Mastering Project Portfolio Management

A Systems Approach to Achieving Strategic Objectives

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Chapter 12

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12 Implementing and Evaluating Strategic Portfolio Performance

An obvious question is how to assess project and portfolio performance relative to their continued expectation of achieving strategic objectives. In their PMI Research Conference paper on integrating project and portfolio performance measures, Anbari, Cioffi and Forman ask, in part, "what are the currently anticipated benefits" (Anbari, 2010). In Chapter 11 of *Mastering Project Portfolio Management*, we discussed the use of traditional EVM and other measurements to assess the performance of individual projects against their baseline values, and described consolidation of these individual project metrics to produce the equivalent portfolio metrics. In addition, we showed how these traditional metrics are used to create a project and portfolio performance dashboard; such a dashboard displays project and portfolio performance information in terms of the anticipated benefits at the time of selection, and the objectives they support. However, the traditional metrics and methods described in Chapter 11 do not address how to determine the degree to which projects in progress, and portfolios, remain on track to deliver the benefits for which they were selected. This chapter suggests methods to measure strategic project and portfolio performance.

If projects within the portfolio, or the portfolio as a whole, are not on track during implementation to deliver the benefits the organization expected when they were selected, then management needs to understand this as early as possible to make proactive strategic decisions. The authors of this book believe this can be accomplished by developing strategic performance metrics based on benefits and measuring strategic portfolio performance during implementation by comparing current benefit performance against baseline benefit at the time of selection. This draft chapter has been placed on the J. Ross Publishing Web Added Value (WAV) site to provide readers of the book an opportunity to review the concepts and provide constructive feedback and questions. Readers wishing to contribute suggestions or comments are encouraged to provide feedback to the authors via the supplied WAV form and e-mail at sbivins@gwmail.gwu.edu or mb1775@gwmail.gwu.edu for Susan S. Bivins and Michael J. Bible, respectively.

The concepts and methods discussed in this chapter are under development and have not been subjected to formal review. Here we suggest ideas about strategic portfolio performance metrics to monitor project and portfolio performance with respect to anticipated and expected benefits. How well do the portfolio and its member projects remain on track to complete successfully and thus enable the organization to begin realizing the achievement of objectives for which they were selected?

Figure 12.1 highlights the activities and results of the evaluation phase that are specific to strategic project and portfolio performance; recall that the implementation and evaluation phases are iterative and their activities and results overlap and interact.

