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The Total Economic Impact™ Of Maintaining Adabas and Natural

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Executive Summary

In 2007, Software AG commissioned Forrester Consulting to examine the total economic impact (TEI) and potential return on investment (ROI) enterprises may realize by maintaining implementations of Adabas and Natural compared with replacing these systems with other databases and languages (or packaged applications). Adabas is Software AG's transactional database management system (DBMS). Natural is a programming language and application development and deployment environment that has been in use by enterprises around the world since the 1980s. This study illustrates the financial implications of maintaining an organization's Adabas and Natural capabilities compared with a "rip and replace" scenario.

In conducting in-depth interviews with four existing Software AG customers, Forrester found that these companies confronted the decision to replace Adabas and Natural with other database platforms and programming languages (or outsourcing). In all cases, these customers have extensive, critical applications that have been written in Natural and are fed with data from Adabas. Three of the customers actually began large replacement projects; two of the companies ceased replacement efforts in the face of cost and schedule overruns, while another customer was in the midst of reevaluation at the time of the study. The Software AG customers interviewed for this study each described shifts in strategy away from systems enhancement for its own sake toward building business value by capitalizing on the stable Adabas and Natural environment with its continuously growing functionality.

All of the customers interviewed for this study gained valuable new knowledge in the process of evaluating the cost, benefits, risk, and flexibility options inherent in keeping their existing systems versus a "rip and replace" or even a more gradual replacement plan. This case study highlights the major insights and their financial implications, including:

- The potential benefits of replacement systems did not justify the costs of replacing Adabas and Natural for three of the four customers interviewed for this study (the fourth customer was engaged in cost-benefit evaluation at the time of this study).

- Customer's initial perceptions of the limitations of their Adabas and Natural systems — of functionality restrictions and staffing difficulties and future skill shortages — shifted after extensive evaluation of Adabas and Natural versus alternatives (newer databases/languages and/or packaged applications, or a combination thereof). Functionality limits were subsequently viewed as minor or were overcome with upgrades, while mainframe programmers can easily learn Natural and enjoy using it.

- By maintaining and perhaps upgrading Adabas systems and applications created with Natural, existing customers possess options for creating additional business value from modernization initiatives and service-oriented architecture (SOA) projects.

The financial analysis presented in this study is based mainly on the avoided costs of replacing Adabas and Natural. In some ways, this is actually a return on *non*-investment analysis. At the time of their decision to abandon replacement strategies, however, customers typically upgraded to newer Adabas and/or Natural versions, purchased additional Software AG products, and engaged professional services to bridge gaps in functionality that were identified in the evaluation process. Forrester therefore presents the financial framework as an ROI analysis.

Purpose

The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of maintaining Adabas and Natural in 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 maintaining an investment in Software AG's Adabas and Natural.

Methodology

Software AG selected Forrester for this project because of: 1) Forrester's expertise in application portfolio management (APM) and strategic application decisions — whether to keep, modernize, integrate, Web-enable, migrate from, or outsource existing applications, and 2) 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 Adabas and Natural:

1. Costs and cost reduction.
2. Benefits to the entire organization.
3. Risk.
4. Flexibility.

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

Approach

Forrester used a five-step approach for this study:

1. Forrester gathered data from existing Forrester research relative to Software AG's Adabas and Natural and the market for these technologies in general.
2. Forrester interviewed Software AG marketing and sales personnel to fully understand the value proposition of Adabas and Natural investments.
3. Forrester conducted a series of in-depth interviews with four organizations currently using Adabas and Natural.
4. Forrester constructed a financial model representative of the interviews. This model can be found in the TEI Framework section below.
5. Forrester created a composite organization based on the interviews and populated the framework using data from the interviews as applied to the composite organization.

Key Findings

The Adabas and Natural customers interviewed by Forrester came to an understanding that the costs of replacing their Adabas and Natural systems generally outweighed the benefits, while

greatly increasing risks. Further, customers discovered that the limitations of their systems were more easily overcome than originally perceived.

Forrester found three areas of significant benefit, in the form of cost avoidance, for organizations that elect to maintain their implementations of Adabas and Natural versus replace them with an alternative database, packaged application or rewrite in a new programming language:

- Avoiding the cost of new software, professional services, and internal labor for system replacement.
- Avoiding the cost of hiring additional DBAs required for alternative systems.
- Avoiding the cost of additional hardware and operating system software.

Table 1 illustrates the risk-adjusted cash flow for the composite organization to maintain their Adabas and Natural systems, 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.

The risk-adjusted ROI in this study is uncharacteristically higher than the original ROI estimate. This is because the greatest risks exist in replacement initiatives, as explained in more detail below. Customers described replacement initiatives in which costs and schedules expanded far beyond original project proposals, both of which increase the value of maintaining the existing database and applications. For a more in-depth explanation of risk and risk adjustments used in this study, please see the Risk section below.

