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Prepared for IBM
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The Total Economic Impact™ Of IBM WebSphere Application Server
Single-Company Analysis

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Executive Summary

In March 2010, IBM commissioned Forrester Consulting to examine the total economic impact and potential return on investment (ROI) that enterprises may realize by deploying IBM WebSphere Application Server within their environment. WebSphere Application Server provides a stable application infrastructure to build, reuse, run, integrate and manage applications and services.

This study illustrates the financial impact of adopting WebSphere Application Server as a primary application platform within an organization's environment. For this analysis, Forrester examines the impact of WebSphere Application Server on both IT and business processes within a US-based organization which provides outsourced business process services which had chosen to replace an Open Source Application Server with WebSphere.

In conducting in-depth interviews with the organization, Forrester found that the use of WebSphere Application Server allows the organization to:

- Receive high levels of platform support

- Reduce overall support costs within their development environment

- Achieve lower vendor management costs through a single provider of application services

- Reduce administration costs through improved performance

In addition, as the organization increases the usage of WebSphere Application Server, it expects to see additional benefits in improving performance and productivity throughout its application development infrastructure.

Purpose

The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of WebSphere Application Server as part of an overall application development strategy. Forrester's aim is to clearly show all calculations and assumptions used in the analysis. Readers should use this study to better understand and communicate a business case for investing in IBM WebSphere Application Server.

Methodology

IBM selected Forrester for this project because of its industry expertise in application development platforms and Forrester's Total Economic Impact™ (TEI) methodology. TEI not only measures costs and cost reduction (areas that are typically accounted for within IT) but also weighs the enabling value of a technology in increasing the effectiveness of overall business processes.

For this study, Forrester employed four fundamental elements of TEI in modeling the adoption of WebSphere Application Server within the services organization:

1. Costs and cost reduction.

2. Benefits to the entire organization.

3. Flexibility.

4. Risk.

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

Approach

Forrester used a 5-step approach for this study.

1. Forrester gathered data from existing Forrester research relative to IBM WebSphere Application Server, the application development platform market in general, and the Open Source application server that the client chose to replace with WebSphere.

2. Forrester interviewed IBM WebSphere Application Server product management, marketing, and sales personnel to fully understand the potential (or intended) value proposition of IBM WebSphere Application Server.

3. Forrester conducted a series of in-depth interviews with an organization currently using IBM WebSphere Application Server as part of their internal application development environment as a replacement for their open source solution.

4. Forrester constructed a financial model representative of the interviews. This model can be found in the TEI Framework section below.

5. Forrester created a composite organization based on the interviews and populated the framework using data from the interviews as applied to the composite organization.

Key Findings

Forrester's study yielded three key findings:

- **ROI.** Based on the interviews with the IBM WAS customer, Forrester constructed a TEI framework (see Appendix A) and the associated ROI analysis illustrating the financial impact areas. As seen in Table 1 and Figure 1, the ROI for our composite company is 42% with a breakeven point (payback period) of 14 months after deployment for the customer migrating to WebSphere Application Server from their legacy open source application development platform.

- **Benefits.** Benefits of deploying IBM WebSphere Application Server include:

