Part 2: Tool Differences

Part 1 identified tools available for project portfolio management. This part describes key distinctions among the tools.

All tools for project portfolio management (PPM) share a common feature; namely, a database containing information on proposed and/or ongoing projects. Typical project data include the project description, owner, cost estimates, resources required, schedule, anticipated project benefits, and so forth. The tools allow project data to be rolled-up to the portfolio level and then sliced and diced in various ways. The idea is to provide a bird’s eye view of the portfolio, a view that aids decision making by clarifying, among other things, the project mix. Data management features make it easy to add, delete, and edit project data, and to otherwise manage the project database. At minimum, if the tool is advertised as PPM, it will allow you to select and simultaneously view data for multiple projects.

Beyond that, as indicated by the side box, available PPM tools differ in many ways. In this part we explore some of these differences.

Project Prioritization

In addition to providing a repository for project data, nearly all PPM tools provide some project prioritization or portfolio optimization capability. The quality of this capability, however, differs dramatically. The simplest tools merely allow users to manually rank and/or select projects. Most tools go at least one step further and provide capability to score projects based on pre-specified or user-defined criteria.

Different Approaches

- Some tools have been around for years and show their age. Others are beta versions that may not be fully debugged or have all advertised features.
- Price tags vary considerably. Expensive products don’t always provide more capability. Inexpensive products are generally low cost for good reason.
- Some tools represent generic, off-the-shelf software designed to work in most any environment. Others are systems whose parameters are set to better fit a range of situations. Some are custom designs intended for a specific client and application.
- Tools may be standalone, independent applications or designed to link to other software used by the customer. Some tools for PPM are modules within a "suite" of related tools provided by the tool supplier.
- Some tools emphasize detailed scheduling, staffing, and reporting data desired by project managers. Others are geared more toward senior executives interested mainly in setting spending levels, resource allocation, and impacts on the bottom line.
- Some designs are driven by "hard" data, while others are fed entirely by judgments.
- Most tools adopt a top-down approach to data collection wherein data needs are based on what is required to compute the portfolio measures required by executives, but some tools adopt a bottom-up approach that relies on a social-media-type GUI to capture project data from the natural flow of project and non-project work.
- Some tools are massive, all-encompassing packages that require considerable cultural changes by user organizations. Others are small-scale, "starter" tools or tools focused on narrow applications.
defined criteria. In many cases, however, project scoring is limited to subjective judgments regarding how well individual projects support corporate objectives and strategies (an approach commonly referred to as strategic alignment). Simple scoring methods are almost always inaccurate or biased and therefore incapable of identifying value maximizing project portfolios.

Tools with more sophisticated analytics evaluate projects based on simulating or otherwise estimating the impacts or consequences of conducting those projects. Some consider the consequences of not-doing the project. Some incorporate Monte Carlo analysis or other techniques for quantifying uncertainty. A very few include methods for determining the dollar value to the organization of the forecast project consequences using rigorous valuation methods. More discussion of these important differences is provided below and in subsequent parts of this paper.

**Target Applications**

As indicated in the tool table, some tools are intended for specific industries and types of project investments, whereas others are general-purpose. Being advertised for a specific industry or type of project may mean that the tool incorporates specialized project evaluation logic appropriate for that industry or project type. Alternatively, it may merely mean that “templates” have been created that make it more convenient or easier to apply the vendor’s generic logic to the specific types of projects common to that industry. Tools that are truly designed for specific industries build their methodology around the business processes, customer segments, and success factors specific to that industry. Specialized tools are more likely to incorporate models for estimating the benefits produced if the project is conducted (since the mechanisms by which projects create benefit will be industry- and project-type specific).

The biggest subset of targeted PPM tools consists of those aimed at information technology (IT) projects. IT is a popular application because it is easy to identify IT needs, costs are high, and IT spending is typically viewed as discretionary (so prioritizing to decide which projects to conduct makes sense). IT projects are often difficult to justify based on financial analysis alone, and the tools make it easy to define various non-financial measures for evaluating and comparing projects. IT PPM tools may include features to support the tracking and management of application assets created as a result of an IT deployment project, referred to as application project management (APM). Examples of providers with tools designed for IT include Artemis, Cardinis, Compuware, Daptiv, IBM, ITM, Planview, and Serena.

Another large category consists of tools for managing projects to develop new products. These tools typically represent product development as a staged decision process. Examples include products from Augio, BOT International, CA, Gensight, Instantis, Smart Org, Sopheon, and Telelogic. Tools for pharmaceutical PPM comprise a special case, as the drug development stages are well-defined, compliance driven, and have other distinguishing characteristics. Examples include the tools from Enrich, Planisware, and Portfolio Decisionware.

Tools for traditional engineering and construction projects, like those for new products and R&D, distinguish themselves based on capabilities for addressing project risk. Examples of providers of PPM tools aimed at the construction industry include Meridian Systems, Skire, and Oracle (Primavera). Another application requiring strong risk management capabilities is oil exploration.
Examples of tools applied to up-stream oil projects include Oracle’s Crystal Ball and Schlumberger’s (now discontinued) Merak Capital Planning.

