

A Forrester Total Economic Impact™
Study Commissioned By Microsoft
December 2016

The Total Economic Impact™ Of Microsoft Windows 10

Cost Savings And Business Benefits
Enabled By Windows 10

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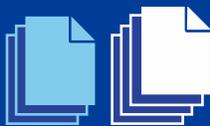
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Benefits And Costs For A Composite Organization



Client service benefits:
\$1,818,511



Mobile worker productivity:
\$7,245,878



Application delivery and testing benefits:
\$1,538,118



Net present value per user:
\$515

Executive Summary

Microsoft commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study to examine the benefits organizations may realize after implementing Windows 10. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact. New features and enablers in Windows 10 can help improve security, streamline management tasks, and improve employee mobility to help organizations better win, serve, and retain customers.

To understand the benefits, costs, and risks associated with a Windows 10 implementation, Forrester interviewed eight customers that have years of experience with Windows, were early adopters of Windows 10, and have completed deployment of a significant number of updates to key teams.¹

These organizations leveraged new tools in Windows 10 to deploy the updated operating system (OS) more quickly and easily than with past efforts, which provided employees swift access to the latest client technologies to help them get their work done more quickly. Improvements in boot times, application access, security, and mobility help IT and users increase productivity and complete work more quickly and effectively. The IT manager for a US professional auto racing team said: “Even our [racecar] drivers have Windows 10 [tablets]; they’re reviewing data in the car when they pull in during practice sessions. This makes a difference in how quickly we can gather and analyze data and make decisions.”

Key Findings

Quantified Benefits. The following risk-adjusted quantified benefits are representative of those experienced by the companies interviewed:

- › **IT management cost savings.** IT administrators estimate a 20% improvement in management time, as Windows 10 requires less IT time to install, manage, and support with in-place deployment and more self-service functions. Also, with Windows 10, the organization has reduced the need for some third-party software products.
- › **Convenient application provisioning and testing.** With Windows 10 and System Center Configuration Manager (SCCM), the organization is able to provide employees with self-service tools to find and install an application in just a few minutes (versus several hours previously). Additionally, Windows 10-as-a-service can help significantly reduce application testing needs, as more frequent, more specific operating system updates can help focus application testing needs.
- › **Reduced security remediation costs and reduced security risk.** With new features such as Credential Guard and Device Guard, and existing features now improved or enabled by new software and hardware (such as BitLocker), security events requiring IT remediation are reduced or avoided by 33%.
- › **Improved employee tools and resources that enable more-effective customer interactions.** Windows 10’s increased mobility and improved wake and boot times enable client-service employees to meet more clients. PCs boot up in less than 5 minutes, versus waiting 20 minutes for their PC to boot up and log into key systems.
- › **Improved user productivity.** Mobile employees estimate they can take advantage of 25% of time previously unavailable for work, enabling them to get more done more quickly wherever they may be.



› **Improved or retained sales.** Sales reps using Windows 10 (particularly at technology companies) can use Windows 10 as one way to show their commitment to the latest technologies, delivering presentations to generate new sales (or protect existing ones) to improve operating margin by several basis points.

› **Quicker and easier deployments compared with earlier upgrades.** Several organizations highlighted that deployment of Windows 10 was much easier and faster than past migrations. Deployments of three or four years in the past are expected to take just a year or two now.

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

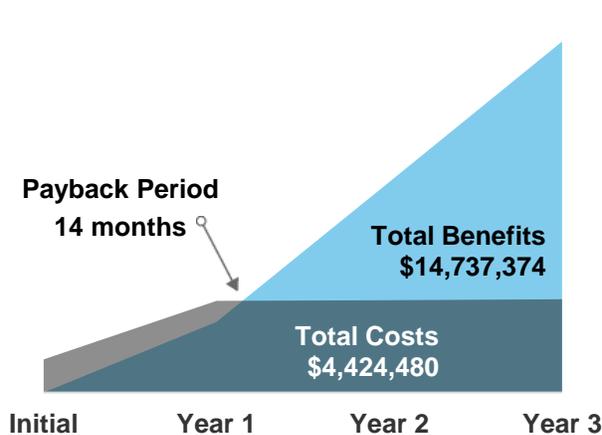
› **Initial planning and implementation costs.** The organization's upfront costs include planning, training, application testing, piloting, and other implementation tasks, as well as some new device purchases costs.

› **Implementation costs for later deployment rollout.** After the initial planning and deployment, more client devices will be updated (or replaced) in later years.

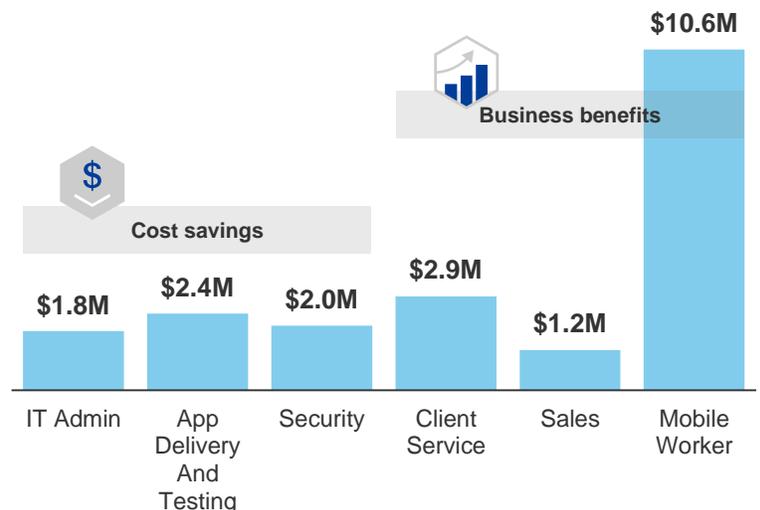
› **Other ongoing costs.** Windows 10 includes some new features and a new structure for more-frequent operating systems updates; even though these result in significant overall IT management time savings, they also add some new management task time.

Forrester's interviews with eight customers have been summarized as a composite organization. The TEI analysis for the composite resulted in an estimated, risk-adjusted three-year analysis present value (PV) of benefits of more than \$14 million versus the PV of costs of \$4.4 million, which adds up to a net present value (NPV) of \$10.3 million (about \$515 per user included in the full deployment), and an ROI of 233%.

Three-Year Risk-Adjusted Financial Summary



Three-Year Risk-Adjusted Benefits



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

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 Windows 10.

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 Windows 10 can have on an organization. Specifically, we:



DUE DILIGENCE

Interviewed Microsoft stakeholders and Forrester analysts to gather data relative to Microsoft Windows 10.



CUSTOMER INTERVIEWS

Interviewed eight organizations using Windows 10 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

Forrester employed four fundamental elements of TEI in modeling Microsoft Windows 10's 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.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Microsoft 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 report to determine the appropriateness of an investment in Microsoft Windows 10.