Table 1: Composite Company ROI

Summary financial results	Original estimate	Risk-adjusted
ROI[1]	199%	331%
Payback period[2] (years)	0.33	0.28
Total costs (present value[3])	-€1,202,911	-€1,202,911
Total benefits (present value)	€3,593,285	€5,189,325
Total (net present value[4])	€2,390,374	€3,986,414

Source: Forrester Research, Inc.

Disclosures

The reader should be aware of the following:

- The study is commissioned by Software AG and delivered by the Forrester Consulting group.
- Software AG 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.
- The customers for the interviews were provided by Software AG.
- 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 maintaining an organization's investment in Adabas and Natural.
- This study is not meant to be used as a competitive product analysis.

Software AG's Adabas And Natural: Overview

Adabas

According to Software AG, Adabas is a scalable transactional database management system (DBMS) designed for superior power and performance to support changing requirements and business growth. Users can connect critical business applications built with Java, Cobol, or Natural to Adabas to access key business data, or link structured data with multimedia files. Adabas 2006 continues to provide powerful functionality, such as flexible data structures, data compression, and scalability to meet heavy transaction loads. Adabas delivers extremely high transaction levels — more than 300,000 commands per second — with a fraction of the staff and system resources needed for a comparable relational database management system (RDBMS).

Software AG has continued to invest in Adabas to bring new capabilities for meeting changing business requirements with unlimited data storage, unsurpassed ease-of-use, and the fastest transaction levels of any online transaction processing (OLTP) database. Users can store any type of data and process any data volume, while providing high application availability and performance to end users. Adabas supports mainframe, Linux, Unix, and Windows platforms, and the entire Adabas environment can be managed from a single Web-based interface regardless of platform. Software AG reports that organizations maintaining existing Adabas implementations can avoid costly and time-intensive integration projects with open access to Adabas data using Web services, XML, Java, .NET and SQL standards. This enables staff with no prior knowledge of Adabas to easily access data managed in Adabas directly, saving money on training and reducing requests to IT by providing business users with the information they need in their everyday applications.

Natural

Natural is a complete application development environment for designing, developing, and employing business-critical applications that run on all popular platforms, including mainframes, Windows, Unix, and Linux. Natural has been used by enterprises around the world since it was introduced in 1979. Designed to support enterprise-scale applications on the mainframe and open systems platforms, recent versions, such as Natural 2006, are packaged with powerful tools that enable SOA and Web services with full support of open-source environments and rich Internet applications. Natural can be used to open up key information to clients and partners without major redevelopment. Natural enables fast and reliable design, development, testing, debugging, and maintenance of new Web-based business applications — and extends existing applications — supporting a real SOA. It also supports the Eclipse-based development environment, with faster and more efficient development of Java, .Net, and Natural projects in a single collaborative environment.

Simple and efficient, Natural requires fewer lines of code for a given task than other development languages. The language is easy to learn; developers new to Natural can be trained and productive in a matter of weeks, and they don't need to learn new tools to develop for various platforms. It enables rich-client functionality in a standard Web browser without proprietary clients, runtime engines, or plug-ins. Other benefits include the ability to restructure and optimize source code by automatically scrubbing bad or redundant code and implementing pre-coded solutions for better quality applications and reduced maintenance costs.

Software AG continues to invest in and support new capabilities for Adabas and Natural and provides a variety of high-value tools for both.

Analysis

The financial analysis presented in this study is based mainly on the avoided costs of replacing Adabas and Natural. This might be more accurately termed a return on *non*-investment analysis. At the time of their decision to abandon replacement strategies, however, customers typically upgraded to newer Adabas and/or Natural versions, purchased additional Software AG products, and engaged professional services to bridge gaps in functionality that were identified in the evaluation process. Forrester therefore presents the financial framework as an ROI analysis.

Forrester's approach to evaluate the impact that maintaining Adabas and Natural can have on an organization included the following steps:

- Interviews with Software AG product marketing and product management personnel.
- In-depth interviews of four organizations currently using Adabas and Natural.
- Construction of a common financial framework for the continuing use and maintenance of Adabas and Natural.
- Construction of a composite organization based on characteristics of the interviewed organizations.

Interview Highlights

A total of four interviews were conducted for this study, involving representatives from the following companies (Software AG customers based in the United States, Europe, and Australia).

