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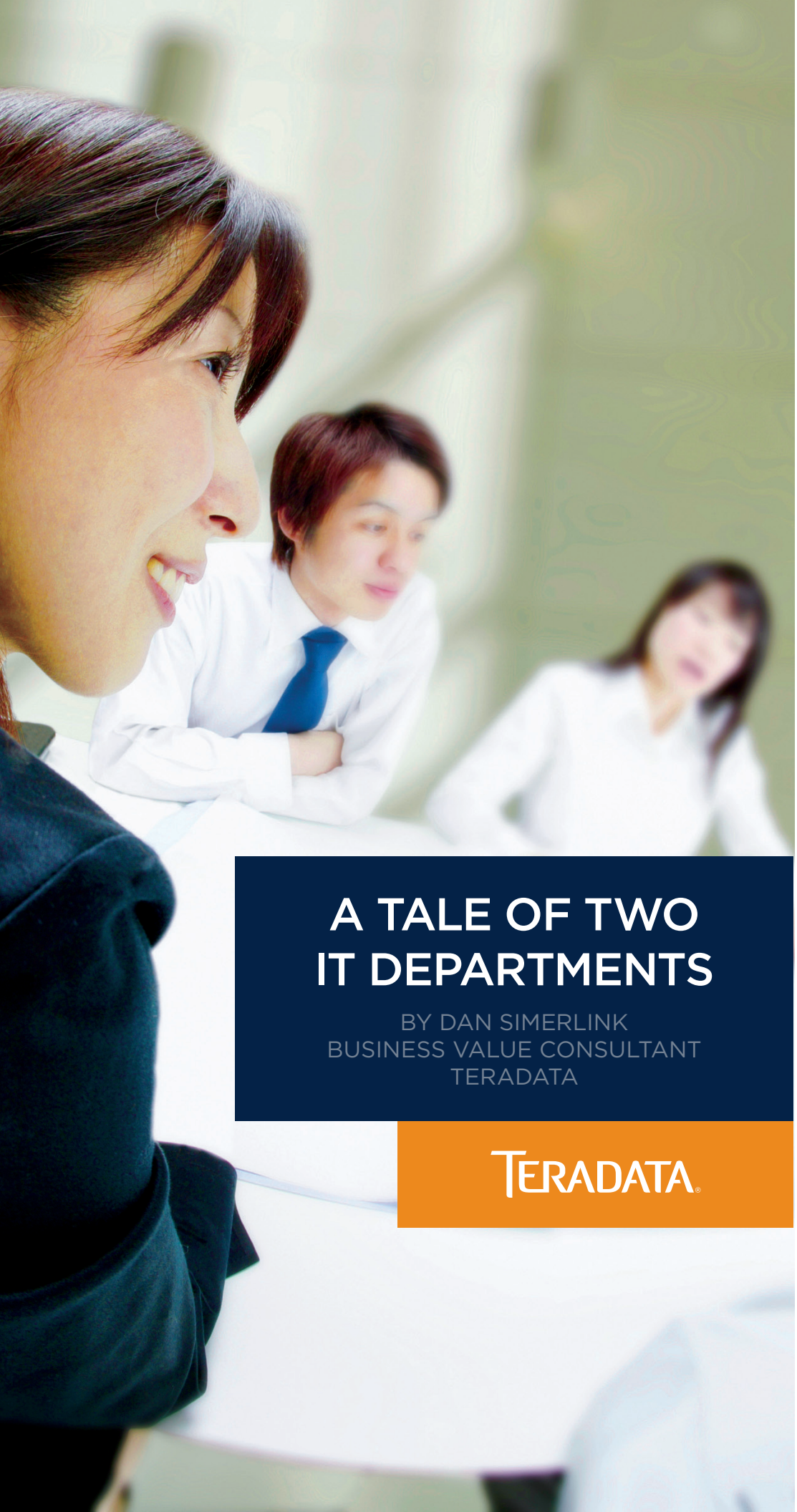

A TALE OF TWO IT DEPARTMENTS

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Labor-Intensive Data Marts versus Integrated Data Warehouse

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EXECUTIVE SUMMARY

Many organizations are confronted with rapidly expanding data sources, shrinking budgets, and tighter service level agreements. This trifecta produces an unending torrent of requests that need to be fulfilled with fewer resources. Unfortunately, the situation is often exacerbated by having to maintain an arsenal of labor-intensive data marts.

