprise client orders enabled by Azure		75%	75%	75%
Dt	Income from new enterprise sales	D1*D2*D3*D4*12	$270,000	$450,000	$630,000
	Risk adjustment	↓15%			
Dtr	Income from new enterprise client sales (risk-adjusted)		$229,500	$382,500	$535,500

Unquantified Benefits

Some benefits are not able to be quantified financially, either because they are not directly related to financial results or they're areas that the interviewed organizations have not yet measured. For the composite organization, the following unquantified benefits should be considered to add additional weight to the ROI analysis focus of this study:

- **Value of Azure tools in improving business operations.** The IT director for a restaurant chain cited several ways in which Azure capabilities helped enhance the business: "We've used the Azure environment, including some of the new data tools such as the data lake and event services, to help us with our single customer view. As soon as a customer downloads a marketing promotion from the website, we see they've done it and start communicating with them. And by using some of the Azure tools, at no additional cost, we've started to build some applications to influence our operations."
- **Easier access to new technologies.** The organization is now able to more flexibly and easily pilot new technologies with little or no upfront investment. For example, one division wanted to try out Hadoop, so it turned on that Azure service and started using it almost immediately. The senior network engineer at a global professional services firm explained, "One that would have been hard to stand up on site would be Hadoop clusters, to try out some new potential business endeavors around big data." The director of IT at a global conglomerate said, "To try out something on-premises would have been too cost prohibitive to go down that path."
- **Development and testing process improvements.** Some developer and QA improvements are included above, in the cost savings enabled by migrating on-premises and outsourced servers to Azure IaaS. Much of that was for developer and QA workloads. But developer and QA benefits go beyond simple server changes:
  - **Developers and testers can set up environments much more quickly.** They can create an environment that exactly matches production in just a few clicks.

"Instead of the staff focusing on just keeping the lights on, they are into more forward-looking strategic activities. Now we're all about added value, rather than managing backups."

IT director, restaurant chain

Implementation risk is the risk that a proposed investment may deviate from the original or expected requirements, resulting in higher costs than anticipated. The greater the uncertainty, the wider the potential range of outcomes for cost estimates.

- **Developers can take advantage of Azure integrations more easily.** In order to complete tasks more quickly, developers can avoid issues that come up when production and development environments are not identical. “Now we can easily spin up a number of different environments,” said the project director at a software and services vendor.
- **Developers can self-provision assets.** For example, they can turn on a specific testing environment, meaning less time waiting for servers to install or for requests to be completed, or even for physical servers to be ordered and set up.
- **Applications and modules can be completed more quickly and more accurately.** This means that time-to-market can be reduced for client projects, and employees can take advantage of improvements sooner for internal projects.

› **Workload and service rightsizing.** Some services can be turned off during quiet hours, such as the dev/test environment. “From about 10 p.m. until 6 a.m., we shut the environment down,” said the manager of web technologies for a sporting goods manufacturer, highlighting the benefits enabled by services such as Azure virtual machines and dev/test labs. Some of these costs are incorporated in the cost savings highlighted above, as well as the cost of ongoing Azure subscriptions, but additional opportunities to rightsize services and turn them off when not in use are expected.

› **Streamlines the organization’s journey toward Azure PaaS.** The lift-and-shift migration of many server workloads to Azure IaaS has created new opportunities and significantly saved on IT costs. Like the improvement of its website, the composite organization will start to consider what services and applications can be moved to Azure PaaS, as an opportunity to take advantage of additional Microsoft services, to simplify IT, and to provide employees, partners, and customers with additional opportunities to access and share information and services. Potential benefits are detailed in the Total Economic Impact Of Microsoft Azure PaaS.[2]

Additional benefits:

- Ability to easily pilot new technologies, without making large upfront investments
- Developer and test productivity
- Service rightsizing and turning off when not in use

Flexibility

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

› **The organization can continue to expand its use of Azure’s functionality.** For instance, the IT director for a restaurant chain described: “We’re starting to play around with the internet of things, for which there’s a whole Azure environment. It’s something we’re going to look at. In our world, being able to connect our fridges and our ovens and our air conditioning units and understand what they’re doing and how much energy they’re consuming, is a big thing. And then how we can use that data for proactive maintenance, or to help us reduce energy costs, or even to remove tasks such as taking temperatures of fridges.”

