

FORRESTER®

The Total Economic Impact™ Of Meraki MV Smart Cameras

Cost Savings And Business Benefits
Enabled By MV Smart Cameras

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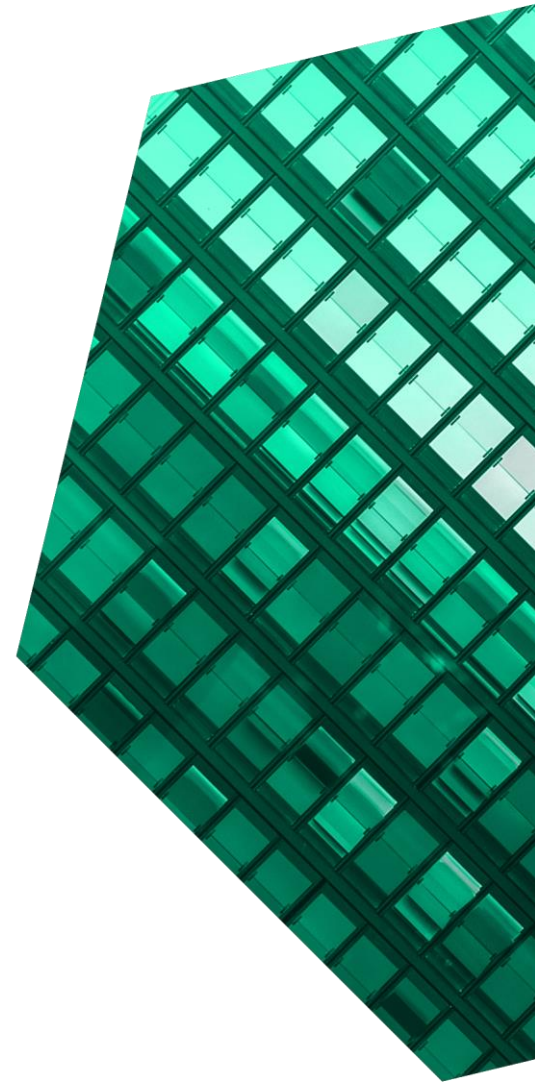
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ABOUT FORRESTER CONSULTING

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Executive Summary

Meraki MV is a line of smart cameras that are simple to deploy and configure, help customers to rapidly access and share video footage, are continually updated with the latest features, and eliminate the cybersecurity vulnerabilities of traditional on-premises surveillance systems.

The Cisco Meraki MV cloud-managed video surveillance system addresses users' top priorities: reliability and operational simplicity. Users can see their entire security camera system on one dashboard at any time. Meraki MV smart cameras eliminate the need for digital video recorders (DVRs), network video recorders (NVRs) and video management systems (VMS). This simplified architecture allows organizations to achieve substantial savings in installation costs and ongoing maintenance expenses. Meraki MV's intelligent search capability saves users hours of time searching for needed video footage. When a security event occurs, local staff are easily able to handle requests for video footage, without calling on IT or loss prevention managers.

“Our senior VP of IT has a poster in his office that says, ‘simplicity,’ with the letters ‘IT’ in red. His mantra really is simplicity. I think that the Meraki platform is very simple to use, whether you are an IT professional installing it or you are the end-user who is viewing and downloading a video. You don't have to get a certificate to install it. It's just very easy to purchase, easy to install, and easy for the end-user to operate.”

Director of IT, real estate investment trust

KEY STATISTICS



Return on investment (ROI)

43%



Net present value (NPV)

\$1.26M

Meraki MV commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying Meraki [MV smart cameras](#).¹ The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Meraki MV smart cameras on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed four executives and surveyed 30 decision-makers with experience using Meraki MV smart cameras. For the purposes of this study, Forrester aggregated the experiences of the interviewed and surveyed decision-makers and combined the results into a single [composite organization](#).

Prior to using Meraki MV smart cameras, interviewees were using a combination of older NVR or DVR surveillance systems. Companies spent a minimum of 4 to 5 hours per week at each of their

locations to access and share important video footage. Interviewees often deferred adding cameras to improve security coverage because of unpredictable expansion costs. The process of diagnosing and repairing defective cameras entailed long wait times and expensive repairs. A hodgepodge of camera brands and NVRs, combined with the lack of a regular process for updating firmware left users vulnerable to cyberattacks.

After the investment in Meraki MV smart cameras, the interviewees were able to:

- Install additional cameras easily and cost-effectively.
- Obtain firmware updates automatically to protect themselves against cybersecurity vulnerabilities.
- Find and share needed video footage in minutes instead of hours.
- Resolve camera problems with a quick call to the Meraki MV support team.
- Determine when cameras were offline without traveling to the site.

“We are getting greater business value with Meraki. Comparing what we were paying for the cameras before to what we’re paying now we are saving somewhere around 25%. We’re paying less money for the cameras that we’re getting through Meraki and we’re spending less to get them implemented.”

- National director of electronic physical security, healthcare

Time to access and share footage

Before **120 min.** After **12 min.**

KEY FINDINGS

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

- **Reduced cost of adding Meraki MV versus traditional cameras contributed more than \$2.6 million in net benefits over three years for the composite organization.** Traditional on-premises systems require every new camera to be manually connected and configured to the NVR/DVR and VMS hardware by specialized installers. Meraki MV eliminates the need for NVR/DVR and VMS configuration by placing high-endurance video storage on the camera and video management in the cloud. Cameras are automatically configured as they are plugged in.
- **Reduced time to access and share video footage saved more than \$1,000,000 over three years for the composite organization.** Interviewees who had previously used traditional systems recalled spending 4 to 5 hours to access and download desired footage to an external storage device and then drive it across town to share with others. Meraki MV’s intelligent search capabilities made it fast and easy to find desired footage and share a link to the footage with other staff or law enforcement. The composite organization saved 17,280 hours in Year 1 based on eight video footage requests

“The easiest way to justify the price difference between a traditional NVR system and Meraki MV is the process for finding a video clip. If someone breaks a car window in a parking garage, with Meraki MV you select the camera and ask to see movement in a specific area during a specific time. It immediately displays all the video clips for you. The property manager and the resident can quickly look at the clips to see what happened to the car. In contrast, with an NVR system, the property manager or leasing staff spends 5 to 6 hours reviewing footage until they find the exact clip they were looking for.”

- Director of IT, real estate investment trust

per month at 100 locations and labor costs of \$25 per hour.

- **Avoided cost of diagnosing and replacing cameras amounted to \$457,000 over three years for the composite organization.** When users of traditional systems experienced camera problems, they scheduled a technician visit, waited five to eight days, and paid an average of \$525 per camera for diagnosis and repair. Meraki MV customers contacted support, obtained an immediate resolution, or obtained

“Traditional on-premises cameras are fairly cheap, but the camera companies are smaller AV companies. Getting a technician out takes 5 to 8 business days. There is a \$150 trip charge. If the camera is defective the cost is \$200 to \$300 for the new camera plus installation. A typical bill for a single camera replacement runs between \$500 and \$600.”

- Director of IT, real estate investment trust

an RMA for a replacement camera at no additional charge, and had the replacement camera within two days.

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

- **Ability to know when cameras are offline without traveling to the site.** Interviewees recouped valuable IT staff time with the Meraki MV dashboard. It allows users to see the status of all cameras in the video surveillance system without inspecting individual cameras. Eighty-two percent of surveyed organizations cited this feature as one of the top two benefits of Meraki MV.
- **Improved reliability.** Interviewees were frustrated by the unpredictability of their old systems. Malfunctioning cameras went undetected for weeks. Meraki MV users receive failure alerts when cameras go offline and can take immediate action to maintain high levels of uptime. Seventy-seven percent of surveyed decision-makers stated that reliability was their top priority in choosing a surveillance system.
- **Lower cost to maintain hardware, software, firmware, and configuration updates.** Surveyed decision-makers experienced reductions of up to 75% in maintenance costs with Meraki MV smart cameras.
- **More predictable expansion costs.** NVRs, DVRs, and VMS are designed to handle a fixed number of cameras. Interviewees often found that adding a single camera necessitated the purchase of an additional NVR/DVR and VMS, and all cameras at a location had to be reconfigured to work with the new hardware. Meraki MV users do not face any of these costs.
- **Improved cybersecurity.** The Meraki MV license agreement includes security updates. Users always have the latest protection. Surveyed decision-makers cited strong

cybersecurity as one of their top five priorities when choosing a video surveillance system.

