A Forrester Total Economic Impact™ Study

Commissioned By

CA Technologies

Project Director:
Michelle S. Bishop

Contributors:
Adrienne Capaldo

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The Total Economic Impact™ Of CA Release Automation

Improving Release Quality And Enabling Faster Deployment In Complex Enterprise Environments

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Table Of Contents

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Executive Summary

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

> ***"The most valuable benefit of CA Release Automation is that we were able to address the need of the development team to deploy more quickly without increasing our resource base. We've also added quality and have more stable releases."***
>
> *- Head of production integration, test, and release management, leading financial services firm*

To better understand the benefits, costs, and risks associated with a CA Release Automation implementation, Forrester interviewed five organizations who had implemented this solution in their enterprise. CA Release Automation is a continuous delivery solution for reliably deploying applications on demand, accelerating the delivery of applications and improving the quality of releases. CA Release Automation easily integrates into any application release environment to streamline deployments, reduce costs, and provide visibility into all phases of a continuous delivery pipeline.

Prior to implementing CA Release Automation, the customers interviewed were trying to more nimbly and reliably release software applications to their customers in an effort to improve customer satisfaction while also supporting complex enterprise environments and reduce costs. With CA Release Automation, customers were able to increase the number of deployments without increasing overall resources, reduce wait times, enable faster time-to-recover and reduce errors from manual processes, achieve faster time-to-market, increase release visibility, and improve quality of releases.

CA RELEASE AUTOMATION ENABLES FASTER, MORE RELIABLE DEPLOYMENTS AND IMPROVES PRODUCTIVITY

The majority of the organizations interviewed for this case study were large enterprises working in complex environments with large-scale deployments of CA Release Automation. The composite organization based on these companies reflects these characteristics. Our subsequent financial analysis found that a composite organization based on the interviewed organizations would experience the three-year risk-adjusted ROI, payback, and benefits shown in Figure 1.[1] Organizations with smaller deployments should consider scaling costs and benefits accordingly to match deployment size, in their own analysis. See Appendix A for a description of the composite organization.

The composite organization analysis points to benefits of $10,613,211 over three years versus implementation costs of $2,171,711, adding up to a net present value (NPV) $8,441,500.

CA Release Automation enabled the organizations interviewed to gain IT operations and configuration management and testing headcount savings; improve productivity of application developers and testers; realize cost savings due to a reduction in failed deployments and faster time to recover from errors; and reduce downtime, leading to avoidance of revenue loss. Organizations also reported an improvement in deployment time by as much as 20x.

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

Source: Forrester Research, Inc.

› **Benefits.** The composite organization experienced the following risk-adjusted present-value benefits that represent those experienced by the interviewed companies:

- **Configuration management and testing headcount savings.** With CA Release Automation, the composite organization's configuration management and testing team saved time and effort on deployment. This headcount savings of six FTE's is quantified at $1.22 million over three years.
- **Cost avoidance of additional IT operations headcount.** With the operational agility enabled by CA Release Automation, organizations were able to avoid the cost of hiring additional IT operations personnel even as their deployments continued to increase. The composite organization saved $1.69 million in cost avoidance of additional engineering headcount over the three-year analysis.
- **Productivity savings for developers and testers.** Faster application release cycles through CA Release Automation also reduced wait times for developers and testers and contributed to improved productivity for these teams and other roles within the organization dependent on these timelines. Organizations interviewed estimated savings between 5% to 20% for their developers and testers. For the composite organization, these three-year productivity savings for developers and testers were valued at $7.04 million.
- **Fewer errors and faster time to recover from errors.** With an improvement in release quality and improved transparency enabled by CA Release Automation, organizations were able to recover faster from errors and also reduce the number of errors during the deployment process. The cost savings from reducing failed deployments and faster time to recover from errors were quantified as $662,411 over three years.
- **Revenue savings with reduction in downtime.** Increase in quality of releases with CA Release Automation also resulted in a decrease in downtime for a number of the organizations interviewed. This downtime was caused by errors resulting from the lack of visibility into and nonstandardization of release processes in their pre-CA Release Automation environments, among other reasons. Organizations can choose to quantify this benefit in terms of the revenue impact of reduced downtime. In the analysis, Forrester quantified the cost avoidance of revenue loss with reduced downtime as $32.22 million over three years but did not include this benefit in final ROI calculations.
- Other benefits experienced by the organizations interviewed include: **improved quality and accuracy of deployments, increased agility and faster deployment by as much as 20x, faster time-to-market, increased flexibility with support for complex environments, improved change management for standardized processes, higher release visibility, and improved compliance and security.**

› **Costs.** The composite organization experienced the following risk-adjusted costs:

- **CA Release Automation software licenses and maintenance fees.** The composite organization paid an initial $200,000 in CA Release Automation software licenses, and then expanded its deployment to an additional $250,000 in Year 2 and $250,000 in Year 3. Maintenance fees over the three-year analysis were $100,676.
- **Additional hardware and software costs.** The composite organization maintained two servers for CA Release Automation at a cost of $10,146 over the three-year analysis.
- **Professional services fees.** For the initial implementation and training for CA Release Automation, the composite organization spent $121,266 in professional services fees.
- **Implementation costs.** The composite organization had four resources working for four months on initial deployment of CA Release Automation and one resource allocated for a year on the second phase of deployment. This effort also included the business transformation and adoption process of moving to a new way of working. Total implementation costs were $317,864.
- **Release management and administrative costs.** The composite organization has three full-time resources working on release management and administration at a total cost of $1,027,319 over three years.

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 Release Automation.
- CA 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 provided the customer names for the interviews but did not participate in the interviews.

TEI Framework And Methodology

INTRODUCTION

From the information provided in the interviews, Forrester has constructed a Total Economic Impact (TEI) framework for those organizations considering implementing CA Release 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 Release Automation can have on an organization (see Figure 2). Specifically, we:

- Interviewed CA marketing, product management, sales, and sales engineering personnel, along with Forrester analysts, to gather data relative to CA Release Automation and the marketplace for deployment automation tools.
- Interviewed five organizations currently using CA Release Automation to obtain data with respect to costs, benefits, and risks.
- Designed a composite organization based on characteristics of the interviewed 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. The discount rate used in the PV and NPV calculations is 10%, and the time horizon used for the financial modeling is three years.
- Risk-adjusted the financial model based on issues and concerns the interviewed organizations highlighted in interviews. Risk adjustment is a key part of the TEI methodology. While interviewed organizations 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 Release Automation: 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 B for additional information on the TEI methodology.

FIGURE 2
TEI Approach

Source: Forrester Research, Inc.