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

- **As the organization moves more workloads to Azure**, it can take advantage of the accounting and financial opportunities of moving even more capital expenditures to operational costs.

- **The organization can also tune and optimize infrastructure more effectively.** For example, one interviewed organization has enabled and tested multiple Azure configurations. (For example, does it really need eight cores per instance? Or do four-core or two-core instances meet its needs?) This organization has tested its Azure infrastructure configuration to find the best combinations of server numbers, size, and other operational characteristics, with the goal of delivering the best performance at a reasonable cost.

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	Costs of Azure implementation and initial workload migration	$239,800	$0	$0	$0	$239,800	$239,800
Ftr	Ongoing Azure costs and additional workload migration	$0	$644,545	$818,056	$1,011,570	$2,474,172	$2,022,037
	Total costs (risk-adjusted)	$239,800	$644,545	$818,056	$1,011,570	$2,713,972	$2,261,837

Costs Of Azure Implementation And Initial Workload Migration

For the composite organization, the first deployed workloads were primarily lift and shift (with the customer-facing website exception already discussed). The organization estimates that it required three FTEs over 20 weeks for the initial migration, for tasks including:

- Planning, particularly around any impact that migrating a workload may have on IT resources, applications, or business processes.
- Training for IT resources to learn how to manage Azure as well as the workloads running on it.
- Data migration and preparation for workloads and/or data sources being migrated or connected to an Azure service.
- Implementation effort to finally migrate each workload.

Some added costs were incurred for some additional consulting assistance.

For most organizations, migration into Azure is not a one-time event, but often lasts several years as the company migrates hundreds of applications and changes business processes. While the training and planning time is no longer needed, migration best practices can help save time, and some resource time is required to move and monitor those workloads on Azure IaaS. These costs are included in the Ongoing Azure Costs And Additional Workload Migration section below.

The implementation costs add up to $218,000. Implementation costs will vary based on the number and nature of workloads deployed and the IT labor compensation rates. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV of $239,800.

The table above shows the total of all costs across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total costs to be a PV of $2.3 million.

Five months
initial migration time

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Costs Of Azure Implementation And Initial Workload Migration: Calculation Table						
REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
E1	FTEs involved in Azure IaaS planning, migration, and prelaunch implementation		3			
E2	Planning, migration, and implementation weeks		20			
E3	Average Azure IT fully loaded salary (hourly)		$70			
E4	Other initial costs		$50,000			
Et	Costs of Azure implementation and initial workload migration	E1*E2*(E3*40)+ E4	$218,000			
	Risk adjustment	↑10%				
Etr	Costs of Azure implementation and initial workload migration (risk-adjusted)		$239,800	$0	$0	$0

Ongoing Azure Costs And Additional Workload Migration

The composite organization has implemented several workloads on Azure IaaS, including compute, storage, networking, management, and security. The organization is a customer of other Microsoft solutions and services; therefore, based on its size and other licensing needs, it qualifies for Azure pricing for enterprise organizations.

While individual organizations' needs and licensing agreements differ, these programs have been considered when estimating the price of Azure IaaS licensing for the composite organization. Azure licensing is estimated to be about $290,950 in the first year for the composite organization, which includes:

- Sixty core virtual machines, primarily general purpose Dv3-series Azure VMs.
- Block blob storage of 100 TBs.
- Professional Direct support.

Additional workloads are migrated in later years, and Azure service licensing needs are also expected to grow. Migration effort is also included (as outlined above, with costs reducing each year as fewer workloads need migration, and best practices helping to speed up the process).

Given that Azure licensing, migration tasks, and expected new hires are all estimated, Forrester adjusted these costs upward by 10%, yielding a three-year, risk-adjusted total PV of $2,022,037.

