A Forrester Total Economic Impact™ Study Prepared For Oracle

The Total Economic Impact Of Oracle Exalogic

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FORRESTER®

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Executive Summary

In June 2013, Oracle commissioned Forrester Consulting to examine the total economic impact and potential return on investment (ROI) enterprises may realize by deploying Exalogic. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Exalogic on their organizations.

Exalogic Decreases IT Costs And Increases System Performance

Our interviews with one existing customer, Cognizant, and subsequent financial analysis found that the organization we interviewed experienced the risk-adjusted ROI, internal rate or return (IRR), costs, and benefits shown in Table 1. Infrastructure projects with a payback of less than one year are generally viewed as very good.

Table 1
Three-Year Risk-Adjusted ROI[1]

ROI	IRR	Payback period	Total benefits (PV)	Total costs (PV)	Net present value
91%	69%	13 months	$7,864,933	($4,114,940)	$3,749,993

Source: Forrester Research, Inc.

Forrester has built a three year financial model to demonstrate the anticipated financial results the interviewed company will realize. Three years was chosen because this is a reasonable timeframe in which to look at benefits associated with a capital project. At the time of writing, the Exalogic solution had been in place for approximately one year. Therefore, Forrester assumed that the recurring benefits and costs realized in year one of the study will remain constant and are carried forward at the same level for the subsequent two years.

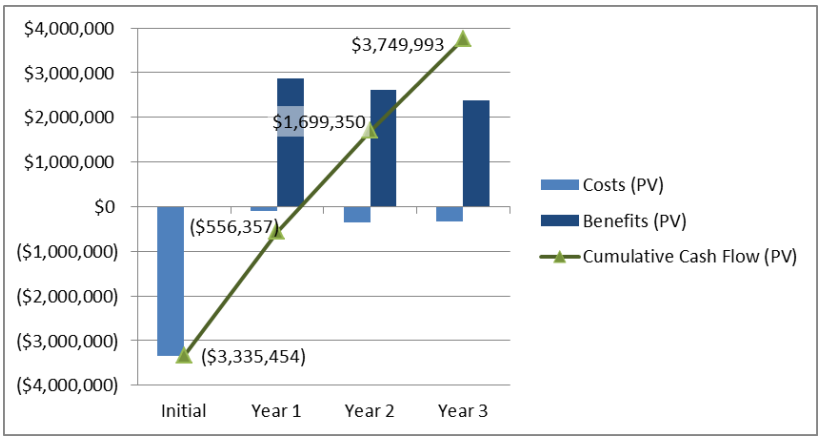
- **Benefits.** The organization we interviewed experienced the following benefits:
    - **Eliminated hardware.** The previous IT estate was at the end of its useful life and was due for replacement when the organization undertook the Exalogic migration. In total, the organization avoided purchasing 88 servers of various uses and configurations. The three-year cost that the organization will avoid for added hardware, maintenance, and hosting totals $7.18 million.
    - **Increased business user productivity.** The interviewed organization realized business productivity gains in multiple ways. One was quantified for illustrative purposes in this study: the decreased time to create service orders. Approximately 3,000 service orders are created each workday; the time to create those orders was cut in half. Half of this improvement is attributable to

Exalogic; the other half was achieved through software rewrites. The total productivity gain over three years equates to slightly less than $2 million.

- **Reduced IT operations team size.** The number of IT full-time equivalent (FTE) resources required to operate and update the PeopleSoft system and the infrastructure hosting it is half of what was required to maintain everything in the previous Unix server environment. Beginning in year one of the study, the number of FTEs required decreased from 12 to six. These resources could be deployed onto other projects and future hires for an expanded team could be avoided. The three-year savings totals $1.8 million.
- **Improved system performance (unquantified).** Improved system performance is a reason for the quantified benefits described above. System performance also leads to better scalability, greater IT team peace of mind, improved user satisfaction, and increased ability to support new business initiatives. These benefits were not quantified in the study.

