

A Forrester Total Economic Impact™ Study Prepared For Oracle

Total Economic Impact™ Study Of Oracle Data Integrator

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FORRESTER

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Executive Summary

In April 2011, Oracle commissioned Forrester Consulting to examine the total economic impact and potential return on investment (ROI) enterprises may realize by deploying Oracle Data Integrator (ODI). The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of the Oracle Data Integrator on their organizations.

Oracle Data Integrator Offers Operational And Capital Savings

A series of interviews were conducted with a large global system for mobile communications (GSM) operator that operates in eight countries across Eastern Europe. The organization has more than 500 Oracle Databases instances, of which 150 are in production. The organization purchased Oracle Data Integrator to replace an extract, transform, and load (ETL) tool that had been used for six years within its data mining group. Since implementation, the organization has expanded the use of ODI to new initiatives including a mission-critical network operations data infrastructure (NODI) project. After migration to ODI from the prior ETL environment, the organization has decreased its batch-running time by a factor of nine. It's important to note that the organization also deployed Oracle Exadata Database Machine sometime after migration to ODI, which has led to a decrease in total batch run time by a factor of 20. For the purpose of this study, we will primarily evaluate the costs and benefits of deploying ODI.

Our interviews revealed the following set of benefits:

1. Improvement in data mining project completion and shorter reporting cycle.
2. Overall administrative and training costs savings.
3. Ability to extend existing hardware life.
4. Improvement in the overall performance of ETL and queries.

To fully understand the potential impact on their organizations, readers should take into consideration all benefits. The risk-adjusted ROI, costs, and benefits are illustrated in Table 1. All numbers have been rounded.

Table 1

Three-Year Risk-Adjusted ROI¹

ROI	Payback period	Total benefits (PV)	Total costs (PV)	Net present value
167%	6.9 months	\$7,404,373	(\$2,768,044)	\$4,636,329

Source: Forrester Research, Inc.

- **Benefits.** The organization we interviewed achieved the following benefits with ODI:

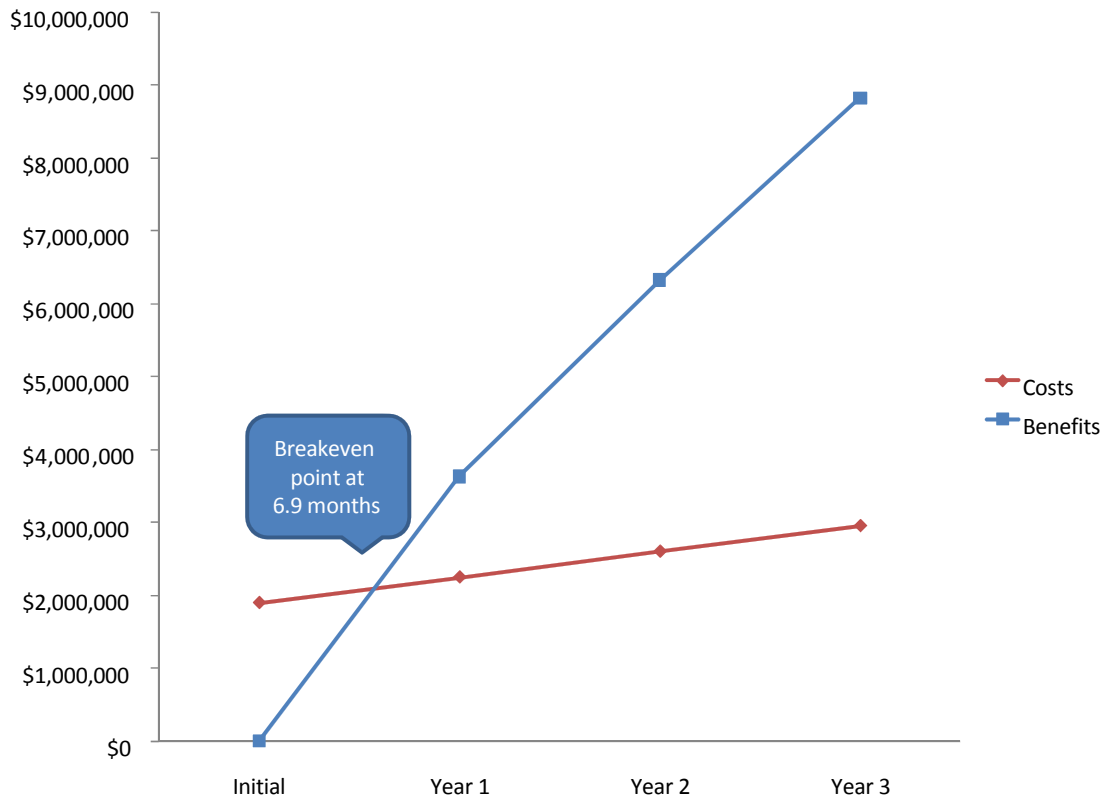
- **Quicker project completion.** This benefit represents the speed at which various data mining projects are being completed compared with the prior environment.
- **Shorter reporting cycle that helps business users make decisions faster.** This benefit represents the reduction in the reporting cycle from 30 days to seven days after deployment of ODI. After implementing Oracle Exadata, the organization further reduced the reporting cycle to three days. In this study, we have only estimated the cost savings associated with the initial deployment of ODI (separate from the Oracle Exadata deployment).
- **Overall administrative cost savings driven through automation and simplicity.** This benefit represents the savings resulting from ongoing management and administrative efforts of loading and unloading data.
- **Eliminating ongoing third-party training cost.** This benefit represents the savings when the organization has the ability to develop and host its own internal training.
- **Deferring hardware upgrades.** This benefit represents the ability to run ETL jobs with increasing data volumes without having to upgrade the hardware.
- **Costs.** The organization we interviewed experienced the following costs:
 - **ODI software license and annual maintenance costs.** This cost represents the total investment in software and maintenance costs. Readers should note that these are based on list prices and individual organization's negotiated pricing could vastly differ.
 - **Internal implementation costs.** This cost represents the internal IT resources contributed to the analysis and deployment of ODI.
 - **Third-party professional services savings.** This cost represents the costs associated with the third-party professional services that were hired to support transition and host in-house training of developers.
 - **Ongoing administrative cost.** This cost represents the ongoing administrative effort associated with ongoing training and daily management of the system.