Microsoft 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.

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

The Windows 10 Customer Journey

BEFORE AND AFTER THE WINDOWS 10 INVESTMENT

Interviewed Organizations

For this study, Forrester conducted eight interviews with Microsoft Windows 10 customers. Interviewed customers include the following:

INDUSTRY	REGION	INTERVIEWEES	KEY BUSINESS GOAL
National government public health department	Asia Pacific	GM of IT services and manager of IT services	Standardize client devices and take advantage of new technologies
Multinational food and beverage conglomerate	Headquartered in the US	Senior manager of end user technology	Streamline IT costs, improve application delivery and mobility
Global IT services firm	Headquartered in Asia	Head of IT	IT cost savings
Professional auto racing team	US	Manager of IT	Gain a competitive advantage through technology
National Telco/ISP	Europe	IT architect	Help employees leverage new technologies
Regional health insurance company	US	Director of infrastructure services and system specialist	Deliver new client platform quickly by empowering employees
Global IT hardware and software vendor	Headquartered in the US	IT director and IT systems engineer	Leverage new deployment benefits to quickly standardize client devices
Multinational automotive manufacturer	Headquartered in Asia	Manager, end user services	Support employees with new technologies

Key Challenges

Based on individual interview responses, decision-makers at the composite organization saw the following issues, drivers, and opportunities leading up to its decision to deploy Windows 10:

- › **Deploy to client devices more quickly than in the past.** Deployment of major OS upgrades has been difficult and time consuming.
- › **Reduce IT management task time and other costs.** IT managers and admins recognize that the latest management and security tools can reduce issues, save time, and reduce other software costs.
- › **Enable business users to deliver greater value.** Employees have identified issues such as clients having to wait, and trying to sell new technology services while presenting using an older operating system.
- › **Improve security.** Older versions of Windows (often along with the hardware running that older OS) do not enable the latest security technologies, such as BitLocker, Secure Boot, and Device Guard.
- › **Improve productivity.** Organizations have identified a number of employee tasks, especially outside the office, that have become difficult and time consuming.

“Even our [racecar] drivers have Windows 10 [tablets]; they’re reviewing data in the car when they pull in during practice sessions. This makes a difference in how quickly we can gather and analyze data and make decisions.”

IT manager, US professional auto racing team



Solution Requirements

The interviewed organizations all wanted to be able to take advantage of the latest version of Windows but needed to ensure that the costs of deployment would not get in the way. They needed to see that:

- › Deployment would be easier to manage than in past experiences.
- › End user training and support could be minimized.

As the interviewed organizations started to deploy Windows 10, they found deployment to be easier than expected, because:

- › In-place and self-service deployment allowed users to deploy Windows 10 on their own with minimal impact to their work and files.
- › Many employees were already experienced using Windows 10 at home, so training and support was much easier than in past deployments.
- › Windows 10-as-a-service has encouraged interviewed organizations to focus on delivering and supporting a single desktop standard across the whole organization, helping reduce IT complexity.

Key Results

The interviews revealed key results from the Windows 10 investment:

- › **IT costs are reduced with Windows 10.** Administration, security management, and client support resource time are reduced. Some Windows 10 features also deliver key capabilities that can save costs for a third-party software solution.
- › **End user productivity is increased.** Employees are able to get more work done with Windows 10. End users can handle simple IT tasks (such as installing software or resetting a password) on their own and are also able to leverage the touch-enabled Windows 10 operating system and the latest devices and form factors to get more work done in mobile settings.
- › **Application testing needs are decreased.** Windows 10 already provides good application compatibility. Windows 10-as-a-service will provide regular, incremental updates (compared with complete operating system migrations), so that application testers can now focus their time testing applications that are impacted by new operating system features (versus testing all applications in past operating system migrations). Applications that are not impacted by new operating system features do not need the same level of testing rigor.
- › **Windows 10 can help drive new business.** Companies that sell technology services, such as the telco and the hardware and software vendor, can help demonstrate their commitment to technology as employees use Windows 10 to work with customers and make presentations. These organizations can unlock new sales opportunities — or at least avoid losing existing ones.
- › **Windows 10 was easier and quicker to deploy compared with earlier operating system upgrades.** Deployment tasks are able to be completed by more end users in a self-service fashion or by unattended automated IT processes. And even attended installations are much quicker, with fewer clicks needed.

“It is extremely attractive knowing that at any given time we can look out across our enterprise and see two versions of an operating system: the one that we’re running now and the one that we will be migrating to. We can have a standard baseline configuration across all our devices.”

IT director, global hardware and software vendor



“With features like Remote Assistance, there are actually less [support] calls coming through.”

GM of IT services for a national public health department



Composite Organization

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

- › It is a US-based organization with a global presence and a large number of mobile workers.
- › It has 20,000 employees and 24,000 Windows client devices (tablets, laptops, and desktops).
- › The previous operating system standard was Windows 7. Some devices, primarily tablets and laptops, had Windows 8.1.
- › Implementation started in 2016; 7,500 clients were deployed in the first year, with completion expected by the end of 2017 as new deployments often reach 1,000 devices per week.

Description of Organization: A multinational corporation based in the US that includes several business divisions that require departments: IT administration and support, security, application development, development and delivery of technology-based solutions, client services, internal sales, and other mobile-user roles such as technical services.



Key assumptions

- 20,000 employees
- \$50 average hourly rate for information workers
- 24,000 Windows devices
- 30 desktop management IT admins
- \$70 average hourly rate for IT and app testing
- 150 minutes to request and have app installed
- 10 hours to resolve an average security issue
- 625 client service employees
- \$40 average hourly client-service rate
- 20-minute average boot-up time
- 2,200 mobile workers
- Operating margin: \$250 million

Financial Analysis

QUANTIFIED BENEFIT AND COST DATA AS APPLIED TO THE COMPOSITE

Total Benefits

REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Atr	Cost savings	\$261,468	\$844,560	\$844,560	\$1,950,588	\$1,570,212
Btr	Application delivery and testing savings	\$618,500	\$618,500	\$618,500	\$1,855,500	\$1,538,118
Ctr	Security improvements	\$221,760	\$709,632	\$709,632	\$1,641,024	\$1,321,230
Dtr	Client service benefits	\$731,250	\$731,250	\$731,250	\$2,193,750	\$1,818,511
Etr	Sales benefits	\$500,000	\$500,000	\$500,000	\$1,500,000	\$1,243,426
Ftr	Mobile worker productivity	\$1,219,920	\$3,889,600	\$3,889,600	\$8,999,120	\$7,245,878
	Total benefits (risk-adjusted)	\$3,552,898	\$7,293,542	\$7,293,542	\$18,139,982	\$14,737,374

IT Management Cost Savings And Productivity

Windows 10 helps IT management teams reduce desktop management time and costs. Windows 10 is a familiar interface, so little or no end user training or extra support is required.