- **Costs.** The organization we interviewed experienced the following costs:
  - **Implementation internal labor costs.** The project to implement Exalogic and migrate PeopleSoft to an Exalogic platform consisted of three phases, one for each PeopleSoft Suite used: Enterprise Learning Management (ELM), Human Capital Management (HCM), and Enterprise Services Automation (ESA). Each phase had a different duration and number of full-time equivalent (FTE) employees involved. In total, the migration phases lasted 19 weeks, with a total of 208 man-weeks of effort. The total internal labor costs were just under $400,000
  - **Implementation professional services costs.** The organization used 40 man-days of Oracle professional services during the initial migration to Exalogic to ensure that the systems were set up and configured properly and to address changes in how authentication was handled, which differed slightly from the previous Unix environment. The organization used an additional 80 days of professional services during the first year in production for new PeopleSoft application implementations. The total cost was $144,000.
  - **Exalogic hardware, licenses, and support.** The entire previous IT estate used to host PeopleSoft was replaced with an Exalogic ½ rack in the production environment and an Exalogic ¼ rack for disaster recovery. These could also support anticipated growth for the foreseeable future. The Oracle standard price for this Exalogic hardware and software configuration was $2.4 million and the annual support contract was $433,000.

Figure 1
Three-Year Risk-Adjusted Cash Flow



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 size of the hardware estate being replaced and the cost of deployment.** The size of the hardware estate being replaced affects multiple cost and benefit categories, including the cost of server life-cycle replacement and the amount of labor required to maintain and update the solutions.
- **The value of the applications deployed on Exalogic.** Exalogic engineered systems are highly reliable and provide excellent performance improvements. These characteristics can be more valuable for systems that are linked to revenue generation or which are mission-critical.

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 use their own estimates within the framework provided in the report to determine the appropriateness of an investment in Oracle Exalogic.
- 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 name for the interview was provided by Oracle.

TEI Framework And Methodology

Introduction

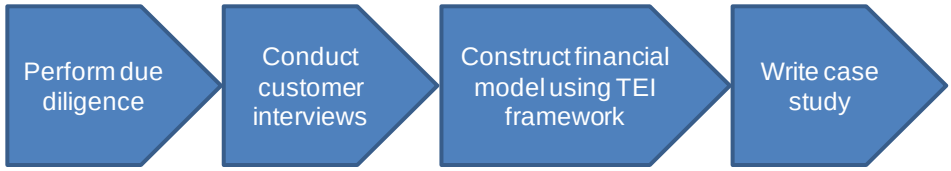
From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ framework for those organizations considering implementing Oracle Exalogic. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision.

Approach And Methodology

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

- Interviewed Oracle marketing personnel and Forrester analysts to gather data relative to Exalogic and the marketplace for engineered systems.
- Interviewed one organization currently using Oracle Exalogic 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 Exalogic'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

The company interviewed for this study was Cognizant, a global IT and business services company. Cognizant provides consulting and outsourcing services to more than 1,000 clients on five continents. Cognizant is headquartered in New Jersey and has more than 170,000 employees around the world.

Much of the internal IT organization is based in India, including the team responsible for the implementation and ongoing management of Exalogic. To make this study more applicable to the reader, we used typical US salaries in the cost/benefit calculations in place of the India-based salaries that Cognizant incurred.

Cognizant has deployed the PeopleSoft Suite in three phases: Enterprise Learning Management (ELM), Human Capital Management (HCM), and Enterprise Services Automation (ESA). ELM and ESA previously existed in an Unix environment and were migrated to Exalogic. HCM was added as part of the overall Exalogic project. A ½ Exalogic rack now hosts the PeopleSoft implementation as well as Oracle Content Management, which was added subsequently. There is also an Exalogic ¼ rack used in the disaster recovery (DR) facility.

The interview with Cognizant uncovered the following salient points:

- Cognizant had a wide range of selection criteria, and Exalogic came out ahead in all areas.
    - "We looked at performance, dependability, and user satisfaction. Exalogic won out."
    - "The cost for relative performance was also important to us. We compared the cost/performance ratio of our existing in-house solution with Exalogic, and decided that Exalogic was the better choice."
- Implementing Exalogic was more cost-effective than building a new, comparably performing custom solution.
    - "The custom solution we designed looked like it was going to cost less. However, in testing and evaluation, it did not scale or meet our performance objectives. That made Exalogic the right choice from a financial perspective."
- The need to support business growth was one of the driving factors in looking for an engineered solution and implementing Exalogic.
    - "We have been growing at a blistering pace in terms of revenue and employees. We saw that our existing system was not scaling. Users were experiencing slow performance and complaining. We needed to improve our systems for customer satisfaction."
    - "PeopleSoft is used by everyone. It needs to support a very large number of concurrent users, and that number is growing every year. Exalogic provides the scalability we need."