1. **Nissan Europe**. www.nissan-europe.com. The European division of a major automaker. The UK data center and IT organization is responsible for all of the company's IT from the UK to Russia, Scandinavia to the Mediterranean. Core systems and critical applications for finance, HR, sales and warranty run on Adabas and Natural to support the activities of 12,000 employees and dealer personnel. In this largely homogenous database and code environment, the organization has avoided many of the integration challenges of transitions to ERP and package solutions. Applications have been developed in-house using Natural since the mid 1980s. Nissan Europe has been a source of several IT best practices for the company's organizations in other regions of the world, as well as a joint venture with another automaker, and has adopted a parts system for re-use that was developed with Adabas and Natural by Nissan Australia. With the start of an SOA framework begun in 2006, the company is currently expanding its use of Software AG products to extend mainframe applications via the Web and XML messaging. IT staff includes approximately 100 Natural developers (mainly contractors) and three Adabas DBAs.

2. **American Community Mutual Insurance Company (ACMI)**. www.american-community.com. A health insurer operating in the Midwest United States, generating more than $300 million in annual premium revenue from group and individual health insurance coverage. This company has used Adabas and Natural since 1992. The company's core insurance processing, claims, billing, and enrollment run on Adabas and Natural, which are accessed by approximately 225 users. The IT department numbers 95 staff. Recently ACMI has acquired upgrades to Adabas and Natural and licensed integration technology and modernization products from Software AG.

3. **IP Australia**. www.ipaustralia.gov.au. An Australian Federal Government agency responsible for administering patents, trade marks, designs and plant breeder's rights. Adabas and Natural have been deployed in this organization since the mid 1980s. Systems created with these products are used to administer a number of IP rights management processes. These include: trade mark and design administration, search, examination, registration and renewal; and in relation to patents - applications received by IP Australia under the Patent Cooperation Treaty, and a sub-set of patent renewals. There are approximately 300 users of the trade mark, design and patent systems.

4. **Crédit Logement**. www.creditlogement.fr. A French residential loan guarantee company, a joint venture of more than a dozen French banks, which processes over 400,000 loan applications yearly. The leading loan guarantee organization in France, this organization administers approximately €118 billion in mortgage-less home purchase loans to 3 million residential buyers. A user of Adabas and Natural since the early 1990s, current projects involve legacy modernization, Web enabling existing Natural applications, and critical Basel II requirements. The company employs 212, including 25 IT staff plus another 25 IT contractors.

The in-depth interviews with these four Software AG customers uncovered a number of important insights:

- For each of the companies interviewed for this case study, most or all of the critical applications run on Adabas and Natural.

- Each of the companies interviewed evaluated an initiative to replace Adabas and Natural applications in favor of newer systems, either packaged applications, custom development in a new language, new relational databases, or outsourced capabilities.

- These organizations reported that the newer systems they evaluated typically did not have enough additional functionality to justify additional cost.

- Perceptions about the difficulty of hiring Adabas administrators and Natural programmers were frequently overcome after customers discovered 1) newer database platforms require more DBAs than Adabas and 2) programmers, especially COBOL, can quickly become proficient in Natural. Further, interviewees explained that the tools available with Adabas and Natural represent a full development workbench and are sometimes superior to tools required to make other databases and programming languages effective.

- Three of the organizations interviewed for this study reported that they have plans to selectively develop new applications in Natural.

- Rip and replace initiatives were seen as less compelling, and unlikely to be cost-effective, after investigation into the relative ease of Web-enabling existing Natural applications supported by data in Adabas.

- Maintaining Adabas and applications built with Natural was typically seen as the low-risk option after comprehensive evaluations, pilot tests, and in some cases described by interviewed organizations, actually attempting to implement new systems.

- Several of the customers changed their initial perceptions that the Adabas and Natural development environment was functionally and technically constrained. In a new development environment, initially seen as more flexible and less constrained, the

expansion of functionality creates governance and scope containment problems when developers "build things because they can — not because they are needed."

- One company reported that mainframe availability on Adabas is 99.999% compared to 99.5% for a midrange platform. Another company reported that its analysis indicated that since Adabas is the fastest database available, any other choice "would have been a step backwards."

- For the companies that started initiatives to replace Adabas and Natural, each one experienced cost and schedule overruns. Two companies abandoned these projects. Another company was re-evaluating its migration plans as of the publication of this study. A fourth did not proceed in the face of many man-years to replace systems.

TEI Framework

Introduction

From the information provided in the interviews, Forrester has constructed a TEI framework for those organizations that are evaluating the viability of maintaining implementations of Adabas and Natural. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that impact the investment decision.