“My end user team reports fewer support calls as the number of Windows 7 machines have reduced and Windows 10 has increased. With Windows 10, there are no calls,” said the head of IT for a global IT services firm. “With features like Remote Assistance, there are actually less calls coming through,” added the GM of IT services for a national public health department.

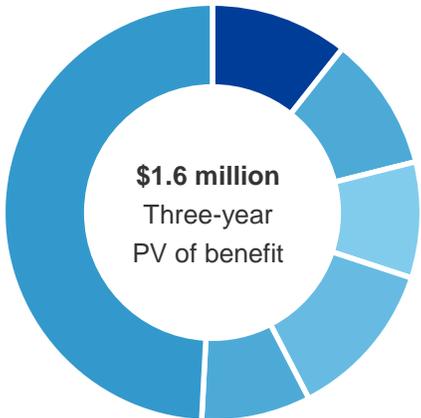
Windows 10 also helps reduce IT management time, with new and improved features such as improved security and increased integration with System Center Configuration Manager and Microsoft Intune, as well as other desktop and mobile management solutions. These mobile device management (MDM) capabilities are now built into Windows 10 for PCs and tablets, not just phones, and *Organization* can manage all types of Windows devices the same way.

Additionally, Windows 10 includes new and enhanced features that can take the place of applications that were purchased from a third-party vendor in the past. “We are using Windows Defender now,” said the senior IT manager for a food and beverage conglomerate. Drive encryption and antivirus utilities were both identified by several interviewed organizations, along with other applications.

Organization has a team of device managers that can take advantage of these benefits:

- › Thirty people who spend about half their time on desktop client management tasks (for the first year, with only about one-third of devices migrated to Windows 10, and only nine from this team are affected).

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 more than \$14.7 million.



- › Compared with previous Windows versions, *Organization* estimates it has reduced desktop management resource time by 20% for devices that have been upgraded to Windows 10.
- › By the second and third year, the savings equates to multiple full-time equivalents (FTEs), allowing members of the desktop management team to take on other important tasks in the IT department.
- › The annual license cost for third-party applications that can be replaced by Windows 10 is estimated to add up to about \$30 per migrated client device.

A risk-adjustment factor has been applied:

- › IT productivity savings are adjusted to reflect potentially overestimated time savings.
- › Third-party license cost savings are also adjusted in case of overestimation.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted present value of \$1,570,212.

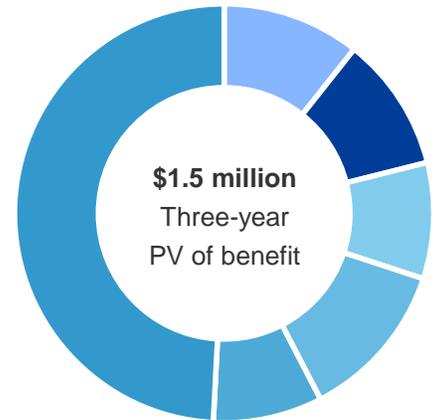
Impact risk is the risk that the business or technology needs of the organization may not be met by the investment in Windows 10, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for benefit estimates.

IT Management Cost Savings And Productivity — Calculation Table

REF.	METRIC	CALC	YEAR 1	YEAR 2	YEAR 3
A1	Number of employees		20,000		
A2	Windows 10 deployment as a percentage of employees		31%	100%	100%
A3	Employees with Windows 10 devices	A1 * A2	6,250	20,000	20,000
A4	Windows 10 devices deployed	A3 * 1.2	7,500	24,000	24,000
A5	Number of IT employees		350	350	350
A6	Number of IT employees managing client devices		30	30	30
A7	Number of IT employees managing Windows 10 devices	A5 * A1	9	30	30
A8	Hours per week before (per employee)		20		
A9	Improvement with Windows 10		20%		
A10	Hours per week saved with Windows 10 (per IT client management employee)	A7 * A8	4		
A11	Average IT hourly rate		\$70		
A12	Amount of time saved used for work tasks		50%		
At	Third-party license cost savings (annual, per device)		\$30	\$30	\$30
At	Cost savings	A7 * A10 * A11 * A12*52 + (A4*At)	\$290,520	\$938,400	\$938,400
	Risk adjustment	↓10%			
Atr	Cost savings (risk-adjusted)		\$261,468	\$844,560	\$844,560

Application Delivery And Testing Time Savings

Windows 10 can integrate with tools and services such as System Center Configuration Manager, Microsoft Intune, the Windows App Store, and the new Windows Store for Business. In conjunction with Windows Update for Business that helps ensure corporate standards include the latest patches and updates, end users can search and install many applications when they need them. “It’s all about the application,” said the senior manager of end user technology for a global food and beverage conglomerate. With Windows 10, users can access the right applications from their Windows App Store or other catalogs, and with Active Directory and SCCM integration ensure they are installing the right versions of the right applications based on their role, team, and department.



Application Delivery And Testing Time Savings

REF.	METRIC	CALC	YEAR 1	YEAR 2	YEAR 3
B1	Employees with Windows 10	A3	6,250	20,000	20,000
B2	App requests per employee per year		2	1	1
B3	App request time before Windows 10 (min)		150		
B4	App request time with Windows 10 (min)		15		
B5	Average information worker hourly rate		\$50		
B6	Amount of time saved used for work tasks		50%		
B7	Total employee application time savings	$B1 * B2 * (B3 - B4) / 60 * B5 * B6$	\$703,125	\$703,125	\$703,125
B8	Number of apps in portfolio		200		
B9	App testing time per application per year (average in hours)		40		
B10	Average app testing hourly rate	B5	\$70		
B11	Percentage of apps that can shorten testing with Windows 10-as-a-service		50%		
B12	Percentage of time saved with shortened testing		75%		
B13	App testing time savings	$B8 * B9 * B10 * B11 * (1 - B12)$	\$70,000	\$70,000	\$70,000
Bt	Application delivery and testing savings	B7 + B13	\$773,125	\$773,125	\$773,125
	Risk adjustment	↓20%			
Btr	Application delivery and testing savings (risk-adjusted)		\$618,500	\$618,500	\$618,500

With self-service tools, *Organization* estimates it saves significant employee time. End users do not need to wait for IT to respond to their request, and issues such as downloading the wrong version are greatly reduced. *Organization* estimates that:

- › Applications from the corporate catalog are downloaded and installed about one to two times per year per employee, on average.

- › Before Windows 10, the application request time impact on end users was estimated to be 150 minutes, based on the time impact of waiting for IT help and running through a potentially less automated install process
- › With Windows 10, the application request time impact on end users is now estimated to be just 15 minutes with self-service features.