- Switching to Exalogic reduced complexity and maintenance.
    - "Maintainability was another problem we faced. There were too many servers for the PeopleSoft deployment and it took too many people to maintain."
    - "Maintaining PeopleSoft and the underlying hardware was becoming more and more complex. Patches had to be applied in multiple places, and the risk of human error was increasing. Additionally, the maintenance window was growing and encroaching on times users needed to be on the systems."

Framework Assumptions

Table 2 provides the model assumptions that Forrester used in this analysis. For Cognizant, the IT operations team responsible for Exalogic and PeopleSoft is located in India. For this study, a US salary was used to make the study more applicable to the reader. Readers should apply their own labor costs to all calculations in the study.

Table 2
Model Assumptions

Ref.	Metric	Value
A1	IT employee annual fully burdened cost*	$100,000
A2	Generic business user annual fully burdened cost*	$85,000
*Fully burdened cost includes insurance, paid vacation, and any other cost borne by the organization.		

Source: Forrester Research, Inc.

The discount rate used in the PV and NPV calculations is 10% and 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.

Some dollar values presented in this study have been rounded to the nearest whole cent or dollar. Therefore, some of the calculation results in the subsequent tables may not exactly match the results if the reader follows the formulas and values presented.

Costs

This section describes the costs associated with the implementation and ongoing management of Oracle Exalogic.

Implementation Internal Labor Costs

The installation of the Exalogic hardware and migration of PeopleSoft was completed in three phases:

- Phase one consisted of standing up the hardware and migrating PeopleSoft ELM. This lasted five weeks.
- Phase two consisted of a new implementation of HCM. This lasted six weeks. The full cost is included in this study even through a migration would have cost less than this new implementation.
- Phase three saw the implementation of ESA, which is part of the PeopleSoft Financial Suite. This final phase lasted eight weeks.

The project teams were a mix of PeopleSoft administrators, infrastructure engineers, developers, and testers. On average, all members of the project teams spent approximately 75% of their time working on these efforts. Cognizant reported that there were no major complications during the projects.

Table 3

Implementation Internal Labor Costs

Ref.	Metric	Calculation	Initial
B1	Percentage of time spent on the project		75%
B2	Number of resources for Phase 1 (ELM)		9
B3	Duration of Phase 1 (weeks)		5
B4	Number of resources for Phase 2 (HCM)		4
B5	Duration of Phase 2 (weeks)		6
B6	Number of resources for Phase 3 (ESA)		26
B7	Duration of Phase 3 (weeks)		8
B8	Total number of man-weeks	B1*(B2*B3+B4*B5+B6*B7)	208
B9	Average weekly fully burdened cost	A1/52	$1,923
Bt	Implementation internal labor costs	B8*B9	$399,503

Source: Forrester Research, Inc.

Cognizant's labor to maintain the solution is not included in the cost section of the study because it is less than with the previous Unix-based solutions. This benefit and the required ongoing headcount to maintain PeopleSoft and Exalogic can be found in the benefits section of the study.

Implementation Professional Services Costs

Cognizant used Oracle professional services during the initial phase and first year of the study. Cognizant had estimated that it would need 120 man-days of consulting for the initial deployment, and purchased that amount. However, it turned out Cognizant only needed to use 40 of those days. The majority of the initial work was assisting with standing up the Exalogic environment properly and ensuring optimal configurations. Authentication is handled slightly differently compared with the previous Unix environment, so the professional services team made the necessary changes to ensure that everything worked properly. Cognizant used the remaining 80 days during the first year of deployment to implement new features in HCM and ESA. A generic consulting rate is used in this calculation, as much of Cognizant's work was done in India, where the consulting rates can be different than those in North America or Europe.

Table 4
Implementation Professional Services Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
C1	Number of consultant man-days		40	80	0	0
C2	Average daily rate		$1,200	$1,200	$1,200	$1,200
Ct	Implementation professional services costs	C1*C2	$48,000	$96,000	$0	$0

Source: Forrester Research, Inc.

