

ESG Economic Value Validation

# Quantifying the Value of Google Chromebooks with Chrome Enterprise Upgrade

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## Executive Summary

Google engaged ESG to conduct a detailed Economic Value Validation (EVV) and develop a quantitative model examining how an investment in Chromebook end-user and kiosk devices could deliver efficiency and cost savings over a three-year period. The analysis is designed to help IT organizations determine the fully-burdened costs and benefits of deploying Chromebooks compared with a “present mode of operation” (PMO) that reflects how organizations typically deploy Windows-based, end-user computing devices. This analysis is built upon ESG’s evaluation of Chromebook devices, in-depth interviews with Google engineers and customers, end-user case studies, ESG qualitative and quantitative market research with IT decision makers, and ESG’s general familiarity with end-user computing. It is designed to provide prospective customers with a comprehensive picture of the potential direct and indirect cost and benefit drivers they should take into account when considering an investment in Google Chromebooks.

As discussed in the following pages, Google Chromebooks offer the opportunity for organizations to significantly lower both capital and operational expenses, while greatly reducing risk to the organization. Chrome OS is purpose-built for the cloud, removing many compute, storage, and application requirements from the device, and can therefore accomplish significantly more with lower cost hardware and less software. Organizations looking to improve security, mobility, and collaboration while limiting cost may greatly benefit by transitioning some or all of their end-user devices to Chrome Enterprise Upgrade-based Chromebook devices instead of costly PCs running legacy operating systems such as Windows and Mac/iOS.

## Challenges

IT’s responsibilities for end-user computing devices and applications extend to purchasing, deploying, managing, updating, troubleshooting, maintaining, repairing, protecting, and securing. Traditional devices—most commonly, Windows- and Mac/iOS-based PCs and laptops, as well as tablets—pose challenges. They are expensive to buy because each one must provide a complete computing infrastructure that is equipped for current computing needs, and generally upgradable for future needs, for a wide range of applications. They are also expensive to maintain: Software licenses must be purchased and tracked, and it takes significant effort to maintain corporate standards for access control, security, application delivery, peripheral connection, etc. When there is a problem, users bring their devices to IT, who must spend time (often working with component vendors) troubleshooting problems, fixing components, reinstalling software, etc. The costs of acquisition, deployment, and ongoing management and maintenance quickly become burdensome. But until recently, there has been no other option.

Another key issue is security. Keeping all the devices in an organization up to date with the latest security patches is a monumental task, consuming time and money, and yet essential in today’s vulnerability landscape. Also, it is standard operating procedure to store data on laptops and PCs; as a result, IT has had to develop procedures and implement solutions to prevent data loss and data access in the event of devices being lost or stolen. While these efforts can be effective, they often result in significant lost productivity, as it can take days to recreate data and to configure a new device appropriately.

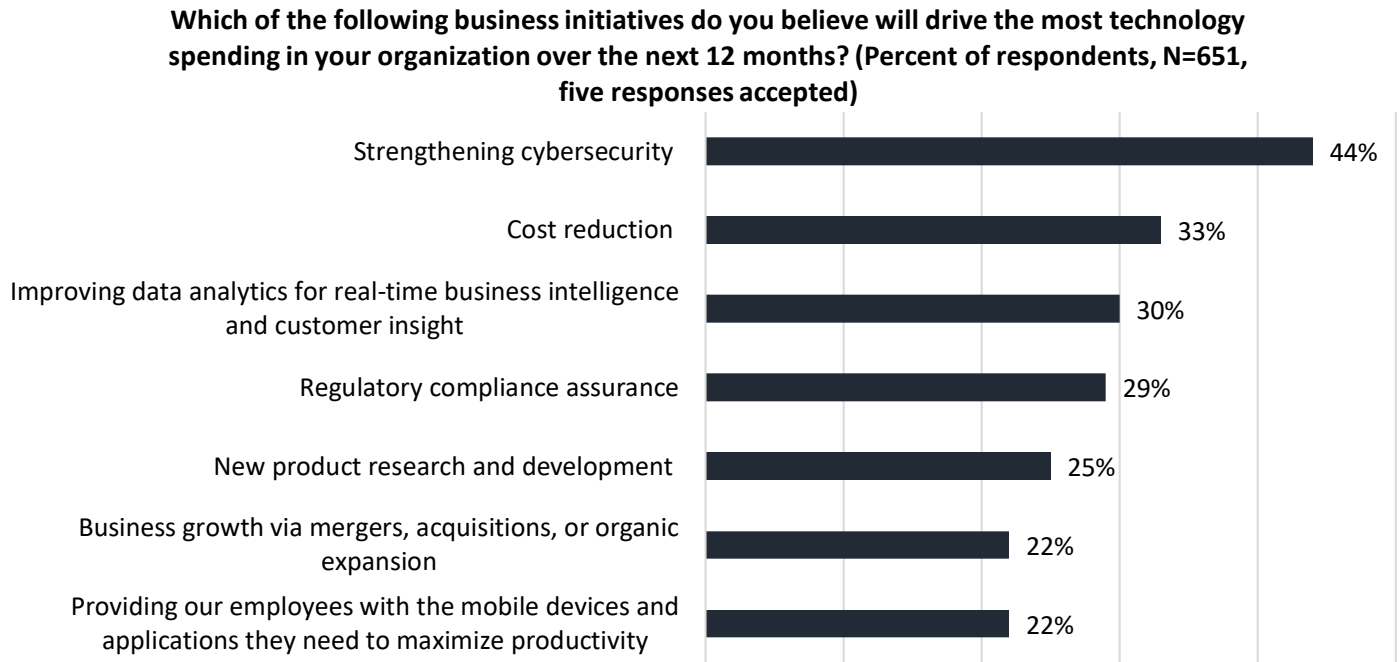
### Highlights of ESG’s Three-year Modeled Scenario of Google Chrome Enterprise Upgrade on Chromebooks for a Medium Enterprise:

