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The Total Economic Impact of SQL Backup™ from Red Gate Software

Single Company Analysis – Insurance

Project Director: Paul Devine

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Executive Summary

In July 2007, Red Gate Software commissioned Forrester Consulting to examine the total economic impact (TEI) and potential Return on Investment (ROI) enterprises may realize by deploying SQL Backup from Red Gate Software. SQL Backup is a backup and restore tool for Microsoft SQL Server databases, offering advanced features such as compression, encryption, ease-of-use, and high performance. This study illustrates the financial impact of adopting SQL Backup in a typical SQL Server environment.

In conducting in-depth interviews with one existing customer of SQL Backup Pro, Forrester found that the company achieved:

1. **Improved application performance:** In a native SQL Server backup environment, business application performance was reduced whilst backups were running. The adoption of SQL Backup reduced the time to complete a backup and, therefore, increased application performance since the backup process was no longer interfering with the application. This benefit is quantified as increased employee productivity.
2. **Increased Database Administrator productivity:** The reference company's database administrators (DBAs) spent less time carrying out backups and recovering databases. This benefit was quantified as the reduction in Database Administrator time spent recovering databases and resolving backup issues.
3. **Reduced storage hardware costs:** The reference organization reduced expenditure on disk and tape storage because of SQL Backup's compression capability.

Purpose

The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of SQL Backup on their organizations. 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 Red Gate Software/SQL Backup.

Methodology

Red Gate Software selected Forrester for this project because of its industry expertise in database management software 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 SQL Backup:

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 A for additional information on the TEI methodology.

Approach

Forrester used a four-step approach for this study:

1. Forrester gathered data from existing Forrester research relative to SQL Backup and the database management software market in general.
2. Forrester interviewed the SQL Backup marketing and sales personnel at Red Gate Software to fully understand the potential (or intended) value proposition of the solution SQL Backup provides.
3. Forrester conducted a series of in-depth interviews with one organization currently using SQL Backup.
4. Forrester constructed a financial model representative of the interviews. This model can be found in the TEI Framework section below.

Key Findings

Forrester's study yielded three key findings:

- **ROI.** Based on the interview, Forrester constructed a TEI framework, and the associated ROI analysis illustrating the financial impact areas. As seen in Table 1, the ROI for our reference company is 96% with a breakeven point (payback period) of 13 months after deployment.
- **Benefits.** The reference organization increased application performance, improved Database Administrator productivity, and reduced hardware costs.
- **Costs.** The primary cost for SQL Backup is the initial licensing cost. Other costs include maintenance support and upgrade costs, which are typical costs applicable to any enterprise software.

Table 1 illustrates the risk-adjusted cash flow for the reference 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: Reference Company ROI, Risk-Adjusted

Ref.	Total benefits	Calculation	Year 1	Year 2	Year 3	Total	NPV
R1	Total costs		\$90,417	\$18,083	\$18,083	\$126,583	\$110,728
R2	Total benefits		\$87,189	\$87,189	\$87,189	\$261,567	\$216,826
R3	Net benefit	R2 - R1	(\$3,228)	\$ 69,106	\$69,106	\$134,983	\$106,098
R4	Return on Investment	R3 / R1					96%
R5	Payback period						13 months

Source: Forrester Research, Inc.

Disclosures

The reader should be aware of the following:

- The study is commissioned by Red Gate Software and delivered by the Forrester Consulting group.
- Red Gate Software reviewed and provided feedback to Forrester, but Forrester retains 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.
- The customer name for the interview was provided by Red Gate Software.
- Forrester makes no assumptions as to the potential Return on Investment that other organizations will receive. Forrester strongly advises that readers should use their own estimates within the framework provided in the report to determine the appropriateness of an investment in Red Gate Software/SQL Backup.
- This study is not meant to be used as a competitive product analysis.