  o Reduced support costs in moving to enterprise license

  o Improved administration savings through automation

  o Greater application performance and availability

  o Improved development productivity
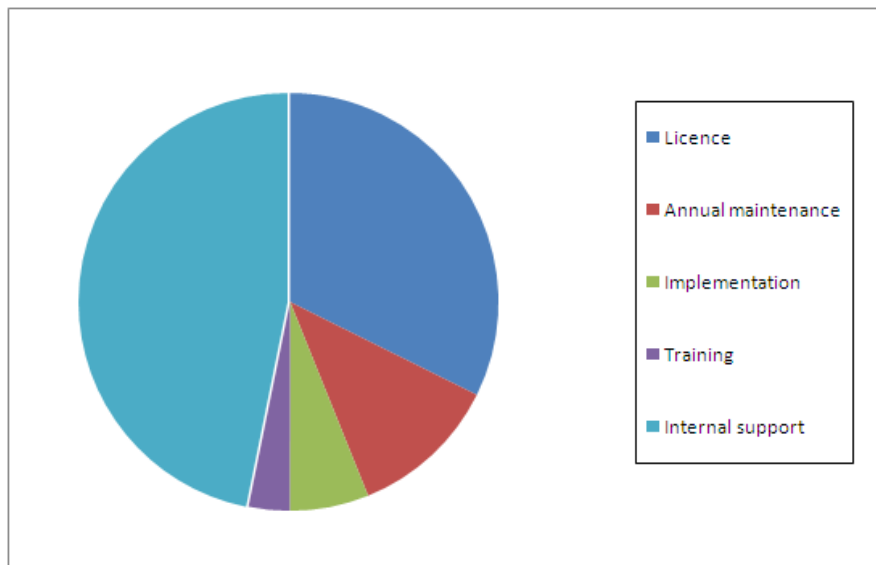
Figure 1: Total Three-Year Benefit Breakdown
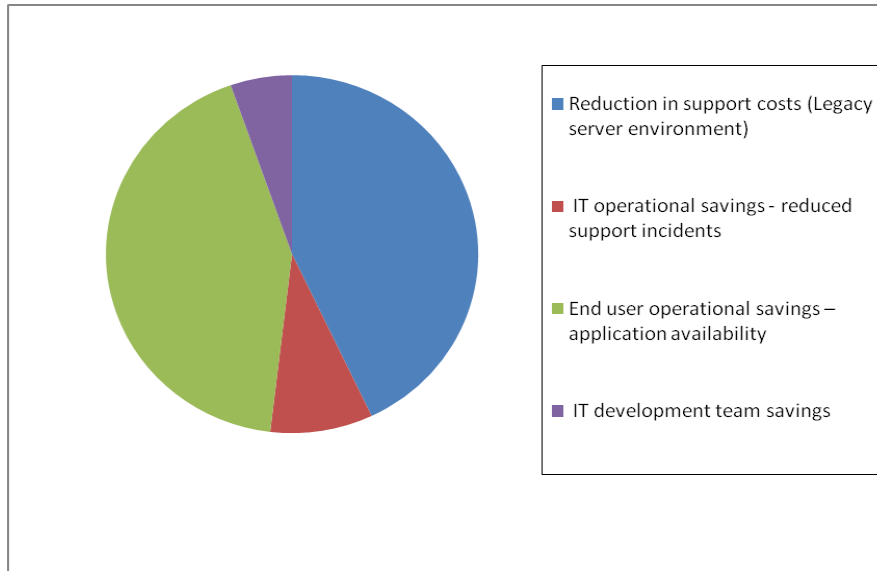
Source: Forrester Research, Inc.

- **Costs.** Costs of WebSphere Application Server included the costs of product licenses and maintenance, cost of internal support to maintain the IBM platform, as well as costs of implementation and training.

Figure 2: Total Three-Year Cost Breakdown

Source: Forrester Research, Inc.

Table 1 illustrates the risk-adjusted cash flow for the organization, based on data and characteristics obtained during the interview process. Forrester risk-adjusts these values to take into account the potential uncertainty that exists in estimating the costs and benefits of a technology investment. The risk-adjusted value is meant to provide a conservative estimation, incorporating any potential risk factors that may later impact the original cost and benefit estimates. For a more in-depth explanation of risk and risk adjustments used in this study, please see the Risk section.

Table 1: Composite Company ROI, Risk-Adjusted

	Initial	Year 1	Year 2	Year 3	Total	NPV
Total costs	155,400	1,460,952	676,716	666,924	2,959,992	2,543,877
Total benefits		1,149,696	1,594,080	1,664,640	4,408,416	3,613,268
Total	(155,400)	(311,256)	917,364	997,716	1,448,424	1,069,391
ROI						42%
Payback period (years)						1.4

Source: Forrester Research, Inc.

Forrester found that the primary drivers associated with the ROI at the representative organization were the amount of data integration, the number and level of experience of the development staff, as well as the complexity of the business processes that feed directly into business applications.

