Making R&D Portfolio Management More Effective

Data from a portfolio management benchmarking study provides a standard of excellence in portfolio management practices.

Michael M. Menke

OVERVIEW: R&D organizations are among the leading users of project portfolio management (PPM). PPM plays a critical role in making R&D investments more productive in terms of delivering desired results. PPM performance can be improved by benchmarking PPM performance against best practices and improving those practices that fall below best practice standards. This paper presents a benchmarking study focused on PPM best practices in R&D organizations, including benchmarking data and some general findings supported by that data. The best use of the benchmarking database is to analyze the process in individual organizations, identify key challenges and areas for improvement, and make appropriate recommendations on how to improve PPM processes to make them more effective.

KEYWORDS: Project portfolio management, R&D portfolio management, Best practices, Benchmarking

There are two major applications of project portfolio management (PPM). Strategic PPM is about selecting the best set and mix of projects to deliver future benefits. But what does "best" mean? Cooper, Edgett, and Kleinschmidt (1998) found that portfolio management in R&D organizations is generally intended to meet three overarching objectives: strategic alignment, strategic balance, and maximum return. Why these three? Maximum return is obvious; every organization would like to get the most value (in terms of their objectives) for each dollar invested.

Strategic alignment is necessary to enhance the probability that the potential value created by R&D will be realized. R&D does not produce value directly—it only creates assets and capabilities that can be used in downstream organizations (such as manufacturing, marketing, sales, and customer service) to deliver value. If the projects are not aligned with the organization's strategy, the chance that they will be successfully implemented to deliver value is greatly reduced. In a similar vein, strategic balance seeks to balance higher return against higher risk, longer time frames, and other factors, to ensure that simplistic financial projections do not dominate the project selection process. Thus, both strategic alignment and strategic balance are used to help ensure that the most value is delivered from R&D efforts, ensuring that the portfolio doesn't simply contain the projects with the highest potential financial return without proper consideration of the various risks associated with each project.

The second application of PPM is to manage shared resources (people, facilities, and budget) during the execution of projects. This is sometimes called *pipeline management*. Key activities here include making sure the pipeline is not overloaded; balancing the aggregate supply of and demand for resources; identifying, managing, and mitigating bottlenecks; and reallocating resources among projects using well-defined value-based priorities. Without effective pipeline management, many projects will be late, over budget, and underperforming, which clearly degrades value creation.

Does Good PPM Lead to Realized Value?

Clearly most R&D organizations believe that it does, since many organizations use portfolio management extensively. One of the big problems R&D organizations face is that their projects tend to be costly, risky, and done years before the benefits are realized. This makes the project selection process

Michael Menke has been working in the fields of strategy, decision making, portfolio management, and R&D management since 1972, both as Chief Portfolio Advocate at HP and as an external consultant. Much of his portfolio management consulting has been with R&D organizations. He and colleagues at SDG pioneered a value-based approach to portfolio management that is particularly useful for maximizing return, one of the three main objectives of portfolio management. Since 2011, he has co-led the groundbreaking project portfolio management best-practices benchmarking study presented here. He is now president of Value Creation Associates. mmenke@value-creation.com, mmenke41@gmail.com

DOI: 10.5437/08956308X5605128

very difficult, and PPM—especially using decision and risk analysis methods for project evaluation—helps manage these difficulties. But is there any proof that good portfolio management leads to better bottom-line results?

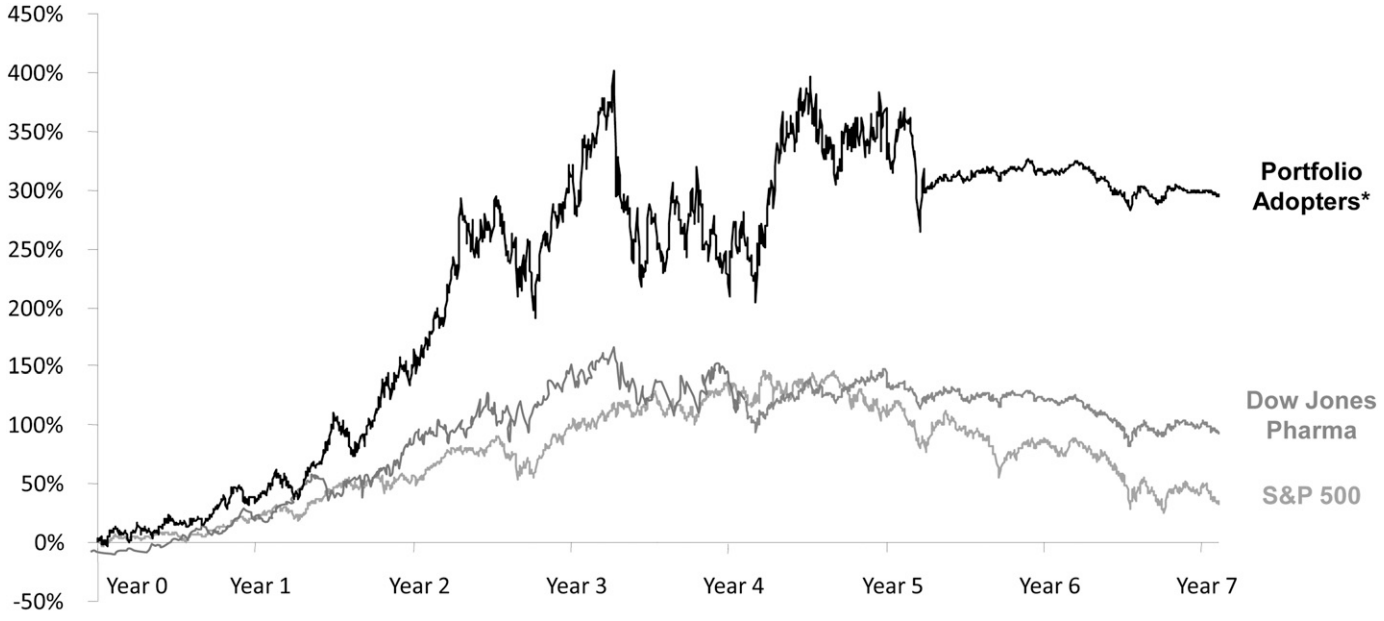
While this is very difficult to prove, there are numerous published case studies of PPM helping organizations improve the value *potential* of their portfolios. Sharpe's (1998) study of SmithKline-Beecham's PPM asserts an increase in a drug development portfolio expected value of $2.6 billion for a PPM effort of several million dollars. A more recent oil company example (Reinsvold, Johnson, and Menke 2008) shows an expected value increase of about $1 billion for an effort of around $1 million. The expected return on PPM effort in both cases is on an order of magnitude of 1,000 to 1, although these efforts were both expensive due to their first-time nature and the heavy use of external consultants.