Exalogic Hardware, Licenses, And Support

Prior to the deployment on Exalogic, PeopleSoft was hosted on multiple Unix application and web servers (see the benefits section for details). All of this was replaced with a single Exalogic ½ rack and a ¼ rack for DR usage. This configuration also had capacity to support growth for the foreseeable future; Cognizant subsequently deployed Oracle Content Management on it as well as PeopleSoft Financials. Forrester used Oracle's published price list in performing these calculations. The reader's organization may be eligible for discounts, so Forrester recommends consulting with their Oracle account manager.

In addition to the upfront purchase price, there is also an annual recurring ongoing support contract cost for both the hardware and Exalogic Elastic Cloud Software (EECS). These include all of the necessary patches and updates.

Table 5
Exalogic Hardware, Licenses, And Support

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
D1	Exalogic 1/2 rack - primary		$600,000			
D2	Exalogic 1/4 rack - DR		$370,000			
D3	Annual support and maintenance	1/2 rack @ $72,000+1/4 rack @ $44,400	$116,400		$116,400	$116,400
D4	EEC Software License	$10,000 * 144 processors	$1,440,000			
D5	EECS Update License And Support	$2,200 * 144 processors	$316,800		$316,800	$316,800
Dt	Exalogic hardware, licenses, and support	D1+D2+D3+D4+D5	$2,843,200	$0	$433,200	$433,200

Source: Forrester Research, Inc.

Total Costs

Table 6 shows the total costs associated with implementing Exalogic and migrating PeopleSoft to the new environment.

Table 6
Total Costs, Non-Risk-Adjusted

Ref.	Cost Category	Initial	Year 1	Year 2	Year 3	Total
Bt	Implementation internal labor costs	($439,454)	$0	$0	$0	($439,454)
Ct	Implementation professional services costs	($52,800)	($105,600)	$0	$0	($158,400)
Dt	Exalogic hardware, licenses, and support	($2,843,200)	$0	($433,200)	($433,200)	($3,709,600)
	Total Costs	($3,335,454)	($105,600)	($433,200)	($433,200)	($4,307,454)

Source: Forrester Research, Inc.

Benefits

The first half of this section looks at the benefits that could be quantified for this study. The second half describes the qualitative benefits that the interviewed customer experienced from adopting Exalogic, but which could not be fully quantified in the financial model.

Eliminated Hardware

Prior to Exalogic, PeopleSoft was deployed on 88 Unix servers between production and disaster recovery: application, web, batch, and integration. All of the servers were at their end of life and had reached maximum capacity. Had Exalogic not been used, Cognizant would have had to replace all of the servers. Maintaining the same server count would have resulted in twice the number of CPUs because of improvements in server cost/performance characteristics. Some additional hardware would have been required by year three of the study. These costs were all eliminated by the Exalogic production ½ rack and DR ¼ rack.

Cognizant uses a monthly cost for calculating the total cost of ownership (TCO) of its hardware. This includes the initial purchase over the lifetime, maintenance, and hosting. These monthly costs are used in the savings calculations.

Table 7
Eliminated Hardware

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
E1	# of web servers not added		38		
E2	Average annual cost - web servers	$1,700*12 months	$20,400	$20,400	$20,400
E3	Avoided web server costs	E2*E1[through current year]	$775,200	$775,200	$775,200
E4	# of app servers not added		42		
E5	Average annual cost - app servers	$2,700*12 months	$32,400	$32,400	$32,400
E6	Avoided app server costs	E5*E4[through current year]	$1,360,800	$1,360,800	$1,360,800
E7	# of batch and integration servers not added		8		
E8	Average annual cost - batch servers	$2,700* 12 months	$32,400	$32,400	$32,400
E9	Avoided batch and integration server costs	E8*E7[through current year]	$259,200	$259,200	$259,200
Et	Eliminated hardware	E3+E6+E9	$2,395,200	$2,395,200	$2,395,200

Source: Forrester Research, Inc.

Increased Business User Productivity

Increased application and system performance along with less system downtime, depending on the nature of the applications, can result in increased business productivity. This will vary greatly from organization to organization, depending on the nature of the business and applications hosed on Exalogic. One example from Cognizant has been quantified in the study. Readers are encouraged to consider how improved IT performance will result in improved business performance.

Cognizant has a workload in PeopleSoft for project managers to create service orders, e.g., to request new project team member or initiate new project. Previously, it took business users 7 minutes to create a service order. This has now been reduced to 2 minutes because of increased performance from Exalogic as well as application-level changes. Half of this time savings is attributable to Exalogic; the remainder comes from software code rewrites.

