

A Forrester Total Economic
Impact™ Study
Commissioned By
CA Technologies

Project Director:
Dean Davison
February 2016

The Total Economic Impact™ Of CA Technologies Workload Automation

Table Of Contents

Executive Summary	3
Disclosures	4
TEI Framework And Methodology	5
Analysis	6
Financial Summary	16
CA Technologies' Workload Automation: Overview.....	17
Appendix A: Total Economic Impact™ Overview.....	18
Appendix B: Glossary.....	19

ABOUT FORRESTER CONSULTING

Forrester Consulting provides independent and objective research-based consulting to help leaders succeed in their organizations. Ranging in scope from a short strategy session to custom projects, Forrester's Consulting services connect you directly with research analysts who apply expert insight to your specific business challenges. For more information, visit forrester.com/consulting.

© 2016, Forrester Research, Inc. All rights reserved. Unauthorized reproduction is strictly prohibited. Information is based on best available resources. Opinions reflect judgment at the time and are subject to change. Forrester®, Technographics®, Forrester Wave, RoleView, TechRadar, and Total Economic Impact are trademarks of Forrester Research, Inc. All other trademarks are the property of their respective companies. For additional information, go to www.forrester.com.

Executive Summary

CA Technologies commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) that enterprises may realize by deploying CA Workload Automation (CA WLA). The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of CA WLA on their organizations. CA WLA helps organizations simplify workload management through improved automation and pushing workload tasks to development teams.

To better understand the benefits, costs, and risks associated with CA WLA, Forrester interviewed an existing customer with years of experience using CA WLA. The organization that Forrester interviewed manufactures consumer electronics that it sells through retailers around the globe.

Prior to CA WLA, the customer developed and maintained a “homegrown,” legacy-based application that provided scheduling for 3,000 jobs. In addition, the organization purchased two additional utilities that integrated jobs from client-server systems. The workload manager told Forrester:

“To use the old tool, application developers would submit a request to operations. The operations team would secure the necessary approval from involved parties and then schedule the task.”

The workload manager continued: “Using CA WLA, the application development teams are able to manage workload tasks on their own. Allowing the application teams to manage their own jobs has saved considerable time.” With a total of 50 developer teams that save an average of 1 hour every day, the time savings to development teams of directly managing job scheduling totaled more than 13,000 hours per year, which is valued at more than \$2.1 million over three years. In addition, the organization retired its homegrown system and used CA WLA functionality to replace two third-party tools that it was already purchasing.

CA Technologies’ Workload Automation helps consolidate job scheduling and allows application development teams to directly manage jobs.

The benefits for the organization that Forrester interviewed are:

- **Increased productivity of application teams: \$2.1 million.**
- **Avoided cost of centrally managing job scheduling: \$810,000.**
- **Avoided cost of maintaining a homegrown system: \$648,000.**
- **Savings from third-party tools no longer required: \$306,850.**

CA WLA INCREASES DEVELOPER PRODUCTIVITY BY 13,000 HOURS PER YEAR

Forrester’s interview with a CA WLA customer found that the organization experienced the results shown in Figure 1. The financial analysis shows that the organization benefited from reduced costs of more than \$3.2 million compared with incurred costs of more than \$941,069. The final results are a net present value (NPV) of more than \$2.3 million.

FIGURE 1
Financial Summary Showing Three-Year Risk-Adjusted Results



Source: Forrester Research, Inc.

- › **Benefits.** The organization experienced the following risk-adjusted benefits:
 - **Increased productivity of application development teams.** Shifting operations control for workload management directly to the development teams reduced the time of 50 management teams by 1 hour per day, for a total of 13,000 hours per year. This resulted in a productivity increase of more than \$2.1 million over three years.
 - **Avoided cost of centrally managing workload operations.** The organization avoided the cost of three full-time equivalents (FTEs) to centrally manage workloads. The reduced cost totaled \$810,000 over three years.
 - **Avoided cost of maintaining a homegrown scheduling system.** The organization was able to avoid the cost of two FTEs required to develop and maintain the homegrown workload application functioning, for a reduced cost that totaled \$648,000 over three years.
 - **Savings from third-party tools replaced by CA WLA functionality.** The organization used two third-party tools that it was able to avoid renewing because of the functionality within CA WLA. The avoided cost of the two tools resulted in a savings of \$306,850 over three years.
- › **Costs.** The organization experienced the following risk-adjusted costs:
 - **Cost of licensing, hosting, and implementing CA WLA.** The organization paid CA for a perpetual license of \$500,000 and a maintenance fee of 20% per year. In addition, the organization spent \$100,000 in effort implementing CA WLA and \$35,000 for the hardware to host CA WLA. The total cost to the organization for CA WLA over three years was \$981,750.
 - **Cost of managing security for application teams.** The one-time cost of building the security plan allowed 50 application teams to directly manage their own job scheduling rather than making requests to a centralized team. The setup cost was a nominal \$13,200.