Both of these examples demonstrate large increases in portfolio *expected* value, which is different from *realized* value. Realized value can only be achieved by downstream organizations that receive and effectively use the assets and capabilities delivered by the R&D effort. The intrinsic value potential of these assets and capabilities can be substantially increased or decreased by the quality of the people and processes in these receiving organizations. This makes it almost impossible to accurately attribute realized value to R&D PPM efforts.

However, in the pharmaceutical industry, which is extremely dependent on a steady flow of new, high-value products, the relationship between strategic portfolio management and business success is more direct, since strategic PPM is precisely concerned with finding the best new-product opportunities. Identifying pharmaceutical companies with best-practice PPM processes and comparing their performance to other pharmaceutical companies and to the general stock market comes close to addressing the question at hand. And, in fact, a comparison of the market performance of those companies with best-practice PPM processes in place to the S&P 500 index and the Dow Jones pharma index over time seems to indicate a strong association between excellent portfolio management and superior stock price performance—the ultimate bottom line (Figure 1).

A Best-Practice Approach to Improving PPM Effectiveness

A classic approach to improving effectiveness in organizations is benchmarking: identifying best-in-class companies and then learning what they do that helps them to be best in class. One of the first large-scale benchmarking efforts for R&D portfolio management was conducted by Cooper, Edgett, and Kleinschmidt with IRI members around 1990, resulting in the seminal book *Portfolio Management for New Products* (1998). Other attempts to identify and validate best practices for portfolio management have followed. *Project Portfolio Management: A Practical Guide* (Levine 2005) also describes many PPM best practices, although with more of an IT focus. And in 2006, the American Productivity & Quality Center (APQC) conducted another R&D best-practices benchmarking study (Edgett 2006). A more recent compendium of PPM best practices is found in *Project Portfolio Management: A View from the Management Trenches* (Pennypacker and Retna 2009). In addition, during my seven years as Chief Portfolio Advocate for HP, I conducted several unpublished R&D portfolio benchmarking studies for different HP businesses.



** "Portfolio adopters" includes organizations that have fully implemented a value-based portfolio management and resource allocation approach using decision analysis*

FIGURE 1. Stock price performance of pharmaceutical firms with PPM processes vs. Dow Jones pharma index and S&P 500

Over the past three years, I have co-sponsored an international portfolio management benchmarking study, PPM Accelerate, to gather quantitative data on the usage of the PPM best practices identified in these earlier works. The goal was to provide some simple quantitative assessment of the importance of these practices to PPM performance. Through three rounds of data collection, we gathered extensive data from 44 organizations actively engaged in project portfolio management. Of these, 27 (60 percent) are doing R&D portfolio management, making this study very relevant for IRI members; the other 17 participating organizations are applying PPM to manage and prioritize other kinds of projects, such as IT, capital investment, supply chain, and marketing. The study is ongoing; there will be additional future rounds of PPM benchmarking.

The quality of the participants in a benchmarking study is very important in identifying and validating best practices. Since it is very difficult to determine the impact of PPM on corporate results directly, we looked for participants for whom PPM was a critical business process and who had high maturity in portfolio management. Therefore, the study included 10 participants from the pharma industry, which is a leader in R&D PPM (Table 1). These companies indeed exhibited very high levels of PPM performance in our study and helped establish the performance benchmarks. In fact the top 25 percent of all participants are organizations using PPM for R&D (5 life sciences/pharma, 2 chemicals, 2 oil & gas, and 2 fast-moving consumer goods [FMCG]).

The core of PPM Accelerate is a set of 50 best practices for PPM derived from prior benchmarking studies (including those cited above), an extensive literature search, and over 30 years of working with organizations doing portfolio management. For example, practice A1—Pursue three overarching objectives in portfolio management: strategic alignment, strategic balance, and return maximization—is among Cooper, Edgett, and Kleinschmidt's (1998) key findings.

The 50 best practices we identified are sorted into eight categories (Table 2), which include categories for practices related to strategic alignment, strategic balance, and risk assessment (categories B and F); return maximization is captured in categories for practices to create value and to generate financial information (A and D). The additional categories capture the full spectrum of PPM practices. First, since PPM is at its core a decision-making process, there are categories for governance (G) and decision behavior (C). And since PPM is a process, there is a category for practices around the PPM process itself (H). Finally, there is a category for practices on resource management and bottleneck management (E) to cover pipeline management.