SQL Backup from Red Gate Software: Overview

According to Red Gate, SQL Backup includes a range of features to make backups faster, smaller, and secure:

- Up to 10 times faster for backups than native SQL Server. In tests on a 306 GB SQL Server database, SQL Backup took 2 hours 53 minutes to restore the database, compared with 28 hours 3 minutes for native backup.
- Three high-performance compression levels to compress backups by up to 95%. A Compression Analyzer is also available in the Back Up wizard to enable you to select the optimal compression level for individual backups.
- 256-bit AES encryption to secure backups against attack and unauthorized access.
- Timeline Monitoring, an interactive monitoring facility from the GUI that enables you to keep careful track of past, present and future backup activities on all registered servers.
- An intuitive GUI with interactive hints for on-the-spot assistance.
- Multiple threads within SQL Backup's engine to optimize backup processes.
- Support for clusters, and a cluster-aware mechanism for fast and easy installation.
- Support for enterprise-wide reporting.
- A Log Shipping wizard with straightforward set-up in just six steps.
- Support for 64-bit versions of SQL Server.

More information on SQL Backup and Red Gate Software can be found at:

<http://www.red-gate.com/backup>

Analysis

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

- Interviews with Red Gate Software marketing and product development personnel.
- An in-depth interview with one organization currently using SQL Backup.
- Construction of a common financial framework for the implementation of SQL Backup.
- Construction of a reference organization based on the characteristics of the interviewed organization.

Interview Highlights

One interview was conducted for this study. The organization is a UK-based insurance provider with more than 10,000 employees worldwide. Their primary DBMS platform is SQL Server, but also supports DB2, Oracle, and Progress databases. The database administration team comprises of 16 DBAs who manage databases in test, production, and development platforms. The organization supports more than 1,200 SQL Server test, development, and production databases.

The in-depth interviews uncovered that moving from native SQL Server backups to backups created with SQL Backup provided the following benefits:

- **Improvement in application performance:** The main driver for application performance according to the customer was that backups became faster. The reduced time to backup databases allowed critical applications to function with minimal impact on performance. For one critical application the backup used to take 12 hours with native SQL Server. This resulted in reduced application performance during each morning whilst the backup was running. The duration of each backup was reduced to three hours after SQL Backup was deployed.
- **Improvement in Database Administrator productivity:** The reference organization's DBAs spent more than 24 hours of Database Administrator time every month on recovering databases in the native SQL Server backup environment. This was reduced by 75% using SQL Backup. Also, the customer previously spent four hours correcting backup failures per month, which was reduced by 80% using SQL Backup. Restoration of backups was also faster because of the 80% compression ratio achieved with SQL Backup.
- **Storage Hardware Savings:** The reference organization achieved 80% compression on its backups. This resulted in significant savings for disk and tape storage.

The reference organization created from the customer interview represents a UK-based global insurance organization with more than 10,000 employees. The organization provides general automobile, individual, home and commercial insurance in more than 25 countries worldwide.

The following describes the reference organization's environment:

- The organization has made a significant commitment to Microsoft SQL Server to support the majority of their business applications. The reference organization has 16 DBAs and more than 1,200 SQL Server databases, which include test, development, and production.
- SQL Server is used for all home-grown applications, while other DBMSes such as DB2, Oracle, and Progress are supported for third-party applications. The SQL Server databases were largely run on HP servers, including 64-bit operating systems.
- The organization was taking full backups everyday of more than 700 databases, which were first backed up to disk, before moving them to a tape library. One of the issues the organization was dealing with was backup failures, often caused by lack of disk storage. However, with SQL Backup's compression feature, the backup failures were reduced considerably.
- On average, the organization recovered one database every week to meet business requirements.

TEI Framework

Introduction

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

Reference Organization

Based on the interview with the existing customer provided by Red Gate Software, Forrester constructed a TEI framework and an associated ROI analysis that illustrates the areas impacted financially. The reference organization that Forrester synthesized from these results represents a UK-based insurance company with more than 10,000 employees.

Framework Assumptions

Table 2 lists the discount rate used in the PV and NPV calculations and time horizon used for the financial modeling.

Table 2: General Assumptions

Ref.	General assumptions	Value
A1	Discount rate	10%
A2	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 departments to determine the most appropriate discount rate to use within their own organizations.