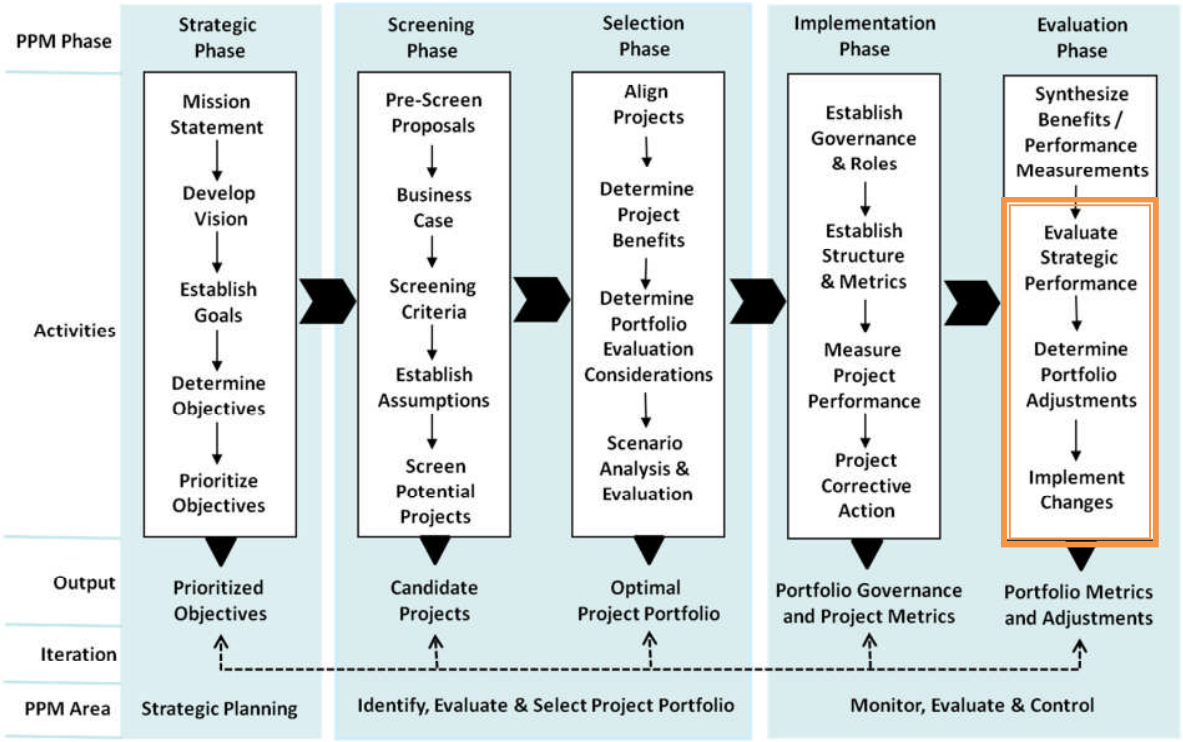

Figure 12.1. PPM Model – Evaluation Phase Strategic Performance

In selecting the optimal portfolio subject to constraints, the organization has chosen the combination of projects that provides the highest total expected benefit. Once selected and implemented, there are no guarantees that the total expected benefit of the portfolio or that of individual projects will remain static as the portfolio moves through implementation. Benefits can change due to a reevaluation when the organization's strategy changes, or when more promising project candidates come along, resulting in reprioritization and reselection of or major adjustment to the portfolio. However, project benefit also can change even while the strategy and list of candidates remains constant for a period of time, due to risk or opportunity events that negatively or positively affect projects and thus in aggregate, performance of the portfolio. In addition, estimates and assumptions made within the business cases prior to portfolio selection may prove to be vastly under or overstated, representing greater risk or opportunity than foreseen at the time of selection. A means of measuring such changes must be devised. Management needs evidence that the portfolio and its constituent projects continue to produce the same chance of achieving organizational objectives that they had when selected.

The evidence we suggest is using the original expected benefit (anticipated benefit discounted by risk) at the time of selection as the baseline; by measuring risk performance periodically, an adjusted expected benefit, or current expected benefit, can be compared to the baseline and trends can be observed just as they are using traditional metrics. Current expected benefit should be as good as or better than baseline expected benefit because along the way, known and unknown risks are encountered and managed, for better or worse, or are simply not encountered.

Some would say that expected benefit is no longer meaningful once the portfolio is selected; they might reason that the performance of a financial portfolio is assessed only by its current monetary value and liken project portfolio performance to financial portfolio performance when assessing benefit. We disagree in the sense that the benefit to be realized from a project in terms of achieving strategic objectives remains unfulfilled during its execution; the strategic benefit is realized only after the project, or a meaningful phase of the project, has been completed and becomes operational. This makes a project portfolio different from a financial portfolio. Whereas strategic gains derived from the project portfolio are not realized until after successful completion of its member projects, the owner of a financial portfolio can in most cases immediately realize current value, or limit losses, by liquidating the investment. This is not the situation for project portfolios, which require upfront investment for a payoff at some point in the future after project completion. The strategic performance of the project and portfolio must be continuously monitored to ensure that the perceived benefits (priorities) at the time of selection continue to forecast the delivery of strategic benefit after successful operation is achieved.

Because of this difference, in our view, risk-discounted benefit remains meaningful throughout the life of a project and the portfolio of which it is a member. The anticipated benefit represents the evaluated priority of a project rather than some realized return in the case of a financial investment; the expected benefit is simply that priority discounted by probability of failure at any point in time during execution.

12.1 Determining the Basis for Measuring Strategic Performance

Two values represent the strategic benefit of candidate projects, anticipated benefit and expected benefit; one or both can be chosen as the basis for assessing strategic performance. Expected benefit is simply anticipated benefit discounted by risk, or probability of failure. Risk performance for a project is specific to that project and can therefore be changed independently of risk for all other projects (except for closely related projects, of course) without changing the evaluated anticipated benefit; expected benefit thus functions well as a performance metric in terms of successful completion, which enables achievement of strategic expectation.

12.1.1 Reassessing Anticipated Benefit

Recall that the anticipated benefits represent the ratio-scale relative priorities of all the candidate projects with respect to one another, whether funded or not. In this regard, anticipated benefits do not change until a reprioritization is performed as a result of changes in the strategic plan; or when the organization chooses to reprioritize for other reasons, such as when many new candidate projects are added to a previously evaluated candidate pool or when funded projects are terminated. However, this does not mean that projects in the portfolio stay on track to deliver those anticipated benefits between reprioritizations, so we need metrics to provide regular progress information as measured against benefits.

Because anticipated benefit for a project is a relative number, we believe that evaluators have little basis for accurately modifying anticipated benefit for a given project independently of all other projects, whether pair-wise comparisons or absolute measures such as ratings scales have been used to evaluate the alternatives. Ratings scales are surrogates for pair-wise comparisons and are commonly used when the number of alternatives is large. Some might argue that it is, therefore, reasonable to change the anticipated benefit of a project by simply rating it

again. In our view, changing the rating for a given project outside the context of a full re-evaluation violates the integrity of the ratio-scale relative priorities that were established during an evaluation cycle. An exception to this guidance might be rating a new alternative when it is added to the candidate pool, because adding a new alternative does not change the anticipated benefits of the existing alternatives. *(This statement is true unless the distributive rather than the ideal mode is selected for synthesis. For further information about ideal versus distributive synthesis, refer to Forman (2001)*).

Another reason to avoid simply re-rating a project is that those who are measuring individual project progress are usually not the same people who performed the prioritization. Even with the same evaluators, rating individual projects is different in mindset and context from evaluating all assigned projects at once. So, although when using ratings scales or other absolute measurements, it is possible to change the rating for a particular project, we advise against it.