The categories, and the practices within them, cover a wide spectrum of PPM activities as well as the connection of PPM to adjacent and related processes, such as strategy development, project evaluation, project management, and resource management. The validity and importance of these 50 practices (Table 3) has been tested and validated by the participating organizations, which consider them to be both relevant and important. We also surveyed participants about the frequency of 25 PPM pitfalls (essentially bad practices), which largely confirmed the findings from the best practice analysis.

TABLE 1. Study participants by industry

Financial
AEGON
APG
ING (2)*
LeasePlan
Rabobank
UWV
Life Sciences/Pharma
Bayer Healthcare (3)
Genentech/Roche
Genmab
Gilead
Jansen/J&J (2)
Pfizer (2)
Takeda
Chemicals & Refining
Bayer MaterialScience (2)
Dow (2)
ExxonMobil Research & Engineering (3)
FMCG
Beiersdorf
Friesland Campina
P&G
Unilever (2)
Engineering/Manufacturing
Boeing (3)
Lockheed Martin
Philips
Rockwell Automation (3)
Communications
Cisco Services
Cisco Corporate
UPC (2)
Airlines
KLM

Organizations in italics are engaged in PPM for R&D.
**Numbers in parentheses indicate multiple participating organizations within the company.*

To measure the extent to which participating organizations engaged in PPM best practices, we adopted a scoring system used in previous R&D decision quality benchmarking studies (Matheson, Matheson, and Menke 1994; Menke 1997a, b). In this system, participants assessed each practice on four dimensions:

1. Its relevance to achieving the company's PPM objectives (yes/no),
2. Its importance to achieving the company's PPM objectives (1 to 7),
3. The frequency with which the practice is executed when appropriate (0–100 percent), and
4. How well the company executes the practice relative to what is feasible (0–100 percent).

TABLE 2. PPM best practice categories

Category		*Definition*
A	PPM Added Value	Practices related to why people do PPM and how they use it to add value
B	Analytics, Reporting, & Risk Assessment	Practices related to analyzing data for the portfolio and for individual projects to assess and manage risk
C	Behavior	Practices related to the "soft" people side of PPM decision making
D	Financial Information	Practices around financial information people use to support portfolio decisions and how they develop it (e.g., project evaluation and business cases)
E	Resource Information & Management	Practices around how people measure, manage, and balance the resources to execute the portfolio
F	Strategy & Strategic Alignment	Practices around how people develop strategy and then align the project portfolio with the strategy
G	Organization & Governance	Practices around the formal structure, organization, and governance of PPM
H	PPM Process	Practices relating to the formal PPM process and associated product development process

These assessments were usually provided by very knowledgeable senior managers in the participating organizations, typically the portfolio process owners; in some cases, the information was generated as a team effort or was reviewed with others.

The relevance and importance measures were used to validate the set of practices. Multiplying frequency of use by quality of execution gives a performance score for the organization. This score (also called an actualization score) is our main measure of effective usage of best practices.

TABLE 3. Best practices by category

A. Added Value and Value Creation	
A1	Pursue three overarching objectives in PPM process: strategic alignment, strategic balance, and return maximization.
A2	Use KPIs (i.e., strategic contribution, improved efficiency, balanced risk, higher ROI) to measure the effectiveness of PPM.
A3	Use a value/return measure that is aligned with shareholder value (e.g., eNPV).
A4	Take explicit steps to maximize portfolio return (e.g., "Efficient Frontier" approach).
A5	Communicate the added value of PPM to the organization frequently and explicitly.
B. Analytics, Reporting, and Risk Assessment	
B1	Use clear, user-friendly reports that meet the needs of decision makers.
B2	Use effective visual displays (e.g., risk-return grid) to convey portfolio information.
B3	Align portfolio analytics and reporting across tiers to improve comparability.
B4	Use an appropriate mix of methods to improve decision quality (sensitivity analysis/risk analysis/decision analysis).
B5	Show impact of project risk on future project and portfolio value.
B6	Measure, understand, and manage portfolio risk from global variables that impact many projects, such as oil price.
B7	Identify the key bottleneck time clearly and transparently.
B8	Identify the key bottleneck money clearly and transparently.
B9	Identify the key bottleneck people clearly and transparently.
B10	Identify the key bottleneck material clearly and transparently.
C. Management Decision Behavior	
C1	All stakeholders are disciplined and reliable in following the agreed PPM processes.
C2	Management decision making is knowledge-based, transparent, and consistent.
C3	Portfolio management results in an allocation of resources to projects and programs.
C4	Once portfolio decisions are made, they are supported by all involved parties.
C5	Projects are prioritized according to a clear set of rules.
D. Financial Information and Analysis	
D1	Monitor a mix of financial information (NPV/eNPV/etc.).
D2	Align PPM with regular planning and control processes, such as the capital budget process.
D3	Measure the strategic and financial value of portfolio decisions using a business case.
D4	Reassess the business case throughout the project life cycle.
D5	Benefit management is leveraged well (robust realizable benefits, capture all forms of benefits created, etc.).
D6	Where possible, "book" benefits early by cutting budgets, limiting headcount, and including these changes in performance targets.

