KPI PARTNERS IS AN INDUSTRY LEADER IN PROJECT ANALYTICS

KPI Partners is a world class consulting firm focused on Business Intelligence solutions and strategies.

KPI Partners' consultants have experience in managing both IT and non-IT projects (i.e. construction, product development and others) across a multitude of industries. This white paper is written based on the collective experience of KPI Partners' consultants in Project Management and in the implementation of Business Intelligence solutions.

KPI Partners is an industry leader in Project Analytics

Many of us at KPI Partners have been involved with Project Management in various industries – including manufacturing, service and construction. In addition, KPI Partners is itself a project-based business and experiences first hand many of the same challenges described in this white paper.

In our experience, the definition of what constitutes a project varies widely between departments, industries and even among project managers.

A project is often defined as a finite endeavor, having specific start and completion dates, undertaken to create a unique product or service which add value in terms of additional revenue or reduced cost. All projects have constraints like dates, budgets, resources, etc. All projects also have goals and objectives.

Do you know how many projects are underway at your company? Current economic conditions require resources from different teams to bond together for mission-critical activities. These are projects! Isn't tracking performance a huge priority?

The primary goal of a Project Analytics system is to help project stakeholders meet project objectives in an optimized manner while honoring the project constraints.

Project Analytics systems help to manage projects by providing key information about the project to the different key stakeholders including:

- The project team members
- The beneficiary of the project (i.e., employees or customers)
- The project sponsors or steering committee
- The project funding source (i.e., internal or external)
- The project cost manager (could be internal finance department or customer's finance dept)
- The project revenue manager for customer funded projects

Project Analytics

A Project Analytics system helps to manage projects by providing key information to all key project stakeholders, at the right time, to make proactive and informed project decisions.

All stakeholders will have different informational needs that a Project Analytics system needs to satisfy. One primary determinant of stakeholder need is the type of project being analyzed. In KPI Partners' experience with hundreds of projects across multiple industries, we have identified four main project types. These project types and the industries that they are commonly associated with are described in the next section.

Project Types

Project types can be analyzed into four types via a simple 2 x 2 matrix based on the ultimate customer for a project (i.e. internal employees or external customers) and on the funding source for the project (i.e. internal such as a business unit funding an IT project or external such a customer funded project to build a new aircraft).

Table 1: Project Types

External Customer	**Type II Project** Utility company builds a portal so that customers can pay their bills online	**Type IV Project** Defense contractor builds next generation aircraft for the government
Internal Customer	**Type I Project** Business funded IT project to improve the HRMS system	**Type III Project** Government grant to cross train employees in new skills
	Internal Funding	**External Funding**

Separating projects into types highlights the fact that different types of projects that fall into each of the quadrants will have different analytical requirements that will be outlined further in this paper. Let's look at which industries commonly have which different types of projects.

Table 2: Project Types by Industry

External Customer	**Type II Project** All industries but common in Telecommunications, Utilities, Business to Business, Retailing	**Type IV Project** Aerospace and Defense, Professional Services, Construction, Public Sector
Internal Customer	**Type I Project** All Industries	**Type III Project** Often seen in Public Sector funded projects
	Internal Funding	**External Funding**

Type 1 projects are particularly noteworthy in that they are what are called “Capital Expenditure” projects. In these cases, your company is spending cash (earnings) today to invest in an expected gain that will occur in the future. For projects of this type, justifications and proposed return on investment (ROI) are typically established up front. If the project is not carefully managed, the expected pay off is in jeopardy!

History shows that projects that are carefully managed – large or small – are considered most successful both in the short and the long term. Project Analytics systems help manage projects in almost all cases. Individual requirements will determine specific metric needs, but all projects have a customer and are funded by someone. It is recommended to use the tables above as a guideline to position your projects, and then manage them using software specifically designed for this purpose, such as Oracle’s newly-released Project Analytics application.

Project Progress

A good Project Analytics system will need to meet the needs of all four project types. Of course, one can be guaranteed that during the course of any project, the analytic system will need to answer the ubiquitous question: **How is the project going?**

The question may be asked by a resource working on the project or by a senior executive who is the executive sponsor responsible for the project. The answer will vary depending on the project type and the project stakeholder asking the question.