Disclosures

The reader should be aware of the following:

- › The study is commissioned by CA Technologies and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.
- › Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the report to determine the appropriateness of an investment in CA Workload Automation.
- › CA Technologies 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.
- › CA Technologies provided the customer name for the interview but did not participate in the interviews.

TEI Framework And Methodology

INTRODUCTION

From the information provided in the interviews, Forrester constructed a Total Economic Impact (TEI) framework for those organizations considering implementing CA Workload Automation. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision, to help organizations understand how to take advantage of specific benefits, reduce costs, and improve the overall business goals of winning, serving, and retaining customers.

APPROACH AND METHODOLOGY

Forrester took a multistep approach to evaluate the impact that CA Workload Automation can have on an organization (see Figure 2). Specifically, we:

- › Interviewed CA Technologies marketing, sales, and/or consulting personnel, along with Forrester analysts, to gather data relative to the marketplace for CA WLA.
- › Interviewed an organization currently using CA WLA to obtain data with respect to costs, benefits, and risks.
- › Constructed a financial model representative of the interview using the TEI methodology. The financial model is populated with the cost and benefit data obtained from the interview.
- › Risk-adjusted the financial model based on issues and concerns the interviewed organization highlighted in the interview. Risk adjustment is a key part of the TEI methodology. While the interviewed organization provided cost and benefit estimates, some categories included a broad range of responses or had a number of outside forces that might have affected the results. For that reason, some cost and benefit totals have been risk-adjusted and are detailed in each relevant section.

Forrester employed four fundamental elements of TEI in modeling CA WLA's service: benefits, costs, flexibility, and risks.

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

FIGURE 2
TEI Approach



Source: Forrester Research, Inc.

Analysis

INTERVIEW HIGHLIGHTS

Forrester interviewed an organization that manufactures consumer electronics that are sold around the world.

Situation

Prior to using CA WLA, the organization:

- › Built and maintained a legacy application that centrally managed scheduled jobs.
- › Required application teams to submit workload requests that were managed centrally by an operations team. Each of the 50 application teams spent an average of 1 hour every day managing workloads.
- › Maintained licenses for third-party tools that contributed to workload management activities.

“We had our own homegrown scheduler that was written by people here in assembly-level language code.”

~ Manager, workload management

Solution

The organization implemented CA Workload Automation with a license for about 300 agents to manage job scheduling activities for mainframe, Unix, Linux, and Windows systems.

Results

The interview revealed that the organization:

- › **Retired its legacy workload management application.** The organization was able to retire its legacy job scheduler and refocus a total of five employees. Two employees maintained the legacy application itself, and three additional employees centrally managed the scheduling activities.
- › **Reduced the time required by application teams to manage job scheduling.** The organization was able to provide limited privileges to 50 application development teams that allowed the teams to directly manage job scheduling rather than submit requests to a central management group. The change increased the productivity of development teams by 1 hour per business day, for a total of 13,000 hours in improved productivity over three years.
- › **Avoided the cost of third-party tools replaced by CA WLA functionality.** The organization was able to discontinue licensing of two third-party tools that it no longer required because the functionality was replaced by capabilities within CA WLA.

“Currently, CA WLA is used by 50 development teams, but the number is increasing because the broadcasting of success with workload automation in our enterprise has enticed other application teams.”

~ Manager, workload automation

BENEFITS

The organization was able to reduce costs in four ways:

- › Increased productivity of application development teams.
- › Avoided cost of centrally managing workload operations.
- › Avoided cost of maintaining a homegrown scheduling system.
- › Savings from third-party tools replaced by CA WLA functionality.



Increased Productivity Of Application Development Teams

Across the organization, 50 development teams directly managed job scheduling rather than making requests to a central operations team. The impact was that each development team saved 1 hour each business day, which saved a total of 13,000 hours per year for the development teams. Based on the average application developer annual salary of \$120,000, the total savings for the organization was \$750,000 per year, or more than \$2.2 million over three years.

Forrester risk-adjusted this benefit downward by 5% to account for variability in the number of development teams. The risk-adjusted benefit totaled more than \$2.1 million over three years.