- 146% return on investment (ROI)
- \$1.5M in expected savings and benefits over three years
- 63% lower cost of administration
- 43% lower cost of hardware
- 52% lower TCO of devices

*when compared with deploying Windows-based laptops for use in the enterprise.*

ESG research confirms the importance of security and cost reduction. In a recent study, respondents indicated that strengthening cybersecurity and reducing costs are two of the business initiatives that they believe will drive the most technology spending at their organizations in 2018. Rounding out the most-cited initiatives is providing employees with mobile devices and applications needed to maximize productivity (see Figure 1).<sup>1</sup> It is clear that deploying end-user devices that improve security and reduce costs while improving productivity would lead to a winning outcome.

**Figure 1. Top Seven Business Initiatives Driving Technology Spending in 2018**



Source: Enterprise Strategy Group

Traditional devices suffer other challenges as well. First, traditional laptops tend to have large screens and batteries that generate more heat, since they must be available for any use case and application. Next, over time, traditional laptops slow down as services are run in parallel. Because they are designed to handle any use case, they tend to be complex—many devices offer a significant amount of functionality that most users never need. Organizations are bolting on the ability to leverage cloud applications and data as well as collaboration solutions; most traditional devices were not built for that, and it can impact performance. Another challenge for IT is supporting laptops from different vendors, all needing expensive support plans, and complicating maintenance; finding and fixing problems may involve OS, hardware, and component vendors, who often point fingers at each other.

### The Solution: Chromebooks with Chrome Enterprise Upgrade

Chromebooks are notebook devices that run Google’s Chrome OS and are designed primarily for cloud-based applications and data. The hallmarks of Chromebooks are low cost, simplicity, ease of use, and security. They can be used for many functions: office workers, front-line workers in the field, kiosks, etc. Many hardware vendors (including HP Inc., Dell, Lenovo, Samsung, and Acer) offer Chromebooks in different sizes and styles. They are built to use the cloud-based Google G Suite that includes Gmail (email), Google Calendar (calendar), Hangouts (collaboration), Google Docs (word processing), Google Drive (storage), Google Sheets (spreadsheet), Google Slides (presentation), and more. Users simply log into their Google Account and their applications, data, and preferences are launched. As a result, in situations where it makes sense, the same device can be used by different end-users. For example, in a call center, a day-shift worker may log into his Gmail

<sup>1</sup> Source: ESG Research Report, [2018 IT Spending Intentions Survey](#), February 2018.

account for the day, with his applications, data, and preferences available; when the night-shift worker arrives, she logs in and her desktop, applications, preferences, etc. are loaded. By upgrading Chrome OS to Chrome Enterprise Upgrade, organizations can unlock enterprise-level features for enhanced productivity and collaboration, simpler IT administration, improved security, and enterprise-level support.





Key features of Chromebooks with Chrome Enterprise Upgrade include:

- **Fast performance.** In addition to the use of solid-state drives (SSDs), Chromebooks are designed to minimize hardware processing and memory requirements by offloading many traditional functions to the cloud. They do not require bigger batteries or generate excessive heat, and they are free of the “bloatware” that traditional laptops have, enabling faster booting and overall performance.
- **Centralized management in the cloud**, shrinking the amount of time and effort IT spends handling them. Administrators can push out user and device settings, such as application, feature, and security policies, from a central console. Automatic, no-cost software updates occur in the background, eliminating the need for IT to manage that process, while ensuring up-to-date features.
- **Built-in virus protection and security**, with threat scanning at each start up, Google Safe Browsing, and data encryption.
- **Automatic file backup to the cloud**, making them accessible from any device. In addition, since no data resides on the device, if it is lost or stolen, no data is vulnerable.
- **Longer battery life and faster charging**, which helps increase up-time and productivity and minimize power consumption.
- **Easy download of applications from the Google Play Store**, including Android apps, so enterprises can better manage and control application distribution.
- **Additional business-focused features**, available via Chrome Enterprise Upgrade (\$50/year/device), such as support for single sign-on, integration with Microsoft Active Directory, EMM and UEM management, including VMware AirWatch, Citrix, IBM, Zoho, and remote management of printers, browser extensions, software updates, and networks.

Chromebooks offer lower cost of acquisition and TCO. They can be used in offline mode, as well; Chromebooks do provide some local storage, and applications can work without an Internet connection, syncing content once reconnected.