Table 2Three-Year Risk-Adjusted Running Totals²

Category	Initial	Year 1	Year 2	Year 3
Costs	(\$1,893,495)	(\$2,245,164)	(\$2,596,833)	(\$2,948,503)
Benefits		\$3,630,580	\$6,321,160	\$8,823,741

Source: Forrester Research, Inc.

Figure 1
Three-Year Risk-Adjusted Payback Analysis



Source: Forrester Research, Inc.

Factors Affecting Benefits And Costs

Table 1 illustrates the risk-adjusted financial results that were achieved by the organization. The risk-adjusted values take into account any potential uncertainty or variance that exists in estimating the costs and benefits, which produces more conservative estimates. The following factors may affect the financial results that an organization may experience:

- The organization interviewed was able to deploy Oracle Data Integrator in less than a week; this may vary based on knowledge, expertise, and type of environment it's being deployed on.
- The organization provided minimal training to existing developers, and the development team was able to begin work on multiple initiatives simultaneously.
- The ability to reuse previously created scripts allowed the developers to save resources. It also reduced any error, testing, and troubleshooting tasks that would be necessary when creating new codes.
- The hardware cost savings could vary for an organization based on its existing infrastructure.

Disclosures

The reader should be aware of the following:

- The study is commissioned by Oracle and delivered by the Forrester Consulting group.
- 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 Oracle Data Integrator.
- Oracle 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 customer names for the interviews were provided by Oracle.

TEI Framework And Methodology

Introduction

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ framework for those organizations considering implementing Oracle Data Integrator. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision.

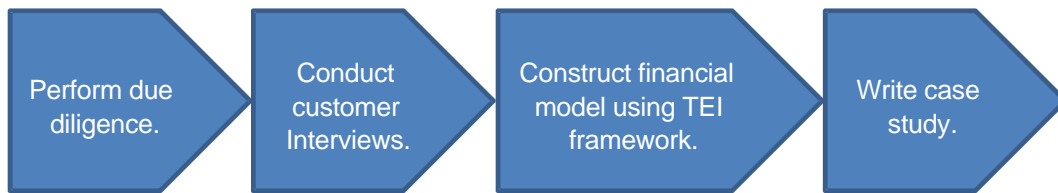
Approach And Methodology

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

- Interviewed Oracle marketing and sales and Forrester analysts to gather data relative to Oracle Data Integrator and the marketplace for data mining.
- Interviewed an organization currently using Oracle Data Integrator to obtain data with respect to costs, benefits, and risks.
- Constructed a financial model representative of the interviews using the TEI methodology. The financial model is populated with the cost and benefit data obtained from the interviews as applied to the composite organization.

Figure 2

TEI Approach



Source: Forrester Research, Inc.

Forrester employed four fundamental elements of TEI in modeling Oracle Data Integrator's service:

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

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

Analysis

Interview Highlights

A series of in-depth interviews were conducted for this study, involving representatives from a large GSM that operates in eight countries across Eastern Europe. The organization has more than 500 Oracle databases, of which 150 are in production. The organization purchased Oracle Data Integrator to replace an existing ETL tool that was being used for six years within its data mining group. Since deployment, the organization has expanded the use of ODI to a number of new initiatives including supporting a mission-critical NODI project. The organization has negotiated an unlimited enterprise license deal with Oracle.

The migration to ODI allowed the interviewed organization the ability to react swiftly to volumes of information about its customers as opposed to having to wait almost an entire month. Business users could make more insightful decisions, and administrators became more productive, freeing up their time to support other tasks.

Table 3

Performance Improvement

Category	Reporting length	Total performance improvement
Prior to ODI	Reports took 480 hours of processing time (240 hours per shift).	
After implementing ODI (on the same hardware)	Reports are completed in 56 hours of processing time.	9x
After implementing Oracle Exadata	Reports are completed in 24 hours of processing time.	20x

Source: Forrester Research, Inc.