Analysis

COMPOSITE ORGANIZATION

For this study, Forrester conducted interviews with representatives from the following five companies, which are CA customers based in the US and Europe:

- A Fortune 100 financial services organization with over $895 billion in combined assets under management and over 5,000 deployments a month.
- An international financial services company that specializes in the settlement of securities transactions as well as the safekeeping and asset servicing of these securities. It has over 3,500 employees and over 1,200 people in its development and infrastructure teams who will automate 160 applications with CA Release Automation.
- A multinational enterprise software company with over $3 billion in annual revenue.
- A major telecommunications provider with over $10 billion in revenue and 21,000 employees who used CA Release Automation to deliver complex digital TV service releases.
- A Fortune Global 500 banking and financial services corporation with over $40 billion in annual revenue and approximately 18,000 deployments a month.

"Agile and continuous delivery can be nothing but a journey. You are never done; you are constantly moving the needle. There is always something you can do. Through it all, the CA Release Automation tool is relatively bulletproof."

~ Director, DevOps tools management, Fortune 100 financial services firm

Based on the interviews, Forrester constructed a TEI framework, a composite company, and an associated ROI analysis that illustrates the areas financially affected. The composite organization that Forrester synthesized from these results represents an organization with the following characteristics:

- It is a large financial services corporation.
- A seven-person team manages release orchestration and deployment tools.
- A team of 1,200 IT staff leverages CA Release Automation.
- It is currently running 5,000 deployments a month on CA Release Automation.

Prior to the CA Release Automation implementation, the composite organization, also known as *The Composite Organization,* had a homegrown deployment tool and very tightly coupled applications. The company was not fully centralized, however, as other application teams throughout the enterprise also used their own scripts and manual processes for deployment. This environment was elongating the release weekend, and deployments were growing more unreliable. *The Composite Organization* also had many application organizations adopting Agile practices, which would generate even more releases in the future. To address these problems, the

In analyzing the interviewed companies' operational metrics and the information provided in the anecdotal information and quoted statements, Forrester noted the large size of development operations, the complexity of the development environments, the large number of deployments, the need for quick and error-free releases, and the tolerance for financial risk as key characteristics of the majority of the companies involved in this study. This leads Forrester to select a large composite organization with 1,000 developers and testers supported by a variety of engineers, application teams, and other related users.

organization decided to implement CA Release Automation with two pilot applications. The goal was to release multiple applications on shared infrastructure along with increase the deployment speed of each individual application. Another goal was to address future growth, as the composite organization anticipated that its infrastructure and application portfolio would double in size. After the success of this pilot, CA Release Automation was rolled out to a larger application base.

"Our production deployments are now 20 times faster with CA Release Automation."

~ Head of production integration, test, and release management, financial services firm

INTERVIEW HIGHLIGHTS

Situation

Highlights from discussions with the companies interviewed include:

- The main driver for moving to CA Release Automation was to achieve faster deployment or shorten release timeframes. Some of these organizations had previously shifted their development methodology to Agile and needed CA Release Automation to address the "*enormous backlog*" as their dev teams released in smaller, faster increments. Their pre-CA release processes were not standardized, with mainly manual processes and some scripts intermittently applied throughout the organization. Other organizations interviewed implemented CA Release Automation simultaneously with their new dev methodology. One of these organizations wanted to use CA Release Automation to "*help us drive a DevOps mindset across the company.*" Its CA Release Automation implementation was part of a program to build a common enterprise framework and centralize best practices for the organization.
- One organization used CA Release Automation as part of a technology stack for automation. It used CA Release Automation as a back-end deployment engine, in conjunction with an orchestration tool and is currently working on automation of the data layer. Its driver for moving to a technology automation stack with CA Release Automation was to replace a homegrown tool, increase reliability of its releases, and drive volume through its release weekend.
- Another driver for these organizations in their choice of CA Release Automation was the ability of the solution to handle complex environments and multiple technologies. These organizations had multiple tools throughout their enterprise and chose CA Release Automation because it could easily integrate with these tools. As one interviewee said: "*We were searching for a tool which could deal with different systems. We needed a solution that was highly customizable and flexible. The CA support team know what customer needs are and are able to provide the software pieces that we need really fast*."
- Improving efficiency and managing costs were also additional drivers.
- One organization implemented CA Release Automation for just one application in order to reduce errors and the length of the deployment process. This organization also intended to use tangible results from its initial CA Release Automation implementation to help market the benefits of moving to automation

"I know we have a complicated framework — we have different components with different functionalities on different applications. But dealing with complicated frameworks is where CA Release Automation is really strong."

~ Lead, core application team, major telecommunications provider

and scale up in the enterprise. It wanted its initial implementation to serve as a catalyst for a culture shift that would drive a "DevOps mindset" across the company.

"With CA Release Automation, I can go out to the dev teams and show that we have an enterprise-grade platform that you can bring your current tools to and plug in. It allows us to have a versatile approach that can tie all the loose threads into a center of excellence and best practice. We've only just begun."
— Group manager, IT delivery optimization, multinational enterprise software company

Solution

These organizations implemented CA Release Automation to manage application releases across data center application teams, application environments, and distributed data center infrastructure.

Results

The interviews revealed that several benefits drove the analysis:

- **Increased agility and faster deployment by as much as 20x.** Each organization interviewed cited faster deployment as a CA Release Automation benefit. One financial organization's production deployments went from 20 hours to less than an hour with CA Release Automation, representing an improvement of 20x. Another technology company had developed a completely cloud-based system for its customers and used CA Release Automation to reduce delivery times. This technology company went from a production release every eight weeks to a release every two weeks for its system. Other organizations reported similar improvements in deployment time, with one large banking and financial services organization going from two weeks to 20 minutes to deploy to a test environment for a back-end system.

  One interviewed technology company implemented CA Release Automation for its core web application while also transforming its development process to improve workflows and the traditional code check-in process. Just by redesigning its manual production release process, it saw an 80% improvement in time-to-deploy. Using CA Release Automation for this redesigned process resulted in a 6-minute deployment time compared with 25 minutes, representing an additional 76% improvement.

- **Faster time-to-market.** With faster deployment times through CA Release Automation, organizations also benefited from faster time-to-market for new services and features to their customers. One large banking and financial services organization noted that it has been able to deliver products faster: "*We've increased a lot in speed to deploy; it took a week before because of all the quality issues.*" One telecommunications provider interviewed noted that CA Release Automation enabled it to deliver a feature set to its customer in 10 days, and this would have taken four to five months in its previous environment because of its slow deployment process.