**Figure 2. Chromebooks with Chrome Enterprise Upgrade**


Chromebook Devices

-  Simple
-  Low cost
-  Fast
-  Secure



Chrome Enterprise Upgrade

-  Enhanced Productivity & Collaboration
-  Efficient IT Administration
-  Enterprise Grade Security
-  Enterprise Level Support

Cloud focused 

*Source: Enterprise Strategy Group*

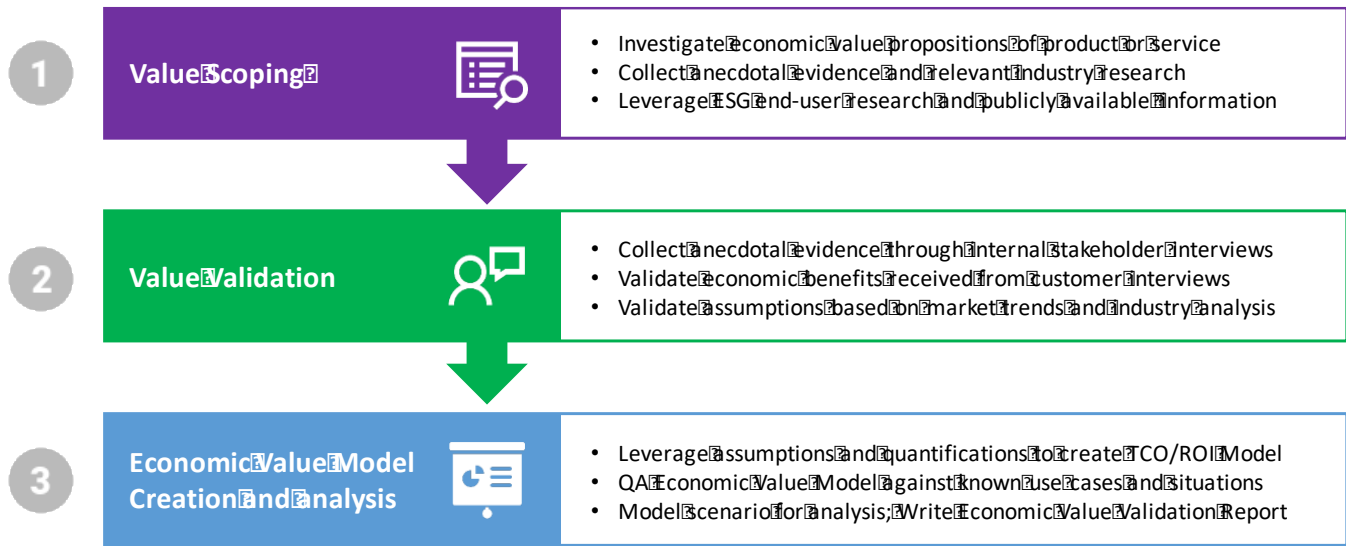
**Economic Value Validation (EVV) Process**

ESG’s Economic Value Validation process is a proven method for understanding, validating, quantifying, and modeling the economic value propositions of a product or solution. The process leverages ESG’s core competencies in market and industry analysis, forward-looking research, and technical/economic validation. The EVV process consists of four main phases: value scoping, validation, quantification, and model development.

In the value scoping phase, ESG works with a vendor’s internal stakeholders to discuss the ways in which the product or solution can impact potential customers. These economic benefits may be in the form of cost savings (lower CapEx or OpEx), cost avoidance (e.g., reducing compliance risk, eliminating the need for professional services), increased revenue (e.g., faster task completion, ability to handle more desktops), and other soft benefits (e.g., increased user productivity, higher customer satisfaction). In the value validation phase, ESG conducts in-depth interviews with end-users to better understand and quantify how these potential value propositions have impacted their organizations, particularly in comparison with previously deployed and/or experienced solutions.

In the final stages, ESG blends the quantified values revealed through the stakeholder and customer interviews with known industry values and additional research, resulting in a validated set of assumptions on which to build a scalable and dynamic TCO/ROI model. This [Economic Value Model \(EVM\)](#) accepts as inputs the answers to typical qualifying questions regarding a potential customer’s IT environment and business needs. The model then returns a detailed report of expected savings, TCO, and ROI over a given time period when compared with a relevant, defined present mode of operation. An overview of the ESG Economic Value Validation process is shown in Figure 3.

**Figure 3. ESG EVV Methodology**



Source: Enterprise Strategy Group

### Economic Value Overview

ESG’s Economic Value Validation process revealed that deploying Chromebooks in the enterprise can provide significant cost savings and opportunities for economic benefit. ESG found that Chromebooks help organizations in three primary areas:

- 1) Reduced acquisition costs, including hardware and software.
- 2) Reduced operational costs, including deployment, administration, support, maintenance, and power.
- 3) Improved business uptime, including lower data risk, increased user productivity, and less downtime.

Chromebooks can replace traditional Windows, MacOS, or iOS devices used for kiosks (such as for event registration), field workers (such as insurance adjusters or utility workers), office workers, and more, whether they have basic, advanced, or power-user requirements.

- Basic requirements: mostly web surfing, email, and chat; low CPU and memory needs; need long battery life and portability; simplified user experience.
- Advanced requirements: run several applications simultaneously; moderate CPU and memory needs; battery life and portability are important as is a good user experience.
- Power-user requirements: run many applications simultaneously; high CPU and memory needs; high storage capacity needs; advanced video support; touchscreen support.

ESG validated Chromebook’s economic value propositions through a series of customer case studies and interviews with a variety of organizations and individuals that had deployed Chromebooks in the enterprise. These organizations covered a range of industries including utilities, health services, and industrial services; deployments ranged from medium to very large organizations, with hundreds to thousands of employees and devices, and locations around the globe. These customers revealed how Chromebooks helped them reduce costs and improve business in several ways.



