

A Forrester Total Economic Impact™
Study Commissioned By Apple
October 2019

The Total Economic Impact™ Of Mac In Enterprise

Cost Savings And Business Benefits
Enabled By An Employee Choice Program

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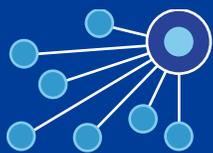
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Key Benefits



Reduced hardware, software, support, and operational costs:

\$678.56 per device



Improved employee performance and engagement:

20% improved retention

5% increased sales

48 hours of improved productivity

Executive Summary

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

Mac provides another option for end user machines, compared to a standard enterprise PC deployment. To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed seven customers with experience deploying Mac in their enterprise.

Prior to using Mac, the interviewed organizations were largely PC-based. However, organizations reported that their focus on enterprise PC deployment introduced some challenges: 1) the PC imaging process was manual and time-consuming for IT full-time equivalents (FTEs); 2) employees were using their own Mac in an unsupported state; and 3) organizations were seeing an increase in the number of Mac devices in their environment, due to acquisitions. Organizations were hoping to improve security reliability/performance of their hardware.

The interviewed organizations decided to implement an employee choice program and enterprise Mac deployment due to: Mac being easier to manage; a desire to improve the employee experience; and Mac being a more secure platform. This resulted in significant benefits, as detailed in this case study. With Mac, organizations reduced IT support costs, improved employee productivity and engagement, and improved overall security.

Forrester developed a composite organization based on data gathered from the customer interviews to reflect the total economic impact that Mac could have on an organization (see Composite Organization for more information). All values are reported in risk-adjusted, three-year present value (PV) unless otherwise indicated.

Key Financial Findings

Quantified benefits. The following benefits reflect the three-year financial analysis associated with the composite organization.

- › **On a per-device basis, Mac costs \$628.31 less than comparable PCs when considering three-year support and operational costs.** For the composite organization, this results in reduced IT support costs totaling \$11.6 million. Less time is needed to provision Mac, fewer service tickets are opened, and the tickets that are opened are easier to resolve. Overall, a higher number of Mac devices can be managed per IT FTE. Additionally, they require less energy to operate.
- › **On a per-device basis, Mac costs \$50.25 less than comparable PCs when considering three-year hardware and software costs, despite the upfront acquisition cost for Mac being \$500 higher.** This results in reduced and avoided costs totaling \$36.5 million. While on average the Mac costs more upfront, this is partially offset by the cost of a comparable PC that the employee would otherwise need to order, and differences in residual value for the devices. Additionally, there is no need to purchase an OS license or software maintenance contract for Mac, and the underlying architecture and included security features obviate the need for some additional endpoint security licenses.



ROI
255%



Benefits PV
\$117 million



NPV
\$84 million



Payback
< 6 months

“You have to separate causation from correlation, but there’s no doubt an employee choice program is beneficial for our organization.

Employees who choose Mac are more innovative, in sales they close larger deals, and they’re much less likely to voluntarily quit. And, they respond with higher overall IT satisfaction on employee surveys.”

CIO, technology industry

“It’s much, much easier to manage our Macs. The marriage of the hardware and software is difficult to beat. Every time we buy a new PC, it’s a whole new set of drivers, software, and imaging that we have to deal with.”

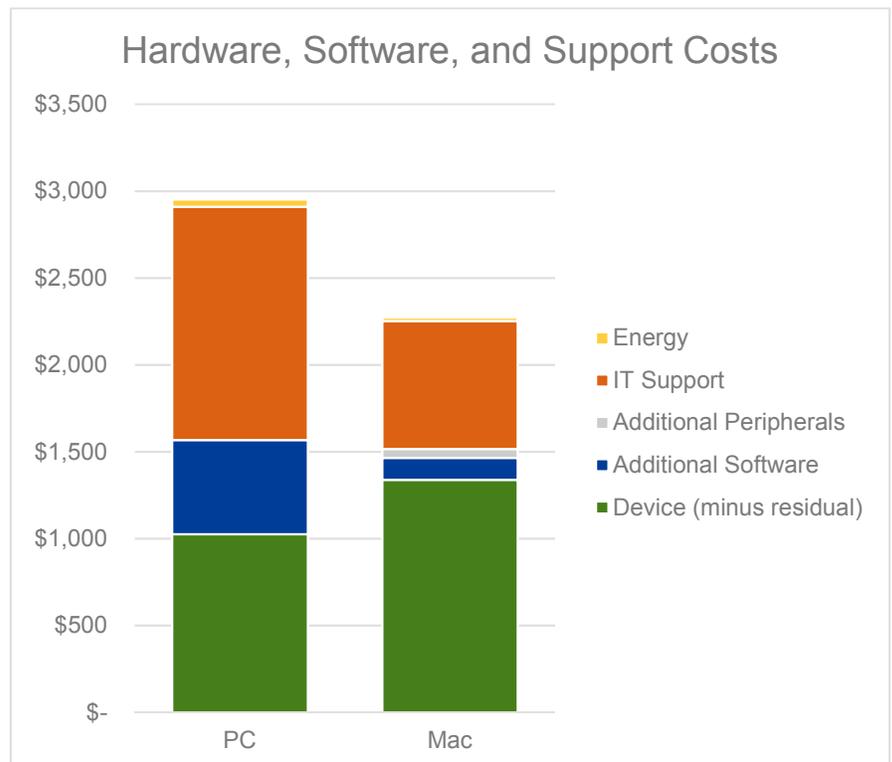
IT director, retail industry

- › **Reduced risk of a data breach by 50% per deployed Mac.** For the composite organization, this results in a total expected value of \$1.5 million. Interviewed organizations noted that their Mac has a fundamentally more secure architecture than their PCs, which results in a reduced risk of security incidents.
- › **Improved employee performance and engagement, resulting from a 20% improvement in retention rate, 5% increase in sales performance, and 48 hours of increased productivity per employee over three years.** For the composite organization, this leads to a \$67 million impact. This is due to improved machine performance, reduced employee frustration with work technology, and improved employee engagement leading to an increase in discretionary effort, performance, and employee retention rate.

