The Total Economic Impact™ Of IBM Services For Application Migration And Modernization To A Hybrid Multicloud Environment

Cost Savings And Business Benefits Enabled By Application Migration And Modernization To A Hybrid Multicloud
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**ABOUT FORRESTER CONSULTING**

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Executive Summary

IBM Services helps its customers to effectively plan, manage, and migrate their applications to a hybrid multicloud environment. IBM Services commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential ROI enterprises may realize by using IBM Services for migrating and modernizing their applications to a multicloud environment. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of leveraging IBM Services for application migration and modernization services for their organization.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed and surveyed 32 IBM Services customers for application migration and modernization to a hybrid multicloud environment.

Before leveraging IBM Services, the majority of customers considered leveraging internal resources for the purpose of migration and modernization. However, prior migrations yielded limited success, leading to project delays and increased risk in delivery. These limitations led organizations to devoting more time and resources to a successful implementation, or to limiting the scope of their migration or modernization effort.

Key Findings

**Quantified benefits.** The following risk-adjusted present value (PV) quantified benefits of using IBM Services for application migration and modernization are representative of those experienced by the companies interviewed:

- **Improved speed of migration and modernization by 46.5%.** Speed was another area of benefit noted by the interviewed customers. Leveraging IBM Services provided a faster path to completion, compared with having to undertake the initiative on their own.

- **Reduced cost of application migration and modernization by 34%**

  Interviewed and surveyed customers noted that they were able to reduce the overall cost of migration and modernization by over one-third, as compared with trying to leverage internal staff resources for the initiative.

- **Reduced risk of failed application migration and modernization by 40%.** Customers also indicated that the risk of a failed migration would have been much higher if they had not leveraged IBM Services for the migration and modernization. This resulted in fewer errors and reduced risk of integration failures.

- **Reduced risk of disruption and availability of applications by 44%.** With reduced risk and improved time to delivery, there is a lower chance of disruption to core applications, ensuring that downtime is minimized.

- **Reduced risk of compliance fines and penalties.** Organizations noted that the smooth delivery of a migration and modernization project reduces the likelihood that the project will run into compliance regulatory issues.
IBM Services for Application Migration and Modernization

Reduced number of FTEs required for ongoing support of applications. Organizations also noted that a successful migration and modernization project does not end at project completion. A project that is successfully integrated can also reduce the likelihood that additional staff will be needed to support the project on an ongoing basis into the future from reduced integration errors.

Unquantified benefits. The interviewed organizations experienced the following benefits, which are not quantified for this study:

- **Reduced risk of future platform incompatibility.** While organizations did focus on the cost implications of moving forward with IBM Services, they also noted that the IBM Services approach did allow for the potential of future investments to integrate easier into the current environment.

- **Improved ability to create innovation.** Freeing up contingency capital from a migration and modernization project allowed organizations to move investments to more value-added tasks.

Costs. The interviewed organizations experienced the following risk-adjusted PV costs:

- **Services cost.** The cost billed to IBM Services to assist in migration and modernization of applications.

- **Management oversight cost.** The cost associated with managing the IBM Services relationship for migration and modernization services.

Forrester’s interviews and survey with 32 existing customers and subsequent financial analysis found that an organization based on these interviewed organizations experienced benefits of $6.3 million over three years versus costs of $2.8 million, adding up to a net present value (NPV) of $3.5 million and an ROI of 128%.

