New Techniques in Project Portfolio Management

Don't Stifle Innovation with Excessive Phasing and Gates

by

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ABSTRACT

Managing multiple ideas, candidate initiatives and in-flight projects across diverse business units is a large challenge for major organizations. Overseeing global demand for projects as well as resource needs, risks, issues, compliance and value measurement requires an enterprise-class solution. Accompanying this solution are need-to-know executional dashboards that effectively serves a diverse range of stakeholders and purview roll-ups.

This thesis intends to identify several processes, enablers and key success factors that effectively usher in project development efforts through their gates and phases. The arguments presented conclude that managing a pipeline of ideas, candidates, and projects-in-flight can be successfully aided by applying new techniques in Project Portfolio Management (PPM).

Configuring such solutions can leverage methods that harness project prioritization, execution and monitoring. To gain maximum effectiveness, the formal and less formal influences that shepherd initiatives must not stifle bottom-up creativity, user innovation, intrapreneurship, developer agility or change management. Newer commercial offerings of PPM solutions improve upon the frameworks that simplify portfolio governance and empower enterprise innovation.
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Part I - Introduction

Motivation

Corporations seek to accelerate project development cycles to gain faster go-to-market execution. With new PPM and governance methods (e.g. resource management, demand management, internal and external sourcing algorithms, workload balancing), improved efficiencies are attainable.

Controls for cost, scope, compliance and quality dimensions need to be managed to maximize healthy innovation. Care must be taken to not manage allocations so strictly that enterprise innovativeness is constrained or frustrated.

To achieve balance, Project and Portfolio Management solutions facilitate an ideation pipeline and optimal project mix that considers risks, rewards, trends and technology tradeoffs. Strategic planning and tactical management featuring executive dashboards shepherd new initiatives, garner approvals, manage work, reduce unwelcome project 'surprises' and bolster transitions to operational readiness and success occurs.

Historically, large and complex initiatives would entail phases like:

1. Define
2. Design
3. Develop
4. Unit Test
5. Integrate
5. System Test
6. Deploy
7. Maintain
The legacy shortcomings of waterfall include:

- Tendency for scope creep
- Inflexibility after definition phase that rely on defined change controls
- Stakeholders and customers are less intimately involved
- Tangible results manifests later, after extensive fund commitment
- Project health monitoring and project performance tracking are influenced by behavioral factors

The shortcomings of Waterfall methods are well established. Increasingly, Rapid Application Development, Spiral \(^1\) and Agile approaches arose.

Such variants from Waterfall promise to better control risk and decrease reliance on upfront documentation and to involve more prototyping to manage story points, iterations and releases. Some Agile teams claim they “move too fast” to stall progress for documenting their work, especially if multiple tool sets are involved.

Furthermore, stakeholders participate actively throughout and help brainstorm requirements and interfaces and prioritizations. Iterations and releases are monitored as burn down unfolds and

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velocity metrics are monitored. The prototype itself becomes a more reliable representation of progress. However, if you are the CXO with limits on time and budget – how can you grapple with such activities and know where you stand. Executives must grapple with overseeing many diverse projects that are in-flight or transitioning to operations. The Chief Marketing Officer wants to roll-out and deploy new offerings and roadmaps quickly and effectively. As consumerization of technology intensified, and as organization encouraged democratization of innovation – a comprehensive and rigorous system was needed to nurture and manage projects within and across portfolios.

Hence, PPM has arisen as a critically valuable framework for organizations.

**Thesis Statement & Primary Research Objectives**

What is PPM? Why would an enterprise embrace PPM? How would PPM be achieved? What results would occur? What cautionary factors apply to ensure innovation thrives, risks are mitigated and programs succeed?

This thesis analyzes new advances in project portfolio management (PPM) including concepts, best practices, toolsets and workflows. Inter-relationships of PPM to: Product Lifecycle Management, Project Development Lifecycle Management, Program Management, Project Management, Software Development Lifecycle Management, Service Management and Technology Change Frameworks are also included.

**Research Methods & Approaches**

Modern techniques of the Project Development Lifecycle and SDLC frameworks are examined, as well as integrated program/project workplans. Additional considerations include Systems Engineering, Financial portfolio theory (e.g. CAPM, risk diversification), System Dynamics, Utility-Cost matrices, System of Systems, etc. Emerging trends and potential add-on components that could expand the PPM footprint for modern enterprises are also considered.
Driving Need for PPM

What if there is a severe shortage internally for iOS programmers and Android programmers? As firms rush to launch a wave of mobile and cloud applications that their consumers can embrace, go to market timing is often vital. If development for a project is rushed in an attempt to meet customer deadlines or incentive-driven performance targets, quality assurance could get swept under the rug, and bite back later. The cost of defective work and re-work will ultimately come home to roost.

How would you plan multiple initiatives to avoid shortages or bottlenecks? What would be the means to diversify risk with multiple parallel projects concurrently in-flight? All the while, not being dependent on a few scarce suppliers, workers, technologies, platforms, channels, user acceptance testers, executive leaders or other bottlenecks?

These are key issues for global organizations. To manage portfolio demands and balance the ecosystems of resources, PPM can help! So long as PPM is undertaken correctly by an experienced team of company representatives, contributing stakeholders and professional implementers.

As we shall see, it's a delicate balancing act to effectively inject:

- Discipline
- Accountability
- Rigor
- Visibility

Taking care to not stifle:

- Creativity
- Innovation
- Intrapreneurship
- Motivation
- Coordination
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- Information sharing

While managing:
- ROI
- Inter-Project synergy and consistency
- Visibility
- Fewer stalled or runaway projects
- More successful projects
Overall Approach to Project Portfolio Planning

The best approach will require managers and executives to:

- Identify new and existing ideas for pipeline funnel
- Classify by project types: platform, derivative, R&D, partnered, M+A, etc.
- Estimate the average time and resources needed for each project type, based on standards and past initiatives
- Identify current and attainable resource bandwidth
- Design a target mix of projects taking into consideration corporate Mission, Goals, Strategies, Risk Preferences and Critical Success Factors
- Balance Demand for projects with resources on hand or attainable
- Choose projects based on weighted prioritization criteria
- Close doomed initiatives as early as possible
- Refine program and product development methods for repeatability and scalability

An executive such as a CIO requires a dashboard to monitor the portfolios underway. As projects progress through a lifecycle of ideation, setup, funding, execution, closure, transition.

The diagram below shows a dashboard screenshot for a corporate portfolio. The horizontal axis is Finish Date and the vertical axis represents projects in the portfolio; a smaller red circle reflects a relatively less costly project which is performing poorly; a larger green circle reflects a larger budget and a favorable project health. As market conditions and an organization’s activity unfolds, portfolio composition and priorities will shift.
The diagram below highlights Business Alignment and Finish Dates from an actual PPM solution user interface. Larger spheres reflect bigger budget initiatives. Green indicates healthy. Yellow indicates caution. Red denotes problematic and worse than defined Yellow ranges.

**Portfolio Dashboard of In-Flight Projects**

The early concepts of a central PMO (Project Management office) and CPM (critical path method) techniques flourished under professional management and NASA space race of the 1960’s.

There has long been a struggle between the PMO and development teams to reach consensus about the appropriate way to communicate status and gather actuals for project reporting. ³

The project Management Institute certifies Project Management practitioners with a PMP designation. PPM systems are a relatively recent solution category. As ERP and IT Service Management mature, the footprint of PPM will evolve further. Frequently asked questions about PPM are highlighted below.
**What is PPM?**

The following paragraphs provide context for “What is PPM?” As part of an introductory framework for understanding the role of PPM in innovation, the following questions help to add structure to the framework. To generalize, the Chief Marketing Officer, Chief Financial Officer and Chief Information Officer need to “get on the same page” with their ecosystem of stakeholders (e.g. contributors, managers, executives, suppliers and partners). Further elaboration of the Who – What – Where – Why – and How – is examined below.

**Who Uses PPM?**

Headcount, skills inventory and resource availability dynamically adjust when overseeing a portfolio of in-flight projects. The balance of demand and supply will continue to adjust. Resources are planned, “soft” reserved, trained and “hard” assigned accordingly. The different roles that may negotiate these assignment can typically include:

- Stakeholder
- Employee
- Partner / Supplier
- Supervisor
- Project Manager
- Resource Manager
- PMO
- Trainer
- Etc.

**What is a Portfolio?**

Can executives borrow resources from different pools to accelerate different projects and come out ahead?
Where is PPM obtained?
Accenture and other prominent system integrators obtain PPM from leading solution providers (e.g., HP, CA, Planview) that on for deployments at Fortune 500 clients. The top providers and their implementation approaches are discussed later in this document.

Why does a firm want PPM?
We know that in-flight projects are increasingly numerous, complex and diverse. Inter-related programs may exhibit dependencies, links and pre-requisites. This document will examine What success looks like with PPM, while explaining benefits and limits of PPM.

How proven is PPM?
Is PPM ready for prime-time? What PPM solutions offer strategic vision completeness and ability to execute? These questions are examined below.

How is PPM deployed?
What methodologies provide the best delivery framework and which technical architectures and data management models suit global enterprises?

What cautions are needed when deploying PPM?
Centralization of ideas should not be excessively top down such that grass-roots contributions are stifled. Adequate representation from across the ecosystem of participants (potential users, users, customers, employees, executives and other stakeholders) need to provide regular input.
What will PPM not do?

Exclusions include Enterprise Resource Planning systems and General Ledger systems. However, PPM must integrate and co-exist with key financial, human resources and information technology systems.

Why bother Deploying PPM?

Organization leaders are increasingly expected to accomplish more with less. PPM enables a CXO to oversee a range of initiatives and project types. Candidate projects being proposed are handled by PPM, as well as programs/projects already underway.

PPM adds discipline and a central repository for strategically handling the demand for new Projects, while aligning the attraction/retention/deployment of scarce resources. In this manner, the corporate mission, building for the future and adhering to necessary compliance can be dealt with concurrently. The central repository of information and reports within a PPM solution helps break through organizational silos and helps to institutionalize a single source of “ground truth” of key enterprise information.

In this thesis, we examine Project and Portfolio Management and what’s new in optimizing resource allocation while balancing competing demands.

Different Project candidates exhibit different profiles and needs across the portfolio. Operational Planning systems need to be complementary and be able to constructively co-exist. Investments and resource allocations should be guided by the best minds collectively but still accept candidates from a range of origins. Early warning alerts for mistaken initiatives enable a project to be killed early as deemed necessary.
With improved governance, business process management and investment decisions, the organization can better manage: Money, People, Processes, Data, Effort and Deliverables across the firm. This enables the CXO and CIO to:

- Make smart IT portfolio decisions
- Compress duration for delivery of commitments
- Balance agility with governance
- Pursue both Strategic and tactical excellence
- Encourage both innovation and discipline
**Example of PPM Activation**

**Case Study:** BNP Paribas recently went live globally with a solution to help streamline IT projects for: enlisting internal and external resources and improving financial tracking.

BNP deployed a project governance strategy to help balance business demand of technology resources. Project resources are allocated and project health is closely tracked.

BNP exemplifies a corporate-wide, multi-language interface deployment. Data delivery to the financial firm’s accounting systems is supported. Business Units and teams can more effectively manage and prioritize requests in alignment with overall enterprise mission/strategies.