Disclosures

The reader should be aware of the following:

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

- IBM reviewed and provided feedback to Forrester, but Forrester maintained editorial control over the study and its findings and did not accept changes to the study that contradicted Forrester's findings or obscured the meaning of the study.

- The customer names for the interviews were provided by IBM.

- Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that the readers should use their own estimates within the framework provided in the report to determine the appropriateness of an investment in IBM WebSphere Application Server.

- This study is not meant to be used as a competitive product analysis. To compare competing products, readers should conduct their own analysis employing the framework provided within this document

IBM WebSphere Application Server: Overview

IBM believes it is time to build a smarter planet because the world is more instrumented, interconnected and intelligent than ever before. To take advantage of the new opportunities that a smarter planet presents, organizations need to be agile while optimizing their costs. One way to achieve agility and cost optimization is to take a close look at your business applications and the infrastructure that supports them. Companies need an application infrastructure that drives efficiencies, is secure and is just as dynamic as today's business climate. The IBM WebSphere® Application Server Family was designed from the ground up to enable company IT operations and development to increase business agility and optimize costs by:

- Creating more innovative applications that improve customer satisfaction with access to real-time communication technologies and a comprehensive set of open standards-based programming models.

- Achieving cost savings through the highly effective performance that WAS offers by running the same number of workloads on fewer servers and by leveraging advanced clustering for higher availability and scalability.

- Reducing development and management costs with "no-charge developers' licenses" and mature and user-friendly centralized administration and management tools.

Analysis

As stated in the Executive Summary, Forrester took a multistep approach to evaluate the impact that implementing WebSphere Application Server can have on an organization:

- Interviews with IBM product management, marketing, and sales personnel.

- In-depth interviews of a leading business process services firm, with locations in North America, Western Europe, South Africa, and Asia Pacific, currently using WebSphere Application Server within their testing and production environment.

- Construction of a common financial framework for the implementation of WebSphere Application Server.

Interview Highlights

The interviews uncovered a number of characterisms about this customer and its strategy to cut costs and create new market opportunity using IBM WebSphere Application Server:

- The organization provides business outsource solutions and supporting applications primarily focused on back office processes. The organization currently supports roughly 1,000 applications which they provide to clients as part of their existing service offering.

- Prior to 2008, the organization had made a substantial investment in an existing Open Source Application development platform for both their testing and production environment. At the time, the organization were deploying applications on distributed platforms but integrated with mainframe and backend to provide the ability to scale to meet global customer demand. These applications included major mission critical applications used by the majority of clients as well as smaller custom applications which did not need continuous uptime.

- In 2008, the organization needed to scale a large mission critical application to meet customer growth. While the Open Source Application development platform was set up with an infrastructure which depended on independent clusters to isolate failure of services, the organization noted difficulty in maintaining high levels of system availability due to lack of support capabilities to sustain 24x7 operations within the open source contract. As a result, the organization evaluated other platforms, including WebSphere Application Server as an alternative to their existing open source development platform for their mission critical application.

- The organization ultimately settled on WebSphere Application Server for several critical reasons. First, the organization needed to guarantee to executive management and to their customers high levels of system availability for large, mission critical applications. IBM provided improved quality of service and faster response times to queries or support requests. Second, the organization was able to move to and consolidate their existing IBM contracts into a single enterprise agreement, allowing the organization to realize economies of scale as their support requirements grew. Third the organization saw the ability to increase automation within their application development and change request process, reducing the overall administration burden to IT.

TEI Framework

Introduction

From the information provided in the in-depth interviews, Forrester has constructed a TEI framework for those organizations considering implementation of IBM WebSphere Application Server. The objective of the framework is to identify the cost, benefit, risk, and flexibility factors that affect the investment decision.

Framework Assumptions

Table 2 lists the discount rate used in the present value (PV) and net present value (NPV) calculations and the time horizon used for the financial modeling.

Table 2: General Assumptions

Ref.	General assumptions	Value
	Discount rate	10%
	Length of analysis	Three years

Source: Forrester Research, Inc.

Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult with their finance department to determine the most appropriate discount rate to use within their own organization.

In addition to the financial assumptions used to construct the cash flow analysis, Table 3 provides salary assumptions used within this analysis.