  "With our product, it's a huge chain to get something out to the customers. I do not want my team to be a roadblock in this chain. With CA, whatever we get from the developers and from UI, it's really getting done, we are getting it to the market extremely fast. Now they are not even able to deliver as fast as we can deploy."
  — Lead core application team, major telecommunications provider

  "Our organization is moving to platform-as-a-service cloud infrastructure. We are able to quickly build a seamless solution in CA Release Automation to deploy applications in the cloud infrastructure."
  — Manager, DevOps enterprise release and deployment, Fortune 100 financial services firm

- **Improved quality and accuracy of deployments, resulting in cost avoidance of revenue loss.** Organizations consistently cited an improvement in deployment quality as a benefit of their CA Release Automation implementation. As one organization remarked: "*We are proactively deploying features to our customers with full confidence that there will be no customer impact with these new features. And we also know that in the event that we do deploy and it doesn't work, we can roll it back with one button and the latest version will be working fine*." For a number of interviewees, improved release

quality led to a reduction in downtime. Organizations saw a decrease in errors in production due to failed deployments. This downtime reduction was quantified in terms of revenue impact in the analysis.

- **Labor savings for IT operations and configuration management and testing.** As organizations implemented CA Release Automation, they were able to standardize processes, automate, and significantly reduce the effort for application release and deployment processes in their enterprise. These benefits translated to labor savings for configuration management and testing teams as well as cost avoidance of additional IT engineering headcount as the release workload continued to rise.

"Initially we did two to three deployments a week. A deployment would take a few hours, or one day, and it would require a lot of resources. Now we are deploying 10 times a week with less resources."
– Head of production integration, test, and release management, financial services company

"We've eliminated night shifts, which is important for an IT manager. Now that we are fully automated, it's naturally much faster. Before CA Release Automation, we didn't finish things in time, there were mistakes, and engineers had to do night shifts."
— Lead core application team, major telecommunications provider

- **Productivity savings with reduced wait times.** As CA Release Automation enabled faster deployments and the deployment process became more standardized and predictable, organizations found that this reduced wait times for their application developers and testers. These time savings led to improved productivity for these teams.

"[With CA Release Automation], dev can now have an end-to-end-ready platform in 3 hours. And our testers can start testing faster. We've also embedded previously manual testing work into the Release Automation framework and easily saved 5 to 6 hours."
— Lead core application team, major telecommunications provider

"One of our core application deployments was done twice a week due to lack of automation, intensive manpower, and complicated deployment procedure. After automating this application deployment in CA Release Automation, the application is being deployed at least 50 times in a week all the way from continuous integration to production."
— Manager, DevOps enterprise release and deployment, Fortune 100 financial services firm

- **Fewer errors and faster time to recover from errors, leading to IT remediation cost savings.** Organizations found an increase in successful deployments with the predictability and standardization enabled by CA Release Automation. With increased visibility into the release process, organizations also benefited from faster issue remediation. This reduction in errors during the release process resulted in IT cost savings.

"We've seen a decrease in errors from manual processes; [with CA Release Automation], it's saved so much discussion and it's saved so much work. Our deployment process is now almost the same every time and easy to track."
— Manager, continuous delivery and integration team, leading multinational banking and financial institution

- **Increased flexibility with support for complex environments**. A number of organizations also noted that a big advantage of working with CA Release Automation was their flexibility in supporting multiple technologies. These organizations had different technologies across the enterprise and valued the versatility of CA Release Automation and its out-of-the-box functionality that supported multiple environments. As one executive noted: "*I know we have a complicated framework — we have different components with different functionalities on different applications. We need things done at a specific time, which is almost impossible to happen. But dealing with complicated frameworks is where CA Release Automation is really strong*."

"The tool was very versatile. For example, deployments of third-party software, back-end, front-end, anything you think of, could be done, including all kinds of configuration like load balances — so many things were possible with CA Release Automation, much more than a simple deploy of software."
— Manager, continuous delivery and integration team, leading multinational banking and financial institution

"With CA Release Automation, we are able to treat and deploy the environment configuration as a code. Environment configuration parameters are templatized, tokenized, and versioned in our source repository system, and the configuration values are stored in [the] software configuration management system. CA Release Automation is integrated with these systems to build and deploy configuration files."
— Manager, DevOps enterprise release and deployment, Fortune 100 financial services firm

- **Improved change management with the standardized processes.** Organizations were looking for an enterprise framework for deployment, and with CA Release Automation they were able to create standard, repeatable processes that eliminated or minimized errors from previously manual processes. As one manager for DevOps strategy noted: "*In a calendar year, for this one application, we'd have one or two production incidents that we could tie back to change-related deployment errors. Some component piece was forgotten, or something got fat-fingered.*" An organization that had implemented CA Release Automation for 20 applications noted that it was still in the early stages of automation, as it wanted to move its entire application base to CA Release Automation, expand automated testing, and explore environment orchestration to "*get to the next level of maturity*" and benefit from standardized and repeatable release processes.

"With automation, the knowledge of that person is in the system. The process itself is improved. With these simple processes, there is no dependency on heroes."
— Manager, continuous delivery and integration team, leading multinational banking and financial institution

Another impact of standardization and automation of processes was termed "*breaking the knowledge dependency*" by one interviewed organization. It no longer had to worry about the loss of knowledge with personnel changes, as application release scripts and expertise that were previously maintained by individuals were now automated through CA.

- **Higher release visibility.** Visibility was also an important benefit to the organizations interviewed. As one IT director remarked, "*Our proprietary release process had no visibility, but now we can show that developers have visibility and end-to-end traceability*." This visibility helped this organization get buy-in from its developers as it moved off its homegrown tool to CA Release Automation. Organizations valued the ability to orchestrate and promote releases through CA Release Automation's promotion path and the visibility this gave into their release pipeline.

- **Improved compliance and security.** Security was also a common thread in decisions by several of the organizations to engage with CA Release Automation. This was particularly important to several financial services firms, with one interviewee adding, "*We're a financial institution and very complex in terms of security infrastructure and the security layers we had in place*," when explaining their choice of CA. Another company noted that by using CA Release Automation, it now had "*guaranteed SOX compliance,*" which lessened the workload on its engineering team to comply with internal and external audits.

BENEFITS

The composite organization, called *The Composite Organization,* experienced a number of quantified benefits in this case study.

Configuration Management And Testing Headcount Savings

With CA Release Automation, the interviewed customers reported that they could now automate deployments and reduce the manual effort to keep up with their application development teams that had moved to Agile. One interviewed organization had built homegrown tools for release orchestration and deployment, but these tools and pre-CA processes could not keep up with the increase in deployments that the enterprise needed, as its infrastructure and application portfolio had doubled in size. It implemented a project with end-to-end automation as a goal and CA Release Automation as a major component of its technology stack. CA Release Automation replaced its legacy automation tool as well as eliminated other manual deployments. Its director for DevOps

strategy noted, "*As we've developed more automations in CA Release Automation, we've cut out the effort to manage the test environment. We've also built a lot of intelligence in the tool so now we can trust it, without having to do legwork [as compared with our previous environment]*." This organization estimated that it achieved approximately $500,000 in hard savings as a result of eliminating six resources in configuration management and testing with CA Release Automation.