Additionally, the standard application testing time required for every major operating system release can be significantly reduced. With Windows 10-as-a-service, operating systems releases will no longer be the major, every two or three year undertakings that come with new and updated features in virtually every area. Instead, operating system updates will come incrementally, around twice a year, and will include focused feature updates and additions. So applications that don't interact with a new or updated feature likely don't need significant testing. The IT systems engineer at a global technology company said, "We're starting to change our approach; instead of telling our application team, 'Here is the list of things to test,' they can focus just on their applications that interact with a new or updated operating system module. Otherwise you're probably good to go."

Since this benefit applies to a broad group of both end users and application testers with a variety of skills and needs, a higher risk-adjustment factor has been applied, as the application needs and benefits may be overestimated.

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted present value of \$1,538,118.

Reduced Security Issues And Remediation Costs

Windows 10 includes a number of new and improved security features, such as BitLocker, Windows Defender, Windows Hello, Credential Guard, and leveraging virtualization to manage and improve security and encryption even more. *Organization* has seen that the Windows 10 deployment, along with improved security policies and education, has led to a reduction in security issues requiring remediation (these are typically issues like malware or spyware but are occasionally more significant, such as a lost laptop or missing USB drive).

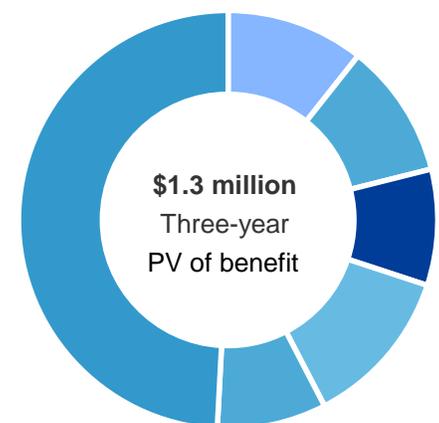
"Windows 10 security enhancements — secure credentials, UEFI capability, and others — help enable or at least enhance how we protect confidential data," said the senior IT manager for a food and beverage conglomerate. The IT manager for a US professional auto racing team added, "Right out of the box, some of the features, like Credential Guard, the virtualization-based security, help Windows 10 to be probably the most secure out-of-the-box Windows platform."

The IT manager for the professional auto racing team continued by detailing how good security is an expected and desirable benefit (and not just an onerous process): "When I started here, I swear it was probably six months to a year [until] I walked to the engine shop [and] people were not closing books and putting rags over parts and pieces. Well, they didn't know me, and they wanted to make sure that I was going to be here. These guys work very hard for the competitive edge they are trying to obtain for the team. They don't want that information walking out the door."



Application request time from 150 to 15 minutes.

75% reduction in OS-related application testing time expected with Windows 10-as-a-service.



Reduced Security Issues And Remediation Cost Savings

REF.	METRIC	CALC	YEAR 1	YEAR 2	YEAR 3
C1	Number of Windows 10 clients	A4	7,500	24,000	24,000
C2	Number of security issues related to Windows client devices per month, before Windows 10	C1 / 75	100	320	320
C3	Time to resolve each issue in hours, before Windows 10		10	10	10
C4	Total hours managing security issues, per month, before Windows 10	C2 * C3	1,000	3,200	3,200
C5	Reduction in issues and resolution time with Windows 10		33%	33%	33%
C6	Average IT hourly rate		\$70	\$70	\$70
Ct	Security improvements	C4 * C5 * C6	\$277,200	\$887,040	\$887,040
	Risk adjustment	↓20%			
Ctr	Security improvements (risk-adjusted)		\$221,760	\$709,632	\$709,632

Organization's estimates:

- › Before Windows 10, there was an average of 320 security issues per month related to client devices (Year 1 reflects the subset of issues as a percentage of deployed Windows 10 devices).
- › Security issues take an average of 10 hours to resolve.
- › With Windows 10, *Organization* estimates a 33% reduction in issues and/or resolution time.

Like application delivery, a higher risk-adjustment factor has been applied to adjust for:

- › The likely high variance in end user skill in avoiding insecure situations.
- › Overestimation in the amount of time required to resolve each issue.

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted present value of \$1,321,230.

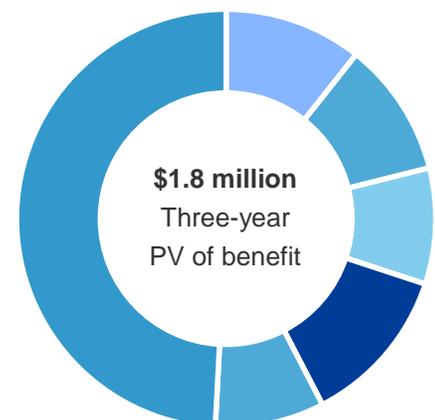


33% reduction in security issues with Windows 10.

Client Management Process Improvements

Organization identified one specific process that Windows 10 immediately affected. Employees working directly with customers in call centers or in offices for in-person meetings would have to delay their first meeting by 10 or 15 minutes or more while their desktop booted up and they logged in to necessary resources. "Service agents have 15 minutes or more in the morning, to just boot up their systems and to log on so they're ready to either take calls or to service customers. We have reduced that down to less than 2 minutes [with Windows 10]," said the GM of IT services for a national public health department.

While new hardware and single sign-on services also helped improve client management processes, Windows 10 was a key enabler of faster times from bootup to being ready for customer meetings and calls. *Organization* estimates a 75% improvement, reducing the amount of time these hourly workers spend coming in early and staying later.



A higher risk-adjustment factor has been applied to adjust for potential:

- › Overestimation in old boot times.
- › Overestimation of improved boot times with Windows 10.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted present value of \$1,818,511.

Client Management Process Improvements					
REF.	METRIC	CALC	YEAR 1	YEAR 2	YEAR 3
D1	Client service employees	A3 * 10%	625	625	625
D2	Minutes waiting for bootup, restart, shutdown each day, before Windows 10		20		
D3	Minutes waiting for bootup, restart, shutdown each day, since Windows 10		5	5	5
D4	Average client service hourly rate		\$40		
D5	Amount of time saved used for work tasks		50%		
Dt	Client service benefits	$D1 * (D2 - D3) / 60 * D4 * 260 * D5$	\$812,500	\$812,500	\$812,500
	Risk adjustment	↓10%			
Dtr	Client service benefits (risk-adjusted)		\$731,250	\$731,250	\$731,250

New Or Retained Sales Opportunities

Organization identified some news sales benefits based on gaining new opportunities and also not losing others. As a company that, in part, sells technology solutions, showing up for a sales call with an old laptop running an earlier operating system version can put sales at risk. Potential customers will not see a commitment to technology and may take their business elsewhere. Also, sales reps can leverage Windows 10 and the latest devices as part of their sales pitch — the new OS is apparent to all, and the latest tablet or hybrid device can also raise interest and excitement from potential customers.