An all too typical answer to this question for a Type 1 project might be:

"Well, we are just under budget but we have another eight weeks to go which is a three weeks more than we planned but that is OK because there were two change requests early on that increased the scope. It has taken more hours than we expected to complete the current phase, but we worked over the Christmas break, which was expensive, but we used lower level cheaper resources so it didn't cause too much problem. Given everything, I think we will probably be all right."

Sound familiar?

For a Type III or Type IV project (i.e. external customers and external funding), the following might be added to the response above:

“I am not sure if we are making money on the project because the costs have really gone up. In addition, I have no visibility as to whether the client has actually paid for the milestone invoices we sent a month back. This means we may have more financial exposure if the next phase of the project has any hiccups.”

What does this mean? It sounds like an elaborate smoke screen and it quite possibly is. On the other hand, it is more likely that the Project Manager does not have the information he needs to answer the questions asked of him because it doesn’t exist, or because is scattered in multiple systems. Some of the information might be in his project management system, some of the financial information might be in the ERP systems, and some of the project quality information may be in a defect tracking or case management system. Other information is not captured at all.

Project Analytics Framework

There is a better way for the Project Manager to be able to answer these questions for himself and to his stakeholders. It is by first constructing a clear framework for project performance and management. The framework will vary based on the project type but will have many common elements as shown in the table below.

Table 3: Project Analytics Framework

#	Success Criteria	Project Type I & II (Internal/External Customer, Internal Funding)	Project Types III and IV (External Customer, External Funding)
1	Schedule	✓	✓
2	Scope	✓	✓
3	Resources	✓	✓
4	Quality	✓	✓
5	Cost	✓	✓
6	Revenue	Possible	✓
7	Financial Performance (Margin, Cash Flow)	Possible	✓

The success criteria that project stakeholders focus on will vary somewhat by stakeholder and project types but will generally contain the seven items listed in the project framework. A notable exception is that revenue may not be tracked on internally funded projects. In addition, the financial performance metrics for a non-revenue generating project will focus primarily on variance reporting between budget costs and actual costs. In revenue generating projects, there are a host of additional financial performance metrics such as profitability and cash flow.

As part of the preparation process for the onset of any project, it must be determined which metrics are most important to ensure the success of the project. Also, the Project Type (based on the 2x2 tables on page 2) should be determined so that all stakeholders agree on the customer and funding of the project. Some projects may be a combination of types, but it is important to communicate all project information within the company prior to the project start.

The next sections will describe in detail some of the key metrics, dimensions, data sources and capabilities for the seven elements of a project analytics framework as described above.

Schedule Metrics

Schedule metrics answer the basic project question of whether or not the project is on schedule. This question is typically answered with the following key metrics:

- Number of overdue tasks
- Number of tasks starting later/earlier than planned
- % Completion vs. Expected % Completion
- Variance between Expected Completion Date vs. Actual Completion Date

At any point in a large project, there will probably be some tasks behind schedule and an equal number ahead of schedule.

Project stakeholders want to understand these metrics along the following key criteria or dimensions: project, resource, location, task type and organization.

Scope Metrics

Scope metrics answer the basic project question of what tasks need to be done in order to complete the project. A common question that is frequently asked is about “scope creep”, which is the addition of more tasks being added to a project without adding appropriate resources or time or funding to the project. Some examples of key scope metrics are:

- Number of tasks
- Units of output (i.e. number of widgets, etc.)
- Increase or decrease in number of tasks or units of output as compared to a project baseline
- Number and cost of change requests

Every project will have some scope changes. A weakness in most project management activity is that scope changes are not monitored and approval is often verbal and not recorded. A better way to manage scope change is to account for it in the planning stage - there will be scope changes, and they must be allowed for. The next step is to put in place a tracking system with appropriate approvals. Scope metrics depend on a scope tracking and management system to capture scope information throughout the duration of the project.