Costs. The following costs reflect the three-year financial analysis associated with the composite organization to support 30,000 Macs.

- › **Implementation and labor costs totaling \$903,983.** This is from professional services for implementation, internal labor for implementation, and internal labor for ongoing platform support.
- › **Hardware and hardware deployment costs totaling \$32 million.** Interviewed organizations noted hardware and deployments costs related to the Mac itself, third-party mobile device management (MDM) costs, an incremental cost for additional Mac peripherals, and AppleCare extended warranty and enterprise support.

Forrester’s interviews with seven existing customers and subsequent financial analysis found that an organization based on these interviewed organizations experienced benefits of \$117 million over three years versus costs of \$33 million, adding up to a net present value (NPV) of \$84 million and an ROI of 255%. Additionally, per-device comparisons of hardware, software, and support costs are shown in the graph below.



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 Mac.

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 Mac can have on an organization:



DUE DILIGENCE

Interviewed Apple stakeholders and Forrester analysts to gather data relative to Mac.



CUSTOMER INTERVIEWS

Interviewed seven organizations using Mac to obtain data with respect to costs, benefits, and risks.



COMPOSITE ORGANIZATION

Designed a composite organization based on characteristics of the interviewed organizations.



FINANCIAL MODEL FRAMEWORK

Constructed a financial model representative of the interviews using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewed organizations.



CASE STUDY

Employed four fundamental elements of TEI in modeling the impact of Mac's 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 Apple 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 Mac.

Apple 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.

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

The Enterprise Mac Customer Journey

BEFORE AND AFTER THE ENTERPRISE MAC INVESTMENT

Interviewed Organizations

For this study, Forrester conducted seven interviews with Mac customers. Interviewed customers include the following:

INDUSTRY	GEOGRAPHIES	INTERVIEWEES	EMPLOYEES	MAC DEPLOYMENT
Financial services	Global	Platform manager	>100,000	2,000
Healthcare	North America, EMEA	Endpoint services director	>100,000	5,000
Manufacturing	Global	IT manager	50,000	500
Retail	North America	IT director; director of communications	600	500
Technology	Global	Platform manager; service manager	75,000	>20,000
Technology	Global	Chief information officer (CIO)	>100,000	>20,000
Technology	Global	Platform manager	>100,000	>20,000

Key Challenges Prior To Mac Enterprise Deployment

Before the investment in Mac, interviewees described the following challenges with their previous environment:

- › **The PC imaging process was archaic, manual, and time-consuming.** An IT director in the retail industry told Forrester: “We want to be able to hand a new hire a laptop that’s ready to go, to walk away and not have to do anything. We’re averaging five new hires a week, so we want to make sure that employees have the easiest and fastest experience into setting up their new machine. And the Mac platform lets us do that very, very easily.”
- › **Employees were using Mac in an unsupported state.** An endpoint services director in the healthcare industry stated: “People were jury-rigging their Mac workstations. There was literally no support for Mac from IT. It was a choose-your-own adventure, self-support type thing.”
- › **Organizations were seeing an increasing number of Mac devices in their environment due to acquisitions.** Organizations noted that due to acquisitions, the number of Mac devices in the environment was growing quickly, and they needed a more effective way of managing them.

“We wanted to manage our Macs effectively, so we looked for best practices in other organizations leading the way. How do they do software distribution? How do they run their help desk? How do they provision the assets? How do they do remote connectivity? How do they do Wi-Fi certificates? We really don’t want to take a product everybody loves and make it more difficult for them to use.”

CIO, technology industry

Why Mac?

Interviewed organizations stated the following reasons on why they chose an employee choice program and deployed Mac to address their challenges:

- › **Mac is easier to manage.** An IT director in the retail industry said: “Apple provides tools like Apple Business Manager, which works with third-party MDMs. It allows us to fix things very quickly and be very flexible, and that’s something we haven’t been able to do in other platforms.”
- › **A desire to improve the employee experience.** An endpoint services director in the healthcare industry told Forrester: “There are a lot of people that are Mac users, that consider themselves more productive as a result of that device. And so, our desire is to try to make that available for them.”
- › **Mac is a more secure platform.** An endpoint services director in the healthcare industry stated: “Our executives looked over at our CISO and asked, ‘As a result of moving to Mac in our enterprise, are we going to be more secure from a workstation perspective?’ And his answer was simply ‘Yes.’”

“Our primary focus is to change the end user experience by providing people that opportunity to choose between a Mac and a PC. Even if at the end of the day, the total cost is a big equal sign and the dollar amount is the same between both devices, it still makes sense to offer that choice.”