After implementing ODI, the batch-running time was improved by a factor of nine times; this compares ETL processing times, improvement in data loading, unloading, and transformation performance between the previous ETL environment and ODI when using the same hardware. To further improve performance, sometime after implementation of ODI, the organization placed ODI on Oracle Exadata Database Machine X2-2 — a 96 CPU cores for database and a 168 CPU cores on storage. The use of Oracle Exadata produced a total of 20 times performance improvement for the same ETL.

Here are examples of what the organization reported against:

- Understanding subscriber segmentations (demographics, location, profiling).
- Subscriber credit scoring.

- Service and need-based analysis.
- Social network analysis.
- Behavior-based segmentation.

These reports, which are at the heart of marketing, customer satisfaction, and sales that help development of new sources of revenue, all relied on timely accurate information. The importance of the timeliness of this data is even more apparent when the organization is continuously evaluating information that by nature is constantly changing, such as social network analysis, credit scoring, and customer behavior.

The interviews uncovered the following:

- The prior environment was complex and difficult to use. Only two of the developers could understand the custom code development, making it challenging to support the environment, especially as data volume grew and more sources required ETL processing. Recruitment, training, ongoing support, and retention became obstacles to growth.
- During the pre-implementation of ODI, the organization's data mining team allocated two people for two months to complete the discovery and planning phase. The actual implementation of ODI was completed in less than a week.
- As the organization's business was growing and changing, the business units demanded more real-time and near-real-time integrated data. The ability to shorten the reporting cycle played an important role in implementation and adoption of ODI for various new and existing data mining initiatives. In the prior environment, the data mining team needed 30 days to produce the end-of-month reports. After deployment of ODI, it was able to produce the same report in seven days. Later, using Oracle Exadata, it was able to further improve the reporting production timeline to three days.
- The organization's data mining team is currently managing 13 projects simultaneously after implementing ODI. The development portion of these projects takes six months, and the testing requires another six months. Prior to using ODI, the organization needed to spend three months on each project consecutively to complete the development and testing. The deployment and testing process has decreased by 60% since the deployment of ODI.
- After deploying ODI, the data mining team was able to reduce ongoing development cycles because they now have a centralized source and the team was no longer required to do any hand-coding or manual integration. In addition, the organization spent three days of the following month managing the reporting development process. This is a shift from the prior environment, where for one month, two developers were dedicated for 24 hours (one covered night shift and one for day shift) to create reports for the prior month.
- The organization reported that it was able to reuse 60% of configurations that were produced after it implemented Oracle Data Integrator solution. This allowed the team to reduce error and troubleshoot quicker. It also expedited the completion of existing and future initiatives on data management.

- According to interviews, previously, a data mining team administrator spent 50% of his time answering questions for database administrators and developers. Why? A complex development environment, where developers were required to use specialized language for coding and the need to continuously produce custom codes, created an error-prone environment. As a result, the ability to create reusable data and code and the opportunity to have a separate development, testing, and production environment with separate master and work repositories resulted in the decision to migrate to ODI. After deployment of ODI, the administrator reduced his day-to-day activities by 5% and allocated 10% of his time toward in-house training preparation and delivery. As a result, the corporatewide, dedicated training is effective and targeted because the trainer has hands-on experience and is aware of the organization's internal needs and resources. The system is also easier to work with because it doesn't require a specialized language, which further simplifies recruitment and retention that were previously challenging. This has also allowed the organization to reduce the cost of third-party professional services associated with training.

Framework Assumptions

Table 4 provides the model assumptions that Forrester used in this analysis.

Table 4

Model Assumptions

Ref.	Metric	Calculation	Value
A1	Hours per week		40
A2	Weeks per year		52
A3	Hours per year (M-F, 9 a.m. to 5 p.m.)		2,080
A4	Average fully loaded ³ salary of Java developer		\$129,555
A5	Fully loaded hourly rate of Java developer	(A4/A3)	\$62

Source: Forrester Research, Inc.

The discount rate used in the PV and NPV calculations is 10%, and the time horizon used for the financial modeling is three years. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult with their respective company's finance department to determine the most appropriate discount rate to use within their own organizations.

Costs

This section describes and lists the costs related to planning, testing, and implementing Oracle Data Integrator over a three-year period. Cost assumptions are based on detailed interviews with an organization using ODI for its data

mining. All costs are based on list prices and do not include any negotiated discounts. The following cost model can serve as a framework for other organizations.

Software Licensing And Annual Maintenance Costs

This section will measure the total software licensing and annual maintenance investment in ODI. The organization has an unlimited enterprise license deal with Oracle. To measure the software license and annual maintenance costs of this investment, the following considerations were made:

- The list price for license cost and annual maintenance of ODI is \$23,000 and \$5,060 per license, respectively.
- Oracle estimates that the customer would require 64 licenses of ODI.
- ODI shared the resources with other data management and data mining functions.

Table 5 illustrates the calculation. This category represents 95% of the overall investment in Oracle Data Integrator.

Table 5

Software License And Annual Maintenance Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
B1	Total number of licenses		64			
B2	ODI software license fees		\$23,000			
B3	ODI software maintenance costs		\$5,060	\$5,060	\$5,060	\$5,060
Bt	Software license and annual maintenance costs	$B1*(B2+B3)$	\$1,795,840	\$323,840	\$323,840	\$323,840

Source: Forrester Research, Inc.