As a result, timely, on-budget delivery of products and services is improved. Before a project is approved, a program portfolio executive views a pipeline and resources’ bench availability. In collaboration with fellow bank decision-makers, the executive determine a new candidate project’s relevance, budget, ROI, strategic impact, etc.

Hence, PPM visibility and reports can validate resource availability, based on capacity plans and workforce management systems. Upon project approval, a Project Manager enlists on-demand team members with skills to perform a planned Work Breakdown Structure, with standards for variation reporting.

For increased flexibility and just-in-time utilization, mid-level managers or project-team level actors submit timesheets and monitor risks from a shared PPM dataset to consolidate and analyze PPM metrics (e.g. variance from budget, deadline, quality) throughout the project lifecycle.

**Fundamentals of PPM**

The following terms and phrases are fundamental to PPM:

- Portfolio
- Project Plan
- Budget
- Timesheet
- Project Health
- Resource Management
- Demand Management
Commercial Off-the-Shelf Publishers

Many organizations start their Project Portfolio Management Information System with a purchase from one of these leading vendors:

- HP
- Planview
- Computer Associates

The commercial off-the-shelf-software harnesses the scale of many clients' industries to maintain a solution of rich features and best practice functionalities. Once configured, PPM solution modules help manage the intake of innovation candidates/proposals. Deliberately managing phases and gates can provide excellent results. As we will discuss, care should also be taken to ensure phases and gates do not impair democratizing idea generation and grass-roots innovation.

Corporate PPM Frameworks such as Phases and Gates

IT/Business professionals often experience situations where the organization expects to deploy enterprise-wide solutions with too few resources and accelerated timelines.

How can you manage a range of diverse initiatives and project types? PPM enables strategic and effective handling to meet the demand for new projects while concurrently overseeing a myriad of resource types, skill sets and fluid availabilities.

A typical framework for large organization will include:

- Concept to Approval
- Define and Design
- Specify and Build
- Test
- Go Live Preparations
- Shake-out / Stabilization
Phases and gates can exist less formally or less systematized. However, with a mature PPM system, the result is end-to-end system for a global enterprise which can more readily manage a balanced portfolio of projects. Projects are often diverse within an enterprise and in varying states of progress/completion: overseeing demand, resources, in-flight project health, risks and issues is more manageable with a modern PPM system.

PPM systems can assist management in performing operational planning as they guide investments and pursue project success governing: costs, labor, scope and accomplishing deliverables, remaining consistent with what was envisioned in mission, objectives, portfolio strategy and project plans.

With a structured PPM solution, the organization can assess projects for the high impact, high efficiency and high success attributes. This enables centralized or decentralized emphasis, prioritization and sequencing. As the firm will ideate, define and initiate a collection of projects, programs and portfolios are constructed and monitored through the delivery process. Some similarities exist as compared to SDLC, but PPM is at a higher level of executive direction, product planning, capex/opex rationing and approval tracking.

A pipeline and funnel of projects evolve and gain sponsorship so that high potential-projects can attract resources (hardware, software, talent) and form a team as the enterprise develops a high
performance culture and high efficiency culture. PPM helps deliver quality, timeliness and cost control. PPM also offers project tracking, project risk/issue management and workforce balancing.

Performed by a virtual and on-demand high performance team that is assembled just in time as resources perform work, roll-on to project and efficiently roll-off for re-deployment to other projects.

Cycle times and demand types for diverse range of projects can vary. Suppose a straightforward maintenance or basic service with short term-milestone, low unknowns and recurring efforts. Or, suppose a highly strategic project of larger budget, more unknowns, very innovative and “highly tolerant of ambiguity” resources (more expensive talent). Somewhere in the middle range of simple and complex could be a solution enhancement.

A simple Maintenance Request requires relative low talent and short overall timeline and smaller budget. A solution Enhancement is moderate effort and scale. A highly innovative breakthrough solution with complex integration touchpoints and many unknowns is at the far end of the continuum. This cycle wavelength concept is illustrated further below.

**Beware of Stifling Innovation**

People at some firms are inclined to resist innovation – why? The status quo may be perceived as stable, secure, straightforward or easier workload. And the capex / opex rationing process can constrain ideation that progress thru gates and be incrementally funded in phases. Proposals should align with changing market conditions, corporate mission, resources and viability. And competition, pricing, features, capacities are factors to weigh.

The source of an original idea or refinement may derive from a range of stakeholders and participants. It is important to realize that excessive gates or phases should not interfere with the incubation or Intake of ideas from employees, executives, suppliers, regulators or customers.
A disruptive innovation can be competence-destroying to the status quo incumbents instead of competence-creating; and provoke a shift to activities and techniques that the firm may lack current and future prowess. Incumbents could resist or sabotage ideas that seem threatening to an individual or group, even if an innovative ideas holds promise for long term organizational rewards.

"Innovation atrophy will set in unless creative people fight it. That's where the CIO has to set the tone." 6

InformationWeek, May 27, 2011

The following examples show dis-continuous innovations that require adjustments in how firms embrace change and re-define operational excellence. Examples of such shifts are:

- Human assemblers of light manufacturing → 3-D printing
- PC and Laptop manufacturer → Smartphone and Tablet manufacturer
- On-premise client-server solutions → Off premise Cloud solutions from Server Farms

These examples are competence destroying innovations that can thwart a leader who lacks necessary expertise. The legacy leaders will often resist, or skeptically postpone acceptance of new market directions. As Clayton Christensen points out in the Innovators Dilemma, an established firm is inclined toward largest customers who represent the bulk of a firm’s current revenues.

Such customers invest in present day supportive infrastructures and go-to-market practices. The trauma and quarterly-revenue-driven mindset means that “Change” is often avoided. Intertwined in the resistance to change are fears of market share erosion, canibalization, margin deterioration, dis-intermediation, inadequately-trained workforce, etc.

Where a few number of users perceive a need, the lead users tend to innovate earliest. The role of users (not just suppliers) in advancing innovation is vital to recognize and leverage. Hence, a
PPM ideation and requirements definition should accommodate employee bottom-up as well as customer-provided info.

**Innovation, Funnel Management and Dissemination**

> "Innovation by users provides a very necessary complement to, and feedstock for manufacturer innovation."  
> Professor von Hippel, Massachusetts Institute of Technology, Democratizing Innovation 2005

An impressive culture of innovation at Massachusetts General Hospital where Dr. Nat Sims has been successful at attracting and germinating ideas for medical innovation. Some people might question whether reliance on Dr. Sims represents a bottleneck and a less efficient method to funnel candidates for incubation as compared to an institutionalized PPM system. In fact, the CIMIT.org nurtures early stage, high-risk ideation. Projects in early stages are assessed using benchmarks recognized by both business and scholars.

Without PPM, can MGH really comprehend what “the right hand is doing and what the left hand is doing” on an enterprise scale?

What if an idea is not “exciting” or “cutting edge” but nonetheless indicate a high ROI? Do such ideas curry less favor and suffer in funding? Would a mundane idea for transforming building security ever see the light of day compared to breakthrough surgery?

In addition to Dr. Sims, particular comprehensive system solutions at MGH exist for tracking idea candidates from concept to approval. An on-site evangelist can influence and complement an institutionalized PPM system. A personal touch is not mutually exclusive to a rigorous info system that could manage portfolios of concepts/programs/projects that progress or dropout of the MGH pipelines toward payoff or rejection.

> "When innovations don’t fit existing (business) architecture, inability to understand and respond results."  
> Professor Eric von Hippel, Massachusetts Institute of Technology
In both the example of MGH and 3M, there are many informal competing sources of funding – and many competing ideas as to what is worth funding. In other words, the arrangement is more of an internal marketplace than a hierarchy. This thesis argues that a systemized PPM approach helps reduce bottlenecks, reliance on tribal knowledge and individual “heroes” like Dr. Sims. Admittedly, grant restrictions and regulatory constraints (e.g. clinical trials) are also practical limitations that govern grants and disbursements with phases and gates that can impede innovativeness and fast adoption.

PPM system should take care to not create an autocracy of sources for innovation. Implemented correctly, the PPM system will enable a diverse source of employees, contractors, suppliers, partners, executives and virtual teams to ideate and shepherd candidates through a comprehensive selection and development process.

**Funnel Management and Overcoming Resistance**

At MGH, Dr. Nat Sims humanized and attracted ideas through a less formal "funnel" to gain approval and funding. Each new idea is a candidate for funding, refinement and fostering transformation. The funnel inherent to good PPM should not be so onerous that worthy candidates get frustrated or deflected.

The PPM can acknowledge business units, but needs to be cautious not to involve an undue hierarchical bureaucratization. Any organization may have political fiefdoms arise, but PPM can help reduce favoritism, Cronyism and not-invented-here biases. Constructed properly and governed properly, PPM can help produce fact-based approval decisions objectively and more timely. Projects stand on their merit as they progress through realistic phases and gates.

Exceptions, alerts, risks and issues garner appropriate levels of visibility within the PPM system. Reporting is effective, distributed and punctual. Of course, reporting will often be dependent on the quality of information that Project Managers are submitting in the tracking mechanisms. If negativity or frustration becomes excessive, and innovative thinking becomes punished, the PPM system will suffer. To maximize adoption and success, PPM systems should ensure adequate
inputs are collected for user feedback and continuous process improvement. Examples include proper integrations with employee feedback systems, supplier feedback systems and customer feedback systems.

Of course, when managing the intake funnel of candidates, it would be inappropriate to rely on local managers’ fragmented disparate spreadsheets to track Dr. Sims anecdotal hallway impressions of what initiatives warrant organizational support. PPM can offer the enterprise view. Individual intelligence can be collectivized and institutionalized with enterprise systems. Proper governance can help nurture both: discipline and creative ideation.

"Massachusetts General Hospital has many competing sources of internal innovation funding. Only one source of which is managed by Dr. Nat Sims."  

Professor Eric von Hippel, Massachusetts Institute of Technology

Avoiding a potential pitfall of reliance on centralized, top-down approvals are possible by including local representation of the review processes. Purse-strings are a chokepoint of control. If approvers are gatekeepers for a single funding source, the rejections could be viewed as stifling and discourage ideation.

Demand will typically exceed resources available to allocate and necessitate prioritization and phasing of dependencies and pre-requisites. Indeed, purse-strings are a chokepoint of control that roll-up to executive management. To avoid ivory towers, sustaining multiple “pockets” of funding can help reduce frustration and reduce out-of-touch impersonal relations among ideators, customers, approvers, users, project workers, etc.

While some less formal pockets of maverick actors may strive to avoid/circumvent the otherwise formalized tendency for “No” rejections, retaining their participation and enthusiasm by various means is helpful. Likewise, in the case of acquisitions, the “can-do” culture and nimbleness is important to retain. Otherwise, status quo play-it-safe tendencies will become inbred. The administrative system is built around the silo-ed and hierarchical bureaucracy. The social, Do-It-Yourself skunkworks structure tends to offer grass-roots ideation close to the customer, and the promise of ongoing democratic contributions.
A range of actors typically have a variety of bonuses and incentives structured on diverse goals and personal micro-motives. It is essential to unravel and rationalize the factors to align with agreed-upon mission and objectives. Behavioral distortions that attempt gaming the system, or "sandbagging" forecasts, or misleading overseers with misrepresented ‘earned value’ calculations or other indicators needs to be sniffed out and dealt with to sustain PPM reporting integrity.  