### Financial Summary

<table>
<thead>
<tr>
<th>Initial</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total benefits PV, $6.3M</td>
<td>$431,286</td>
<td>$566,167</td>
<td>$726,960</td>
</tr>
<tr>
<td>Total costs PV, $2.8M</td>
<td>$1,729,542</td>
<td>$2,865,838</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benefits (Three-Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced risk of disruption and availability of applications</td>
</tr>
<tr>
<td>$431,286</td>
</tr>
<tr>
<td>Improved speed of migration</td>
</tr>
<tr>
<td>$566,167</td>
</tr>
<tr>
<td>Reduced risk of compliance fines and penalties</td>
</tr>
<tr>
<td>$726,960</td>
</tr>
<tr>
<td>Reduced cost of migration and modernization</td>
</tr>
<tr>
<td>$1,729,542</td>
</tr>
<tr>
<td>Cost avoidance of failed migrations</td>
</tr>
<tr>
<td>$2,865,838</td>
</tr>
</tbody>
</table>
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 Framework And Methodology

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ (TEI) framework for those organizations considering implementing IBM Services.

The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the impact that IBM Services application migration and modernization to a hybrid multicloud environment can have on an organization:

**DUE DILIGENCE**
Interviewed IBM Services stakeholders and Forrester analysts to gather data relative to application migration and modernization to a multicloud environment.

**CUSTOMER INTERVIEWS**
Interviewed and surveyed 32 organizations using application migration and modernization to a hybrid multicloud environment to obtain data with respect to costs, benefits, and risks.

**COMPOSITE ORGANIZATION**
Designed a composite organization based on characteristics of the interviewed organizations.

**FINANCIAL MODEL FRAMEWORK**
Constructed a financial model representative of the interviews using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewed organizations.

**CASE STUDY**
Employed four fundamental elements of TEI in modeling IBM Services for application migration and modernization to a multicloud environment's impact: benefits, costs, flexibility, and risks. Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester’s TEI methodology serves to provide a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by IBM Services 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 Services.

IBM Services 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 Services provided the customer names for the interviews but did not participate in the interviews.
The Application Migration And Modernization To A Multicloud Environment Customer Journey

Interviewed Organizations

For this study, Forrester interviewed and surveyed 32 existing customers leveraging IBM Services application migration and modernization to a hybrid multicloud environment. Interviewed customers include the following:

Key Challenges

In large part, respondents saw the need to move to a hybrid multicloud environment was driven by the need to drive operational efficiency within the organization, while providing more flexibility to scale their key applications. However, the decision to have IBM Services drive the project came down to the need to overcome several key challenges:

› The need to ensure successful migration and modernization of a core enterprise application. In many cases, organizations saw the opportunity for a cloud-first strategy, but they were concerned with how to successfully integrate their primary application to a flexible, cloud-based environment.

› The need to use experienced resources around application migration and modernization. As part of the effort to move projects to the cloud, many organizations were concerned that their internal staff did not have the experience or skills for a successful transformation.

Solution Requirements

The interviewed organizations searched for a solution that could:
› Ensure the smooth delivery of an application migration and modernization project.
› Reduce the risk associated with application migration and modernization.
› Allow the organization to have the skills and expertise to minimize the impact of the business.

The following chart highlights the specific reasons why organizations chose IBM Services:

“What made you consider leveraging IBM to help in the migration and modernization of your application to the cloud?”

(Select all that apply.)

- We have an existing relationship with IBM: 70%
- We believe that IBM was best suited to minimize the risk associated with the migration: 61%
- We value their expertise in a hybrid, multivendor cloud application environment: 60%
- We value their worldwide services expertise: 59%
- IBM offered the most competitive bid to perform the migration: 30%
- None of the above/Don’t know: 0%

Base: 30 global IS/IT services customers
Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, April 2019

Key Results

The interviews revealed that key results from the application migration and modernization to a hybrid multicloud environment investment include:

› Reduced the risk associated with the migration and modernization of an enterprise application.
› Improved the time-to-value, resulting from moving an application to a flexible, cloud-based environment.
› Better predict the costs and demands associated with a migration.

“We found it to be much more important to have a vendor who understands our landscape, understands our domain, and understands our business.”

EA, financial services

“So, total cost of ownership certainly is a driver there, however, the ability to me of changing market conditions is certainly another part of that. Understanding our client and the changing market is certainly the key component to that.”