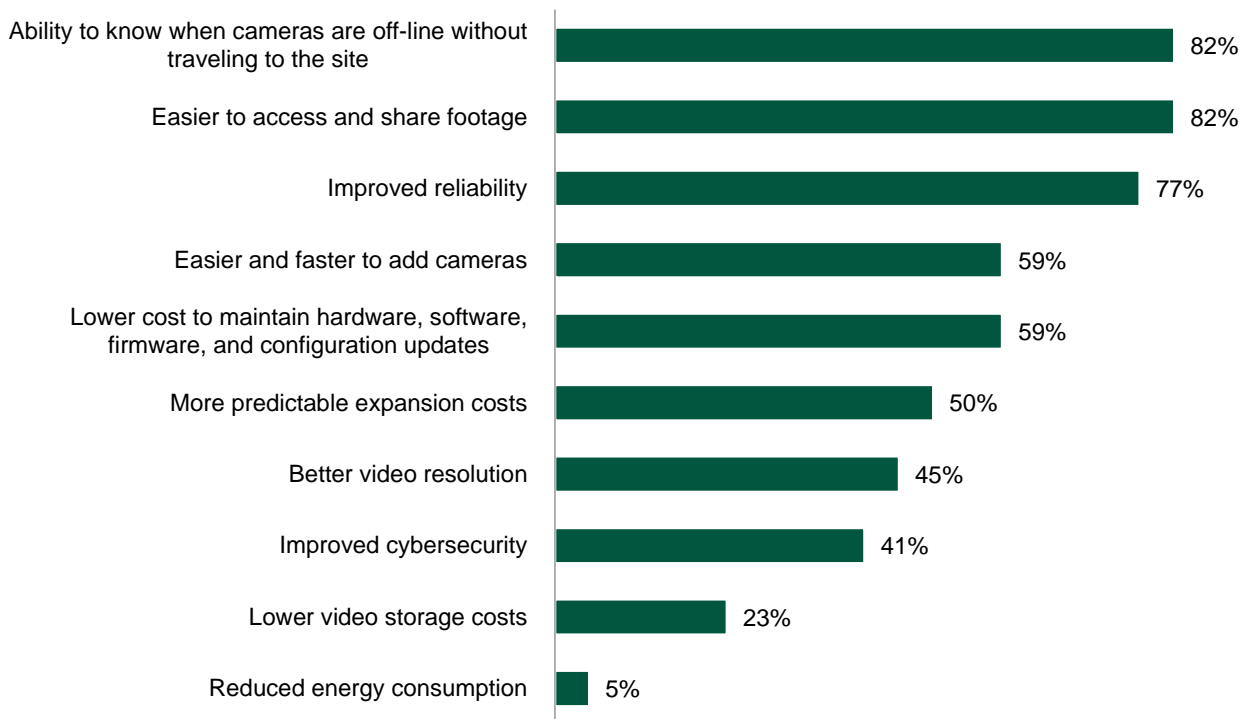
- **Lower video storage costs.** Meraki MV users were able to invest the savings from lower video storage costs in improvements in security coverage. Surveyed decision-makers reduced their video storage costs by up to 60% with Meraki MV.
- **Reduced personnel costs to monitor cameras.** The simplicity of the Meraki MV smart cameras allowed IT and loss prevention managers to delegate video pulls to local staff. Managers were able to regain up to 50% of their time by delegating to staff at a lower pay grade.
- **Reduced energy costs.** The elimination of NVR, DVR, and VMS hardware allowed Meraki MV users to reduce the footprint of their equipment rooms, which reduced energy usage. Surveyed organizations reduced their energy costs by up to 30%.

Costs. Risk-adjusted PV costs include:

- **Meraki MV cameras.** The composite organization pays \$1,200,000 for 1,500 cameras across 100 locations in Year 1. The organization pays \$180,000 in Year 2 and \$207,000 in Year 3 as the number of locations increases by 10% per year and the number of cameras per location increases by 15%.
- **Internal training costs.** The Meraki MV composite organization needs 30 minutes per location at a cost of \$25 per hour of trainee time. Initial training for 100 locations amounts to \$1,250.

The financial analysis which is based on the decision-maker interviews and survey found that a composite organization experiences benefits of \$4.17 million over three years versus costs of \$2.90 million, adding up to a net present value (NPV) of \$1.26 million and an ROI of 43%.

“What benefits are you realizing with the Meraki MV system?”



Base: 22 users of Meraki MV smart cameras

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco Meraki, August 2021



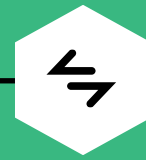
ROI
43%



BENEFITS PV
\$4.17M



NPV
\$1.26M



PAYBACK
10 months

Reduced cost of adding Meraki MV

\$2.6M

Reduced time to access and share video footage

\$1.1M

Avoided cost of diagnosing and replacing cameras

\$457.4K

TEI FRAMEWORK AND METHODOLOGY

From the information provided in the interviews and survey, Forrester constructed a Total Economic Impact™ framework for those organizations considering an investment in Meraki MV smart cameras.

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 the Meraki MV smart cameras can have on an organization.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Meraki MV and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.

Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the study to determine the appropriateness of an investment in Meraki MV smart cameras.

Meraki MV 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.

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

Forrester fielded the survey online to professionals with experience using MV smart cameras.



DUE DILIGENCE

Interviewed Meraki stakeholders and Forrester analysts to gather data relative to the MV Smart cameras.



DECISION-MAKER INTERVIEWS AND SURVEY

Interviewed four decision-makers and surveyed 30 decision-makers at organizations using Meraki MV smart cameras to obtain data with respect to costs, benefits, and risks.



COMPOSITE ORGANIZATION

Designed a composite organization based on characteristics of the interviewed and surveyed decision-makers.



FINANCIAL MODEL FRAMEWORK

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



CASE STUDY

Employed four fundamental elements of TEI in modeling the investment impact: benefits, costs, flexibility, and risks. Given the increasing sophistication of ROI analyses related to IT investments, Forrester's TEI methodology provides a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

The Meraki MV Smart Cameras Customer Journey

Drivers leading to the MV smart cameras investment

KEY CHALLENGES

Forrester interviewed four executives and surveyed 30 decision-makers with experience using MV smart cameras at their organizations. For more details on these individuals and the organizations they represent, see [Appendix B](#).

Prior to the implementation of Meraki MV smart cameras, interviewees were using a variety of camera brands that were 10 or more years old. Video was stored on a DVR or NVR.

