

A Forrester Total Economic
Impact™ Study
Commissioned By
IBM

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The Total Economic Impact™ Of IBM

UrbanCode

Achieving Velocity In An Enterprise
DevOps Environment

FORRESTER®

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Executive Summary

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

To better understand the benefits, costs, and risks associated with an IBM UrbanCode implementation, Forrester interviewed four customers with several years of experience using IBM UrbanCode to support their DevOps approach. IBM UrbanCode Deploy is a tool for automating application deployments to hybrid environments. It is designed to support Agile developers moving toward continuous delivery by facilitating rapid feedback and satisfying the compliance requirements of production support teams. Audit trails, versioned configuration, and approvals contribute to that governance.

Prior to implementing IBM UrbanCode, the customers interviewed were facing scalability, delivery speed, and application stability issues. These organizations wanted to implement standardized, repeatable processes and significantly decrease the effort required to deploy an application. With IBM UrbanCode, customers were able to reduce time-to-market for new features and services, improve deployment times, reduce deployment complexity, increase transparency into the release process, reduce the risk of failed deployments, implement DevOps on an enterprise scale, and reduce the cost to deploy.

IBM UrbanCode can accelerate application delivery, save IT operations and development resources, and reduce deployment risk. The costs and benefits over a three-year period for a division of a composite organization with over 100,000 employees, based on customer interviews, are:

- **Investment costs: \$633,427.**
- **Total cost savings and benefits: \$3,687,066.**

IBM URBANCODE BRINGS DEPLOYMENT VELOCITY WHILE REDUCING RELEASE COSTS

Our interviews with these customers and subsequent financial analysis found that a composite organization based on these interviewed organizations would experience the risk-adjusted ROI, and benefits shown in Figure 1.¹ See Appendix A for a description of the composite organization.

The composite organization analysis points to benefits of \$3,687,066 over three years versus implementation costs of \$633,427, adding up to a net present value (NPV) \$3,053,639.

IBM UrbanCode enabled the organizations interviewed to save IT operations engineering resources, achieve faster time-to-market with improvement in application development productivity by at least 15%, and lower costs by reducing the risk of failed deployments. These organizations also reported benefits such as reducing the cost of a release by as much as 97% and dramatically reducing deployment times to better support their developers who had adopted Agile application delivery approaches.

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

ROI:
482%

NPV:
\$3,053,639

**Delivery
automation
resources saved:**
at least 30%

**Time-to-
deployment:**
▼ as much as 75%

Source: Forrester Research, Inc.

- › **Benefits.** The composite organization experienced the following risk-adjusted present-value benefits that represent those experienced by the interviewed companies:
- **IT operations resource savings.** With the improved efficiency enabled by deployment automation and audit resource savings through IBM UrbanCode, IT DevOps automation teams were able to save at least one-third of their allocated resource headcount. The composite organization realized \$430,199 in IT operations engineering savings as a result of IBM UrbanCode over the three-year analysis.
 - **Faster time-to-market with improved application development productivity.** Organizations reported an increase in speed-to-market for new features, products, and services as their teams reduced development cycle times, with the increases ranging from 15% to 75%. These organizations' application development teams saw an improvement of at least 15% in productivity as their companies implemented IBM UrbanCode for deployment automation. These faster time-to-market savings with improved application development team productivity represent approximately \$2.65 million in savings over three years.
 - **Reduction in risk of failed deployments.** With the increased consistency and transparency in the release deployment process enabled by IBM UrbanCode, organizations interviewed reported a significant decrease in their number of failed deployments. One organization's 80% successful deployment rate increased to at least 96% with IBM UrbanCode. The three-year cost savings from reducing failed deployments was quantified as \$608,437 for the composite organization.
 - Other benefits experienced by the organizations interviewed include: reduced cost per release by 97%, faster speed of deployment with a 75% decrease in deployment time, increased repeatability, improved stability through standardization, improved scalability and increased transparency into the release process, and improved employee satisfaction.
- › **Costs.** The composite organization experienced the following risk-adjusted costs:
- **IBM UrbanCode software license fees and maintenance.** The composite organization paid a total of \$268,373 in software license and annual maintenance fees over the three-year analysis.
 - **Hardware costs.** The composite organization maintained four servers for IBM UrbanCode at a cost of \$15,220 over the three-year analysis.
 - **Professional fees.** The composite organization occurred \$29,580 in professional services fees for initial implementation and training as part of its IBM UrbanCode deployment.
 - **Implementation costs.** The financial model accounts for effort spent on implementation of IBM UrbanCode in a phased approach over the three-year analysis, to model the pace that applications are onboarded on the tool. For three years, total implementation costs are valued at \$251,767.
 - **Administrative costs.** The composite organization also allocated \$27,540 per year in administrative costs of the IBM UrbanCode solution.

