

A Forrester Total Economic  
Impact™ Study  
Commissioned By  
IBM

Project Director:  
Jan ten Sythoff  
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# The Total Economic Impact™ Of IBM MQ

High Reliability And Cost Efficiencies  
Deliver Compelling Benefits In High  
Throughput Environments

FORRESTER®

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### ABOUT FORRESTER CONSULTING

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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 MQ (previously named IBM WebSphereMQ). The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of IBM MQ on their organizations.

To better understand the benefits, costs, and risks associated with an IBM MQ implementation, Forrester interviewed two existing enterprise customers with multiple years of experience using the solution; this research was supplemented by an online survey of six existing customers in a number of industries and regions.

Enterprises are managing ever higher quantities of data generated from customers, partners, suppliers, and other entities, with increasing connectivity provided by the growth in use of mobile devices, connected machines, and cloud-based services. The rapid and stable flow of this data is fundamental to the efficient operation of businesses. IBM MQ is a messaging-based, middleware-enabling connectivity between business applications and other IT systems.

Many enterprises invest into entry-level, open source messaging products that address many requirements and situations but cannot scale in high throughput environments in a sufficiently reliable way. IBM MQ is highly scalable and reliable with high performance; furthermore, IBM MQ enables enterprises to take a first step in migrating to an enterprise bus architecture, which provides significant scope for future growth as well as increased agility.

**IBM MQ improves reliability, efficiency, and throughput.**

**The costs and benefits for the composite organization over three years based on customer interviews are:**

- **Investment costs: \$397,064.**
- **Total benefits: \$660,228.**
- **Net benefits: \$263,166.**

### IBM MQ INCREASES DEVELOPER PRODUCTIVITY AND DELIVERS SUSTAINED RELIABILITY

Our interviews and survey responses from a total of eight existing customers and subsequent financial analysis found that a composite organization based on these organizations experienced the risk-adjusted ROI, benefits, and costs shown in Figure 1.<sup>1</sup> See Appendix A for a description of the composite organization.

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



Source: Forrester Research, Inc.

› **Benefits.** The composite organization highlighted the following benefits:

- **Reduced support incident costs through high reliability.** Open source alternatives cannot easily provide the performance and stability required in many enterprise-class environments. Downtime is simply not an option because of the impact on revenue and reputation. IBM MQ is a reliable, scalable messaging infrastructure that can reduce support incidents and the associated costs of system restoration.
- **Improved team efficiency through reduced application complexity.** IBM MQ frees up developer time by simplifying applications and removing complexity. Applications no longer have to address the issues associated with messaging delays or failures, enabling developers to focus on more productive tasks.
- **Reduced hardware requirements through increased throughput.** Open source message queue alternatives would require substantially more hardware investments to achieve the same throughput as IBM MQ. On average, clients reported a 40% improvement in system performance, thus avoiding additional hardware investments, complexity, and the associated maintenance costs.
- **Reduced maintenance costs.** IBM MQ's built-in alerts and application monitoring capabilities facilitate easier maintenance, as well as early identification of potential problems or incidents.

› **Costs.** The interviewed organizations identified the following costs:

- **Software licensing fees.** The licensing fees include the software license fees plus the annual maintenance and support charges.
- **Planning and implementation costs.** There are a number of costs associated with the planning and installation of IBM MQ. The most significant is associated with the resources required to configure the applications and integrate them with IBM MQ. There are also planning (proof of concept), installation (integration and testing), and typically some professional services costs.
- **Training costs.** There is around a week's worth of training, principally for developers, but also for system administrators, project managers, and other members of the project team. Both the enterprises interviewed highlighted that training costs could be minimized by having the IBM professional services team provide insights at the time of the installation of the system.

## 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 MQ.
- › 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 MQ. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision.

### APPROACH AND METHODOLOGY

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

- › Interviewed IBM marketing, sales, and technical personnel to gather data relative to MQ and the marketplace for messaging solutions.
- › Interviewed two organizations currently using IBM MQ to obtain data with respect to costs, benefits, and risks. This was supplemented with an interview with an IBM technical salesperson for a third customer, as well as an online survey of six other enterprises with investments in the software.
- › 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 and survey as applied to the representative 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 the relevant section.