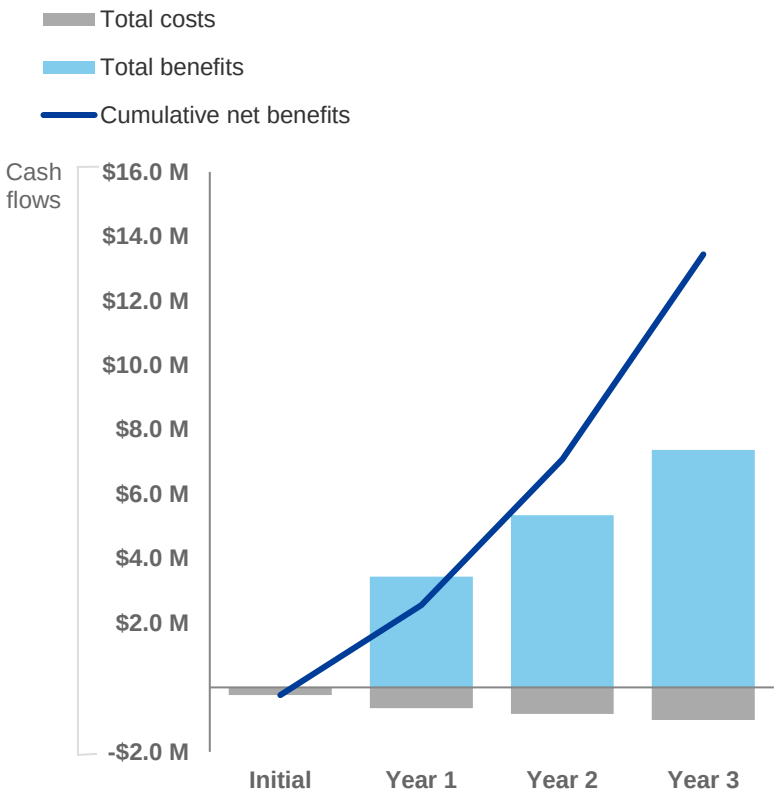
Two to 4 FTEs spend 100% of their time on ongoing management of Azure IaaS.

Ongoing Azure Costs And Additional Workload Migration: Calculation Table						
REF.	**METRIC**	**CALC.**	**INITIAL**	**YEAR 1**	**YEAR 2**	**YEAR 3**
F1	Azure licensing costs			$290,950	$363,688	$454,609
F2	Additional workload migration costs			$75,000	$50,000	$25,000
F3	FTEs supporting Azure			2	3	4
F4	Average fully loaded salary			$110,000	$110,000	$110,000
Ft	Ongoing Azure costs and additional workload migration	F1+F2+(F3*F4)	$0	$585,950	$743,688	$919,609
	Risk adjustment	↑10%				
Ftr	Ongoing Azure costs and additional workload migration (risk-adjusted)		$0	$644,545	$818,056	$1,011,570

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 Table (Risk-Adjusted)

	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Total costs	($239,800)	($644,545)	($818,056)	($1,011,570)	($2,713,972)	($2,261,837)
Total benefits	$0	$3,438,900	$5,344,763	$7,370,719	$16,154,381	$13,081,162
Net benefits	($239,800)	$2,794,355	$4,526,706	$6,359,148	$13,440,410	$10,819,325
ROI						478%
Payback period						<3 months