The decision-makers noted how their organizations struggled with common challenges, including:

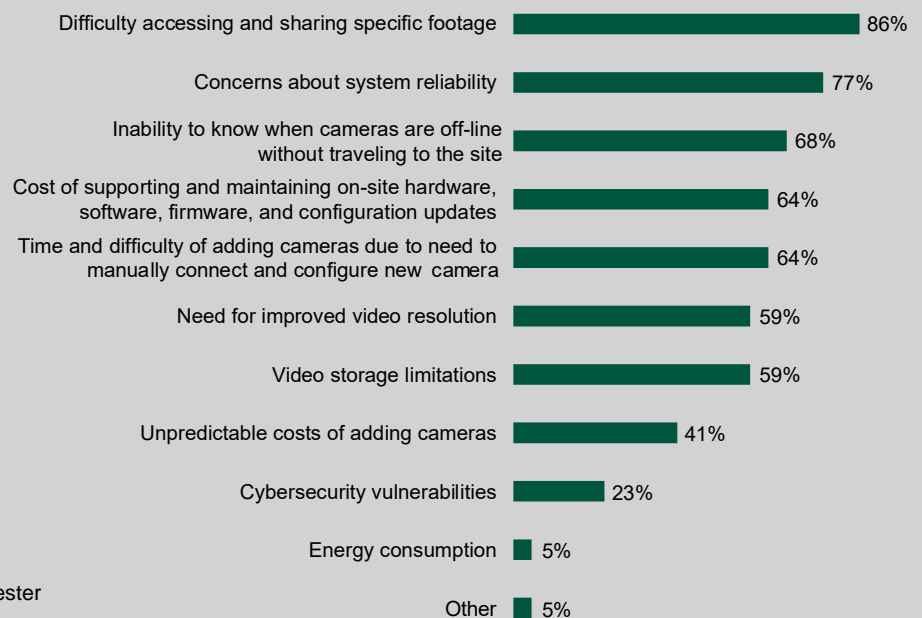
- **Difficulty accessing and sharing video.** Interviewees highlighted the complexity of accessing and sharing video with traditional systems. Local personnel had to call on a high-level IT or physical security manager to locate the desired footage. The process of locating the footage took hours and required the user to be physically present to conduct the search. Once

“No one wanted to add any cameras to the old system because they hated the interface. More cameras and more people monitoring them just multiplied the dissatisfaction with the poor interface and limitations of the cameras.”

Enterprise systems engineer, city government

the footage was located, it had to be downloaded to an external storage device and transported to another location where other staff or law enforcement could view the video.

“What challenges led to considering and implementing the Meraki MV system?”



Base: 22 users of Meraki MV smart cameras

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco Meraki, August 2021

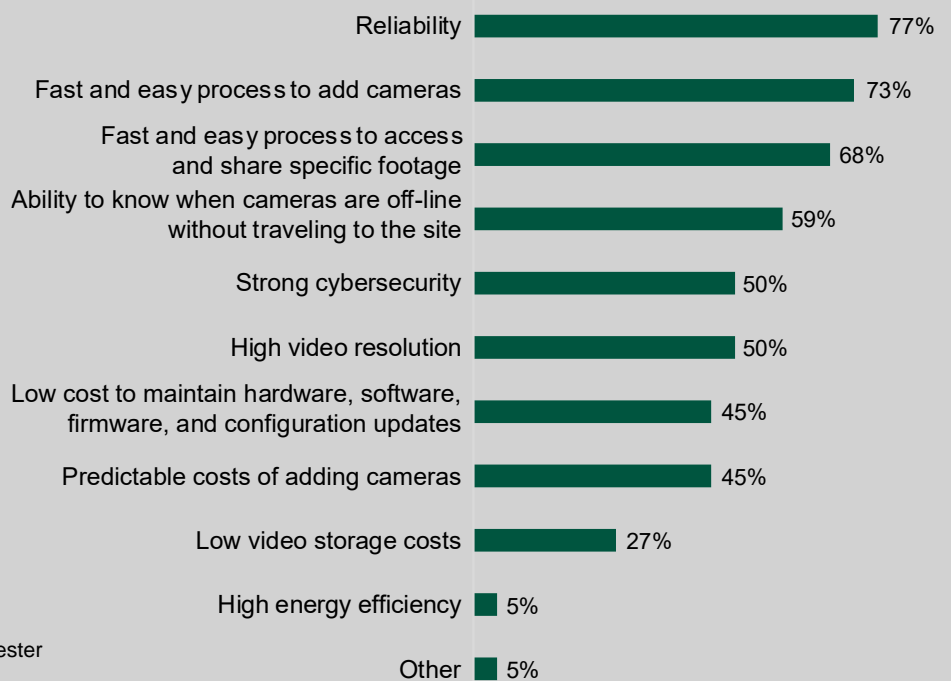
- **Inability to know when cameras are offline without traveling to the site.** Interviewees with traditional systems lacked remote visibility to the status of cameras. The systems didn't have the capability to send notifications when cameras went offline. Staff spent hours traveling to sites to determine camera status.
- **Time and difficulty of adding cameras.** Interviewees often delayed adding needed cameras due to the time and cost of calling an AV specialist to install them. In some cases, the high cost required conducting an RFP process to add a camera. These barriers meant that known security risks were not addressed in a timely manner.

SOLUTION REQUIREMENTS/INVESTMENT OBJECTIVES

The decision-makers searched for a solution that provided:

- High reliability and uptime.
- A fast and easy process for adding cameras.
- A fast and easy process to access and share specific footage.
- Ability to know when cameras are offline without traveling to the site.
- Strong cybersecurity.
- A seamless process to update to the latest features and firmware.

“What were your top priorities in choosing a surveillance system?”



Base: 22 users of Meraki MV smart cameras

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco Meraki, August 2021

COMPOSITE ORGANIZATION

Based on the interviews and survey, Forrester constructed a TEI framework, a composite company, and an ROI analysis that illustrates the areas financially affected. The composite organization is representative of the four companies that Forrester interviewed and the 30 companies that Forrester surveyed and is used to present the aggregate financial analysis in the next section. The composite organization has the following characteristics:

Description of composite. The composite organization is a 100-location business with 15 Meraki MV cameras per location. The number of locations increases by 10% per year. The number of cameras increases by 15% per year.

Deployment characteristics. The composite organization has global offices. Its offices are growing organically at 10% annually to serve the needs of its customer base.

Key assumptions

- **100 locations worldwide**
- **10% annual increase in locations**
- **15% annual increase in cameras**
- **50 employees per location**
- **15 cameras per location**
- **Replaced 10-year-old traditional system**
- **\$12,000 average camera deal size per location**

Analysis Of Benefits

■ Quantified benefit data as applied to the composite

Total Benefits						
Ref.	Benefit	Year 1	Year 2	Year 3	Total	Present Value
Atr	Reduced cost of adding Meraki MV smart cameras	\$2,452,140	\$249,062	\$284,670	\$2,985,871	\$2,648,931
Btr	Reduced time to access and share video footage	\$388,800	\$427,680	\$470,448	\$1,286,928	\$1,060,364
Ctr	Avoided cost of diagnosing and replacing cameras	\$160,313	\$184,359	\$212,013	\$556,685	\$457,390
	Total benefits (risk-adjusted)	\$3,001,253	\$861,101	\$967,131	\$4,829,484	\$4,166,685

REDUCED COST OF ADDING MERAKI MV SMART CAMERAS

Evidence and data. Interviewees delayed adding cameras due to the cost and complexity of the process. Installation required by a specialized vendor and the time needed to configure the camera to work with the NVR, DVR and VMS drove up costs. The cost of an additional camera entailed more than the camera itself. Once all the costs were totaled it was easier and more cost effective to add cameras to a Meraki MV smart camera system versus a traditional option.

- In the survey, 73% of decision-makers cited having a fast and easy process for adding cameras as one of their top priorities in choosing a surveillance system.
- The city government interviewee noted that a wide variety of cameras were used in the previous system, which the organization developed over a 20-year period. The cost of adding cameras was unpredictable and always required using the camera vendor because of the system complexity.
- The healthcare services company interviewee observed that all cameras were tied back to the server with cable in the traditional camera

system. Many ports and protocols on the LAN and firewall had to be opened to add a camera and send data back to the corporate office and security operations center. Meraki MV smart cameras eliminate hardware and configuration complexities.

- The real estate investment company’s director of IT stated that there was a one to two week wait to schedule an AV company to install a camera. The total cost for adding a traditional camera was \$2,200 (\$400 for the camera, \$800 for labor to run cable and configure the NVR, and \$1,000 for cable). He contrasted this scenario to a recent request to add a Meraki MV smart camera to a residential building rooftop. A member of the property management team was able to visit the site and connect a new camera within two days of receiving the request, at an out-of-pocket cost of \$800 for the Meraki camera with a three-year license.

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

- In Year 1 the composite organization installs 1,500 cameras across 100 locations.
- The number of cameras increases to 1,725 in Year 2 and to 1,984 in Year 3, based on a

10% annual increase in locations and a 15% annual increase in the number of cameras.