*Endpoint services director,
healthcare industry*

Key Results With Mac

The interviews revealed that the investment in Mac addressed the challenges interviewees were facing and provided additional benefits as well:

- › **Reduced IT support costs.** An IT manager in the manufacturing industry told Forrester: “From candid talks with IT managers, they’re just not getting a significant volume of calls from the amount of new Mac users they have. And, historically speaking, Mac users practically did not ever put in a ticket.”
- › **Improved employee productivity and engagement.** A platform manager in the technology industry stated: “People love being able to have their choice. We’re listed as one of the best places to work, and often our laptop choice program is called out. Deploying Mac has enabled much higher customer satisfaction with employees.”
- › **Improved security and reduced risk of a data breach.** An IT manager in the manufacturing industry said: “The T2 chip is an amazing asset to have on the devices; the encryption is built in. There’s so much I can say about the security of a modern Mac today, that you’re just not going to have the problems you typically run into with PCs.”

“The initial acquisition costs more for the Mac; but the operational cost is a significant savings for the Mac compared to PC, the support cost is a savings, and the resale is significantly higher. That’s the delta in savings.”

*Endpoint services director,
healthcare industry*

“A director at our company chose Mac. She told us she’s saving literally 2 hours some days no longer waiting for her computer to boot up and go through its restart cycle. Think about the impact on scaling that across the company.”

*IT manager, manufacturing
industry*

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 seven 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:

Description of composite. The composite is a global organization headquartered in North America with 100,000 employees and a high penetration and adoption of iOS (~80% of mobile devices, based on customer interviews). Employees had been using Mac in an unsupported state outside of corporate policy, with the machines not being managed by IT. There was no formal infrastructure or best practices in place for an employee choice program, so the composite decided to implement one. In the first three years, 10,000 employees chose Mac annually — either as a new employee or as part of their machine refresh cycle. Note that many of the benefits modeled in the following pages are achievable while the company is scaling up its deployment.



Key assumptions

- 100,000 employees
- 80% adoption of iOS
- 10,000 Mac devices deployed annually

Analysis Of Benefits

QUANTIFIED BENEFIT DATA AS APPLIED TO THE COMPOSITE

Based on customer interviews, Forrester found that Mac costs less for the composite organization when considering hardware and software costs to a comparable PC over three years. Forrester also found that the differential in support and operational cost savings was even higher for Mac.

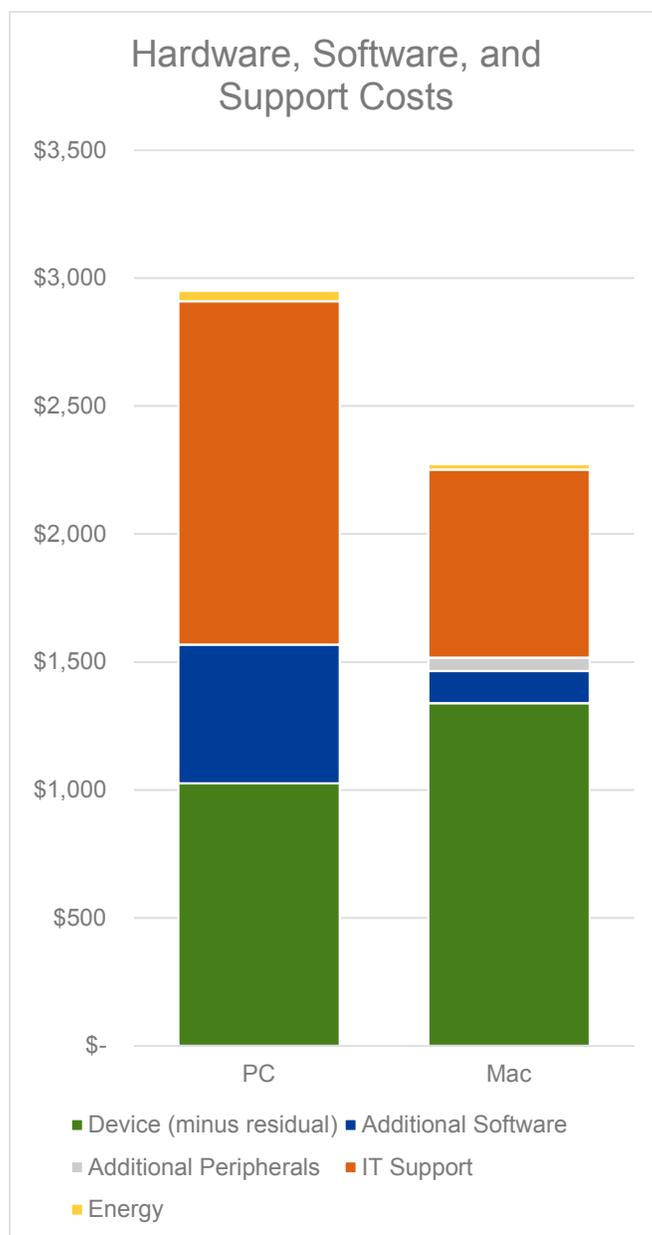
Combining hardware, software, support, and operational costs over three years leads to a cumulative cost advantage for Mac deployments. Note that “Risk adjustment” below is the aggregated risk adjustments made to each benefit and cost category, as described in the following sections. The graph below has incorporated the risk adjustments within the totals modeled for device, additional software, additional peripherals, IT support, and energy.