Table 3: Salary Assumptions

Ref.	Metric	Calculation	Value
A1	Hours per week		40
A2	Weeks per year		50
A3	Hours per year (M-F, 9-5)		2,000
A4	Hours per year (24x7)		8,736
A6	Hourly		$60

Source: Forrester Research, Inc.

Costs

Costs around IBM WebSphere Application Server for the interviewed organization include cost of software, hardware, maintenance, implementation, and ongoing platform support. The actual cost of the solution will vary depending on the size of the development staff, the number and size of applications as well as the overall level of support. Based on the discussions with the interviewed customer, the cost of platform hardware is incorporated into the cost of implementation.

License And Maintenance Cost

The cost of licensing represents a portion of the overall investment cost of the solution. License costs are priced according to the number of development licenses and client nodes the organization will deploy. Based on interviews with the representative organization, the total three year license and maintenance cost equates to $1,242,640. Based on the interviews with the representative organization, we assume that the annual software maintenance cost equates to roughly 20% of the discounted cost of license. This would have been enough to cover the cost of the production and testing environment.

Training Cost

The cost to train the individual developers on the new IBM WebSphere Application Server platform was another cost cited by the interviewed organization. Prior to implementing IBM WebSphere Application Server, the majority of the developers had been trained on the legacy Open Source development platform, and the organization had made an investment to retrain the developers on the IBM WebSphere Application Server platform. For the purpose of this analysis, we assume that each of the developers will participate in training. The cost per developer includes the formal cost of training, the lost productivity from participating in the training session, as well as the indirect cost of informal training. Table 4 illustrates the total training cost of $75,040.

Implementation Cost

The cost to implement includes the cost of internal resources to plan and deploy as well as an external third party to aid in planning and implementation of the WebSphere Application Server platform. The organization indicated that it invested roughly $148,000 in internal efforts for the implementation. The organization noted it was willing to pay a premium associated with external implementation in order to reduce the possible risks of delivery. Of the total implementation costs, roughly 20% of the cost was devoted to strategy and planning, while 80% was devoted to actual implementation and testing of the solution.

Ongoing Support Cost

In addition to initial implementation costs, the organization also needed to devote staff for the ongoing support of the WebSphere Application Server platform. Ongoing support costs include the IT and business labor necessary to support and manage the application environment. For the purpose of this analysis, the organization allocates on average $456,000 for ongoing support. Table 8 illustrates the equation used.

Total Costs

Table 4 illustrates the total incremental costs of the IBM platform for the interviewed organization.

Table 4: Total Cost

	Initial cost	Year 1	Year 2	Year 3	Total	PV
License	-	887,600	-	-	887,600	806,909
Annual maintenance	-	-	177,520	177,520	355,040	280,084
Implementation	148,000	-	-	-	148,000	148,000
Training	-	64,000	9,600	1,440	75,040	67,198
Internal support	-	456,000	456,000	456,000	1,368,000	1,134,005
Total Cost	**148,000**	**1,407,600**	**643,120**	**634,960**	**2,833,680**	**2,436,195**

Source: Forrester Research, Inc.

Benefits

The second component of this analysis looks at the potential benefits associated with an organization migrating a portion of their application development environment to IBM WebSphere Application Server.

Reduced Support Cost Savings

By moving to an enterprise license model, the organization was able to realize savings in two ways. First, it enabled the organization to purchase high levels of platform support without having to pay a cost premium in the open source environment. The organization noted in the previous Open Source environment the cost of the support contract ultimately varied based on the level of response time with an incremental cost required for reducing the stated SLA response time to less than 8 hours. While the basic level of support was adequate for non-mission critical applications, the organization would have had to purchase significant additional support for those applications where maintenance of uptime was critical.

Second, as the organization scaled their application development environment, it was faced with the option of either purchasing additional premium Open Source support or consolidating support through the WebSphere Enterprise license. The organization saw the opportunity to realize additional cost savings as the number of applications and the need for mission critical support grew.