In this paper, we compare two IT departments. The first department has a number of labor-intensive data marts that requires many database administrators (DBAs), while the second department has an integrated data warehouse that requires fewer DBAs. This paper focuses on the incremental business value created by freeing up some of the existing DBAs from the tactical work that they are doing and refocusing them on strategic projects. This shift is made possible by consolidating labor-intensive data marts into a single integrated data warehouse.

A business case shows that moving from the architecture of IT Department 1 (labor-intensive data marts) to the architecture of IT Department 2 (integrated data warehouse) yielded a return on investment of 190 percent and a five-year Net Present Value (NPV) of $9.24 million. This return was achieved by consolidating the labor-intensive data marts and redeploying tactical DBAs into strategic positions. To create a conservative estimate that examines only the effect of moving tactical DBAs into strategic positions, the hardware, software, and other cost takeout opportunities were not used in the business case.

Focusing on the single aspect of using their most valuable employees (DBAs) for strategic advantage will underscore the fact that organizations need to innovate continually and relegate repetitive and mundane tasks to technology. Data from Forrester,[1] Gartner,[2] the Six Sigma Management Institute,[3] and the Standish Group[4] were used to support this business case. The intended purpose of this paper is to provide a strategic and profitable option for your IT department.

INTRODUCTION

It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us[5]*...*

When Charles Dickens penned these words in his novel, "A Tale of Two Cities," he had no idea how relevant his words would be to the operations of an IT department. Today's IT department has "everything before them" in terms of cutting-edge technology and petabytes of data, yet the same IT department is cash and resource strapped (i.e., "we had nothing before us...").

This paper shows how an organization's choice of an IT architecture will have a huge impact on its IT department's ability to complete projects and create a strategic advantage for the company. The first section compares IT Department 1, which depends on a conglomeration of federated labor-intensive data marts, with IT Department 2, which operates an integrated data warehouse. The graphics in Figure 1 depict the structure of these two IT departments.

The second section explains the business value, Net Present Value (NPV), and the Return on Investment (ROI) for the IT departments' operations. The final section contains suggested next steps.

LABOR-INTENSIVE DATA MARTS

Every day organizations are exploring new ways to wring more business value from their data. For example, Davenport & Harris' groundbreaking book, *Competing on Analytics,* stated that high performing companies were 50 percent more likely to use analytics to their strategic advantage.[6] In addition, analytics significantly affect the bottom line. Projects involving business intelligence with predictive technologies had a median ROI of 145 percent, as compared to a median ROI of 89 percent for projects that did not include predictive analytics.[7]

The analytics revolution has led to the creation of many single-purpose data marts. However, there can be a dark side to these data marts, in that their proliferation

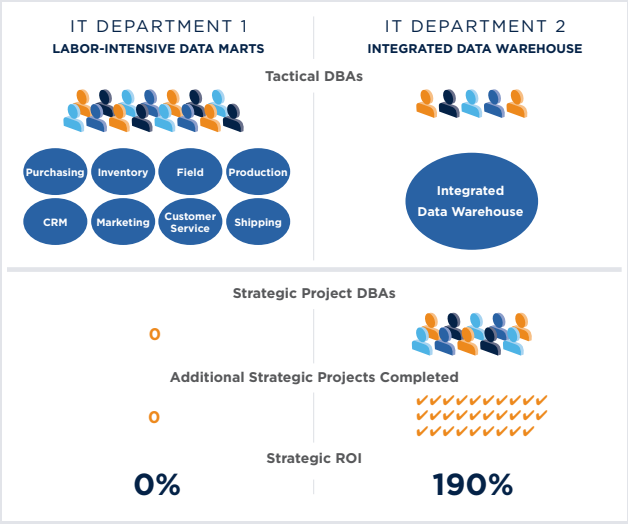

Figure 1. A comparison of labor-intensive data marts with an integrated data warehouse.