Forrester employed four fundamental elements of TEI in modeling IBM MQ: 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 and deployment 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 a total of two interviews with representatives from the following companies, which are IBM MQ customers:

- › Company 1 is a global payments processing company based in the United States, with over 8,000 employees, worldwide operations, and revenues in the billions.
- › Company 2 is a US-based electronic health records (EHR) company with over 400 employees managing over 80 million patient records.

In addition, a number of MQ customers provided responses to an online survey, including a midsized bank based in India and a global restaurant chain's operations in China.

Based on the interviews and survey sample, 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:

The organization is a US-based midsized bank with revenues of \$2 billion, revenue growth of 10%, around 10,500 employees, 5 million customer accounts, 700 branches, and total assets of \$65 billion.

The organization provides both consumer and business banking, as well as a range of investment and insurance services. A key area of focus for the bank over the last few years has been its multichannel strategy, enabling its customers to access accounts online and on mobile devices. It also plans to expand both its portfolio of services and its national footprint.

### INTERVIEW HIGHLIGHTS

The interviews with the two organizations highlighted very different circumstances, revealing contrasting drivers for the need to invest into improving their messaging infrastructure. The payment processing company wanted to move away from its proprietary network, which it had built in order to address its requirements for very high transaction volumes, security compliance, and very high reliability. Not only was this infrastructure costly to operate, but it also drew resources away from its core business. The electronic health records company was growing very fast, and the open source messaging system it had invested into could not cope with the expected rate of growth in messaging volumes in certain parts of its business, particularly in continuing to meet its compliance requirements.

#### *Situation*

- › Most urgent was the need to support the growth of digital channels: Not only was online banking adoption showing mass market adoption, but the development of mobile channels required a messaging system with very high reliability, particularly given the potential for broken data sessions and lost messages.
- › At a time of continued revenue growth, increasing adoption of online channels, product and regional expansion, and competitive pressure to enhance multichannel capabilities, the bank identified a need to upgrade its back-end systems in anticipation of its growth prospects and the need for faster development cycles.
- › The bank, like the rest of the financial system, was still recovering from the banking crisis and having to accommodate tighter compliance and a more risk-averse environment. Cost efficiency was and remains a priority consideration, despite the improving economic situation.

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*“The cost avoidance for a major incident is really in lost revenue and reputational damage.”*

VP, technical operations

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### *Solution*

In order to address the short- to medium-term issue of the growth of its digital channels, the bank decided to invest into IBM MQ infrastructure. Not only would this support the continued growth in the use of digital channels, but it was also an important stepping stone in migrating to a service-oriented architecture that would provide the agility and scalability needed for its longer term growth aspirations.

### *Results*

The interviews revealed that:

- › **IBM MQ demonstrated significant improvements in scalability and throughput over the open source alternative.** The organization determined that the alternative of investing into more hardware for the existing open source message queue software would not provide the reliability and long-term cost efficiencies it was looking for.
- › **IBM MQ simplifies applications, thus freeing up developer time.** The alternative option of scaling up the existing open source messaging system would require additional application development work, resulting in a more complex application environment that would not only incur higher maintenance costs, but also slow down future application development, and hence time-to-market.
- › **Selecting IBM MQ significantly decreased risk.** The mobile site and apps would be inherently less stable channels to market, thus increasing the risks of lost or failed transactions and in turn customer support costs plus the associated impact on the bank's reputation. High reliability and stability were fundamental in enhancing the mobile channel.
- › **Open source solutions remain a viable part of the organization's IT strategy, for use in the right situations.** While not suitable for strategic and customer-facing applications, open source messaging products continue to be used in situations with lesser requirements.

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*“Our evaluation showed that hardware requirements would be significantly higher if we went with the open source solution.”*

~VP, technical operations

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## BENEFITS

The organization identified a number of benefits that Forrester quantified as part of this case study:

- › Improved team efficiency.
- › Reduced support incidents.
- › Reduced hardware requirements.
- › Reduced maintenance costs.

### ★ Improved Team Efficiency

IBM MQ takes complexity out of applications by removing their need to be able to deal with lost messages and error handling, simplifying coding requirements, and thus freeing up developer time.

To calculate this benefit, the model assumes a total of 20 team members responsible for testing and deployment, with an average cost of \$112,500 per year. Annual savings are calculated based on a 5% reduction in the resource requirements. Table 1 illustrates the calculation used.