3,000 service orders are created every workday resulting in a lot of saved time. Because not all productivity gains translate into additional work — for example, employees spend some of the time gained web surfing or chatting with colleagues — only 50% of the potential benefit is realized.

The reader is encouraged to quantify opportunities for productivity gains in their own organization. These will come from improved system performance and availability.

Table 8

Increased Business User Productivity

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
F1	Number of service orders submitted	3,000*250 workdays	750,000	750,000	750,000
F2	Time saved per service order (minutes)		5.0	5.0	5.0
F3	Percentage of savings attributed to Exalogic		50%	50%	50%
F4	Total time savings (hours)	(F1*F2*F3)/60 minutes	31,250	31,250	31,250
F5	Number of FTEs	F4/2,000 hours	15.6	15.6	15.6
F6	Average business user annual fully burdened cost	A2	$85,000	$85,000	$85,000
F7	Total potential productivity gain	F4*F5	$1,326,000	$1,326,000	$1,326,000
F8	Percentage of potential benefit realized		50%	50%	50%
Ft	Increased business user productivity	F6*F7	$663,000	$663,000	$663,000

Source: Forrester Research, Inc.

Reduced IT Operations Team Size

The level of effort required to maintain the Exalogic environment and the PeopleSoft implementation on top of it is significantly less that required by the previous Unix-based server solution. Examples given by Cognizant of time savings are shown in Table 9.

Table 9

IT Effort Comparison

Activity	Time required in Unix solution (man-hours)	Time required in Exalogic solution (man-hours)
Maintaining servers/Exalogic	240 per quarter	40 per quarter
Maintaining web/application server environment	48 per month	0.5 per month
Deploying a new server environment	8	1
Upgrading PeopleSoft Tools or installing a minor PeopleSoft patch	72	4

Source: Forrester Research, Inc.

Many other activities have been fully automated or eliminated. In addition to the time savings, PeopleSoft batch processes could not be run during these maintenance periods. No batch processes were run on Sundays because of planned maintenance. Specific examples of eliminated activities that result in more uptime include:

- Daily online backup
    - ESA 5 hours
    - HCM 4 hours
    - ELM 2 hours
- Daily refresh of non-production (1 environment) with production copy
    - ESA 7 hours
    - HCM 5 hours
    - ELM 4 hours

Additionally, with the previous solution a lot of IT effort needed to be completed at night and over the weekend to avoid service disruptions to the organization. This has now been mostly eliminated. Examples of activities eliminated include:

- Weekly App, Web and Batch server maintenance : 12 hours (Saturday 8PM to Sunday 8AM)
- Monthly DB offline maintenance : 12 hours (Saturday 8PM to Sunday 8 AM)

All of the savings described above and other time savings have resulted in a 50% reduction in the IT team supporting the PeopleSoft infrastructure. IT resources that previously worked on maintaining the hardware environment can be redeployed to other parts of the IT organization to work on higher value activities.

Table 10
Reduced IT Operations Team Size

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
G1	FTEs required before Exalogic		12	12	12
G2	FTEs required with Exalogic		6	6	6
G3	Number of fewer FTEs	G1-G2	6	6	6
G4	Annual fully burdened cost per FTE	A1	$100,000	$100,000	$100,000
Gt	Reduced IT operations team size	G3*G4	$600,000	$600,000	$600,000

Source: Forrester Research, Inc.

Total Benefits
Table 11 shows the total quantified benefits realized by implementing Exalogic.

Table 11
Total Benefits, Non-Risk-Adjusted

Ref.	Benefit Category	Year 1	Year 2	Year 3	Total
Et	Eliminated hardware	$2,395,200	$2,395,200	$2,395,200	**$7,185,600**
Ft	Increased business user productivity	$663,000	$663,000	$663,000	**$1,989,000**
Gt	Reduced IT operations team size	$600,000	$600,000	$600,000	**$1,800,000**
	Total Benefits	**$3,658,200**	**$3,658,200**	**$3,658,200**	**$10,974,600**

Source: Forrester Research, Inc.

Improved System Performance (Unquantified)

The benefits described above are partly a byproduct of improved system performance. Better system performance brings other benefits that could not be quantified for this study. Readers should take these additional benefits into consideration when evaluating an Exalogic migration.