TABLE 3. *continued*

E. Resource Information and Management	
E1	Identify and monitor resource bottlenecks.
E2	Manage the balance between resource demand and resource supply.
E3	Do not overload the project pipeline or the people; resource projects adequately.
E4	Examine alternative strategies and resource levels to achieve project objectives.
E5	Clearly articulate the relationship between resources, timelines, and risk resolution.
F. Strategic Information and Alignment	
F1	Have a well-defined business strategy and communicate it to all employees clearly and often.
F2	Create an awareness of the strategic impact of the project portfolio.
F3	Translate strategic goals and gaps into necessary projects; build in strategic alignment.
F4	Confirm that the projects in the portfolio are sufficient for the strategy to succeed.
F5	Use strategic buckets to avoid conflicts between projects from different buckets.
G. Portfolio Governance and Organization	
G1	Ensure that portfolio governance is clearly defined and understood.
G2	Have a clear division of responsibilities (i.e., between divisional and central PMO).
G3	Have a well-documented and implemented set of decision criteria, business rules, and internal controls regarding PPM.
G4	Use PPM as a key decision-making process so that PPM drives the allocation of resources.
G5	Use cross-functional teams to ensure high quality and broad acceptance of decisions.
G6	Integrate PPM with other key business processes, such as strategy development and project management.
G7	Provide specific training to ensure those involved in PPM acquire the necessary skills.
H. PPM Process	
H1	Use a consistent PPM process, language, and tools across all levels and functions.
H2	Evaluate projects in a standardized way that combines quantitative and qualitative measures.
H3	Use an idea-to-launch process with decision gates.
H4	Require a comprehensive business case early in the process and update it at each decision gate.
H5	Make decisions, set priorities, and allocate resources using PPM process.
H6	Measure and monitor anticipated benefits as an integral part of the PPM process.
H7	Have a framework for learning; audit the PPM process regularly and improve as needed.

Results and Findings

The first step in analyzing results was to verify that we had constructed a valid set of best practices. We began with a very strong set of practices, most of which had been identified and validated in earlier comprehensive R&D PPM benchmarking studies. We did, however, add a few new practices where we believed there were gaps, based on over 30 years of PPM consulting experience with dozens of companies in many industries. An example is practice F4—Confirm that the projects in the portfolio are sufficient for the strategy to succeed. For this small subset, the benchmarking assessments also helped to validate the new practices as well as the entire set. The primary mechanism for validating the practices was the questions regarding relevance and importance. On these measures, respondents were remarkably consistent: 7 of the 50 practices were considered relevant by all respondents, and another 6 by all but one. All but two were considered relevant by 80 percent of participants or more.

We also asked each participant to assess the importance of each relevant practice on a scale of 1–7. Often on such questions, people will ignore the top and bottom scores, but here 7 was a frequent answer in our study. Eleven practices achieved an average score of 6.0 or above (Table 4); only four scored lower than 5.0. Taken together, these data show that respondents believed that these practices represent an important and valid set of best practices.

We assessed participating organizations' execution of best practices using questions about frequency of use and quality of execution; multiplied together, these two ratings yielded a performance score. The highest average performance score is 73 percent, for practice H3—Use an idea-to-launch process with decision (e.g., stage/phase) gates—and average scores decline fairly rapidly down to 36 percent; 45 percent of the practices had average performance scores below 50 percent (Figure 2). Clearly, for the "average" PPM organization, there is substantial room for improvement in best-practice performance.

Having established that the practices are indeed important and that there is lots of room for improvement in their execution, we set out to establish a standard of excellence for these practices. To do this we averaged the performance scores for the top three performers for each practice. In every case, the averaged performance scores for the top three were 30 percent better, or more, than the average of all participants, establishing the quantitative gap between average performance and best-in-class performance for each practice. This best-in-class standard has been quite useful in helping benchmarking participants devise and implement customized PPM improvement programs.

Arranging the results on a grid that maps average importance (x-axis) against average performance (y-axis)

TABLE 4. Practices with importance scores of 6.0 or higher

Practice		Score
C3	Portfolio management results in an allocation of resources to projects and programs.	6.4
A1	Pursue three overarching objectives in PPM process: strategic alignment, strategic balance, and return maximization.	6.4
C1	All stakeholders are disciplined and reliable in following the agreed PPM processes.	6.4
C2	Management decision making is knowledge-based, transparent, and consistent.	6.3
H5	Make decisions, set priorities, and allocate resources using PPM process.	6.2
C5	Once portfolio decisions are made, they are supported by all involved parties.	6.2
D3	Measure the strategic and financial value of portfolio decisions using a business case.	6.1
G4	Use PPM as a key decision-making process so that PPM drives the allocation of resources.	6.1
B1	Use clear, user-friendly reports that meet the needs of decision makers.	6.0
H1	Require a comprehensive business case early in the process and update it at each decision gate.	6.0
H2	Evaluate projects in a standardized way that combines quantitative and qualitative measures.	6.0

provides a useful perspective (Figure 3a). The most important practices are those furthest to the right; those with the highest performance averages are toward the top. Those with high importance averages—greater than 5.4—have the most potential to add value to the PPM process. In the upper right of the grid are practices that have both high importance scores and high performance averages. This cluster includes a number of practices from categories G, organization and governance, and H, PPM process. This suggests that most organizations are fairly strong in these two categories. These practices can be considered essential for PPM excellence—if you are not doing them well you are in danger of being uncompetitive. The 11 practices in the lower right quadrant of the grid, which have high average importance scores (greater than 5.4) and low average performance scores (less than 46 percent), are of special interest (Figure 3b). These are practices that can confer competitive advantage to those organizations that choose to actualize them highly, since they are recognized as highly important but generally poorly executed. There are three strategy practices (category F), three resource management practices (category E), and two added value practices (category A) in this group, suggesting that these three categories, although recognized as important, are typically weaker than the others in terms of *average* performance.