Composite Organization: Finanz Allgemein GmbH

Based on the interviews with the four existing customers provided by Software AG, Forrester constructed a TEI framework, a composite company, and an associated ROI analysis that illustrates the financial implications. By aggregating the findings from the customer interviews and portraying a composite organization that is achieving value from Software AG products, this Forrester study illustrates the financial impact of maintaining implementations of Adabas and Natural. The composite organization that Forrester synthesized from these results represents a German financial services firm with 2,000 employees and annual revenue of €390 million. The company serves several hundred thousand clients through several hundred agents. The company staff includes 350 users of the Adabas and Natural systems and 110 IT staff. All mission critical applications run on Adabas and Natural, including billing, renewals, agent support functions, etc. This company, which we will refer to as Finanz Allgemein GmbH, or FA, evaluated a complete rip and replace of systems that were built on Adabas, using Natural, since the mid 1990s. FA is currently using Adabas version 7.4.2 and Natural 3.1.6, and upgrading to 4.2.3

FA evaluated a financial application that was offered either as a standalone system or via an ASP model. FA backed away from this option, after lengthy investigation and analysis, upon discovery that the service provider could not support all of FA's lines of business (commercial and individual) without a major system development. A key piece of software needed to support the individual lines was only in the early stages of development, indicating hidden costs and high risk ahead.

FA also actually piloted the outsourcing of several applications currently running on Adabas, created with Natural. This project was cancelled, however, when neither cost savings nor increased functionality materialized.

Perhaps most importantly, FA came to the understanding that the planned replacement of Adabas and Natural systems was not going to make the company more responsive to internal or external customers. This aspect of replacement was reinforced repeatedly by the customers interviewed for this study.

FA realized that one of the main appeals of this alternative system was the GUI front end on what was otherwise also a mainframe system built with COBOL. So FA began to investigate the opportunities to add more modern interfaces and also to Web-enable its Adabas and Natural systems.

Framework Assumptions

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

Table 2: General Assumptions

General assumptions	Value
Discount rate[5]	10%
Length of analysis	Five years

Source: Forrester Research, Inc.

Organizations typically use discount rates between 8% and 16% based on their cost of capital. Readers are urged to consult with their finance departments to determine the most appropriate discount rate to use within their own organizations.

Costs

> *A two-year project was going to become a four-year project, and the cost was going to triple. Meanwhile people from the business side realized how much [functionality] they already had.*
>
> Vice President, CIO
> Software AG customer that began and later abandoned a replacement initiative

License And Maintenance Costs For Adabas And Natural

The costs that are included in the TEI framework for this analysis are those that are deemed necessary for the continuing use of Adabas and Natural for a five-year period into the future.

This case study assumes that the composite organization will adopt certain new tools and features of Adabas and Natural offered in current versions, including:

- **Adabas 2006:** Extended data structures, ability to manage multimedia data, and flexibility to handle growing and unpredictable data volumes.
- **Natural 2006:** Optimized performance, Unicode support for globalization, enhanced XML and SQL statement support, plus local and remote debugging.

This case study also assumes that the composite organization will upgrade its Adabas and Natural license and maintenance by 5 million service units (MSU) to support typical hardware platform capacity growth.

License And Maintenance Costs For New Products

When FA decided to cancel its replacement project, the company subsequently invested in new licenses of Software AG products that would allow it to extend its current implementations to meet new requirements such as external data access, Web enablement, and improved development tools to reduce cost and effort to add new functionality and maintain current systems. These products included:

- **Adabas SQL Gateway:** To provide business users with access to data through desktop applications or a data warehouse.
- **Natural Productivity Package – Enterprise Edition:** To provide development staff with a modern Windows- and Eclipse-based IDE to further develop and maintain Natural applications running on any platform (Mainframe, Linux, Unix, or Windows). Additionally, the package provides tools to support model-based development and the ability to automatically generate Web services.
- **EntireX and ApplinX:** To Web- or service-enable current applications.

Professional Services

In order to upgrade and enhance its Adabas and Natural environment, FA will have engaged a significant level of professional services associated with the Adabas and Natural upgrade from 20 to 25 MSU. Additional professional services are warranted for Adabas and Natural performance tuning and for new products (modernization).

Training

"We found that we can hire a COBOL developer and after a few weeks s/he can be proficient in Natural," reported one interviewee. The composite company enjoys a stable workforce with low staff turnover. Nevertheless every 18 months to two years, the company must hire and train a DBA or programmer. Software AG customers related the ease at which new staff can be trained in Natural or Adabas, typically with the aid of computer-based training courses completed on-site.

Total Costs

The costs of avoiding replacement of Adabas and Natural are summarized in Table 3 below.

Table 3: Total Costs

Metric	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Maintenance of current licenses (20 MSU)		€128,000	€128,000	€128,000	€128,000	€128,000	€640,000
5 MSU upgrade license	€79,000						€79,000
5 MSU upgrade maintenance		14,000	14,000	14,000	14,000	14,000	€70,000
New product license	€150,000						€150,000
New product maintenance		27,000	27,000	27,000	27,000	27,000	€135,000
Professional services – 5 MSU upgrade	€60,000						€60,000
Professional services – Adabas Natural tuning	€10,000						€10,000
Professional services – new products implementation	€250,000						€250,000
Training for new DBAs		3,500	3,500	3,500	3,500	3,500	€17,500
Total	€549,000	€172,500	€172,500	€172,500	€172,500	€172,500	€1,411,500

Source: Forrester Research, Inc.