is extremely costly. The ongoing care and feeding of the data marts may require an army of DBAs, and the size of that army significantly increases as data accumulates. For example, an organization may have their purchasing information in one data mart, inventory in another, and production, CRM, marketing, customer service, and shipping information each in their own separate data marts. The separate labor-intensive data marts may also store similar information, causing inconsistent reporting and no single version of the truth.

These high labor costs and multiple versions of the truth can make organizations less profitable, and their reduced agility may slow their efforts to take their organization to the next level.

These issues will only get worse as the amount of data increases. For example, the analyst group IDC predicts that "the digital universe will be 44 times bigger in 2020 than it was in 2009."[8] Also in 2010, Gartner reported "that enterprise data growth will be 650 percent over the next five years."[9] Again, this huge growth of data will reduce the effectiveness of the IT departments that rely on labor-intensive data marts.

To stay up with the growth of data, IT Department 1 will continually require more DBAs. Some of the tasks that consume DBAs' time when managing labor-intensive data marts include:

- Reorganizing data or index space.
- Pre-allocating table and index space.
- Physical partitioning of disk space.
- Pre-preparing data for loading (convert, sort, and split).
- Unloading and reloading data spaces due to expansion.
- Writing or running programs to split input source files into partitions for loading.[10]

While tasks like these may seem insignificant, they quickly add up and can require three to four times[11] the number of DBAs that integrated data warehouses require. From a financial point of view, this means that a greater amount of the IT budget will be spent on tactical maintenance of the data marts rather than on strategic projects. This paper tells the stories of representative groups of DBAs from two different IT departments. The only difference between them is that Department 1 has labor-intensive data marts and Department 2, with an integrated data warehouse, does not. To examine only the effect of moving tactical DBAs into strategic positions, the hardware, software, and other cost takeout opportunities were not used in this business case.

For the sake of comparison, 15 DBAs in IT Department 1 will be compared to 15 DBAs in IT Department 2. The labor-intensive data warehouse of IT Department 1 will

IDC predicts "the digital universe will be 44 times bigger in 2020 than it was in 2009." Also in 2010, Gartner reported "that enterprise data growth will be 650 percent over the next five years."[12]

Strategic Advantage for IT Department 2: Teradata Integrated Data Warehouse

Description		Year 1	Year 2	Year 3	Year 4	Year 5	5 Year Total
Number of DBAs allocated for DW upkeep	15						
Percentage of DBAs now available for strategic projects	66%						
Number of DBAs now available for strategic projects	10						
Average annual ROI per FTE	$349,323						
Average annual project return for 10 FTEs	$3.49 Million	$3.49 Million	$3.49 Million	$3.49 Million	$3.49 Million	$3.49 Million	$17.47 Million
5 Year Net Present Value (NPV)							**$14.10 Million**
Average annual cost of one FTE	$ 120,469						
Number of FTEs	10						
Average five year cost of 10 FTEs	$1.20 Million	$1.20 Million	$1.20 Million	$1.20 Million	$1.20 Million	$1.20 Million	$6.02 Million
5 Year Net Present Value (NPV)							**$4.86 Million**
5 Year Net Strategic Benefit ($14.10M - $4.86M)							**$9.24 Million**
WACC (Weighted Average Cost of Capital)	12%						
Return on Investment (ROI)							**190%**

Figure 2. It was estimated that a strategic DBA, with a fully-loaded cost of $120,469 per year, can generate $349,323 in incremental value each year. To calculate the NPV, the weighted average cost of capital was assumed to be 12 percent. Transferring ten DBAs from tactical roles to strategic projects will produce a five-year NPV of $9.24 million dollars and yield an ROI of 190 percent. Appendix 1 and the table in Figure 2, contain the source data that was used to derive these numbers.

require a staff of 15 full-time equivalents (FTEs) just to maintain the operations of the environment. Since IT Department 2 is using an integrated data warehouse, it only needs one-third[13] the DBAs (five FTEs) to maintain the data warehouse. Thus, ten DBAs can tackle strategic projects enabling the organization to be more competitive.