Improved and more reliable system performance makes life easier for the IT operations team. According to Cognizant, "End of year is the peak period of activity for human resources. This results in a large spike in system usage. Prior to Exalogic, it was always a challenge to maintain system performance. Since implementing Exalogic, we have not had any performance issues and no longer worry about it. We know that the system has more than enough spare capacity to handle these spikes."

Exalogic operates significantly below peak performance capabilities. This provides ample capacity to handle all current situations and opportunity for future growth.

Table 12

Exalogic Peak Loads

Activity	Web	Application
Actual load seen in production	7,600 concurrent users	5,600 concurrent users
CPU	<10%	<35%
Memory	<50%	<70%

Source: Forrester Research, Inc.

Exalogic also performs better than the previous Unix solution as described in the business user productivity section. This performance improvement can be seen by business users in many other areas. The table below shows comparative load test results that affect user experience/satisfaction.

Table 13

Comparable Load Tests: 12,000 Users Over HTTPS

Transaction	Unix Environment	Exalogic Environment	% Improvement
Timesheet submit	32.253	19.331	40.1%
Timesheet approve	27.4	12.268	55.2%
Expenses create	43.043	28.597	33.6%
Expenses approve by PM	46.266	23.887	48.4%
PAS submission	42.347	28.928	31.7%
Service order creation	26.587	13.92	47.6%

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 Exalogic 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.

Redeploying PeopleSoft to Exalogic has made for an inherently more flexible organization from both a technology and business perspective. IT resources now have more time to work on other business-led initiatives. Additionally, system changes can be made more quickly to respond to business needs. Business users now have more time available to work on other pressing business needs. These benefits are partially captured in the quantified benefits above.

Cognizant is also undertaking two initiatives that could deliver additional benefits in the future. The first involves an Exalogic upgrade to the latest version, which supports virtualization. With the new version in place, a virtual machine can be created and deployed behind the load balancer in 7 minutes. This greatly reduces time-to-deploy and improves system performance. The second initiative is to deploy Exadata, the companion engineered system database to Exalogic. This will result in even greater IT performance and reduced operating costs. These future benefits are not included in the ROI analysis.

Risk

Forrester defines two types of risk associated with this analysis: implementation risk and impact risk. "Implementation risk" is the risk that a proposed investment in Exalogic 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 Exalogic, 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 following implementation risks that affect costs are identified as part of this analysis:

- **The size of the deployment.** A larger deployment can take more time to implement, increasing internal labor costs and professional services.
- **The breadth of Oracle usage.** A company that uses a range of Oracle products may be able to negotiate better prices as part of a wide-ranging enterprise agreement than a company using only Exalogic.

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

- **The size of the deployment.** A larger deployment, in addition to increasing costs, should result in additional benefits.
- **IT operations team size.** Depending on the previous size of the IT operations team and the anticipated growth, the number of FTEs saved may be larger or smaller than the savings depicted in this study.
- **Business user productivity.** If the systems deployed on Exalogic do not affect business user activities, this benefit may not apply. Readers are encouraged to identify other business benefits derived from deploying their mission-critical application on Exalogic.

Table 14 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 14
Cost And Benefit Risk Adjustments

Costs	Low	Most likely	High	Mean
Implementation internal labor costs: medium risk	100%	100%	130%	110%
Implementation professional services costs: medium risk	100%	100%	130%	110%
Exalogic hardware, licenses, and support: no risk	100%	100%	100%	100%
Benefits	**Low**	**Most likely**	**High**	**Mean**
Eliminated hardware: high risk	50%	100%	100%	83%
Increased business user productivity: medium risk	80%	100%	100%	93%
Reduced IT operations team size: medium risk	80%	100%	100%	93%

Source: Forrester Research, Inc.

Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

Financial Summary

The financial results calculated in the Costs and Benefits sections can be used to determine the return on investment, internal rate of return, net present value, and payback period for the organization's investment in Exalogic. These are shown in Table 15 below.

Table 15
Cash Flow — Non-Risk-Adjusted

Cash flow — Original estimates						
	Initial	Year 1	Year 2	Year 3	Total	Present value
Costs	($3,290,703)	($96,000)	($433,200)	($433,200)	($4,253,103)	($4,061,462)
Benefits	$0	$3,658,200	$3,658,200	$3,658,200	$10,974,600	$9,097,402
Net benefits	($3,290,703)	$3,562,200	$3,225,000	$3,225,000	$6,721,497	$5,035,940
ROI	124%					
IRR	88%					
Payback period	11 months					

Source: Forrester Research, Inc.