In addition to the financial assumptions used to construct the cash flow analysis, Table 3 provides salary assumptions used within this analysis. Fully burdened annual salary includes employee benefits and office-related overheads.

Table 3: Salary Assumptions

Ref.	Metric	Calculation	Value
B1	Hours per week		40
B2	Weeks per year		52
B3	Hours per year (M-F, 9-5)		1760
B4	Database Administrator fully burdened annual salary		\$135,000
B5	Hourly	(B4/B3)	\$77
B6	Business Employee fully burdened annual salary		\$135,000
B7	Hourly	(B6/B3)	\$77

Source: Forrester Research, Inc.

Costs

Costs reflect the overall expenses of licensing SQL Backup, including maintenance support and upgrade costs paid annually.

Software Costs

This is the cost associated with acquiring SQL Backup. The software can be installed off-the-shelf and customized to meet business requirements, such as frequency of backups, type of backups (full or incremental), and schedule. It also includes features to enable compression and encryption. All of the features are part of SQL Backup. Table 4 shows the costs of SQL Backup.

Table 4: Cost of SQL Backup, Non-Risk-Adjusted

Ref.	Metric	Value
C1	Cost of SQL Backup	\$70,000

Source: Forrester Research, Inc.

Maintenance Support and Upgrade Costs

Table 5 illustrates the maintenance support and upgrade costs for SQL Backup.

Table 5: Cost of Maintenance Support and Upgrades, Non-Risk-Adjusted

Ref.	Metric	Year 1	Year 2	Year 3
D1	Cost of Maintenance Support and Upgrades	\$17,500	\$17,500	\$17,500

Source: Forrester Research, Inc.

Total Costs

The total cost of acquiring SQL Backup for the reference organization is illustrated in Table 6. This includes the cost of the software and maintenance and upgrade costs. For purposes of this analysis, we have not included risk-adjusted costs; however, organizations with volatile IT or business environments may wish to consider a range of possible outcomes in the cost category to account for rapid changes in day-to-day activities that often occur in companies undergoing significant change.

Table 6: Total Costs, Non-Risk-Adjusted

Ref.	Project costs	Calculation	Year 1	Year 2	Year 3	Total	PV
C1	Cost of SQL Backup		\$70,000			\$70,000	\$63,636
D1	Cost of Maintenance Support and Upgrades		\$17,500	\$17,500	\$17,500	\$52,500	\$31,322
E1	Total costs	(C1 + D1)	\$87,500	\$17,500	\$17,500	\$122,500	\$94,959

Source: Forrester Research, Inc.

Benefits

The second component of this analysis looks at the potential benefits associated with purchasing SQL Backup. The reference organization attributed quantifiable benefits to the value that was obtained when they moved from using native SQL Server to using SQL Backup for creating backups. The benefits of this transition were noted in our interview to be in the form of: improved application performance, increased productivity, and reduced storage hardware costs.

Improved Application Performance

The reference organization identified reduced business application performance whilst backups were running in a native SQL Server backup environment. One critical application took twelve hours to back up with native SQL Server. This resulted in reduced application performance for two hours each morning. The adoption of SQL Backup reduced the time to complete the backup to three hours and, therefore, increased application performance since the backup process was no longer interfering with the application. Business employees were able to use the application, without any degradation in performance, and work more productively.

The benefit was quantified by identifying: 1) hours per day that business applications are impacted by backups; 2) number of concurrent users of the business applications; and 3) productivity loss due to backups. Table 7 illustrates the impact on application performance, and the calculation used to derive the benefit.

Table 7: Improved Application Performance – Increased Business Employee Productivity, Non-Risk-Adjusted

Ref.	Metric	Calculation	Value
F1	Number of hours per day when performance of business applications is reduced because of backups in native SQL Server backup environment		2 hours
F2	Number of concurrent business users impacted by reduced performance of business application		8 concurrent users
F3	Reduction in employee productivity resulting from reduced application performance		20%
B7	Business employee fully burdened hourly salary		\$77
F4	Number of business days per year		220 days
F5	Annual value of increased productivity because of improved application performance	(F1*F2*F3*B7*F4)	\$54,208

Source: Forrester Research, Inc.