To calculate the impact of support savings, the model assumes in the Open Source environment the organization was paying the cost of premium support based on the number of CPU's and the number of development FTE's equating to $16,000 per CPU and $16,000 per user. The model assumes at the point of migration, the representative organization had 32 CPU's running the selected mission critical applications and 100 FTE's supporting the development. For the representative organization, moving to an enterprise license resulted in an estimated 30% cost savings to support the mission critical applications. In addition, assuming the rate of growth for both

staffing and hardware increases by 10%, it's possible to calculate the future cost savings within the environment. Table 5 illustrates the calculation used.

Table 5: Reduced Support Cost Savings

Ref.	Description	Calculation	Year 1	Year 2	Year 3
A1	Estimated growth (Yearly)			10%	10%
A2	Number of CPU's	A1*A2	32	35	39
A3	Development FTE	A1*A3	100	110	121
A4	Cost per License		$ 16,000	$ 16,000	$ 16,000
A5	Estimated reduction in license cost		30%	30%	30%
A6	Total Annual Savings	((A2*A5)+(A3*A5))* A4	633,600	696,000	768,000

Source: Forrester Research, Inc.

Improved Administration Efficiency in Maintaining Mission Critical Applications

With the migration to WebSphere, the organization also noted the ability to drive additional efficiency savings among developers through automation features found in WebSphere to maintain high levels of availability. WebSphere Application Server allowed the organization to maintain high levels of availability through features connecting to back-end resources, and basic troubleshooting. In particular the organization was able to increase the level of automation through the creation of scripts, reducing the need for administration involvement at different points in the testing and application change cycle. Tuning and monitoring of the platform was also improved with some of the Dynamic caching features found within WebSphere Application Server 6.1.   As a result of Caching dynamic content the organization was able to maintain high levels of performance while at the same time not requiring high levels of administration staff on call to manually tune and monitor the platform.

To calculate the benefit of improved automation, the model assumes in the legacy Open source environment, roughly 30% of the administrator's time is spent responding to monitoring and tuning hardware to meet the performance requirements of the application. Through automation and Dynamic features found within WebSphere Application Server, the organization was able to reduce the level of administration effort by 40%, leading to an annual savings of 150,000. Table 6 illustrates the calculation used.

Table 6: Improved Administration Efficiency

Ref	Description	Calculation	Value
B1	Number of administrators		10
B2	Salary - Fully Burdened		$125,000
B3	Percent of time monitoring and tuning		30%
B4	Estimated reduction		40%
B5	Total Annual Savings	B1*B2*B3*B4	150,000

Source: Forrester Research, Inc.

Improved Application Availability

The other impact of improved automation and maintaining high levels of performance is the impact on the end users of the application. The migration to WebSphere also provided the organization the ability to take advantage of a virtualized application platform, allowing for fewer hardware devices to manage. This makes possible new configurations, such as dynamic virtualization between pools of application servers allowing the organization to maintain high levels of availability. Through clustering, the organization can take down a part of the cluster without having to take down the whole application for all users or invest in additional external high availability software.

To calculate the impact of performance, the model assumes the average number of users accessing the application at any given time equates to 40,000 users. In the previous Open Source environment, if the organization needed to take down the application to perform unplanned maintenance related to performance, the average amount of time the application would be down was 45 minutes. Assuming the organization was able to avoid the loss of availability, an end user would regain on average 20% of their time. At a user blended cost per hour of $120 this would equate to a total savings of $720,000 per year. Table 7 illustrates the calculation used.

Table 7: Improved Application Availability

Ref.	Description	Calculation	Value
C1	Average number of clients accessing application		40,000
C2	Cost per user		120
C3	Time to bring down application - alternative environment (hrs)		75%
C4	Productivity time saved		20%
C5	Operational savings – availability of the application	C1*C2*C3*C4	720,000

Source: Forrester Research, Inc.

Improved Developer Efficiency

The final area of impacted noted by the interviewed organization was reduced development within the application development environment specifically to improve the speed of certain functions around installation, configuration and deployment of J2EE applications.   Through virtualization, there was no need to deploy new applications in physical boxes. Applications could be created on a mini-disc and hardware mounted to point to the mini disc, allowing for reduced time and effort to install a new application into production.