Internal Implementation Costs

This category represents 2% of the overall investment. This section is divided into two sets of tasks: 1) the resources allocated to installation, production, and testing of ODI, and 2) the effort to complete the discovery and planning phase.

During the discovery and planning phase, the organization allocated two people for two months to complete due diligence prior to installation and testing. We have estimated a monthly fully loaded salary of \$10,796 (\$129,555/12 months per year) for each developer.

The interviews also revealed that installation and testing took less than a week of effort to implement ODI. For implementation, the data mining team allocated 10 hours for three developers at a fully loaded hourly rate of \$62 to complete this stage. Table 6 illustrates the calculation for installation, production, and testing costs. Table 7 represents total internal implementation costs, including the effort associated with pre-implementation due diligence.

Table 6

Installation, Production, And Testing Costs

Ref.	Metric	Calculation	Value
C1	Number of people		3
C2	Number of hours		10
C3	Average fully loaded hourly rate		\$62
Ct	Installation, production, and testing costs	$C1 * C2 * C3$	\$1,860

Source: Forrester Research, Inc.

Table 7

Internal Implementation Costs

Ref.	Metric	Calculation	Initial
Ct	Installation, production, and testing cost		\$1,860
D1	Number of people		2
D2	Number of months		2
D3	Average monthly fully loaded salary		\$10,796
Dt	Internal implementation costs	$Ct + (D1 * D2 * D3)$	\$45,044

Source: Forrester Research, Inc.

Third-Party Professional Services Costs

This category represents 1% of the overall investment. The organization employed a third-party professional services firm to support deployment and training. The ODI deployment was an integral part of the data mining effort. To ensure a smooth transition, the organization needed to employ resources to facilitate a successful migration.

We estimate that for 15 days two consultants at a rate \$1,000 per day were supporting analysis and training. Table 8 represents this calculation.

Table 8
Professional Services Costs

Ref.	Metric	Calculation	Initial
E1	Number of consultants		2
E2	Average fully loaded daily rate		\$1,000
E3	Average number of days		15
Et	Professional services costs	$E1 * E2 * E3$	\$30,000

Source: Forrester Research, Inc.

Ongoing Administration Costs

This category is the final component of costs and represents 2% of the total investment. This measures the ongoing administrative effort required after deploying ODI. According to interviews, after deployment of ODI the administrator spent 5% of the time addressing ongoing questions and supporting developers and 10% of the time creating training collateral for new and existing employees.

After implementing ODI, the organization brought corporatewide training in-house for developers using ODI. This is dedicated internal training for the organization. According to the interviews, the training is more effective and targeted because the trainer has hands-on experience and is aware of the organization's internal needs. The system is also easier to work with because it doesn't require a specialized language that would make recruitment and retention challenging. This has also allowed the organization to reduce the cost of third-party professional services associated with training. Table 9 illustrates the calculation.

Table 9

Ongoing Administrative Costs

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
F1	Number of administrators		1	1	1
F2	Time percent of spent on daily management activities		5%	5%	5%
F3	Average percent of time spent creating training collateral		10%	10%	10%
F4	Number of training sessions hosted annually		2	2	2
F5	Number of hours per session		32	32	32
F6	Average fully loaded salary		\$129,555	\$129,555	\$129,555
Ft	Ongoing administrative costs	$F1*(F2*F6+F3*F6+F4*F5*F6)$	\$23,420	\$23,420	\$23,420

Source: Forrester Research, Inc.

Total Costs

Table 10 summarizes costs of implementation of Oracle Data Integrator. Figure 3 illustrates the breakdown of costs.

Table 10

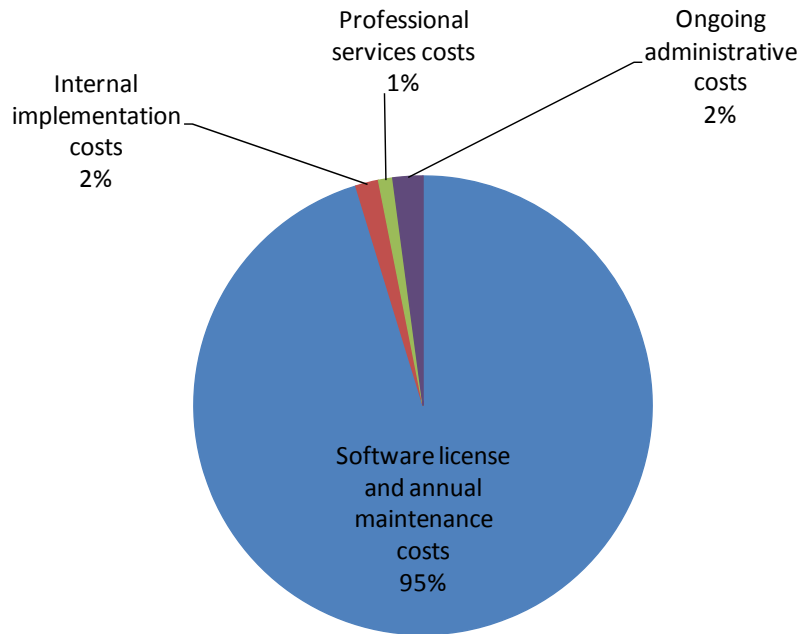
Total Costs — Non-Risk-Adjusted

Costs	Initial	Year 1	Year 2	Year 3	Total	PV
Software license and annual maintenance costs	(\$1,795,840)	(\$323,840)	(\$323,840)	(\$323,840)	(\$2,767,360)	(\$2,601,182)
Internal implementation costs	(\$45,044)				(\$45,044)	(\$45,044)
Professional services costs	(\$30,000)				(\$30,000)	(\$30,000)
Ongoing administrative costs		(\$23,420)	(\$23,420)	(\$23,420)	(\$70,260)	(\$58,242)
Total costs	(\$1,870,884)	(\$347,260)	(\$347,260)	(\$347,260)	(\$2,912,664)	(\$2,734,468)

Source: Forrester Research, Inc.