- The cost per camera for a traditional camera is \$400.
- The cost per location of an NVR serving up to 16 cameras is \$1,071.
- The cost per location of a VMS serving up to 16 cameras is \$1,320.
- The total hardware costs for one location with 15 traditional cameras, one NVR, and one VMS is \$8,391.
- The installation and configuration cost per traditional camera is \$344. The installation cost per VMS is \$500. The VMS setup cost per camera is \$63. The cabling cost per traditional camera is \$200.
- The total installation and configuration cost of one location with 15 traditional cameras, one NVR, and one VMS is \$9,594.
- The annual cost per traditional camera for implementation of software patches and updates is \$500. The annual cost for VMS licensing is \$50 per camera. The annual cost per location for VMS maintenance is \$1,000.
- The total annual recurring costs for one location with 15 traditional cameras, one NVR and one VMS is \$9,250.
- The cost per camera for a Meraki MV smart camera is \$800.
- The total hardware costs for one location with 15 Meraki MV smart cameras is \$12,000.
- The installation and configuration cost per Meraki MV smart camera is \$344. The cabling cost per Meraki MV smart camera is \$200.
- The total installation and configuration cost of one location with 15 Meraki MV smart cameras is \$8,156.
- The annual cost per camera of a 1-Year Meraki MV smart camera license is \$180.
- The total annual recurring costs for one location with 15 Meraki MV smart cameras are \$3,000.
- When the composite organization implements Meraki MV in 100 locations with annual location growth of 10% and annual camera growth of 15% over three years, the present value of the choosing Meraki MV over a traditional camera system is almost \$2,649,000. This benefit calculation incorporates hardware, installation and configuration, and annual recurring costs.

“The fact that we have added 25 new Meraki cameras since completing the camera project, without adding any new facilities, really shows how much better the Meraki interface has been accepted and used by my customers. They are now looking at other places in their facilities that need cameras, rather than ignoring the coverage holes just to avoid having to monitor more cameras with a clunky system.”

Enterprise systems engineer, city government

Risks.

- The exact cost of adding a camera will vary by the traditional camera brand, the amount of time needed to run cable between the camera and the NVR/DVR/VMS, configuration time, and the labor rate in the local area. Forrester used labor time and hourly wage rates for installation tasks cited in recent industry association studies.

- Additional costs will be incurred when there is insufficient capacity in the existing NVR/DVR/VMS to expand the number of cameras. In those instances, the organization will have to purchase an additional NVR/DVR/VMS.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of more than \$2,600,000.

Cost Comparison: Traditional Versus Meraki MV Smart Cameras			
System Type	Camera hardware*	Installation and Configuration**	Recurring**
Traditional One location with 15 cameras, one NVR, one VMS	\$8,391	\$9,594	\$9,250
Meraki MV smart cameras One location with 15 smart cameras	\$12,000	\$8,156	\$3,000

* Hardware costs based on costs cited on security system distributors' websites and by TEI interviewees.

** Installation, configuration, and recurring costs based on industry association studies on labor rates and hours for common installation tasks.

Reduced Cost Of Adding Meraki MV Smart Cameras					
Ref.	Metric	Source	Year 1	Year 2	Year 3
A1	Number of cameras	Composite	1,500	1,725	1,984
A2	Incremental cameras	A1CY-A1PY	1,500	225	259
A3	Number of locations	10% growth	100	110	121
A4	Incremental locations	A3CY-A3PV	100	10	11
A5	Cost of traditional camera	Composite	\$400	\$400	\$400
A6	Cost of NVR	Composite	\$1,071	\$1,071	\$1,071
A7	Cost of VMS	Composite	\$1,320	\$1,320	\$1,320
A8	Subtotal: Total cost of hardware	$(A5 \cdot A2) + ((A6 + A7) \cdot A4)$	\$839,100	\$113,910	\$129,801
A9	Camera installation and configuration	Composite	\$344	\$344	\$344
A10	VMS setup	Composite	\$500	\$500	\$500
A11	VMS setup per camera	Composite	\$63	\$63	\$63
A12	Cabling	Composite	\$200	\$200	\$200
A13	Subtotal: Total installation and configuration	$((A9 + A11 + A12) \cdot A2) + (A10 \cdot A7)$	\$960,500	\$141,575	\$162,561
A14	Implementation of software patches and updates	Composite	\$500	\$500	\$500
A15	Camera software licensing – 1 year	Composite	\$50	\$50	\$50
A16	VMS maintenance cost	Composite	\$1,000	\$1,000	\$1,000
A17	Subtotal: Total recurring costs	$(A14 + A15) \cdot A2 + (A16 \cdot A4)$	\$925,000	\$21,250	\$23,938
At	Reduced cost of adding Meraki MV	A8+A13+A16	\$2,724,600	\$276,735	\$316,300
	Risk adjustment	↓10%			
Atr	Reduced cost of adding Meraki MV smart cameras (risk-adjusted)		\$2,452,140	\$249,062	\$284,670
Three-year total: \$2,985,871			Three-year present value: \$2,648,931		

REDUCED TIME TO ACCESS AND SHARE VIDEO FOOTAGE

Evidence and data. Meraki MV smart camera users saved up to 98% of the time it took to access and share video footage on their previous traditional system. Interviewees who were high-level IT and physical security managers were able to delegate the process of accessing and sharing video to local staff, recouping hours of executive time, and enabling staff to be more responsive to local needs.

- In the survey, 86% of decision-makers cited difficulty accessing and sharing specific footage as the top challenge that led to considering and implementing the Meraki MV smart camera system.
- The city government interviewee described their challenge: “We had difficulties with just being able to share footage. Everything filtered through IT. Towards the end it seemed like no one had been trained on how to pull footage, and it all started to fall back on my position.”
- The supermarket interviewee stated the benefit of the Meraki MV smart camera system: “There are many stakeholders in our enterprise that are now using the Meraki MV system. Previously they would have had to leverage our team to pull the video footage or contact a store manager on their busy day to pull the video for them. That’s one of the extra pluses for us.”
- The healthcare system interviewee described the Meraki MV smart camera system as light-years better than the previous solution. They

stated, “It literally takes [the process] from hours to minutes.”

- The city government interviewee observed that it took 2.5 hours to view 7 hours of video footage at four times speed with the previous system. In comparison, it takes less than 5 minutes to perform a Meraki MV motion search on 7 hours of video footage, resulting in a 97% time savings.

Modeling and assumptions.

- In Year 1, the composite organization has 100 locations. The number of locations increases to 110 in Year 2 and 121 in Year 3.
- Video footage searches are reduced by 90% — from 120 minutes to 12 minutes — saving 108 minutes per request. There are eight video search requests per month per location. 17,280 hours are saved in Year 1 at an average hourly wage of \$25 per hour, totaling \$432,000.

Risks.

- Time savings varies by the number of video footage requests per month, the length of the search period, and the skill level of the employee in performing searches. The pay scale of the employee conducting the searches also impacts the cost savings.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of almost \$1,100,000.

Reduced Time To Access And Share Video Footage					
Ref.	Metric	Source	Year 1	Year 2	Year 3
B1	Number of locations with cameras	Interviews	100	110	121
B2	Average minutes saved per request	Composite	108	108	108
B3	Number of requests per year	Composite	96	96	96
B4	Number of hours saved annually	B1*B2*B3/ 60 minutes	17,280	19,008	20,909
B5	Average cost per hour of individuals accessing footage	TEI standard	\$25	\$25	\$25
Bt	Reduced time to access and share video footage	B4*B5	\$432,000	\$475,200	\$522,720
	Risk adjustment	↓10%			
Btr	Reduced time to access and share video footage (risk-adjusted)		\$388,800	\$427,680	\$470,448
Three-year total: \$1,286,928			Three-year present value: \$1,060,364		

AVOIDED COST OF DIAGNOSING AND REPLACING CAMERAS

Evidence and data. Interviewees with traditional on-premises systems dreaded repairing and replacing problem cameras because their organizations often lacked a budget category for security system repairs, scheduling repairs with specialized technicians was inconvenient, and replacing a single camera came with a high price tag. Organizations often delayed or avoided repairs, which created significant gaps in their video surveillance coverage.