## Cost of acquisition

For traditional Windows, Mac, and iOS devices, hardware and software are expensive. In terms of hardware, traditional devices—such as Windows and Mac laptops, and tablet devices—are built to handle almost any task and application, so they are designed with hefty resources, including screens, graphics cards, CPU, memory, and data storage. OS upgrades often add costs, and servers are needed to support applications. Software licenses are also costly, for productivity applications like Microsoft Office, mobility software, and security software such as virus scanning. When devices are lost, stolen, or broken, they must either be repaired (often involving component vendors) or new devices must be purchased for the fully weighted costs of hardware, software, and support.

For Chromebooks, built for cloud-based applications and data, the hardware cost is significantly lower, and OS upgrades are delivered automatically, with no additional operational cost. G Suite applications are less expensive than traditional tools, and no mobility or antivirus software is needed. No servers are required for supporting cloud-based Google applications. Chrome Enterprise does add a minimal cost but is not required for all use cases. Chromebooks can be replaced at low cost, and can also be re-imaged instead of repaired. The customers that we spoke with generally cited cost reduction as the number one benefit seen to date:

*“We spent £900 on a laptop and a Chromebook is £140. That’s a no-brainer. It has its own ecosystem – you don’t have to worry about patching, you don’t have to worry about remote management, you don’t need to worry about anti-virus, because it’s all in-built.”*

*“We have sunken costs with other devices, with their extended contracts. In some of the areas we had an overpriced laptop with an extended battery and a larger screen, attached to a cart because it had to be secured to something but still mobile. The laptops were \$2,700 to \$3,000 plus \$100s in software, Windows license, other pieces, encryption. Plus \$800-\$900 for a cart, \$50 for the lock and other wiring, and now it’s a big bulky piece of equipment to haul in and out of rooms instead of being able to walk over and sit with a patient. Instead, we got a \$220 Chromebook plus \$150 maintenance – that’s like a 15:1 reduction in cost – if you can provide the same experience, then the patient experience and interface with caretaker is improved.”*

*“For our office workers, they had \$1,500 laptops; [replacing them] even with the business edition Chromebook, \$500 plus the management license, you’re still well under half. In the 3- to 5-year service window, if you had to purchase another to replace it because of wear and tear, you’re still within range.”*





## Operational Costs

Traditional devices add operational costs in many ways, starting with larger batteries to run the hefty configured resources. They take longer to charge and consume more power than Chromebooks. Support contracts are also expensive, as are the costs of troubleshooting and repair. Bolt-on software takes additional administration effort, as IT handles customization and support of OS, application, drivers, and integration tasks. IT must spend significant time planning, deploying, and updating; managing applications, access, and security; troubleshooting, wiping/repurposing units; and more. These tasks consume significant time and add to the operational cost.

Chromebooks are lighter weight devices and take less time to charge, resulting in less power consumption. There is no extended support contract to purchase; a one-year warranty is included from the device manufacturer, and once that expires, the low purchase price often makes it more cost-effective to simply replace the hardware, which takes no time to personalize because that's done in the user profile and delivered on login from any machine. No hardware troubleshooting or repair is needed. They do require administrative time for customization and support of OS, application, and integration activities, but we found them to be slightly less costly. With fewer models, the planning process is simpler, as is deployment, which requires just a Gmail account and Chromebook serial number. Updates are automatic and transparent, and applications are installed and removed simply using the Google Play Store or pushed from a management console. Built-in security removes that burden from administrators, who are also mostly relieved of troubleshooting and repair tasks, since devices can simply be wiped and re-issued. Chromebooks can also be managed with UEM or EMM software so as not to add another management silo.

One customer we spoke with uses Chromebooks for kiosks in a nationwide health club system. He appreciated that everything was included to set up, deploy, and run on a Chromebook; they didn't have to buy independent kiosk applications, and deployment and repurposing took minutes. Other customers had similar experiences to share:

*“Deployment is so simple – put the serial number in the management console, and people just log in. It’s fantastic.”*

*“It takes us 2-3 minutes to deploy a Chromebook. And for updates and patching, it’s eight seconds done automatically in the background, vs. 30-60 minutes with a PC. Also, fewer things can go wrong – so it’s a black and white situation, it’s either fixable or not. We don’t spend a long time identifying problems and getting vendor support.”*

*“If your Windows machine acts up, you’ll bring it in and we’ll sit and diagnose it. With a Chromebook, I’m just going to hand you the one I’m using, and you log into that. Then I’ll reset it with PowerWash and use it myself.”*

*“With Chromebooks, we don’t have to have a bunch of devices up to date and ready—we can just have a stack of them sitting there. If something’s wrong you can figure it out later – give someone a generic device in the same group and let them just get back to work.”*

*“With Chromebooks, we don’t have to disrupt the whole business with change management or big discussions and approval—we just keep rolling on with better, upgraded functionality. We quite like that.”*

*“For now, we still need to employ a couple of people to build desktops and laptops. I don’t envision us having to do that with Chromebooks. Management of Chromebooks is probably 25% compared to Windows devices, including deployment, patches, troubleshooting.”*



## Improved Business Uptime

Traditional devices suffer productivity drains due to a variety of causes, cutting work sessions short due to charging and rebooting times, longer login times, the need to patch and apply updates, and security scans. When systems become full, users must manage files to open up space, and sharing and collaborating on files can add extra cycles. While these may seem insignificant on a per-user basis, adding up all this time for hundreds or thousands of users can result in hundreds of thousands of dollars in lost productivity. These devices also require troubleshooting and support to find and resolve issues. Lost or stolen devices leave data vulnerable unless you purchase add-on encryption software.