Three-Year Hardware And Software Costs

Metric	PC	Mac
Device costs	\$1,200	\$1,700
Incremental required software	\$570	\$120
Incremental peripherals	\$0	\$50
Residual value %	10%	25%
Residual value \$	(\$120)	(\$425)
Risk adjustment	(\$82.50)	\$72.25
Total	\$1,567.50	\$1,517.25
Differential	+\$50.25	

Three-Year Support And Operational Costs

Metric	PC	Mac
Provisioning	\$43	\$3.58
Service tickets and resolution	\$540	\$202.50
Additional general IT management	\$758.60	\$459.56
Energy costs	\$42	\$21
Risk adjustment	\$0	\$68.65
Total	\$1,383.60	\$755.29
Differential	+\$628.31	



In addition to the financial cost metrics related to hardware, software, support, and operation, Forrester additionally identified significant business benefits related to enterprise Mac deployments. These are described in more detail in the following sections and include quantified impacts from improved employee productivity and engagement and reduced risk of data breach, in addition to the financial metrics associated with device and support costs.

The table below shows the total of all benefits across the areas listed in the following sections, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total benefits to have a PV of nearly \$117 million.

Total Benefits

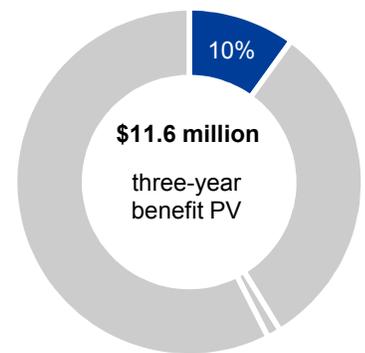
REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Atr	Reduced IT support and operational costs	\$2,414,880	\$4,829,760	\$7,244,640	\$14,489,280	\$11,629,888
Btr	Reduced and avoided hardware and software costs	\$13,271,500	\$15,143,000	\$15,874,500	\$44,289,000	\$36,506,623
Ctr	Reduced risk of a data breach	\$305,900	\$611,800	\$917,700	\$1,835,400	\$1,473,192
Dtr	Improved employee performance and engagement	\$13,932,800	\$27,865,600	\$41,798,400	\$83,596,800	\$67,099,360
	Total benefits (risk-adjusted)	\$29,925,080	\$48,450,160	\$65,835,240	\$144,210,480	\$116,709,063

Benefit 1: Reduced IT Support And Operational Costs

Interviewed organizations described the following benefits related to reduced IT support costs:

- › Less time is needed to provision Mac devices as the machines are shipped directly to the employee, and all applications and relevant policies are downloaded automatically and managed via a third-party mobile device management platform. This utilizes Apple's free Apple Business Manager offering to make this process automatic.
- › Fewer service tickets are opened by Mac users, due to self-service capabilities and fewer overall issues with performance. Mac users tend to call the support desk fewer times because they're familiar with the platform and they're motivated to make it work, citing that "it just works."
- › The tickets that are opened for Mac are easier to resolve, as there is less complexity in the ecosystem. Additionally, there tends to be fewer hardware-related issues and fewer dependencies on multiple vendors.
- › Overall, a higher number of Mac devices can be managed per IT FTE. This is due to Mac having a simplified toolset, more automation, reduced patching, application updates, configuration failures (resulting in rework and troubleshooting), and an overall reduction in required attention for the machines.

For the composite organization, based on the customer interviews,



**Reduced IT support costs:
10% of total benefits**

Forrester estimates that:

- › It takes an IT employee 5 minutes to set up a Mac for provisioning, as opposed to 60 minutes for a PC. Additionally, the Mac receives major OS updates and patches annually, so the savings from automated software updates accrue on an annual basis.
 - Note – we are not including the sunk costs of developing PC images in this analysis, as these are still required unless an organization deploys 100% Mac in the enterprise.
- › 10,000 employees annually choose Mac instead of PC for their new machine (or replacement / lifecycle refresh).
- › Average fully burdened IT salary is \$43/hour.
- › An average of six tickets are opened per PC user per year, and each ticket costs \$30 to resolve. Mac users open 50% fewer tickets, and each ticket costs 25% less to resolve.
 - There is less complexity in the ecosystem and fewer places to go wrong. As Apple has control over the hardware and OS, resolution of issues tend to be simpler and less error prone, requiring fewer steps to resolve any given issues.
- › 200 PCs can be managed per IT FTE, whereas 500 Mac devices can be managed per IT FTE (given best practice deployments of enterprise Mac).
 - Note – as the reduced provisioning and service ticket effort associated with Mac are implicitly included in this machine-to-IT FTE ratio, those benefits are subtracted out from this benefit in the final quantification.

This benefit can vary due to uncertainty related to:

- › Average fully burdened IT salary.
 - Note that salary is a conservative estimate of the value an employee provides to the organization.
- › Use of Apple's best practices in deploying Mac in the enterprise.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding an annual benefit ranging from \$2.4 million to \$7.2 million, with a three-year, risk-adjusted total PV of \$11.6 million.

“The major benefit we see from the Mac platform is that it’s a lot easier for us to manage the platform with a smaller IT staff. That’s big, especially when we’re a startup and we need to be fast, flexible, and agile.”

IT director, retail industry

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.