**TABLE 1**  
Improved Team Efficiency: Lower Application Complexity Frees Developer Resources

| Ref. | Metric                                 | Calculation              | Year 1    | Year 2    | Year 3    |
|------|--|--------------------------|-----------|-----------|-----------|
| A1   | Team size                              |                          | 20        | 20        | 20        |
| A2   | Cost per resource                      |                          | 112,500   | 112,500   | 112,500   |
| A3   | Estimated reduction                    |                          | 5%        | 5%        | 5%        |
| At   | Total developer efficiency savings     | $A1 \times A2 \times A3$ | \$112,500 | \$112,500 | \$112,500 |
|      | Risk adjustment                        |                          | ↓ 5%      |           |           |
| Atr  | Developer efficiencies (risk-adjusted) |                          | \$106,875 | \$106,875 | \$106,875 |

Source: Forrester Research, Inc.

### ★ Reduced Support Incidents

IBM MQ's high reliability reduces the number of support incidents; its application monitoring capability also provides early alerts of potential system failure. IBM MQ avoids all major incidents, reducing costs but more importantly safeguarding revenue and the business' reputation. For the companies interviewed for this analysis it was this, beyond all other considerations, that was the reason for their investment in IBM MQ.

Furthermore, four out of five minor incidents were avoided altogether, while the time to restore those that are not avoided is reduced significantly, adding additional quantifiable benefits.

**TABLE 2**  
**IT Operational Savings: Reduced Support Incidents Lead To IT Operational Savings**

| Ref. | Metric  | Calculation                | Year 1   | Year 2    | Year 3    |
|------|---|----------------------------|----------|-----------|-----------|
| B1   | Number of major incidents                             |                            | 0        | 1         | 2         |
| B2   | Length of time (hours)                                |                            | 70       | 70        | 70        |
| B3   | Resource requirement                                  |                            | 5        | 5         | 5         |
| B4   | Cost per resource                                     |                            | \$59     | \$59      | \$59      |
| B5   | Reduction in major incidents                          |                            | 100%     | 100%      | 100%      |
| B6   | Total major incident cost                             | $B1*B2*B3*B4$              | 0        | \$20,508  | \$41,016  |
| B7   | Number of minor incidents                             |                            | 15       | 18        | 22        |
| B8   | Length of time (hours)                                |                            | 25       | 25        | 25        |
| B9   | Resource requirement                                  |                            | 4        | 4         | 4         |
| B10  | Cost per resource                                     |                            | \$59     | \$59      | \$59      |
| B11  | Reduction in minor incidents                          |                            | 80%      | 80%       | 80%       |
| B12  | Reduction in time to restore                          |                            | 70%      | 70%       | 70%       |
| B13  | Savings from reduction in minor incidents             | $B7*B8*B9*B10*B11$         | \$70,313 | \$84,375  | \$103,125 |
| B14  | Savings from improved time to restore minor incidents | $B7*B8*B9*B10*(1-B11)*B12$ | \$12,305 | \$14,766  | \$18,047  |
| Bt   | Total annual savings                                  | $B6+B13+B14$               | \$82,617 | \$119,648 | \$162,188 |
|      | Risk adjustment                                       |                            | ↓ 5%     |           |           |
| Btr  | IT operational savings (risk-adjusted)                |                            | \$78,486 | \$113,666 | \$154,079 |

Source: Forrester Research, Inc.

### ★ Reduced Hardware Requirements

IBM MQ improves system performance by 40%, on average, and is therefore able to process messages at a higher rate. This translates into a reduction in hardware investments that the open source alternative would require to manage the continued growth of the composite organization.

To calculate this benefit, the model starts by assuming that it would require five additional servers to use the open source solution and calculates the capital investment required for those servers (at \$12,500 each) as well as a 20% ongoing annual support fee. Table 3 illustrates the calculation used.

TABLE 3

## Hardware Savings: Significantly Greater Throughput Results In Hardware Savings

| Ref. | Metric                      | Calculation              | Year 1   | Year 2   | Year 3   |
|------|-----------------------------|--------------------------|----------|----------|----------|
| C1   | Number of servers avoided   |                          | 5        | 0        | 0        |
| C2   | Cost per server             |                          | \$12,500 | \$12,500 | \$12,500 |
| C3   | Hardware investment savings | $C1 \times C2$           | \$62,500 | 0        | 0        |
| C4   | Annual server support fee   |                          | 20%      | 20%      | 20%      |
| C5   | Annual server support cost  | $C1 \times C2 \times C3$ |          | \$12,500 | \$12,500 |
| Ct   | Total hardware savings      | $C2 + C5$                | \$62,500 | \$12,500 | \$12,500 |

Source: Forrester Research, Inc.