The composite organization automated deployments with CA Release Automation. In its previous environment, it had maintained a large configuration management and testing team to manage its internally developed deployment solution as well as the manual process to set up systems. It also saw an increase in the deployment volume as the organization shifted to Agile development. By moving to CA Release Automation, the composite organization was able save six headcount in its configuration management and testing team. At a fully loaded annual cost of $83,500 per full-time equivalent (FTE), this saves the organization $501,000 per year. To account for variability in configuration management and testing savings among the interviewed organization, this benefit was risk-adjusted and reduced by 2%. This results in quantified savings of $490,980 annually.

TABLE 1
Configuration Management And Testing Labor Savings

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
A1	Number of configuration management and testing FTEs (saved)		6	6	6
A2	Annual rate per person		$83,500	$83,500	$83,500
At	Configuration management and testing FTE savings	A1*A2	$501,000	$501,000	$501,000
	Risk adjustment		↓ 2%		
Atr	**Configuration management and testing FTE savings (risk-adjusted)**		**$490,980**	**$490,980**	**$490,980**

Source: Forrester Research, Inc.

Cost Avoidance Of Additional IT Operations Headcount

All the organizations interviewed reported productivity benefits for their IT operations teams, as their engineers saved time on release management and release change management tasks by implementing CA Release Automation. Apart from reduced wait times between tasks, their current resources were now deployed to new tasks without the need of additional resources. These organizations all achieved faster deployment times as they automated with CA and established standard repeatable processes. One organization with a 25-person integration engineering, release automation, and deployment team estimated that it would have needed four more engineers for this team without using CA Release Automation for its main IPTV core application.

This organization also used CA Release Automation for completely automating firewall configuration for its platform and routers and estimated an additional one engineering FTE in annual savings as a result of this project. It also recently completed a project that would automate the configuration of live, multicast routers in its network that would result in additional time savings for its team.

Another interviewed organization with approximately 18,000 deployments a month estimated that with the general efficiencies it achieved as a result of CA, it avoided hiring additional IT operations headcount, saving the organization $1.1 million annually. One IT director at this organization noted, "*We have more than doubled actual physical deployment tasks and not added to our release management structure*."

One interviewed enterprise executed its continuous delivery initiative with CA Release Automation after moving to Agile and was now up to approximately 18,000 deployments a month. As an example of its improvement, it noted it now had one to two engineers running automated deployments for a major back-end system. Prior to CA Release Automation, this back-end system needed a team of 20 people running deployments in all environments. For this system, this represents a 90% reduction in manpower with automation. Another organization that was in the early stage of its CA Release Automation deployment reported that it had calculated approximately $12,000 of time savings for two resources on 52 releases so far. One company that had 20 applications automated with CA Release Automation estimated that it saved hiring an additional five to six operations headcount as a result. Another organization noted that to get to the same number of deployments without CA Release Automation, it would have had to increase its engineering team by 35%.

Apart from configuration management and testing savings, the composite organization also benefited from avoiding the cost of hiring additional IT operations engineers, as it doubled its code deployments and the work associated with these deployments without increasing its current engineering team. As *The Composite Organization* expanded its deployment of CA Release Automation, it saved hiring an additional two IT operations headcount in the first year of implementation and six and eight operations headcount in years 2 and 3, respectively. At an annual fully loaded compensation of $135,000 per FTE, the total net present value savings was $1,726,296 over the three-year analysis. This benefit was risk-adjusted and reduced by 2% to account for variability, resulting in overall annual operations headcount cost avoidance savings of $1,691,770 over the three years.

TABLE 2
Cost Avoidance of Additional IT Operations Headcount

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
B1	Number of engineers saved		2	6	8
B2	Annual rate per engineers		135,000	135,000	135,000
Bt	Cost avoidance of additional IT operations headcount	B1*B2	$270,000	$810,000	$1,080,000
	Risk adjustment		↓ 2%		
Btr	**Cost avoidance of additional IT operations headcount (risk-adjusted)**		**$264,600**	**$793,800**	**$1,058,400**

Source: Forrester Research, Inc.

Productivity Savings For Developers And Testers With Reduced Wait Times

Another area of benefit quantified by a number of the organizations interviewed was a reduction in wait time for application development and testing teams. Without CA Release Automation, these organizations were struggling to keep up with the number of deployments needed, as more and more of their developers were shifting their development to an Agile methodology. "*There's been a tremendous amount of savings*," noted one IT DevOps director. "*We are now launching 300 nondependent tasks simultaneously every 10 to 20 minutes versus hours*." One organization estimated that by redesigning its development process and implementing CA

Release Automation, it went from a release time of 91 minutes to 6 minutes for a standard payload. One financial services organization noted that production deployment for one critical application was now 20 times faster with CA Release Automation.

Apart from seeing a reduction in wait times for application developers and testers, CA Release Automation customers also noted that they were able to improve the quality of development and testing, as developers were now more organized with giving release teams information prior to deployment. "*They can't come in with partial information and figure it out by deployment time like they used to do*," noted one head of production integration, test, and release management. "*They now have to be more proactive, as we've standardized how they pass information for deployment and testing with CA Release Automation*."

One financial services organization estimated that its developers and testers improved productivity by 10% to 20% as a result of reduced wait times and improved processes with CA Release Automation. Another interviewed organization with a 60-person core application team noted that its developers and testers saved approximately 5% to 10% of their overall time per year with the efficiency enabled by CA.

Another organization quantified these development and testing productivity savings in terms of absolute wait times. It assumed that across the board, application teams saved at least half an hour per deployment and, at 5,000 deployments per month, the organization quantified $1.5 million in development and testing savings per year. One manager for DevOps Strategy at this organization noted, "*We think 30 minutes is quite conservative*." This organization also noted that there were some ancillary savings for other roles such as DBAs, system analysts, and project managers across eight to 10 other categories, though it did not include this in its $1.5 million savings calculation.

With CA Release Automation, the composite organization saw an average productivity improvement of 10% for developers and testers. When calculating productivity benefits, Forrester conservatively assumes that only 50% of this productivity benefit is captured for productive work. This organization has 1,000 users in its development and testing teams. In the model, deployment to these teams was phased, with an initial 300 users in Year 1 and growing to 650 users in Year 2 and 1,000 users by Year 3. At an average fully loaded compensation of $92,000 per FTE, the benefit of improved developer productivity is quantified at $7.18 million over three years. This quantified benefit was further risk-adjusted and reduced by 2%. The risk-adjusted productivity benefit for application developers and testers through CA Release Automation was $7.04 million over the three-year analysis. See the section on Risks for more detail on risk adjustment.