Benefit 1: Reduced IT Support And Operational Costs: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Time required to provision a PC (minutes)	Composite organization	60	60	60
A2	Time required to provision a Mac (minutes)	Composite organization	5	5	5
A3	Number of Mac devices provisioned annually	Net new Mac deployments; includes refreshes in Years 4 and 5	10,000	10,000	10,000
A4	Average fully burdened IT salary (hourly)	Composite organization	\$43	\$43	\$43
A5	<i>Subtotal: reduced provisioning effort (rounded)</i>	$(A1-A2)/60*A3*A4$	\$394,167	\$394,167	\$394,167
A6	Average number of tickets per PC per year	Composite organization	6	6	6
A7	Reduced number of tickets per Mac	Composite organization	50%	50%	50%
A8	Average cost to resolve tickets per PC	Composite organization	\$30	\$30	\$30
A9	Reduced cost to resolve tickets per Mac	Composite organization	25%	25%	25%
A10	<i>Subtotal: support costs for PCs</i>	$D1*D2*A6*A8$	\$1,800,000	\$3,600,000	\$5,400,000
A11	<i>Subtotal: support costs for Mac</i>	$D1*D2*A6*A7*A8*(1-A9)$	\$675,000	\$1,350,000	\$2,025,000
A12	<i>Subtotal: reduced support costs</i>	$A10-A11$	\$1,125,000	\$2,250,000	\$3,375,000
A13	Number of PCs managed per IT FTE	Composite organization	200	200	200
A14	Number of Mac devices managed per IT FTE	Composite organization	500	500	500
A15	<i>Subtotal: reduced management costs (rounded)</i>	$(D1*D2/A13 - D1*D2/A14)*A4*2080 - A5 - A12$	\$1,164,033	\$2,722,233	\$4,280,433
At	Reduced IT support costs	$A5+A12+A15$	\$2,683,200	\$5,366,400	\$8,049,600
	Risk adjustment	↓10%			
Atr	Reduced IT support costs (risk-adjusted)		\$2,414,880	\$4,829,760	\$7,244,640

Benefit 2: Reduced And Avoided Hardware And Software Costs

Interviewed organizations described the following reduced and avoided costs due to the enterprise Mac deployment:

- › While on average the Mac costs more upfront, this is partially offset by the cost of a comparable PC that the employee would otherwise need to order.
 - Note – the cost of the Mac is incorporated into the financial model quantification in Cost 2: Hardware And Hardware Deployment Costs.
- › There is no need to purchase an OS license or software update maintenance for Mac.
- › The Mac underlying architecture and included security features obviate the need for some additional endpoint security licenses that are required for comparable PC deployments. Additionally, security patches for Mac are at no cost.
- › Mac requires less energy to operate.

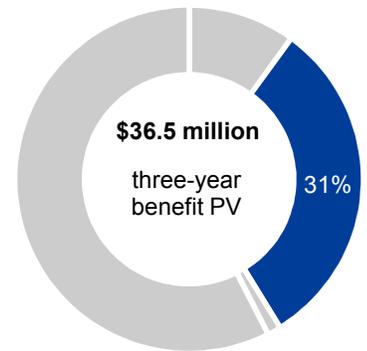
Based on the customer interviews, Forrester estimates for the composite organization:

- › 10,000 employees are choosing Mac annually.
- › The average cost for an enterprise PC is \$1,200, and the machine maintains a 10% residual value after three years.
- › OS license costs for PCs average \$150 per year per machine.
- › Additional endpoint security licenses for PCs average \$40 per year per machine.
 - Note that this number may be lower or higher for organizations, based on which endpoint solutions are replaced due to the underlying architecture and included security features for Mac.
- › Mac requires 50% less energy to operate.

This benefit can vary due to uncertainty related to:

- › Number of employees choosing Mac.
- › Average cost for an enterprise PC and residual value after three years.
- › Additional OS and security license costs for PCs.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding an annual benefit ranging from \$13.3 million to \$15.9 million, with a three-year, risk-adjusted total PV of \$36.5 million.



Reduced and avoided costs:
31% of total benefits

Benefit 2: Reduced And Avoided Hardware And Software Costs: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
B1	Number of employees choosing Mac per year	Net new Mac devices; includes refreshes in Years 4 and 5	10,000	10,000	10,000
B2	Cumulative Mac devices deployed	$D1 * D2$	10,000	20,000	30,000
B3	Average cost per PC	Composite organization	\$1,200	\$1,200	\$1,200
B4	Residual value for PCs after three years	Composite organization			10%
B5	Additional OS license costs and maintenance	Composite organization	\$150	\$150	\$150
B6	Additional endpoint security licenses	Composite organization	\$40	\$40	\$40
B7	<i>Subtotal: avoided PC costs (rounded)</i>	$B1 * B3 - B1 * B3 * B4 + B2 * (B5 + B6)$	<i>\$13,900,000</i>	<i>\$15,800,000</i>	<i>\$16,500,000</i>
B8	Annual energy costs per PC	60W, 8 hours per day	\$14	\$14	\$14
B9	Reduced energy costs per Mac	Composite organization	50%	50%	50%
B10	<i>Subtotal: reduced energy costs</i>	$B2 * B8 * B9$	<i>\$70,000</i>	<i>\$140,000</i>	<i>\$210,000</i>
Bt	Reduced and avoided costs		\$13,970,000	\$15,940,000	\$16,710,000
	Risk adjustment	↓5%			
Btr	Reduced and avoided costs (risk-adjusted)		\$13,271,500	\$15,143,000	\$15,874,500

Benefit 3: Reduced Risk Of Data Breach

Interviewed organizations noted that their Mac has a fundamentally more secure architecture than their PCs. This resulted in a reduced risk of security incidents, along with obviating the need for some of the security agents they ran on their PC machines (which is quantified in Benefit 2), especially when following Apple's best practices in deploying and securing Mac devices.