Disclosures

The reader should be aware of the following:

- › The study is commissioned by IBM 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 IBM UrbanCode.
- › IBM 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.
- › IBM 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 IBM UrbanCode. 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 IBM UrbanCode can have on an organization (see Figure 2). Specifically, we:

- › Interviewed IBM marketing, product management, sales, and sales engineering personnel, along with Forrester analysts, to gather data relative to IBM UrbanCode and the marketplace for deployment automation tools.
- › Interviewed four organizations currently using IBM UrbanCode 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.
- › 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 IBM UrbanCode: 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 four companies, which are IBM customers based in the US:

- › One of the largest multinational banking and financial services corporations in the world, with over 200,000 employees. This organization is currently supporting 350 consumer banking applications with IBM UrbanCode.
- › A leading specialist insurer with over 3,000 employees and \$2.5 billion in annual revenue.
- › A global provider of enterprise loyalty marketing and programs, with approximately 1,500 employees and over \$650 million in annual revenue.
- › A division of one of the world's largest mutual fund and financial services firms, with over 40,000 employees. This division has approximately 300 employees on its IT team and uses IBM UrbanCode Deploy as the center of its entire DevOps stack.

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 solutions advisory division of a leading multinational banking and financial services corporation with over 100,000 employees worldwide.
- › This division has a 250-person IT group.
- › Six IT operations engineers are allocated to the DevOps automation team.
- › The organization implemented IBM UrbanCode in 2013.

Prior to its IBM implementation, the composite organization, known as *Organization A*, had moved to an Agile application delivery model in 2006. Two years later, it built homegrown automation for release management using functionality from its legacy data center automation software solution, an open source continuous integration tool, and several layers of internally developed scripts. This solution presented challenges with scalability and stability. As part of its DevOps initiative and to fully implement continuous delivery, *Organization A* implemented IBM UrbanCode Deploy and IBM UrbanCode Build.

“IBM UrbanCode Deploy was the catalyst to get us to focus on continuous delivery. It’s going to get us to the goal of monthly releases for our flagship applications with a high confidence level and a true DevOps team. It’s one of those technologies that will catapult you to the next level.”

~ VP of architecture and data services, leading mutual fund and financial services firm

INTERVIEW HIGHLIGHTS

Situation

Most of the organizations interviewed were on a multiyear iterative journey. They were struggling to scale releases to match their growth in code deployment that was driven by their implementation of Agile development practices. Highlights from discussions with the companies interviewed include:

- › Those organizations that had a purely manual process for code deployment prior to IBM UrbanCode were looking for ways to standardize across multiple systems to ensure that applications would operate the same way through different environments (such as test versus production). As one organization's director for platform services noted: "We wanted to put everyone on the same page. IBM UrbanCode helped us and drove a lot of standardization on the operations side, from the configuration layout to the bare metal up." Alleviating audit concerns with increased traceability was another driver for their move to standardization.
- › Another main driver of the move to IBM UrbanCode was to reduce the "crazy amount of effort" these organizations were expending on their manual code deployments. One organization noted that its IBM UrbanCode implementation included changing portions of its release deployment process to ensure that "we didn't just automate a bad process."
- › Organizations that had partially automated deployment processes chose to implement IBM UrbanCode to eliminate bottlenecks in their process and address scalability and growth issues. One executive remarked, "In our old system, we were trying to hook too many things together. Our weekend releases were building into Monday and Tuesday. We had to retool our system because we didn't want our main site to go down."

Solution

These organizations undertook DevOps initiatives using IBM UrbanCode for deployment automation. All of the organizations used Deploy while a number of the companies interviewed also implemented Build, Release, and AnthillPro.

Results

The interviews revealed that several benefits drove the analysis:

- › **Improved ability to automate deployments in complex environments (or reduced complexity of deployment), leading to productivity and resource savings.** With the deployment automation enabled by IBM UrbanCode, organizations were able to save the time and effort spent by their IT operations and application development teams on their

"The cost benefit to us of implementing UrbanCode was a reduction of 97% in the cost of a release. From an average of eight people working for 3 hours for every release, it's now one person working 10 to 15 minutes."

~ Enterprise architect, global specialist insurer

"IBM UrbanCode brings us enterprise scale — their products do flow together; any plug-in is vendor-supported. They have 160 plug-ins for all different products. It allows us to be flexible and extensible. It allows us to focus on service. We're not doing integration work."

~ SVP of DevOps services, Fortune 500 banking and financial services corporation

manual deployment processes. The application development team saw productivity gains, and the IT operations team was able to save additional resources as a result.

“When you have a tightly coupled, complex architecture with all these dependencies built into it, that’s where UrbanCode plays well.”

— Head of infrastructure engineering, global provider of loyalty and marketing programs

- › **Reduction in risk of failed deployments, leading to cost savings.** Using IBM UrbanCode, organizations were able to implement repeatable, reliable processes and reduce the likelihood of error in a release. As the number of failed deployments decreased, organizations saved on the cost of fixing these failed releases.