To calculate this benefit, the model assumes the organization requires on average 225 hours to test and move a new application from a test environment into production. Assuming 20 new releases over the course of a year, through faster integration, the organization will be able to improve the overall cost by 40%. Table 8 illustrates the calculation used.

Table 8: Improving Developer Efficiency

Ref.	Description	Calculation	Value
D1	Time to set up a new application (hrs)		225
D2	Number of new application releases		20
D3	Hourly cost		50
D4	Estimated savings (percentage)		40%
D5	IT development team savings	D1*D2*D3*D4	90,000

Source: Forrester Research, Inc.

Total Benefits

Table 9 illustrates the total three-year benefits as a result of the migration to the IBM WebSphere Application Server platform. The total PV benefits equate to roughly $2.3 million. IT benefits were reduced by 25% in Year 1 to take into account of implementation time. Business Impact benefits were reduced by 50% to take into account the added time it takes for the business to act on and realize changes from increases in trusted data.

Table 9: Total Benefits

	Year 1	Year 2	Year 3	Total	PV
Reduction in support costs (Legacy server environment)	475,200	696,000	768,000	1,939,200	1,584,216
IT operational/management savings – Automation	112,500	150,000	150,000	412,500	338,937
Operational savings – availability of the application	540,000	720,000	720,000	1,980,000	1,626,897
IT development team savings	67,500	90,000	90,000	247,500	203,362
Total	**1,195,200**	**1,656,000**	**1,728,000**	**4,579,200**	**3,753,412**

Source: Forrester Research, Inc.

Risk

Forrester defines two types of investment risk associated with this analysis: implementation and impact risk. **Implementation risk** is the risk that a proposed technology investment may deviate from original resource requirements needed to implement and integrate the investment, 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 technology investment, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for cost and benefit estimates. Quantitatively capturing investment risk by directly adjusting the financial estimates results in more meaningful and accurate estimates and a more accurate projection of the ROI.

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

- Installation and testing could demand more time than originally anticipated.

- Timeliness of having to provide specific functionality to meet business requirements exists.

- Acquisition costs could be higher than originally anticipated for hardware and software.

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

- The amount of development savings may be lower than originally anticipated due to the time it takes to train and move to an integrated environment.

Steps For Measuring Investment Risk

Risk factors are used in TEI to widen the possible outcomes of the costs and benefits (and resulting savings) associated with a project. TEI applies a probability density function known as triangular distribution to the values entered. At a minimum, three values are calculated to estimate the underlying range around each cost and benefit estimate. The expected value — the mean of the distribution — is used as the risk-adjusted cost or benefit number. The risk-adjusted costs and

benefits are then summed to yield a complete risk-adjusted summary and ROI. In this study, Forrester discovered that engaging with IBM was a relatively low-risk endeavor, as expressed by the interviewed organizations, and applied a risk factor of 110% to the costs and 96% to the benefits to arrive at a risk-adjusted number. Table 10 provides a risk-adjusted breakdown of the costs received. Table 11 provides a risk-adjusted breakdown of the benefits received.

Table 10: Risk Adjustment, Cost

	Initial Cost	Year 1	Year 2	Year 3	Total	PV
License	-	905,352	-	-	905,352	823,047
Annual maintenance	-	-	186,396	186,396	372,792	294,088
Implementation	155,400	-	-	-	155,400	155,400
Training	-	76,800	11,520	1,728	90,048	80,637
Internal support	-	478,800	478,800	478,800	1,436,400	1,190,705
Total Cost	**-**	**1,460,952**	**676,716**	**666,924**	**2,959,992**	**2,543,877**

Source: Forrester Research, Inc.

Table 11: Risk Adjustment, Benefit

	Year 1	Year 2	Year 3	Total	PV
Reduction in support costs (Legacy server environment)	465,696	682,080	752,640	1,900,416	1,552,532
IT operational/management savings – Automation	106,875	142,500	142,500	391,875	321,990
Operational savings – availability of the application	513,000	684,000	684,000	1,881,000	1,545,552
IT development team savings	64,125	85,500	85,500	235,125	193,194
Total Benefit	**1,149,696**	**1,594,080**	**1,664,640**	**4,408,416**	**3,613,268**

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. Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

The use of the IBM WebSphere Application Server platform in conjunction with an effective application development strategy can potentially enable future benefits throughout the organization as a way to scale performance gains through the use of the Power 7 platform.