Meraki MV smart camera customers received replacements for problem cameras under the license agreement. Organizations with Meraki MV not only saved on repair costs, but they also achieved improved uptime and better surveillance coverage on their entire system.

- The city government enterprise systems engineer said: “The city typically would not replace cameras until they absolutely had to. Some cameras never got replaced that should have been because they didn’t have money. Usually when there was a renovation project or

a new building project, cameras would be integrated into the project. There was no cost center for access control or surveillance.”

- The healthcare services company national director of electronic physical security noted: “The biggest challenge we have is just replacing the failed or failing cameras that we have in place and then going back and evaluating dead spots throughout the organization from a true physical security perspective. A lot of our hospitals are in areas where there’s a probability of high crime. I’m finding more and more that we might not have solid coverage today. As I move forward, we’re eliminating all those gaps in coverage.”

Modeling and assumptions.

- In Year 1, the composite organization installs 1,500 cameras across 100 locations.
- The number of cameras increases to 1,725 in Year 2 and 1,984 in Year 3 based on a 10% annual increase in locations and a 15% annual increase in the number of cameras.

- Twenty-five percent of cameras have issues based on the 10-year age of the composite organization’s traditional cameras.
- The average cost per repair of traditional cameras is \$525, including trip charge, technician labor, and replacement camera.
- Meraki MV customer pays an average of \$50 per camera in overhead to diagnose and replace a camera. Replacement cameras are included in the Meraki MV software license agreement.
- The avoided cost of diagnosing and replacing cameras is \$178,000 in Year 1.

Risks.

- The number of cameras with problems will vary by the location and age of the camera. Outdoor cameras and older cameras are subject to a higher percentage of breakdowns.
- The cost per camera for repairs will vary by brand, type of camera, and the cost of technician labor.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of over \$457,000.

Avoided Cost Of Diagnosing And Replacing Cameras					
Ref.	Metric	Source	Year 1	Year 2	Year 3
C1	Number of cameras	Composite	1,500	1,725	1,984
C2	Percent of cameras with issues	25% per year	375	431	496
C3	Cost per camera with traditional	Interviews	\$525	\$525	\$525
C4	Cost per camera with Meraki	Interviews	\$50	\$50	\$50
Ct	Avoided cost of diagnosing and replacing cameras	C2*(C3-C4)	\$178,125	\$204,844	\$235,570
	Risk adjustment	↓10%			
Ctr	Avoided cost of diagnosing and replacing cameras (risk-adjusted)		\$160,313	\$184,359	\$212,013
Three-year total: \$556,685			Three-year present value: \$457,390		

UNQUANTIFIED BENEFITS

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

- **Ability to know when cameras are offline without traveling to the site.** Surveyed decision-makers cited this capability as one of the top two benefits of the Meraki MV system. Users always know the status of every camera in their video surveillance system by checking the Meraki MV dashboard. They save time by eliminating the need to do individual camera checks.

The city government enterprise systems engineer described the pre-Meraki MV process for verifying camera status: “IT was tasked with going out every morning to verify that all 200 cameras were functioning because they would drop offline and there was no notification. They also had to verify that the recordings were taking place on the back end because sometimes they would stall and stop working.”

- **Improved reliability.** The desire for improved reliability was a primary motivator of the search for a new camera system.

In a traditional system when an NVR or DVR stops working all the cameras that are wired to it also stop working. The entire location is left unprotected. A loose cable can cause a camera to stop working. The cable problem can easily remain undetected until footage needs to be pulled.

The real estate investment trust director of IT observed: “Fifty to 60% of the cameras were offline and not working anymore — whether it was just a bad camera or a 10-year-old camera that finally failed. We found NVRs not working anymore on the property and had no clue that was even happening.”

- **Lower cost to maintain hardware, software, firmware, and configuration updates.**

Surveyed organizations reported savings in maintenance costs for hardware, software, firmware, and configuration updates of up to 75% with Meraki MV. Interviewed decision-makers were frustrated with the time and expense of keeping their traditional systems up and running.

Traditional NVR/DVR systems may offer a lower initial cost per camera, but the savings disappear as the organization expands its video surveillance system. There are many hidden costs that become apparent after the initial hardware investment. Significant staff time is required to replace failed equipment, add cameras, update the software, and manage video storage and retention. As new hardware is added, staying current with software and firmware updates becomes increasingly challenging.

All Meraki MV smart camera software updates are managed automatically for the delivery of new features and security updates. Updates and new features are part of the license agreement.

The real estate investment trust director of IT described the updating process: “When we buy a camera system from an audio-visual company they may install a very nice camera system, but once the installer leaves no one ever updates the firmware on the NVR or camera. The hardware sits there for years without getting updated. With Meraki MV the system warns us when we are behind on a firmware update. We are always current on our Meraki MV code compared to the products installed by other companies.”

The city government enterprise systems engineer noted: “Cost was a big thing on the back end. Every time [our operating system] required us to move to a new version, a complete upgrade on the camera system was needed. We had to have the company that

installed the camera system perform the upgrade at a huge cost”.

- **More predictable expansion costs.** Meraki MV smart cameras include onboard storage on every camera, thereby eliminating the need for an NVR, DVR or VMS to store and manage video footage. VMS functions are handled by the Meraki MV cloud dashboard. Meraki MV users never have to worry about adding recording and video management systems when they want to add cameras. Users with traditional on-premises systems often face difficult decisions when they want to add a camera and find out that their DVR/NVR or VMS lacks the capacity for additional camera connections.

- **Avoiding additional hardware expenses.** The city government enterprise systems engineer estimated an annual savings of \$50,000 with Meraki based on the cost of the camera and other hardware that had to be upgraded to add cameras to the previous traditional on-premises system.

The healthcare system national director of electronic physical security observed: “With any camera that ties back to an NVR or headend we have to purchase a server, a specialized desktop computer, and the specialized software to view the cameras at an estimated cost of \$10,000 to \$15,000. With Meraki we don’t have to purchase any of that.”

The real estate investment trust director of IT stated: “We looked at another company. They were just starting into their cloud systems, but they still needed a controller, or what we call a server, on premise and it’s something that we didn’t want. We don’t want another piece of hardware at the property.”

- **Improved cybersecurity.** Meraki MV includes security updates in its licensing agreement.

Decision-makers who previously were concerned about vulnerabilities in their old systems gained confidence that their Meraki MV systems were protected from cybersecurity attacks.

The city government enterprise systems engineer expressed his cybersecurity concerns: “I oversaw cybersecurity for our organization for several years. I am very security conscious, and security was a top priority in selecting a new camera system. I had so many different cameras and I had no idea of how many of them had vulnerable firmware.”

Cybersecurity is a significant disruptive cost in operating a video surveillance system given the vulnerabilities generated by having addressable devices on the organization’s network.

According to the Ponemon Institute’s 2021 Cost of Data Breach Study, the global average cost of a data breach is \$4.24 million. The Ponemon Institute is a research firm specializing in privacy, data protection, and information security policy.

- **Lower video storage costs.** Surveyed decision-makers reduced their video storage costs by up to 60%. Interviewees were often surprised by the reduction in storage and bandwidth that they achieved with the Meraki MV system.

The city government enterprise systems engineer noted the positive impact of changing to Meraki MV: “We save between 23 and 30 terabytes of video storage. This is a huge savings, and it has allowed us to eliminate some older array networks and move to faster, newer systems. Reclaiming almost 30 terabytes was a huge cost saver.”

- **Reduced personnel costs to monitor cameras.** The simplicity of the Meraki MV system allowed interviewed decision-makers to

use lower-paid personnel to download the video footage. IT directors were able to recoup half their time dedicated to working with security systems by delegating video pulls to administrative personnel. Individual locations were also more self-sufficient. Half of the respondents in the survey indicated that their key reason for choosing Meraki MV over other systems was operational simplicity.