- › **Increased speed of deployment, leading to faster time-to-market for new features and services.** Interviewees consistently reported that IBM UrbanCode increased the speed of deployment for their organizations. Organizations saw an exponential increase in deployments, with one organization reporting growth from one deployment a week to 50, and another reporting a jump from 30 deployments a week to 815. Another organization reported a 75% decrease in deployment time, with formerly 1-hour deployments completed in 15 minutes. As a result of this faster deployment, companies could now deliver new features and services earlier than before.

“We’ve removed an enormous bottleneck and reduced our time-to-market. Our business partners are happy to see functionality quicker, now that we’ve moved to 20 deploys a week through [UrbanCode] Deploy.”

— VP of architecture and data services, leading mutual fund and financial services firm

- › **Reduced cost of a release by 97%.** One organization interviewed reported that with its move to IBM UrbanCode, each release took up fewer resources, from an average cost of GBP 3,300 per release to an average of GBP 97 per release today. This represents a reduced cost per release of 97%.

- › **Repeatability and standardization of the deployment process, leading to improved stability.** With their IBM UrbanCode implementation, organizations were able to establish standard, repeatable processes for deployment. This repeatability was one of the top benefits cited by the interviewees, as it enabled them to be more confident in the stability of their releases when they went to production. These organizations also noted how easy it was in IBM UrbanCode to define operations, such as how to restart a server and develop processes in a standard way.

“[With UrbanCode], we did 700 deployments over all environments in the course of a month, and it was always the same. That repeatability and reliability of deployment — our production deployment worked the first time because we did it so many times.”

— Enterprise architect, global specialist insurer

- › **Improved ability to scale.** One organization, which was using IBM UrbanCode to support deployment automation for 350 applications with a target to support 800 applications companywide, stated that one of the main benefits of working with IBM UrbanCode was the ability of the solution to support enterprise-scale deployments. UrbanCode could support multiple technologies such as web, mainframe, and other platforms. It noted that other solutions would have required integration resources, whereas IBM UrbanCode, with its plug-in offerings, could support different products. The ease of data flow throughout the solution meant that DevOps could focus on service and system maintenance instead of working on code. As one SVP noted: “These products were meant to work together to pass metadata. You can run certain tests at build time, and Build makes sure that information is available as part of the artifact set that flows through the system.”

“IBM UrbanCode’s out-of-the-box integration with RTS was huge. Because of the flexibility of the architecture, IBM was able to provide the plug-in very quickly. That is the competitive advantage of IBM UrbanCode — all those plug-ins. No environment is going to be homogeneous.”

— VP of architecture and data services, leading mutual fund and financial services firm

- › **Increased visibility into the release process.** Transparency was another consistent benefit cited by the interviewed organizations. One enterprise remarked that instead of a release snapshot like other build tools, “Build is aware of what’s

going on, it labels it, and before we go into production, it checks the label.” With UrbanCode, this organization could now ensure quality and integrity further down in the system. Another organization noted that using Deploy significantly improved its configuration management process. “Deploy can get the configuration [of the production environment], and make sure the testing environment is configured exactly the same way. Deploy removed our blind spots; it broke all that up and made the steps discernable. Now anybody can work on any app versus just the subject matter experts,” one executive noted. By removing the manual setting of configuration parameters, this organization increased transparency of the configuration management process and reduced the effort spent on analyzing dev scripts whenever an error occurred.

“We showed our team that in [UrbanCode] Deploy, you can see error codes and steps in the process. For example, in the middle of a production release, something failed. That release manager went into the web UI, drilled down, took a screenshot, and sent it to the WebSphere team. They got the problem resolved before they could even open up a ticket. Overall, we now get issues resolved in a tenth of a time.”

— SVP of DevOps services, Fortune 500 banking and financial services corporation

- › **Improved employee satisfaction.** By eliminating repetitive manual processes and easing the workload on IT operations and developers through UrbanCode, a number of the organizations reported increased employee satisfaction, as their teams could now work on “high-value” tasks. One company said that with its UrbanCode deployment, it eliminated weekend releases that were building into Monday and Tuesday. One manager noted, “Doing the same deployment over and over again is soul destroying. I had people up for 3 hours through the night doing the same thing again and again. Now their job is more about optimizing applications and establishing metrics to show value to the business.”

BENEFITS

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



IT Operations Engineering (DevOps Automation) Savings

By reducing the complexity of deployments through IBM UrbanCode, organizations were able to save significant time and effort spent by their DevOps automation resources on releases. Factors that contributed to these time savings include the creation of standardized, repeatable processes; the increased transparency of the release process; and the faster time-to-deployment enabled by IBM UrbanCode. An executive at one organization also noted the significant value of IBM UrbanCode's visual process designer and templates feature by remarking, "I don't need 100 engineers, I have 50," to illustrate the resources saved as a result of this feature.