TABLE 3
Productivity Savings — Developers And Testers

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
C1	Number of developers and testers		300	650	1,000
C2	Annual rate per person (average)		$92,000	$92,000	$92,000
C3	Percentage productivity improvement		10%	10%	10%
C4	Percentage captured for productive work		50%	50%	50%
Ct	Labor savings/productivity savings — developers and testers	C1*C2*C3*C4	$1,380,000	$2,990,000	$4,600,000
	Risk adjustment		↓ 2%		
Ctr	**Labor savings/productivity savings — developers and testers (risk-adjusted)**		**$1,352,400**	**$2,930,200**	**$4,508,000**

Source: Forrester Research, Inc.

Fewer Errors And Faster Time To Recover From Errors

Improvement in quality and accuracy of deployments as well as a decrease in errors from manual processes were also benefits cited by interviewed organizations. Increased visibility and transparency with the CA Release Automation tool was another benefit that contributed to faster time to recover for failed deployments or a reduction in failed deployments altogether for these companies. One organization noted: "*Our legacy tool had a database which showed which app was deployed and what version, but that was all. Now when you go through CA Release Automation, you have a visibility and end-to-end traceability*." One major banking organization noted that its application availability went from a range of 96% to 97% to a range of 99.1% to 99.5% in its post-CA Release Automation environment.

One interviewed organization estimated that its engineers had saved a few hours per week in bug investigation as a result of increased visibility with CA Release Automation. Another organization reported a decline of 16 production errors per year with its CA Release Automation implementation for a major application. It quantified this benefit in terms of time savings for IT operations and development as well as time savings for the business, which could not operate with an application outage.

Another organization used to see a production rollback for every 20 releases in its previous environment. Post-CA Release Automation, the need for production rollbacks was now more stable at once for every 100 releases, representing a 98% reduction in production errors.

The benefit of a faster time to recover from errors was quantified in terms of cost savings from a reduction in major production errors for the composite organization. At 5,000 deployments a month, with 5% of those as production deployments, *The Composite Organization* was able to reduce major production errors per month by 12 with increased visibility and quality of deployments with CA Release Automation. These production incidents typically required 15 FTEs working for 2 hours to resolve these incidents. At an average fully loaded compensation of $64.90 per hour, the total cost savings due to faster time to recover from errors and a reduction in failed deployments was $280,385 per year. As organizations had varying ways of quantifying the effort to address production errors, these cost savings were risk-adjusted and reduced by 5%. The risk-adjusted total

benefit resulting from faster time to recover and a reduction in production errors was $266,365 per year. See the section on Risks for more detail.

TABLE 4
Faster Time To Recover From Errors — Cost Savings

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
D1	Labor cost of major production errors in the release deployment process	$64.90 per hour*15 FTEs*2 hours	$1,947	$1,947	$1,947
D2	Number of major production deployment errors (reduced per month)		12	12	12
Dt	Faster time to recover from errors — cost savings (reduced per month)	D1*D2*12	$280,385	$280,385	$280,385
	Risk adjustment		↓ 5%		
Dtr	**Faster time to recover from errors (risk-adjusted)**		$266,365	$266,365	$266,365

Source: Forrester Research, Inc.

Revenue Impact Of Reduced Downtime With Improved Release Quality

The previous benefit quantified the reduction in deployment errors due to CA Release Automation in terms of time savings for IT resources. This downtime reduction benefit can also be quantified in terms of the revenue impact of downtime. Better issue resolution, increased visibility, and standardized processes through CA Release Automation all enabled an increase in deployment quality and a reduction of failed releases in pre-production and production environments for the interviewed customers.

One customer interviewed stated that it was using CA Release Automation to support a major revenue-generating application whose portal was responsible for 50% of its revenue and served 300,000 customers. Another major banking customer observed that an automated, standardized deployment process through CA Release Automation has "*saved so much discussion and work*" on issue resolution and increased the quality of the company's deployments and reduced downtime. This customer, when asked to estimate the revenue impact of downtime, stated, "*Think about the number of customers and if our website is down, then all those customers can't pay.*" He also added that downtime also would have an impact on the bank's credibility.

To estimate the revenue impact of reduced downtime for the composite organization, Forrester used a conservative estimate of $50,000 per hour based on a USA Today survey of data center managers.[2] At an average length of 2 hours for a major production incident for the composite organization, this would translate to $100,000 in revenue impact per major incident. As the composite organization was able to reduce the number of major production incidents by 12 per month as a result of its CA Release Automation deployment, the total revenue impact benefit of reduced downtime with CA Release Automation is $14.4 million per year. This benefit was risk-adjusted and reduced by 10% to $12.96 million per year, or a total of $38.88 million over three years.

TABLE 5
Reduced Downtime — Revenue Impact

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
E1	Cost of downtime per hour	Source: USA Today survey	$50,000	$50,000	$50,000
E2	Number of hours per incident		2	2	2
E3	Number of incidents a month		12	12	12
Et	Downtime cost — revenue impact	E1*E2*E3*12	$14,400,000	$14,400,000	$14,400,000
	Risk adjustment		↓ 10%		
Etr	**Downtime cost — revenue impact (risk-adjusted)**		**$12,960,000**	**$12,960,000**	**$12,960,000**

Source: Forrester Research, Inc.

For the purposes of a more conservative analysis, the $38.88 million value was not included in the final ROI calculations. Forrester quantified the revenue impact of downtime for the composite organization to illustrate how organizations should also consider the business value of reduced downtime through CA Release Automation outside of IT recovery costs. Forrester encourages readers to use their own estimates in cost per hour of downtime, dependent on the nature of their business and the revenue impact of their applications supported by CA Release Automation.

Total Benefits

Table 6 shows the total of all benefits across the first four areas listed above, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total benefits to be a PV of $10.61 million.

TABLE 6
Total Benefits (Risk-Adjusted)

Ref.	Benefit	Year 1	Year 2	Year 3	Total	Present Value
Atr	Configuration management and testing headcount savings	$490,980	$490,980	$490,980	$1,472,940	$1,220,995
Btr	Cost avoidance of additional IT operations headcount	$264,600	$793,800	$1,058,400	$2,116,800	$1,691,770
Ctr	Productivity savings — developers and testers	$1,352,400	$2,930,200	$4,508,000	$8,790,600	$7,038,035
Dtr	Faster time to recover from errors — cost savings	$266,365	$266,365	$266,365	$799,096	$662,411
	Total benefits (risk-adjusted)	**$2,374,345**	**$4,481,345**	**$6,323,745**	**$13,179,436**	**$10,613,211**

Source: Forrester Research, Inc.

**Note that numbers may not align due to rounding.*

COSTS

The composite organization experienced a number of costs associated with the CA Release Automation solution:

- CA Release Automation software licenses.
- CA Release Automation maintenance fees.
- Additional hardware and software.
- Professional services.
- Implementation costs — internal labor.
- Release management and administrative costs.