Based on the customer interviews, Forrester estimates for the composite organization:

- › An average of 200,000 records are at risk for a given data breach event.
- › The likelihood of a data breach at an organization prior to Mac deployment was 14% per year, which is approximated from independent benchmark research conducted by the Ponemon Institute, "2018 Cost of a Data Breach Study".¹
- › The average cost per lost or stolen record is \$230, which is approximated from the US-based metrics found in the previously cited Ponemon Institute study.
- › Mac deployment in the enterprise is 10%, 20%, and 30% in Years 1, 2, and 3, respectively.
- › Mac reduces the likelihood of a data breach by 50% per device. One customer noted that they experience as much as 90% fewer security incidents on their Mac devices.

This benefit can vary due to uncertainty related to:

- › The number of records at risk per data breach event.
- › The likelihood of a data breach.
- › The adoption of Mac in the organization.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding an annual benefit ranging from \$305,900 to \$917,700, with a three-year, risk-adjusted total PV of \$1.5 million.



50% reduced likelihood of data breach per enterprise-deployed Mac

Benefit 3: Reduced Risk Of A Data Breach: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
C1	Average number of records at risk per data breach	Composite organization	200,000	200,000	200,000
C2	Likelihood of data breach at an organization, prior to Mac deployment	Composite organization	14%	14%	14%
C3	Average cost per lost or stolen record	Composite organization	\$230	\$230	\$230
C4	Percent Mac deployment	D2	10%	20%	30%
C5	Reduced likelihood of data breach for Mac devices	Composite organization	50%	50%	50%
Ct	Reduced risk of a data breach	C1*C2*C3*C4*C5	\$322,000	\$644,000	\$966,000
	Risk adjustment	↓5%			
Ctr	Reduced risk of a data breach (risk-adjusted)		\$305,900	\$611,800	\$917,700

¹ "2018 Cost of a Data Breach Study: Global Overview," Ponemon Institute, July 2018

Benefit 4: Improved Employee Performance And Engagement

Interviewed organizations described the following benefits related to improved employee productivity and engagement:

- › Improved machine performance, including faster startup time, led to an increase in employee productivity, in addition to significantly reducing employee frustration with trying to accomplish work. Part of the improved startup time is due to the reduced need of additional security agents on the machine due to the more secure underlying architecture.
- › Improved employee engagement due to the ability to choose a Mac as their work machine led to an increase in discretionary effort and performance (e.g., increased sales performance from the sales team).
- › Improved employee engagement also led to a tangible benefit of improving the employee retention rate.

Based on the customer interviews, Forrester estimates for the composite organization:

Improved Productivity From Time Saved

- › 100,000 total employees, of which 10% choose Mac in Year 1, which increases to 20% and 30% in Years 2 and 3, respectively.
- › An average time of 5 minutes per day waiting for tasks like wake/reboot on a PC, compared to 1 minute for a Mac.
- › An average fully burdened employee salary of \$78,000.
- › 20% of time savings is put toward more productive work (productivity capture).

Improved Sales Performance

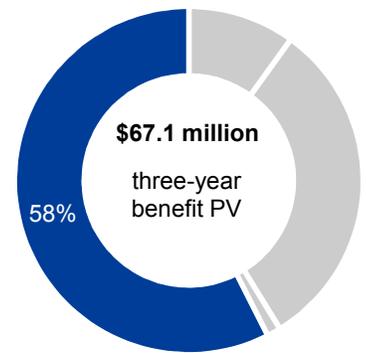
- › Of the employees choosing Mac, 30% of them are sales employees.
- › An annual sales quota of \$1 million per sales employee.
- › A 5% increase in sales performance for employees choosing Mac, 20% of which can be attributed to Mac and the employee choice program.
- › A 15% profit margin.

Improved Employee Retention

- › Average employee churn rate for employees not choosing Mac is 15%.
- › There is a 20% improvement in retention rate for employees choosing Mac.
- › It costs 50% of an employee's annual salary to replace an employee due to attrition (a conservative estimate compared to industry research performed by the Society for Human Resource Management).

This benefit can vary due to uncertainty related to:

- › Number of employees choosing Mac, and average fully burdened salaries.
 - Note that salary is a conservative estimate of the value an employee provides to the organization.
- › Productivity capture.



Improved employee engagement and performance: 58% of total benefits

“You have to separate causation from correlation, but there’s no doubt an employee choice program is beneficial for our organization. Employees who choose Mac are more innovative, in sales they close larger deals, and they’re much less likely to voluntarily quit. And, they respond higher overall satisfaction with IT on employee surveys.”

CIO, technology industry

- › Improvement in productivity and retention rate.
- › Profit margin.
- › Cost to replace employees

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding an annual benefit ranging from \$14 million to \$42 million, with a three-year, risk-adjusted total PV of \$67 million.