EA, financial services
Composite Organization

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 is representative of the 32 companies that Forrester interviewed and is used to present the aggregate financial analysis in the next section. The composite organization that Forrester synthesized from the customer interviews has the following characteristics:

**Organization description.** The representative organization is a global F1000 financial services organization with roughly $2B in revenue. The organization has a distributed IT organization with a mixture of custom line-of-business (LOB) applications and large, enterprisewide systems. The organization uses an overall cloud-first strategy for its software environment to improve flexibility and scalability while keeping costs under control as it grows into new markets.

**Deployment characteristics.** The organization originally identified a custom core application that needed to be migrated and modernized to a newly distributed cloud-based environment. The IT organization originally intended to use internal staff to perform the bulk of the migration and modernization. However, due to the complexity of the migration, the organization decided to leverage IBM Services.

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“**My margin for error is a zero. So, the risk is around the confidence of being able to understand the workload and the domains and to move them to a target-state environment where down the road and subsequently to the move, we can refactor, optimize, and further expand on a microservice architecture.”**

EA, financial services

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**Key assumptions:**
- Global F1000
- 2B in revenue
- Over 400 LOB applications
Analysis Of Benefits

QUANTIFIED BENEFIT DATA AS APPLIED TO THE COMPOSITE

Total Benefits

<table>
<thead>
<tr>
<th>REF.</th>
<th>BENEFIT</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
<th>TOTAL</th>
<th>PRESENT VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atr</td>
<td>Reduced cost of migration and modernization</td>
<td>$0</td>
<td>$1,096,200</td>
<td>$1,096,200</td>
<td>$2,192,400</td>
<td>$1,729,542</td>
</tr>
<tr>
<td>Btr</td>
<td>Cost avoidance of failed migrations</td>
<td>$1,152,396</td>
<td>$1,152,396</td>
<td>$1,152,396</td>
<td>$3,457,188</td>
<td>$2,865,838</td>
</tr>
<tr>
<td>Ctr</td>
<td>Improved speed of migration</td>
<td>$227,664</td>
<td>$227,664</td>
<td>$227,664</td>
<td>$682,992</td>
<td>$566,167</td>
</tr>
<tr>
<td>Dtr</td>
<td>Reduced risk of disruption and availability of applications</td>
<td>$474,414</td>
<td>$0</td>
<td>$0</td>
<td>$474,414</td>
<td>$431,286</td>
</tr>
<tr>
<td>Etr</td>
<td>Reduced risk of compliance fines and penalties</td>
<td>$292,321</td>
<td>$292,321</td>
<td>$292,321</td>
<td>$876,964</td>
<td>$726,960</td>
</tr>
<tr>
<td></td>
<td>Total benefits (risk-adjusted)</td>
<td>$2,146,796</td>
<td>$2,768,581</td>
<td>$2,768,581</td>
<td>$7,683,959</td>
<td>$6,319,793</td>
</tr>
</tbody>
</table>

“Which of the following benefits have you experienced because of your investment in IBM compared with other alternatives associated with the migration of the application to a hybrid multivendor cloud environment?”

(Select all that apply.)

- Improved ability to create innovation: 63%
- Reduced risk of disruption and availability of applications: 80%
- Improved speed of migration: 60%
- Reduced risk of compliance fines and penalties: 47%
- Reduced risk of failed migrations: 47%
- Reduced cost of migration and modernization: 43%
- Reduced number of FTEs required for ongoing support of applications: 37%
- Reduced risk of future platform incompatibility: 27%
- None of the above/Don’t know: 0%

Base: 30 global IBM GSS customers
Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, April 2019

Benefit 1: Reduced Cost Of Migration And Modernization

One of the primary benefits noted by IBM Services customers is around driving the overall cost efficiency of the migration and modernization process:

The table above shows the total of all benefits across the areas listed below, 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 $6.3 million.
Maintaining or improving cost efficiency was an important driver as organizations migrated and modernized their applications to the cloud. In addition, organizations that chose IBM Services were looking for a partner that would drive cost efficiency as part of the overall project. Many of the contacted organizations saw that the decision to move to IBM Services reduced the risk of cost overruns, as compared to relying primarily on internal staff to migrate and modernize the application. While the decision to move to IBM Services did result in an upfront initial cost, over 43% of organizations noted an overall reduction in cost compared to an internal led project.