While Forrester believes that organizations purchasing IBM WebSphere Application Server and Application development strategy in combination can take advantage of these flexibility options, quantification (using the financial industry standard Black-Scholes or the binomial option pricing models) of the additional value associated with these options for this customer would require scenario development and forward-looking analysis that is not available at this time.

The value of flexibility is unique to each organization, and the willingness to measure its value varies from company to company (see Appendix A for additional information regarding the flexibility calculation).

TEI Framework: Summary

Considering the financial framework constructed above, the results of the Costs, Benefits, Flexibility, and Risk sections using the representative numbers can be used to determine ROI, NPV, and payback period. Table 12 shows the consolidation of the numbers for the composite organization.

Table 12: Cash Flow Summary — Non-Risk-Adjusted

	Initial	Year 1	Year 2	Year 3	Total	NPV
Total costs	148,000	1,407,600	643,120	634,960	2,833,680	2,436,195
Total benefits		1,195,200	1,656,000	1,728,000	4,579,200	3,753,412
Total	(148,000)	(212,400)	1,012,880	1,093,040	1,745,520	1,317,217
ROI						54%
Payback period (years)						1.2

Source: Forrester Research, Inc.

Table 13 below shows the risk-adjusted values, applying the risk-adjustment method indicated in the Risks section and the values from Tables 10 and 11.

Table 13: Cash Flow Summary — Risk-Adjusted

	Initial	Year 1	Year 2	Year 3	Total	NPV
Total costs	155,400	1,460,952	676,716	666,924	2,959,992	2,543,877
Total benefits		1,149,696	1,594,080	1,664,640	4,408,416	3,613,268
Total	(155,400)	(311,256)	917,364	997,716	1,448,424	1,069,391
ROI						42%
Payback period (years)						1.4

Source: Forrester Research, Inc.

It is important to note that values used throughout the TEI framework are based on in-depth interviews with a single organization. Forrester makes no assumptions as to the potential return that other organizations will receive within their own environment. Forrester strongly advises that readers use their own estimates within the framework provided in this study to determine the expected financial impact of implementing IBM WebSphere Application Server.

Study Conclusions

Based on information collected in interviews with a current IBM WebSphere Application Server customer, Forrester found that organizations can potentially realize benefits in the form of improved development efficiency within their current environment as well as faster time to benefit from their development projects especially for mission critical applications with demanding SLA's.

The financial analysis provided in this study illustrates the potential way that an organization can evaluate the value proposition of IBM WebSphere Application Server. Based on information collected during the in-depth customer interviews, Forrester calculated a three-year risk-adjusted ROI of 42% for the composite organization with a payback period of 14 months. All final estimates are risk-adjusted to incorporate potential uncertainty in the calculation of costs and benefits.

Based on these findings, companies looking to implement IBM WebSphere Application Server can see cost savings and productivity benefits. Using the TEI framework, many companies may find the potential for a compelling business case to make such an investment.

Appendix A: Total Economic Impact™ Overview

Total Economic Impact (TEI) is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

The TEI methodology consists of four components to evaluate investment value: benefits, costs, risks, and flexibility. For the purpose of this analysis, the impact of flexibility was not quantified.

Benefits

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

Costs

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

Risk

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

Flexibility

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

Appendix B: Glossary

Discount rate: The interest rate used in cash flow analysis to take into account the time value of money. Although the Federal Reserve Bank sets a discount rate, companies often set a discount rate based on their business and investment environment. Forrester assumes a yearly discount rate of 10% for this analysis. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult their organization to determine the most appropriate discount rate to use in their own environment.

Net present value (NPV): The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.

Present value (PV): The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total NPV of cash flows.

Payback period: The breakeven point for an investment. It 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 Table 2 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 and are the sum of the initial investment and the discounted cash flows in each year.

Example Table

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

Source: Forrester Research, Inc.