TABLE 1
Increased Productivity Of Application Development Teams

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
A1	Number of development teams		50	50	50
A2	Hours of improved productivity to development teams per year	1 hour per day	260	260	260
A3	Developer hours reduced per year	A1*A2	13,000	13,000	13,000
A4	Hours converted to full-time equivalents	A3/ 2,080 hours	6.25	6.25	6.25
A5	Average burdened salary for developers		\$120,000	\$120,000	\$120,000
At	Increased productivity of application development teams	A4*A5	\$750,000	\$750,000	\$750,000
	Risk adjustment		↓ 5%		
Atr	Increased productivity of application development teams (risk-adjusted)		\$712,500	\$712,500	\$712,500

Source: Forrester Research, Inc.



Avoided Cost Of Centrally Managing Workload Operations

Prior to using CA WLA, the organization employed three staff in workload operations, which was a central team that managed incoming requests from the application teams, scheduled and managed jobs, and resolved problems or exceptions. By allowing the application teams to manage workloads directly, the three staff were reassigned to manage other data center needs.

The reduction of three resources required to manage workload operations resulted in a total savings of \$300,000 per year and \$900,000 over three years. Forrester risk-adjusted this benefit down by 10%, resulting in a risk-adjusted, three-year savings of \$810,000. See the section on Risks for more detail.

TABLE 2
Avoided Cost Of Centrally Managing Workload Operations

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
B1	Staff required to manage job scheduling		3	3	3
B2	Average burdened salary		\$100,000	\$100,000	\$100,000
Bt	Avoided cost of centrally managing workload operations	B1*B2	\$300,000	\$300,000	\$300,000
	Risk adjustment		↓ 10%		
Btr	Avoided cost of centrally managing workload operations (risk-adjusted)		\$270,000	\$270,000	\$270,000

Source: Forrester Research, Inc.



Avoided Cost Of Maintaining A Homegrown Scheduling System

The homegrown tool required two developers to maintain it and keep it current. Once the legacy application was retired, the developers were redeployed to other projects. The savings for the organization totaled \$720,000 over three years. The organization also saved amounts for the MIPS and DASD capacity required by the application, but these amounts were nominal and excluded from the financial analysis.

Forrester risk-adjusted this benefit down by 10% to account for the varying costs that other organizations may invest in maintaining homegrown scheduling systems. This resulted in a risk-adjusted, three-year total benefit of \$648,000.

TABLE 3
Avoided Cost Of Maintaining A Homegrown Scheduling System

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
C1	Number of developers required to maintain homegrown tool			2	2	2
C2	Averaged burdened salary			\$120,000	\$120,000	\$120,000
Ct	Avoided cost of maintaining a homegrown scheduling system	C1*C2		\$240,000	\$240,000	\$240,000
	Risk adjustment		↓ 10%			
Ctr	Avoided cost of maintaining a homegrown scheduling system (risk-adjusted)			\$216,000	\$216,000	\$216,000

Source: Forrester Research, Inc.



Savings From Third-Party Tools Replaced By CA WLA Functionality

The organization had purchased two tools that completed its legacy system for job scheduling, but the tools had similar functionality as CA WLA. After purchasing CA WLA, the organization was able to avoid the cost of renewing its licenses for the other tools. The total savings over three years was \$323,000.

Forrester risk-adjusted this benefit down by 10%, resulting in a risk-adjusted, three-year total benefit of \$306,850.

TABLE 4
Savings From Third-Party Tools Replaced By CA WLA Functionality

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
D1	Annual license for tool No. 1			\$65,000	\$65,000	\$65,000
D2	Perpetual license for tool No. 2		\$80,000			
D3	Annual maintenance for tool No. 2			\$16,000	\$16,000	\$16,000
Dt	Savings from third-party tools replaced by CA WLA functionality	D1+D2+D3	\$80,000	\$81,000	\$81,000	\$81,000
	Risk adjustment		↓ 5%			
Dtr	Savings from third-party tools replaced by CA WLA functionality (risk-adjusted)		\$76,000	\$76,950	\$76,950	\$76,950

Source: Forrester Research, Inc.



Total Benefits

Table 5 shows the total of all benefits as well as associated present values, discounted at 10%. Over three years, the organization expects all benefits to total a net present value of more than \$3.2 million.

TABLE 5
Total Benefits (Risk-Adjusted)

Ref.	Benefit	Initial	Year 1	Year 2	Year 3	Total	Present Value
Atr	Increased productivity of application development teams	\$0	\$712,500	\$712,500	\$712,500	\$2,137,500	\$1,771,882
Btr	Avoided cost of centrally managing workload operations	\$0	\$270,000	\$270,000	\$270,000	\$810,000	\$671,450
Ctr	Avoided cost of maintaining a homegrown scheduling system	\$0	\$216,000	\$216,000	\$216,000	\$648,000	\$537,160
Dtr	Savings from third-party tools replaced by CA WLA functionality	\$76,000	\$76,950	\$76,950	\$76,950	\$306,850	\$267,363
	Total benefits	\$76,000	\$1,275,450	\$1,275,450	\$1,275,450	\$3,902,350	\$3,247,855

Source: Forrester Research, Inc.