As shown in Appendix 1, each strategic project consumes 1.75 person years, and the 10 DBAs from IT Department 2 can complete approximately 29[14] additional strategic projects in a five-year period, resulting in an increased value of more than $9 million.

The tasks assigned to DBAs have a huge effect on the IT department's ability to work strategically. Ken Kudla, CIO and VP of IT of The Queen's Medical Center in Honolulu, painted a poignant picture of the chronic issues that plague IT departments. While handling 30 concurrent projects, Kudla was trying to complete a document imaging project that had begun six years prior, in addition to replacing seven different hospital information systems.[15] In the meantime, more requests for IT projects were being submitted.

The CIO of National Public Radio, Bob Holstein, reminds us of the salient fact that CIOs must deliver on all promises they make. "Any CIO who sets an expectation that something will get done—and it doesn't—will be committing career suicide,"[16] Holstein asserts.

Having seen the exact same issues, a VP of sales remarked, "While our data doubled over the past three years, and operations were significantly diversified (new products, new services, and geographic expansion), we have remained almost the same staff to manage [the] company's operations. We faced new demands from hired branch managers and account managers, as well [as] from vendors. BI (business intelligence) became an important factor in our daily tasks."[17]

The sad truth is that a short-staffed, underfunded IT department with labor-intensive data marts will always be stuck in reactive tactical mode. Meanwhile, competitors will be using their IT departments to gain strategic advantage.

THE HIGH COST OF BEING TACTICAL

There is a high cost associated with a tactical organization especially if the organization finds itself constantly reacting to requests. As stated previously, this paper examines only the labor cost of being tactical, and the effect of transferring tactical DBAs to strategic positions.

Salary data from Robert Half was used to estimate the average annual cost of an FTE at $120,469.[18] The number of tactical DBAs for IT Department 2 was estimated at five, or one-third of the 15 tactical DBAs in IT Department 1, and these numbers were derived from actual data mart consolidation engagements.[19]

The pie charts in Figure 3 show how the FTEs can be tactically or strategically deployed based on the type of IT architecture that the company uses. Also, keep in mind that as the number of data marts grow, the number of tactical DBAs needs to increase.

Now that a foundation has been created to show the effects of using labor-intensive data marts, we will quantify the benefits of an integrated data warehouse. In addition to the 15 FTEs that were previously mentioned at a fully-loaded cost of $120,469 per year, the average project ROI needs to be estimated.

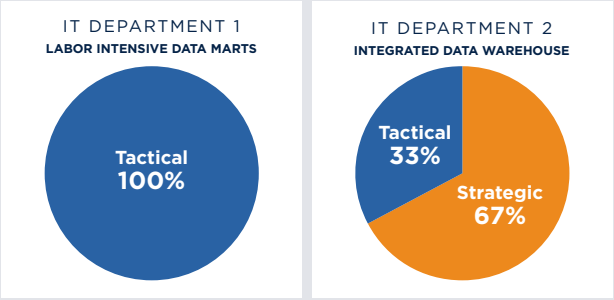

Figure 3. Salary Allocation for 15 DBAs in IT Department 1. Salary Allocation for 15 DBAs in IT Department 2

Based on data from Forrester,[20] the Six Sigma Management Institute,[21] and the Standish Group,[22] the average annual value created by a strategic project FTE was estimated to be $349,323.[23] The spreadsheet in Figure 2 shows how the 15 DBAs that were formerly used for labor-intensive data marts can now be divided into a subgroup of five DBAs for maintaining the integrated data warehouse, while the remaining 10 DBAs can focus on strategic projects that will help the organization in outperforming its competition. In summary, organizations must continually innovate and relegate repetitive and mundane tasks to technology so valued employees can create strategic value—and increase competitive advantage.