Finally let us examine how the practices that are considered important (average contribution>5.4) but have low average performance scores (45 percent or lower) differ by industry (Table 5). These are practices that meet the same

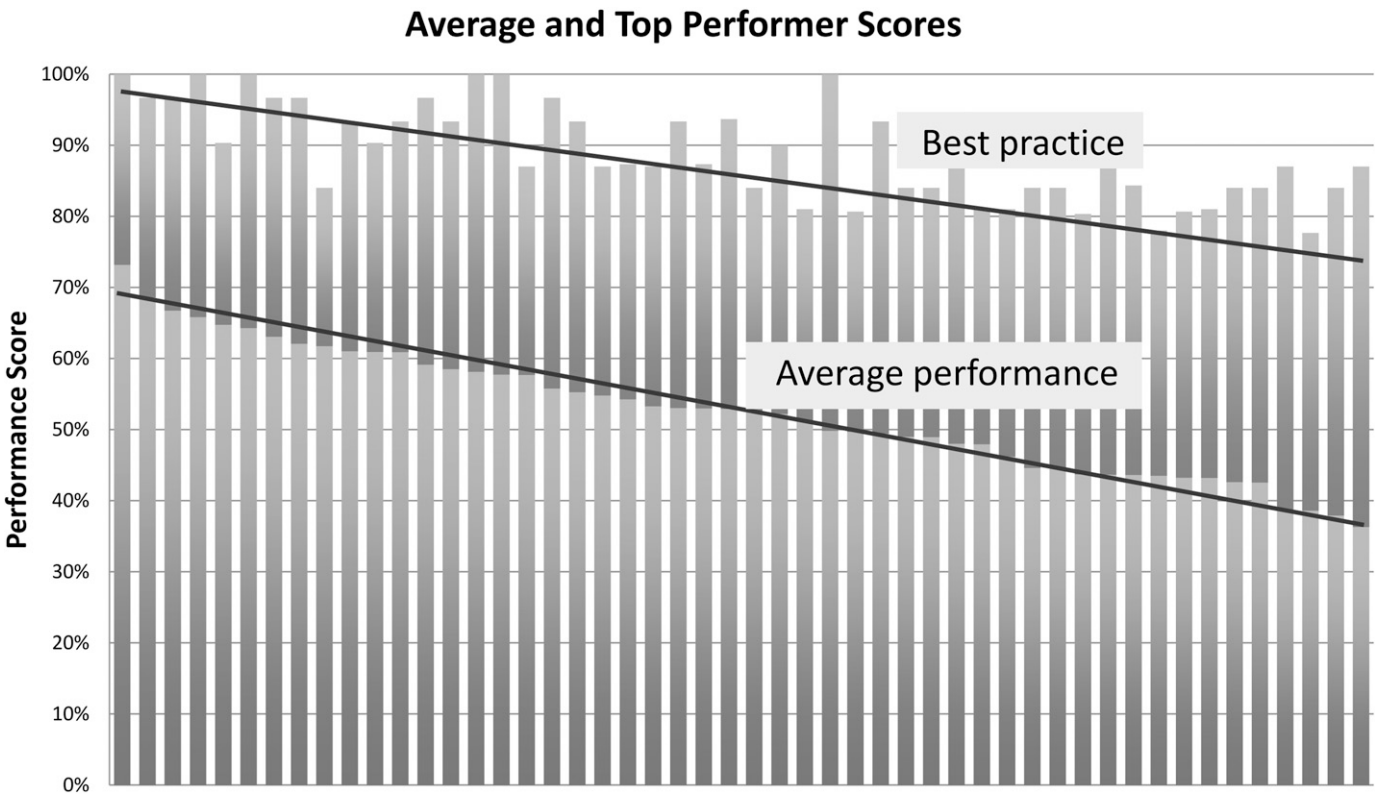


FIGURE 2. Average performance scores of top three organizations in each practice and across sample

criteria as those in the lower right quadrant highlighted in Figure 3, but applied to smaller industry subgroups. Twenty-four practices, including at least one from every category, fall into this range. The Chemicals & Refining subgroup (7 organizations) has no practices that meet these conditions—a very strong showing. On the other hand, the Engineering/Manufacturing subgroup (6 organizations) has 18 practices meeting these conditions, spread across seven of the eight practice categories. This indicates a strong need for most engineering-manufacturing companies to strengthen their PPM process and practices. The FMCG group has 10 such practices and Pharma/Life Sciences only 3. Taken together, these data suggest that the dominant improvement targets for R&D organizations are 1) resource management, 2) governance and decision behavior, 3) PPM added value, and 4) strategy and strategic alignment. However, of the 24 practices in table 5, only 6 are common to two or more industry groups. So improvement needs differ by industry, just as they differ for each individual company.

Another analysis of weaker and stronger practice performance categories offers further insight (Figure 4). The pyramid on the left shows category average performance for the eight practice categories for all 44 participants (R&D plus others). Category E, Resources, is clearly the lowest performance category, followed by A, B, and F. So on average these are the practice categories that need the most improvement in portfolio management. The pyramid on the right shows the same analysis for 27 organizations doing all or mostly R&D projects. R&D organizations demonstrate stronger performance in every category, although in strategy they are essentially the same. Since Strategy was a weak category to begin with, this suggests that on average R&D organizations can do a much better job of aligning the project portfolio with business and corporate strategies. Also the 44% average category performance score for category E, Resources, while better than the average of all participants, is still the weakest category for R&D organizations and suggests a need for R&D organizations to improve resource management.

We found significant variation in PPM performance by industry, particularly when similar industries are aggregated. Among the 27 participants whose PPM process was all or mostly focused on R&D projects, there were 9 life science organizations, 7 chemicals and refining organizations, 6 engineering/manufacturing organizations (including Cisco Services), and 5 FMCG organizations. We examined differences among these organizations with regard to average importance and performance by category.

There was not a lot of difference among the industry groups regarding the importance of particular categories of practices. The most important category was Behavior (C), with average importance scores ranging from 5.95 to 6.38. Analytics, Reporting, and Risk Assessment (B) and Resource Information and Management (E) were considered least important, with scores ranging from 5.09 to 5.57.