**Earned Value**

Earned value as a measure of a project’s value that has been earned to-date. The specified Begin dates and planned End dates are weighed along with actual work completed. Appendix 1 explains components of the Earned Value calculation.

**Rallying Non-Executives to Ideate**

Maintaining multiple funding sources can also permit multiple missions/strategies to co-exist for different business units or for different continents. In other words, encouraging more of an intra-firm marketplace than a strictly controlled central hierarchy is a healthy approach. There is a tradeoff of centralization and de-centralization that will differ by industry and participating firm. At Intuitive Surgical in Silicon Valley, California the shop floor workers are regularly measured on the quantity and quality of their Employee Suggestions as a source for innovation.

Although primarily from a manufacturing continuous process improvement standpoint, at a tactical shop-floor level, the leading edge processes and order-fulfillment occurs throughout the shift. The workers interact with end users for support issues, and often can anticipate user needs and use extensions. Each set of assembled finish products is tested and cleared for shipment (new) or remediation (existing) to handle user needs, the community and ecosystem creates suggestions for a range of improvements. This illustrates how innovation is a double-edged sword. Innovation disrupts production efficiency – and production is a primary focus of many organizations.
As we know from Michael Porter’s “5 Forces” and others trusted experts, organizations may pursue strategies such as: (a) Innovator, (b) Hi-Touch Customer Service, or (c) Low-Cost Producer. Introducing new ways of doing things can be disruptive to (b) and (c). Typically, most firms will devote 80% of budget spend to “operations” and 20% or less to innovation. Modern firms hope to “flip that equation.”

A countering factor is that sometimes an incumbent will find ways to improve their existing technology in the face of competitive inroads. (e.g., the “sailing ship effect” meant sailboats performance improved in the face of new steamboat competition). Tribal knowledge and informal skunkworks may also be tapped for counter-culture innovating.  

Example of User Hacks or Encouraged Modifications with Democratized Innovation

The entire ecosystem gains by providing end users with toolkits for idea exploitation, adaptation and improvement.

**Examples of User Hacks or Encouraged Modifications**

- Wikipedia
- Angie’s List
- Ancestry.com
- Twitter
- Healthcare
- Microsoft Xbox and Kinect
- Sport Invention
  - Snowboarding
  - Snowkiting
  - Mountain Biking
- Digital Photography
- Star Trek fanzines and books
End users are unique as compared to multi-level stakeholders, resellers or partners. End users are less feuding fiefdoms, and more goal-aligned. Users more willingly share innovative ideas as opposed to hoarding for commercial gain. Therefore, any PPM system should take care to solicit and elicit valuable innovation ideas from a range of stakeholders. Over-reliance on a bureaucratized PPM system would stifle the organization’s propensity and capacity to innovate effectively.

In a scenario informally presented about Massachusetts General Hospital, Doctors are empowered to devise innovations via “boutique” production of medical services:

- Identify improvements for a specialists’ practice
- Leverage MGH Labs and Clinics
- Perform limited in-house clinical trials
- Navigate regulatory constraints
- “Market” their own inventions to their particular patients while peer physicians provide standard approach to peer patients as a comparative benchmark
- The best outcomes prevail as the new standard

An organization like MGH should foster use of less formal pockets for funding as well as a systematic enterprise-wide approach typical of large corporations when managing their PPM funnel. In all cases, security and compliance is overarching. Boards handling oversight and accountabilities should consider all funding approvals as important “gates”.

Of course, it is inappropriate to rely on disparate Excel spreadsheets across islands in the enterprise. The promulgation of state of the art, and necessary adherence is more rapidly and effectively disseminated with an enterprise-wide PPM system. Relying solely on a few champion charismatic/persuasive actors to usher which initiatives gain organizational support is short-sighted and in-bred. A comprehensive PPM system can coordinate the formal and less formal venues and vehicles of innovation without being stifling.
New Techniques in Project Portfolio Optimization

Handling Innovation with PPM - A Fortune 500 Firm Example

How can an enterprise avoid reliance on disparate spreadsheets and unsystematic evaluation of ideas and candidate projects?

Project Portfolio Management solutions and governance endeavor to add process flow to systematize, institutionalize, centralize, formalize

- approval traceability
- initiative prioritization
- resource allocation (internally and externally)

Are business cases rigorous in applying hurdle rates and projecting benefits, costs, payback and ROI? Ordinarily, the business cases are mandatory, and pre- and post- audited.

A PPM system helps manage the intake of innovation proposals through project health, risks, issues, resource management, etc. However, as pointed out during the lecture materials, this process of stage-gates can be counter-productive to democratizing idea generation. It becomes an excuse for the micro-motives to block potentially disruptive (but worthy) ideas from progression.

While enabling some intake of initiative proposals, stage-gate and PPM methods are no threat to incumbent hierarchies who remain “secure in the knowledge that there will be many chances to kill a project later.”

Professor Eric von Hippel, Massachusetts Institute of Technology, Lecture of March 15, 2013

In organizations observed by this thesis’ author, phases and approval gates are handled formally in conjunction with a PPM discipline because:

- PPM solutions orchestrate the portfolio optimization
- Capital rationing is more deliberately controlled, as a source of political power
Ideation is a more formal screen from centralized and decentralized actors, advisory boards and forums who weigh:
- Problem Statement
- Business Vision
- High Level Benefits
- Approach
- Technical Assessment reviewed with business stakeholders
- Prioritization

The defined business requirements and functional design phases clarify the sponsor/stakeholder needs in detail and describe how technology is planned to address the needs.

The staged approach is incremental in committing dollars and people. Funding and human resources are assigned as candidate proposals get researched, prototyped and deployed.

- Concept through Review and Approval
  - Value Statement Approval
  - Business Case Approval
- Definition
  - Requirements
  - Functional Design
- Design and Develop
  - Technical Specifications
  - Unit Build
- System Test
  - Unit Testing
  - Integration Testing
  - End to End System Testing
- Deploy
  - Go Live Confirmation
  - Transition and Steady State

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The phases and gates above include considerations for:

- Idea Screen
- Value Proposition (ROI)
- Investment Review Board
- Architectural Review Board
- Market Requirements Document
- Business Requirements Document
- Project Plan
- Work Breakdown Structure
- Staffing Requests from pools of resources and “Centers of Excellence”
The swimlanes cited above refer to three phases in this example of phases and gates to progress through a cycle of states such as idea-candidate-program-project-closed. Each phase has “go/no-go” gate(s) in which committees review candidates seeking advancement through the progression.

- Phase 1 - Concept to Approval
- Phase 2 - Definition and Design
- Phase 3 - Technical Design and Build

Examples of control gates for a phase in the Concept to Approval stream contain increasingly detailed specifications such as:

- Value Statement
- Initiative Prioritization Review
- Prioritization Review Meeting
- Solution Options and Financials Estimates
- Business Case Approval
- Resource Staffing

Examples of control gates for a phase in the Definition & Design stream contain increasingly detailed specifications (e.g. Formalized Portfolio Management) examine requests, programs and projects for solution architectures, solution designs and go-to-market plans.

Examples of control gates for a phase in the Technical Design & Build stream contain increasingly detailed specifications such as:

- Detailed Solution Build
- Testing Scripts
- User Acceptance Testing
New Techniques in Project Portfolio Management

- Updated Project Plan
- Project Closure Plan

The shortcomings worthwhile to point out include:

- Assumption everything that is important to know is input into PPM solution
- Control and approvals should invite centralized and decentralized approvers
- Designated managers who view system reports should have visibility into ranks
- Unless intentionally circumvented via a slush fund, will turn a blind eye to (or compete with) less formal (or rogue/shadow/skunkwork) systems since disparate spreadsheets lack auditability, traceability and a single source of truth
- Corporate Acquisitions that are carefully and not hastily integrated can help overcome a resistance to change or “not invented here syndrome”

Google allows employees one day per week to pursue ad hoc projects on their own. (Of course, the workload for employees at Google is often already 7 days per week.

The definition & design phases aim to clarify the Business needs in extensive detail; and to explain how technology and change management will address the business needs.
Crossing the Chasm and The Product Lifecycle

In Crossing the Chasm, the bell curve signifies the initial increasing and then decreasing market embrace of an innovation as a Product Lifecycle evolves. As the market maturity unfolds, a shift from breakthrough thinking is replaced by continuous improvement thinking. Talented practitioners of the former are usually different than practitioners of the latter.

The left axis reflects quantity of adopters, the right axis reflects elapsed time and phases.

![Adoption Curve Diagram]

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PLM versus PDLC versus ALM and SDLC

A senior executive will oversee one or more portfolios. This oversight will reflect the span of accountability and responsibility attributed to the executive. Depending on the hierarchy and dimensions that an organization defines for business units and initiatives, a portfolio is typically comprised of several programs.

PPM evaluates and manages ROI of different projects and deciding where to invest. Agile helps execute projects that are selected. Each program has multiple products under development. Supporting these product initiatives, multiple projects will be at varying states of maturity and completion. An initiative such as "HRIS Mobility", or "Migrate Field Engineering Dispatch to Cloud" could be managed as a separate infrastructure horizontal, or integrated as part of a product, or productized service offering.
The discussions above distinguished between PLC, PPM and SDLC. One of the advantages of balancing proposed initiatives with available resources, is to cross-reference current market position, and projected future market position of the associated new/enhanced project portfolio pursuits.

PPM will identify which candidates are tracking well and in a trajectory that can maximize rewards for the sponsors and the organization overall. Tweaking (e.g. inserting or deducting scarce resources) can occur in tandem with go-to-market efforts.

BCG historically envisioned COWs throwing off cash which can be used as working capital to help fund up-and-comer question marks or known STARS. Stars are experiencing high growth rates and may need to attract more resources to ultimately evolve into COWS that generate liberal rewards. Efforts identified as DOGS can be punctually decommissioned or re-defined to limit unnecessary resource leakage.

These overall patterns also allude to S-curves as well as the Product Lifecycle Management (PLM) of Define-Launch-Grow-Decline. The analogies to Geoffrey Moore’s Crossing the Chasm can also be made as market adoption up-ticks occur for Stars as a critical mass of followers evolves, and the quantity of network nodes (user and stakeholders) expand.
Demand Management and “Operations versus Innovation” Mix

Demand Management can aid in weighing the trade-off of Operations versus Innovation. Strategic decision-making is easier when the more numerous and predictable tactical decisions are segregated out.

Historically, the CIO/CTO’s expenditures were highly consumed by “keeping the show on the road”. Consequently, innovation was often under-emphasized. In recent years however, advances occurred in IT manageability and affordability. For example, due to utility computing and Cloud capabilities, many firms are striving to “flip the equation” mix from 80/20 to 50/50 or potentially even 20/80, depending on their industry and competitive climate.