The city government enterprise systems engineer observed: “More people are using the system now. They are monitoring the system and providing video, and they make much less money than I do. We are achieving at least a 50% savings in personnel costs.”

- **Reduced energy costs.** Meraki MV interviewees were able to reduce the footprint of their server rooms and decrease cooling costs. Most surveyed organizations saved 10% to 30% in energy costs.

The healthcare system national director of electronic physical security observed: “I was trying to reduce the footprint of the server room which would decrease BTUs [British thermal units] and decrease my electricity utilization in the MDFs [main distribution frames] and IDFs [intermediate distribution frames]. I’ll put the load onto my switches where I am already paying for BTUs and air conditioning.”

FLEXIBILITY

The value of flexibility is unique to each customer. There are multiple scenarios in which a customer might implement Meraki MV smart cameras and later realize additional uses and business opportunities, including:

- **Advanced intelligence for anomaly detection.** The healthcare system national director of electronic physical security has plans to use future AI enhancements to the Meraki MV system, available through Meraki

MV partnerships, to detect anomalies such as fights or gatherings of large crowds. Package left behind detection will also be valuable in healthcare spaces.

- **Customer traffic pattern mapping for better merchandising.** The supermarket senior director of loss prevention is looking forward to using heat mapping and traffic pattern analysis to improve product placement and the customer in-store experience.
- **Cost-effective security patrol monitoring.** The real estate investment company director of IT is testing sending Meraki video streams to a third party to remotely monitor parking garages during evening and early-morning hours. If it observes a car break-in, the third party will advise the intruder by loudspeaker that they have called the police. The director of IT told Forrester, “9.5 times out of 10 the person runs out of the garage, and they are gone.” The real estate investment company reduces security guard costs while continuing to provide a high level of protection in parking garages.
- **Integration with access control system.** The city government’s enterprise systems engineer plans to upgrade its 1998 vintage access control system to current technology standards. The chosen access control system vendor will integrate with Meraki MV smart cameras through an API. A log file will be created for anyone opening a door along with a link to the video footage of the person entering or leaving the building.

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
Dtr	Cost of Meraki MV Cameras	\$2,316,000	\$0	\$347,400	\$399,510	\$3,062,910	\$2,903,265
Etr	Cost of training	\$1,313	\$0	\$131	\$144	\$1,588	\$1,529
	Total costs (risk-adjusted)	\$2,317,313	\$0	\$347,531	\$399,654	\$3,064,498	\$2,904,794

COST OF MERAKI MV CAMERAS

Evidence and data. Interviewed decision-makers readily added Meraki MV smart cameras because of the ease of installation and predictability of costs. They were never constrained by the capacity limitations of an NVR, DVR or VMS.

- Interviewees paid an average of \$800 per Meraki MV camera.
 - The real estate investment trust director of IT stated, “We’ll put the \$800 camera up there, plug it in and you’re good to go within a couple hours,” when referring to installing a Meraki MV camera in a building rooftop location.
 - The supermarket senior director of loss prevention noted their typical cost was \$750 per camera with about 35 to 65 cameras per store.
- The cost of installation, cabling and configuration was \$544 per camera based on industry association studies.
- Meraki MV costs for a 1-year license was \$180. License costs include patches and updates, as well as replacements for non-working cameras.

Modeling and assumptions.

- In Year 1, the composite organization purchases 15 cameras per location for 100 locations. At \$800 per camera for 1,500 cameras, the organization spends \$1,200,000.
- The cost of additional camera purchases is \$180,000 in Year 2 and \$207,000 in Year 3 based on a 10% per year increase in the number of locations and a 15% per year increase in the number of cameras.
- The combined total for cameras, installation, cabling and configuration, implementation of software patches and updates, and camera software licensing is \$2,316,000 in Year 1. The combined total for additional cameras is \$347,400 in Year 2 and over \$399,500 in Year 3.

Risks.

- Total camera costs will vary by the camera models chosen. Installation costs will vary based on local labor rates, the location of camera placements, as well as ceiling height and ceiling material.

Cost Of Meraki MV Cameras

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
D1	Cost per camera	Interviews	\$1,200,000		\$180,000	\$207,000
D2	Cost of installation, cabling, and configuration	Assumption	\$816,000		\$122,400	\$140,760
D3	Implementation of software patches and updates	Assumption	\$30,000		\$4,500	\$5,175
D4	Camera software licensing - 1 year	Assumption	\$270,000		\$40,500	\$46,575
Dt	Cost of Meraki MV Cameras	D1+D2+D3+D4	\$2,316,000	\$0	\$347,400	\$399,510
	Risk adjustment	0%				
Dtr	Cost of Meraki MV Cameras (risk-adjusted)		\$2,316,000	\$0	\$347,400	\$399,510
Three-year total: \$3,062,910			Three-year present value: \$2,903,265			

Results. Forrester used a 0% risk adjustment factor for the cost of Meraki MV cameras, yielding a three-year total PV of \$2,900,000. A 0% risk factor was used as the pricing was based on current Meraki MV list prices.

COST OF TRAINING

Evidence and data. The ease of the training process enabled users to confidently operate the Meraki MV smart camera system and reduced their reliance on department managers for operational assistance.

- Interviewees spent an average of half an hour to train an employee on Meraki MV smart cameras.
- The healthcare system national director of electronic physical security stated: “If I’m training three people on the site and I train them individually, it takes me about an hour and a half. I typically only train leaders at the sites, not necessarily the security guards.”
- The supermarket senior director of loss prevention observed: “We sit down and show them about a 35 to 40 minute tutorial of exactly what the system does, how to use it, and how to export video. It’s one-off training. After that, it will be the responsibility of the

“We send the property team the training videos from the Meraki website and that’s how we train them. There is really no training cost at all. It is really just the hardware purchases and the installation.”

Director of IT, real estate investment trust

local loss prevention personnel responsible for that store to come back and follow up with any extra training afterward.”

- The city government enterprise system engineer noted: “I just started using [a video recording] function and created training videos. Now when we have new training, I just send out a link to the videos and a link to the PDF of the how-to stuff, and I turn them loose. I’ve gotten back no feedback on the last three

I've sent out other than: 'We love the system. It's easy to use.'"

Modeling and assumptions.

- Based on 100 locations, 30 minutes of training per location, and an average hourly wage per trainee of \$25, the cost of training in Year 1 is \$1,250.
- Additional training costs are \$125 in Year 2 and \$138 in Year 3 as the number of locations increases by 10% per year.

Risks.

- The cost of training can vary based on the number of minutes of training required and the hourly wage of the participants.

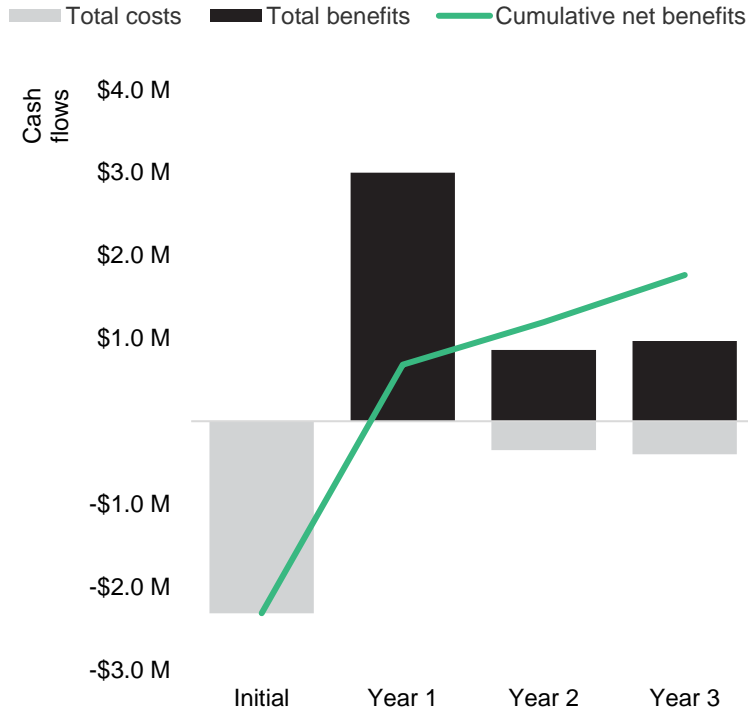
Results. To account for these risks, Forrester adjusted this cost upward by 15%, yielding a three-year, risk-adjusted total PV of over \$1,500.