The differences in average performance by category are more interesting (Table 6). The chemicals and refining subgroup is the strongest both overall and in seven of the eight categories. Life sciences is slightly lower overall, but

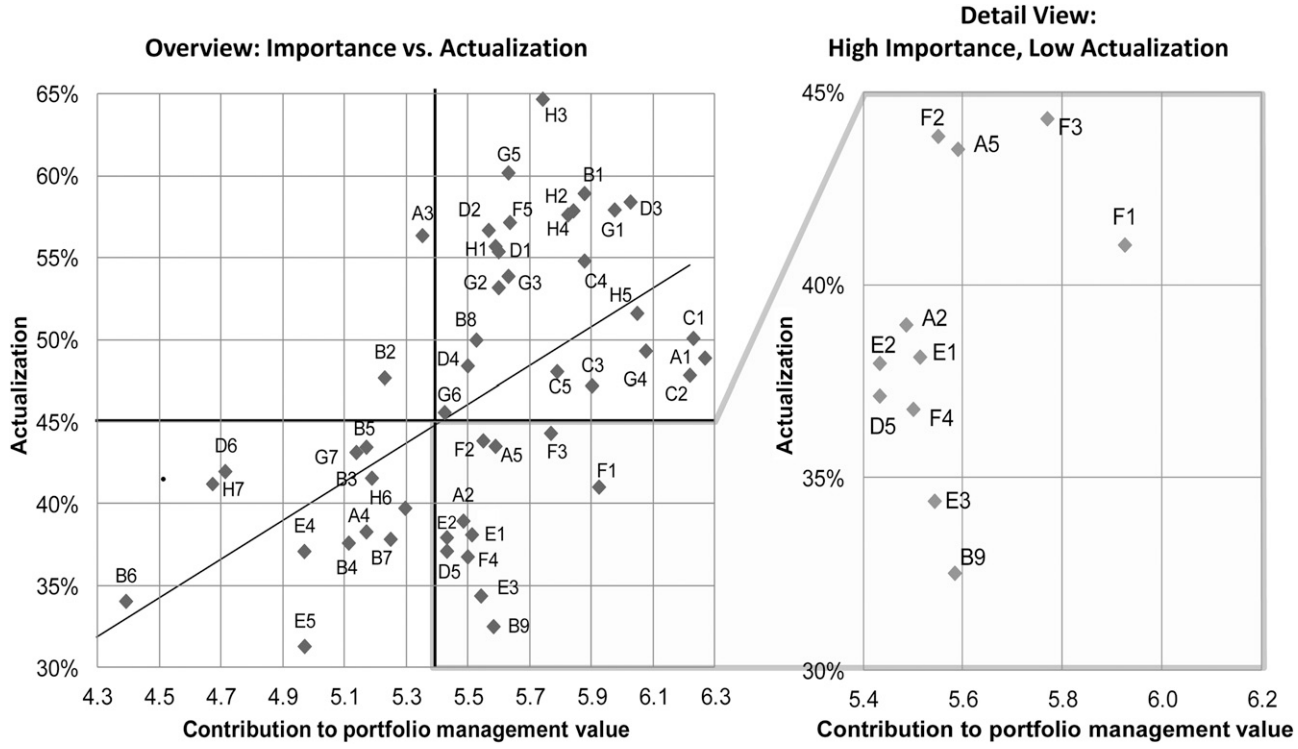


FIGURE 3. Best practices mapped by average importance score vs. average performance score

TABLE 5. Average PPM performance scores by industry for critical practices

Practice		Engineering/Manufacturing	FMCG	Life Sciences	Theme
A1	Pursue strategic alignment, strategic balance, and return maximization.	38%			Value
A2	Use KPIs to measure effectiveness.	45%			Value
A4	Maximize portfolio return.		32%		Value
A5	Communicate added value of PPM.	41%			Value
B2	Use effective visual displays.	42%			Displays
B4	Use mix of methods to improve decision quality.	28%			Analysis Methods
B7	Identify bottleneck time.	29%	18%		Bottlenecks
B9	Identify bottleneck people.	39%	35%	44%	Bottlenecks
C2	Decision making is knowledge-based, transparent, consistent.	45%			Decision Behavior
C3	PM results in allocation of resources to projects/ programs.	41%	45%		Decision Behavior
C5	Projects prioritized according to clear rules.	28%			Priorities
D5	Benefit management is leveraged well.		44%	44%	Benefit Mgmt
E1	Identify, monitor resource bottlenecks.	34%			Bottlenecks
E2	Manage balance between resource demand and supply.	33%	38%		Resources
E3	Don't overload pipeline or people; resource projects adequately.	37%			Resources
E5	Clearly articulate relationship btwn resources, timelines, risk.		24%		Risk
F1	Communicate business strategy clearly and often.			23%	Strategy
F3	Translate strategic goals and gaps into projects.	42%	44%		Strategy
F4	Confirm that portfolio is sufficient for strategy.	27%			Strategy
G1	Ensure portfolio governance is clearly defined and understood.		36%		Governance
G4	PPM drives allocation of resources.	41%			Governance/Behavior
G6	Integrate PPM with other key business processes.	31%			Integration
H5	Make decisions, set priorities, allocate resources using PPM process.		45%		Governance/Behavior
H6	Measure anticipated benefits as part of PPM process.	36%			Benefit Mgmt
#		18	10	3	