Providers of tools for professional services (e.g., Innotas, Oracle, OpenAir, HP, XenLogic) emphasize project staffing and billing. Electric, gas, and water utilities are asset-intensive businesses, and the tools designed for such industries often evaluate projects in terms of their impacts on asset performance (e.g., tools from Copperleaf, Davies Consulting, Folio Technologies, and UMS).

Tools aimed at government and government contractors often include functionality designed to satisfy federal project management requirements such as the Clinger-Cohen [1] and Sarbanes-Oxley Acts [2]. BOT International, Compuware, Daptiv, Innotas, VCSonline, for example, advertise features designed to ensure compliance with government mandates.

**Tool Sources**

Tools can also be distinguishing based on the types of organizations that provide them. Consulting companies, software vendors, and service providers all offer PPM tools. In terms of market share, software vendors and software service providers deliver the most tools. Suppliers range from large companies with international sales forces to tiny niche players.

Operations research consultants and academics have been delivering customized, portfolio optimization tools for at least two decades, often using Microsoft Excel to create their applications. The industry-specific PPM tools offered by some consulting companies are generalized versions of custom tools created and paid for by previous clients. Software vendors began providing commercial PPM tools in earnest beginning around the mid 1990s. Many of the early entrants were start-up’s, pioneers who mainly focused on tracking projects and displaying portfolio-level data.

Software vendors with established products for project management quickly recognized the opportunity to add portfolio capability to their products. In essence, they up-sized their project management tools—whereas their original tools were designed to provide support for the planning and control of individual projects, the portfolio versions added features for multi-project management, including multi-user access (through providing a client-server environment), cross-project resource loading, and cross-project data roll-up and reporting. Examples of long-time project management vendors who early on introduced portfolio versions to their product line include Artemis, Niku (now Computer Associates), Planview, and Welcom (now Deltek).

More recently, software giants, including SAP, Microsoft, HP, and Oracle, have entered the PPM space, mostly by acquiring niche players and integrating the products into their offerings. Generally, the larger software houses offer PPM modularly as a component of an enterprise project management (EPM) or an enterprise resource planning (ERP) “solution”—a software suite intended to address a wide-range of needs faced by a project-based enterprise. For example,
Microsoft’s Project Portfolio Server is a software platform that allows organizations to create and manage project portfolios on a central server accessed via its web client, Project Portfolio Web Access. Various modules of Portfolio Server can be activated, including Portfolio Builder, Portfolio Optimizer, and Portfolio Dashboard. The product can be used independently or integrated with Microsoft Project Server and Project Professional, collectively marketed as an Enterprise Project Management Solution.

Tool Types

Another way to distinguish tools is based on the features provided, in particular, whether the tool emphasizes features to support project prioritization and selection (the central theme of portfolio management) or more traditional needs of large, project-based organizations.

Tools Focused on Analysis and Optimization

As noted previously, a relatively small fraction of PPM tools provide well-established prioritization and portfolio optimization algorithms. To do so requires incorporating superior analytic capabilities. The sidebox provides a summary of the characteristics often present in tools with this focus. Features provided that are typically not available from other tools include capability to optimize under multiple constraints, compute project value in dollar units, display the efficient frontier, re-optimize with some projects being forced into or out of the portfolio, identify optimal multi-period strategies (e.g., multi-year project decisions), select project versions based on total portfolio funding level, compute risk-adjusted project value, and optimize the portfolio subject to achieving portfolio performance targets.

Most tools focused on prioritization are provided by organizations specializing in operations research and decision analysis, or from industry consultants or software vendors with strong capabilities in these areas. The tools are almost always configured to be industry and/or problem-context specific and employ special models and methods of analysis deemed appropriate for the application area. For example, Copperleaf’s PPM tool for utilities uses mixed integer programming to allow for multi-year budget constraints. Schlumberger's tool for oil and gas exploration generates and analyzes portfolios of exploration projects (oil wells) using a genetic search algorithm.

Some PPM tools focused on project selection and prioritization are custom applications created using general-purpose tools for modeling and analysis. Examples of tools used for this purpose include (in addition to Excel) @Risk, Analytica, Criterium DecisionPlus, Crystal Ball, and DPL Portfolio. Some ERP suites contain modules that provide portfolio optimization capability (e.g., Microsoft's Portfolio Optimizer). A few companies (e.g., Enrich Consulting and SmartOrg) have
developed web-based PPM tools with strong portfolio optimization capabilities that may be customized for specific industry applications. SumOpti delivers customized tools to support portfolio and resource decisions based on a very efficient optimization engine.

Tools Focused on Project Management

Because, as stated above, many vendors entered the portfolio space by augmenting their existing project management tools, it is not surprising that so many PPM tools provide strong project management features even though they may lack portfolio optimization capability. An industry insider put it this way, “As interpreted by the software industry today, PPM is about managing the execution of project work after the decision is made to do the work.”