Chromebooks have longer battery life and faster charging, require fewer logins and reboots, make use of automatic updates, and software updates and virus scanning are completed in the cloud; in addition, the cloud focus means there are fewer problems to resolve. All of this adds up to greater productivity. They boot quickly from SSD, and don't suffer from forced system updates, "blue screens," or system hangs. Collaboration is greatly simplified and files are far easier to find and share. The simplicity and built-in security mean less downtime and greater productivity. In addition, if they are lost or stolen, a Chromebook's location can be identified, and they can be remotely disabled, and re-enabled when found. This results in significant savings and continued business uptime.

*"We can automatically disable this if it's stolen. It's low risk and low cost. PCs have a lot of maintenance, need to be encrypted, it could be up to a day before getting back up."*

*"Once you have a Chromebook, if a new generation comes out, you put it in the same OU and you have the person log into it and they get to work. So you can have newer equipment more often for less money, and you don't have the days of prep to ready a machine, migrate files, and changeover the experience. All the work is done ahead of time, prior to a user getting on the Chromebook"*

*"With mobile Windows devices, if they weren't on the network we couldn't get to them. And if they were offline for a while, they'd come back on the network completely unpatched, looking for updates, which then took time. There's a lag between any vulnerability being discovered, having a patch available, downloading it and rolling it out, then rebooting all the machines to make it effective. With Chromebooks, the updates are automatic and don't interfere with productivity."*

*"It's about new capabilities for your business—flexibility that leads to more options, and collaboration that leads to efficiency. Time is freed up, and if people use that time, you get extra productivity. These are traditional targets for any executive team running a business."*

*"With GDPR, there's another business case for Chromebooks. We will need central control to encrypt our end user devices, know where they are. To prevent ransomware attacks we'll have no choice, we'll have to patch all our devices. So now it's a bigger ecosystem where you start adding on centrally managed encryption, patching, and verification solutions, so Chromebooks can help."*

*"In the next 5 years we want to build a zero-branch infrastructure. We'll have a router, access to Internet, and a security device, with built in Wifi. That's all we want. Chromebooks fit with this—go and buy one off the shelf, give us the serial number, and log in. That's it."*

## Economic Modeling

### ESG’s Google Chromebook Economic Value Model

ESG leveraged the information collected through vendor-provided material, public and industry knowledge of economics and technologies, and the results of customer interviews to create a three-year TCO/ROI model that compares the costs and benefits of deploying, managing, and supporting Google Chromebooks in the enterprise versus deploying Windows-based PCs. Because no two organizations are the same, the model was designed to allow for flexibility in characterizing the end-user’s environment and device requirements. The validated assumptions and logic contained in this model are also used as the basis for Google’s online Chromebook TCO/ROI Calculator.

The model is based on the number of endpoint and office worker devices that an organization will need to support over a three- or five-year period. Endpoint devices are characterized as devices that require basic web connectivity such as kiosks, mobile workstations, or field devices. Office worker devices are characterized as traditional, individual-contributor laptop replacements for everyday productivity. The requirements for each class of device can be set to basic, advanced, or power user, with each category having increasingly higher technical capabilities that result in higher cost. Descriptions of the device types selectable in the model are shown in Figure 4.

**Figure 4. Description and Terminology of Chromebook and PC Devices Used in TCO Model**

Device Type	Most Important Factors	Basic	Advanced	Power User
<b>Front-line Devices</b> (Ex – Chromebook Flip, Chromebook 13 etc.)	<ul style="list-style-type: none"> <li>• Low Cost</li> <li>• Portability</li> <li>• Durability</li> <li>• Battery Life</li> </ul>	<ul style="list-style-type: none"> <li>• Web / mail / Chat</li> <li>• Lower CPU and memory requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate CPU and Memory Requirements</li> <li>• Core i3 Equivalent</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate CPU, Memory, Display and Storage Requirements</li> <li>• Core i5 Equivalent</li> </ul>
<b>Office Worker Devices</b> (Ex – Chromebook Pro, Chromebook Plus, Pixelbook etc.)	<ul style="list-style-type: none"> <li>• Performance</li> <li>• Portability</li> <li>• Comfort / Style</li> </ul>	<ul style="list-style-type: none"> <li>• Office Productivity</li> <li>• Basic Laptops</li> <li>• Core i3 Equivalent</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate CPU, Memory, Display and Storage Requirements</li> <li>• Core i5 Equivalent</li> </ul>	<ul style="list-style-type: none"> <li>• Higher CPU, Memory, Display and Storage Requirements</li> <li>• Core i5 Equivalent</li> </ul>

*Source: Enterprise Strategy Group*

The model also considers the total number of end-users and annual revenue of the organization, the productivity software required, and the breakdown of end-user and administrative time spent performing common tasks related to the devices. The remainder of the assumptions used in the model are set according to ESG’s knowledge of the industry and products and quantitative data collected from customer validation.

The model calculates and reports the expected total cost of ownership (TCO), which includes hardware, software, and licensing costs; operational costs (power); expected support and maintenance costs; and expected administrative costs over the modeled time period. The model also predicts additional potential savings from the avoided cost of device downtime, increased end-user productivity, and reduced risk of lost or stolen devices that are made possible through the use of Chromebooks rather than PCs. The model then reports the total expected savings and benefits and calculates the expected return on investment (ROI) realized when replacing PCs with Chromebooks.