Project stakeholders want to understand these metrics along the following key criteria or dimensions: project, resource, location, task type and organization.

Resource Metrics

Resource metrics answer the basic project question of what resources are allotted to a specific project and whether these resources are under-allocated or over-allocated. Resources can be people or equipment, etc.. Some examples of key resource metrics are:

- Number of resources
- Resource utilization
- Resource hours
- Amount of resource overtime
- Variance Analysis in terms of Budgeted Resource vs. Actual Resources consumed

In addition to project resource usage, it is important to have a project resource budget at the start of the project so that resource variance can be tracked.

Project stakeholders want to understand resource metrics along the following key criteria or dimensions: project, resource, location, task type and organization.

Quality Metrics

Quality metrics answer the basic project question on the quality level of the project deliverables. This is often one of the most challenging metrics to capture. However, with the widespread usage of issue management, defect tracking, warranty management and other systems, this information is more widely available than ever. Some examples of key quality metrics are:

- Number of high/medium/low defects
- Number of open/closed/deferred defects
- Cost to fix defect
- Warranty costs
- Status of quality tasks
- Number of Quality Assurance plan tasks completed and outstanding

One way to monitor quality is to set up a quality assurance project plan with quality events marked at the planning stage. These are activities that can be undertaken to check quality and could include activities such as walkthroughs, document inspections, or testing of a particular component. As each of these events is completed, these tasks can be reported on.

Project stakeholders want to understand quality metrics along the following key criteria or dimensions: project, resource, location, task type and organization.

Cost Metrics

Cost metrics answer the basic project questions on project cost. Some examples of key cost metrics are:

- Types of cost such as people, equipment, etc.
- Billable vs. non-billable costs
- Travel costs
- Allocated costs (i.e. burden)
- Variance analysis (budget vs. actual)

It is important to have a cost budget by time period so that actual costs can be compared to budget for a particular period of time. It is not sensible to monitor budget in total. For example, if the budget were expended half-way through a project, this would not provide any warning that the problem occurred and could cause serious jeopardy for project completion. For this reason, a project cash flow needs to be created for the budget and monitored at all times. Typically this is would be an estimate month by month of expenditure.

Project stakeholders want to understand cost metrics along the following key criteria or dimensions: project, resource, location, task type and organization.

Revenue Metrics

Revenue metrics are applicable to external customer facing projects. They answer the key question of the financial resources available to cover the costs of a project. Revenue could be in the form of customer invoicing, or of grants from a funding body. In addition in order to be billed and invoiced as revenue, organizations that manage projects, like construction companies and professional services companies, also need to account for the bookings and backlogs so that future projects can be efficiently planned for.

Some examples of key revenue metrics are:

- Total revenue
- Billed revenue
- Unbilled revenue
- Total funding
- Funding available

Project stakeholders want to understand revenue metrics along the following key criteria or dimensions: project, resource, location, task type and organization.

Financial Performance Management Metrics

The last metric types in the Project Analytics framework are financial performance management metrics. Financial performance management metrics are applicable to externally funded projects (i.e. Type III or Type IV). They answer the key question of how the project is performing on a financial basis. Some examples of key financial performance management metrics are:

- Budget vs. forecast vs. actual for revenues
- Budget vs. forecast vs. actual for revenues
- Project profitability
- Project cash flow
- Time-based trending metrics – Quarter over quarter increase, year ago, month ago, etc.

Project stakeholders want to understand financial performance metrics along the following key criteria or dimensions: project, resource, location and organization.

Project Reporting Strategy: Top Down or Bottom Up

Now that we have established the type of project and the types of metrics that are required for a complete Project Analytics framework, it is useful to consider the two different approaches to project reporting: Top Down and Bottom Up.

Top Down Approach

The top down approach looks at the overall objectives of the project and breaks them down into metrics that can be measured. In this case, understanding how executive management will measure the success of the project is critical. Will the success be measured by an -time completion date, finishing within or under budget, usage of eco-friendly products, building of reusable plant components or other measures that are critical at the executive management level?