Benefits

> *There has been an executive perception that moving away from Adabas and Natural is necessary, that it makes sense … but the perception lags the reality by five years. Many of the tools [that overcome the perceived limitations and perceived obsolescence] did not exist five years ago."*
>
> IT Strategy Manager

Forrester assumes that the composite company will see many of the same benefits that IT decision-makers interviewed for this study identified and quantified. The key category of benefits that organizations realized by maintaining Adabas and Natural was avoiding the major cost and risk of replacing critical systems, which was under consideration and/or actual implementation with each of the customer organizations participating in the study.

Avoiding Cost Of Replacement

Like three of the four companies interviewed for this study, Forrester assumes that FA has engaged in extensive analysis, pilot testing of alternative systems, and perhaps actually engaging initiatives to replace Adabas and Natural. FA will have discovered that additional functionality, if any, from newer systems does not fully justify the costs, especially given uncertainty around final total costs and time to project completion.

Forrester established a set of assumptions to quantify this benefit for the composite company. Based on cost avoidance described by the interviewed Software AG customers, Forrester believes that the total cost of a replacement of the composite company's critical systems in favor of packaged applications and / or another database and programming language (or a combination) would be initially quoted at €3 million with a two-year project schedule. This amount includes new software, professional services, internal labor, and user training. Interviewees also cited other benefits of maintaining Adabas and Natural, including ease of administration and lower hardware requirements.

Avoiding Cost Of Additional DBAs Required For Alternative Systems

FA runs its Adabas and Natural shop with one DBA, who is about 75% dedicated to the platform. The alternatives evaluated by FA require more DBA resources and administrative overhead. "You can fix something in 5 minutes [on Adabas] vs. 4 hours [on an alternative]," noted one interviewee. Forrester's assumption for additional required DBAs is two full time staff earning annual compensation totaling €112,000 each (fully loaded compensation rate including benefits).

Avoiding Cost Of Additional Hardware Required For Alternative Systems

The alternatives evaluated by FA would have required more hardware resources and annual maintenance. Forrester's assumption for additional servers required is three boxes (and the required software) at a cost of €35,000 each (€105,000 total), plus €15,750 for annual maintenance of the operating systems.

Total Benefits

The benefits of avoiding replacements costs and hiring additional staff described above are summarized in Table 4 below.

Table 4: Total Benefits

Benefits	Year 1	Year 2	Year 3	Year 4	Year 5	Total
New system purchase and installation costs avoided: software, professional service, labor	€1,500,000	€1,500,000				€3,000,000
Additional DBA compensation costs avoided	224,000	224,000	224,000	224,000	224,000	1,120,000
Server cost avoidance	105,000	15,750	15,750	15,750	15,750	168,000
Total	€1,829,000	€1,739,750	€239,750	€239,750	€239,750	€4,288,000

Source: Forrester Research, Inc.

Risk

There isn't anything inherently risky in Adabas or Natural.

IT Strategy Manager

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 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. In this case, the scenario works in an opposite manner; the risks of *avoided* project cost increases and schedule overruns appear in the benefit category.

Forrester risk-adjusts the benefit estimates to better reflect the level of uncertainty that exists for each estimate. In this case, Forrester does not risk-adjust the cost assumptions. This is done: a) for clarity; b) because the nature, scope and magnitude of these costs are relatively simple to assess prior to an upgrade initiative; and c) because the precise costs can be set contractually prior to project engagement.

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. The risk-adjusted value is the mean of the distribution of those points.

For example, in the case of the benefit of avoiding hiring additional DBAs that would be required to operate new systems, the original assumption of two (2) additional DBAs used in this analysis can be considered the "most likely" or expected value. Yet this amount will vary based on the decision made around the replacement system. This variability represents a risk that is captured as part of this study. Forrester uses an assumption of three (3) DBAs on the high end, two (2) as the most likely, and one-and-a-half (1.5) full time equivalents (FTEs) on the low end. Each of these is multiplied by the fully loaded annual compensation amount of €112,000. Since this is an estimate of a cost avoidance, and costs are more likely to be revised upward than downward, this has the effect of increasing the benefit. Forrester then creates a triangular distribution to reflect the range of expected benefits, with 2.17 as the mean.