Balancing Tradeoff of “Keeping Show on The Road” versus Innovation

Upon investigating the merits of PPM, the question may arise: “What value can PPM Deliver?” Answer: Both Tactical and Strategy Coordination, frameworks, lifecycle management, single-source-of-truth,
New Techniques in Project Portfolio Management

resource allocation. In other words, a chess-board view of the internal and external resource landscape that encompasses:

- Plan
- Execute
- Track projects

**Phases and Gates**

- PPM uses Standards Boards that can leverage PMI, PMBOK and BABOK
- PPM leverages proven methods to propose, approve, execute and report
- Waterfall is well-established due to link to standards and experiences
- Waterfall is becoming less entrenched as Agile gains proponents

Some projects are problem-prone early. In a waterfall approach, if not properly managed, the set of expenditures that projects attract can become a death spiral that gobbles up scarce resources in terms of talent, funding, timelines and market opportunity.

In recent years, project methods, however, have increasingly enlisted agile approaches with iterative releases and more collaborative development approaches. The result is better intra- and inter- project communications that enable timely go-to-market launches. PPM systems have incorporated new workflows that accommodate agile development efforts. PPM systems can insert a project structures which adapt to scrum meetings, story points, prototyping, prioritizing, velocity management, and roll-up reporting.

**Emphasis on Business Services**

PPM solutions have acknowledged the influence of Service Management and flexible development approaches. Organizations can readily assemble people to govern:

- Business process modeling
- Orientation toward business processes not technical platforms
- Centers of excellence (such as offshore testers)
- Demand management gates with an enterprise purview
Coordinated services and COE's governance to accept business stakeholders input into both process and technology actions (also known as “two in a box” where the business stakeholder collaborates closely with a developer).

With PPM, the organization is better able to handle demand management through a lifecycle to:

- Collect candidates
- Evolve and refine ideas
- Approve and structure highest merit ideas for initiation and prioritization
- Setup project managers
- Assign and share resources
- Re-use Work Breakdown Structures
- Execute projects
- Release resources

In fact, Planview PPM recently introduced supplementary feature-sets to include service management and service catalogs. In this manner, frequent project elements (e.g. Amazon Web Service or other modules) can be readily stood-up or cancelled with necessary security and change standards as a business imperative gains elastic compute capacity on relatively short notice. Hence, we see Service-Oriented Architecture and other development frameworks indeed complement the planning and execution of projects via PPM.

**PPM and Governance are Mutually Re-Enforcing**

An enterprise-scale solution for PPM will rely on well-designed human governance Processes particularly configured to a firm’s requirements. By implementing the vendor’s solution and configuring to particular enterprise needs, strong aspects of governance best practices are instilled.
A. Executive Council

Shapes mission, objectives, strategies for entire organizational portfolio of assets, resources, commitments.

B. Governance Council

Comprised of cross-functional groups that own investments. The right mix of undertakings that impact augments corporate value. Are the benefits promised being achieved? Several of these governance councils may oversee different classifications of Work.

C. Steering Teams and Program Boards

Steering teams and program boards manage prioritization, attend gate reviews, provide tactical direction and monitor the health of their programs/projects. Changes such as re-prioritization, timeline shifting, re-plan, or cancellation can be recommended, often in the context of the overall portfolio status and balance.
**Demand Management Synchronizes BPM and IT**

Organizations have enlisted PPM to establish programs that foster business transformation initiatives, overcoming stakeholder resistance to change and re-engineered.

The demand management approach handles complexity, and allows for better BPM (business process management) orientation. For teams under Chief Marketing Officer and Chief Information Officer, a unifying framework is possible to coordinate business and technology initiatives:

- Governance to link cross-business-unit interactions
- Risk management for business and technology resources
- Metrics for performance tracking
- Cost management to guide allocation of scarce resources

**Stakeholder Groups and Handling Demand Management**

An enterprise-scale solution for PPM will still rely on well-designed human governance processes. By implementing the vendor’s solution and configuring to particular enterprise needs, beneficial strengthening of governance best practices are instilled:

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![Diagram](image)
As illustrated below, the functional stakeholder will view the PPM activity as a matrix influence. The actors will have a dotted line reporting relationship to the Project Manager on record within the PPM system. The contributors identified in the Staffing Requests will submit timesheets that reflect their exertion of effort.

The contributors may be assigned say 20%, or 50%, or 100% or some percentage, based on the negotiated understanding with the project sponsors, portfolio director, project manager or functional managers of the functionally-aligned staff. Some contributors may roll-on for a particular phase such as “design”, but roll-off prior to development, testing or deployment. In this manner, subject matter expertise is enlisted for a particular set of activities that call for certain skill sets.

Non-permanent teams are composed of diverse contributors from a range of organization disciplines that can roll-on and roll-off during the life of the project initiatives.
The defining and controlling elements of the lifecycle for an Innovate/Develop/Operate framework will include:


Example of Dynamic Flows for Projects In Flight

To help visualize the dynamics of Resource workload in the face of demand upon projects, the following diagram illustrates factors that influence resource capacity. Frustration levels are offset when capacity is augmented or better organization, information sharing and collaborating. Furthermore, rigor of intake of projects and the ability to add focus through prioritization offsets workload levels. Increased demand supports and adds to workload levels. Adding team members can actually increase distractions, frustrations and errors. This illustration shows the advantages that enterprise-wide PPM can provide.

Managing a pool of resources that are eligible for assignment to initiatives is a major undertaking. Updating skills and handling of timesheets and work account codes for cross-charges, project financials, and project health monitoring adds to a PPM system’s administrative and managerial challenges.

Team Member Workload

-(Offset to Workload: Intake, Rigor and Prioritizing)
Distractions  (S: Multi-tasking, Add’l Team Members)
Quantity of Errors needing rework
Frustration

Offset to Frustration:
-Resource Capacity
-Organize knowledge portal community
-Cooperate and disseminate lessons learned
For the example above, \( S \) indicates supporting influence, and \( 0 \) represents an offsetting force. The variables at the two ends of the connector flow in same direction or opposite directions. Negative, or balancing, feedback loop seeks a goal. If an existing level of the dynamic variable is above the goal, then the loop structure drives its value down. When an existing level is below, the causal loop is driven upwards. With PPM solutions and techniques, the countervailing factors of demand and resource are more effectively balanced. Consequently, the ability to inculcate grass-roots ideas, gain approval and go-to-market is institutionalized in a consistent framework and methodology.

Some business flows exhibit negative feedback loops to equalize and stabilize. Resistance to status quo could also occur. Despite exogenous factors that necessitate change, some flows are stubborn to adapt. In the example of Microsoft was slow to embrace the internet, slow to embrace search and slow to embrace “non-PC” mobility. With varying success, Microsoft at times pursued catchup to re-claim market share, and thrive with healthy profit margins. The successor to CEO Steve Ballmer will undoubtedly employ a modernized portfolio system for managing demand, resource availability and project candidates.

Two areas that existing PPM vendors can pursue include:

- Incorporation of dynamic flows and the downstream ripple effects from adjusting variables.
- Inter-pool resource sharing in the face of changing market conditions, changing resource supply conditions and changing regulatory conditions.
Part III – Portfolio Diversification and Risk Mitigation Scenarios

Project Cycle Attributes and Demand Types

A portfolio will undergo a range of demand types. The cycle time and resources needed to accomplish a straightforward work request is short, with relatively few actors, and lower complexity. At the other end of the spectrum, are highly strategic projects with many contributors, many dependencies and many workstreams. These complex and strategic efforts are usually longer term in duration.

Complexity, ambiguity, resource-intensive, scope drives need for higher talent resources. An example of highly defined and repeatable is say, a tactical maintenance request, or a de-commissioning. There is a range of varieties that occur within the two ends of the spectrum.

The budgets can vary for such projects (work-orders). The nature of the demand will dictate how and when resources are assigned, be they programs, projects, work orders or service requests. Depending upon the industry, the versatility and transferability of resources will vary in responding to programs, projects, Incidents, Install-Move-Add-Change, Problem, Release, Continuity, etc.
The COTS vendor PTC Servigistics has recently began to offer a new field engineering module called Planned Services. Unlike reactive break-fix in customer service of a field engineering, planned services is proactive. There are occasions where an installation customer visit is scheduled in advance and the resources dispatched are queued based on proximity, skills, technician calendar availability and customer install site availability for a longer term horizon than reactive break-fix efforts.

For these field dispatched “mini -projects”, tasks and projects are assignable to field resources based on skill, proximity, and availability. If a resource has a free afternoon in say Customer Services, this particular resource could be dispatchable to a professional services project for a specified duration.

A unified system will help coordinate actors/tasks/milestone deadlines/utilization, etc. The cross-pool interchange of resources can be accomplished. And, the versatility of resources can be accomplished through cross-training and by recognizing the common tasks within distinct project structure models.

**Modern Portfolio Theory (MPT) and Optimization Scenarios**

Understanding and supporting CMO and CIO perspectives are helpful to aid the CEO and Board in decision-making. PPM will offer a vantage point that assists the executive ranks including PMO, CTO, CIO, CMO, CFO, CEO, Compliance roles and Board members.

Managing indicators such as Earned Value, ROI, Total Cost of Development, sequencing, staging, risk mitigation and Program Health Monitoring are better able to access bottom-up information that is fact-driven via a PPM solution.

With an engine to provide executive visibility into ‘making investments’, assigning resources, applying filters and monitoring success or issues of ‘bets’ that are in-flight. On Wall Street, investment analysts that evaluate large and small corporations will often remark that the future value of an organization is directly influenced by the projects pursued. That is, the allocation of firm resources. Hence, an enterprise-caliber PPM solution enables reliable top-down investment diversification and risk management capabilities.

Considering the measurements of risk for multiple investments, the overall rewards can be optimized. Specifically, the Capital Asset Pricing Model can be considered for insights on quantity and type of project investments to diversify and optimize portfolio management.
The correlations and co-efficients of project portfolios' composition will impact overall corporate risks and payoffs.

**Expected Return** = “Time Premium” + “Risk Premium”
Where “Risk Premium” = “quantity of risk” × “price of risk”

Measure of risk:
For SML, risk is measured by β and SML is applicable to any asset, portfolio or security

**Use of CAPM: Capital Budgeting and Establishing Hurdle Rates for a Firm’s Projects**

Using beta from stand-alone traded firms: e.g., β =1.6
Then, calculating expected rate of return (or “hurdle percentage rate”):

rf = 4%, E(rM)=15%

Therefore, E(rproject) = 0.04 + 1.6 (0.15-0.04) = 21.6%

Example Project Specification and related business case (value proposition) write-up:
Investment = $X Million
Expected phase milestone payouts: $X Million for Year 4, $X Million in year 8

**Impact of Number and Type of Projects on Portfolio Risk**

An approach to investment management analyzed and popularized by Harry Markowitz and encouraged by widespread acceptance of the usefulness is known as the Capital Asset Pricing Model (CAPM).

With diversification, risk can be reduced relative to the average return of a portfolio by distributing investments among a variety of asset classes (i.e. stocks, bonds, money market, precious metals, fine art and
collectibles). Furthermore, by including international geographies and investment classes, diversification can be further enhanced.

Similarly, a CIO/CFO/CXO will want to diversify investments across technology platforms, products/services, business units and geographies to maximize returns. In some cases, the dilution of skillsets may have a detrimental effect.

Consider an example of mobile platforms such as Apple iOS, Google Android, and Blackberry. The shrinking of market share by Research in Motion’s Blackberry as threatening to undermine firms’ prior investments in Blackberry mobile devices.