Figure 3

Total Costs — Non-Risk-Adjusted



Source: Forrester Research, Inc.

Benefits

The benefits that we had sufficient data to quantify financially are: 1) improvement in project completion; 2) shorter reporting cycles; 3) overall administrative cost savings; and 4) deferred hardware upgrades. These benefits represent operating savings as well as capital savings that represented a three-year risk-adjusted PV of \$7.69 million. Readers should note that these benefits only represent the values that the organization that was interviewed received from deployment of ODI. It doesn't include any gains realized from the use of Oracle Exadata.

Improvement In Project Completion

During the interview process, we collected a number of examples to help quantify the value the organization gained when deploying ODI. One of those examples was the improvement in project completion. According to the interviewees, after implementing ODI, the organization managed 13 data mining projects simultaneously. The development portion of these projects takes about six months, and the testing requires another six months. Prior to using ODI, the organization had to spend three months on each project to complete the development and testing. So instead of delivering 13 projects within the year, the organization would have had to spend 39 months to deliver the same number of initiatives. Therefore, after deployment, the overall process of development and testing decreased while performance, project completion, and report delivery significantly improved.

To measure this calculation, we estimate that prior to implementation of ODI, the organization required three months per project completion. After deployment, the organization completes the same number of projects in 12 months. The savings represents the reduction in effort for seven developers with average monthly fully loaded salary of \$10,796 (\$129,555/12 months per year). Table 11 presents the calculation. This section represents 64% of the overall benefits.

Table 11

Improvement In Project Completion

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
G1	Number of months required to complete 13 projects prior to implementation of ODI		39		
G2	Number of months required to complete 13 projects after implementation of ODI	Includes development and testing	12		
G3	Average monthly fully loaded salary per developer		\$10,796		
G4	Total number of developers		7		
Gt	Improvement in project completion	$(G1-G2)*G3*G4$	\$2,040,444	\$2,040,444	\$2,040,444

Source: Forrester Research, Inc.

Shorter Reporting Cycles

One of the most important values organizations interviewed placed on the implementation of ODI was the ability to significantly reduce various reporting cycles. Our interviewee mentioned that in the past, reporting took 240 hours to process per shift: For example, January data was accessible on March 1. That considerably limited the organization's ability to address business issues that were supported by the following sample of analysis: 1) understanding subscriber segmentations; 2) subscriber credit scoring; 3) service and need-based analysis; 4) social network analysis; and 5) behavior-based segmentation.

These reports are necessary tools for marketing, production, and sales to help in the development of new sources of revenue, which relies on timely and accurate information. The importance of the timeliness of this data is even more apparent when the organization is continuously evaluating information that by nature is constantly changing, such as social network analysis, credit scoring, and customer behavior.

Based on the interviews, prior to implementation of ODI, the organization used two developers at a fully loaded hourly rate of \$62 for 480 hours per month (30 days*8 hours per shift*2 shifts) to monitor and prepare end-of-month reporting. After implementing ODI, this effort was reduced to 56 hours per month (7 days*8 hours per shift). Table 12 illustrates the benefit. This category represents 20% of the overall benefits.

Table 12
Shorter Reporting Cycles

Ref.	Metric	Calculation	Per period
H1	Number of workers		2
H2	Average fully loaded hourly rate of Java developer		\$62
H3	Number of hours before ODI		480
H4	Number of hours after ODI		56
H5	Number of months		12
Ht	Shorter reporting cycle	$H1 * H2 * (H3 - H4) * H5$	\$630,912

Source: Forrester Research, Inc.

Overall Administrative And Third-Party Training Cost Savings

During the interview process, we identified that in the past, the data mining team administrator would dedicate 50% of his shift to addressing questions related to system administration and developers coding related questions. According to our interviewee, the team heavily focused on the production system. It was costly and hard to recruit and retain developers because the prior ETL application used a special language. This section primarily calculates the reduction in administrative effort. Table 13 presents the calculation. This section represents 3% of the overall benefits.

Table 13
Overall Administrative Cost Savings

Ref.	Metric	Calculation	Per period
I1	Number of workers		1
I2	Annual fully loaded salary		\$129,555
I3	Average percent time savings		50%
It	Administrative and training cost savings	$I1 * I2 * I3$	\$64,778

Source: Forrester Research, Inc.

After deployment of ODI, the organization was also able to produce and host training sessions in-house, which led to reduction in third-party training costs. The interviewed organization was able to reduce four third-party training

sessions annually. Each training session required three days at an average daily cost of \$1,000. This leads to annual savings of \$12,000. Table 14 illustrates the calculation.