Table 5: Risk Adjustment Example — Replacement Costs Avoided

Metric	Per Period	Year 2	Year 3	Year 4	Year 5	Total
Variable Low	1.5					
Number of additional DBAs	2					
Variable High	3					
Annual fully loaded compensation	€112,000					
Percent dedicated	100%					
Equation Low	€168,000					
DBA compensation costs avoided	€224,000					
Equation High	€336,000					
Total (Original)	€224,000	€224,000	€224,000	€224,000	€224,000	€1,120,000
Total (Risk Adjusted)	**€242,667**	**€242,667**	**€242,667**	**€242,667**	**€242,667**	**€1,213,335**
Total (Low)	€168,000	€168,000	€168,000	€168,000	€168,000	€840,000
Total (High)	€336,000	€336,000	€336,000	€336,000	€336,000	€1,680,000

Source: Forrester Research, Inc.

Another example can be seen in the risk treatment of the very large combined benefit of avoiding the software, services, and labor costs of a system replacement. Customers interviewed for the study explained the large uncertainty around the final costs and time to complete such a proposed, planned, or partially implemented replacement. In order to capture this uncertainty, Forrester begins with an original estimate of €3 million and two years to completion. The high end assumes the project ultimately requires €9 million and four years, while the low end is assumed to be €3 million . The risk-adjusted amount is thus €5,000,000 over four years, with the bulk of the expenditures occurring in Years 1 and 2.

Table 6: Risk Adjustment Example — Replacement Costs Avoided

Metric	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total (Original)	€1,500,000	€1,500,000	€0	€0	€0	€3,000,000
Total (Risk Adjusted)	**€1,750,000**	**€1,750,000**	**€750,000**	**€750,000**	**€0**	**€5,000,000**
Total (Low)	€1,500,000	€1,500,000	€0	€0	€0	€3,000,000
Total (High)	€2,250,000	€2,250,000	€2,250,000	€2,250,000	€0	€9,000,000

Source: Forrester Research, Inc.

The risk adjustment for the final item in the benefits category, server cost avoidance, is shown in Table 7 below:

Table 7: Risk Adjustment Example — Server Costs Avoided

Metric	Initial	Year 2	Year 3	Year 4	Year 5	Total
Low	2					
Number of servers	3					
High	5					
Cost per server	35,000					
Equation Low	70,000					
Server cost avoidance	105,000					
Equation High	175,000					
Total (Original)	€105,000	€15,750	€15,750	€15,750	€15,750	€168,000
Total (Risk Adjusted)	**€116,667**	**€17,750**	**€17,750**	**€17,750**	**€17,750**	**€186,667**
Total (Low)	€70,000	€10,500	€10,500	€10,500	€10,500	€112,000
Total (High)	€175,000	€26,250	€26,250	€26,250	€26,250	€280,000

Source: Forrester Research, Inc.

Flexibility

> *We are working on the right things that bring revenue and save cost, more for our external customers versus our internal users and a lot of that is determining what functionalities and self-service to deliver through the Web. [We can] keep the mainframe just as a stable place that has all that wonderful data that we need and all those wonderful daily transactions of billing and enrolling and paying agents. That is the strategy.*
>
> Vice president, CIO
> Software AG customer that began and later abandoned a replacement initiative

Flexibility, as defined by Forrester's TEI methodology, represents an investment in additional capacity or agility today that can be turned into future business benefits at some additional cost in the future. This provides an organization with the "right" or the ability to engage in future initiatives — but not the obligation to do so. There are multiple scenarios in which a customer might choose to maintain Adabas and Natural for a specific set of purposes and later discover additional value that can be unlocked or "opened" from legacy data and existing applications. Forrester believes there are several such real options available to the composite organization. This section presents an example of one such option. The flexibility component of TEI captures that value using the industry standard Black-Scholes option pricing model.

When FA abandoned plans to replace Adabas and Natural, the company faced several opportunities to modernize its environment and address opportunities that would not be feasible if the IT organization would have become engrossed in a large system replacement. For example, IT leaders and business unit managers at FA focused on a financial services sales process that was

almost entirely manual and very time consuming. The project objective was to automate the process, reduce errors, and ultimately reduce the time required to complete an application, grant approval, complete the transaction, and provide new visibility to agents who could check the status of an order via Web self-service capability.

The solution leveraged existing software products, synchronizing with mainframe Adabas account management systems, and it incorporated a third-party document management system. FA also acquired software tools from Software AG's SOA product suite that can model and automate business processes, integrate with databases, monitor processing times to create metrics to check, and report on the status of work in process, volume, and trends.

Cost for the project included Software AG and third-party software amounting to €315,000 and annual maintenance of €150,000. Professional services were engaged for €250,000 and internal labor was estimated at €200,000. The total price of the project was €1,065,000, most of which is incurred in Year 2 of the analysis.

Table 8: Flexibility Cost Assumptions

Metric	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present Value
License - new software		€315,000				€315,000	€286,364
Maintenance			150,000	150,000	150,000	€450,000	€373,028
Labor - integration, testing		200,000				€200,000	€181,818
Professional services		250,000				€250,000	€227,273
Flexibility cost		€765,000	€150,000	€150,000	€150,000	€1,215,000	**€1,068,482**

Source: Forrester Research, Inc.