In order to calculate the impact of reduced costs associated with migration and modernization, Forrester compiled data across the interviewed and surveyed organizations. Of those that noted that they saw a reduction in costs, we calculated an average cost reduction based on the range of reported cost savings. The overall estimated reduction in cost equated to 34%.

To calculate the benefit, Forrester assumed that the total cost of the migration and modernization initiative with IBM Services equated to 4 million in Year 1 and 3.5 million in Years 2 and 3. Comparing that with an internally staffed project, the cost would be roughly 34% higher in Years 2 and 3 of the analysis or 1.2 million per year.

### Reduced Cost Of Migration And Modernization: Calculation Table

<table>
<thead>
<tr>
<th>REF.</th>
<th>METRIC</th>
<th>CALC.</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Total initiative cost – alternative</td>
<td>$4,000,000</td>
<td>$4,718,000</td>
<td>$4,718,000</td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td>Total initiative cost – IBM Services</td>
<td>$4,000,000</td>
<td>$3,500,000</td>
<td>$3,500,000</td>
<td></td>
</tr>
<tr>
<td>A3</td>
<td>Reduced cost of migration and modernization</td>
<td>A1-A2</td>
<td>$0</td>
<td>$1,218,000</td>
<td>$1,218,000</td>
</tr>
<tr>
<td></td>
<td>Risk adjustment</td>
<td>↓10%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atr</td>
<td>Reduced cost of migration and modernization (risk-adjusted)</td>
<td></td>
<td>$1,096,200</td>
<td>$1,096,200</td>
<td></td>
</tr>
</tbody>
</table>
Benefit 2: Cost Avoidance Of Failed Migration

Another key benefit mentioned by the interviewed organizations for the investment was the potential reduction in risk from a failed migration to a hybrid multicloud environment. Several organizations note that the shift to IBM Services made it possible to rely on the expertise of external experienced resources who can anticipate the complexity of moving an application to a hybrid multicloud environment.

In order to calculate the impact of reduced costs associated with migration and modernization, Forrester compiled data across the interviewed and surveyed organizations. Of those that noted that they saw a reduction in cost avoidance, we calculated an average cost reduction based on the range of reported cost savings. The overall estimated reduction in cost equated to 40%.

"You noted ‘Reduced risk of failed migrations’ as a benefit of your investment in IBM. Using your best estimate, what is the percentage reduction in risk associated with using IBM to support the migration of your applications?"

<table>
<thead>
<tr>
<th>Reduction Percentage</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>91% to 99% reduction</td>
<td>7%</td>
</tr>
<tr>
<td>100%/Completely reduced</td>
<td>0%</td>
</tr>
<tr>
<td>81% to 90% reduction</td>
<td>7%</td>
</tr>
<tr>
<td>71% to 80% reduction</td>
<td>7%</td>
</tr>
<tr>
<td>61% to 70% reduction</td>
<td>7%</td>
</tr>
<tr>
<td>51% to 60% reduction</td>
<td>11%</td>
</tr>
<tr>
<td>41% to 50% reduction</td>
<td>14%</td>
</tr>
<tr>
<td>31% to 40% reduction</td>
<td>14%</td>
</tr>
<tr>
<td>21% to 30% reduction</td>
<td>14%</td>
</tr>
<tr>
<td>11% to 20% reduction</td>
<td>14%</td>
</tr>
<tr>
<td>5% to 10% reduction</td>
<td>14%</td>
</tr>
<tr>
<td>Less than 5% reduction</td>
<td>0%</td>
</tr>
<tr>
<td>No change</td>
<td>0%</td>
</tr>
</tbody>
</table>