Cost Of Training						
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
E1	Number of new locations	Composite	100		10	11
E2	Training required	Interviews	50		5	6
E3	Average cost per hour of individuals accessing footage	Interviews	\$25	\$25	\$25	\$25
Et	Cost of training	$E1 * E2 * E3$	\$1,250	\$0	\$125	\$138
	Risk adjustment	↑5%				
Etr	Cost of training (risk-adjusted)		\$1,313	\$0	\$131	\$144
Three-year total: \$1,588			Three-year present value: \$1,529			

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)



The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.

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

Cash Flow Analysis (Risk-Adjusted Estimates)

	Initial	Year 1	Year 2	Year 3	Total	Present Value
Total costs	(\$2,317,313)	\$0	(\$347,531)	(\$399,654)	(\$3,064,498)	(\$2,904,794)
Total benefits	\$0	\$3,001,253	\$861,101	\$967,131	\$4,829,484	\$4,166,685
Net benefits	(\$2,317,313)	\$3,001,253	\$513,570	\$567,477	\$1,764,986	\$1,261,891
ROI						43%
Payback						10 months

Appendix A: Total Economic Impact

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

TOTAL ECONOMIC IMPACT APPROACH

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

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

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

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

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



PRESENT VALUE (PV)

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



NET PRESENT VALUE (NPV)

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



RETURN ON INVESTMENT (ROI)

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



DISCOUNT RATE

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



PAYBACK PERIOD

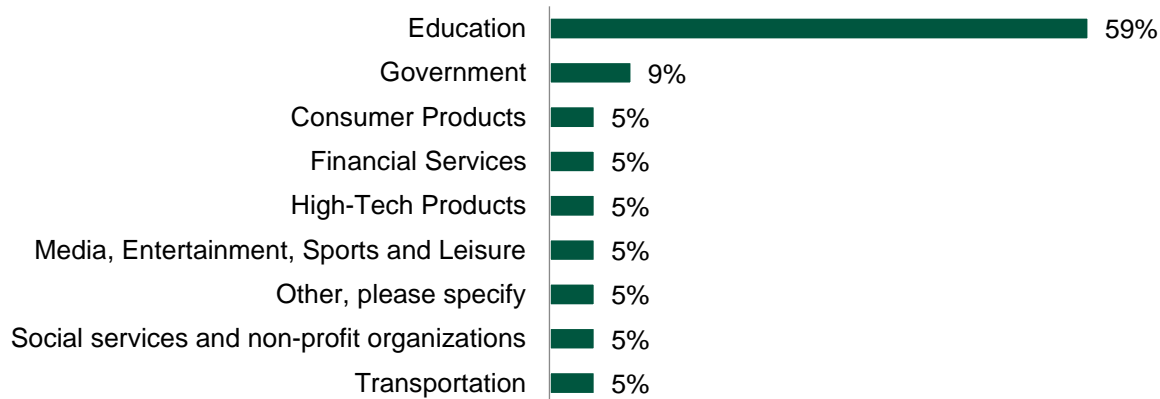
The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost.

Appendix B: Interview And Survey Demographics

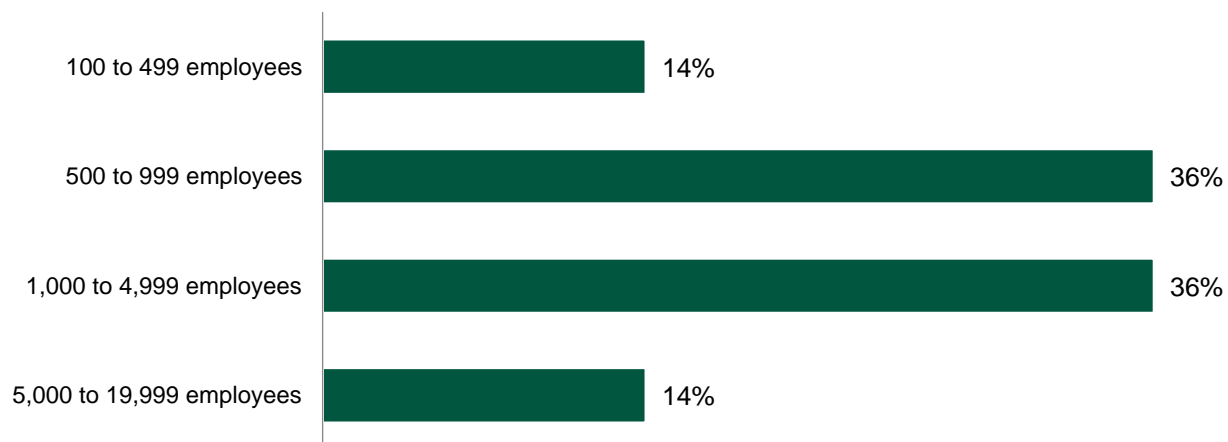
Interviewed Decision-Makers			
Interviewee	Industry	Region	Employees
Enterprise systems engineer	City government	Headquartered in Arizona	1,500
Director of IT	Real estate	Headquartered in Illinois	3,000
National director of electronic physical security	Healthcare	Headquartered in Texas	110,000
Senior director of loss prevention	Supermarket	Headquartered in California	16,000

Survey Demographics

“Which of the following best describes the industry to which your company belongs?”



“Using your best estimate, how many employees work for your firm/organization worldwide?”