### ★ Lower Maintenance Costs

IBM MQ is easier to maintain than open source alternative message queue systems, saving system administrators time. In the case of the composite organization, we estimate it would save 6 hours per week.

TABLE 4

## Maintenance Savings: Lower Operational Costs

| Ref. | Metric                              | Calculation              | Year 1   | Year 2   | Year 3   |
|------|-------------------------------------|--------------------------|----------|----------|----------|
| D1   | Weekly time savings                 |                          | 6 hours  | 6 hours  | 6 hours  |
| D2   | Cost per hour                       |                          | \$50     | \$50     | \$50     |
| Dt   | Total maintenance savings           | $D1 \times D2 \times 52$ | \$15,600 | \$15,600 | \$15,600 |
|      | Risk adjustment                     |                          | ↓ 5%     |          |          |
| Dtr  | Maintenance savings (risk-adjusted) |                          | \$14,820 | \$14,820 | \$14,820 |

Source: Forrester Research, Inc.

### Total Benefits

Table 5 shows the total of all benefits across the four areas listed above, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total benefits to be a PV of more than \$660,000.

**TABLE 5**  
**Total Benefits (Risk-Adjusted)**

| <b>Ref.</b> | <b>Benefit</b>        | <b>Initial</b> | <b>Year 1</b>    | <b>Year 2</b>    | <b>Year 3</b>    | <b>Total</b>     | <b>Present Value</b> |
|-------------|-----------------------|----------------|------------------|------------------|------------------|------------------|----------------------|
| Atr         | Team efficiency       | \$0            | \$106,875        | \$106,875        | \$106,875        | \$320,625        | \$265,782            |
| Btr         | Reduced incidents     | \$0            | \$78,486         | \$113,666        | \$154,078        | \$346,231        | \$281,051            |
| Ct          | Hardware savings      | \$0            | \$62,500         | \$12,500         | \$12,500         | \$87,500         | \$76,540             |
| Dtr         | Maintenance savings   | \$0            | \$14,820         | \$14,820         | \$14,820         | \$44,460         | \$36,855             |
|             | <b>Total benefits</b> | <b>\$0</b>     | <b>\$262,681</b> | <b>\$247,861</b> | <b>\$288,273</b> | <b>\$798,816</b> | <b>\$660,228</b>     |

Source: Forrester Research, Inc.

## COSTS

The primary costs considered for this TEI of the interviewed organizations' comparison of the IBM MQ versus an open source alternative included:

- › Software licensing fees.
- › Planning, installation, and training costs.

These represent Forrester's analysis of internal and external costs that would be experienced by the organization for initial planning, implementation, and ongoing maintenance associated with the solution. Table 6 shows the total of all costs as well as associated present values, discounted at 10%. Note that the risk adjustment applies only to the planning and installation costs, and not the professional services and training costs. Hence the total risk adjustment is lower than 5%. Over three years, the composite organization expects total costs to total a net present value of a little more than \$397,000.

**TABLE 6**  
**Total Costs (Risk-Adjusted)**

| Ref. | Cost            | Initial   | Year 1    | Year 2   | Year 3   | Total     | Present Value |
|------|-----------------|-----------|-----------|----------|----------|-----------|---------------|
| X1   | License         | \$0       | \$175,000 | \$35,000 | \$35,000 | \$245,000 | \$214,313     |
| X2   | Implementation  | \$178,063 |           |          |          | \$178,063 | \$178,063     |
|      | Risk adjustment | ↑ 5%      |           |          |          |           |               |
| X3   |                 | \$182,751 |           |          |          | \$182,751 | \$182,751     |
|      | Total costs     | \$182,751 | \$175,000 | \$35,000 | \$35,000 | \$427,751 | \$397,064     |

Source: Forrester Research, Inc.

The license fees are the cost of MQ software payable to IBM. They include the license fees in the first year and the annual support and maintenance fees in the following years. The implementation costs include all the upfront costs, including planning, installation, training, and professional services fees. Planning includes the need to analyze, prepare, and compare business cases for different options and undertake proof of concept. Installation includes the application configuration, integration, and system testing. A professional services fee was also incurred, which not only helped in the configuration and integration, but was also utilized for training purposes, the costs for which have also been included.