"We've saved 20 hours a week of hands-to-keyboard time. We didn't even track wait time. This is even more significant. This was people actually logging on and doing the work."

— VP of architecture and data services, leading mutual fund and financial services firm

This financial services organization reported decreasing its average 4-hour turnaround time for a release to 5 minutes as it deployed builds instantaneously through IBM UrbanCode. It moved from two builds a day to 20 or 30 builds a day. Another organization replaced its four enterprise architects working on deployment support with two DevOps engineers who spent 70% of their time supporting IBM UrbanCode. One enterprise reported that when it implemented deployment automation with IBM UrbanCode, it was able to do the same amount of work with one-third of the staff. This organization estimated that it saved 10 to 12 FTEs out of a team of 30 as the build functions completely disappeared. One SVP for DevOps noted: "With an operations team, when you no longer have to focus on deployment, your productivity increases. This ratio holds up. One person can support three or four apps. With automation, one operations engineer can support 10 to 20 applications." Another organization that implemented UrbanCode prior to its development teams going Agile noted that it would have had to hire more people to keep up with the demand of its development team without the tool.

By implementing deployment automation with IBM UrbanCode, *Organization A* was able to realize IT operations savings as it reallocated 30% of its six-person DevOps automation team. In the first year of using IBM UrbanCode, the composite organization saved one IT operations resource. As UrbanCode was used to support more applications in years 2 and 3, these IT operations engineering savings increased to two FTEs. To account for variability in IT operations engineering savings among the interviewed organizations, this quantified benefit was risk-adjusted and reduced by 2%. At an annual fully loaded compensation of \$108,000 per resource, these savings are quantified at \$430,199 over three years.

TABLE 1
IT Operations Engineering Savings

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
A1	Number of DevOps automation resources (saved)		1	2	2
A2	Yearly rate per person		\$108,000	\$108,000	\$108,000
At	IT operations engineers saved	B1*B2	\$108,000	\$216,000	\$216,000
	Risk adjustment		↓ 2%		
Atr	IT operations engineers saved (risk-adjusted)		\$105,840	\$211,680	\$211,680

Source: Forrester Research, Inc.



Faster Time-To-Market With Improved Application Development Productivity

The increased speed of deployment and operational efficiency as a result of moving to IBM UrbanCode also drove time savings for the application development teams of the interviewed organizations. Developers were spending less effort on a release. They also spent less time waiting for DevOps automation engineers to complete their tasks, as developers could initiate code deployments.

One organization decreased deployment times by 75% and observed that the time saved by its development team was reinvested in quality and speed of feature delivery. As one interviewee noted, “Our developers now put out more product in the same amount of time.” This organization noted that the success of its enterprise deployment was a result of approaching those developers. They were typically Java development teams and represented 10% of the organization’s target population, and they were willing to adopt a DevOps approach. The success stories from these early adopters then drove adoption throughout the organization, as it grew to 2,500 users of the IBM UrbanCode solution.

Another interviewed organization reported that build cycle times improved by at least 15%. Its developers could run tests and address code defects quicker, resulting in faster cycles. “Our developers could fail faster,” one manager noted. It estimated that its application development team saw a 20% improvement in throughput as a result of IBM UrbanCode.

Following the IBM UrbanCode implementation, the composite organization saw an average productivity improvement of 10% in the first year for 150 people in its application development team. As *Organization A*’s IBM UrbanCode deployment matured, this productivity improvement increased to 15% in years 2 and 3.

When calculating productivity benefits, Forrester conservatively assumes that only 50% of this productivity benefit is captured for productive work. At an average fully loaded compensation of \$110,000 per full-time equivalent (FTE), the benefit of improved developer productivity is quantified at \$825,000 in Year 1. This quantified benefit was risk-adjusted and reduced by 2%. The risk-adjusted benefit of improved application development productivity through IBM UrbanCode is \$808,500 in Year 1 and \$1,212,750 in the subsequent years. See the section on Risks for more detail.

TABLE 2
Faster Time-to-Market With Improved Developer Productivity

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
B1	Number of application development resources		150	150	150
B2	Annual rate per person		\$110,000	\$110,000	\$110,000
B3	Percent improved productivity		10%	15%	15%
B4	Percent captured		50%	50%	50%
Bt	Improved productivity — application development	$B1 \times B2 \times B3 \times B4$	\$825,000	\$1,237,500	\$1,237,500
	Risk adjustment		↓ 2%		
Btr	Improved productivity — application development (risk-adjusted)		\$808,500	\$1,212,750	\$1,212,750

Source: Forrester Research, Inc.