SUGGESTED NEXT STEPS

If you have read this far, chances are you have a sizeable portion of your IT Department devoted to maintaining labor-intensive data marts. As the amount of data increases and new project requests stream in, you will need a way to work smarter, not harder. These steps will allow you to cut your costs while creating a competitive strategic advantage via better use of your labor.

1. Create an inventory of your data marts.
2. Select the data marts that will allow for a rapid payback.
3. Calculate your existing hardware costs as well as your annual recurring costs (FTE and non-FTE).
4. Compare the cost of maintaining the status quo with the cost of moving to an integrated data warehouse.
5. Calculate the incremental business value derived from the data mart consolidation project.
6. Develop a value-based migration roadmap.
7. Present your findings to upper management to get their buy-in.

The sad truth is that a short-staffed, underfunded IT department with labor-intensive data marts will always be stuck in reactive tactical mode. Meanwhile, competitors will be using their IT departments to gain strategic advantage.

Although the steps above may seem easy, there are many issues that can sidetrack (or kill) a data mart consolidation project. We have found that many organizations:

- Have difficulty keeping pace with the increasing requests and maintenance due to growth of data.
- Are challenged by upper management to do more with less—and be more strategic.
- May not have the time (or expertise) to scope and execute a data mart consolidation project successfully.

The Business Value Consulting Team at Teradata is dedicated to helping organizations like yours identify, quantify, and capitalize on initiatives that will drive greater value from your existing staff. Contact Teradata's Business Value Consulting Team for a thorough business case that can be presented to the decision makers in your organization.

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Among the services the Business Value Consultant brings to the engagement are objectively helping clients to determine the financial impact of their prospective and past investments in data warehousing and analytical solutions, as well as tracking and monitoring key performance indicators and value throughout the implementation cycles.

The quantification of ROI expressed in terms of revenue, profitability, and business process enhancement opportunities; and cost savings that can be reasonably expected, requires the Teradata team to understand a customer's circumstances including technology, strategy, business processes, people, and organization. Because of the unique nature of every business, implementing a data warehouse solution will have different impacts on different prospects. The Teradata Business Value Consulting team stands ready to collaborate with you as you quantify the ROI potential for your data warehouse solution.

To help clients understand how data warehousing and analytical solutions will affect their organizations, Teradata deploys a team of professionals to help identify an efficient plan which will move them from where they are today to where they want to be tomorrow. Equipped with a thorough understanding of a client's wants, needs, and limitations, our professionals provide the confidence to:

- Create a single and accurate view of the organization.
- Make the necessary investment in Teradata solutions to secure desired results.
- Set achievable goals with intermediate benchmarks to help monitor progress.
- More fully support and leverage business strategies, initiatives, and tactics by removing limitations and enhancing capabilities to take new and/or better actions.

Our consulting staff works closely with your business-user community to identify strategies for capturing value, design processes for implementing those strategies, and properly equip your people so they can operate successfully in the reengineered work environment. We work with you to develop mutually agreed upon metrics that capture the value associated with the process improvements. By tracking the process improvement from operations to the P&L (and ultimately to cash flow), we can help identify clearly the value of a Teradata solution to your organization.

> Organizations must continually innovate and relegate repetitive and mundane tasks to technology so valued employees can create strategic value—and increase competitive advantage.

ABOUT THE AUTHOR

Dan Simerlink has over 20 years' experience in the technology industry and is a Business Value Consultant for Teradata. As an Adjunct Professor for Indiana Wesleyan University, Dan has a PhD in Knowledge Management and has assisted scores of graduate level executives in strategic planning, pricing theory, statistics, and financial analysis.