Risk mitigation tactics by an enterprise can be pursued in several ways. Consider a global Salesforce used mobile devices in the field across three continents. If Asia uses Blackberry, Europe uses Android and Americas uses iOS, in the event Blackberry faces bankruptcy, one of the other platforms can be used as a replacement for Asia. This diversified approach may possess a Total Cost of Ownership and Total Cost of Development that exceeds a universal platform. However, the operational risk to the enterprise may be deemed better mitigated. Of course, risks can be characterized across several dimensions including technical, operational, cultural, legal, competitive, etc. Managing the costs, tradeoffs, options and hedging tactics requires greater attention going forward.


By applying aspects of the above principles, the ability to diversify risk based on vendor profitability and revenue growth as well as platform maturity and technology adoption rates is helpful in guiding the investment decision of various project quantities and project types.

Additional indicators of technology risk that can be factored into producing a technology beta include the following:

- Quantity of Users and annual growth rate of new users
- Quantity of web page visits and annual growth rate of unique visits
- Forrester, Gartner or other Research Analyst rankings and critiques
- Years of earning $1 Million threshold or more of annual revenue

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Measuring risk is a discipline gaining greater prominence across many industries. Risk exists in several forms. When new technologies are introduced to an organization, the vendor’s capabilities, capacities and products need scrutiny and oversight. Tools such as spreadsheets can help guide the risk measurement process and foster consistency and comprehensiveness. There is a science and an art to risk assessment and compliance management. With Sarbox, Basel, FinReg and many evolving protections, firms are bolstering their Risk Management resources and skills.

Eight C’s are sometimes cited when performing Supplier Evaluation in Purchasing and Supply Management. The Cs include:

1. Competency
2. Capacity
3. Commitment
4. Control
5. Cash
6. Cost
7. Consistency
8. Communication

http://www.mindtools.com/pages/article/10-cs.htm#sthash.3hFoKPME.dpuf

Performance risk and reliability factors are typically weighed in choosing a supplier’s offerings. The mix of vendors, technology types and program types can be assessed when assembling a portfolio of investments. Understanding the business impact of interruption, latency, security breach can also weigh on the risk assessment for a particular service offering.
The Vendor Risk Assessment and Business Impact Assessment (BIA) will consider the customers system/data characteristics and the ability to sustain an outage, security attack, natural disaster or other contingencies:

- User population, quantity of transactions, mission-criticality, system recovery
- Fault tolerance, interruptability, upstream/downstream integrations
- Resource Recovery Priority
- Revenue, costs, profit, assets, liabilities, creditworthiness, contingent lawsuits
- Customer
  - Confidentiality and privacy
  - Loyalty, trust, affinity, brand equity
- Competitor
- Compliance (e.g. federal, state, HIPAA, etc.)
- Employees
  - Confidentiality and privacy
  - Loyalty, trust, career management, recruiting, retention
- Suppliers
  - Confidentiality and privacy
  - Loyalty, trust, relationship building, reliability, efficiency

When evaluating, selecting and managing a diversified portfolio of project initiatives, the BIA risk management can consider major tiers of:

- Application
- Platform
- Infrastructure
More specifically, the technology stack should further consider projects in-pipeline and in-flight for their distribution across layers such as:

- Applications
- Middleware
- Databases
- Operating System
- Servers / Cloud / Virtualization
- Storage
- Network

The above are dimensions separate from the standard PPM dashboard dimensions of over/under budgets, over/under scope and over/under timelines.

**Weighted Scoring**

Organizations strive to expending resources to attain maximum value. Weightings of attributes are often used to produce a composite score to reflect projects’ risk, urgency and business impact.

Multiple business units compete for scarce resources and capital rationing.

- Market Opportunity
- ROI, IRR, Payback (projected)
- Community or Enviro Impact
- Competitor Advantage
- Technical Complexity and Layers (e.g. infra, platform, app)
- Program Difficulty
- Labor Relations
- Accessible Skillsets
- Facilities and Capacities

The scoring results are indicators that enable important discussions about tradeoffs, decision-making and execution planning.
Consider the following scenarios for mapping the relative diversification of technologies and portfolios:

**SCENARIO: DIVERSIFY SOFTWARE VENDORS “AS IS” OR “TO BE” FOR 2016**

<table>
<thead>
<tr>
<th>Rate</th>
<th>Of Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rackspace</td>
<td>Autodesk</td>
</tr>
<tr>
<td>Avaya</td>
<td>TIBCO</td>
</tr>
<tr>
<td>Savvis *</td>
<td></td>
</tr>
<tr>
<td>Apple</td>
<td>Citrix</td>
</tr>
<tr>
<td>Oracle</td>
<td>Salesforce</td>
</tr>
<tr>
<td>Amazon Web Services</td>
<td>EMC VMware</td>
</tr>
<tr>
<td>Microsoft Azure</td>
<td>SAP</td>
</tr>
</tbody>
</table>

* Acquired by CenturyLink April 2011

**PERCENT OF BUDGET**
## SCENARIO: DIVERSIFY TECHNOLOGY TYPES – "AS IS" OR "TO BE" FOR 2016

<table>
<thead>
<tr>
<th>RATE</th>
<th></th>
<th>OF GROWTH</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-Contact Center</td>
<td>Big Data Customer Profiling</td>
<td>-Oracle Real Application Cluster</td>
<td></td>
</tr>
<tr>
<td>-Retail Tablet</td>
<td>GPS Asset Tracking</td>
<td>-Oracle ERP</td>
<td>SAP ERP</td>
</tr>
<tr>
<td>-Retail Smartphone</td>
<td>-EMC SAS</td>
<td>-Microsoft ERP Dynamics</td>
<td></td>
</tr>
</tbody>
</table>

PERCENT OF BUDGET OR QUANTITY OF DEVELOPER HEADCOUNT
### SCENARIO: DIVERSIFY PROGRAM TYPES "AS IS" OR "TO BE" FOR 2016

<table>
<thead>
<tr>
<th>Rate of Growth</th>
<th>-Energy Conservation</th>
<th>-Sales Automation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-HR Recruiting</td>
<td>-Order Processing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Manufacturing Plant</td>
</tr>
<tr>
<td></td>
<td>-Finished Goods Inventory</td>
<td>-Accts Payable</td>
</tr>
<tr>
<td></td>
<td>-Campaign Mgmt</td>
<td>-Facilities Management</td>
</tr>
<tr>
<td></td>
<td>-HR-Payroll</td>
<td>-Accts Receivable</td>
</tr>
<tr>
<td></td>
<td>-HR Appraisal</td>
<td>-Procurement</td>
</tr>
</tbody>
</table>

**PERCENT OF BUDGET**

**Note:** Include assignment for Vendor Reliability/Stability which is factored into project beta for risk calculation engine. Prioritize business payoff, balance workloads, optimize risk coefficients and structure enterprise-wide portfolio profiles.

### Scenarios and What-If Calculations

Suppose a Portfolio directed is faced with Pushing out a date or overspending on costs. This will raise a concern over what are the ripple effects across the sister-projects inflight within the same or adjacent portfolios. PPM provides a toolset for performing analysis, and making adjustments.
For ease of management and monitoring, multiple projects with inter-relationships can be collectively grouped as part of a Portfolio. The Portfolio is often comprised of two or more programs. Each program will be comprised of one or more projects. Projects can be spun out, de-composed or re-consolidated as warranted by business market conditions, labor market conditions, executive directives, M+A, phases, management styles, etc.

- Project Status, Start and Finish Dates for Tasks
- Manage, monitor, measure Burndown rates, Burnup rates, levels/trends versus planned resource consumption levels
- Sprint meetings and Sprint backlogs
- Product backlog by phase
- Supervisors can oversee what’s on front-burner, what’s pushed to back burner. Or whether more resources may need to be injected.
- Team member assignments and story tracking, defect tracking, story point estimations

A wide range of project plan templates can be made available to practitioners and selected for purpose to fit by the Project Manager or Program Manager.
Part IV – Deployment of PPM

Roadmap of Functionalities

From a technology perspective, the PPM sweet spot requires a mix of project, demand, resource, portfolio, and time management features and functions ... The vendors featured in this Magic Quadrant support the sweet spot in many ways. 23

Gartner Magic Quadrant, November 2012

As we recall that PPM enables oversight of proposed and in-flight Idea proposals and underway projects. That is, from Ideation to Project Initiation thru Governance, launch lifecycle, Investment Methodology and Closure (transition to operations).

The growing presence of agile, service management and business process management along with proven re-usable project workplan templates has improved the delivery results including:

- Requirements management
- Demand management
- Capacity management
- Offshore and outsource partnering
Resource visibility and workload balancing
Project Prioritization
Administrative efficiencies
Total Cost of Development
Time to Launch

Domain Structures (Organization, Cost, Work, Project)

To help future-proof the initial setup and configuration of any solution, a conceptual grasp of the dimensions should be aligned with the particular business and process needs of the deploying organization. In the case of PPM for a standard type of organization, the following factors are central to a deployment:

- Resource Breakdown Structure
  - Parent Holding Company / Lines of Business / Organizational Departments / Acquisitions , Mergers, Divestitures
- Work Breakdown Structure
  - Pools of Labor : Business Analysts, DBAs, Developers, Testers, Architects
- Cost Breakdown Structure
  - Responsibility Centers, Cost Centers, ERP and Financials
Data Elements and Dimensions of a PPM Implementation

Hierarchies and data elements are configured for a particular organization’s industry and processes. Common themes and configurations will include the following:

**CONFIGURATION HIERARCHIES**

<table>
<thead>
<tr>
<th>People</th>
<th>Funding</th>
<th>Work</th>
<th>Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Organization</td>
<td>• Capex/Opex</td>
<td>• Mission</td>
<td>• Customers</td>
</tr>
<tr>
<td>• Business Units</td>
<td>• Hi Level Accounts</td>
<td>• Objectives</td>
<td>• Markets</td>
</tr>
<tr>
<td>• Departments</td>
<td>• Mid-Level Budgets</td>
<td>• Strategies</td>
<td>• Product Families</td>
</tr>
<tr>
<td>• Groups / Teams</td>
<td>• Project Accounting</td>
<td>• Programs</td>
<td>• Services</td>
</tr>
<tr>
<td>• People Names</td>
<td>• Expenses – Accruals</td>
<td>• Projects</td>
<td>• Product SKU</td>
</tr>
</tbody>
</table>

**Contributor Time Expended per Project (Timesheet per Project / Activity)**

<table>
<thead>
<tr>
<th>EMPLOYEE NAME</th>
<th>Project Name</th>
<th>Project #</th>
<th>Cost Center</th>
<th>Hours</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PAC-010</td>
<td>021132</td>
<td>2032</td>
<td>22</td>
<td>Nov 02 – Nov 09</td>
</tr>
<tr>
<td></td>
<td>PAC-040</td>
<td>021123</td>
<td>1032</td>
<td>19</td>
<td>Nov 02 – Nov 09</td>
</tr>
<tr>
<td></td>
<td>Vacation</td>
<td>034200</td>
<td>2055</td>
<td>0</td>
<td>Nov 02 – Nov 09</td>
</tr>
</tbody>
</table>
Vendor Vision Completeness and Ability to Execute

As indicated earlier, CA, Planview, Compuware and HP are leading vendors with COTS offerings and associated professional services to assist with integrations and implementations.25

The PPM sweet spot examines a mix of project, demand, resource, portfolio and time management. A goal is to align the enterprise’s needs to a PPM toolset to get visibility without introducing excessive complexity or process impediments for the projects being initiated and tracked.