PPM tools focused on project management typically include features to support project planning (e.g., PERT charts, Gantt charts, milestones, critical workpaths, work breakdown structures, financial analysis), communication and collaboration (e.g., bulletin boards, automated email), document management (e.g., for project plans, charters, regulatory compliance requirements documents), project status tracking (e.g., progress reporting, earned value management, schedule and cost variance analysis), and post project analysis (e.g., benefits monitoring, surveys, lessons learned). Examples of tools with strong project management features include Pacific Edge, Planview, and Sciforma, as well as giants Microsoft, Oracle, and HP.

Tools Focused on Resource Balancing

Many tools with strong project management features also include capability to support the assignment of people and other resources to projects. Such tools track the resource needs of new and existing projects and the skills and availability of people. The concept, often referred to as resource balancing, is to help the organization improve efficiency through maximizing the utilization of available resources.

The sidebox summarizes characteristics of tools with this focus. Typically, the tools include features for resource management (e.g., resource pools, people scheduling tools, skills-matching tools) and accounting (e.g., timesheets, expense reporting, billing). PPM tools with strong resource balancing features generally include those provided as modules available within ERP suites, so-called business intelligence tools (such as that provided by XenLogic), and PPM tools designed for professional services firms.

Multi-Project Management Tools:
Emphasize project execution and workflow support. Typically, they provide capabilities to:
- Support planning, including defining project schedules and work breakdown structures.
- Generate project cost estimates.
- Monitor project status, including schedule and cost.
- Establish alerts.
- Support team communication and collaboration.

Resource Balancing Tools:
Help the organization understand project resource demands and resource availability. Typically, they provide capabilities to:
- Track the skills, experiences and interests of skilled staff.
- Manage work requests.
- Document resource allocations and track utilization.
- Determine the need for additional internal and external resources.
- Spot bottlenecks and underutilized resources.
It should be noted that, although resource balancing tools support project staffing, such tools do not automate staff assignments. Even PPM tools with the best analytics for portfolio optimization rarely address the mathematical problem of identifying value-maximizing staff assignments. The difficulty is not just mathematical, but the challenge of knowing or estimating the many relationships that would be required before a solution could be computed, such as how the number of people assigned, fraction of time allocated, and phasing affects team performance. Rather than optimize the allocation of people resources, nearly all PPM tools with resource balancing capability simply support the traditional 3-step process for resource assignment: (1) identify the projects that you’d like to do given the constraints on costs (wherein project costs include labor costs), (2) attempt to phase and stage the desired projects to accommodate people and resource availability, and (3) iterate as necessary.

**Delivery Options**

Suppliers make PPM tools available to customers in several ways. The tool may be provided as a standalone application installed on a single computer, or each user may obtain a copy with project data being written to a central database. Alternatively, the application may be installed on the customer's client server so as to provide access to multiple users over the local network. Even if the application is installed on your server, users' computers may still need software installed to access it. Web-based tools are a form of server-based applications wherein the user's web browser serves as the client software—no software need be installed on the machines of individual users. A growing percentage of providers make PPM tools available "on-demand," also referred to as Software as a Service (SaaS). The tool supplier or application service provider (ASP) hosts the application, typically, making it available to the customer over the internet. Providers of SaaS tools include @task, Daptiv, Clarizen, and Project Insight. Also, many vendors with web-based tools designed for in-house deployment are now offering to host the applications for their customers, thereby including a SaaS option.

Each approach has advantages and disadvantages. Desktop applications tend to be relatively inexpensive, and continue to work even if the local network is down. Server-based tools allow multiple, simultaneous user access and offer centralized control over the application (but users not connected to the network won’t have access). Web-based applications allow users to access the tool from almost any computer, including machines on which you can’t install client software (e.g., PDA’s and iPhones).

The major advantage to customers of SaaS is little or no initial capital outlay is required to purchase software. Instead, the tools are paid for based on monthly or usage-based fees (see discussion of tool costs below). Also, a SaaS deployment may eliminate the need to involve your organization’s IT department in the purchase decision. A goal for providers of SaaS tools is to make their products attractive to a broad spectrum of potential clients and to make the incremental costs of each sale as low as possible. Thus, SaaS tools tend to be simple and easy to use, but they generally lack models and analytic capability that are specific to the customer’s industry and business situation. SaaS tools almost always include basic features to support collaboration, project management, and resource balancing. Of concern to some organizations are data security issues and the risk that a supplier outage will cut users off the application. In addition, providers
of on-demand tools are challenged to integrate their tools with their customers’ other tools and data sources.

**Notes**

1. A U.S. federal law passed in 1996 that requires federal agencies to apply more rigorous processes to IT spending decisions.
2. A U.S. federal law passed in 2002 that establishes more rigorous accounting standards and business practices for publicly-held companies.