The costs listed below are for the composite organization; smaller organizations should consider scaling the cost categories listed below to match their deployments. Please note that in the tables 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 10% discount rate. For additional information, see Appendix D.

CA Release Automation Software Licenses

The composite organization purchased $200,000 of CA Release Automation licenses for its initial deployment. With the quantified gains and success of its initial implementation, *The Composite Organization* grew its CA Release Automation deployment to an additional $250,000 in licenses in Year 2 and another $250,000 in Year 3. As these fees are typically set by CA upon contract, this cost category was not risk-adjusted.

CA Release Automation Maintenance Fees

The composite organization also paid 20% software maintenance fees, equivalent to $100,675 over the three-year analysis. In the first year of license purchases, maintenance fees were already included in the initial cost. As these fees are typically set by CA upon contract, this cost category was not risk-adjusted.

Additional Hardware And Software

To support CA Release Automation, the composite organization allocated two servers at an annual cost of $2,000 a year per server in the private cloud. The annual server hardware and software cost to the composite organization is $4,000 per year. This cost was risk-adjusted up by 2% to account for variability, to a total annual additional hardware and software cost of $4,080 per year. See the section on Risks for more detail.

Professional Services

The composite organization paid $40,000 in professional services to CA for its initial Release Automation implementation. This cost includes CA consulting fees for training, deployment, and technology transfer. Over the three-year analysis, the composite organization paid $118,888 in professional services fees to CA. To account for the variability in different levels of additional consulting services and training required, this cost was risk-adjusted up by 2% to $121,266.

Implementation Costs — Internal Labor

The composite organization employed a phased approach in its CA Release Automation deployment. During the initial phase, the composite organization had the equivalent of four FTEs working for four months on the implementation rollout. Implementation costs include many tasks beyond product implementation. These costs

also include cultural and organizational activities to transform both development and operations organizations in order to adopt methodologies to improve and speed up application delivery processes. During the second phase, one FTE spent one year on implementation post-launch to supplement the release management and administration resources itemized below. At a fully loaded annual cost of $135,000 per FTE, the total implementation cost to the composite organization was $302,727. To account for the variability in the amount of resources and implementation time needed for different organizations, the cost was risk-adjusted up by 5% to $317,864.

TABLE 7
Implementation Costs — Internal Labor

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
G1	Number of people		4	1		
G2	Annual rate per person		$135,000	$135,000		
G3	Length of implementation	Months	4	12		
Gt	Implementation costs	G1*(G2/12)*G3	$180,000	$135,000	$0	$0
	Risk adjustment	↑ 5%				
Gtr	**Implementation costs — internal labor (risk-adjusted)**		**$189,000**	**$141,750**	**$0**	**$0**

Source: Forrester Research, Inc.

Release Management And Administrative Costs

Forrester also includes the ongoing cost of release management and administration of CA Release Automation in the financial model. The composite organization has three engineering resources supporting release management and the CA Release Automation solution. At a fully loaded annual rate per FTE of $135,000, the ongoing CA release management and administration costs are $405,000 per year. This value was risk-adjusted up by 2% to account for variability, to $413,100 per year.

TABLE 8
Release Management And Administration Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
H1	Number of people			3	3	3
H2	Annual rate per person			135,000	135,000	135,000
H3	Release management and administrative costs	H1*H2	$0	$405,000	$405,000	$405,000
Ht	Risk adjustment	↑ 2%				
Htr	**Release management and administrative costs (risk-adjusted)**		**$0**	**$413,100**	**$413,100**	**$413,100**

Source: Forrester Research, Inc.

Total Costs

Table 9 shows the total of all costs as well as associated present values, discounted at 10%. Over three years, the composite organization expects costs to total a net present value of $2.17 million.

TABLE 9
Total Costs (Risk-Adjusted)

Ref.	Cost Category	Initial	Year 1	Year 2	Year 3	Total	Present Value
Etr	CA Release Automation licenses	$200,000	$0	$250,000	$250,000	$700,000	$594,440
Ftr	CA Release Automation license fees (yearly)	$0	$0	$40,000	$90,000	$130,000	$100,676
Gtr	Additional hardware and software	$0	$4,080	$4,080	$4,080	$12,240	$10,146
Htr	Professional services	$40,800	$0	$51,000	$51,000	$142,800	$121,266
Itr	Implementation costs	$189,000	$141,750	$0	$0	$330,750	$317,864
Jtr	Release management and administrative costs	$0	$413,100	$413,100	$413,100	$1,239,300	$1,027,319
	Total costs (risk-adjusted)	**$429,800**	**$558,930**	**$758,180**	**$808,180**	**$2,555,090**	**$2,171,711**

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 implement CA Release Automation and later realize 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).

A number of the organizations interviewed had only implemented CA Release Automation to a small portion of their applications. As more and more application teams adopt CA Release Automation, these organizations can expect to see faster, more reliable releases as well as additional IT operations labor savings, improved application development and testing productivity, and cost savings from faster time to recover from error. Expansion of the use of CA Release Automation to other use cases outside of software deployments can also generate additional labor savings and time-to-market customer benefits. One organization noted: "*We are really in the early days. Once we've moved our entire application base to Release Automation, we also want to look at environment orchestration*."

One financial services customer interviewed was in the early stages of a project to automate the recycling of servers for their organization's release weekend using CA Release Automation. CA Release Automation would work with a third-party database to automate the recycling of servers for 2,500 application clusters. This would allow the organization to make the release window smaller with more efficient validation and save additional manual effort. The customer estimated that this would reduce a 48-hour release process to 15 hours and would also allow the organization to schedule production releases more frequently, from monthly to weekly. The labor cost savings and customer benefits from this additional project should also be balanced by the costs to implement this project, which includes two full-time resources working for six months.

> "I can now go out to the teams and show we have an enterprise-grade platform with CA Release Automation and say, 'You can bring your current tools and platforms and plug in. You get auditing and help with SOX compliance that gives you flexibility.' CA Release Automation is a place to have a versatile approach, and [you] can tie all the loose threads into a center of excellence and best practice."
> *— Group manager, IT delivery optimization, enterprise software company*

The value of flexibility is unique to each organization, and the willingness to measure its value varies from company to company.

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

TABLE 10
Benefit And Cost Risk Adjustments

Benefits	Adjustment
Faster time to recover from errors — cost savings	↓ 5%
All other benefit categories	↓ 2%
Costs	**Adjustment**
Implementation costs — internal labor	↑ 5%
All other cost categories	↑ 2%

Source: Forrester Research, Inc.

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.

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

- Labor savings may vary depending on the pre-CA Release Automation environment of these organizations and how their operations and release teams are structured.
- Customer benefits may also vary depending on the size and scope of their deployments, as well as the different maturity level of each organization.
- The downtime reduced and resulting cost savings may vary depending on the particular applications that benefited from CA Release Automation.