It should be noted that the data and conclusions presented in this report reflect the output of ESG’s economic value analysis based on the specific use cases and assumptions modeled for this report. ESG acknowledges that changes to these assumptions will lead to different results, and therefore advises IT professionals to use this report as one validation point in a comprehensive financial analysis prior to making a purchase decision.

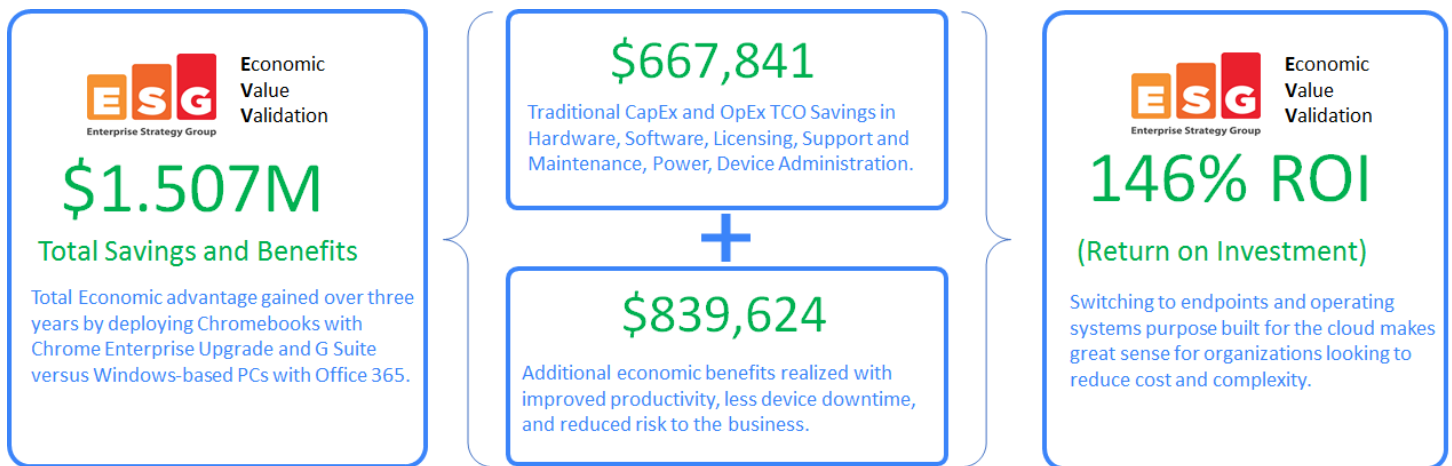
Pricing assumptions for both Chromebooks and Windows-based PCs are based on a blend of typical vendor offerings that meet specific requirements and were obtained from publicly available sources such as IT vendor websites and published price lists. Where possible, the same vendors were chosen to supply both Chromebook and PC models to keep costs as consistent as possible. ESG acknowledges that list prices, configuration details, or other data used as inputs may vary depending on information sources.

**Example: Using the EVM to Predict Savings for a Modeled Organization**

To illustrate the economic advantage that can be achieved by an organization through a Chromebook deployment, ESG ran a set of assumptions through the ESG Economic Value Model. The scenario modeled a medium-sized organization generating roughly \$50M in annual revenue. ESG assumed that this organization would deploy 250 basic endpoint devices to support field operations, and 100 advanced office worker devices for information workers at corporate headquarters. ESG assumed that the organization was looking to replace their PCs and Office 365 E3 with Chromebooks running Chrome Enterprise Upgrade and G Suite Business. It was assumed that the organization had decided to transition to an all-in-the-cloud strategy and did not have any requirements to support legacy windows applications with virtual desktops.

With this information entered, the ESG EVM calculated that by deploying Chromebooks instead of PCs, the modeled organization could expect total savings and benefits of roughly \$1.5M over a three-year period. These savings result in an expected ROI of 146%. A summary of the modeled results is shown in Figure 5.

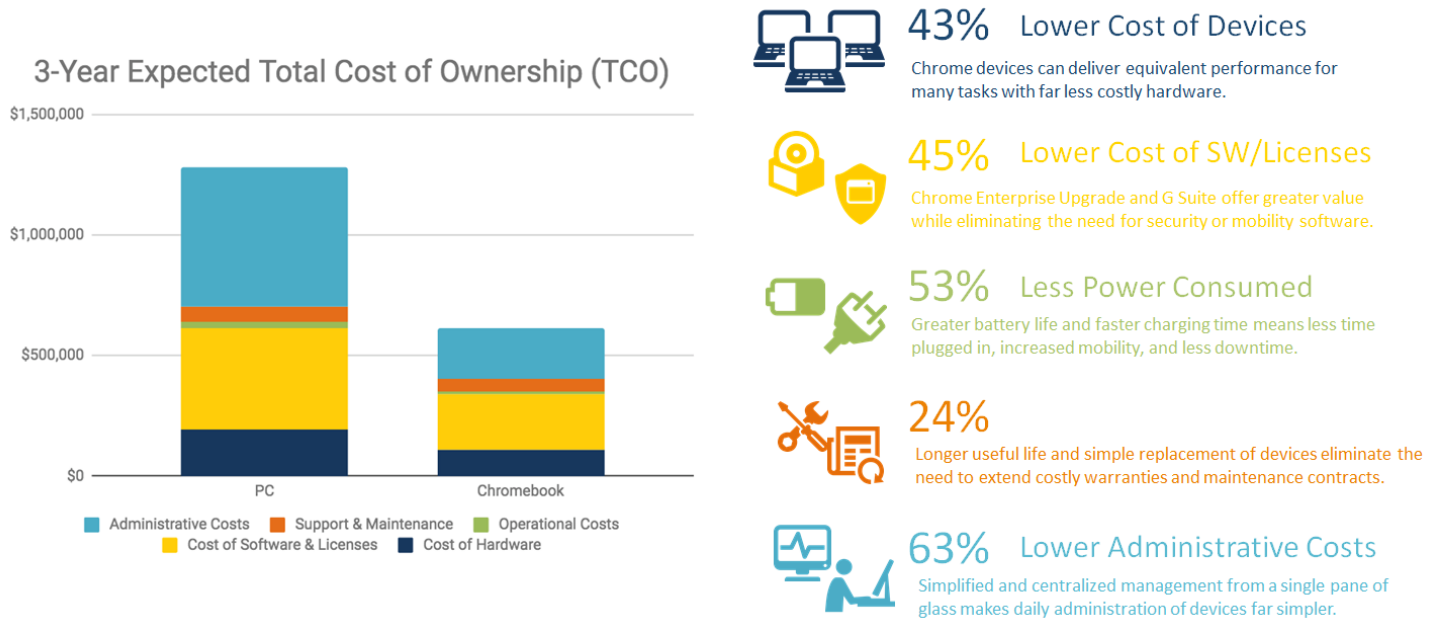
**Figure 5. Summary of Savings and Benefits Expected with Chromebooks for a Medium-sized Organization**