COSTS

The organization experienced a number of costs associated with CA WLA:

- › Cost of licensing, hosting, and implementing CA WLA.
- › Cost of managing security for application teams.

These represent the mix of internal and external costs experienced by the organization for initial planning, implementation, and ongoing maintenance associated with the solution.



Cost Of Licensing, Hosting, And Implementing CA WLA

The organization deployed CA WLA with a license for about 300 agents. The perpetual license cost \$500,000 and incurred a 20% maintenance fee each year thereafter. The organization spent \$100,000 for the time and effort it took to implement CA WLA and another \$35,000 for the hardware that supported it. The cost over three years totaled \$935,000.

Forrester risk-adjusted this cost upward by 5%, resulting in a risk-adjusted total over three years of \$981,750.

TABLE 6
Cost Of Licensing, Hosting, And Implementing CA WLA

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
E1	CA WLA perpetual license		\$500,000			
E2	CA WLA annual maintenance	$E1 * 20\%$		\$100,000	\$100,000	\$100,000
E3	Implementation cost	$E1 * 20\%$	\$100,000			
E4	Hardware cost to host CA WLA	$E1 * 7\%$	\$35,000			
Et	Cost of licensing, hosting, and implementing CA WLA	$E1+E2+E3+E4$	\$635,000	\$100,000	\$100,000	\$100,000
	Risk adjustment		↑ 5%			
Etr	Cost of licensing, hosting, and implementing CA WLA (risk-adjusted)		\$666,750	\$105,000	\$105,000	\$105,000

Source: Forrester Research, Inc.



Cost Of Managing Security For Application Teams

The organization required 4 hours of effort to create the security policies that allowed each application team to directly manage its job scheduling. The total cost for 50 applications teams was \$12,000 for 200 hours. Forrester risk-adjusted this cost upward by 10% to account for the variation in policy implementation, which resulted in a final risk-adjusted cost of \$13,200.

TABLE 7
Cost Of Managing Security For Application Teams

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
F1	Number of development teams		50			
F2	Hours required to set up security plan for application teams	4 hours per team	200			
F3	Equivalent FTEs		0.1			
F4	Average burdened salary		\$120,000			
Ft	Cost of managing security for application teams	F3*F4	\$12,000	\$0	\$0	\$0
	Risk adjustment		↑ 10%			
Ftr	Cost of managing security for application teams (risk-adjusted)		\$13,200	\$0	\$0	\$0

Source: Forrester Research, Inc.

Total Costs

Table 8 shows the total of all costs as well as associated present values, discounted at 10%. Over three years, the organization expects total costs to total a net present value of \$941,069.

TABLE 8
Total Costs (Risk-Adjusted)

Ref.	Benefit	Initial	Year 1	Year 2	Year 3	Total	Present Value
Etr	Cost of licensing, hosting, and implementing CA WLA	\$666,750	\$105,000	\$105,000	\$105,000	\$981,750	\$927,869
Ftr	Cost of managing security for application teams	\$13,200	\$0	\$0	\$0	\$13,200	\$13,200
	Total costs	\$679,950	\$105,000	\$105,000	\$105,000	\$994,950	\$941,069

Source: Forrester Research, Inc.

RISKS

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 CA WLA 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 CA WLA, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for cost and benefit estimates.

Quantitatively capturing implementation risk and impact risk by directly adjusting the financial estimates results provides 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.

Table 9 shows the values used to adjust for risk and uncertainty in the cost and benefit estimates for the organization. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