Increased Database Administrator Productivity

The reference organization identified Database Administrator productivity benefits from using SQL Backup.

The benefit was quantified by identifying: 1) the number of backup failures requiring corrective action; 2) hours of manual intervention requiring Database Administrator time in a native SQL Server environment (most of the issues were related to disk storage, but some involved regular administration activities); and 3) reduction in Database Administrator efforts after deploying SQL Backup.

Table 8 shows the improvement in Database Administrator productivity resulting from a reduction in time spent correcting backup failures for the reference organization.

Table 8: Increased Database Administrator Productivity – Reduction in Backup Failures, Non-Risk-Adjusted

Ref.	Metric	Calculation	Value
G1	Number of backup failures per month requiring corrective action in native SQL Server environment		4 backup errors per month requiring corrective action
G2	Database Administrator time required to complete corrective action		2 hours
G3	Reduction in number of backup failures due to implementation of SQL Backup		80%
G4	Reduction in Database Administrator time spent on correcting backup failures per month	$(G1 * G2 * G3)$	38.4 hours
B5	Database Administrator fully burdened hourly salary		\$77
G5	Percentage of time saved that is used productively		75%
G6	Annual reduction in cost of correcting backup failures	$(G4 * B5 * G5)$	\$2,218

Source: Forrester Research, Inc.

In addition to reducing backup failures, the reference organization was able to reduce the time taken to recover databases. The 80% compression ratio achieved with SQL Backup reduced backup size by 80% and reduced the time to recover the databases. The subsequent improvement in Database Administrator productivity is quantified by identifying the time DBAs were taking to recover databases before and after deploying SQL Backup.

Table 9 looks at the improvement in Database Administrator productivity resulting from a reduction in time spent recovering databases for the reference organization.

Table 9: Improved Database Administrator Productivity – Reduced Time to Recover Database, Non-Risk-Adjusted

Ref.	Metric	Calculation	Value
H1	Number of database recoveries required per month		4 per month
H2	Database Administrator time required to recover a database in native SQL Server backup environment		7.5 hours
H3	Percentage reduction in Database Administrator time required to recover a database using SQL Backup		80%
H4	Database Administrator time required to recover a database using SQL Backup		1.5 hours
H5	Annual reduction in Database Administrator time spent recovering databases	$(H4-H2)*H1*12$	252 hours per year
H6	Percentage of time saved that is used productively		75%
B5	Database Administrator fully burdened hourly salary		\$77
H7	Annual reduction in cost of recovering databases	$(H5*H6*B5)$	\$14,533

Source: Forrester Research, Inc.

Storage Hardware Savings

The reference organization reduced backup size by 80% through SQL Backup's compression capabilities and achieved significant hardware savings as a result.

The level of storage hardware savings is a function of the number of backups completed daily, the size of the backups, compression ratios, and the cost of disk and tape storage.

The reduced hardware cost on the reference organization is shown in Table 10 for the reduction of disk storage.

Table 10: Reduced Storage Hardware Costs – Disk Storage, Non-Risk-Adjusted

Ref.	Metric	Calculation	Value
I1	Number of databases being backed up daily (full backup)		700 databases
I2	Average size of backup		4,000 MB
I3	Total database backup size	(I1*I2*1024)	2,867,200 MB
I4	Percentage reduction in disk space resulting from the use of SQL Backup		80%
I5	Average cost per MB for mid range enterprise storage		0.01 per MB
I6	Disk storage savings resulting from the use of SQL Backup	(I3*I4*I5)	\$22,938

Source: Forrester Research, Inc.

The reduced hardware cost for the reduction in tape backups is shown in Table 11.