Once the top-level objectives are understood, supporting metrics can be drawn from the project. The project plan and the actual and budget and financial statements are the first places to look. In support of the objectives, metrics from these systems can be gathered. For example, if the key measurement is on-time delivery, measurement of the planned interim milestones versus actual dates is an obvious place to start. It is important that each objective should have at least one metric to measure project success/failure rates.

Bottom Up Approach

The bottom up approach looks at the project from the project manager's level first. He or she will need key metrics to provide insight into the health of the project. Although many metrics will be the same as with top down, there will also be a host of new metrics which are key to the project manager.

Examples of these metrics include staffing levels – are the staff under- or over allocated? And, material consumption metrics – are waste expectations being met? The strength of the bottom up approach is that the details will provide the baseline for a roll up to executive appropriate metrics.

Both Approaches are required for Successful Projects

With KPI Partners' experience delivering a multitude of projects across multiple industries, we have seen that both the bottom up and top down approaches are required in the right balance to meet the objectives of the specific project. In fact, a Project Analytics solution needs to be able to support both top down and bottom up reporting and analysis.

Criteria for a World Class Project Analytics Solution

Having now established a framework for project analytics across project types, it is useful to specify both the functional and technical criteria for a world class Project Analytics solution.

Firstly, a world class project analytics solution needs to be designed to meet the needs of:

- the four main project types
- the needs of multiple industries
- different project management methodologies

To accomplish this, a world class Project Analytics solution needs to have the following features:

- Aggregate information up and down common hierarchies such as time, organization, geography, etc. to facilitate both a top down and a bottom up approach
- Information can be sliced and diced on key criteria such as time, organization, cost center, etc.
- Contain the key metrics required to satisfy the project analytics framework
- Be an open system that allows information from multiple systems to be integrated into the Project Analytics solution
- Meets the needs of customers in multiple countries with support for multiple currencies, languages and locales

The remainder of this white paper will describe Oracle's Project Analytics solution and how this solution addresses the project analytics needs of project stakeholders.

Oracle Project Analytics

Oracle Project Analytics is a solution is part of Oracle's Business Intelligence Applications suite. In addition to Oracle Project Analytics, this application suite includes Oracle Financial Analytics, Oracle Human Resources Analytics, Oracle Supply Chain Analytics and Oracle Customer Relationship Management Analytics.

The advantage of an Analytic application is that it is *pre-built* and comes *out of the box*. This is a lower cost, lower risk option that frees up valuable resources for other important work and other projects!

Oracle Project Analytics meets many of the requirements of a world class project analytics solution as described in this white paper.

It meets the needs of different project stakeholders through a pre-built and open project analytics data warehouse and several pre-packaged dashboards including:

- Project Executive – provides organizational views to monitor performance and the health of projects to improve profitability and operate more efficiently;
- Project Management – provides a complete view of project performance from high-level summary down to cost, revenue, and budget transaction details;
- Public Sector – designed for public sector and organizations not reliant on profitability and margin tracking. Fully integrated with the Oracle Financial Analytics module.

Oracle Project Analytics contains many of the features required of a world class project analytics solution including the following:

- Detail data is stored in the Project Analytics data warehouse and it can be aggregated up the common conformed dimensions of project, organization, time, geography, etc.
- Contains key project-specific functionality such as:
  - *Project calendar (year, quarter, month, week, day),*
  - *Organizational hierarchy (business unit, division)*
  - *Project location*
  - *Customer*
  - *General Ledger account hierarchy*
- Provides many of the key metrics and dimensions of the project analytics framework.
- Fully open product at both the data and reporting levels to allow additional information to be easily integrated so that a single view is presented to the end user.
- Designed to meet the project analytics needs of different project types in different industries and different countries through the inclusion of key features such as multi-currency, multi-language and multi-infrastructure support.

Figure 1 and Figure 2 shows two illustrations of the out of box reports and dashboards available in Oracle Project Analytics.