TABLE 9
Benefit And Cost Risk Adjustments

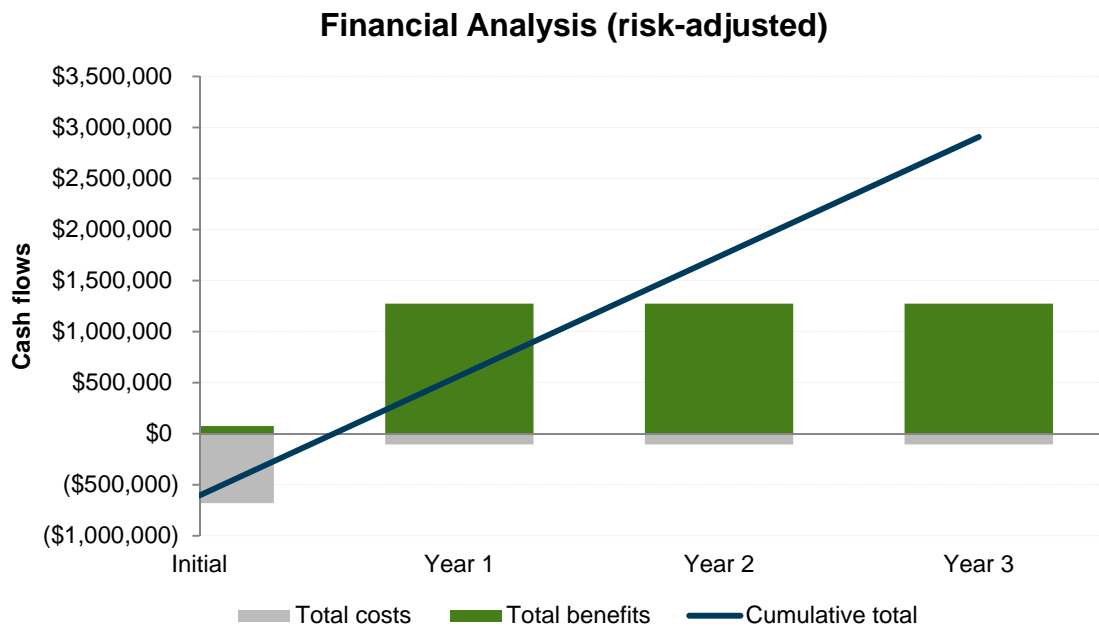
Benefits	Adjustment
Increased productivity of application development teams	↓ 5%
Avoided cost of centrally managing workload operations	↓ 10%
Avoided cost of maintaining a homegrown scheduling system	↓ 10%
Savings from third-party tools replaced by CA WLA functionality	↓ 5%
Costs	Adjustment
Cost of licensing, hosting, and implementing CA WLA	↑ 5%
Cost of managing security for application teams	↑ 10%

Source: Forrester Research, Inc.

Financial Summary

The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the organization's investment in CA WLA. Table 10 below shows the risk-adjusted ROI, NPV, and payback period values. These values are determined by applying the risk-adjustment values from Table 9 in the Risks section to the unadjusted results in each relevant cost and benefit section.

FIGURE 3
Cash Flow Chart (Risk-Adjusted)



Source: Forrester Research, Inc.

TABLE 10
Cash Flow (Risk-Adjusted)

	Initial	Year 1	Year 2	Year 3	Total	Present Value
Costs	(\$679,950)	(\$105,000)	(\$105,000)	(\$105,000)	(\$994,950)	(\$941,069)
Benefits	\$76,000	\$1,275,450	\$1,275,450	\$1,275,450	\$3,902,350	\$3,247,855
Net benefits	(\$603,950)	\$1,170,450	\$1,170,450	\$1,170,450	\$2,907,400	\$2,306,786
ROI						245%
Payback						6.2 months

Source: Forrester Research, Inc.

CA Technologies' Workload Automation: Overview

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

CA Workload Automation enables organizations to define, monitor, and control all aspects of workload management and batch scheduling to full automation of applications from a single graphical interface across servers, operating systems, and geographical locations. It provides a breadth of platform coverage, event-based architecture, intelligent resource management, flexible configuration, a very high level of automation, and ease of use.

For organizations that need to maintain a highly reliable, high-performance workload automation system, CA Workload Automation helps you respond quickly to real-time business demands by reducing the complexity of managing application workloads across physical, virtual, and cloud environments and ensuring major business applications are managed with greater reliability and flexibility in sync with workflows running in the rest of the enterprise.

Appendix A: 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. TEI assists technology vendors in winning, serving, and retaining customers.

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

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 form 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.

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 can only be used with additional investment in training at some future point. However, having the ability to capture that benefit has a PV that can be estimated. The flexibility component of TEI captures that value.

RISKS

Risks measure 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 risk factors are based on a probability density function known as "triangular distribution" to the values entered. At a minimum, three values are calculated to estimate the risk factor around each cost and benefit.

Appendix B: Glossary

Discount rate: The interest rate used in cash flow analysis to take into account the time value of money. Companies set their own 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 organizations 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 NPV of cash flows.

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

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 at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations are not calculated until the summary tables are the sum of the initial investment and the discounted cash flows in each year.

Sums and present value calculations of the Total Benefits, Total Costs, and Cash Flow tables may not exactly add up, as some rounding may occur.

TABLE [EXAMPLE]

Example Table

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
------	--------	-------------	--------	--------	--------

Source: Forrester Research, Inc.