Although key milestones might be tracked, the sweet spot of PPM does not drill deeply into task tracking. (Day to day project tracking can be accomplished at the project level by the PM using MS Project and then uploaded to PPM, ERP-Financials and HR-Payroll or Contingent Workforce Service Center and supplier/vendor management including professional services Statements of Works. The overall Portfolio view is helpful to the CIO. The project managers and resource managers have their own views based on privileges granted.

Cross-silo compliance is also a manageable dimension where multiple programs in a Portfolio overseen by PPM could be affected by a particular set of requirements. Examples include: Basel III, Graham-Leach-Bliley Act, CFPB, Dodd-Frank, Security, etc. Similarly, the coordination of various recurring project sub-models can be re-purposed in handling contributors, resource pool managers, and resources.

Project Health and Watchlists

What are the trends facing the actors? Stable? Worsening? Improving? Implications for risks, project health trends, executive alerts, will need to be weighed by portfolio managers. Decisions on green lighting follow-on phases, or securing back-up suppliers will be useful in less proven/higher risk technologies.
Moreover, the conditions permitting a project state improving from Red to Yellow. Or being promoted from Red to Green (or Yellow to Green) can be specified with approval checkpoints and pre-conditions. Alerts for exceptional conditions can also be customized for a firm’s industry and situation.

The following illustrate example dashboards and factors for PPM features and capabilities:

- **Project Issues, Risks, Alerts or Governance Exceptions**

- **Project Financials, accruals invoice, purchase orders, consumables, Supplier SOWs, actual versus biz case, plan, budget, forecast, close plan, etc.** MTD, YTD, Project Initiation To Date, etc.

- **Resource Assignments** – matching talent to projects, workload balancing and skill development avoid cases where iPhone mobile app developer and you have an
unexpected shortage that disrupts your overall portfolio progress due to dependencies, shortages, conflicts, etc.

- Project Manager, Product Manager, Business SME, Enterprise Architect, Data Base Administrator, Business Analyst, Developer, Tester, Middleware, Vendor, Storage, Network, Trainers, etc.
- Executive Reporting (Demand Management, Portfolio Balancing, etc.
- Coordination of off-shore resource management, etc.

By applying several of the above techniques and visors, PPM improves firms’ abilities to:

1-Plan
Sprints may be planned for whatever duration is determined by each Agile team. User stories can be provided by application or product owners and sub-tasks can include those from developers, testers, and documenters.

2-Execute
Project and resource management resources can be assigned by function – Requirements, Reserves, Allocations, and Authorizations – to block off resource availability for iterations and release planning

3-Track
Actuals versus Baselines, Forecasts, Budgets. Risk, Issues, Exceptions
Data Elements and Configuration

As previously mentioned, the leading vendors offer out of the box capabilities which will need to be configured to a specific firm’s industry and processes. The following data elements are commonly used to enable beneficial analysis and reports:

- Resource Breakdown Structure
  - Parent Holding Company / Lines of Business / Organizational Departments and Acquisitions–Mergers–Divestitures

- Work Breakdown Structure
  - Pools of Labor: Business Analysts, DBAs, Developers, Testers, Architects, Project Managers

- Cost Breakdown Structure
  - Responsibility Centers, Cost Centers, ERP and Financials Interfaces

- PPM uses proven methods to propose, approve, execute and report

- Hence, Waterfall is well-established due to link to Standards

- Project methods, however, are shifting increasingly toward iterative (Agile) development in terms of both total expenditures and quantity of initiatives.

- PPM systems have an administrative workflow “backbone” to configure for agile development environments. PPM systems can support a range of project approaches.

- PPM benefits help Development Teams manage the work that fills a demand pipeline. A PPM application can support communication / collaboration needs; and Enterprise-Level (as well as bottom-up Team-Level needs) and KPI Reporting for Agile and Scrum development needs. For bottom-up and top-down efforts

Templates for Project Plan Structure and Execution

Work Requests and Service Management endeavors can leverage consistent and repeatable templates.

- Release and iteration planning
- Incremental and time-boxed development
- Daily stand-up meetings
- Retrospectives and scheduled reviews
- Story-based point accumulations
New Techniques in Project Portfolio Management

- Test Driven Development and Test Script Strategies
- Refactoring and regression analyses
- Design for Manufacturing
- Continuous integration with daily code check-ins
- Automated builds and versioning

Project Example: Fiber Optic Backbone, Email Archival, Mortgage Application, Regulatory Reporting, Financial Datamart

Work: Project Subject, Project Type or Work Request Type, Category, Priority, Start Date, Projected Benefit, etc.

Stages: Phases, Tasks, Durations, Effort, Resources.

Variance Analyses: Actual versus Plan for Capex and Opex with further drill-down.

New Techniques in Project Portfolio Management

Risks, Issues, Changes, Name, ID, Category Type, Owner are shown above.

© Computer Associates Inc. UI Screenshot 30

Alerts, utilization, earned value, milestones and a range of project attributes are managed via portlets and pre-formatted reporting capabilities.
The Portfolio Scorecard summary in the interface above shows investment names, goal, assignments, risks, stages, start dates, planned costs, budgets, staffing, etc.
PPM Technical Implementation Environment

The example below illustrates the distinct regions that are used to stand up a PPM deployment. Similarities exist in a range of industries’ approach to system development. The typical key regions erected and sustained for developing PPM solutions are listed and illustrated below as:

- Development
- Unit Testing
- System Integration Testing
- Quality Assurance
- Production
- Training

System Integration Testing exercises a software system’s coexistence with interacting elements. Multiple integrated systems that have passed system testing are used as input, and tests requiring interactions are performed. The deliverable systems are then passed on to acceptance testing and quality assurance.
New Techniques in Project Portfolio Management

When performing exercises in Train, the data is usually affected by learner inputs and may need to be restored to initial state. Refreshment occurs back to a baseline for next training undertaking (or refreshed with new illustrative data to support new training/learning exercises) that is as fully representative and realistic as appropriate. Note that QA aligns with structure/composition of Production region. DR mirrors the abilities of Production in the event of need for fail over and fault tolerance.

PPM Environment Design with Hardware and Software

Example Architecture – PPM Enterprise Deployment

The system architecture illustrated above shows servers and databases to support the respective capacity and processing requirements for a proposed enterprise-class PPM system. The sizing identified reflects the projected requirements for security, availability, continuity for development, testing, integration, production and training of a proposed PPM system.
Part V – Incorporating New Techniques and Features in PPM Solutions

Applying Agile for a Range of Project Portfolio Situations

Agile techniques have gained wider acceptance in recent years. Modernized PPM solutions increasingly incorporate Agile into functionalities, feature sets and project management capabilities. Agile can often offer advantages over traditional techniques because for Agile:

- Re-planning occurs frequently
- Estimates for (a) size, and (b) duration are distinct
- Plans are based on features
- Smaller stories keep the work progressing, with ability to re-prioritize components
- Tracking emphasizes the team perspective, not the individual level
- Interchange of Resources occurs across Shared Pools
- Mix of Products and features optimized In-flight, considering business conditions, seasonality, etc.

Releases are planned based on key elements such as constraints, estimates, prioritization and then organized into manageable offerings. For example:

Release/Product Planning

![Diagram of Release/Product Planning Process]

**Constraints**
- Budget
- Schedule

**Requirements Analysis**

**Estimate Work**

**Prioritize & Group**
- Business Priority
- Technical Complexity
- Dependencies
- Integrations

**Organize Iterations**
- Define Iteration Length
- Assess Velocity
- Organize Integrations
- Build Schedule (hi-level)
Iterations can be planned based on key elements such as actual velocity, requirements, acceptance criteria and then break down tasks, estimates of effort, scheduling and validation of projected resources needed. This approach is illustrated in the diagram below. For example:

Iteration Planning
PPM and Agile Together

The desire to avoid costly mistakes, such as spending too much effort on estimating and tracking using waterfall, has prompted organizations to pursue alternate techniques. Gartner reports that “by 2012, Agile development methods will be utilized in 80% of all software development projects.”

- Agile is more sustainable and manageable pace and velocity compared to Waterfall, which tends to be “slow-slow-then PANIC” in practice.
- Prototyping is a key communication vehicle.
- Easier to not spend 90% of budget only to learn your project is way behind vision. In fact, the visibility of the prototype has continuously shown manifestation of resources expended.
- Test Driven development (whether functionality accomplishes task and doesn’t conflict with other functions/features is manifested in the prototype).
- Do not document early to lock-in. Document late or continuously as interactivity unfolds and deeper understanding of business needs evolve.
- Avoid temptation for deep mid-stream documentation and resources allocated that “doesn’t necessarily show tangibly in the product.”
- Motivational daily stand-up meetings help instill accountability of “what will be accomplished today” and calling out encountered obstacles/dependencies that need to be resolved/cleared away by peers or management.
- With two in a box, the business unit representative (and customer proxies) can interact with a developer to explain, refine or adapt to changing market conditions or externalities; and the fulfillment of the developer (and bi-directional knowledge sharing) improves. This improves customer-centricity of product development.
- Sponsors and managers often request high levels of accuracy in the estimates, requiring large efforts.
- If duration expanded in waterfall to perfect estimating, you will never get 100% accuracy – there is still uncertainty. And diminishing marginal returns on time invested.
- Agile teams can estimate “good enough” and thereby optimize their materiality/productivity per energy and time expended.
- Stories can be consolidated or “broken down” and de-composed.
- Re-prioritization is fluid and continual. Points-based story estimation typically used in Agile can be assisted with tools such as Scrumworks or JIRA by Atlassian Inc. This JIRA tool is an example of a useful tool widely used for tracking and managing story points.
- KPI reporting used in Agile is understandable by doers and overseers.
Governance and Release Management complement PPM Implementations
Agile Roles Can Complement PPM Implementations

Manage monitor and Fix: At the story, release, project and program level. Notice the roles for Agile within a nimble team identified above can include: Project Manager, Iteration Manager, Business Analyst, Customer, Developer and Tester.
Lessons Learned about Merits of Agile

Increasingly, the modern techniques of Agile are being incorporated into PPM systems. For example,

- Prototyping is a vital communication vehicle
- No matter how much time is spent estimating early in the project, unexpected conditions can arise
- Sponsors and managers request accuracy in development estimates, with diminishing returns on forecasting efforts and precision attempts
- Agile teams focus on “good enough” estimating to help sustain momentum
- Keeping it Simple means the ability to “maximize what is not necessary to focus on” – and manage by exception

Example of Agile Templates within PPM Framework

A recurring structure can be applied as a PPM template. This templatized structure is retrievable within a PPM solution’s Project template library. For example,
Specific Agile Roles and Responsibilities

The Agile approach enables creativity, effectiveness and speed for team members and team managers. A PPM system framework complements Agile by providing discipline, rigor and the institutional view.