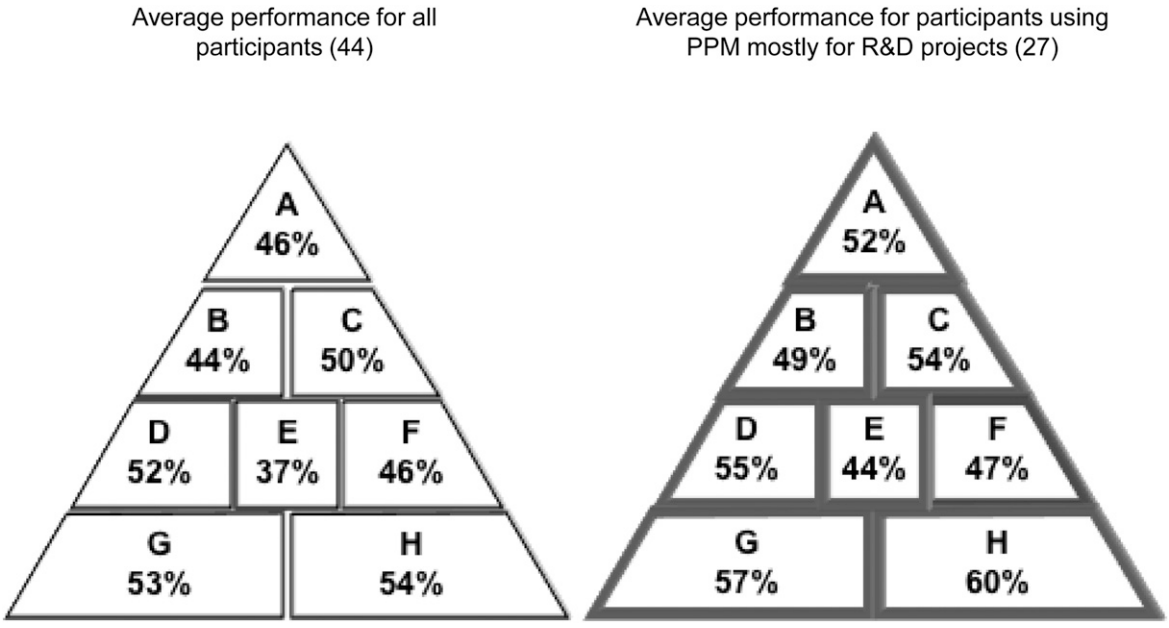


FIGURE 4. Comparison of performance by category for all participants vs. participants with R&D focus

TABLE 6. PPM practices across industries

Practice Category	Chemicals (7)	Life Sciences (12)	FMCG (5)	Engineering (8)	Finance (7)	Top 3
A	56%	63%	49%	41%	*36%*	89.6%
B	62%	55%	*38%*	*36%*	*30%*	86.1%
C	63%	62%	47%	43%	46%	88.5%
D	67%	61%	46%	48%	48%	92.1%
E	52%	51%	*35%*	*36%*	*23%*	80.9%
F	53%	45%	49%	47%	49%	86.5%
G	67%	64%	49%	46%	47%	90.3%
H	71%	65%	52%	52%	41%	89.4%
All Practices	62%	58%	45%	43%	40%	88.0%

TABLE 7. 10 practices with highest performance averages

Practice		Average
H3	Use an idea-to-launch process with decision gates.	73%
G5	Use cross-functional teams to ensure high quality and broad acceptance of decisions.	69%
H4	Require a comprehensive business case early in the process and update it at each decision gate.	67%
D1	Monitor a mix of financial information (NPV/eNPV/etc.).	66%
H2	Evaluate projects in a standardized way that combines quantitative and qualitative measures.	65%
A3	Use a value/return measure that is aligned with shareholder value (e.g., eNPV).	64%
D3	Measure the strategic and financial value of portfolio decisions using a business case.	63%
F5	Use strategic buckets to avoid conflicts between projects from different buckets.	62%
H5	Make decisions, set priorities, and allocate resources using PPM processes.	62%
H1	Use a consistent PPM process, language, and tools across all levels and functions.	61%

TABLE 8. 10 practices with lowest average performance scores

Practice		Average
D6	Where possible, "book" benefits early by cutting budgets, limiting headcount, and including these changes in performance targets.	44%
E4	Examine alternative strategies and resource levels to achieve project objectives.	44%
E2	Manage the balance between resource demand and resource supply.	43%
E3	Do not overload the project pipeline or the people; resource projects adequately.	43%
B9	Identify the key bottleneck people clearly and transparently.	43%
D5	Good leverage of benefit management (robust realizable benefits, capture all forms of benefits created, etc.)	43%
E5	Clearly articulate the relationship among resources, timelines, and risk resolution.	39%
B10	Identify the key bottleneck material clearly and transparently.	39%
F4	Confirm that the projects in the portfolio are sufficient for the strategy to succeed.	38%
B6	Measure, understand, and manage portfolio risk from global variables that impact many projects, such as oil price.	36%

clearly strongest in Added Value (A) and roughly equal to the chemicals group in behavior (C), financial information (D), and resources information and management (E). Yet even these two strongest industry groups are about 20 percent below the benchmark top three. FMCG and engineering-manufacturing firms are similar in overall performance, coming in about 15 points below the two strongest. The performance scores for financial firms (largely concerned with PPM for IT projects) are even lower in most categories.

Many participants have made significant changes to their PPM processes and practices as a result of what they learned from this benchmarking.

Almost all firms show weaker performance in resource management and strategy categories than in other categories, even though there are differences among the industry groups. This reinforces the earlier finding that all organizations, including R&D organizations, should look at strengthening the connection between their PPM processes and strategy and resource management processes.

Of the 10 practices that have the highest average performance scores across our R&D portfolio participants, 5 are PPM process practices, 2 are financial information practices, and 1 each come from the added value, strategy, and

governance categories (Table 7). Notably absent from this list are any behavior practices, despite their very high importance. This may be because the PPM process owners have only limited influence on management decision behavior.