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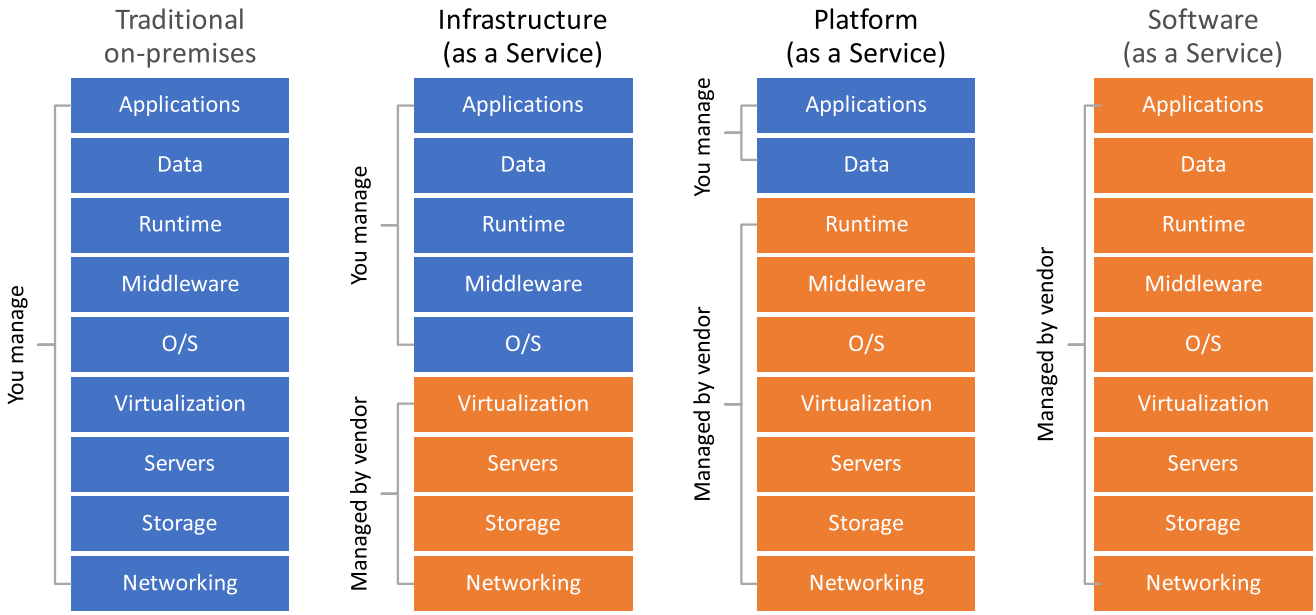
Microsoft Azure IaaS: Overview

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

Microsoft Azure is a global, trusted, and Hybrid cloud platform that enables organizations to quickly build, deploy, and manage applications across a large network of Microsoft-managed data centers, supporting migration and deployment of applications in close proximity to customers and supporting geo-redundancy. In addition to having the largest global scale, Azure is a trusted cloud with the largest compliance portfolio with certifications and security attestations. Azure is the only cloud provider that provides a comprehensive and consistent Hybrid platform with capabilities like Azure Stack, Azure Stack HCI and Azure Active Directory.

Microsoft Azure enables organizations to build and run applications without focusing on the infrastructure. It provides automatic operating system and service patching, built-in network load balancing, and resiliency against hardware failures. It supports a deployment model that enables customers to upgrade applications without downtime.

Microsoft Azure IaaS comprises core services such as compute, storage, networking, security, and related management capabilities. It facilitates large scaling of applications with features like scale sets and managed disks. It is an automated self-service platform with services like Azure Resource Manager that allow for fast and templatized resource provisioning. It supports a flexible billing model where customers are charged for the virtualized machines used by the second.



Source: Microsoft

Microsoft Azure provides open source, flexible, and cross-platform support across a broad selection of programming languages, frameworks, tools, databases, and architectures, such as .NET, Node.js, Java, PHP, and Python. It allows organizations to reliably host and scale out application code, storing data using relational SQL databases and NoSQL data stores, as well as advanced data analytics services, to extract value from all types of data and devices.

For more information, visit www.azure.com.

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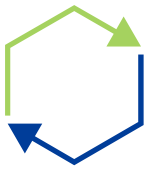
Appendix A: Total Economic Impact

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: “The Total Economic Impact™ Of Microsoft Azure IaaS,” Forrester Consulting report prepared for Microsoft, July 2017.

[2] Source: “The Total Economic Impact™ Of Microsoft Azure PaaS,” Forrester Consulting report prepared for Microsoft, June 2016.