Benefit 4: Improved Employee Performance And Engagement: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
D1	Number of employees	Composite organization	100,000	100,000	100,000
D2	% of employees using Mac	Composite organization	10%	20%	30%
D3	Average time for PC wake/reboot per day (min)	Composite organization	5	5	5
D4	Average time for Mac wake/reboot per day (min)	Composite organization	1	1	1
D5	Average working days per year	Composite organization	240	240	240
D6	Average fully burdened employee salary (annual)	Composite organization	\$78,000	\$78,000	\$78,000
D7	Average fully burdened employee salary (hourly)	Composite organization	\$38	\$38	\$38
D8	Productivity capture	Forrester assumption	20%	20%	20%
D9	<i>Subtotal: Improved productivity from quicker startup</i>	$D1 * D2 * (D3 - D4) / 60 * D5 * D7 * D8$	\$1,216,000	\$2,432,000	\$3,648,000
D10	Number of sales employees choosing Mac	$D1 * D2 * 30\%$	3,000	6,000	9,000
D11	Average annual sales per sales employee	Composite organization	\$1,000,000	\$1,000,000	\$1,000,000
D12	Increase in sales performance for employees choosing Mac	Composite organization	5%	5%	5%
D13	Improved performance attributed to Mac and employee choice	Composite organization	20%	20%	20%
D14	Profit margin	Composite organization	15%	15%	15%
D15	<i>Subtotal: Improved sales performance</i>	$D10 * D11 * D12 * D13 * D14$	\$4,500,000	\$9,000,000	\$13,500,000
D16	Average employee churn rate for employees not choosing Mac	Composite organization	15%	15%	15%
D17	Improvement in retention rate with employees choosing Mac	Composite organization	20%	20%	20%
D18	Cost to replace employee	$D6 * 50\%$	\$39,000	\$39,000	\$39,000
D19	<i>Subtotal: Improved employee retention</i>	$D1 * D2 * D16 * D17 * D18$	\$11,700,000	\$23,400,000	\$35,100,000
Dt	Improved employee productivity and engagement	$D9 + D15 + D19$	\$17,416,000	\$34,832,000	\$52,248,000
	Risk adjustment	↓20%			
Dtr	Improved employee productivity and engagement (risk-adjusted)		\$13,932,800	\$27,865,600	\$41,798,400

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	Implementation and labor costs	\$136,620	\$308,568	\$308,568	\$308,568	\$1,062,324	\$903,983
Ftr	Hardware and hardware deployment costs	\$0	\$8,253,000	\$14,626,500	\$16,537,500	\$39,417,000	\$32,015,612
	Total costs (risk-adjusted)	\$136,620	\$8,561,568	\$14,935,068	\$16,846,068	\$40,479,324	\$32,919,595

Cost 1: Implementation And Labor Costs

Interviewed organizations noted implementation and ongoing internal labor costs for platform support.

Based on the customer interviews, Forrester estimates for the composite organization:

- › \$50,000 is spent on professional services for implementation.
- › Two IT FTEs spent 20 weeks on implementation activities, at an average fully burdened salary of \$43/hour.
- › Three IT FTEs are needed for ongoing platform support.

This cost can vary due to uncertainty related to:

- › Required implementation professional services.
- › Required implementation and ongoing support.
- › Fully burdened IT salary.

To account for these risks, Forrester adjusted this cost upward by 15%, yielding an initial cost of \$136,620, an annual cost of \$308,568, and a three-year, risk-adjusted total PV of \$903,983.

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 have a PV of \$33 million.

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.

Cost 1: Implementation And Labor Costs: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
E1	Professional services	Composite organization	\$50,000			
E2	Internal implementation FTEs	Composite organization	2			
E3	Average fully burdened IT salary (hourly)	C4	\$43	\$43	\$43	\$43
E4	Implementation time (weeks)	Composite organization	20			
E5	Ongoing platform support (FTEs)	Composite organization		3	3	3
Et	Implementation and labor costs	$E1+E2*E3*E4*40+E5*E3*2,080$	\$118,800	\$268,320	\$268,320	\$268,320
	Risk adjustment	↑15%				
Etr	Implementation and labor costs (risk-adjusted)		\$136,620	\$308,568	\$308,568	\$308,568

Cost 2: Hardware And Hardware Deployment Costs

Interviewed organizations noted hardware and deployments costs related to the Mac itself, a third-party MDM, an incremental cost for additional Mac peripherals, and AppleCare support.

Based on the customer interviews, Forrester estimates for the composite organization:

- › An incremental 10,000 Mac devices are deployed each year.
- › The average cost for a Mac is \$1,700, and is estimated to maintain a residual value of 25% after three years. Additionally, with Apple Financial Services, the Mac could be financed. For this example, the Mac is placed on a three-year lease, allowing the upfront cost to be spread over three years. For simplicity, the analysis does not include the cost of interest.
 - Note that this average cost for Mac is dependent on the distribution of machines purchased. For example, this could be higher if employees focused more on top-end MacBook Pros, or lower if more employees choose the MacBook Air.
- › Average annual cost for a third-party MDM is \$40 per Mac.
 - Note that the price for a third-party MDM may vary depending on size of deployment, hosting requirements, and required implementation or integration costs.
- › Average cost for additional Mac peripherals is \$50 upon deployment.
- › Average cost for AppleCare for Enterprise (three-year service contract) is \$129 per Mac upon deployment when there are more than 5,000 Apple devices deployed in the enterprise.

This cost can vary due to uncertainty related to:

- › Cost of a Mac and residual value.
- › Annual cost of the third-party MDM.
- › Incremental cost for Mac peripherals and AppleCare support.
- › The use of Apple Financial Services or a competing provider to realize residual value upfront and optimize financial terms.