Table 11: Reduced Storage Hardware Costs – Backup Tapes, Non-Risk-Adjusted

Ref.	Metric	Calculation	Value
I3	Total database backup size		2,867,200 MB
J2	Number of days backup tapes are retained		30 days
J3	Storage space per backup tape		200,000 MB
J4	Utilization level per tape		75%
J5	Number of tapes required per backup		19 tapes
J6	Number of tapes required for 30 days		573 tapes
I4	Storage saving resulting from the use of SQL Backup		80%
J7	Reduction in number of tapes		459 tapes
J8	Average cost per tape		\$40
J9	Tape storage savings resulting from the use of SQL Backup		\$18,350

Source: Forrester Research, Inc.

Total Benefits

The reference organization identified improved application performance, increased administrator productivity and reduced storage hardware costs as the most important benefits achieved from the deployment of SQL Backup. The summary of benefits is shown in Table 12.

Table 12: Total Benefits, Non-Risk-Adjusted

Ref.	Project benefits	Calculation	Year 1	Year 2	Year 3	Total	PV
F5	Improved Application Performance		\$54,208	\$54,208	\$54,208	\$ 162,264	\$ 134,807
H7	Increased Database Administrator Productivity	(G6+H7)	\$16,771	\$16,771	\$16,771	\$50,312	\$41,706
K1	Reduced Hardware Costs	(I6+J9)	\$41,288	\$41,288	\$41,288	\$123,863	\$102,676
K2	Total Benefits	(F5+H7+K1)	\$112,266	\$112,266	\$112,266	\$336,799	\$279,190

Source: Forrester Research, Inc.

Risk

Risk is the third component within the TEI model; it is used as a filter to capture the uncertainty surrounding different cost and benefit estimates. If a risk-adjusted ROI still demonstrates a compelling business case, it raises confidence that the investment is likely to succeed because the risks that threaten the project have been taken into consideration and quantified. The risk-adjusted numbers should be taken as “realistic” expectations, since they represent the expected values considering risk. In general, risks affect costs by raising the original estimates, and they affect benefits by reducing the original estimates.

For the purpose of this analysis, Forrester risk-adjusts cost and benefit estimates to better reflect the level of uncertainty that exists for each estimate. 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.

For example, take the case of SQL Backup's prices. The \$70,000 value used in this analysis can be considered the “most likely” or expected value. Third-party backup software prices vary based on the number of servers. This variability represents a risk that must be captured as part of this study. Forrester uses a risk factor of 110% on the high end, 100% as the most likely, and 100% on the low end. This has the effect of increasing the cost estimate to take into account the fact that original cost estimates are more likely to be revised upward than downward. Forrester then creates a triangular distribution to reflect the range of expected costs, with 103% as the mean (103% is equal to the sum of 110%, 100%, and 100% divided by three). Forrester applies this mean to the most likely estimate, \$70,000, to arrive at a risk-adjusted value of \$72,100.

Please note that cost savings and productivity gains realized by other organizations may vary from those realized by the interviewed customer.

The following tables show the values used to adjust for uncertainty in cost and benefit estimates. Different costs and benefits estimates have different levels of risk adjustments. For example, Forrester applied a higher risk weighting to increased application performance as compared with increased Database Administrator productivity. Readers are urged to apply their own risk ranges, based upon their own degree of confidence in the cost and benefit estimates.

Table 13: Cost Category Risk Adjustments

Ref.	Risk to cost	Low	Most likely	High	Risk adjusted
L1	Cost of SQL Backup	100%	100%	110%	103%
L2	Cost of Maintenance Support and Upgrades	100%	100%	110%	103%

Source: Forrester Research, Inc.

Risk adjustments for benefits reduce the original benefits estimates. For example, Forrester applies a risk range of 50% on the low end of the estimate and 80% on the most likely and 100% on the high range for increased application performance. This has the effect of reducing the benefit estimate by 33%, equal to 77% of the original value.