- **Sponsors** – business unit or accountable (RACI) leadership
- **Product Owners** – product vision, user stories & feature prioritization
- **Customers** – input during sprint demos that become new user stories for product backlog prioritization
- **SCRUM Masters and Development Managers** – populate sprint backlog from product backlog and sub-tasks for stories.
- **Architects** – for enterprise, platform and solution views
- **Developers** – make testing notes against stories or sub-tasks and report effort for costing purposes
- **Resource Managers** – optimize resource utilization across multiple projects and ensure resource availability on critical projects
- **Business Analysts** – process flows, business requirements and use case contributors, test scripts
- **Testers** – test conditions, test execution, regression analyses, transition to operations

Elements and Artifacts for Business Process Management Modeling

- **Use Cases** – input during sprint demos that become new user stories for product backlog prioritization
- **Business Process Flows** – showing swimlanes, actors and if/then conditional branching
- **Requirements Traceability Matrix** – showing standalone and testable requirements
- **Business Requirements Definition** – which influences the Detailed Solution Design and the Project Design documents
- **TCOE handover (Outsourced Offshore)** – Testing Center of Excellence
- **UAT** – reactions and refinements when key business representatives see results during walk throughs of test region, training region, or prototype or pilot simulations
Stories, Point Estimates, Velocity and Resource Burndown

To handle some of the Agile calculations and to monitor metrics such as Velocity and Burn-down, the functionalities can exist off the shelf in a leading PPM solution. For example, the Sprint number, Planned Story Points and Earned Story Points in a Planview readout illustrated below. The Agile Sprint burndown diagram illustrated in a Planview GUI appears below to depict Actual Story Points earned versus Planned Story Points.
A “Burn-Up” Report shows work accomplished per iteration (sprint velocity) and also scope changed in a project. The extrapolation forecasts the speed work is completed versus rate of scope change. Consequently, release completion forecasting helps release planning.  

**SaaS and Cloud for PPM Deployment**

PPM systems can be installed on premise or more recently via off-premise SaaS approaches. The merits of off-premise imply the vendor is responsible for regular patches and system administration. The disadvantage is that security arrangements will involve an external handshake. The software vendor will typically involve a highly recognized partner such as Microsoft or Amazon to host the application. Additional noteworthy characteristics of the SaaS option include:

- Security is audited by 3rd party on a weekly basis
- 99.5% availability
- Redundant Architecture
- World Class facilities
- Replication
- No Single point of failure
- Zero action recovery
- Pre-configured standard edition accessible within 5 days
- “On the fly”: new users, and new features are adoptable in-flight
- Community Forums (enable ‘open-source’ like sharing among subscribing customers)
- Multi-language interface
- Different templates (project plans) are available within the PPM solution frameworks
Part VI – Conclusion

PPM helps overcome drawbacks of less formal systems. Namely, the concern whether “the right hand knows what the left hand is doing.” Business units should not be silo’ed. Indeed some resources can thrive when a share pool is dispatchable.

The need to adequately define responsibility for an organization-wide purview of funding candidates, investment diversification and funding allocations makes sense.

As we saw, Servigistics can dispatch resources based on customer type, technician proximity, technician skill and technician availability. Mobility is harness with reactive and proactive Task and Project management.

PPM systems won’t unduly autocratize innovation – as long as outlets and encouragement can still occur. Employee suggestion plans, user forums, customer surveys should still continue, and be effectively disseminated in the military industrial complex.

In the illustrative case of Admiral Sims’s 39 cannon-fire innovation, the hierarchical and bureaucratic inertia was irksome and counter-productive. “I loath indirection and shiftiness in high places.” Good ideas need to be promulgated promptly, and PPM facilitates quick and effective institution-wide dissemination.

The marketplace of ideas is superior to a top-down centrally controlled hierarchy, as evidenced by the difficulty of Communist societies. Dr. Nat Sims is an influential catalyst who can assess the need for improvements vis a vis inflow of innovative program/project candidates.

MGH has organized their reward system to better align micro-motives. “Smart” drug infusion pumps greatly increased safety, effectiveness and efficiency of dispensing pharmaceuticals. A range of stakeholders could have resisted Nat’s innovativeness. His willingness to introduce disruptive change was formidable. Fortunately, his ability to
shepherd funding and resources was not buttoned-up by a central PPM or overly restrictive Phase-Gate system.

For the aforementioned Intuitive Surgical, the operations display a board for each worker’s weekly innovation suggestions. The display is for all to view, and shows which worker-generated ideas were enacted. The Contact Center receives input from the end-users and are logged for review by the relevant Product Managers. Therefore, on one hand a focus is on cost-efficiency of current processes is maintained. Concurrently, the ability to collect and share end-user input from Contact Centers and end-user forums also help ferment (“a very necessary complement to, and feedstock for, manufacturers”) for systematizing and fostering innovation.

**Intuitive Surgical Robotic components**

Surgeons may resist inroads of Intuitive Surgical Inc.’s robotics based approach. The surgeons could consciously or semi-consciously resist adoption, or deny fear their roles become obsolete. The surgeons could point to malpractice suits of robotic surgery and revert to their more intrusive, slower recovery, high-definition camera, precision controls. Indeed the traditional organizational structures of surgery, chemotherapy, radiology may no longer apply to a $2 million per robotic surgical device/platform that works 24 x 365 without eye-strain or back-stiffness. In fact, the robots are surgeon-assisted and the physician’s posture over the machine’s controls permits longer hours of concentration with reduced trembling.

The original Intuitive innovation was fostered under the extreme conditions of US Army battlefield surgery without risking a highly trained surgeon in theater. Whether a robotic surgeon will pass muster at a MGH investment review board, or have enticed the support of MGH opinion leading physicians in the hallways, we may never know. We do know that a
rapidly increasing quantity and percentage of all prostatectomies and hysterectomies are performed with robotic assistance.

**Research and Analysis has Led to Deeper Understanding**

Portfolios comprised of concurrent in-flight projects gain from various insights and techniques including:

- Sharing resources from a project in its early stages benefits cost & schedule
- Borrowing resources early in the project is less effective
- The extent of productivity loss by sharing resources has a greater impact on cost & schedule
- Multi-tasking is more effective when there are productivity gaps in individual projects (and overall worker utilization is enhanced)
- Adding new staff benefits schedule, but adds significant cost (varies with relative experience)
- Resource balancing in portfolios is a dynamic process
- Individual decision-making cannot reflect ripple effects using only static snapshots, which are commonly available in the existing PPM tools
- Advanced techniques like System Dynamics add value in decision-making by modeling various scenarios
- PPM vendors should integrate methods to better capture the dynamics for effective decision-making in portfolios

Project Portfolio Management Systems can impede bottom-up User creativity. PPM regimes can be criticized at times for being autocratic, bureaucratic, slow and stifling. To avoid such pitfalls, best practices will include:

- Centralize and standardize the demand management process
- Enhance communication flow between Technology Change agents and the business units serving the customers
- Embrace new channels of input from employees, customers, suppliers and all stakeholders
- Gain visibility into the resource pool
- Improve analytical insight into allocation of critical resources assigned to programs/projects
- Gain efficiency in administration and oversight
- Balance inbound work (demand) with existing resources (supply of time, people and money)
- Increase the visibility into existing project status
- Gain better control over outsourced and off-shore development and services

Some professionals might complain that PPM fosters incremental, (not breakthrough) improvements occur on the periphery or are limited to core existing customer base, careful to avoid deep cannibalization of the status quo.

Knowing how and where to find lead users is a ripe source of innovation. A large percentage of the most successful start-ups are founded by lead users who are acting and experimenting close to their particular need. Yes, it’s true that “Necessity breeds invention”. But armed with PPM solutions and knowing common PPM pitfalls as reviewed in this thesis, will help augment:

- proactively managing creativity
- rates of ideation
- quality of project health oversight and
- quantities of in-flight high impact initiatives
Appendix 1 – Overview: PPM Ideation and Idea Approval Review

The overall process flow is simplified below for ideation, approval, managing and post-completion review. The function actors are typically Business Development, Finance, Planning and Audit. Wherever possible, ideation should be open and transparent and allow for top-down direction by executives as well as bottom-up intake via customer service systems, employee systems, partner systems, etc.
Appendix 2 – Example of Earned Value Calculation

The Earned Value Calculator is a tool for project managers to quantify tracking information about project status. Specific numerical measurements enable objective review of progress as the project progresses through work tasks per project schedule.

http://groups.engin.umich.edu/CIS/course.des/cis525/js/f00/tejal/form.htm

Start Date: January

- Budgeted Cost of Work Scheduled (BCWS): $1,000,000
- Budget At Completion (BAC): $1,100,000
- Budgeted Cost of Work Performed (BCWP): $920,000
- Actual Cost of Work Performed (ACWP): $1,500,000
- The Schedule Performance Index (SPI) 0.92
- The Schedule Variance (SV) -$80,000
- The Percent Scheduled For Completion 90.9%
- The Percent Complete 83.6%
- The Cost Performance Index (CPI) 0.61
- The Cost Variance (CV) -$580,000

Budgeted Cost of Work Scheduled (BCWS) – Sum of the BCWS values for all work Tasks that should have been completed by that point in time on the project schedule.

Budgeted Cost of Work Performed (BCWP) – Sum of the BCWS values for all work tasks that have actually been completed by a point in time on the project schedule.

Budget at Completion (BAC) – Sum of the BCWS values for all work tasks.

Actual Cost of Work Performed (ACWP) – Sum of the effort actually expended on work tasks that have been completed by a point in time on the project scheduled.

Scheduled Performance Index (SPI) – Indicator of efficiency with which project is using scheduled resources.

Schedule Variance (SV) – Absolute indicator of variance from the planned schedule.

Percent Scheduled for Completion (PSFC) – Indicator of percentage of work was expected to be completed by time ‘t’.

Percent Complete (PC) – percent of completeness of the project at a given time in time.

Cost performance Index (CPI) – indicator of project performing within defined budget.