To account for these risks, Forrester adjusted this cost upward by 5%, yielding an annual cost ranging from \$8 million to \$17 million, with a three-year, risk-adjusted total PV of \$32 million.

“The new MacBook Airls that have come out are actually a cheaper price point and might really compete with the MacBook Pro, which is what we’re currently offering. So we might actually save even more money on Mac by purchasing the newest Airls, since these should cover all the business processes we need.”

IT manager, manufacturing industry

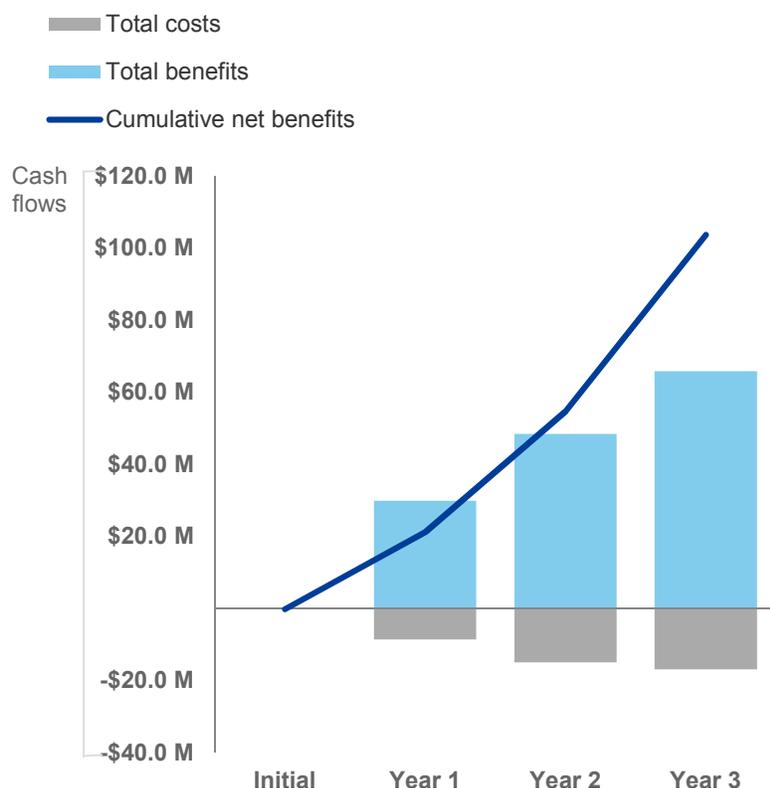
Cost 2: Hardware And Hardware Deployment Costs: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
F1	Number of Mac devices deployed annually	B1		10,000	10,000	10,000
F2	Cumulative Mac devices deployed	B2		10,000	20,000	30,000
F3	Average cost per Mac	Composite organization		\$1,700	\$1,700	\$1,700
F4	Residual value for Mac after three years	Composite organization				25%
F5	Average annual cost per Mac with payments set over three years (rounded)	F3/3		\$567	\$567	\$567
F6	Average annual third-party MDM cost per Mac	Composite organization		\$40	\$40	\$40
F7	Average cost for additional Mac peripherals	Composite organization		\$50	\$50	\$50
F8	Average cost for AppleCare per Mac	Composite organization		\$129	\$129	\$129
Ft	Hardware and hardware deployment costs	$F1*(F7+F8) + F2*(F5+F6) - (F1*F3*F4)$		\$7,860,000	\$13,930,000	\$15,750,000
	Risk adjustment	↑5%				
Ftr	Hardware and hardware deployment costs (risk-adjusted)			\$8,253,000	\$14,626,500	\$16,537,500

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.



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

Cash Flow Analysis (Risk-Adjusted)

	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Total costs	(\$136,620)	(\$8,561,568)	(\$14,935,068)	(\$16,846,068)	(\$40,479,324)	(\$32,919,595)
Total benefits	\$0	\$29,925,080	\$48,450,160	\$65,835,240	\$144,210,480	\$116,709,063
Net benefits	(\$136,620)	\$21,363,512	\$33,515,092	\$48,989,172	\$103,731,156	\$83,789,468
ROI						255%
Payback period						< 6 months

Appendix A: Total Economic Impact

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

Total Economic Impact Approach



Benefits represent the value delivered to the business by the product. The TEI methodology places equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization.



Costs consider all expenses necessary to deliver the proposed value, or benefits, of the product. The cost category within TEI captures incremental costs over the existing environment for ongoing costs associated with the solution.



Flexibility represents the strategic value that can be obtained for some future additional investment building on top of the initial investment already made. Having the ability to capture that benefit has a PV that can be estimated.



Risks measure the uncertainty of benefit and cost estimates given: 1) the likelihood that estimates will meet original projections and 2) the likelihood that estimates will be tracked over time. TEI risk factors are based on "triangular distribution."

The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1 that are not discounted. All other cash flows are discounted using the discount rate at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value calculations of the Total Benefits, Total Costs, and Cash Flow tables may not exactly add up, as some rounding may occur.



Present value (PV)

The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total NPV of cash flows.



Net present value (NPV)

The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.



Return on investment (ROI)

A project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits less costs) by costs.



Discount rate

The interest rate used in cash flow analysis to take into account the time value of money. Organizations typically use discount rates between 8% and 16%.



Payback period

The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost.