A Forrester Total Economic Impact™ Study Prepared For Google

Measuring The Total Economic Impact Of Google Apps

A Cross-Industry Survey And Analysis

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About Forrester Consulting
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Executive Summary

In May 2010, Google commissioned Forrester Consulting to examine the total economic impact and expected return on investment (ROI) enterprises may realize by adopting Google Apps after having managed a traditional on-premise messaging and collaboration environment. Google Apps is a cloud-based messaging and collaboration platform that includes mail, calendaring, IM, as well as Web-based collaborative documents, spreadsheets, presentations, and sites. The purpose of this study is to provide readers with a framework and analysis to evaluate the potential financial impact of switching from legacy email and productivity solutions to Google Apps.

To accomplish this analysis, Forrester conducted a combination of in-depth executive interviews as well as two broader surveys targeted at both IT and end user groups. This approach allowed Forrester to realize the broad impact Google Apps is having on IT and end user organizations and to supplement this data with an understanding of the underlying factors driving firms to move to a cloud-based messaging and collaboration platform.

Google Apps Drives IT Cost Savings And Key Collaboration Benefits

Our interviews and broader survey around Google Apps and our subsequent financial analysis identified several key takeaways for organizations migrating to a cloud-based messaging and collaboration environment:

- **Ninety-three percent of respondents saw positive, tangible IT and end user impacts that drove ROI.** End users familiar with cloud-based personal email transitioned more smoothly to using Google Apps at work.
- **End user productivity gains were even greater than IT cost savings.** End users were able to use Gmail more efficiently than their previous email solution and collaborate more effectively with Google Docs and Google Sites than with traditional office software.
- **The switch to Google Apps was usually driven by replacing or augmenting an existing email solution.** However, Forrester saw a growing number of cases where organizations chose Google Apps for collaboration and then migrated to the messaging platform.
- **For the representative organization, the three-year results of switching to Google Apps from traditional infrastructure include:**
    - Risk-adjusted ROI of 307%
    - Risk-adjusted net present value (NPV) of $10,039,612
    - Payback (break-even) within seven months

Based on our in-depth interviews with IT groups and end users who had migrated to Google Apps as well as a broader survey of 600 IT and end user respondents, Forrester created a representative financial model to aggregate the results. These results are meant to highlight the common cost and benefit impacts of migrating to Google Apps from a previous on-premise IT environment and should be used as a starting point for readers assessing the potential economic impact of Google Apps within their organization. Table 1 illustrates the summary findings.

Actual return on investment will vary by organization. However, the findings contained within the analysis suggest positive tangible returns for the participating organizations.

Table 1
Composite Organization Three-Year Risk-Adjusted ROI/NPV[1]

ROI	Payback period	Total benefits (PV)	Total costs (PV)	Net present value
307%	7 months	$13,309,852	$3,270,240	$10,039,612

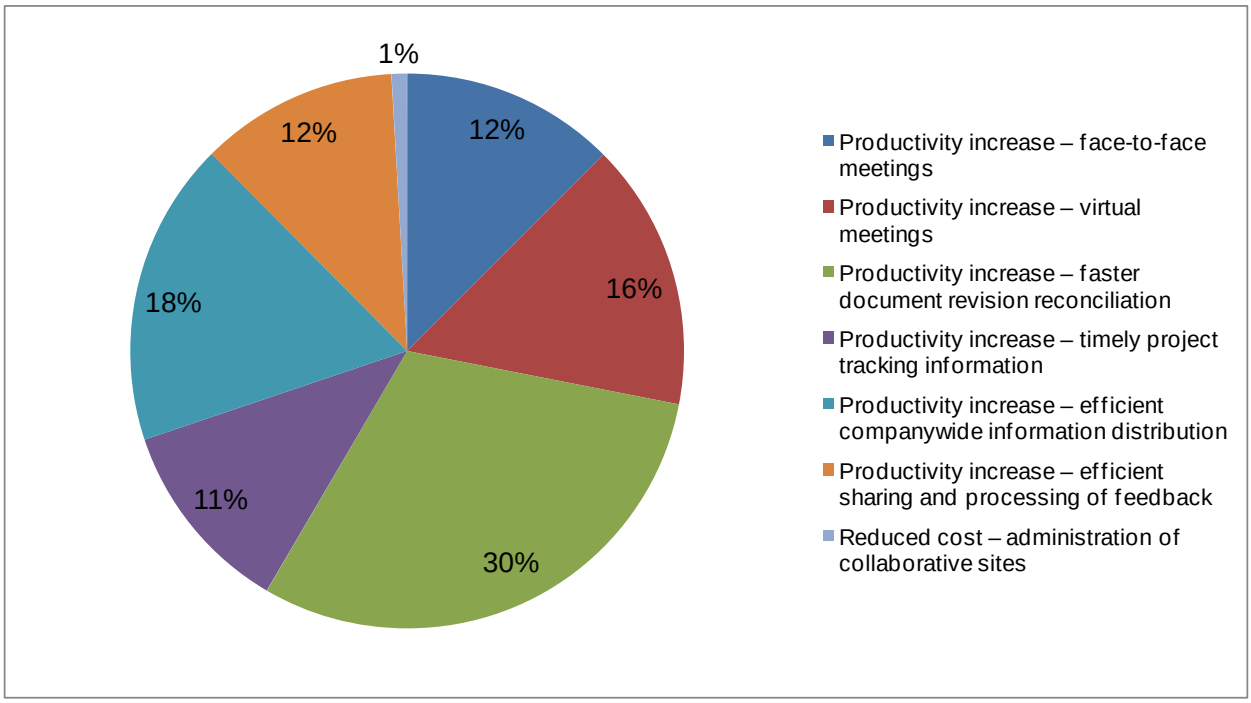
Source: Forrester Research, Inc.

- **Benefits.** Benefits realized by client organizations included both IT and end-user impacts. The representative organization realized the following benefits that represent those described by the interviewed and surveyed companies:
    - **IT-impact benefits.** These included the cost savings resulting from moving an organization's on-premise messaging and collaboration environment to Google cloud-based architecture.
        - Cost savings included reduced spend on licenses and infrastructure.
        - Cost savings included reduced IT administrator time spent on system maintenance, upkeep, patching, and upgrades.
            - Organizations noted specific annual cost savings versus their previous environment of between 38% and 56%.
    - **End-user-impact benefits.** These included specific end-user benefits around the migration of an organization's messaging and collaboration environment to Google Apps.
        - **Messaging-specific benefits.** These included productivity gains around email search, spam filtering, archiving, organization of email, as well as improved response time within the messaging environment.
        - **Collaboration-specific benefits.** These included improved efficiency in terms of sharing and editing documents across teams and within teams, the ability to incorporate feedback more quickly, more efficient face-to-face and virtual meetings, as well pushing more timely and relevant information to distributed teams.
    - **Enabled-flexibility benefits.** These included the ability to achieve secondary benefits from the initial investment in Google Apps.

- **Collaborating with external partners.** The ability to improve the efficiency of interacting with external partners and suppliers through Google Docs and Sites.
- **Leveraging Google Marketplace.** Taking advantage of new process-specific applications from Google Marketplace, further reducing process integration costs.

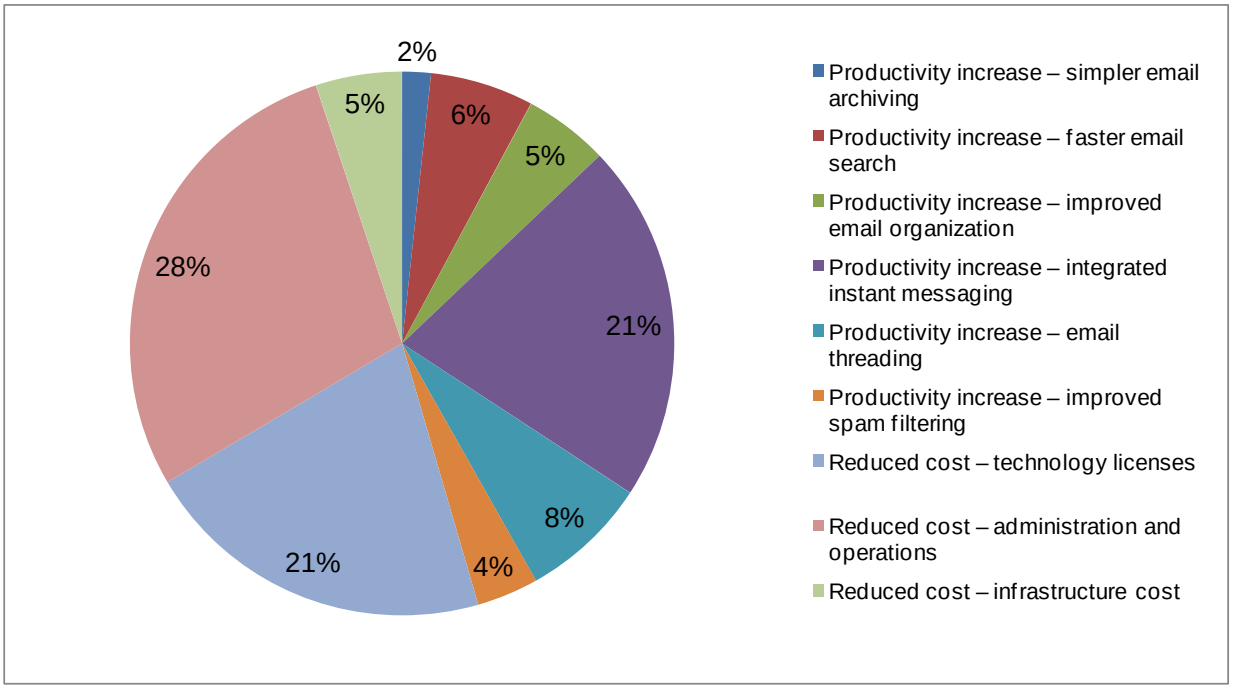
- **Costs.** The composite organization incurred the following costs:
  - Google Apps annual license.
  - Internal implementation and rollout.
  - Ongoing routine support.

Figure 1
Key Benefits Areas – collaboration



Source: Forrester Research, Inc.

Figure 2
Key Benefits Areas – messaging



Source: Forrester Research, Inc.

Factors Affecting Benefits And Costs

Table 1 illustrates the risk-adjusted financial results that the composite organization achieved. The risk-adjusted values take into account any potential uncertainty or variance that exists in estimating the costs and benefits, which produces more conservative estimates. The following factors may affect the financial results that an organization may experience:

- **IT-specific factors.** Level of replacement of legacy messaging and collaboration platform and the ability to repurpose existing IT assets in moving to a cloud-based environment.
- **End user-specific factors.** Success in training end users on new environment, speed of adoption, and rollout of collaboration tools.

Disclosures

The reader should be aware of the following:

- The study is commissioned by Google and delivered by the Forrester Consulting group.

- Forrester makes no assumptions as to the potential return on investment that other organizations will receive. Forrester strongly advises that readers should use their own estimates within the framework provided in the report to determine the appropriateness of an investment in Google Apps.
- Google 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.
- The customer names for the interviews were provided by Google.

TEI Framework And Methodology

Introduction

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ framework for organizations considering switching to Google Apps from a traditional on-premise environment for messaging and collaboration. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision.

Approach And Methodology

Forrester took a multi-step approach to evaluate the impact that adopting Google Apps can have on an organization. (see Figure 3). Specifically, we:

- Interviewed Google product development, marketing, sales, and deployment personnel and Forrester analysts to gather data relative to Google Apps and the market for cloud-based messaging and collaboration services.
- Interviewed 12 organizations currently using Google Apps to obtain data with respect to costs, benefits, and risks.
- Conducted a survey of 600 IT and end-user respondents who had migrated to Google Apps.
- Designed a composite organization based on characteristics of the interviewed and surveyed organizations (see Appendix A).
- Constructed a financial model representative of the interviews using the TEI methodology. The financial model is populated with the cost and benefit data obtained from the interviews as applied to the composite organization.

Figure 3
TEI Approach

Source: Forrester Research, Inc.

Forrester employed four fundamental elements of TEI in modeling the impact of Google Apps:

1. Costs.
2. Benefits to the entire organization.

3. Flexibility.

4. Risk.

Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves the purpose of providing a complete picture of the total economic impact of purchase decisions. Please see Appendix B for additional information on the TEI methodology.

Research Highlights

Research data for this analysis was derived from two sources: in-depth interviews with IT and end user stakeholders from 12 client organizations as well as a broader IT and end user survey consisting of 600 respondents. Clients for both the interviews and survey were globally distributed organizations consisting of at least 1,000 employees.

The 12 interviews uncovered several important drivers, which formed the basis of the financial analysis:

- The majority of the customers interviewed migrated their messaging applications first and then let users organically adopt Google's collaboration applications. In these scenarios, the case for adopting Google Apps was driven by specific cost reductions within the management of an organization's messaging environment.
- While the initial case for migration was usually based on direct cost savings, clients noted the role of Google Apps collaboration tools in driving higher overall value across the organization.
- The organizations interviewed for the study were a combination of globally distributed enterprises and midsized regional companies. Six were headquartered in North America while the rest were located outside of North America.
- The majority of customers saw the use of Google Apps as augmenting their existing collaboration platforms, while the use of Google Apps for messaging was seen as a direct replacement.

The results of the survey allowed us to validate several of the themes identified during the interview process. These included:

- Employees using Google email, calendar, and contacts saw material benefits over their previous email system. Eighty-nine percent of employees using Google Apps felt that the time required to simply sign in to email had decreased. Forty-six percent felt that time spent organizing their email had decreased; 37% felt that time spent searching for email messages had decreased; and 30% felt that time spent locating a contact had decreased.
- Employees who also use Google Docs, Google Sites, or Google Video saw additional benefits. For example, 72% of these employees are now more confident that they always have the current version of a project file, and 70% find that it takes less time to incorporate feedback into documents, spreadsheets, and presentations than before.
- Forty-seven percent of employees using Google's Docs and Google Sites saw material improvements in their levels of collaboration with customers and partners since moving to those tools.

- Forty-seven percent of employees using Google Apps also felt that "If I had to switch back to my previous email environment, my productivity would suffer."

Composite Organization

Based on the interviews with the 12 existing customers provided by Google and broader survey data, Forrester constructed a TEI framework, a composite company, and an associated ROI analysis that illustrates the financial impact of Google Apps. The representative organization Forrester synthesized from these results represents a North American services organization with 18, 000 employees spread out across three continents.

The organization chose to first migrate to the Google Apps messaging platform, with 75% of end users fully migrated in Year 1 of the analysis and 100% of end users migrated in Year 2 and Year 3. The ramp-up of collaboration usage was more gradual; while Google Docs and Sites were immediately available with Gmail accounts, end users organically adopted Google Docs and Google Sites as these collaboration tools took root among their colleagues. In Year 1, 45% of users had started using Google's collaboration tools; in Year 2, 55% had started, and in Year 3 of the analysis, 60% had started.

Framework Assumptions

Tables 2 and 3 provide the basic model assumptions that Forrester used in this analysis. The "Ref." column on the right side of Table 3 is used to illustrate reference metrics used as part of calculations in subsequent tables.

Table 2
Adoption Assumptions - By Application

Application adoption	Percentage	Users
Gmail /Google Mail	100%	18,000
Google Talk	92%	16,560
Contacts	86%	15,480
Google Calendar	97%	17,460
Google Sites	64%	11,520
Google Video	33%	5,940
Google Docs	63%	11,340
Google Groups	9%	1,620

Source: Forrester Research, Inc.

Table 3
Usage Assumptions

Ref.	Metric	Value (%)	Value
	Total employees	18,000	
A1	Percentage of employees migrated to Google messaging	100%	18,000
A2	Percentage of employees with access to Google collaboration	100%	18,000
A3	Percentage of users – high usage	20%	3,600
A4	Percentage of users – medium usage	50%	9,000
A5	Percentage of users – low usage	30%	5,400
A6	Hourly cost per user		$30
A7	Average meeting length		45
A8	Average meeting size		6
A9	Number of departments	50%	
A10	Productivity conversion factor		12
A11	Size of project teams – small		15
A12	Size of project teams – large		30
A13	Working hours per year		2,000

Source: Forrester Research, Inc.

The discount rate used in the PV and NPV calculations is 10%, and the time horizon used for the financial modeling is three years. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult with their respective company's finance department to determine the most appropriate discount rate to use within their own organizations.

Costs

To quantify the ROI impact, we need to examine the incremental costs associated with the migration to Google Apps. These costs included the cost of the Google Apps yearly license, as well as the cost of change management, testing, pilot, implementation, and ongoing routine support.

License Cost

Google Apps is sold for a flat annual license, which includes both the messaging and collaboration tools. The annual license cost is $50 per user per year. Organizations noted a driver in moving to Google Apps was the simplicity of pricing as a factor in considering Google Apps as a messaging and collaboration platform. In addition to the base cost of licenses, message archiving costs of $13 per user per year were added to take into account the regulatory and compliance requirements of an organization of this size.

Change Management

In addition to the cost of licenses, organizations noted several additional costs were incurred as part of the migration away from their on-premise environment to Google Apps. The cost of change management included the time and effort to educate and promote adoption of Google Apps among a core group of power users.

Testing

Another upfront cost with Google Apps was internal testing prior to implementation. Organizations noted the need to ensure the data and information from existing accounts could be successfully migrated from the on-premise environment to the new cloud-based platform.

Pilot And Implementation

The cost of pilot and implementation includes the cost to transition each user to the new Google Apps environment. As part of the rollout, most of the surveyed organizations selected a subset of "power" users to perform the initial pilot as well as act as platform champions during the wider rollout.

Support Costs

Most organizations noted a reduction in overall support costs over time, but a minority of surveyed organizations saw increases in support costs as a result of user questions during the migration period.

Total Costs

Table 4 illustrates the total investment costs for the representative organization.

Table 4
Total Investment Costs – Non-Risk-Adjusted

Cost category	Initial	Year 1	Year 2	Year 3	Total	PV
Google Apps License		1,134,000	1,134,000	1,134,000	3,402,000	2,820,090
Change management	160,000				160,000	160,000
Testing	64,000				64,000	64,000
Pilot and implementation	60,000				60,000	60,000
Initial support	91,125				91,125	91,125
Total cost	$375,125	$1,134,000	$1,134,000	$1,134,000	$3,777,125	$3,195,215

Source: Forrester Research, Inc.

Benefits

For this section of the analysis, we examine benefits accruing both to IT and end user groups after the transition from legacy systems to the Google Apps messaging and collaboration applications within the representative organization.

Messaging-specific benefits

- End user impact
    - Improved efficiency within the messaging environment (email search, spam filtering, message archiving, and message organization).
    - Improved time to resolution (new contact, existing contact).
    - Improved response time to customer or partner request.
- IT impact
    - Reduced software cost.
    - Reduced infrastructure cost.
    - Reduced operations and administration cost.

Collaboration-specific benefits

- End user impact
    - Faster document revision reconciliation.
    - Timely project tracking information.
    - Improved ability to quickly incorporate feedback.
    - Improved meeting efficiency.
    - Efficient companywide information distribution.
    - Efficient sharing and processing of feedback.
- IT impact
    - Reduced software cost.
    - Reduced cost to set up internal sites.

Messaging-Specific Benefits

Google Apps clients noted several key end-user benefits within Google's messaging environment in comparison with their on-premise email solution. Our survey results highlighted the improved efficiency in using specific features within Gmail, including Chat (IM). In particular, users cited key time savings with email search, spam filtering, message archiving, and message organization, as well as the ability to use integrated Chat (IM) within Gmail to quickly identify internal contacts and resolve immediate questions. In addition, users interviewed cited improvements to how they read and respond as a result of Gmail's automatic message organization capabilities like message threading.

Improved Efficiency Within The messaging Environment (Search, Spam Filtering, Archiving, And Organization)

Moving to Gmail had a net positive impact on users for many common tasks. Users saw a reduction in the amount of time spent searching, filtering, and archiving after they became accustomed to Gmail's new features. In the case of email archiving, users noted that in the previous messaging environment they needed to perform manual archiving of their email onto their local client, whereas Gmail's large storage quota eliminates the need for manual archiving. In addition, with all emails stored in one central, easily searched location, the amount of time spent searching for email was reduced as compared with the previous messaging environment, where archived email was stored in multiple locations. In fact, 37% of respondents reported that they spend less time searching for email messages. Forty-six percent of employees using Google Apps found that they spent significantly or slightly less time organizing email.

With Gmail's spam filtering, users are able to reduce clutter within their inbox through a reduction in junk or spam messages. A full 25% agree that they spend less time looking for important messages because they have less spam to deal with. Furthermore, a very high 89% of employees report that they can sign into email faster with Gmail than they could with their previous solution.

To calculate the impact of improved efficiency within the representative organization, each calculation below examines the time spent on average for a given task prior to the adoption of Google for high-, medium-, and low-usage groups and then models the estimated time improvement of each task by group.

Data from the in-depth interviews and broader survey suggests that users see improvements in productivity both in large blocks of time saved but also in small, recurring efficiencies throughout the day. While both sets of improvements are beneficial to an individual employee and the organization as a whole, to be conservative in our financial estimates, Forrester chose to only focus on larger blocks of time saved as part of the financial business case.

Table 5
Productivity Increase – Simpler Email Archiving

Ref.	Metric	Calculation	Value
B1	Time spent archiving past emails – monthly (min)		
B2	High-usage employee (min)		40
B3	Medium-usage employee (min)		20
B4	Low-usage employee (min)		10
B5	Estimated percentage improvement		
B6	High-usage employee		15%
B7	Medium-usage employee		20%
B8	Low-usage employee		25%
	Percentage of employees who see positive impact		46%
B9	Total impacted users – low usage		2,484
B10	Total impacted users – medium usage		4,140
B11	Total impacted users – high usage		1,656
B12	Hourly cost per user		$30
B13	Productivity conversion factor		50%
B14	Months per year		12
B15	**Estimated savings**	(((B2/60)*B6*B11)+((B3/60)*B7*B10)+((B4/60)*B8*B9))*B12*B13*B14	$98,118

Source: Forrester Research, Inc.

Table 6

Productivity Increase – Faster Email Search

Ref.	Metric	Calculation	Value
C1	Time spent searching past emails – weekly (min)		
C2	High-usage employee (min)		30
C3	Medium-usage employee (min)		20
C4	Low-usage employee (min)		10
C5	Estimated percentage improvement		
C6	High-usage employee		15%
C7	Medium-usage employee		18%
C8	Low-usage employee		24%
	Percentage of employees who see positive impact		46%
C9	Total users – low usage		2,484
C10	Total users – medium usage		4,140
C11	Total users – high usage		1,656
C12	Hourly cost per user		$30
C13	Productivity conversion factor		50%
C14	Weeks per year		50
C15	**Estimated savings**	(((C2/60)*C6*C11)+((C3/60)*C7*C10)+((C4/60)*C8*C9))*C12*C13*C14	$353,970

Source: Forrester Research, Inc.

Table 7
Productivity Increase – Improved Spam Filtering

Ref.	Metric	Calculation	Value
D1	Total employees converted to messaging		18,000
D2	Percentage of employees who see positive impact		25%
D3	Number of emails received per day		120
D4	Percentage of email – spam		15%
D5	Time spent filtering incoming emails – daily (min)		15
D6	Working days per year		250
D7	Hourly cost per user		$30
D8	Productivity conversion factor		50%
D9	Estimated percentage improvement		5%
D10	**Estimated savings**	(D5/60)*D6*D1*D9*D8*D7*D2	$210,938

Source: Forrester Research, Inc.

Table 8
Productivity Increase – Improved Email Organization

Ref.	Metric	Calculation	Value
E1	Time spent organizing past emails – weekly (min)		
E2	High-usage employee (min)		30
E3	Medium-usage employee (min)		20
E4	Low-usage employee (min)		15
E5	Estimated percentage improvement		
E6	High-usage employee		10%

E7	Medium-usage employee		14%
E8	Low-usage employee		18%
	Percentage of employees who see positive impact		46%
E9	Total users – low usage		2,484
E10	Total users – medium usage		4,140
E11	Total users – high usage		1,656
E12	Hourly cost per user		$30
E13	Productivity conversion factor		50%
E14	Weeks per year		50
E15	**Estimated savings**	(((E2/60)*E6*E11)+((E3/60)*E7*E10)+((E4/60)*E8*E9))*E12*E14*E13	$290,835

Source: Forrester Research, Inc.

Improved Time To Resolution

While the previous set of productivity benefits focused on common daily tasks around a user's email environment, another set of benefits focuses on the tight integration between Gmail and Chat (IM). Seventy-eight percent of survey respondents said that they use IM for internal collaboration, while 98% exchange ideas via email. Chat is a faster way than email to resolve an issue and quickly move forward — if you can find the contact. With a single address book and unified interface for email and chat, Google Apps speeds up finding contacts and initiating IM sessions. In fact, 30% report that they spend less time looking for a mail contact than with their previous solution. In addition, 19% report spending less time looking for a chat contact than before.

For many of the interviewed customers, in their previous messaging environment, adoption of chat lagged behind that of email. A possible reason for this is that IM did not achieve a critical mass for widespread use and as a result, not all users had IM installed or active on their machines. With the integration of Gmail and Chat in the browser, users were more likely to adopt and use IM features. Users could search for and identify new contacts and quickly resolve questions though increased adoption of IM.

To calculate the benefits related to increased use of IM, we isolated two specific use cases: identifying a new internal contact to ask a question over IM and reaching out to an existing contact using IM.

Table 9
Productivity Increase – Integrated Instant messaging

Ref.	Metric	Calculation	Value
F1	Number of one-on-one interactions per day		10
F2	Percentage of interactions with new contact		10%
F3	Percentage of interactions following up on an outstanding question		70%
F4	Percentage of employees seeing a decrease in time		19%
F5	Number of employees impacted annually		3,420
F6	Time estimate – locating individual		10
F7	Time estimate – query with existing contact		15
F8	Hourly cost per user		$30
F9	Productivity conversion factor		50%
F10	Working days per year		250
F11	Estimated improvement		5%
F12	**Estimated savings**	((F1*F2*F6/60)+(F1*F3*F7/60))* F8*F9*F10*F11*F5	$1,229,063

Source: Forrester Research, Inc.

Improved Response Time

Another benefit cited by users was Gmail's message threading feature, which automatically organizes past emails into coherent conversations, making it easier to summarize and respond to messages. Several organizations noted that in the previous on-premise solution, there was no way to couple related emails by thread, resulting in more time spent searching for past emails and mentally piecing together conversations.

In the employee survey, 48% of respondents report that with message threading in Gmail, Google Apps improves the response time to customer and partner requests when compared with their previous on-premise email system.

Table 10
Productivity Increase – Email Threading

Ref.	Metric	Calculation	Value
G1	Total impacted users – low usage		2,592
G2	Total impacted users – medium usage		4,320
G3	Total impacted users – high usage		1,728
G4	Percentage of employees seeing an increase		48%
G5	Percentage of emails that were part of a previous email thread		60%
	Time spent reviewing and responding to incoming emails – daily (min)		
G6	High-usage employee		30
G7	Medium-usage employee		23
G8	Low-usage employee		18
G9	Hourly cost per user		$30
G10	Working days per year		250
G11	Productivity conversion factor		50%
G12	Estimated percentage improvement		6%
G13	**Estimated savings**	((G6/60)*G3)+((G7/60)*G2)+((G8/60)*G1))*G9*G10*G11*G12*G5	$437,400

Source: Forrester Research, Inc.