Average: 40.35% reduction

Base: 14 global IBM GSS customers
Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, April 2019

To calculate this benefit, Forrester assumes that the migration and modernization effort of the targeted application is part of a much larger cloud infrastructure transformation project incurring a cost of 12 million per year, where 28% of the cost is devoted to testing and migration. Assuming a 40% reduction in cost, we can calculate the potential impact from a reduction in failed migration of roughly $1.35 million per year.
Benefit 3: Improved Speed Of Migration

Another benefit noted by the contacted organizations was the ability of IBM Services to improve the speed associated with the migration. Several organizations noted that IBM Services provided the expertise to ensure that the migration and modernization effort was completed on time, reducing the risk of project delay and business impact.

In order to calculate the impact of improved speed associated with migration and modernization, Forrester compiled data across the interviewed and surveyed organizations. Of those that noted the improvement in speed, we calculated an average cost reduction based on the range of reported cost savings. The overall estimated improvement in speed equated to 46%.

Cost Avoidance Of Failed Migration: Calculation Table

<table>
<thead>
<tr>
<th>REF.</th>
<th>METRIC</th>
<th>CALC.</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>% of project cost associated with application testing and migration</td>
<td>28%</td>
<td>28%</td>
<td>28%</td>
<td></td>
</tr>
<tr>
<td>B2</td>
<td>Total project cost</td>
<td>$12,000,000</td>
<td>$12,000,000</td>
<td>$12,000,000</td>
<td></td>
</tr>
<tr>
<td>B3</td>
<td>% reduction in cost through IBM Services</td>
<td>40.35%</td>
<td>40.35%</td>
<td>40.35%</td>
<td></td>
</tr>
<tr>
<td>Bt</td>
<td>Cost avoidance of failed migration</td>
<td>B1<em>B2</em>B3</td>
<td>$1,355,760</td>
<td>$1,355,760</td>
<td>$1,355,760</td>
</tr>
<tr>
<td>Btr</td>
<td>Risk adjustment</td>
<td>↓15%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cost avoidance of failed migration (risk-adjusted) | $1,152,396 | $1,152,396 | $1,152,396 |

$556 thousand three-year benefit PV

“You noted ‘Improved speed of migration’ as a benefit of your investment in IBM for application migration to a hybrid multivendor cloud environment. Using your best estimate, what is the percent improvement in speed associated with the migration of the targeted applications?”

Average 46.5% reduction

Base: 18 global IBM GBS customers

Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, April 2019
To calculate this benefit, Forrester assumes a 40% expected return on the overall project to the organization. With IBM Services, the organization can improve the time it takes to receive the return based on a 12% cost of capital. Assuming a 46.5% improvement in speed, we can calculate the potential impact from a reduction in failed migrations of roughly $267K per year.

**Improved Speed Of Migration: Calculation Table**

<table>
<thead>
<tr>
<th>REF.</th>
<th>METRIC</th>
<th>CALC.</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Total project cost</td>
<td>12,000,000</td>
<td>12,000,000</td>
<td>12,000,000</td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>Average project return</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>C3</td>
<td>Cost of capital</td>
<td>12%</td>
<td>12%</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>C4</td>
<td>Improvement in speed</td>
<td>46.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ct</td>
<td>Improved speed of migration</td>
<td>C1<em>C2</em>C3*C4</td>
<td>$267,840</td>
<td>$267,840</td>
<td>$267,840</td>
</tr>
<tr>
<td>Ctr</td>
<td>Improved speed of migration (risk-adjusted)</td>
<td>$227,664</td>
<td>$227,664</td>
<td>$227,664</td>
<td></td>
</tr>
</tbody>
</table>

Benefit 4: Reduced Risk Of Disruption And Availability Of Applications

Another benefit noted by the contacted organizations was the ability of IBM Services to reduce the risk of disruption and availability of applications. Several organizations noted IBM Services provided the ability to ensure as part of the migration and modernization process that the impact of adjacent applications were minimized, reducing the likelihood of system downtime.