Source: Enterprise Strategy Group

Of the estimated \$1.5M in expected savings and benefits, roughly \$668K is expected as a result of traditional TCO-related CapEx and OpEx savings. This difference would certainly be impacted by vendor discounts and device requirements. In this case, the competitive products analyzed were configured as equivalently and conservatively as possible to make a fair comparison. It is ESG’s opinion that acquisition and support cost savings may be even greater for some organizations, depending on their current use of PC hardware, operating system, and installed software.

**Figure 6. Estimated Device Total Cost of Ownership with Chromebooks versus PCs**



Source: Enterprise Strategy Group

Looking at the chart above, one can quickly see the significantly high cost of device administration and software compared with cost of acquisition. ESG found that organizations can spend a significant amount of time deploying, configuring, managing access, troubleshooting, and keeping PC devices secure and protected. By automating and moving much of this complexity to the cloud, administrators can save a significant number of hours. Again, it is important to note that the 63% improvement in administrative costs shown here may be conservative compared with what customers have reported in actual deployments.

A Chrome device can be deployed, repurposed, or replaced in minutes, versus the hours or even days it may take for some organizations to ready a PC for use. Chromebooks also come with built-in security and cloud-based features that eliminate the need to purchase, update, and support costly and resource-intensive security, collaboration, and mobility software, and greatly reduce the complexity of installing and removing applications. Finally, a PC is often difficult to maintain and troubleshoot, resulting in the need to purchase expensive extended device warranties and support agreements. ESG’s analysis predicted that the modeled organization could expect \$482 per device in annual operational savings as a result of elimination of device and data backup, elimination of manpower required for hardware upgrades and virus definition updates, and simpler patching of OS and software updates.

Next, ESG calculated some of the additional benefits that may not at first be apparent to an organization through reduction in device downtime, improved productivity and collaboration, and reduction in risk to the business. The expected savings and benefits in these areas are highlighted in Figure 7.

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**Figure 7. Additional Potential Savings and Benefits through Deployment of Google Chromebooks**

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**\$127K Savings Due to Avoided Downtime**

In the event of a hardware failure, a Chromebook user can be up and productive on a new device in under 1 hour, compared to 1-2 days for a typical PC rebuild or repair.

**\$120K Avoided Cost through Reduced Risk**

In the event of a lost/stolen device, Chromebooks can be located and remotely disabled in minutes, helping to avoid an average total loss of \$50K per device.

**\$592K Savings Due to More Productive End-users**

ESG estimates end-users will be 7% more productive on Chromebooks due to less time managing security, applying updates, better battery life, etc.

*Source: Enterprise Strategy Group*

The simplicity and low cost of a Chromebook allows organizations the flexibility to simply issue a new device to a user rather than deal with support and troubleshoot the device. The old Chromebook can then be repurposed, returned, or recycled. End-users can be back up and running in less than an hour versus the entire day or even days that a PC user may be impacted while IT troubleshoots the device, fixes or reissues a new device, re-images the device, and configures the device for individual access. ESG's model predicts that the modeled organization can expect to avoid more than \$127K in cost of downtime.

In addition to getting users back up and running faster in the event of an issue, ESG's model predicted a conservative 7% increase in employee productivity on Chromebooks versus PCs. This improvement was calculated based on faster charging time (less time lost due to low power/no power); less time spent applying updates (OS and application), logging in and out of systems and file shares, updating and patching virus and malware software; and less time managing, sharing, and searching for files. Based on expected employee hourly rates, ESG's model predicted that an organization would be able to benefit from a total of \$592K worth of additional man hours of productivity over the three-year period.

Finally, ESG's model predicts that the modeled organization can save an estimated \$120K through the reduction in business risk due to lost or stolen devices. The industry accepted cost to a business of a lost or stolen laptop is reported by the Ponemon Institute at \$50K per device. ESG assumed that 1 in every 250 laptops may be lost or stolen per year. Because Chromebooks can be located and remotely disabled, they can be secured right away, helping to avoid this risk to the organization.