IT Cost Savings – messaging

In addition to the potential benefits attributed to end users, there was consensus from the broader survey respondents as well as the in-depth interviewees on the possible IT cost savings of moving their messaging environment from a traditional on-premise environment to Google's cloud-based platform. Specific areas of savings include a reduction in licensing costs, reduced infrastructure costs, as well as reduced operational and administration costs. On average, the cost savings for the surveyed organizations ranged anywhere between 38% and 56% compared to their previous baseline environment.

Table 11
Reduced Cost – Technology Licenses

Ref.	Metric	Calculation	Value
H1	Number of messaging users		18,000
H2	Annual software cost – on-premise		$84
H3	Estimated number of licenses reduced – Y1		50%
H4	Estimated number of licenses reduced – Y2		75%
H5	Estimated number of licenses reduced – Y3		95%
H6	**Estimated savings – Y1**	(H1*H2)*H3	$756,000
H7	**Estimated savings – Y2**	(H1*H2)*H4	$1,134,000
H8	**Estimated savings – Y3**	(H1*H2)*H5	$1,436,400

Source: Forrester Research, Inc.

Table 12
Reduced Cost – Administration And Operations

Ref.	Metric	Calculation	Value
I1	Number of messaging users		18,000
I2	Cost per user (pre-investment) – patch and upgrade cost		$7
I3	Estimated reduction		56%
I4	Cost per user (pre-investment) – security management		$36
I5	Estimated reduction		54%
I6	Cost per user (pre-investment) – archiving		$110
I7	Estimated reduction		52%
I8	Cost per user (pre-investment) – backup/disaster recovery		$19
I9	Estimated reduction		50%
I10	Cost per user (pre-investment) – vendor management		$2

I11	Estimated reduction		41%
I12	**Estimated savings**	((I2*I3)+(I4*I5)+(I6*I7) +(I8*I9)+(I10*I11))*I1	$1,635,840

Source: Forrester Research, Inc.

Table 13
Reduced Cost – Infrastructure Cost

Ref.	Metric	Calculation	Value
J1	Number of messaging users		18,000
J2	Infrastructure cost per user (pre-investment)		$53
J3	Estimated reduction in spend – Y1		5%
J4	Estimated reduction in spend – Y2		25%
J5	Estimated reduction in spend – Y3		55%
J6	**Estimated savings – Y1**	(J1*J2)*J3	$47,700
J7	**Estimated savings – Y2**	(J1*J2)*J4	$238,500
J8	**Estimated savings – Y3**	(J1*J2)*J5	$524,700

Source: Forrester Research, Inc.

Collaboration-Specific Benefits

In addition to the messaging productivity benefits cited above, customers noted that the use of Google Apps' collaboration tools also drove additional benefits for their organization. These included faster, streamlined collaboration in the context of incorporating edits from multiple contributors into documents, spreadsheets, and presentations; face-to-face and virtual meetings; distribution of timely, relevant, and accurate information; and soliciting feedback from distributed groups.

Improved Meeting Efficiency

A key part of improved collaboration is the ability to make in-person and virtual meetings more effective. The survey revealed that 39% of employees feel that Google Apps improves the productivity of meeting participants. The causes include Google Docs and Google Sites providing the ability for meeting attendees to have the most up-to-date version of a document, spreadsheet, or presentation prior to the start of a meeting. Seventy-two percent agree that Google Apps makes it easier to have the most current version of a file on hand.

Table 14
Productivity Increase – Face-To-Face Meetings

Ref.	Metric	Calculation	Value
K1	Number of face-to-face meetings per week		20
K2	Percentage of meetings requiring participants to review draft information		60%
K3	Percentage of meeting time spent ensuring users have latest file		20%
K4	Percentage of employees seeing a positive impact		39%
K5	Employees impacted		7,020
K6	Average meeting length (min)		45
K7	Average meeting size		6
K8	Productivity conversion factor		50%
K9	Weeks per year		50
K10	Hourly cost per user		$30
K11	Estimated improvement		15%
K12	**Estimated savings**	K1*K9*K6/60*K2*K3*K11*K10*K5/K7*K8	$236,925

Source: Forrester Research, Inc.

Table 15
Productivity Increase – Virtual Meetings

Ref.	Metric	Calculation	Value
L1	Number of phone/video meetings per week		50
L2	Percentage of meetings requiring participants to review draft information		40%
L3	Percentage of meeting time spent ensuring users have latest file		15%
L4	Percentage of employees seeing an increase		39%
L5	Employees impacted		7,020
L6	Average meeting length (min)		45
L7	Average meeting size		6
L8	Productivity conversion factor		50%
L9	Weeks per year		50
L10	Hourly cost per user		$30
L11	Estimated improvement		15%
L12	**Estimated savings**	L1*L9*L6/60*L2*L3 *L11*L10*L5/L7*L8	$296,156

Source: Forrester Research, Inc.

Improved Timeliness Of Accurate Information

When important project information is readily available to all team members, it leads to more work in parallel, less waiting for others to complete their tasks, and keeping the process moving forward efficiently and in sync. The survey shows that with Google Apps, 70% of employees feel that "the time to create and complete a shared file is improved." In addition, 52% feel that they "no longer have to wait for others to complete a shared document."

Table 16

Productivity Increase – Faster Document Revision Reconciliation

Ref.	Metric	Calculation	Value
M1	Average number of active projects		1,200
M2	Percentage of project time – reviewing and editing documents		20%
M3	Percentage of reviewing time spent reconciling past document versions		20%
M4	Productivity conversion factor		50%
M5	Size of project teams – small		5
M6	Size of project teams – large		15
M7	Hourly cost per user		$30
M8	Working hours per year		2,000
M9	Percentage of working hours spent on project tasks		40%
M10	Estimated time improvement		10%
M11	**Estimated savings**	M1*M8*((M5+M6)/2)*M2* M3*M7*M9*M10	576,000

Source: Forrester Research, Inc.

Table 17

Productivity Increase – Timely Project Tracking Information

Ref.	Metric	Calculation	Value
N1	Average number of active projects		1200
N2	Percentage of project time – reviewing and editing documents		20%
N3	Percentage of reviewing time spent tracking project status/updates		15%
N4	Productivity conversion factor		50%
N5	Size of project teams – small		5

N6	Size of project teams – large		15
N7	Hourly cost per user		$30
N8	Working hours per year		2,000
N9	Percentage of working hours spent on project teams		40%
N10	Estimated time improvement		5%
N11	**Estimated savings**	N1*N8*((N5+N6)/2)*N2*N3*N7*N9*N10	$216,000

Source: Forrester Research, Inc.

Reduced Cost Of Distributed Corporatewide Information

A benefit cited by organizations was the ability to quickly create collaborative sites and files to disseminate corporatewide or team-specific information to the appropriate set of users. In particular, several organizations noted the effectiveness of using Google Docs and Sites as a way to push content such as employee HR policies, benefits summaries, and finance information to different teams.

Table 18

Productivity Increase – Efficient Companywide Information Distribution

Ref.	Metric	Calculation	Value
O1	Number of annual department wide reviews of information		1
O2	Average share of employees impacted		5%
O3	Employees who have adopted collaboration tools		18,000
O4	Time to complete departmental review (hours)		100
O5	Productivity conversion factor		50%
O6	Hourly cost per user		$30
O7	Estimated improvement		25%
O8	**Estimated savings**	O1*O2*O3*O4*O5*O6*O7	$337,500

Source: Forrester Research, Inc.

Improved Effectiveness In Receiving And Processing Feedback

A benefit cited by the interviewed organizations was the ability of communities to open up new channels for executive management to communicate with employees. Seventy percent of survey respondents felt that with Google Apps, "the time it takes to incorporate feedback is reduced."

Prior to the use of Google Apps, the process of soliciting feedback from colleagues was ad hoc, with high time requirements to collect and analyze feedback. For example, face-to-face meetings enabled management to receive immediate feedback from employees but were very time consuming. With increased adoption of Google Docs and Google Sites, management could quickly create collaborative sites and files to solicit feedback on different topics rather than resort to repetitive email communications or face-to-face meetings.

Table 19

Productivity Increase – Efficient Sharing And Processing Of Feedback

Ref.	Metric	Calculation	Value
P1	Number of departmental teams		12
P2	Number of departments		12
P3	Average time spent providing documentation feedback (hours)		15
P4	Size of project teams –small		15
P5	Size of project teams – large		30
P6	Productivity conversion factor		50%
P7	Hourly cost per user		$30
P8	Estimated percentage improvement		30%
P9	**Estimated savings**	P1*P3*P7*P8*P6*((P4+P5)/2)*P2	$218,700

Source: Forrester Research, Inc.

IT-Specific Benefits – Efficiency Savings

As with specific messaging benefits, organizations also saw specific IT cost reduction savings from their collaboration applications. Specific IT savings with Google Apps included the reduced cost of managing collaborative sites. In the previous environment, the representative organization had various internally managed collaboration platforms, involving significant complexity and support costs. With the adoption of Google Apps, the organization could expand end user access to collaborative sites while at the same time reducing the cost by standardizing on a single, hosted collaborative site platform. Prior to the introduction of Google Apps, the organization would deploy and manage 20

new sites per year. With Google Apps, users had greater flexibility to create their own sites, increasing the number of new sites annually to 120 while reducing the IT burden to support those sites.

Table 20
Reduced Cost – Administration Of Collaborative Sites

Ref.	Metric	Calculation	Value
Q1	FTE requirement to plan/test and deploy (hours)		150
Q2	Estimated reduction		38%
Q3	Cost per user		$30
Q4	Productivity conversion factor		50%
Q5	Number of sites created annually		20
Q6	**Estimated savings**	Q1*Q2*Q3*Q4*Q5	$17,100

Source: Forrester Research, Inc.

Total Benefits

Total benefits of switching to Google Apps for both collaboration and messaging are listed in Table 21. Table 21 takes into account the observed ramp-up in usage of the messaging and collaboration tools in Google Apps. For messaging, we observed 75% adoption in Year 1 and 100% adoption in Year 2 and Year 3. For collaboration, we observed 45% adoption in Year 1, 55% adoption in Year 2, and 60% adoption in Year 3.

Table 21
Total Benefits – Non-Risk-Adjusted

Ref.	Benefit category – messaging	Year 1	Year 2	Year 3	Total	PV
B15	Productivity increase – simpler email archiving	73,589	98,118	98,118	269,825	221,705
C15	Productivity increase – faster email search	265,478	353,970	353,970	973,418	799,823
E15	Productivity increase – improved email organization	218,126	290,835	290,835	799,796	657,165
F12	Productivity increase – integrated instant messaging	921,797	1,229,063	1,229,063	3,379,922	2,777,164

G13	Productivity increase – email threading	328,050	437,400	437,400	1,202,850	988,340
D10	Productivity increase – improved spam filtering	158,203	210,938	210,938	580,078	476,630
H6-H8	Reduced cost – technology licenses	756,000	1,134,000	1,436,400	3,326,400	2,703,651
I12	Reduced cost – administration and operations	1,226,880	1,635,840	1,635,840	4,498,560	3,696,310
J6-J8	Reduced cost – infrastructure cost	47,700	238,500	524,700	810,900	634,686
	Total messaging benefits	$3,995,823	$5,628,664	$6,217,264	$15,841,749	$12,955,474

Source: Forrester Research, Inc.

Ref.	Benefit category – collaboration	Year 1	Year 2	Year 3	Total	PV
K12	Productivity increase – face-to-face meetings	106,616	130,309	142,155	379,080	311,420
L12	Productivity increase – virtual meetings	133,270	162,886	177,694	473,850	389,275
M11	Productivity increase – faster document revision reconciliation	259,200	316,800	345,600	921,600	757,109
N11	Productivity increase – timely project tracking information	97,200	118,800	129,600	345,600	283,916
O8	Productivity increase – efficient companywide information distribution	151,875	185,625	202,500	540,000	443,619
P9	Productivity increase – efficient sharing and processing of feedback	98,415	120,285	131,220	349,920	287,465
Q6	Reduced cost – administration of collaborative sites	7,695	9,405	10,260	27,360	22,477
	Total collaboration benefits	$854,272	$1,044,110	$1,139,029	$3,037,410	$2,495,280

Source: Forrester Research, Inc.

Benefit category – total benefits	Year 1	Year 2	Year 3	Total	PV
Total benefits – messaging	$3,995,823	$5,628,664	$6,217,264	$15,841,749	$12,955,474
Total benefits – collaboration	$854,272	$1,044,110	$1,139,029	$3,037,410	$2,495,280

Source: Forrester Research, Inc.

Flexibility

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for some future additional investment. This provides an organization with the "right" or the ability to engage in future initiatives but not the obligation to do so. There are multiple scenarios in which a customer might choose to migrate to Google Apps and later implement additional uses and business opportunities. Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix B).

Customers noted the use of Google Apps provided the ability to leverage secondary benefits such as functionality found in Google Marketplace and the use of Google Apps for more efficient collaboration with external partners, customers, and suppliers.

To calculate the impact of this added flexibility, Forrester chose to compare the potential annual gain from using Google Apps for external collaboration and the use of third-party applications from the Google Apps Marketplace with the cost of taking advantage of these additional benefits. Net benefits of these two impacts are positive for this analysis as compared with the costs, but readers are urged to conduct their own analysis as to when these additional benefits should be exercised.

Table 22
Flexibility – External collaboration – Productivity Increase

Ref.	Metric	Calculation	Value
S1	Number of external partners		5
S2	Number of interactions to complete order process		12
S3	Cost per interaction		$4,500
S4	Estimated cost improvement		40%
S5	Cost to exercise		$10,000
S6	Total flexibility value – external collaboration	(S1*S2*S3*S4)-S5	$98,000

Source: Forrester Research, Inc.

Table 23
Flexibility – Google Apps Marketplace – Reduced Cost

Ref.	Metric	Calculation	Value
T1	Cost to build and deploy standalone applications		$350,000
T2	Percentage change in cost		60%
T3	Cost to exercise		$80,000
T4	Total flexibility value – Google Marketplace	(T1*T2)-T3	$130,000

Source: Forrester Research, Inc.

Risk

Forrester defines two types of risk associated with this analysis: implementation risk and impact risk. Implementation risk is the risk that a proposed investment in Google Apps may deviate from the original or expected requirements, resulting in higher costs than anticipated. Impact risk refers to the risk that the business or technology needs of the organization may not be met by the investment in Google Apps, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for cost and benefit estimates.

Quantitatively capturing investment and impact risk by directly adjusting the financial estimates results in more meaningful and accurate estimates and a more accurate projection of the ROI. In general, risks affect costs by raising the original estimates, and they affect benefits by reducing the original estimates. The risk-adjusted numbers should be taken as "realistic" expectations since they represent the expected values considering risk.

The following implementation risks that affect costs are identified as part of this analysis:

- Risk involved in taking the time to migrate users away from the previous on-premise environment.
- Risk of escalating cost of examining, reforming, and implementing governance and security policy, as cloud based services evolve and grow within the organization.

The following impact risks that affect benefits are identified as part of the analysis:

- Risk of increased training required for both messaging and collaboration applications.

Table 24 shows the values used to adjust for risk and uncertainty in the cost and benefit estimates. The TEI model uses a triangular distribution method to calculate risk-adjusted values. To construct the distribution, it is necessary to first estimate the low, most likely, and high values of risk that could occur. The risk-adjusted value is the mean of the distribution of those points. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

Table 24
Cost And Benefit Risk Adjustment

Costs	Low	Most likely	High	Mean
Risk to cost – license	100%	100%	100%	100%
Risk to cost – internal implementation	100%	100%	160%	120%
Benefits	**Low**	**Most likely**	**High**	**Mean**
Risk to benefits – IT cost savings	55%	100%	100%	85%
Risk to benefits – end-user impact	53%	100%	100%	84%

Financial Summary

The financial results calculated in the Costs and Benefits sections can be used to determine the ROI, NPV, and payback period for the organization's transition from its previous on-premise system to Google Apps. These are shown in Table 25 below.

Table 25
Cash Flow – Non-Risk-Adjusted

	Cash flow – original estimates					
	Initial	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present value**
Costs	$375,125	$1,134,000	$1,134,000	$1,134,000	$3,777,125	$3,195,215
Benefits		$4,850,094	$6,672,773	$7,356,292	$18,879,158	$15,450,755
Flexibility		$228,000				
Net cash flow	($375,125)	$3,944,094	$5,538,773	$6,222,292	$15,330,033	$12,483,540
ROI	391%					
Payback period	6 months					

Source: Forrester Research, Inc.

Table 26 below shows the risk-adjusted ROI, NPV, and payback period values. These values are determined by applying the risk-adjustment values from Table 22 in the Risk section to the cost and benefits numbers in Tables 4 and 21.

Table 26
Cash Flow – Risk-Adjusted

	Cash flow – risk-adjusted estimates					
	Initial	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present value**
Costs	$450,150	$1,134,000	$1,134,000	$1,134,000	$3,852,150	$3,270,240
Benefits		$4,105,267	$5,649,500	$6,230,122	$15,984,890	$13,081,852
Flexibility		$228,000				
Net cash flow	($450,150)	$3,199,267	$4,515,500	$5,096,122	$12,360,740	$10,039,612
ROI	307%					
Payback period	7 months					

Source: Forrester Research, Inc.

Study Conclusions

The data collected in this study from both in-depth customer interviews and broader customer surveys demonstrates that migrating an organization's messaging and collaboration environment from legacy on-premise systems to Google Apps has the potential to provide a solid return on the investment. The risk-adjusted ROI of 307%, along with a rapid payback period (breakeven point) of less than seven months for the representative organization raises confidence that the investment is likely to succeed since the risks and uncertainty that may threaten the project have been considered and quantified. In interviews with Google Apps customers, Forrester found that a wide variety of organizations can realize tangible benefits in the form of:

IT-impact benefits. These included the cost savings resulting from moving an organization's on-premise messaging and collaboration environment to Google's cloud-based architecture.

- Cost savings included reduced spend on licenses and infrastructure.
- Cost savings included reduced IT administrator time spent on system maintenance, upkeep, patching, and upgrades.
- Organizations noted specific annual cost savings of between 38% and 56% versus their previous environment.

End-user-impact benefits. These included specific end user benefits around the migration of an organization's messaging and collaboration environment to Google Apps.

- **messaging-specific benefits.** These included productivity gains around email search, spam filtering, archiving, organization of email, as well as improved response time within the messaging environment.
- **collaboration-specific benefits.** These included improved efficiency in sharing and editing documents across teams and within teams, ability to incorporate feedback more quickly, more efficient face-to-face and virtual meetings, as well pushing more timely and relevant information to distributed teams.

Enabled-flexibility benefits. These included the ability to achieve secondary benefits from the initial investment in Google Apps.

- **Collaborating with external partners.** The ability to improve the efficiency of interacting with external partners and suppliers through Google Docs and Google Sites.
- **Leveraging the Google Marketplace.** Taking advantage of new process-specific applications from Google Marketplace, further reducing process integration costs.

Based on these findings, companies looking to implement Google Apps as part of their messaging and collaboration strategy can anticipate improvements in operational efficiency, end user and IT productivity savings, and additional flexibility benefits. Using the TEI framework, many companies may find the potential for a compelling business case to make such an investment.

Google Apps Overview

Google Apps is a Web-based messaging and collaboration platform available to businesses for a flat license fee of $50 per employee, per year. Google's applications run in any modern browser without any additional software to buy, install, maintain, or upgrade over time. Google also manages the back-end infrastructure in its highly scalable, reliable, and secure data center infrastructure, so there are no servers for customers to purchase, configure, patch, or upgrade over time.

Google Apps includes the following:

- **Gmail** includes 25 GB of storage per employee, Google-powered email search, industry-leading spam protection, and integrated IM, voice, and video chat. Workers can access their Gmail from any computer and on mobile devices including BlackBerry, iPhone, Windows Mobile, and tablets. Employees who prefer the Microsoft Outlook interface can continue to use Outlook as their email client without the company needing to run Microsoft Exchange.
- **Google Calendar** allows employees to manage their schedules, create project calendars, and easily schedule time with colleagues. Multiple calendars can be overlaid to quickly display a composite view of multiple people's schedules. Workers can access Google Calendar on any computer and on mobile devices including BlackBerry, iPhone, Windows Mobile, and tablets. Employees who prefer the Microsoft Outlook interface can continue to use Outlook as their calendar client without the company needing to run Microsoft Exchange.
- **Google Docs** brings multi-person real-time collaboration to documents, spreadsheets, presentations, and drawings. Editors can simultaneously access the same Web-based file from any computer and contribute while others are also making changes, sparing colleagues the inconvenience of collaborating over attachments. Google Docs can import traditional office files and export to those formats as well.
- **Google Sites** allows teams to create and share collaborative team sites without burdening IT for support. Employees can access sites from any computer, and sites can display rich content such as embedded documents, spreadsheets, presentations, calendars, and videos.
- **Google Video** is a private, secure platform for sharing internal videos like trainings, corporate communications, and more. Videos can be viewed or uploaded from any computer.
- **Google Groups** allows administrators and end users to create mailing lists and browse or search discussion archives quickly from any computer. Documents, spreadsheets, presentations, sites, and other content can also be shared with groups so content owners can easily manage information permissions.
- **More Google applications** including Google Voice, Google Reader, Blogger, Picasa, Google Reader, and AdWords are available from Google Apps accounts at no additional charge, and IT administrators can provide the right set of tools to each group within their organization.