## 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. In a number of the cases analyzed for this study, IBM MQ was part of a broader migration to an enterprise service bus architecture. Such a migration, whereby applications no longer connect to each other directly but rather through a shared middleware layer, provides large enterprises with increased scalability and agility.

Moving to such an architecture is a complex and time-consuming process, but the implementation of IBM MQ is often an important first step. Therefore, some of the costs associated with the implementation of IBM MQ can be discounted as part of a broader enterprise service bus project.

IBM MQ also incorporates an option to add a higher level of security. While the standard product incorporates security features such as authentication to connect to the system, enterprises can choose to have all messages encrypted at all times, typically to comply with regulatory requirements in certain industries. Such an option is an additional benefit of the product in the form of flexibility.

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

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

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

- › Installation and testing could demand more time than originally anticipated. This depends on a number of factors, such as the legacy environment and skills and experience of internal IT staff.

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

- › The reduction in the number of incidents could be lower than originally anticipated. The number of support incidents and/or the time to restore them could be less beneficial, depending on many different factors, including the nature of the enterprise’s business and the legacy environment where IBM MQ is being implemented.
- › The improved team efficiencies could be lower than originally anticipated. This depends on many factors, including the development environment and capabilities prior to the investment.

Table 7 shows the values used to adjust for risk and uncertainty in the cost and benefit estimates. The TEI model uses a triangular distribution method to calculate risk-adjusted values. To construct the distribution, it is necessary to first estimate the low, most likely, and high values that could occur within the current environment. The risk-adjusted value is the mean of the distribution of those points. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

**TABLE 7**  
**Benefit And Cost Risk Adjustments**

| <b>Benefits</b>             | <b>Adjustment</b> |
|-----------------------------|-------------------|
| Reduced operational savings | ↓ 5%              |
| Improved team efficiencies  | ↓ 5%              |
| <b>Costs</b>                | <b>Adjustment</b> |
| Implementation costs        | ↑ 5%              |

Source: Forrester Research, Inc.

## Financial Summary

The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the organization's investment in IBM MQ.

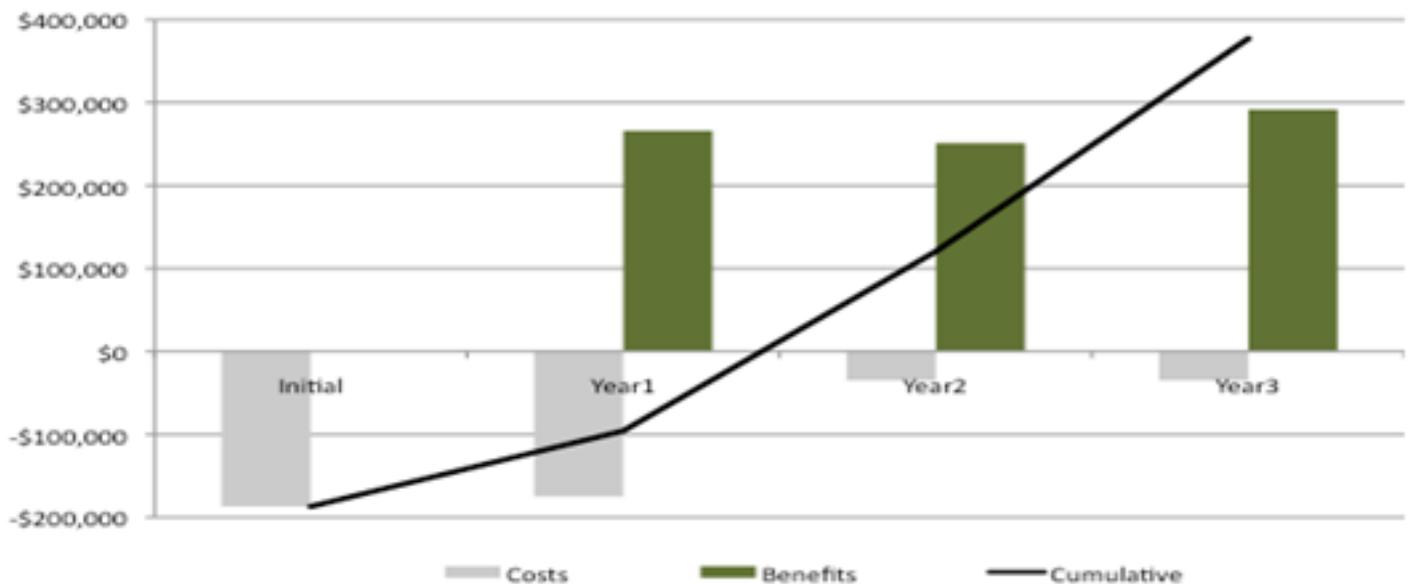
Table 8 below shows the risk-adjusted total costs, total benefits, net benefits, ROI, NPV, and payback period values.