Labor cost savings is estimated to be €720,000 annually (12 hours per application x €50 fully loaded compensation per hour x 1,200 applications), occurring in Years 3, 4 and 5 of this analysis.

Revenue increases amount to an estimated €39 million (a 10% increase) due to the higher productivity (completing more business with the same amount of staff) and better links with agents. This translates into €2 million in incremental net income, also occurring in Years 3, 4 and 5.

Table 9: Flexibility Benefit Assumptions

Metric	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present Value
Labor cost savings			€ 720,000	€ 720,000	€ 720,000	€ 2,160,000	€1,790,533
Incremental net income			2,000,000	2,000,000	2,000,000	6,000,000	€4,973,704
Flexibility benefit			€ 2,720,000	€ 2,720,000	€2,720,000	€ 8,160,000	**€6,764,237**

Source: Forrester Research, Inc.

The result was the elimination of paper-based manual processing and related errors, which reduced the time to complete certain financial account set-up processes and transactions. Competitive advantage was created when the process that formerly required days (above the industry average) is now completed in hours, thereby leading the industry in response and completion time. The solution is also fully Basel II compliant, with file imaging to document each transaction at the sub-process levels.

The value of this flexibility option, calculated using the industry standard Black-Scholes option pricing model, is shown in Table 10 below. For the sake of clarity and because flexibility option value is highly variable for each customer, Forrester does not include the value of this option in the ROI calculations demonstrated throughout this study. This value exists in addition to risk-adjusted benefits described in this analysis. Also, the project could have been engaged and completed under a number of scenarios, but maintaining Adabas and Natural enable FA to start and complete the project sooner, and move on to other modernization opportunities.

Table 10: Flexibility Option Value

Metric	Calculation	Present value
Asset value (benefit)	See text	**€6,764,237**
Cost to acquire	See text	**€1,068,482**
Expiration (time to expire, in years)		2.0
Flexibility	Black-Scholes option pricing model	**€5,766,807**

Source: Forrester Research, Inc.

This project is indicative of FA's potential to create similar value in other areas of the company using its internal capability to create services in an SOA framework and offer new products and agent relationships. As FA develops its SOA strategy to enhance and create agility in its business financial services, agent relationships, and legacy modernization, new products in new markets are currently in the planning stages.

The Software AG customers interviewed for this study realized value similar to that described for FA above. Each described shifts in strategy away from systems enhancement for its own sake toward building business value by capitalizing on the stable Adabas and Natural environment with its existing functionality. Noted one interviewee, "Ours is a stable environment; there is a lot of functionality there. Users will always find more things that they would want those systems to do. So let's say they are good enough and let's look at modernization, service-oriented architecture and what are other functionalities we need to deliver to the external customers versus continuing working on the mainframe systems."

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

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.

Tables 11 and 12 show the risk-adjusted values after applying the risk-adjustment method indicated in the Risk section above.

Table 11: Total Costs

Costs	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present value
Total	€549,000	€172,500	€172,500	€172,500	€172,500	€172,500	€1,411,500	€1,202,911

Source: Forrester Research, Inc.

Table 12: Total Risk-Adjusted Benefits

Benefits	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present Value
New system purchase and installation costs avoided: software, professional service, labor	€1,750,000	€1,750,000	€750,000	€750,000		€5,000,000	€4,112,937
Additional DBA compensation costs avoided	242,667	242,667	242,667	242,667	242,667	1,213,335	919,898
Server cost avoidance	116,667	17,500	17,500	17,500	17,500	186,667	156,490
Total	€2,109,333	€2,010,167	€1,010,167	€1,010,167	€260,167	€6,400,003	€5,189,325

Source: Forrester Research, Inc.

Note that values used throughout the TEI Framework are based on in-depth interviews with four organizations and the resulting composite organization built by Forrester. 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 Adabas and Natural.

Study Conclusions

Forrester's interviews with Software AG customers yielded several important observations:

- Based on information collected in interviews with current Adabas and Natural customers, Forrester found that organizations could realize benefits in the form of large cost and risk avoidance by carefully evaluating the ongoing role of Adabas and Natural in their organizations. Customers interviewed for this study reported that in most cases, the expected benefits of replacement systems did not justify the costs of replacing Adabas and Natural.

- Initial perceptions or beliefs around functionality restrictions and staffing difficulties were unwarranted after extensive evaluation of alternatives. Functionality limits could be overcome with upgrades and mainframe developers and DBAs can easily learn Natural and Adabas.

- By maintaining and perhaps upgrading Adabas systems and applications created with Natural, existing customers hold options for creating additional business value from modernization initiatives and service-oriented architecture (SOA) projects.