Figure 1: Project Performance Dashboard

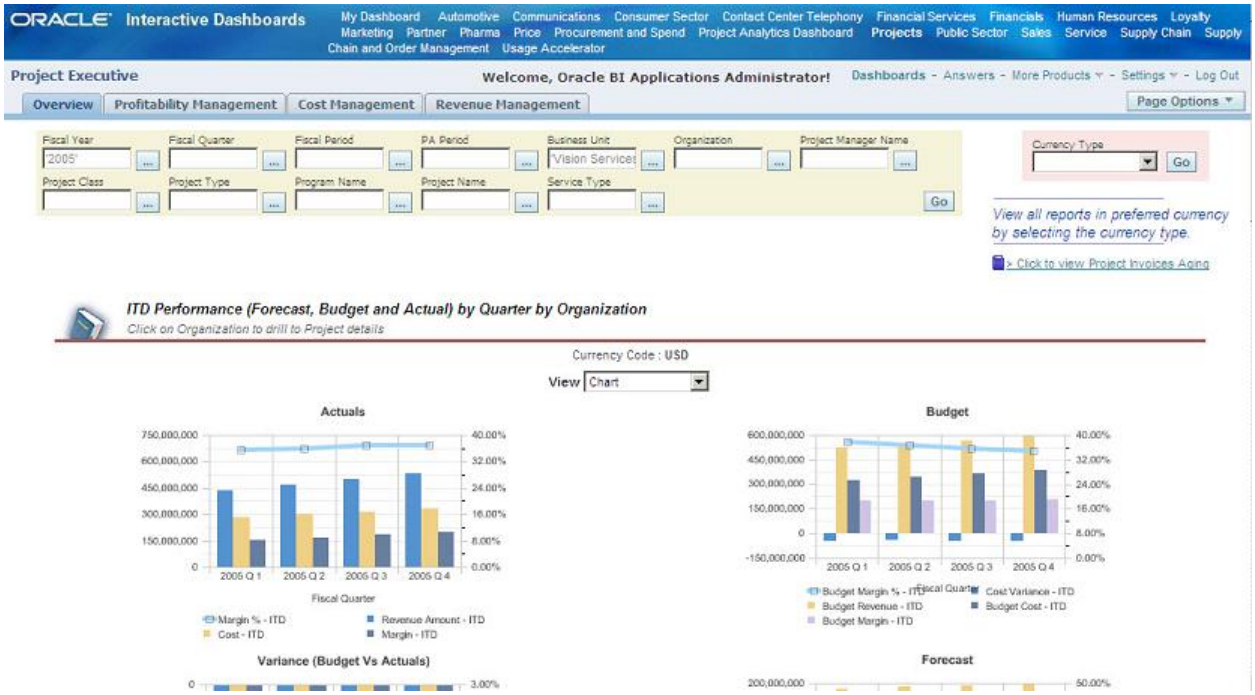
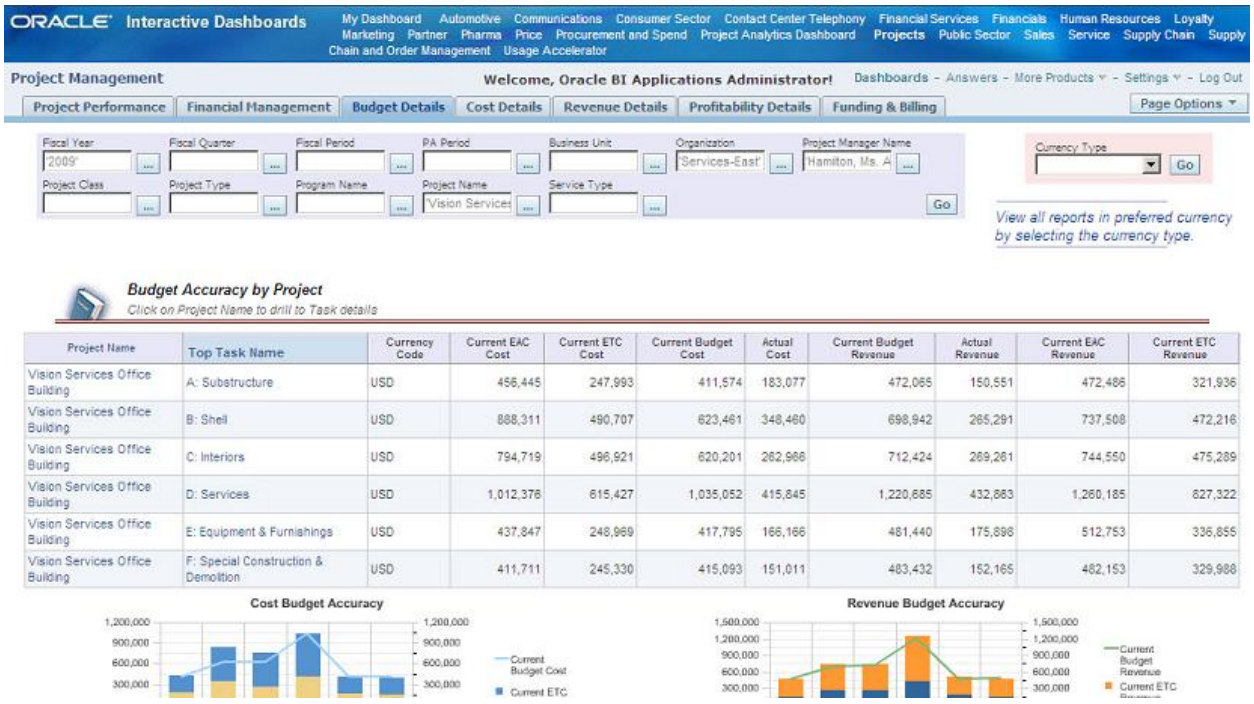