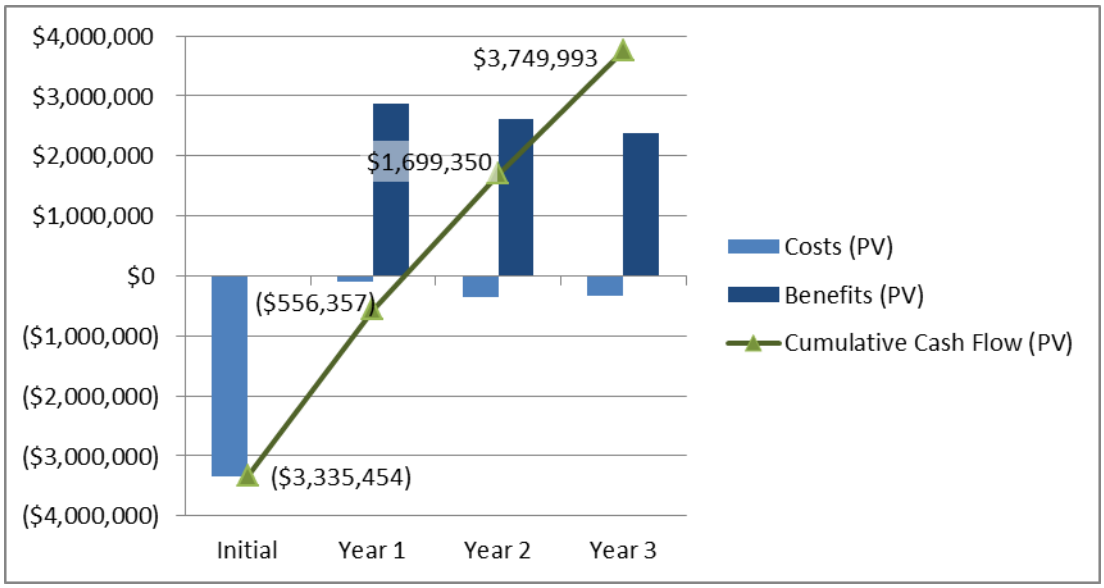
Table 16 below shows the risk-adjusted ROI, IRR, NPV, and payback period values. These values are determined by applying the risk-adjustment values from Table 14 in the Risk section to the cost and benefits numbers in Tables 6 and 13.

Table 16
Cash Flow — Risk-Adjusted

Cash flow — Risk-adjusted estimates						
	Initial	Year 1	Year 2	Year 3	Total	Present value
Costs	($3,335,454)	($105,600)	($433,200)	($433,200)	($4,307,454)	($4,114,940)
Benefits	$0	$3,162,606	$3,162,606	$3,162,606	$9,487,818	$7,864,933
Net benefits	($3,335,454)	$3,057,006	$2,729,406	$2,729,406	$5,180,364	$3,749,993
ROI	91%					
IRR	69%					
Payback period	13 months					

Source: Forrester Research, Inc.

Figure 3
Three-Year Risk-Adjusted Cash Flow



Source: Forrester Research, Inc.

Oracle Exalogic: Overview

Oracle engineered systems include Exalogic, which is a preconfigured and optimized system consisting of Oracle's latest software and hardware.

Oracle describes Exalogic as a "hardware and software engineered together to provide extreme performance, reliability, and scalability for Oracle, Java, and other applications, while delivering lower TCO, reduced risk, higher user productivity, and one-stop support. It is designed, optimized, and certified for running Oracle and third-party applications."

Exalogic provides:

- Fully integrated compute nodes, storage and networking
- Mission-critical virtualization for true application isolation
- Complete management from applications to disk
- Automated application deployment process
- Load balancing via a built-in application delivery controller

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.

Internal rate of return (IRR): The interest rate that will bring a series of cash flows (positive and negative) to a NPV of zero.

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.

Table [Example]
Example Table

Ref.	Category	Calculation	Initial cost	Year 1	Year 2	Year 3	Total

Source: Forrester Research, Inc.

Appendix C: Endnotes

[1] Forrester risk-adjusts the summary financial metrics to take into account the potential uncertainty of the cost and benefit estimates.