Cost Variance (CV) – absolute indication of cost savings.
Appendix 3 – Elements of a PPM RFP for Evaluation and Implementation

1.1 Portfolio Management
Create user definable portfolios or groups of related projects
Associate projects to the organizational structure (business unit, division, etc.)
Roll up budgets and costs
Show budget impact of proposed projects
Show impact of proposed projects on resource capacity
Automate proposal approvals
Support rating criteria based on strategic goals
Vary strategic goals by organizational unit
Support rating criteria based on financial expectations
Capture and report ratings/justification for approving/prioritizing projects
Allow for project classification, filtering, and sorting by type and other characteristics

1.2 Demand Management / Project Intake
Create and track project requests / proposals (including web forms)
Configurable fields (add criteria) for project request form
Support “proposed” projects not yet approved
Support customized forms (e.g., new project request, change request, etc.)
Project request review and approval
Attach documents to project request

1.3 Resource Management
Skill inventory and tracking
Track billable and labor cost rates
Provide standard role-based billing rates
Track allocation (top-down), schedule (bottom-up), and actual time for individual/teams
View resource allocations and schedules across projects
Instantaneous what-if analysis on resource supply and demand
Forecast resource availability for named or generic resources
Calculate resource utilization for individuals and teams
Provide online resource requests (by role or individual)
Map organizational reporting structure
Capture contact info in resource profile

1.4 Project Management
Gantt chart/timeline views across projects/clients/portfolios
Planned vs. actual summaries
Milestone Summaries
Dynamic Project Gantt charts
Team member calendars
Define/maintain task dependencies
Two way sync with MS Project
Ability to track and manage non-work time
Ability to create company-wide non-working days
Provide hierarchical task plan/WBS with target and actual delivery dates
Permit any project plan to become a template
Manage task dependencies
Support task constraints
Assign multiple resources to a task
Provide security permissions for tasks
Notify resources via email when assigned to a task
Permit team members to assign tasks, issues, etc. to others
View and report tasks for a resource
Provide printable Gantt chart views

1.5 Issue / Risk Management
Manage issue lifecycles
Associate issues, risks or action items to any other items, including to a project or a task
View, report, and track issues across projects/programs
Assign issues to individuals
Notify assignee and/or PM by email when issues are created, assigned or completed
Allow conditional rollup of issues and risks to drive project status indicators
Include link to the issue in an automated email
Permit some issues to be private for team members only
Drill up from the issue to the project or task
Drill down from the project or task to the issue
Categorize issues (i.e.: issue “types”)
Permit user-defined probability and impact levels (risks only)
Capture potential impacts
Report a single project’s issues and risks
Support issue and risk reporting across a portfolio or group of projects
Provide custom fields in both issues and risks
Capture project action items with due dates and ownership
Capture project decisions with decision date and responsibility

1.6 Time and Expense
Provide intuitive, easy to read time sheet
Charge time to the project level, task level or non-project work level
Enter time against assigned tasks only
Automatically route timesheets to project managers and final approvers for approval
Capture notes on each time entry; report notes on time reports
View, edit and approve time and expenses
Report on delinquent timesheets
Allow resources / team members to record task % complete on timesheet
Allow managers to override recorded task % complete
Only approved timesheet entries update task schedules
Timesheet entries automatically update task schedule
Report billable vs. non-billable work
Resource can add non-working time (e.g. vacation) to timesheet

1.7 Project Team Collaboration / Document Management
Ability to provide a configurable, project-specific home page to serve as a centralized, real-time source for project team collaboration, document sharing and project milestone tracking
Define triggered notifications based on events
Permit personalized notification rules
Enable sending news to team members
Easily identify unread items
Provide polling/consensus driving
Provide notes or discussion threads on customer, program, project, task, issue, etc.
Store attachments/documents/project artifacts in centralized repository by definable folder structures
Provide version control; check-in/check-out; locking
Include documents in project templates
Store documents with any object – customer, project, task, issue, request, etc.
Search documents across repository
Provide document approval routing
Add custom attributes/fields to categorize documents
Route uploaded documents through custom workflows, allowing multiple approvals, versioning and history
Email alerts

1.8 Financial Management / Budgeting
Provide top-down budgeting of hours, costs and revenue
Provide bottom-up estimates of hours, costs and revenue
Report actuals for hours, costs and revenue
Report project finances by task, phase, milestone, project, program, account, etc.
Provide project-to-date reporting
Report earned value
Distinguish between capital and non-capital costs on a project
Permit capital and operating expenses on the same project
Provide sums and averages in numeric fields on reports
Integrate financial information into ERP system
Provide vendor invoice processing and approvals
Budget forecast
Budget tracking
Expense reporting

1.9 Integration
Web Services Application Program Interfaces (API’s)
Prebuilt integrations to major ERP / CRM systems
Customized Integration Options, Outlook Sync for Tasks and Calendar
Two way sync with Microsoft Project (including import/export .mpp)
Import / export from MS Excel
Active Directory/LDAP integration for user management

1.10 Administration and Security
Control access by system role, i.e.: Admin, Resource Manager, Project Manager, Timesheet User
2. Business Intelligence
Provide user-specific, configurable, real-time dashboards
Summarize financial information for organization, department, account, program, etc.
Drill down to details from dashboards
Track and report status of portfolios
Track and report project health with project status reports
Provide traffic light indicators or similar on dashboards
Track and report project pipeline, backlog, completed projects, etc.
Provide departmental views of projects and proposals
Provide departmental views of resource requirements
Map projects to corporate objectives
For each project or proposal, show degree of alignment, business value, benefits, etc.
Report financial forecast and actuals by date range
Report resource forecast and actuals by date range
Report spending patterns across different types of projects
Provide reporting capabilities for realized post-project value
Provide ad-hoc reporting and queries
Provide ad-hoc graphical reporting
Permit any user to create their own reports
Share custom reports and queries with other team members
Filter data on user-definable criteria
Provide wizards for writing basic reports
Export all reports to Excel, TXT or HTML for off-line analysis
Ability to deliver project reports via various vehicles e.g. email, dashboard, PDF, MS Office

3. Configuration / Flexibility
Solution templates, including reports, status dashboards, resource plans, project plans,
and work plan templates.
Wizard-driven configuration
Project types and WBS templates supported
Ability to create custom fields / applications
Single data model to enable reporting across standard and custom applications
Define custom notifications / workflow
Pre configured solutions available – PMO, IT Governance, SOX, Six Sigma
Role-based views (executive, project manager, team member, client, etc.)

4. Usability
Simple, intuitive web-based interface
Provide context sensitive online help
Provide user-customizable views of project data
Provide user-customizable personal home page
Search across all objects
Provide centralized administration - User ID’s, password resets, etc.
Include links to data in email notifications
Provide wizards for creating new projects
Identify project’s currency - one per project, no need for currency conversion
Easily sharable with business and collaborate with customers / partners
Segregate projects so tool is usable by many groups across the enterprise
Ability to reorder project tasks via drag-and-drop

5. Professional Services / Support
   Implementation methodology and process
   Quick Implementation timeframe
   Range of best practices services
   Solutions consultant’s experience
   Provide web based training
   Offer on-site training; support for train-the-trainer methodology
   Include technical support during business hours via web portal, email and telephone
   Offer after-hours support
   Provide an SLA for support response times
   Community forum and product feedback center
   Online knowledge base
   Pricing for a X user deployment
   Pricing for implementation services
   Pricing for training and ad-hoc services post implementation

6. Pricing
   Pricing for a X user deployment
   Pricing for implementation services
   Pricing for training and ad-hoc services post implementation

7. Vendor Qualifications
   Financial viability, including profitability / cash flow
   Vision and strategy
   Standard terms and conditions
   Executive management
   Number of years in business
   Size of customer base / subscribers?
   International presence
   Customer references

8.0 Technology
   Uptime statistics for past 24 months
   Technology architecture
   Security and ISO 270001 certification
   Provide up-time guarantees (e.g. 99.7%)
   Use Akamai or similar caching technology to reduce latency
   Regular release schedule
Appendix 4 – Example Hewlett Packard PPM System User Interface
The above example for Incident Creation includes fields for short description, status, urgency, impact, schedule, effort, and contact. After incident is created, converting to Task or Project is enabled.
Appendix 6 – Cloud-based PPM Availability Announcement by Vendor as Published by Computer Associates

ISLANDIA, N.Y., July 28, 2010 – CA Technologies (NASDAQ: CA) announced the availability of CA Portfolio Management for Agile IT, a new Agile Project and Portfolio Management (PPM) cloud solution designed to help executives make effective portfolio management decisions and capitalize on more rapid innovation using new Agile planning practices. The new solution, comprised of CA Clarity On Demand and CA Agile Vision, combines the latest version of the industry leading PPM application, with new capabilities for Agile planning in a cloud computing delivery model.

With the growth of cloud computing, consumers of cloud services are demanding rapid delivery and fast response to requests for enhancements and new services. In response, organizations are adopting more agile and iterative approaches to IT service delivery that strain existing project governance processes, and force the convergence of requirements management, agile planning and service portfolio management. The adoption of Agile methodologies will continue to pick up over the next several years. Gartner reports that “by 2012, agile development methods will be utilized in 80% of all software development projects.”

*Delivery of technology-based products is shifting more and more toward iterative, rather than waterfall-based projects. As a result, PPM solutions must help organizations address the needs of agile teams and those responsible for project governance,” said Dan Stang, principal research analyst at Gartner.

CA Portfolio Management for Agile IT

This new solution from CA Technologies provides resource, financial and portfolio visibility to help ensure that products and services are delivered with the right quality, on time, on budget and with the right business value, regardless of whether an Agile or traditional project management approach is taken. The solution’s new features and functionality include:

CA Agile Vision

- **On Demand Agile planning** built on Force.com, salesforce.com ®’s enterprise cloud computing platform, which powers the Sales Cloud, Service Cloud, and Salesforce Chatter applications, hundreds of ISV partner applications, and more than 160,000 custom applications used by salesforce.com’s 77,300 customers
- **Cloud-based service** offers low up-front costs, rapid deployment, pay-for-use, quick end-user adoption, multi-tenancy and scalability
- **Agile sprint planning** creates multiple time-based sprints, monitors sprint progress and manages backlog
- **Agile burn-down velocity charts** improve project forecasting accuracy
- **Agile virtual wall** manages tasks, user stories and resource assignments
CA Clarity On Demand

- **Project Lifecycle Management** presents only the relevant fields and actions based on the stage in the lifecycle of an idea, request, project, service or initiative, allowing users to focus on the current task now
- **Web 2.0 user interface** simplifies navigation, streamlines common tasks, reduces clicks and improves understanding, resulting in faster end-user adoption
- **Drag-and-drop Gantt chart** provides a great browser-based scheduling experience
- **Simplified financial management** functionality that makes planning, budgeting and cost tracking more intuitive

"The ability to accelerate the delivery of commitments to customers is the primary reason there is a need for this solution," said Jose Almandoz, CIO and Global Field Operations vice president, Novell. "This release now gives clear visibility into projects leveraging iterative methodologies, as well as traditional waterfall methodologies. Having a single system of record for all project information allows companies to scale agile to the enterprise. The result will be improved service to customers through delivery of highest value to them."

CA Technologies, as a market leader in PPM, has taken the best practice guidelines from the proven system developed and used internally by salesforce.com to create a management tool delivered via the cloud — CA Agile Vision. Using the Force.com platform, the management tool has been designed for both new and existing agile users, thereby broadening the audience for agile development.

“We’ve delivered the first truly enterprise class solution from the cloud designed to help organizations balance agility with governance by integrating agile planning and PPM in a way that improves the pace of innovation and delivery time to market,” said, Brian Bell, general manager of the Service Portfolio Management customer solutions unit at CA Technologies. “It gives CxO’s the ability to make smart portfolio decisions across all projects, while allowing project teams the flexibility to work using their preferred project approach. Ultimately, this leads to the ability to most effectively meet the toughest demands of their customers.”

CA Clarity PPM, the industry-leading project and portfolio management solution, helps public and private sector IT organizations to achieve world-class performance by improving the quality of their engagement with their stakeholders and enhancing their ability to run at peak efficiency. The CA Clarity PPM system features integrated IT portfolio planning, demand management, project management, resource planning and time, cost and earned value management. More than 1,000 companies, organizations and government agencies depend on CA Clarity PPM to govern IT and manage new product development (NPD). For more information on CA Clarity PPM, please visit www.ca.com.

CA Technologies (NASDAQ: CA) is an IT management software and solutions company with expertise across all IT environments – from mainframe and distributed, to virtual and cloud. CA Technologies manages and secures IT environments and enables customers to deliver more flexible IT services. CA Technologies innovative products and services provide the insight and control essential for IT organizations to power business agility. The majority of the Global Fortune 500 relies on CA Technologies to manage evolving IT ecosystems.
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