It is also interesting to ask which practices have the lowest average performance. Of the 10 lowest, 4 are Resources Management practices, 2 are Bottleneck Management practices, 2 are Financial Information practices, 1 is a Strategy practice, and 1 a Risk Assessment practice (Table 8). This reinforces the improvement needs illustrated by our analysis and highlights again the general need to be stronger in connecting PPM with resource management.

Caveats, Conclusions, and Recommendations

The benchmarking study, as described here, has produced a number of interesting and useful findings and conclusions. Each participating company has received a number of recommendations customized to its specific situation and driven by how it compares to the group as a whole and to top performers. Many of those participants have made significant changes to their PPM processes and practices as a result of what they learned from this benchmarking. These potential benefits are available to all readers who may want to use the findings and the data in this paper to drive PPM improvement programs.

Participants have also raised several issues. First, like any survey-based methodology, the analysis and conclusions are based on subjective assessments. The validity of these assessments is a function of the knowledge and objectivity of the individuals providing the assessments. We worked carefully with participants to ensure this, but in the end it remains subjective. Second, differences among the different participants may be so large that the average assessments of the population have little significance. A statistical analysis of the different assessments of all participants for all 50 practices shows that the standard deviations around the average contributions are about 22 percent and around the average performance scores 45 percent. This does not mean the data is invalid, since the participating organizations are at very different states of PPM maturity, but does suggest the wisdom of avoiding sweeping generalizations based on the analysis presented here.

Third, each organization is unique, and the general conclusions of this paper may not apply to any specific organization. Therefore organizations will obtain maximum benefit by completing the same benchmarking survey instrument that other organizations have completed to see how they compare to peer groups and best-in-class performance. Finally, it is virtually impossible to prove conclusively that better PPM yields better bottom-line results, largely because those results are ultimately delivered by downstream organizations that must accept and implement the assets and capabilities delivered by R&D PPM. We present some intriguing evidence from the pharma industry, but definite causality is elusive.

Offsetting these caveats are several strengths of the approach taken. Subjective assessment is simple, and it takes only several hours to complete the extensive benchmarking questionnaire. The specific organizational analysis can be completed fairly quickly (several days), providing a data-based view of how a PPM group is performing relative to peers. This analysis includes numerous recommendations for improvement based on the assessments provided, which the organization can then subject to its own "gut feel" test to see if they make sense. Several of the participants have said they personally knew in advance the types of improvements they should make but had trouble convincing senior management without evidence. This benchmarking helped them provide that evidence (despite the caveats above). In short, we believe the strengths of the approach far outweigh the caveats.

All R&D PPM organizations should review their own PPM processes against the broad areas of weak performance identified in this study.

We conclude that the 50 best practices in this study, already identified as important in prior studies, are also considered highly relevant and important by these 27 R&D organizations (as well as the 17 non-R&D PPM organizations). The Resource Management category is the weakest practice category across the board and probably needs improving in many R&D organizations. Strategy practices, first having a clearly articulated strategy and then aligning the R&D project portfolio with that strategy, also need improvement in many organizations. Finally there are very significant performance differences across industry subgroups, by category as well as by individual practices. And there are significant differences among the individual organizations with each industry sub-group, so each individual PPM organization must assess its own situation carefully against the general recommendations presented here.

All R&D PPM organizations should review their own PPM processes against the broad areas of weak performance identified in this study. You may or may not be weak in these areas, but they are certainly good places to begin a critical self-examination. Those who are more ambitious can score themselves on all 50 practices and use the data presented here to find out where they are above and below average and make improvements accordingly. We intend to continue gathering benchmarking data from additional organizations, industries, and functional subgroups to refine and further validate our findings and conclusions and would welcome any readers who would like to join the full benchmarking database and compare their PPM processes to that of the top-performing companies.

The PPM Accelerate portfolio management best-practices benchmarking study was co-sponsored by Nolan Norton & Co. of Zeist, Holland, and Value Creation Associates of Redwood City, California, USA.

References

Cooper, R., Edgett, S., and Kleinschmidt, E. 1998. *Portfolio Management for New Products*. Reading, MA: Perseus.

Edgett, S., ed. 2006. *R&D Portfolio Management Benchmarking Study: Final Report*. Houston, TX: American Productivity and Quality Council.

Levine, H. A. 2005. *Project Portfolio Management: A Practical Guide*. San Francisco: Jossey-Bass.

Matheson, D., Matheson, J., and Menke, M. 1994. Making excellent R&D decisions. *Research-Technology Management* 37(6): 21–24.

Menke, M. 1997a. Essentials of R&D strategic excellence. *Research-Technology Management* 40(5): 42–47.

Menke, M. 1997b. Managing R&D for competitive advantage. *Research-Technology Management* 40(6): 40–42.

Pennypacker, J., and Retna, S., editors. 2009. *Project Portfolio Management: A View from the Management Trenches*. New York: John Wiley.

Reinsvold, C., Johnson, E., and Menke, M. 2008. Seeing the forest as well as the trees: Creating value with portfolio optimization. Presentation given at SPE Annual Technical Conference and Exhibition, September 21–24, Denver, CO. SPE Paper 116419. Richardson, TX: Society of Petroleum Engineers.

Sharpe, P., and Keelin, T. 1998. How SmithKline Beecham makes better resource-allocation decisions. *Harvard Business Review* 76(2): 45–52.

Share your expertise . . .

Contribute to *RTM* as an author or peer reviewer. Visit us at http://www.iriweb.org/rtm for announcements of upcoming special issues, author guidelines, and information about volunteering as a peer reviewer.