Table 14
Reduction In Third-Party Training Costs

Ref.	Metric	Calculation	Per period
J1	Number of training sessions		4
J2	Number of days per training session		3
J3	Average daily cost		\$1,000
At	Reduction in third-party training costs	$J1 * J2 * J3$	\$12,000

Source: Forrester Research, Inc.

Deferred Hardware Upgrades

The final savings is the ability to defer capital expenditure. When the organization was evaluating ways to improve performance, it considered two options: 1) keep the prior ETL tool and replace the existing hardware with a more powerful hardware, or 2) implement ODI. In reviewing the potential investment in hardware replacement, it projected the effort to upgrade the existing hardware. Because the hardware that hosts the prior ETL tool was also supporting other applications, the internal effort to move those applications as well as the cost to replace that hardware to a more powerful alternative was significant.

Another drawback that our interviewee mentioned was the scalability and performance issues it was facing. It could not estimate that the hardware replacement will result in the same performance improvement as ODI.

After migration to ODI, the company could process more data management tasks in shorter duration, freeing up the CPU cycles and memory to do more tasks. The organization was also able to place ODI on the existing hardware and defer capital investment by two years; at that time the company will replace hardware with a more cost-efficient solution. As a result, ODI ran more efficiently, consuming fewer resources, which allowed the company to defer hardware upgrades for two years, saving the organization \$800,000 over three years.

To create a framework for the reader, we estimated the cost to replace the hardware with a more powerful alternative at the beginning of the investment period to be around \$1 million. Table 15 illustrates the calculation. This section represents 13% of the overall benefits.

Table 15

Deferring hardware upgrades

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
K1	Number of asset		1		
K2	Cost of an asset		\$1,000,000		(\$200,000)
Kt	Deferring hardware upgrades	K1*K2	\$1,000,000	\$0	(\$200,000)

Source: Forrester Research, Inc.

Total Benefits

Table 16 summarizes the total quantified benefits of using Oracle Data Integrator. Figure 4 illustrates the breakdown of benefits.

Table 16

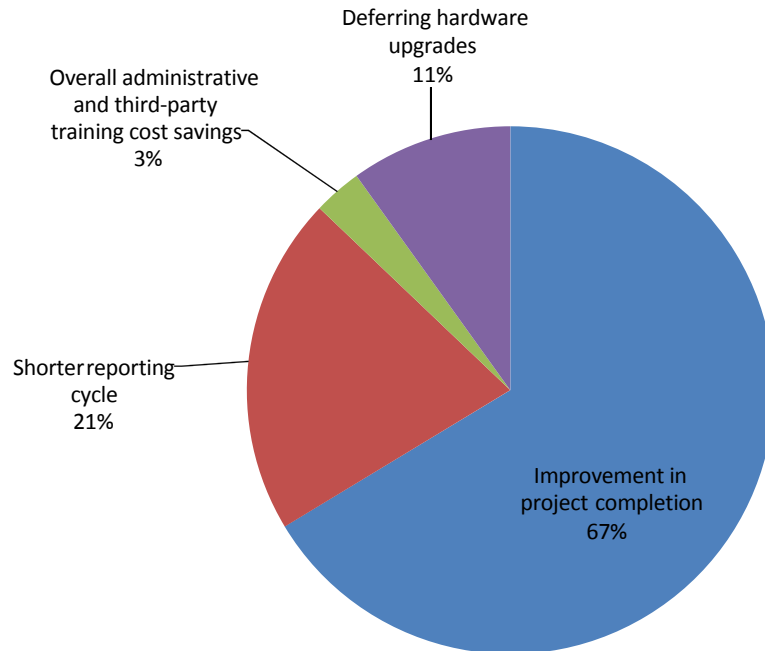
Total Benefits — Non-Risk-Adjusted

Benefits	Year 1	Year 2	Year 3	Total	PV
Improvement in project completion	\$2,040,444	\$2,040,444	\$2,040,444	\$6,121,332	\$5,074,3282
Shorter reporting cycles	\$630,912	\$630,912	\$630,912	\$1,892,736	\$1,568,985
Overall administrative cost savings	\$64,778	\$64,778	\$64,778	\$194,334	\$161,093
Third-party training cost savings	\$12,000	\$12,000	\$12,000	\$36,000	\$29,842
Deferring hardware upgrades	\$1,000,000		(\$200,000)	\$800,000	\$758,828
Total benefits	\$3,748,134	\$2,748,134	\$2,548,134	\$9,044,402	\$7,593,030

Source: Forrester Research, Inc.

Figure 4

Total Benefits — Non-Risk-Adjusted

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. 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 implement Data Integrator and later realize additional uses and business opportunities. Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

If the following metrics are available — the asset value by measuring the benefits (i.e., costs avoided or saved, revenue generated, and/or capital saved), the costs to acquire the solution, and the number of years to measure the investment — we can estimate the flexibility option by using the Black-Scholes option pricing model.

Table 17
Flexibility Benefit Framework

Metric	Calculation
Asset value (benefit)	IT or business costs avoided, revenue generated, capital saved
Cost to acquire option	Planning and discovery, subscription, and annual maintenance are examples of costs to consider
Expiration	Time-to-expire (in years)
Flexibility	Black-Scholes option pricing model

Source: Forrester Research, Inc.