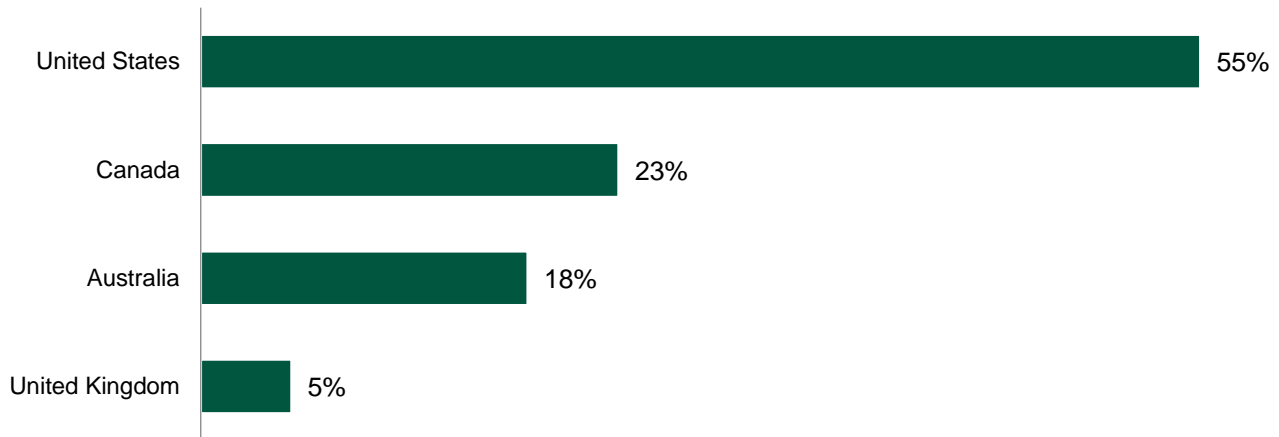


Base: 22 users of Meraki MV smart cameras

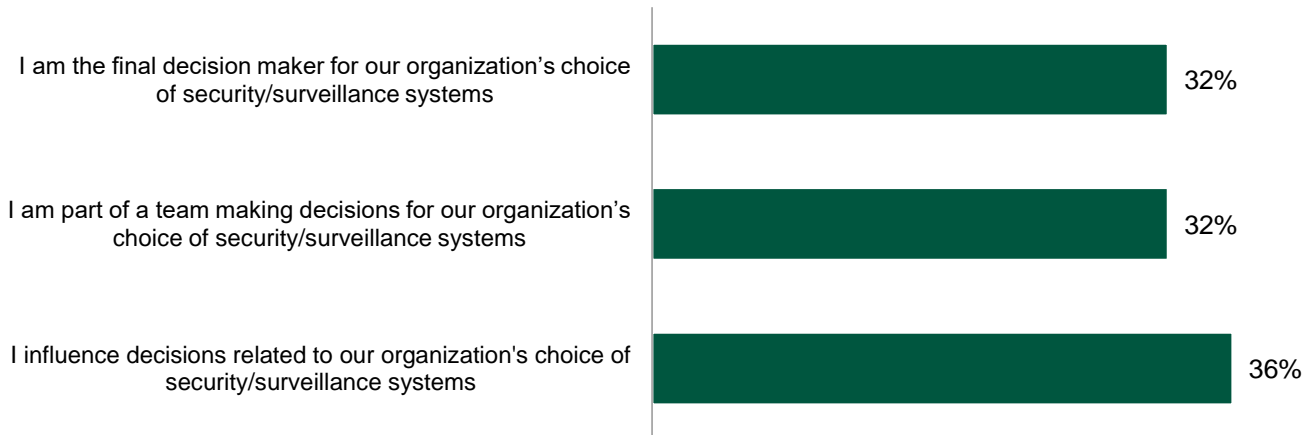
Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco Meraki, August 2021

Survey Demographics

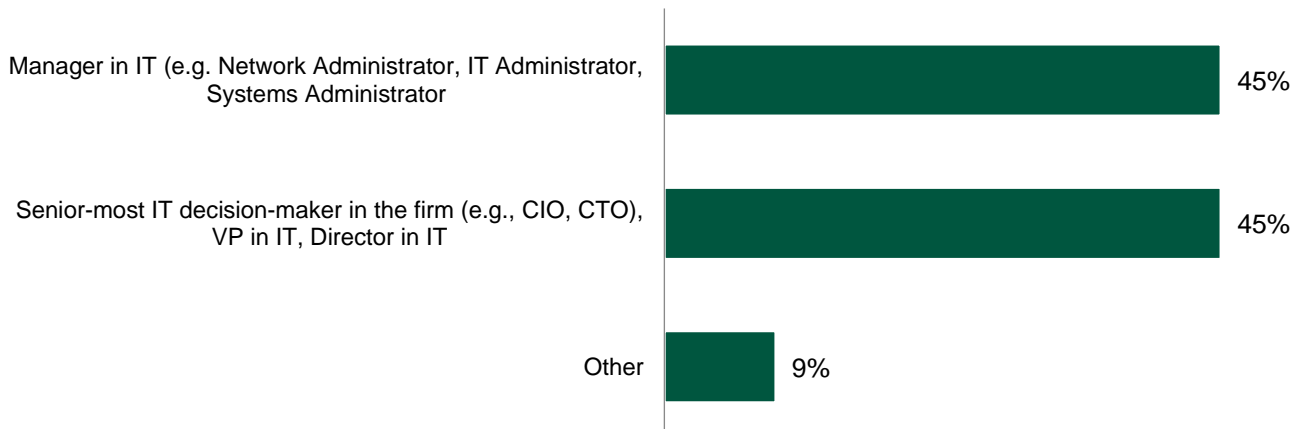
“In which country do you work?”



“What is your level of responsibility when it comes to choosing a cloud-based video surveillance at your organization?”



“Which title best describes your position at your organization?”

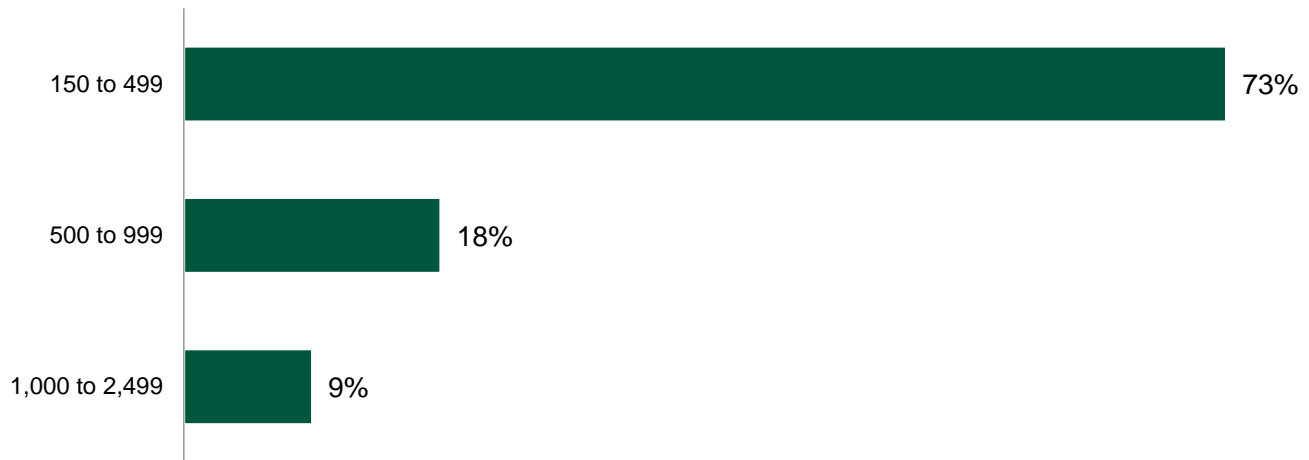


Base: 22 users of Meraki MV smart cameras

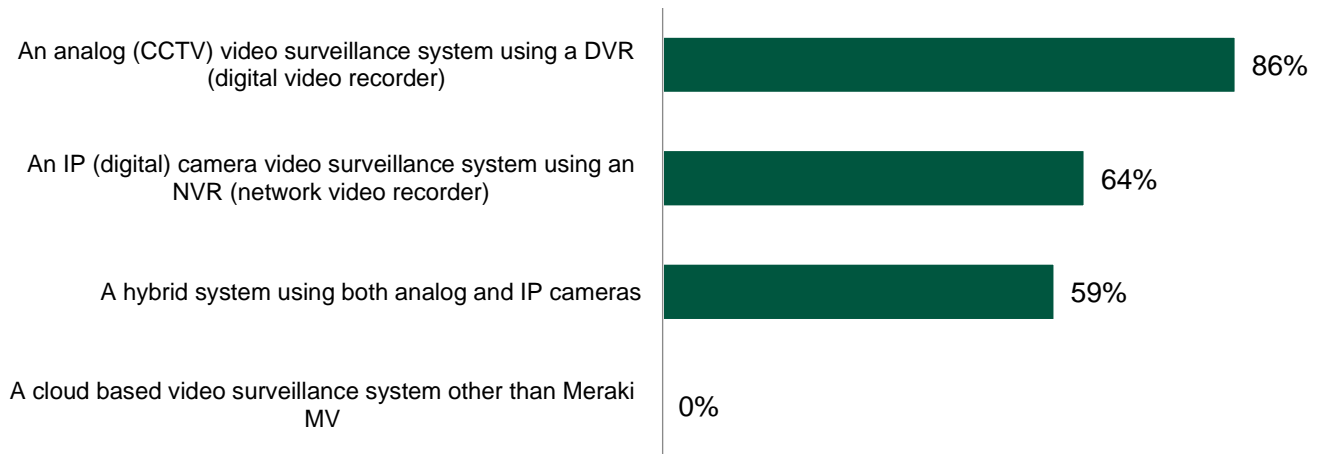
Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco Meraki, August 2021

Survey Demographics

“Using your best estimate, how many Meraki MV cameras does your organization have?”



“Please describe your environment prior to using Meraki MV. What cameras/surveillance system(s) were you using?”



Base: 22 users of Meraki MV smart cameras

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco Meraki, August 2021

Appendix C: Endnotes

¹ Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

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