Migration And Integration Capabilities

At no additional cost, Google offers scalable tools to easily migrate email, calendar, and contacts data from legacy Microsoft Exchange, Lotus Notes, and many IMAP email systems to Google Apps, so workers can seamlessly switch

over to Google Apps with minimal disruption. Furthermore, Google Apps is designed to integrate seamlessly with existing on-premise technology including:

- Single Sign-On (SSO) integration
- LDAP directory synchronization
- Integration with local data repositories with the Secure Data Connector
- APIs that allow flexible programmatic access to Google Apps from many other systems

Data Security

Google Apps has successfully completed an SAS 70 Type II audit to ensure that its security procedures are operating effectively, and Google Apps is the first suite of cloud-based messaging and collaboration applications to receive the stringent Federal Information Security Management Act (FISMA) certification and accreditation from the US General Services Administration.

Reliability, Uptime Guarantee, And Support

Google's Service Level Agreement (SLA) guarantees that Google Apps will be available at least 99.9% of the time, and the actual performance of the system has been significantly higher than this SLA threshold. Google provides enterprise-grade support to customers including 24/7 telephone support for critical administrative issues.

Message Archiving For Regulatory Compliance

In addition to Google Apps, companies can add Google Message Discovery for $13 per employee per year for one-year archiving. Google Message Discovery, powered by Postini, is a Web-based service that provides customers with complete email security, a hosted email archive, plus powerful message search and recovery tools.

Availability And Other Versions Of Google Apps

Google Apps is available in over 150 countries and in over 40 languages. In addition to Google Apps for businesses, Google offers free versions of Google Apps for small organizations, non-profits, and to schools and universities of all sizes.

More Information

For more information about Google Apps or to speak with a Google representative, visit www.google.com/apps.

Appendix A: Composite Organization Description

For this TEI study, Forrester has created a composite organization to illustrate the quantifiable costs and benefits of switching from on-premise technology to Google Apps. The composite company is intended to represent an 18,000-employee enterprise and is based on characteristics of the interviewed customers.

The composite company had been using on-premise messaging and collaboration tools prior to the investment in Google Apps. With the investment in Google Apps, usage varied among the different products:

Table 27
Composite Organization – Application Usage

Application usage						
	Did not use	Fewer than 2 hours per week	2 to 4 hours per week	4 to 8 hours per week	8 to 16 hours (1 to 2 days) per week	More than 16 hours (2 days) per week
Gmail /Google Mail	0%	0%	2%	4%	78%	16%
Google Talk	11%	45%	30%	9%	2%	3%
Contacts	20%	50%	27%	0%	1%	2%
Google Calendar	7%	43%	33%	10%	3%	4%
Google Sites	18%	60%	18%	2%	1%	1%
Google Video	22%	69%	8%	0%	0%	1%
Google Docs	5%	55%	21%	12%	3%	4%
Google Groups	15%	83%	1%	0%	0%	1%

Appendix B: Total Economic Impact™ Overview

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.

The TEI methodology consists of four components to evaluate investment value: benefits, costs, risks, and flexibility.

Benefits

Benefits represent the value delivered to the user organization — IT and/or business units — by the proposed product or project. Often product or project justification exercises focus just on IT cost and cost reduction, leaving little room to analyze the effect of the technology on the entire organization. The TEI methodology and the resulting financial model place 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. Calculation of benefit estimates involves a clear dialogue with the user organization to understand the specific value that is created. In addition, Forrester also requires that there be a clear line of accountability established between the measurement and justification of benefit estimates after the project has been completed. This ensures that benefit estimates tie back directly to the bottom line.

Costs

Costs represent the investment necessary to capture the value, or benefits, of the proposed project. IT or the business units may incur costs in the forms of fully burdened labor, subcontractors, or materials. Costs consider all the investments and expenses necessary to deliver the proposed value. In addition, the cost category within TEI captures any incremental costs over the existing environment for ongoing costs associated with the solution. All costs must be tied to the benefits that are created.

Risk

Risk measures the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: 1) the likelihood that the cost and benefit estimates will meet the original projections, and 2) the likelihood that the estimates will be measured and tracked over time. TEI applies a probability density function known as "triangular distribution" to the values entered. At a minimum, three values are calculated to estimate the underlying range around each cost and benefit.

Flexibility

Within the TEI methodology, direct benefits represent one part of the investment value. While direct benefits can typically be the primary way to justify a project, Forrester believes that organizations should be able to measure the strategic value of an investment. Flexibility represents the value that can be obtained for some future additional investment building on top of the initial investment already made. For instance, an investment in an enterprisewide upgrade of an office productivity suite can potentially increase standardization (to increase efficiency) and reduce licensing costs. However, an embedded collaboration feature may translate to greater worker productivity if activated. The collaboration feature can only be used with additional investment in training at some future point in time. However, having the ability to capture that benefit has a present value that can be estimated. The flexibility component of TEI captures that value.

Appendix C: Glossary

Discount rate: The interest rate used in cash flow analysis to take into account the time value of money. Although the Federal Reserve Bank sets a discount rate, companies often set a discount rate based on their business and investment environment. Forrester assumes a yearly discount rate of 10% for this analysis. Organizations typically use discount

rates between 8% and 16% based on their current environment. Readers are urged to consult their respective organization to determine the most appropriate discount rate to use in their own environment.

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.

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 net present value of cash flows.

Payback period: The breakeven point for an investment. The point in time at which net benefits (benefits minus costs) equal initial investment or cost.

Return on investment (ROI): A measure of a project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits minus costs) by costs.

A Note On Cash Flow Tables

The following is a note on the cash flow tables used in this study (see the example table below). The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1. Those costs are not discounted. All other cash flows in Years 1 through 3 are discounted using the discount rate (shown in Framework Assumptions section) at the end of the year. Present value (PV) calculations are calculated for each total cost and benefit estimate. Net present value (NPV) calculations are not calculated until the summary tables and are the sum of the initial investment and the discounted cash flows in each year.

[Table Example]

Ref.	Category	Calculation	Initial cost	Year 1	Year 2	Year 3	Total

Source: Forrester Research, Inc.

Appendix D: Endnotes

[1] Forrester risk-adjusts the summary financial metrics to take into account the potential uncertainty of the cost and benefit estimates. For more information on Risk, please see page 30.