Figure 2: Project Budget Dashboard



Project Name	Top Task Name	Currency Code	Current EAC Cost	Current ETC Cost	Current Budget Cost	Actual Cost	Current Budget Revenue	Actual Revenue	Current EAC Revenue	Current ETC Revenue
Vision Services Office Building	A: Substructure	USD	456,445	247,993	411,574	183,077	472,065	150,551	472,486	321,936
Vision Services Office Building	B: Shell	USD	888,311	490,707	623,461	348,460	698,942	265,291	737,508	472,216
Vision Services Office Building	C: Interiors	USD	794,719	496,921	620,201	262,966	712,424	269,261	744,550	475,289
Vision Services Office Building	D: Services	USD	1,012,376	615,427	1,035,052	415,845	1,220,685	432,863	1,260,185	827,322
Vision Services Office Building	E: Equipment & Furnishings	USD	437,847	248,969	417,795	166,166	481,440	175,898	512,753	336,855
Vision Services Office Building	F: Special Construction & Demolition	USD	411,711	245,330	415,093	151,011	483,432	152,165	482,153	329,988

Oracle Project Analytics – Out of the Box Metrics, Reports and Dashboards

The out of the box metrics provided by Oracle Project Analytics are comprehensive. Like all Oracle BI Applications, these metrics can be used "as is" or they can be easily modified to suit an individual business' needs. A sample of these out of the box metrics is shown below in Table 4. These metrics are used in out of the box reports used in various role-based dashboards but can be extended.

Table 4: Oracle Project Analytics Metrics

#	Metric Type	Metrics
1	Funding and Budgets	Agreement Amount, Baseline Amount. Allocated Amount. Original Cost Budget, Current Cost Budget, Original Revenue Budget ,Current Revenue Budget, Forecast Cost Budget, Forecast Revenue Budget
2	Costs	Burdened Cost, Burden Cost, Raw Cost, Equipment Cost, Equipment Efforts, People Cost, People Efforts, Billable Cost, Non-Billable Cost
3	Project Revenue and Billing	Revenue Amount, Revenue Quantity, Unbilled Receivables, Unearned Revenue, Invoiced Amount, # of Approved Invoices, Retention Billed, Retention Withheld, Write-off Amount
4	Quality	Margin, Margin Percent, Forecast Margin, Margin Change, Cost Variance, Forecast Cost Variance, ETC Burdened Cost, ETC Revenue

Data Integration Options for Oracle Project Analytics

It is important to understand that project information exists in a wide variety of both structured and unstructured data sources.