**TABLE 8**  
Cash Flow (Risk-Adjusted)

|                | Initial     | Year 1      | Year 2     | Year 3     | Total       | Present Value |
|----------------|-------------|-------------|------------|------------|-------------|---------------|
| Costs          | (\$182,751) | (\$175,000) | (\$35,000) | (\$35,000) | (\$427,751) | (\$397,064)   |
| Benefits       | \$0         | \$262,681   | \$247,861  | \$288,273  | \$798,816   | \$660,228     |
| Net benefits   | (\$182,751) | (\$87,681)  | \$212,861  | \$253,273  | \$371,065   | \$263,166     |
| ROI            | 166%        |             |            |            |             |               |
| Payback period | 14 months   |             |            |            |             |               |

Source: Forrester Research, Inc.

**FIGURE 3**  
Cash Flow Chart (Risk-Adjusted)



Source: Forrester Research, Inc.

## IBM MQ: Overview

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

IBM MQ is messaging-based middleware, essentially enabling applications to exchange information through an indirect middleware layer, thus avoiding the need for them to directly connect to each other. In this way the application itself need not be programmed to deal with transmission failure or error handling, and it can focus purely on the business logic.

IBM MQ:

- › Provides versatile messaging integration, from mainframe to mobile, in a single robust messaging backbone.
- › Connects virtually any commercial IT system, with support for more than 80 platforms.
- › Shields application developers from networking complexities, enabling them to develop and deploy new applications faster.
- › Includes administrative features that simplify messaging management and reduce time spent using complex tools.
- › Offers a range of qualities of service (QoS).

## 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 MQ. The composite organization is based on selected characteristics from the interviews of the IBM MQ customers that participated in this study.

The composite organization that Forrester synthesized from these results represents a midsized US-based bank with 10,500 employees. It primarily provides consumer, business, and commercial banking as well as wealth management, investment, and insurance services. It is present in 20 states, operates 700 branches, and is responsible for managing \$65 billion worth of assets, the majority in deposits.

While it continues to enjoy revenue and customer growth, significant additional pressure was being put on its IT systems through the multichannel strategy it was following in order to improve the customer experience. Three years ago, online banking had already been widely adopted by its customer base, while the need to upgrade its mobile channel was becoming more urgent. Furthermore, the bank was planning to broaden the product portfolio and widen its geographic footprint.

The continued growth of the bank and the increased loads that digital channels were placing on its systems resulted in a need to increase the scalability of messaging capabilities in parts of the enterprise. The open source messaging servers could not provide the throughput required in mission-critical applications without significant investments into more hardware. Moreover, this alternative was not considered to be appropriate because of a lack of reliability and the associated risks of system downtime. A more flexible and stable infrastructure was also required to sustain long-term growth and accommodate rapid application development.

In purchasing IBM MQ, the composite company had the following objectives:

- › Support increased growth in messaging throughput without compromising reliability.
- › Lower complexity and free up developer resources.
- › Provide a road map for a flexible, scalable infrastructure with Agile development capabilities.
- › Reduce costs.

IBM MQ was deployed to support the growth in peak transaction throughput, largely driven by the growing adoption of its digital channels. The open source messaging software was replaced in a number of key systems with the help of the IBM Software Services for WebSphere (ISSW). The increased throughput meant no additional hardware investments were required. This project provided a cornerstone on top of which the bank now plans to migrate to a service-oriented architecture (SOA) through the deployment of an enterprise bus.

## Appendix B: Total Economic Impact™ Overview

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

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

## Appendix C: 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 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.

#### TABLE [EXAMPLE]

##### Example Table

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

Source: Forrester Research, Inc.

## Appendix D: Endnotes

<sup>1</sup> 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.