Cost Savings — Reduction In Failed Deployments

Organizations also reported increased release stability with their IBM UrbanCode implementations and a reduction in risk of failed deployments. One build and release management team member noted: “Pre-IBM, people were going in and manually changing environments, creating directories, for example, which introduced inconsistencies. Now we’ve standardized the release process with UrbanCode, and the main benefit has been stability. Our releases go much more smoothly.” This particular organization realized time savings for issue resolution, as it saw a 97% drop in failed deployments as a result of IBM UrbanCode. Another interviewed organization noted that moving to IBM UrbanCode eliminated the possibility of human error in its build process, with one interviewee remarking, “Now there is no fat-fingering of the build; nobody picked up the wrong build. We’ve eliminated the human error component and reduced risk.”

One financial services organization reported that it went from an 80% successful deployment rate in its old system to at least a 96% successful deployment rate with its IBM UrbanCode implementation. This organization had approximately a quarter of a million deploys and 2 million builds a year.

Organization A reduced its number of failed deployments in production by 144 a year with its implementation of deployment automation through IBM UrbanCode. For these production incidents, the composite organization typically had an average of 10 resources working on an incident for 2 hours. At an average fully loaded compensation per IT resource of \$108,000 a year, or \$51.92 per hour, the cost of a failed deployment to the composite organization was \$1,038. In addition, the composite organization saved 40 man-hours a week on issue resolution for nonproduction releases, representing savings of \$2,077 per week.

The total cost savings to the composite organization as a result of a reduction in failed deployments with IBM UrbanCode is quantified at \$257,538 per year in Table 3 below. The organizations interviewed had varying ranges for percentage reduction in failed deployments as a result of improved stability and release quality with IBM UrbanCode. To compensate, this benefit was risk-adjusted and reduced by 5%. The risk-adjusted total benefit resulting from reduction in risk of failed deployments was \$244,662 per year. See the section on Risks for more detail.

TABLE 3
Risk Reduction Of Failed Deployments

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
C1	Cost of a failed deployment in production	\$51.92 per hour*10 FTEs*2 hours	\$1,038	\$1,038	\$1,038
C2	Number of failed deployments (reduced)		144	144	144
C3	Weekly cost of nonproduction failed deployments	4 hours*10 FTEs *\$51.92 per hour	\$2,077	\$2,077	\$2,077
C4	Number of weeks		52	52	52
Ct	Risk reduction of failed deployments	$(C1 \cdot C2) + (C3 \cdot C4)$	\$257,538	\$257,538	\$257,538
	Risk adjustment		↓ 5%		
Ctr	Risk reduction of failed deployments (risk-adjusted)		\$244,662	\$244,662	\$244,662

Source: Forrester Research, Inc.

Total Benefits

Table 4 shows the total of all benefits across the three 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 \$3.69 million.

TABLE 4
Total Benefits (Risk-Adjusted)

Ref.	Benefit	Initial	Year 1	Year 2	Year 3	Total	Present Value
Atr	IT operations (DevOps automation) savings	\$0	\$105,840	\$211,680	\$211,680	\$529,200	\$430,199
Btr	Improved application development team productivity	\$0	\$808,500	\$1,212,750	\$1,212,750	\$3,234,000	\$2,648,430
Ctr	Risk reduction of failed deployments	\$0	\$244,662	\$244,662	\$244,662	\$733,986	\$608,437
	Total benefits	\$0	\$1,159,002	\$1,669,092	\$1,669,092	\$4,497,186	\$3,687,066

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 IBM UrbanCode solution:

- › IBM UrbanCode software license fees and maintenance.
- › Hardware fees.
- › Implementation costs — professional fees.
- › Implementation costs — internal labor.
- › Administrative costs.



IBM UrbanCode Software License Fees And Maintenance

The composite organization purchased \$200,000 of IBM UrbanCode licenses, with an additional maintenance cost of \$40,000 per year. Licensing fees may depend on the number of agents, the components of the IBM UrbanCode solution implemented, and other enterprise agreements. Because of this complexity, readers are encouraged to work with their IBM account manager to understand what the specific license costs would be. To compensate for the variability in fees, this cost was risk-adjusted up by 2%. The risk-adjusted present value cost of IBM UrbanCode over the three-year analysis was \$268,373. See the section on Risks for more detail.



Hardware Fees

The composite organization also maintained four VMs for its IBM UrbanCode solution at an annual cost of \$1,500 a year per VM. The annual hardware cost to *Organization A* for IBM UrbanCode is \$6,000 per year. This cost was risk-adjusted up by 2% to account for variability, to a total annual hardware cost of \$6,120 per year. See the section on Risks for more detail.



Implementation Costs — Professional Fees

Organization A incurred an additional \$29,000 in professional services fees for initial deployment and training on IBM UrbanCode. To account for the variability in the pre-UrbanCode and DevOps environment for different organizations and subsequent level of additional deployment services and training required, this cost was risk-adjusted up by 2% to \$29,580.