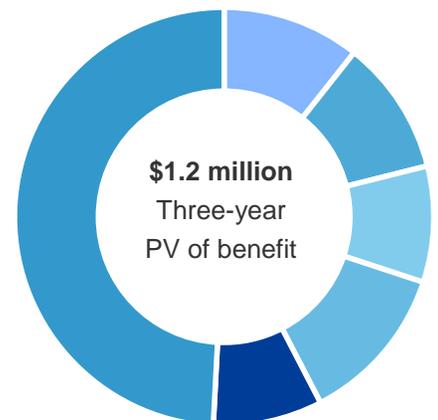
The IT architect for a European telecom and ISP highlighted the potential risk to their business and how Windows 10 can provide some strategic value, saying, “If a salesperson goes to a customer with his Windows 7 device and says, ‘We will give you a Windows 10 environment,’ it’s probably not the best thing to show. Instead, we want to be a showcase to our potential customers.”

Organization has a team of sales reps working directly with potential and current customers that can take advantage of these benefits, and estimates:

- › A \$250 million operating margin.
- › This margin can be improved (or retain what might have been lost) by 25 basis points (or 0.25%).

A risk-adjustment factor has been applied:

- › The amount of operating margin varies from year to year, so may be overestimated.



- › Sales are made or lost based on a variety of direct and environmental impacts, so the impact of Windows 10 on sales may be overestimated.

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted present value of \$1,243,426.

New Or Retained Sales Opportunities

REF.	METRIC	CALC	YEAR 1	YEAR 2	YEAR 3
E1	Operating margin (in millions)		\$250	\$250	\$250
E2	Percentage of margin improved (or protected) with reps using Windows 10		0.25%	0.25%	0.25%
Et	Sales benefits	E1 * E2	\$625,000	\$625,000	\$625,000
	Risk adjustment	↓20%			
Etr	Sales benefits (risk-adjusted)		\$500,000	\$500,000	\$500,000

Mobile Worker Productivity

In addition to improvements in the specific business process outlined in the last section, *Organization* has experienced an overall improvement in employee productivity. Windows 10 leverages the latest mobile form factor features — touchscreen, pen, and other user features — with the latest security integration tools, including BitLocker, VPN, enterprise mobile management, and others. That allows mobile employees to find more ways and more times to use their devices and meet the necessary security requirements to be able to access corporate resources.

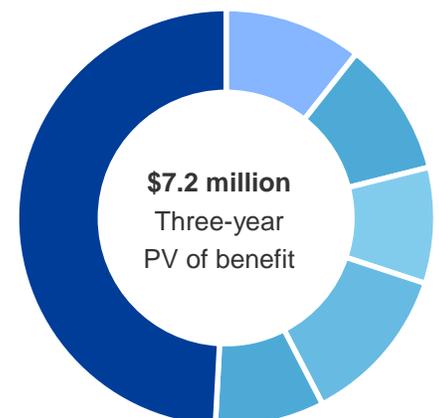
Organization estimates that:

- › 11% of its employees are heavy mobile users.
- › These users spend 17% of their time in situations where they need to get work done or access a resource but are not able to.
- › Situations include a variety of cases, such as: trying to get something done, like participate in a call, review a document, or do another task, that would be delayed until they were back at a better location, such as the office; or extra time spent remediating an issue or delay, such as providing a quote for a product that is no longer in stock.

One interviewed organization, the global IT services firm, highlighted another key employee benefit: Their professionals work on a project at a client site, and then once that project is complete, they move to a new project and a new client site. The head of IT for a global IT services firm summarized his team's tasks: "The team spends a good amount of time and effort deleting the data which was created by an employee in the first project. And then when he moves on to the next project, we have to recreate another environment for him from scratch, which also means deploying and configuring different sets of software on his machine." With Windows 10, *Organization* is ready to fully leverage virtualization for these employees, to help speed up their ramp up and close project tasks. Before, they would have to wipe the hard drive and reinstall a new OS, install the correct applications, connect to the proper domain, and complete other initiation tasks. It can also quickly re-provision devices that are clean, secure, encrypted, and ensure data separation, to match client requirements without affecting device performance. Employees who work onsite at a client location can connect to their network securely



20% productivity improvement for mobile workers with Windows 10.



and get to work. The global IT services firm estimates this task alone took three days to complete (meaning the IT employee was not working on a project for that time), and now it takes just a few hours, mainly to enact and confirm data destruction policies to clients' satisfaction.

Mobile Worker Productivity					
REF.	METRIC	CALC	YEAR 1	YEAR 2	YEAR 3
F1	Windows 10 users	A3	6,250	20,000	20,000
F2	Percent of Windows 10 users that are significantly mobile ("road warriors," etc.)		11%	11%	11%
F3	Mobile Windows 10 users	F1 * F2	690	2,200	2,200
F4	Percent of mobile user time spent on device-intensive tasks that could be impacted by Windows 10		17%	17%	17%
F5	Improvement in productivity with Windows 10		25%	25%	25%
F6	Average IW employee salary per hour		\$50	\$50	\$50
F7	Percent of time recovered for work-related tasks		50%	50%	50%
Ft	Mobile worker productivity	F3 * F4 * F5 * F6 * F7* 2080	\$1,524,900	\$4,862,000	\$4,862,000
	Risk adjustment	↓20%			
Ftr	Mobile worker productivity (risk-adjusted)		\$1,219,920	\$3,889,600	\$3,889,600

Overall, with Windows 10, *Organization* estimates:

- › Improved mobile worker productivity of 25%.
- › 50% of recovered time is specifically used for new work-related tasks (the other half is also important but not specific to productivity benefits, such as socializing with co-workers, talking a walk, and taking a break).

"Mobile worker" is a broad category covering many roles, including roles that do not have an impact on sales and revenue as much as a direct sales representative might. Thus, a risk-adjustment factor of 20% has been applied to reflect the possibility that the benefit for these users is overestimated.

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted present value of \$7,245,878.

Deployment Impact

Windows OS deployment was not a savings that affected ROI, but the investment cost of planning for and deploying Windows 10 was much lower than expected and compared with previous OS deployments. "It was a much easier migration to Windows 10 as compared to Windows 7 and 8," said the head of IT for a global IT services firm. The system specialist for a health insurance organization highlighted similar benefits, saying, "Windows 10 deployment was night and day compared to our previous experience."

Most importantly, *Organization* estimates that its previous deployment took four years, while Windows 10 will take less than two. This

"Windows 10 deployment was night and day compared to our previous experience."