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

- CA Release Automation software licenses, maintenance, and hardware fees may vary depending on the size of the implementation and any other enterprise agreements.
- The variability in implementation size and phases will also affect the cost of professional services and internal labor to implement CA Release Automation. Some organizations may take a more phased approach. The size of the resource team to manage ongoing release management and administration may also vary.

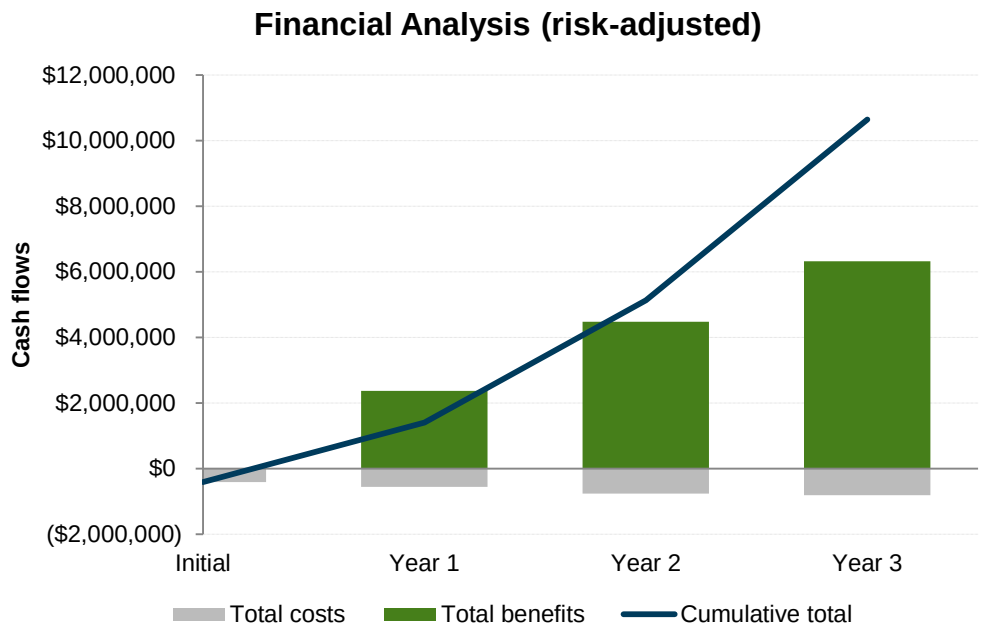
Table 10 shows the values used to adjust for risk and uncertainty in the cost and benefit estimates for the composite organization. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

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 composite organization's investment in CA Release Automation.

Table 11 below shows the risk-adjusted ROI and NPV values. These values are determined by applying the risk-adjustment values from Table 10 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 11
Cash Flow (Risk-Adjusted)

	Initial	Year 1	Year 2	Year 3	Total	Present Value
Costs	($429,800)	($558,930)	($758,180)	($808,180)	($2,555,090)	($2,171,711)
Benefits	$0	$2,374,345	$4,481,345	$6,323,745	$13,179,436	$10,613,211
Net benefits	**($429,800)**	**$1,815,415**	**$3,723,165**	**$5,515,565**	**$10,624,346**	**$8,441,500**
ROI	**389%**					
Payback period	**2.8 months**					

Source: Forrester Research, Inc.

CA Release Automation: Overview

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

Today, there are still numerous bottlenecks and disconnects in the average application delivery pipeline that prevent companies from achieving their continuous delivery goals.

From application and environment complexity to manual handoffs across stages of the software development life cycle (SDLC) to ad hoc integration of tools (e.g., Jenkins, Docker, and Chef), development and operations teams are finding that their traditional "software factory" is not optimized for success in the application economy.

CA Technologies has the end-to-end release automation solution that is foundational for companies to execute a DevOps, continuous delivery strategy. CA Release Automation enables these companies to manage the larger volume and cadence of small-batch releases, orchestrate the entire deployment tool chain, and accelerate applications to market.

With CA Release Automation, companies can:

- **Take control of the continuous delivery pipeline.** Gain visibility, consistency, and reliability across the release pipeline to reduce release failures and application downtime — continually improving quality.
- **Accelerate releases to market — on demand.** Deliver many smaller application iterations and innovations to market faster, reducing deployment time by 94% and reaching a new level of customer responsiveness.
- **Manage the scale of deploying applications agilely.** Easily harness the complexity and volume of applications, tools, and environments inherent in continuous delivery — managing hundreds of distinct applications in development, test, and production environments.

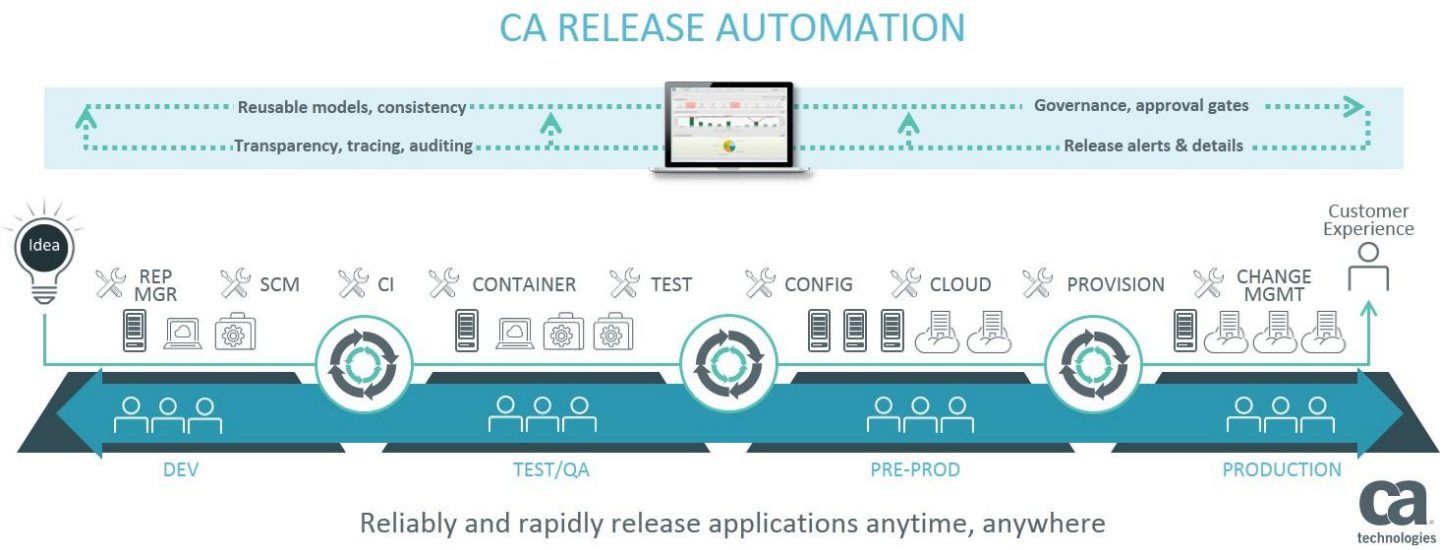
Key features of CA Release Automation include the ability to:

- Simplify and streamline application releases across environments with artifact management, modeling, and tracking.
- Increase reliability and reuse among multiple applications and environments by separating workflows from environments.
- Seamlessly integrate with your current environment thanks to a comprehensive set of action packs and plug-ins for leading third-party solutions — with over 1,800 actions.
- Easily set up deployments, track and rollback releases, and provide transparency across teams with an intuitive, powerful workflow engine.
- Govern and track the release process for IT compliance, auditing, and reporting.