Implementation Costs — Internal Labor

There was a wide range of IBM UrbanCode implementation cost estimates among the interviewees, as each organization had different implementation approaches, environment complexity, and pre-UrbanCode deployment processes. One organization had four resources allocating 20% of their time over three months. Another had two resources allocating 50% of their time over 18 months. For the composite organization, implementation effort was phased out as applications were onboarded on IBM UrbanCode. For the initial setup, *Organization A* had three resources working 20% of the time for a month. Each onboarded application required the resources of one build engineer for an average of three weeks, equivalent to 120 hours. The composite organization increased the number of applications it onboarded on UrbanCode each year. The total implementation cost for internal labor was \$285,992. This cost was risk-adjusted up by 8% to \$308,872. See the section on Risks for more detail.

TABLE 5
Implementation Costs – Internal Labor

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
G1	Number of applications onboarded		n/a	10	15	20
G2	Hourly rate per person	\$108,000/2,080 hours	\$51.92	\$51.92	\$51.92	\$51.92
G3	Hours per application	2 hours*52 weeks	108	120	120	120
Gt	Implementation costs	G1*G2*G3	\$5,608	\$62,308	\$93,462	\$124,615
	Risk adjustment	↑ 8%				
Gtr	Implementation costs — - internal labor (risk-adjusted)		\$6,056	\$67,292	\$100,938	\$134,585

Source: Forrester Research, Inc.



Administrative Costs

Forrester also includes the ongoing cost of administration of IBM UrbanCode in the financial model. The composite organization allocated one-quarter of an IT operations resource to ongoing administrative costs for IBM UrbanCode. At a fully loaded hourly rate per FTE of \$51.92, the ongoing administrative cost of the solution is \$27,000 per year. This value was risk-adjusted up by 2% to account for variability, to \$27,540 per year.

TABLE 6
Administrative Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
H1	Number of people			0.25	0.25	0.25
H2	Annual rate per person			\$108,000	\$108,000	\$108,000
H3	Administrative costs	H1*H2	\$0	\$27,000	\$27,000	\$27,000
Ht	Risk adjustment	↑ 2%				
	Administrative costs (risk-adjusted)		\$0	\$27,540	\$27,540	\$27,540

Source: Forrester Research, Inc.

Total Costs

Table 7 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 \$633,427.

TABLE 7
Total Costs (Risk-Adjusted)

Ref.	Cost Category	Initial	Year 1	Year 2	Year 3	Total	Present Value
Dtr	UrbanCode software license fees and maintenance	\$204,000	\$0	\$40,800	\$40,800	\$285,600	\$268,373
Etr	Hardware license fees (yearly)	\$0	\$6,120	\$6,120	\$6,120	\$18,360	\$15,220
Ftr	Professional fees	\$29,580	\$0	\$0	\$0	\$29,580	\$29,580
Gtr	Implementation costs – internal labor	\$6,056	\$67,292	\$100,938	\$134,585	\$308,872	\$251,767
Htr	Administrative costs	\$0	\$27,540	\$27,540	\$27,540	\$82,620	\$68,488
	Total costs (risk-adjusted)	\$239,636	\$100,952	\$175,398	\$209,045	\$725,032	\$633,427

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 IBM UrbanCode 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).

The composite organization was modeled on a division of an enterprise with 150 FTEs on the application development team. As use of IBM UrbanCode expands to other divisions in the enterprise, we would expect to see additional IT resource savings, productivity benefits, and deployment cost savings. One of the organizations interviewed was currently supporting 2,500 users on IBM UrbanCode and had achieved a 25% penetration rate in its target population pool of 800 applications for automation. As it scaled deployment of UrbanCode, it would also receive commensurate benefits in the future. This organization did note that while it has approximately 2,500 applications in its consumer bank, it did not expect to deploy IBM UrbanCode to all these applications.

“IT DevOps is a premium service. I don’t think that we should have a day where all our applications are automated. We need to prioritize. Think about mobile applications or consumer applications versus an HR application that somebody touches once a year. But we definitely want to be 100% on strategic platforms.”

— SVP of DevOps services, Fortune 500 banking and financial services corporation

Some of the organizations interviewed had only implemented the Deploy portion of the IBM UrbanCode solution. These organizations have the potential to gain efficiency benefits as they implement additional UrbanCode Deploy cloud blueprint functionality, IBM UrbanCode Build, and IBM UrbanCode Release. 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 IBM UrbanCode 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 IBM UrbanCode, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for cost and benefit estimates.

TABLE 8
Benefit And Cost Risk Adjustments

Benefits	Adjustment
IT operations engineering savings	↓ 2%
Improved productivity — application development team	↓ 2%
Reduction in risk of failed deployments	↓ 5%
Costs	Adjustment
Implementation costs — internal labor	↑ 8%
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:

- › Customer benefits could vary depending on their pre-IBM UrbanCode environment, the size of their deployments, as well as the different maturity level each organization has on its Agile and DevOps journey. Some organizations interviewed faced challenges in developer adoption, as moving to continuous delivery required these developers to take ownership of the deployment process.
- › Organizations may have varied ways for valuing the cost of a failed deployment. Organizations that had a more mature deployment process with partial automation and scripts might see less of a reduction in failed deployments compared with organizations coming from a manual environment.