System specialist for a health insurance organization



significantly reduces IT costs and accelerates the impact of benefits; both are reflected in the benefit calculations above. The GM of IT services for a national public health department summarized how quickly it was able to deploy Windows 10 (which it started in early November 2015): “By the end of November, we already had over a thousand employees that had upgraded with the self-serve option. In December, we moved well past 25% of all employees once we started overnight, unattended upgrades. It gives you an idea of how quickly we can deploy.”

Organization can also save installation time for new hardware purchases — with its volume licensing program that includes Software Assurance, it has standardized on Windows 10 Enterprise edition. *Organization*, with the correct authorization and license keys, can “flip the bit” to enable Enterprise edition on new desktops, laptops, and tablets without reimaging the devices received from hardware vendors (OEMs).

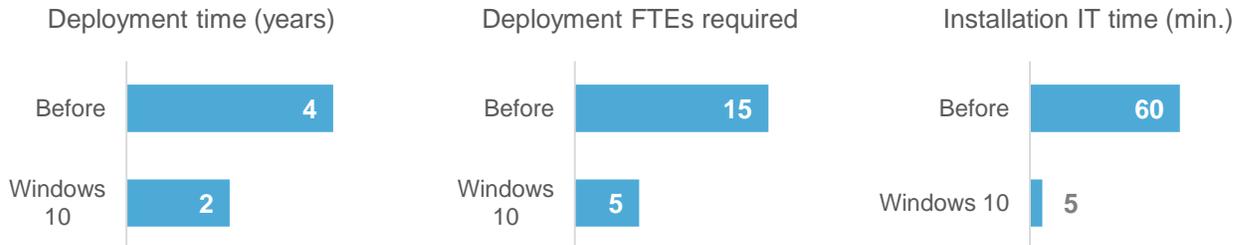
It also estimates that IT effort required for OS deployment has reduced from nearly an hour to just 5 minutes, on average, per client device, due to increased self-service installation, unattended installation, and integration with System Center Configuration Manager, enabling the IT team to automate deployment by “waking” client devices overnight and initiating installation. “For the Windows 7 program over the course of years, we would have had hundreds of people at any one time engaged against it,” said the GM of IT services for the public health department, “[With Windows 10], the upgrade has been very seamless, and we achieved this with the core team of five people.”



Before Windows 10:
three- or four-year
deployments

Windows 10: one- to
two-year deployment
with 1,000 or more
devices migrated each
week.

Improvements In Windows 10 Deployment Compared With Past OS Deployments



Other services integrated with Windows 10 also provide deployment improvements. The IT director at a global technology company said, “We used OneDrive to facilitate mobile user refreshes. It worked as kind of a self-service data migration, and we’ve been receiving very positive feedback.”

Deployment is planned for two years or less (as reflected in the cost section below, with deployment only during the Initial and Year 1 periods), though past deployments were longer not just because the effort was greater but also because *Organization* deployed both software and hardware updates at the same time. FTE resources are also much less — an estimated 10 fewer FTEs at *Organization* were required to deploy Windows 10. The time required to manage a Windows 10 installation (per device) is much lower, with improved processes, increased SCCM integration, Enterprise edition enablement by the OEM, and more self-service user installation. While not included in the time frame of this model, *Organization* can expect to avoid significant time and cost requirements in Year 4 or Year 5 — they won’t need to plan and assign resources for a major operating system update and rollout.

Flexibility

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for some future additional investment. This provides an organization with the “right” or the ability to engage in future initiatives but not the obligation to do so. There are multiple scenarios in which a customer might choose to implement Windows 10 and later realize additional uses and business opportunities. Flexibility would also be quantified when evaluated as part of a specific project. *Organization* plans to see more value from Windows 10 in the future, as it more broadly adopts additional features:

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.

- › **Device Guard.** *Organization* can lock down untrusted applications to avoid IT and security issues to gain additional productivity benefits in this area. This is particularly useful for specific groups of employees, such as those who share devices, or for consultants working at client sites where specific and reliable security policies must be maintained.
- › **Credential Guard.** *Organization* expects to gain greater benefits by further reducing security issues and remediation time with Credential Guard to help limit the severity of many security breaches. The IT manager for a US professional auto racing team said, “Right out of the box some of the features, like Credential Guard . . . help Windows 10 to be probably the most secure out-of-the-box Windows platform.”
- › **Cortana.** It hopes to integrate voice commands with Cortana in the future. Mobile workers, drivers, machine operators, and others who have their hands full could greatly benefit from a voice interface to access navigation or communication functions while driving or working, for example. A voice interface could also help them with other line-of-business tasks that become more important in the future. The GM of IT at a public health department for a national government highlighted a more obvious need that could immediately help: “We’re very interested in the use of Cortana. We are looking to see if that can provide a more natural interface for constituents with disabilities who may not necessarily have the dexterity to be able to interact with a keyboard.”
- › **New Windows 10 features.** A benefit of leveraging Windows 10-as-a-service is the delivery of new features and functions within Windows 10, which *Organization* hopes will provide greater value across benefits covered in this study as well as areas to be identified.
- › **Integration with Microsoft Azure, Microsoft Intune, Windows Upgrade Analytics, and other services.** As *Organization* makes improvements in other areas of its information technology investments, and as Windows 10 improves through service updates, greater opportunities to reduce or avoid IT costs for IT management and future deployments, and provide greater user benefits, will arise.
- › **Windows 10-as-a-service.** *Organization* looks forward to Microsoft’s vision of Windows 10-as-a-service, to help ensure standard updates and patches are applied and to continually provide consistent desktop client devices with the latest technologies. The GM of IT at the public health department highlighted his anticipation for future Windows deployment-as-a-service: “One of the other things that made it cleaner is that we embraced the concept of where Microsoft was going with Windows 10-as-a-service. So we didn’t attempt to customize the OS massively, but instead keep ourselves able to be flexible and agile with what would be coming down the pipe as Microsoft explores their new position as an Agile delivery organization.”

Total Costs

REF.	COST	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Gtr	Initial planning and implementation costs	(\$1,646,190)	\$0	\$0	\$0	(\$1,646,190)	(\$1,646,190)
Htr	Future implementation costs	\$0	(\$2,912,963)	\$0	\$0	(\$2,912,963)	(\$2,648,148)
ltr	Ongoing costs	\$0	(\$52,332)	(\$52,332)	(\$52,332)	(\$156,996)	(\$130,142)
	Total costs	(\$1,646,190)	(\$2,965,295)	(\$52,332)	(\$52,332)	(\$4,716,149)	(\$4,424,480)

Initial Planning And Implementation Costs

In the months leading up to the start of Windows 10 deployment, *Organization* spent time planning the full deployment process, getting trained on new features and tools, testing applications, assessing current hardware needs, and purchasing new hardware where necessary.