CONNECT WITH CA

For assistance in finding the right solution to meet your organization's specific needs, contact CA at: https://www.ca.com/us/contact/call-me/release-automation.aspx.

For assistance in understanding how the business case described in this white paper will scale to your size of operation or enterprise, large or small, contact the ROI and Business Value Analytics Team at: ROIHelp@ca.com.


CA RELEASE AUTOMATION
Reusable models, consistency
Transparency, tracing, auditing
Governance, approval gates
Release alerts & details
Idea
REP MGR
SCM
CI
CONTAINER
TEST
CONFIG
CLOUD
PROVISION
CHANGE MGMT
Customer Experience
DEV
TEST/QA
PRE-PROD
PRODUCTION
Reliably and rapidly release applications anytime, anywhere
ca technologies

Appendix A: Composite Organization Description

For this TEI study, Forrester has created a composite organization to illustrate the quantifiable benefits and costs of implementing CA Release Automation. The composite organization is intended to represent a large financial services corporation and is based on characteristics of the interviewed customers.

The composite company, also known as *The Composite Organization,* is a large financial services corporation that has a seven-person team managing release orchestration and deployment tools. It is currently running 5,000 deployments a month on CA Release Automation and has about 1,200 IT staff leveraging the solution. Prior to the CA Release Automation implementation, the composite organization had an internally developed deployment tool. The organization was not fully centralized, however, as other application teams throughout the enterprise also used their own scripts and manual processes for deployment. This environment was elongating the release weekend, and deployments were growing more unreliable. A bottleneck was also building up an increasing number of *The Composite Organization*'s developers who were adopting Agile methodologies.

In implementing CA Release Automation, the composite company has the following objectives while trying to increase customer value from its applications:

- Achieve faster concurrent deployments and increase deployment speed.
- Address future growth, as the composite organization anticipated that its infrastructure and application portfolio would double in size.
- Implement a deployment automation solution that would integrate well with highly complex environments and multiple technologies in the enterprise as well as be able to work with the firm's extensive security requirements.

FRAMEWORK ASSUMPTIONS

Table 12 provides the model assumptions that Forrester used in this analysis.

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.

TABLE 12
Model Assumptions

Ref.	Metric	Calculation	Value
I1	Hours per week		40
I2	Weeks per year		52
I3	Hours per year (M-F, 9-5)		2,080
I4	Fully loaded compensation, IT operations resource		$108,000

Source: Forrester Research, Inc.

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. 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 enterprise wide 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

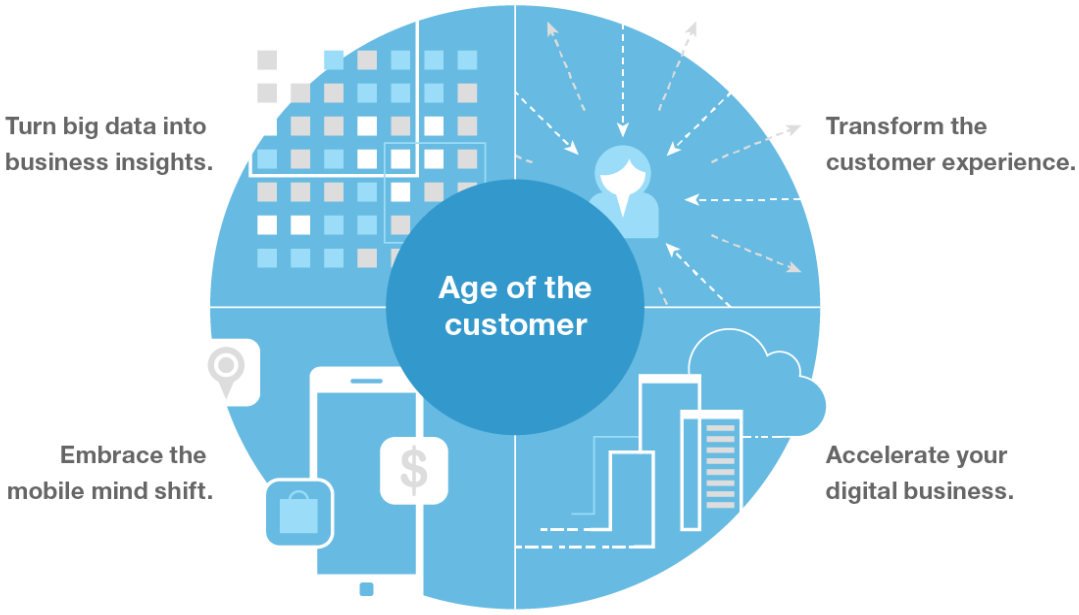
Risks measure the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: 1) the likelihood that the cost and benefit estimates will meet the original projections and 2) the likelihood that the estimates will be measured and tracked over time. TEI 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 C: Forrester And The Age Of The Customer

Your technology-empowered customers now know more than you do about your products and services, pricing, and reputation. Your competitors can copy or undermine the moves you take to compete. The only way to win, serve, and retain customers is to become customer-obsessed.

A customer-obsessed enterprise focuses its strategy, energy, and budget on processes that enhance knowledge of and engagement with customers and prioritizes these over maintaining traditional competitive barriers.

CMOs and CIOs must work together to create this companywide transformation.



Forrester has a four-part blueprint for strategy in the age of the customer, including the following imperatives to help establish new competitive advantages:

Transform the customer experience to gain sustainable competitive advantage.

Accelerate your digital business with new technology strategies that fuel business growth.

Embrace the mobile mind shift by giving customers what they want, when they want it.

Turn (big) data into business insights through innovative analytics.

Appendix D: 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 (shown in the Framework Assumptions section) 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.

Appendix E: 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, see the section on Risks.

[2] Source: "Downtime, Outages and Failures — Understanding Their True Costs," Evolven, September 18, 2012 (http://www.evolven.com/blog/downtime-outages-and-failures-understanding-their-true-costs.html).