Risk

Forrester defines two types of risk associated with this analysis: 1) implementation risk, and 2) impact risk. “Implementation risk” is the risk that a proposed investment in Data Integrator may deviate from the original or expected requirements, resulting in higher costs than anticipated. “Impact risk” refers to the risk that the business or technology needs of the organization may not be met by the investment in Data Integrator, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for cost and benefit estimates.

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

The implementation risk that affects costs is identified as part of this analysis:

- Implementation costs including professional services could vary based on the internal skill set and competencies.

The impact risk that affects benefits is identified as part of the analysis:

- The improvement in administrative effort could vary depending on the prior organization.

Table 18 shows the values used to adjust for risk and uncertainty in the cost and benefit estimates. The TEI model uses a triangular distribution method to calculate risk-adjusted values. To construct the distribution, it is necessary to first estimate the low, most likely, and high values that could occur within the current environment. The risk-adjusted value is the mean of the distribution of those points. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

Table 18
Cost And Benefit Risk Adjustments

Costs	Low	Most likely	High	Mean
Software license and annual maintenance costs	98%	100%	105%	101%
Internal implementation costs (analysis and coding costs)	100%	100%	115%	105%
Professional services (external implementation) costs	100%	100%	125%	108%
Ongoing administrative costs	100%	100%	115%	105%
Benefits	Low	Most likely	High	Mean
Improvement in project completion	90%	100%	105%	98%
Shorter reporting cycle	90%	100%	105%	98%
Overall administrative and training cost savings	80%	100%	103%	94%
Deferring hardware upgrades	80%	100%	103%	94%

Source: Forrester Research, Inc.

Financial Summary

The financial results calculated in the Costs and Benefits sections can be used to determine the return on investment, net present value, and payback period for the organization's investment in Oracle Data Integrator. These are shown in Table 19 below.

Table 19

Cash Flow — Non-Risk-Adjusted

Category	Initial	Year 1	Year 2	Year 3	Total	PV
Costs	(\$1,870,884)	(\$347,260)	(\$347,260)	(\$347,260)	(\$2,912,664)	(\$2,734,468)
Benefits		\$3,748,134	\$2,748,134	\$2,548,134	\$9,044,402	\$7,593,030
Net benefits	(\$1,870,884)	\$3,400,874	\$2,400,874	\$2,200,874	\$6,131,738	\$4,858,562
ROI	178%					
Payback period	6.6 months					

Source: Forrester Research, Inc.

Table 20 below shows the risk-adjusted ROI, NPV, and payback period values. These values are determined by applying the risk adjustment values from Table 18 in the Risk section to the cost and benefits numbers in Table 10 and Table 16.

Table 20

Cash Flow — Risk-Adjusted

Category	Initial	Year 1	Year 2	Year 3	Total	PV
Costs	(\$1,893,495)	(\$351,669)	(\$351,669)	(\$351,669)	(\$2,948,503)	(\$2,768,044)
Benefits		\$3,630,580	\$2,690,580	\$2,502,580	\$8,823,741	\$7,404,373
Net benefits	(\$1,893,495)	\$3,278,911	\$2,338,911	\$2,150,911	\$5,875,238	\$4,636,329
ROI	167%					
Payback period	6.9 months					

Source: Forrester Research, Inc.

Oracle Data Integrator: Overview

According to Oracle, Oracle Data Integrator Enterprise Edition (ODI) delivers unique next-generation Extract Load and Transform (E-LT) technology that improves performance and reduces IT hardware costs while providing batch, bulk data movement, and transformation. Data Integrator accomplishes this through the productivity of a declarative design approach, which helps lower TCO and results in faster and simpler development and maintenance. The lack of reliance on intermediary servers helps keep costs low and results in simpler implementations.

Knowledge Modules are integral modules that are part of ODI and provide a foundation for extensibility. They are plug-in modules that contain sample code and are used to establish connections to sources or targets, whether Oracle or third party. Designed to be highly extensible for any customer application, extraction, transformation, or loading activity, ODI has 100-plus Knowledge Modules, making it able to integrate seamlessly with many applications. ODI can execute on large volumes of data in both batch and mini-batch, and it comes with a built-in change data capture capability via Oracle GoldenGate.

E-LT technology offers multiple benefits in terms of being lightweight, able to run either on the source or target, and not requiring an additional dedicated server, unlike traditional ETL technologies. High performance is a hallmark of E-LT, and ODI accomplishes this by leveraging the database to execute transformations faster, plus ODI can reside where data resides. Finally, ODI provides a unified infrastructure to streamline data and application integration projects while keeping implementation costs low and manageable. Oracle Data Integrator on Oracle Exadata takes the ELT architecture to the next level. The combination of both helps organizations produce fast bulk data transformation as well as easier and more efficient integrated management and monitoring. Specifically, ODI utilizes Oracle Exadata's Smart Scan technology to execute transformations much quicker as well as take advantage of Oracle Exadata's advanced SQL functions. Jobs and data flow are completed faster, with ODI on Oracle Exadata without any need for extra ETL servers or any intermediaries. ODI and Oracle Exadata help extend ELT architecture to form high-performance enterprise-class bulk/batch data movement and transformation that drives data integration to success for any kind of organization.