Note that hardware costs are included only for devices that need to be replaced (e.g., too old to recommend using with Windows 10), *and* were not already budgeted as part of its regular hardware refresh cycle.

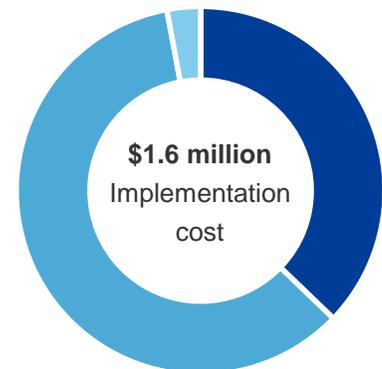
Organization estimates:

- › About one in every eight devices needs to be replaced outside of normal hardware refresh plans.
- › Those devices cost an average of \$1,300 each.

Also note that Windows 10 software license costs are not included here. *Organization* (and all interviewed organizations) licenses software from Microsoft on a volume licensing plan with Software Assurance, which provides access to new versions.

As highlighted above, Windows 10 deployment was much easier than past operating system upgrades. *Organization* estimates that much less IT time — just 5 minutes — was required to initiate the upgrade for each device.

Total of all costs across the cost areas listed above, 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 more than \$6.4 million.



Initial Planning And Implementation Costs

REF.	METRIC	CALC	INITIAL	YEAR 1	YEAR 2	YEAR 3
G1	Windows 10 upgrades deployed to devices	A4	7,500			
G2	New desktops, laptops, or Windows tablets purchased	G1 / 8	940			
G3	Average cost per new device		\$1,300			
G4	Planning and implementation FTE		5			
G5	Planning and implementation hours (total)	G4 * 40 * 26	4,940			
G6	Planning and implementation FTE hourly rate		\$70			
Gt	Initial planning and implementation costs	G2 * G3 + G5 * G6	\$1,567,800	\$0	\$0	\$0
	Risk adjustment	↑ 5%				
Gtr	Initial planning and implementation costs (risk-adjusted)		\$1,646,190	\$0	\$0	\$0

The whole installation process took longer but was more automated, so the IT or end user employee did not need to sit and wait after starting the process. Many more employees also initiated installation on their own, compared with past OS upgrades. Deployment was conducted during evening and night hours (using Wake on LAN and System Center Configuration Manager, as well as in-person IT resources working late a few evenings), which meant only minimal end user work time was affected.

The new hardware purchases and time requirements are risk-adjusted to allow for possible underestimation of time or costs.

To account for these risks, Forrester adjusted this cost upward by 5%, yielding a total of \$1,646,190.

Implementation risk is the risk that a proposed Investment in Windows 10 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.

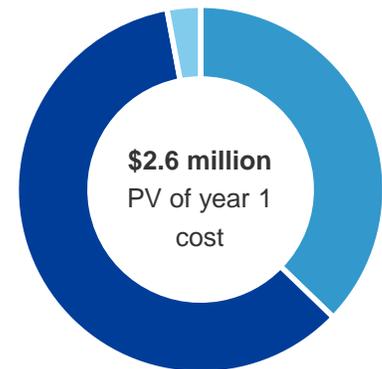
Costs For Continued Deployment

In Year 1, *Organization* deployed the remainder of Windows 10 to users and also purchased some additional out-of-refresh-cycle desktops, laptops, and tablet devices.

Organization estimates:

- › About one in every eight devices needs to be replaced outside of normal hardware refresh plans.
- › Those devices cost an average of \$1,300 each.
- › Windows 10 will take IT about 5 minutes to deploy each device.
- › These deployment costs only occur in Year 1.

The new hardware purchases and time requirements are risk-adjusted to allow for possible underestimation of time or costs. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a risk-adjusted present value of \$2,648,148.



Initial Planning And Implementation Costs

REF.	METRIC	CALC	INITIAL	YEAR 1	YEAR 2	YEAR 3
H1	Windows 10 upgrades deployed to devices	A4	A4	16,500		
H2	New desktops, laptops, or Windows tablets purchased	G1 / 8	H1 / 8	2,060		
H3	Average cost per new device			\$1,300		
H4	Implementation time per device (min)			5		
H5	Total implementation time (hours)	G4 * 40 * 26	H1 * H4 / 60	1,375		
H6	Implementation FTE hourly rate			\$70		
Ht	Future implementation costs	G2 * G3 + G5 * G6	H2*H3+H5*H6	\$2,774,250	\$0	\$0
	Risk adjustment	↑ 5%	↑5%			
Htr	Future implementation costs (risk-adjusted)			\$2,912,963	\$0	\$0

Management Costs For New Windows 10 Tasks

Most ongoing costs related to Windows 10, such as licensing or management and support, beyond planning and implementation, are not

included in this model for several reasons:

- › Desktop management FTEs were part of the IT department before, and continue to be part of the department.
- › No new hires were required specifically because of deploying Windows 10 (and not beyond already planned promotions, attrition, and growth).
- › Windows 10 licenses are already included as part of *Organization's* EA agreement.

The primary management cost associated with Windows 10 that does need to be included is managing Windows-s-a-service updates. While overall IT management (and other costs) are lower, there will be some more time now spent on planning and implementing smaller updates to Windows every six months or so, rather than previously spending considerable time (years, even) on deploying a new major operating system update every four years or so.

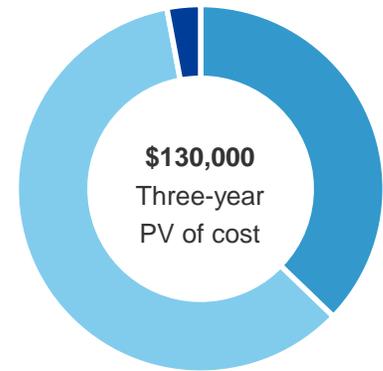
Some new tasks were identified since deploying Windows 10 (such as implementing and managing a new feature in Windows 10); while these are not terribly significant (and much smaller than the IT management time savings covered in the benefit section), they are included in the analysis.

Organization estimates:

- › An operating system update every six months.
- › 1 month of planning and testing (including application testing).
- › 1 extra week for implementation.
- › 1 FTE delivering this work (i.e., two people working half time, etc.).
- › 3 hours per week in new tasks associated with managing Windows 10.

This cost is risk adjusted to allow for possible underestimation of tasks.

To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year risk-adjusted present value of \$130,142.