In order to calculate the impact of reduced risk, Forrester compiled data across the interviewed and surveyed organizations. Of those that noted a reduced risk of disruption and availability, we calculated an average impact of reduced risk. The overall estimated improvement in availability equated to 44%. 
To calculate this benefit, Forrester assumes a baseline three 9s impact on platform availability with an hourly impact of $123K.

Assuming a 44% improvement in availability, we can calculate the potential impact from improved availability of roughly $474K in Year 1 of analysis.

### Reduced Risk Of Disruption And Availability Of Applications

<table>
<thead>
<tr>
<th>REF.</th>
<th>METRIC</th>
<th>CALC.</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>Current availability</td>
<td></td>
<td>99.90%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D2</td>
<td>Hourly downtime impact</td>
<td></td>
<td>$123,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D3</td>
<td>Estimated improvement</td>
<td></td>
<td>44.03%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dt</td>
<td>Reduced risk of disruption and availability of applications</td>
<td>(24<em>365)</em>(1-D1)<em>D2</em>D3</td>
<td>$474,414</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dtr</td>
<td>Reduced risk of disruption and availability of applications (risk-adjusted)</td>
<td></td>
<td>$474,414</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Benefit 5: Reduced Risk Of Compliance Fines And Penalties**

Another benefit noted by the contacted organizations was the ability of IBM Services to reduce the risk of compliance fines and penalties due to delays and mixed success from a migration and modernization effort. Many of the organizations contacted are in regulated industries such as financial services and healthcare, which have to adhere to regulatory requirements around application availability and client and customer data. A delay in the migration and modernization effort or a risk of incompatibility.

In order to calculate the impact of reduced risk, Forrester compiled data across the interviewed and surveyed organizations. Of those that noted a reduced risk of disruption and availability, we calculated an average impact of reduced risk. The overall estimated improvement in speed...
equated to $292,321.

“You noted ‘Reduced risk of compliance fines and penalties’ as a benefit of your investment in IBM. Using your best estimate, how much do you believe the potential exposure from fines and penalties if the migration was not undertaken by IBM?”

<table>
<thead>
<tr>
<th>REF.</th>
<th>METRIC</th>
<th>CALC.</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>Total estimated fines</td>
<td></td>
<td>$292,321</td>
<td>$292,321</td>
<td>$292,321</td>
</tr>
<tr>
<td>E(r)</td>
<td>Reduced risk of compliance fines and penalties</td>
<td>$292,321</td>
<td>$292,321</td>
<td>$292,321</td>
<td></td>
</tr>
<tr>
<td>Risk adjustment</td>
<td></td>
<td>0%</td>
<td>$292,321</td>
<td>$292,321</td>
<td>$292,321</td>
</tr>
</tbody>
</table>

Flexible

The value of flexibility is clearly unique to each customer, and the measure of its value varies from organization to organization. There are multiple scenarios in which a customer might choose to implement Application Migration and Modernization to a hybrid multicloud environment and later realize additional uses and business opportunities, including:

- The ability to scale other applications to a hybrid cloud application.
- The ability to improve the integration of other applications to the cloud.