APPENDIX 1: FINANCIAL CALCULATIONS AND ASSUMPTIONS

Based on data from Forrester, the Six Sigma Management Institute, and the Standish Group,[24] the average annual strategic value per FTE was estimated to be $429,623. This table shows the assumptions that were used in this paper.

Assumptions:	
33 percent	Percentage of labor-intensive Datamart DBAs needed for a Teradata Solution
15	Number of DBAs used in this study
12 percent	Weighted Average Cost of Capital (WACC)
28.57	28.57 projects = 50 person years
$ 349,323	Annual project ROI per year per FTE
$ 120,469	Fully-loaded annual cost of one DBA FTE
Department One	DBA portion = (15) tactical data warehouse DBAs
Department Two	DBA portion = (5) tactical data warehouse DBAs, (10) Strategic project DBAs

Data point one in the table below was determined by using data from the Six Sigma Management Institute.[25] Dr. Mikel Harry provided this data during a training session. A company with $20 billion in revenue with 100,000 employees has:

~ 1 percent BB: blackbelts (four projects/year - $350k impact/project) 117x ROI

~ 5 percent GB: green belts (six projects/year - $75k impact/project) 64x ROI

~ 25 percent WB: white belts (six projects/year - $25k impact/project) 60x ROI

It was assumed that up to ten FTEs would be involved in each project and that the FTEs would complete between four and six projects per year depending on their level. The project success rate of 66 percent was estimated based on research from the Standish Group.[26]

Data point One (Six Sigma Projects)	
BB Value per project per FTE	$ 350,000
BB # of projects/year	4
ROI Subtotal	$ 1,400,000
GB Value per project per FTE	$ 75,000
GB # of projects/year	6
ROI Subtotal	$ 450,000
WB Value per project per FTE	$ 25,000
WB # of projects/year	6
ROI Subtotal	$ 150,000
Blended FTE ROI subtotal (1BB + 3GB + 6WB)/10	**$ 365,000**
66 percent Project success rate (Source: Standish group chaos report: 28 percent -40 percent of projects fail or are canceled)	$ 240,900
Strategic Value per blended FTE per year	**$ 240,900**

Data point two was determined based on information from the Forrester Group.[27] Since only the NPV of the projects was provided, it was assumed that ten FTEs were involved in each project. The average of data points one and two was used to determine the strategic value per FTE per year.

Data point Two (Forrester: The Five Essential Metrics for Managing IT)	
NPV of 71 projects	$ 325,000,000
Assume 10 person years per project (1BB, 3GB, 6WB)	10
Number of projects	71
Strategic value per FTE per year	**$ 457,746**
Average of data points One & Two	
Average Strategic Value per blended FTE per year	**$ 349,323**

According to a 2012 Robert Half salary survey, the average DBA salary was $79,000 - $113,750 and this amount increased by 7.2 percent over the past two years.[28] Since benefits and bonuses can add an additional 25 percent to the cost of an FTE, it was estimated that the average cost of a FTE is $120,469 per year. The fully-loaded DBA cost was determined by taking the average DBA salary for 2012 ($79,000 + $113,750)/2 and multiplying it by 1.25 to derive the fully-loaded cost of benefits et al. (1.25)* ($79,000 + $113,750)/2 = $120, 469.

Calculation of average DBA salary	
Given the range of 2012 DBA salaries $79,000 to $113,750. It can be assumed that the average is ($79,000 + $113,750)/2	**$ 96,375.00**
Calculation of fully-loaded DBA cost	
It was assumed that benefits and other items add an additional 25 percent to the average DBA salary ($96,375 * 1.25)	**$ 120,469**

To determine how many projects could be completed per person year, data was used from the Six Sigma Management Institute. The following table, titled Calculation of projects per person year contains the source data. Based on information from the Six Sigma Management Institute,[29] it was determined that one project could be completed in 1.75 person years and that 28.57 projects can be completed in 50 person years (in this example 10 DBAs x 5 years = 50 person years). These calculations are expanded via the following bullet points:

~ One project = 1BB + 3GB + 6WB | (BB = 3 mos./project / GB = 2 mos./project / WB = 2 mos./project)

~ One project = 1* 3 mos. + 3*2 mos. + 6*2 mos.