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

- › IBM UrbanCode software license, maintenance, and hardware fees may vary depending on the size of the implementation, the number of IBM UrbanCode components used, and any other enterprise agreements.
- › Organizations may have varying requirements for professional services and internal labor at implementation depending on the size and complexity of the deployment, as well as the level of training required to fully adopt Agile and DevOps.

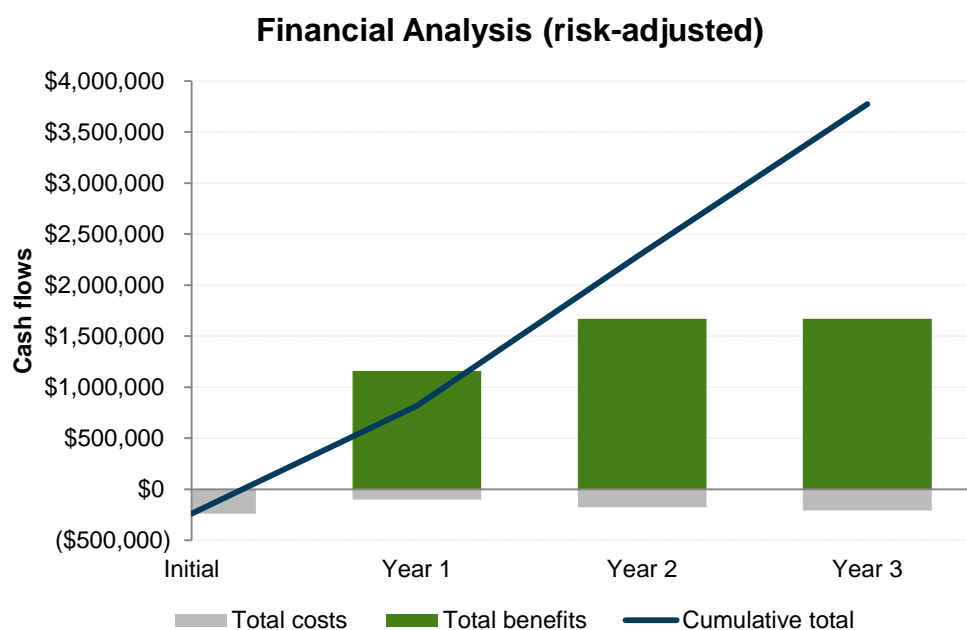
Table 8 shows the values used to adjust for risk and uncertainty in the cost and benefit estimates for the composite organization. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

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 IBM UrbanCode.

Table 9 below shows the risk-adjusted ROI, and NPV values. These values are determined by applying the risk-adjustment values from Table 8 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 9
Cash Flow (Risk-Adjusted)

	Initial	Year 1	Year 2	Year 3	Total	Present Value
Costs	(\$239,636)	(\$100,952)	(\$175,398)	(\$209,045)	(\$725,032)	(\$633,427)
Benefits	\$0	\$1,159,002	\$1,669,092	\$1,669,092	\$4,497,185	\$3,687,066
Net benefits	(\$239,636)	\$1,058,049	\$1,493,693	\$1,460,047	\$3,772,153	\$3,053,639
ROI	482%					

Source: Forrester Research, Inc.

IBM UrbanCode: Overview

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

IBM UrbanCode Deploy, formerly known as uDeploy, is a cloud-ready tool for automating application deployments through environments. It is designed to facilitate rapid feedback and continuous delivery in Agile development while providing the audit trails, versioning, and approvals needed in production.

UrbanCode Deploy features:

- › **Deployment process automation.** Create automated deployment processes using the graphical editor; run processes on thousands of machines simultaneously.
- › **Environment and configuration management.** Use powerful management features that permit configuration-only and traditional code-and-configuration deployments.
- › **Artifact repository.** Store deployment artifacts more securely to enable traceability.
- › **Middleware configuration management.** Detect IBM WebSphere Application Server configurations.
- › **Security, approvals, and notifications.** Customize user permissions, define entrance criteria for environments, and inform stakeholders of deployment actions.

Additionally, UrbanCode Deploy offers cloud blueprint functionality, providing capabilities to:

- › **Design full-stack application environments.** Use a pattern designer to develop and update open, full-stack application environments in a diagram or text editor.
- › **Deploy full-stack application environments for multiple clouds.** Use a multicloud and hybrid strategy across your delivery pipeline.
- › **Manage the environment life cycle.** Update existing environments and execute infrastructure changes based on changes to the pattern artifacts.