The financial analysis provided in this study illustrates the potential way an organization can evaluate the continuing value proposition of existing installations of Adabas and applications written with Natural. Based on information collected in four in-depth customer interviews, Forrester calculated a five-year risk-adjusted ROI of 331% for the composite organization. All final estimates are risk-adjusted to incorporate potential uncertainty in the calculation of benefits.

Based on these findings, Forrester believes that companies looking to maintain their investments in Adabas and Natural can see significant cost avoidance benefits while maintaining options to open legacy data and applications to Web interfaces and modernization opportunities. Using the TEI framework, many companies may find the potential for a compelling business case to make such an investment.

Table 13: Composite Company ROI, Risk-Adjusted

Summary financial results	Original estimate	Risk-adjusted
ROI[1]	199%	331%
Payback period[2] (years)	0.33	0.28
Total costs (present value[3])	-€1,202,911	-€1,202,911
Total benefits (present value)	€3,593,285	€5,189,325
Total (net present value[4])	€2,390,374	€3,986,414

Source: Forrester Research, Inc.

Appendix A: Composite Organization Description

In this TEI study, Forrester has created a composite organization based on detailed interviews with four Software AG customers using Adabas and Natural to illustrate the quantifiable costs and benefits of maintaining existing implementations of Adabas and Natural. The composite is a German financial services firm with 2,000 employees and is based on characteristics of the companies interviewed for this study.

Composite company:	Finanz Allgemein GmbH (or FA)
Industry:	Financial services
Domicile:	Germany
Revenue	€390 million
Assets	€615 million
Employees	2,000
Users	350
IT staff	110
Agents	750
Customers	500,000

Background

- All mission-critical applications run on Adabas and Natural.
- FA evaluated a complete rip and replace of existing systems that have been built on Adabas, using Natural, since the mid-1990s.

For the purpose of the analysis, Forrester assumes that FA made the following discoveries when evaluating the replace versus maintain decision:

- FA started with a perception that its systems were older and did not have as much functionality as newer, packaged applications or what could be available from an outsourced model.
- FA discovered that newer systems did not have enough additional functionality to justify cost. "It wasn't going to make us more responsive to the business."
- There would be a major risk in attempting to engage new financial services application(s) that could handle: a) personal lines, and b) commercial accounts.
    - The first-choice software vendor did not have a mature application for both; that vendor would need to develop the application for commercial accounts.
    - The vendor's proposed system was also a mainframe system with GUI front end.

- FA discovered the relative ease of Web enabling data in Adabas and applications developed with Natural, overcoming internal user perception of a "green screen" environment. "We can keep these systems and make them look like they are new."

- FA started with a perception that finding Adabas and Natural skills would be increasingly difficult to find.

    - They discovered that COBOL programmers could be quickly trained in Natural. The company's stable workforce is complementary to this feature; low turnover makes the modest investment in staff more viable.

- The company determined that other databases and programming languages do not have adequate development tools; Natural has a full development workbench with many tools that are very comfortable for developers.

- An initial belief that the cost of alternative development environments could be less costly was dropped when the company discovered that newer systems typically require more servers, more DBAs and database administration overhead, and the development schedules are longer.

- Impending deadlines for Basel II requirements were approaching faster than the pace of development on the new platform would be able to meet.

- The company recently engaged an IT consulting firm to conduct an IT infrastructure study. "This third-party view said that our systems are good. They can be built upon, they can be opened up, and they are proven and stable."

- FA is currently using Adabas version 7.4.2 and Natural 3.1.6, upgrading to 4.1.4.

- The company has plans to selectively develop new applications in Natural.

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, 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 C: Glossary

[1]**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.

[2]**Payback period:** The breakeven point for an investment. The point in time at which net benefits (benefits minus costs) equal initial investment or cost.

[3]**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.

[4]**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.

[5] **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.

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

Category	Calculation	Initial cost	Year 1	Year 2	Year 3	Total

Source: Forrester Research, Inc.

Appendix D: About the Project Manager

Jeffrey North, Senior Consultant

Jeffrey North is a senior consultant with Forrester's Total Economic Impact (TEI) consulting practice. The TEI methodology focuses on measuring and communicating the value of IT and business decisions and solutions as well as providing a business case based on the costs, benefits, flexibility, and risk of investments.

Jeff came to Forrester with consulting and operating experience, notably working with fast-growth companies. He was a founding member of the digital strategy practice at Cambridge Technology Partners, where he specialized in business value justification of technology investments and customer advocacy. As a director in the international and catalog business units at Staples, Jeff built and managed metrics and reporting programs in North America and Europe as the company experienced significant growth. He has also consulted in a business-IT capacity to retailers and life sciences companies.

Jeff holds a B.A. from St. Lawrence University and an M.B.A. with concentrations in international management and finance from the Thunderbird School of Global Management.