Unstructured data is typically contained in emails, Word documents, etc. Structured data sources which can be more easily integrated and reported on include:

- Project management software as such as Oracle Primavera, Microsoft Project, etc. which contain project schedules, resources, tasks
- ERP systems such as Oracle eBusiness Suite and Peoplesoft which contain project costing, revenue, invoicing, funding, time sheets, expenses, etc.
- Excel spreadsheets
- Project quality systems such as Siebel Service, Mercury Quality center, etc. where defect and quality issues are tracked and managed

The ideal solution is to integrate these disparate sources into a central data source. However, this is not always possible. Oracle Project Analytics provides a fully open architecture that provides customers with a wide variety of choices to access project data. Table 5 lists the wide variety of reporting and data integration options available with Oracle Project Analytics.

Table 5: Reporting and Integration Options for Oracle Project Analytics

#	Metric Type	Typical Data Source	Report on data directly using OBIEE	Export data to CSV, Excel etc. and report using OBIEE	Export data to CSV, Excel etc. and bring into Oracle Analytics Warehouse	Available Out of the Box for Oracle EBS and Peoplesoft
1	Schedule	Project management systems such as Oracle Primavera, MS Project etc.		✓	✓	
		Excel, CSV files, databases	✓	N/A	✓	
2	Scope	Project management systems such as Oracle Primavera, MS Project etc.		✓	✓	
		Excel, CSV files, databases	✓	N/A	✓	
3	Resources	Project management systems such as Oracle Primavera, MS Project etc.		✓	✓	
		Excel, CSV files, databases	✓	N/A	✓	
4	Quality	Defect tracking and issue mgmt systems such as Siebel Service, Mercury Quality Center	✓	✓	✓	✓
5	Cost	ERP systems such as Oracle EBS and Peoplesoft	✓	✓	✓	✓
6	Revenue	ERP systems such as Oracle EBS and Peoplesoft	✓	✓	✓	✓
7	Financial Performance (Margin, Cash Flow)	ERP systems such as Oracle EBS and Peoplesoft	✓	✓	✓	✓

Deployment Options for Oracle Project Analytics

Finally, it is important to consider how a Project Analytics solution should be deployed to project stakeholders in order to maximize user adoption and functionality and minimize the total cost of ownership. Since Oracle Project Analytics is a very open technology, it can be easily integrated into existing systems. There are a number of deployment options:

- Stand Alone Deployment in a separate project analytics application
- Within Existing Project Portal such as Oracle Portal, Sharepoint, etc.
- Within an ERP System. Integrate to existing ERP systems where time and expense information is stored. Out of the box integration to Oracle eBusiness Suite and Peoplesoft is available.

In addition to deployment options, security is also an important consideration to ensure that users can access the Project Analytic system in an easy but secure manner, and also see only the information they are authorized to see. Oracle Project Analytics has extensive security capabilities to address authentication, authorization and data security needs:

- Authentication (i.e. log on to the system)
  - *Separate authentication for Project Analytics*
  - *Authentication via enterprise authentication mechanisms such as Oracle Internet Directory, LDAP, Microsoft Active Directory*
  - *Single Sign On with project application or ERP system*
- Authorization (Decide which reports and dashboards can be seen by role)
  - *Project executive*
  - *Project manager*
  - *Project resource*
- Data Security (What project data should be seen by role)
  - *Which projects to be seen by role or user*
  - *Which metrics and data to be seen by role or user*

Conclusion

There is a saying that if it cannot be measured, it cannot be managed. Traditionally, projects have used schedules and budgets to monitor progress. This only provides part of the answer. It does not address other variables. Just because a project comes in on time and on budget does not mean it is a success. The deliverables may be of poor quality, and there may be dozens of outstanding issues. A much broader view is required to insure a project's ultimate success. The Project Analytics framework presented in this white paper details the elements of a complete project analytics framework and how Oracle Project Analytics meets the needs of this framework.