IBM UrbanCode Release, formerly known as uRelease, is a collaborative release management tool that helps you handle the growing number and complexity of releases. You can plan, execute, and track a release through every stage of the delivery life cycle. Based on lessons learned from working with customers, UrbanCode Release reduces errors, while making large releases faster and more agile.

UrbanCode Release provides:

- › **Collaborative release planning.** This is designed to reduce the time spent in release planning meetings and reviews.
- › **Environment management.** This allocates environments to the development and testing phases in a release, providing better visibility and control.
- › **Streamlined release execution.** This provides processes to facilitate release tracking, email notifications, and automatic promotion to early environments.
- › **Integration capabilities.** These enable interfaces with IBM Rational Team Concert and IBM UrbanCode Deploy.

IBM UrbanCode Build, formerly known as uBuild, is a continuous integration and build management server optimized for the enterprise. It is designed to make it easy to scale the configuration and management of your build infrastructure and seamlessly plug in to development, testing, and release tooling.

UrbanCode Build provides:

- › **Centrally defined templates and processes.** These simplify the addition of new projects by dispersed development teams.
- › **Global reporting.** This extends beyond individual builds or projects to include access to all build activity across the worldwide enterprise.
- › **Dependency management and awareness.** This facilitates complex project builds based on project relationships.
- › **Fine-grained access controls.** These ensure a secure build environment.

Appendix A: Composite Organization Description

For this TEI study, Forrester has created a composite organization to illustrate the quantifiable benefits and costs of implementing IBM UrbanCode. The composite organization is intended to represent a solutions advisory division of a leading multinational banking and financial services corporation with over 100,000 employees worldwide and is based on characteristics of the interviewed customers.

The composite company, also known as *Organization A*, is a division of a multinational corporation with headquarters in the US. It has been an IBM UrbanCode customer since 2012 and uses the Deploy and Build components of the IBM UrbanCode solution. The development team of this division had moved to an Agile development model in 2006. Prior to its IBM UrbanCode implementation, the composite company had built a homegrown automation for release management using functionality from its legacy data center automation software solution, an open-source continuous integration tool, and several layers of internally developed scripts.

In implementing IBM UrbanCode, the composite company has the following objectives:

- › Shorten deployment cycles.
- › Address stability issues and reduce deployment complexity to save time and effort.
- › Implement a deployment automation solution that could operate on an enterprise scale as it was evaluating solutions that could be applied to other divisions within the corporation.

FRAMEWORK ASSUMPTIONS

Table 10 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 10
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 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

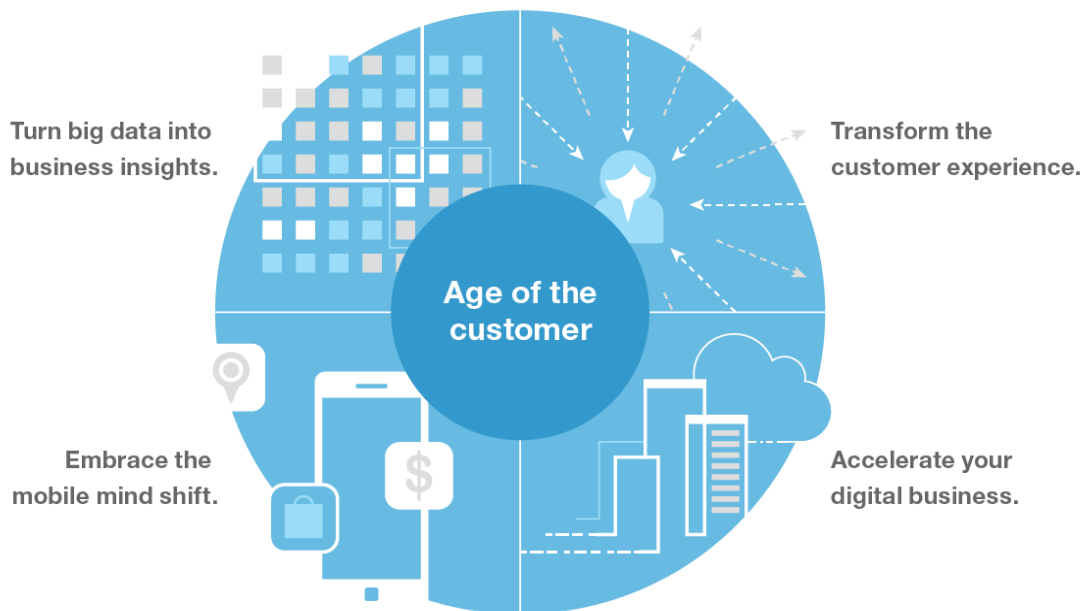
Risks measure the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: 1) the likelihood that the cost and benefit estimates will meet the original projections and 2) the likelihood that the estimates will be measured and tracked over time. TEI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