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

QUANTIFIED COST DATA AS APPLIED TO THE COMPOSITE

Total Costs

<table>
<thead>
<tr>
<th>REF.</th>
<th>COST</th>
<th>INITIAL</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
<th>TOTAL</th>
<th>PRESENT VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dtr</td>
<td>IBM Services cost</td>
<td>$0</td>
<td>$1,100,000</td>
<td>$1,100,000</td>
<td>$1,100,000</td>
<td>$3,300,000</td>
<td>$2,735,537</td>
</tr>
<tr>
<td>Etr</td>
<td>Ongoing administration</td>
<td>$0</td>
<td>$32,921</td>
<td>$32,921</td>
<td>$32,921</td>
<td>$98,762</td>
<td>$81,869</td>
</tr>
<tr>
<td>Ftr</td>
<td>Total costs (risk-adjusted)</td>
<td>$0</td>
<td>$1,132,921</td>
<td>$1,132,921</td>
<td>$1,132,921</td>
<td>$3,398,762</td>
<td>$2,817,406</td>
</tr>
</tbody>
</table>

Cost Of Investment

Forrester identified two costs associated with the investment in IBM Services, those being the cost of IBM Services as well as the cost of management of the IBM Services solution.
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. Forrester assumes a yearly discount rate of 10% for this analysis.

These risk-adjusted ROI, NPV, and payback period values are determined by applying risk-adjustment factors to the unadjusted results in each Benefit and Cost section.

<table>
<thead>
<tr>
<th>Initial</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Total</th>
<th>Present Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total costs</td>
<td>$0</td>
<td>($1,132,921)</td>
<td>($1,132,921)</td>
<td>($1,132,921)</td>
<td>($3,398,762)</td>
</tr>
<tr>
<td>Total benefits</td>
<td>$0</td>
<td>$2,146,796</td>
<td>$2,768,581</td>
<td>$2,768,581</td>
<td>$7,683,959</td>
</tr>
<tr>
<td>Net benefits</td>
<td>$0</td>
<td>$1,013,875</td>
<td>$1,635,661</td>
<td>$1,635,661</td>
<td>$4,285,196</td>
</tr>
<tr>
<td>ROI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>128%</td>
</tr>
<tr>
<td>Payback period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17 months</td>
</tr>
</tbody>
</table>
IBM Services Application Migration And Modernization To A Multicloud Environment: Overview

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

IBM Services is helping clients move and modernize their existing workloads and applications to the right hybrid multicloud environment. IBM uses technologies, such as containers and Kubernetes, to provide flexibility and openness, and has set of practices and partnerships built around hybrid multicloud capabilities.

Leading organizations across industries and around the globe are migrating and modernizing their application environments using IBM Services and solutions. As a result, they are realizing hidden business potential, enhancing customer experiences, and accelerating development and delivery.

IBM’s global team of experts deliver application migration and modernization services using the IBM Garage Method for Cloud and tooling. The methodology is industry-recognized and holistic – supporting strategy, migration, modernization, application development and management. The result is a method that is proven, aligned with industry best practices, and scalable to any size engagement.

www.ibm.com/services/cloud
Appendix A: Total Economic Impact

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.

Total Economic Impact Approach

**Benefits** represent the value delivered to the business by the product. The TEI methodology places 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.

**Costs** consider all expenses necessary to deliver the proposed value, or benefits, of the product. The cost category within TEI captures incremental costs over the existing environment for ongoing costs associated with the solution.

**Flexibility** represents the strategic value that can be obtained for some future additional investment building on top of the initial investment already made. Having the ability to capture that benefit has a PV that can be estimated.

**Risks** measure the uncertainty of benefit and cost estimates given: 1) the likelihood that estimates will meet original projections and 2) the likelihood that estimates will be tracked over time. TEI risk factors are based on “triangular distribution.”

The initial investment column contains costs incurred at “time 0” or at the beginning of Year 1 that are not discounted. All other cash flows are discounted using the discount rate at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations in 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.

**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.

**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.

**Return on investment (ROI)**

A project’s expected return in percentage terms. ROI is calculated by dividing net benefits (benefits less costs) by costs.

**Discount rate**

The interest rate used in cash flow analysis to take into account the time value of money. Organizations typically use discount rates between 8% and 16%.

**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.