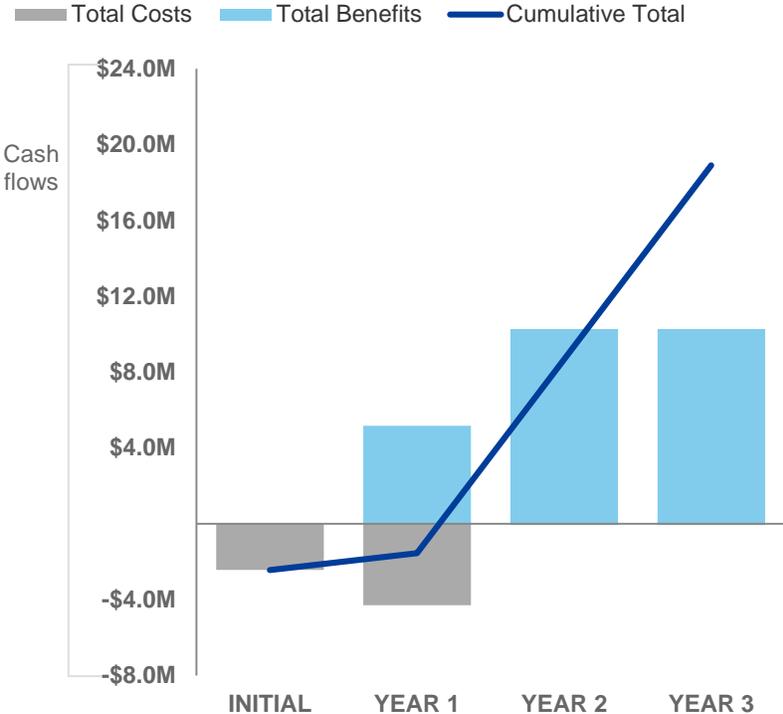
Initial Planning And Implementation Costs

REF.	METRIC	CALC	INITIAL	YEAR 1	YEAR 2	YEAR 3
I1	Operating system updates per year			2		
I2	Hours required to plan for implementation and test each update			160		
I3	Additional hours required for operating system update rollout			40		
I4	Hours per week required for other new Windows 10 tasks			3		
I5	Desktop management FTE hourly rate			\$70		
It	Ongoing costs	$I1 * (I2 + I3 + I4 * 52) * I5$	\$0	\$49,840	\$49,840	\$49,840
	Risk adjustment	↑5%				
Itr	Ongoing costs (risk-adjusted)		\$0	\$52,332	\$52,332	\$52,332

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 *Organization's* investment in Windows 10. 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	(\$1,646,190)	(\$2,965,295)	(\$52,332)	(\$52,332)	(\$4,716,149)	(\$4,424,480)
Total benefits	\$0	\$3,552,898	\$7,293,542	\$7,293,542	\$18,139,982	\$14,737,374
Net benefits	(\$1,646,190)	\$587,604	\$7,241,210	\$7,241,210	\$13,423,834	\$10,312,894
ROI						233%
Payback period						14 months

Microsoft Windows 10: Overview

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

Windows 10

Windows 10 was designed to help organizations lower TCO by helping IT departments reduce the amount being invested in maintaining the status quo with old infrastructure and processes, so there is more to invest in digital transformation. It was also designed to meet and exceed people's productivity requirements as well as deliver on their expectations for more personal computing on the devices they already use, while enhancing the experiences on the new and innovative devices that support touch, ink, and biometrics.

There are four main areas, which are described below, to deliver these promises to organizations and users:



The Most Trusted Platform

Windows has strong defenses to help keep your devices and network secure. It starts with replacing passwords and protecting corporate identities. Using *Windows Hello* and *Microsoft Passport* are the most personal and secure ways to access Windows devices and services today. They provide enterprise-grade security with fingerprint, facial, and iris recognition.

In addition to authentication, Microsoft continues to harden the OS to protect corporate identities such as certificates, tokens, and tickets. In the case of a user's derived credentials (e.g., NTLM hashes), which are those that are issued after authentication and used for single sign-on, these are now protected using hardware-based virtualization to isolate them from attacks, heading off an entire category of attacks that enable lateral movement from the one endpoint to others.

This means that if someone falls victim to an attack, Windows 10 has technologies, such as *Credential Guard*, to help contain the breach and prevent the attacker from moving beyond that device. In the past, attackers could spread across your network from one device using a technique known as "pass the hash." With Windows 10, these attacks (in their current form) no longer work.

Device Guard ensures that only software your IT department has signed is trusted and can run. Even if someone accidentally downloads dangerous software, your devices can be protected against it.

More Productive

Windows 10 delivers productivity to both IT organizations and company employees.

For IT, as the management landscape changes, Windows 10 helps you to become more cloud enabled — on your terms. Windows 10 has support for *MDM* to help simplify management, as well as *Azure Active Directory (AAD) Join* to enable you to use the latest in cloud-connected security. It also supports the *Windows Store for Business*, so you can create a curated store experience for your employees to quickly get the apps they need in a self-service manner.

Most organizations today buy a new computer and then send it off to IT to “flatten” it and reload a new image. The process of creating and maintaining those images is expensive. With *dynamic provisioning* in Windows, when the user logs in for the first time with their Azure AD credentials to a brand-new machine, straight out of the box, you can automatically enroll that device in MDM management, push down any policies IT wants to set, change the editions of Windows from Pro to Enterprise, and push down corporate apps. All of this can happen without IT involvement for the user and without deleting any of the drivers or critical machine setup parameters.

For employees with Windows 10, people can create a document on their PC at work, make some edits on the train home, and make a quick update while on the go with their phone. Windows 10 integration with Office 365 and OneDrive for Business makes this seamless.

More Personal

Working with Windows 10 feels familiar, whether the situation calls for using a mouse and keyboard, touch, pen and ink, or voice. People are instantly productive without the need for training.

In Windows 10, a two-in-one device (such as a Surface Pro or Surface Book) adapts so people get a great mouse and keyboard experience when typing. They can then shift into a touch-optimized “tablet mode” when the keyboard is removed, which is a feature called *Continuum*.

On many Windows Phones, you can connect a mouse and keyboard as well as a large monitor. In this mode, you see what you would expect on a desktop, get the start menu, and use productivity apps as you would expect. Then when you are done, you disconnect and walk away with your phone. It’s like having your PC in your pocket when you need it.

The Most Versatile Devices

Windows 10 is designed to work great on your existing devices. It works with what you have and brings the latest features to your existing hardware. You don’t have to wait until your next hardware refresh to start to take advantage of the value of Windows 10.

When you are ready for that hardware refresh, Windows 10 is also ready to light up today’s devices. In many cases, getting the most from the latest devices requires strong connections between the operating system and the hardware. The two must work in concert to deliver a seamless and powerful experience.

For more information, (and the most recent version of this study) visit <http://www.windows.com/business>.

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.



solution.

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



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 This study is the second in a series, updating and replacing “The TEI Of Windows 10” from June 2016. We added four new interviews to the composite model and updated and added new benefit descriptions.