~ One project = 21 person months (1.75 person years)

~ 28.57 projects = 50 person years

Calculation of projects per person year
Project Data from The Six Sigma Management Institute
1 percent BB: blackbelts (4 projects/year - $350k impact/project) 117x ROI
5 percent GB: green belts (6 projects/year - $75k impact/project) 64x ROI
25 percent WB: white belts (6 projects/year - $25k impact/project) 60x ROI
Also, 1 blackbelt may have 3 greenbelts, 6 white belts, and individual contributors reporting to them in the project.
One project = 1BB + 3GB + 6WB | (BB = 3 mos./project / GB = 2 mos./project / WB = 2 mos./project)
One project = 1* 3 mos. + 3*2 mos. + 6*2 mos.
One project = 21 person months (1.75 person years)
Number of projects that can be completed in 50 person years (.5714 projects / person year) or (One project per 1.75 person years)
28.57 projects = 50 person years

APPENDIX 2: GLOSSARY

Business Intelligence (BI) – An umbrella term that includes the applications, infrastructure and tools, and best practices that enable access to and analysis of information to improve and optimize decisions and performance.[30]

Chief Information Officer (CIO) – The person responsible for planning, choosing, buying, and installing a company's computer and information processing operation. Originally called data processing managers, then management information system (MIS) directors, CIOs develop the information technology vision for the company.[31]

Data mart – A special purpose subset of a company's enterprise data used by a particular department, function, or application.[32]

Data warehouse – A storage architecture designed to hold data extracted from transaction systems, operational data stores and external sources. The warehouse then combines that data in an aggregate, summary form suitable for enterprise-wide data analysis and reporting for predefined business needs. The five components of a data warehouse are production data sources, data extraction and conversion, the data warehouse database management system, data warehouse administration, and business intelligence (BI) tools. A data warehouse contains data arranged into abstracted subject areas with time-variant versions of the same records, with an appropriate level of data grain or detail to make it useful across two or more different types of analyses most often deployed with tendencies to third normal form. A data mart contains similarly time-variant and subject-oriented data, but with relationships implying dimensional use of data wherein facts are distinctly separate from dimension data, thus making them more appropriate for single categories of analysis.[33]

Database Administrator (DBA) – A DBA directs or performs all activities related to maintaining a successful database environment. Responsibilities include designing, implementing, and maintaining the database system; establishing policies and procedures pertaining to the management, security, maintenance, and use of the database management system; and training employees in database management and use.[34]

FTE – full-time equivalent.[35]

Net Present Value (NPV) – An accounting tool that captures the net value of an investment at the current instant in time by taking the sum of the discounted cash flow less the current investmentt.[36]

Petabyte – A measure of memory or storage capacity and is two to the 50th power bytes or, in decimal, approximately a thousand terabytes.[37]

Return on Investment (ROI) – Financial gain expressed as a percentage of funds invested to generate that gain.[38]

Six Sigma – A management philosophy developed by Motorola that emphasizes setting extremely high objectives, collecting data, and analyzing results to a fine degree as a way to reduce defects in products and services.[39]

Weighted average cost of capital (WACC) – A calculation of a firm's cost of capital in which each category of capital is proportionately weighted. All capital sources—common stock, preferred stock, bonds and any other long-term debt—are included in a WACC calculation. All else equal, the WACC of a firm increases as the beta and rate of return on equity increases, as an increase in WACC notes a decrease in valuation and a higher risk.[40]

ENDNOTES

1 Forrester: The Five Essential Metrics for Managing IT, page, 3 ...the actual NPV to expect from 71 projects is $325 million, which is less than the maximum value. This implies that some projects have a negative NPV. In fact, L4 shows $85 million of destroyed value represented by ten projects to the right of L3...

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