Oracle Data Integrator is also an essential component of Oracle's approach to big data. Oracle now adds comprehensive big data support to its best-of-breed offering with support for Hadoop and the autocreation of MapReduce. Using ODI, companies can optimize loading of Hadoop with Oracle Loader for Hadoop to Oracle Big Data Appliance and Oracle Exadata.

The Business Problem That Oracle Data Integrator Enterprise Edition Solves

In today's increasingly fast-paced, data-driven business environment, organizations need to grapple with large volumes of data from multiple sources. As a result, they need to ensure that data can be moved between applications on heterogeneous hardware platforms and systems and guarantee the ability to share data between applications and systems. Projects that implement these integration requirements need to be delivered on spec, on time, and on budget.

Next-Generation Data Integration Provides Compelling Returns

ODI results in significant benefits in two important categories: productivity and performance. Specifically productivity benefits are seen through:

- **Modularity, flexibility, and extensibility.** Knowledge Modules implement the actual data flows and define the templates for code generation across the multiple systems involved in each process. This enables companies to capture and reuse technical expertise and best practices, thus reducing cost of ownership.
- **Unified look and feel with Oracle JDeveloper IDE.** This creates a seamless experience with low training times and ramp-up. The Oracle JDeveloper environment is integrated across all products in Oracle Fusion Middleware including Oracle SOA Suite, Oracle WebCenter, and Oracle WebLogic Server.
- **Faster and simpler development and maintenance.** The declarative rules-driven approach to data integration greatly reduces the learning curve of the product and increases developer productivity while facilitating ongoing maintenance. This approach separates the definition of the processes from their actual implementation and separates the declarative rules (the “what”) from the data flows (the “how”).

ODI’s high performance stems from its unique approach to data movement — ELT. The Extract Load Transform approach eliminates the need for a standalone ETL server and proprietary engine and instead leverages the inherent power of RDBMS engines. Here’s what makes ODI achieve the highest performance and why companies choose Oracle Data Integrator for their data integration needs:

- **Cost-savings.** The elimination of the ETL server and ETL engine reduces both the initial hardware and software acquisition and maintenance costs. The reduced learning curve and increased developer productivity significantly reduce the overall labor costs of the project, as well as the cost of ongoing enhancements.
- **High performance.** Traditional data integration software (ETL) is based on proprietary engines that perform data transformations row by row, thus limiting performance. By implementing an ELT architecture, based on existing RDBMS engines and SQL, the organization is capable of executing data transformations on the target server at a set-based level, giving the organization much higher performance. In addition, as per Oracle, ODI sprints on Oracle Exadata and has shown a 10x improvement in benchmark tests with 7 TB of data processes in one hour.
- **Heterogeneity or platform independence.** Oracle Data Integrator supports all platforms, hardware, and operating systems, which provides flexibility to work with all kinds of environments.
- **Data connectivity.** Oracle Data Integrator supports all RDBMSes including all leading data warehousing platforms such as Oracle Database, Oracle Exadata, Teradata, IBM DB2, Netezza, Sybase IQ, and numerous other technologies such as flat files, ERPs, LDAP, and XML. In addition, Oracle Data Integrator can support big data through Hadoop/MapReduce transformation capability.

ODI And Oracle Fusion Middleware Architecture

The ODI platform integrates in the broader Oracle Fusion Middleware platform and becomes a key component of this stack. Oracle Data Integrator provides its runtime components as Java EE applications, enhanced to fully leverage the capabilities of the Oracle WebLogic Server. Oracle Data Integrator components include exclusive features for enterprise-scale deployments, high availability, scalability, and hardened security. In addition, ODI has strong integration with Oracle SOA Suite and Oracle Services Bus and may be called from either due to the shared design interface or shared application server container. By working with SOA, ODI shares a key capability of handling bulk

data at high volumes with high performance. SOA deployments can be transformed easily into data integration projects that put a premium on loading data warehouses, MDM hubs, BI systems, or integrating applications. The “heavy lifting” of information integration is left to what Oracle Data Integrator does very well and leverages the database’s power to execute fast data transformations. For more information on Oracle Data Integrator and how it can help your organization be successful with data integration visit www.oracle.com/goto/dataintegration.

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.

Benefits

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

Costs

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

Risk

Risk measures the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: 1) the likelihood that the cost and benefit estimates will meet the original projections, and 2) the likelihood that the estimates will be measured and tracked over time. TEI applies a probability density function known as “triangular distribution” to the values entered. At minimum, three values are calculated to estimate the underlying range around each cost and benefit.

Flexibility

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

Appendix B: Glossary

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

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

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

Appendix C: Endnotes

¹ Forrester risk-adjusts the summary financial metrics to take into account the potential uncertainty of the cost and benefit estimates. For more information on Risk, please see page 20.

² This table illustrates the risk-adjusted running totals for costs and benefits to provide a visual view of breakeven period.

³ Fully loaded salary is explained by calculating benefits offered as a part of employment. Typically includes base salary of 25% to 30%. Readers should check with their internal HR to determine the percentage of salary for their respective organization.