Table 14: Benefit Category Risk Adjustments

Ref.	Risk to benefit	Low	Most likely	High	Risk adjusted
M1	Improved Application Performance	50%	80%	100%	77%
M2	Increased Database Administrator Productivity	70%	80%	100%	83%
M3	Reduced Hardware Costs	50%	80%	100%	77%

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 reference organization identified freeing up Database Administrator tasks to work on other tasks as a potential flexibility option associated with SQL Backup. While Forrester believes organizations can take advantage of this flexibility option, estimating a specific option value is too variable. As a result, quantification of any value associated with this option is not included in the analysis.

TEI Framework: Summary

Considering the financial framework constructed above, the results of the costs, benefits, risk, and flexibility sections using the representative numbers can be used to determine a Return on Investment, Net Present Value, and payback period. Table 15 shows the consolidation of the numbers for the reference organization.

Table 15: Reference Company ROI, Non-Risk-Adjusted

Ref.	Total benefits	Calculation	Year 1	Year 2	Year 3	Total	NPV
E1	Total costs		\$87,500	\$17,500	\$17,500	\$122,500	\$107,156
K2	Total benefits		\$112,266	\$112,266	\$112,266	\$336,799	\$279,190
N1	Net benefit	(K2-E1)	\$24,766	\$94,766	\$94,766	\$214,299	\$172,033
N2	Return on Investment	N1 / E1					161%
N3	Payback period						Within 12 months

Source: Forrester Research, Inc.

Table 16 below shows the risk-adjusted values, applying the risk adjustment method indicated in the “Risks” section and the values from Tables 13 and 14 to the numbers in Tables 6 and 12.

Table 16: Reference Company ROI, Risk-Adjusted

Ref.	Total benefits	Calculation	Year 1	Year 2	Year 3	Total	NPV
R1	Total costs		\$90,417	\$18,083	\$18,083	\$126,583	\$110,728
R2	Total benefits		\$87,189	\$87,189	\$87,189	\$261,567	\$216,826
R3	Net benefit	R2 - R1	(\$3,228)	\$ 69,106	\$69,106	\$134,983	\$106,098
R4	Return on Investment	R3 / R1					96%
R5	Payback period						13 months

Source: Forrester Research, Inc.

It is important to note that values used throughout the TEI Framework are based on an in-depth interview with one 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 SQL Backup.

Study Conclusions

The financial analysis provided in this study illustrates the potential way an organization can evaluate the value proposition of SQL Backup. Based on information collected in an in-depth customer interview, Forrester calculated a three-year risk-adjusted ROI of 96% for the reference organization with a payback period of 13 months. All final estimates are risk-adjusted to incorporate potential uncertainty in the calculation of costs and benefits.

In purchasing SQL Backup, the reference company has the following objectives:

- Improve the performance of business applications by minimizing the impact of backup overruns.
- Reduce Database Administrator time spent correcting backup failures and restoring databases.
- Reduce disk and tape hardware costs.

Based on these findings, companies looking to implement SQL Backup can see increased database performance, improved Database Administrator productivity, and reduced storage costs. 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 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 enterprise-wide upgrade of an office productivity suite can potentially increase standardization (to increase efficiency) and reduce licensing costs. However, an embedded collaboration feature may translate to greater worker productivity if activated. The collaboration can only be used with additional investment in training at some future point 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 at 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 Net Present Value of cash flows.

Payback period: The breakeven point for an investment. 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. Present Value (PV) calculations are calculated for each total cost and benefit estimate. Net Present Value (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.

Appendix C: About the Project Manager



Paul Devine

Consultant

Paul's research focus includes business case evaluation tools, IT Value and Forrester's Total Economic Impact (TEI) ROI Methodology.

Paul has more than 7 years research and consulting experience in the Telecommunications and IT sector.

Paul spent the past five years working as an analyst and consultant in Frost & Sullivan's ICT practice. During his time at Frost & Sullivan Paul managed large primary research projects and consulting engagements across Europe, Middle East and Africa.

Prior to joining Frost & Sullivan Paul was a consultant for Communications Market Analysis, an IT and Telecoms marketing consultancy.

Paul earned a B.Sc. in Chemistry with Management Studies and a Master's in Technology and Innovation Management, all from the University of Sussex in the UK.