It should be noted that a complete switch in technology does not come without cost to an organization, and a plan of action should be well thought out to ensure a smooth transition. Organizations should consider factors such as the legacy Windows applications that they must support, redesign, or port to run on Chrome OS or in the cloud, and should be prepared for an inevitable resistance to change. The organizations that ESG spoke with faced these challenges, but reported that once challenges were overcome, end-users were happy with the change. To be fair in this analysis, ESG included in the model a total operational support cost of \$50K that predicted the administrative time spent supporting OS, application, and integration-related issues. This is a cost that each organization should consider, with lower costs expected for new or cloud-ready organizations, and higher costs expected for larger and more established organizations.



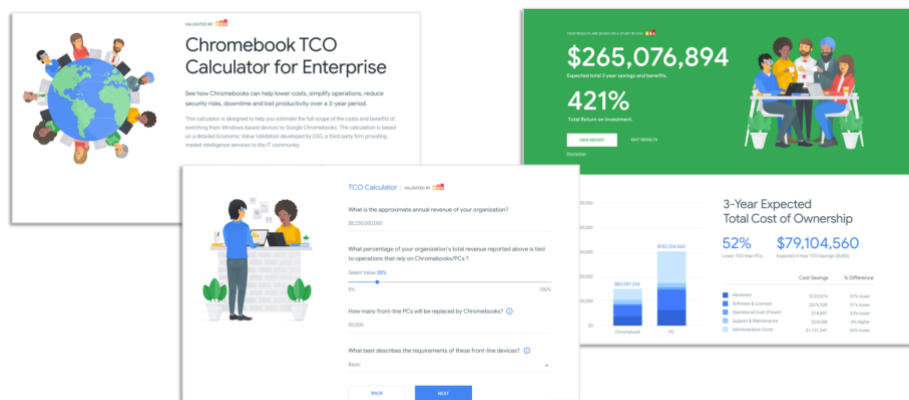
## The Bigger Truth

Organizations are focused on increasing agility and on getting to the cloud if they are not yet there. With global, distributed organizations, this is essential. Legacy operating systems such as Windows and MacOS did not have their roots in the cloud, and essential cloud-based functionality must be bolted on with OS patches and by purchasing third-party security, backup, encryption, mobility, and collaboration software and services. Cybersecurity and cost reduction are top of mind for organizations, and it is critical going forward that a cloud-first, end-user device strategy satisfies the needs of both of these priorities.

Deploying end-user devices that improve security and reduce costs while improving productivity would lead to a winning outcome. This combination of benefits is what Google delivers. Chromebooks were purpose-built for the cloud with optimized hardware that cost-effectively meets the end-user requirements of today’s cloud-first organizations. Chrome Enterprise Upgrade further enables the mobile workforce with enhanced productivity and collaboration and enterprise-level IT administration, security, and support for the entire organization.

ESG validated the economic benefits seen by enterprise organizations that have replaced legacy end-user devices with Chrome OS on Chromebooks and used the findings to generate a TCO/ROI model. This model predicts that a medium-sized organization deploying a total of 350 end-user devices (front-line and office workers) can achieve savings and benefits totaling more than \$1.5M over a three-year period. The modeled organization benefited from significant savings in hardware costs (43% lower), software and licenses (45% lower), support and maintenance (24% lower), and administration (63% lower). In addition, the modeled organization would benefit from decreased downtime of the devices, increased end-user productivity, and a significantly reduced risk. ESG’s model serves as the basis for *Google’s online Chromebook TCO/ROI Calculator*, which can be accessed at <https://cloud.google.com/chrome-enterprise/chromebooks/tco-calculator/> and is shown in Figure 8.

**Figure 8. Chromebook Online TCO Calculator**



Source: Enterprise Strategy Group

As Google has continued to innovate, it is clear that organizations can use Google solutions across their enterprise, supporting a mobility and hybrid cloud strategy. From Google’s Cloud Platform public cloud services to Chromebooks, Pixel phones, G Suite, and Gmail, Google is well positioned to deliver an integrated computing strategy that simplifies IT operations. Google applications may not be as seasoned as Microsoft applications, which have been around for decades, but Google is making great progress in delivering the features that end-users need. In addition, since they were born in the cloud era, they offer highly effective online collaboration features.

Chromebooks are perfect for small businesses with no IT staff, or for new businesses, but for established businesses with legacy applications, there can be challenges. Complex spreadsheets, charts, Excel functions, permissions, and Word templates are hard to transfer, so many organizations will need to continue to support legacy applications, most likely using VDI. Organizations making a change may struggle more with a cultural mindset than with the technology change, but making that cultural change extends the benefits. One customer we spoke with commented,

*“This kind of change is not about technology, because the technology just works. It’s all about changing people. If you deploy the solution but don’t change how you do things, you’re missing at least half the benefit.”*

It bears mentioning that ESG Lab used Google applications in completing this project, including Gmail, Docs, Sheets, Hangouts, Calendar, and more. While some of the experience took some getting used to because of our expertise in Office, the ability to easily collaborate on documents and host weekly face-to-face meetings was a real eye-opener to how much easier these tasks can be. Like Chrome OS and Chromebooks, these applications were simple and intuitive, and just worked.

As analysts accustomed to carrying around and maintaining both Mac and PC laptops to “get the best of both worlds,” we see great value in reducing complexity. If your organization is asking similar questions and struggling to support costly, overpowered, and complex end-user devices, ESG suggests that you give Chrome Enterprise Upgrade and Chromebooks serious consideration.

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