A change in anticipated benefit can happen during a planned portfolio reevaluation cycle or when the organization's strategy changes; in these circumstances, both anticipated and expected benefit is reestablished and re-baselined. However, if reevaluation and reselection were performed as frequently as other metrics are reported -- monthly, for example – the likely result would be a state of constant portfolio chaos in addition to the potential negative impact on executive and portfolio management productivity. For all these reasons, using changes in anticipated benefit alone to measure project and portfolio strategic performance seems impractical. Nevertheless, the degree to which projects and portfolios remain on target to achieve strategic benefits should be assessed as frequently as other measures.

12.1.2 Reassessing Expected Benefit

We suggest that risk is a metric closely related to achieving project and portfolio benefit; if risk is defined as probability of failure, then it represents the likelihood that a project will not complete successfully. If the project does not complete successfully, or is less successful than planned, then it will not deliver its anticipated benefit as evaluated; much more importantly, it will not subsequently help the organization to achieve its strategic objectives. Project risk is assessed as frequently as other performance measurements; it was used to produce the expected benefit values that resulted in project selection into the portfolio. While anticipated benefit is a relative priority with respect to other projects in the candidate pool, risk and expected benefit are unique to the project. Changes in expected benefit over time, when compared to baseline, define how well the project is able to proceed to overcome obstacles when risks are realized, or to preclude them altogether.

As project execution proceeds over time, risks are encountered and managed, effectively or not; these risks events affect expected benefit by increasing or decreasing the project's likelihood of success in terms of delivering benefit. Risks events that are not successfully anticipated or managed become issues that reduce the likelihood of success. Risks that are successfully avoided or managed increase the likelihood of success. Thus we introduce the periodic assessment of risk as a means to determine a project's current likelihood of success and compare it to baseline risk and the expected benefit that resulted in its original selection for funding. Based on this concept, we suggest new strategic portfolio performance metrics that address how both project and portfolio performance can be assessed in terms of continued relevance to achieving strategic goals and objectives.

12.2 Linking Strategy and Performance

While optimizing the portfolio in Chapter 9, anticipated benefits were discounted by risk prior to selecting the optimal portfolio. The projects that, in combination, delivered the highest total expected benefits at a specified budget under specified constraints were funded. The purpose of assessing project risk in portfolio selection is to assign a probability of success or a probability of failure to each alternative, and then to select a risk-adjusted optimal portfolio. The probability of success or failure is based on the qualitative and quantitative risk analyses performed for the individual alternative projects against appropriately constructed risk breakdown structures (RBSs). As a project selected in this manner progresses through its life cycle, it encounters anticipated risk events and sometimes unanticipated risk events; these risk events and management responses to them affect the likelihood of success and thus the expected benefit of a project. When well defined and meticulously assessed, project risk events can have a major impact on achievement of project and portfolio anticipated benefits. For example, risks to achievement of specifications are one kind of scope risk, which, when realized, can mean that deliverables may not perform as required.

Also as described in Chapter 9, it is likely that the relative importance of the risks and even the risks themselves are different for different types of projects. For example, the risk of failing to be first-to-market for a new product development project is extremely important, while that kind of schedule risk may not even appear in the RBS for a different kind of project. Managers of mandatory regulatory projects and new product projects are both likely to consider schedule risk as important, while cost may be less important. Managers of fixed price defense projects might consider cost risks most important, while schedule and scope may be more flexible and less sensitive to risk. An actual organization would likely have multiple RBSs and might use AHP to prioritize different types of risk.

When asking "what are the currently anticipated benefits" (Anbari, 2010), we believe that as a project moves through its life cycle, risk-discounted anticipated benefit, or expected benefit, is not static but dynamic. Expected benefits can change as new information is discovered and are the best predictors of a project's continued ability to deliver its anticipated benefits at completion; because anticipated benefits should only change through reprioritization, while expected benefit can change and be reported and assessed through periodic assessment of risk and its inverse, probability of success.

12.3 Determining Current Expected Benefit

To determine the current expected benefit, we must establish the basis for changing the probability of successful completion of projects, or its inverse, probability of failure or risk. Risk management is often considered to be composed of two stages, risk analysis and risk management (Chapman, 2001). Risk analysis identifies risks and responses while risk management contains a risk monitoring and controlling process. PMI calls the final process in project risk management Risk Monitoring and Control, and describes it as "tracking identified risks, monitoring residual risks, identifying new risks, executing risk response plans, and evaluating their effectiveness throughout the project life cycle" (PMI, 2004, p. 237). During risk analysis, risks are identified, qualitative and quantitative risk analyses are performed, and responses to risks identified. During risk management, responses to unanticipated risks are prepared, and importantly, risks are reported, monitored and controlled. Risk analysis produces discounted project anticipated benefit, called expected benefit, prior to selection of the portfolio; risk reporting, monitoring and controlling, on the other hand, result in positive or negative

changes to project risk as risks are encountered and mitigated, avoided or transferred or accepted. These changes in risk during a project's life, in our view, are used to reassess expected benefit at each measurement period and act as an indicator of current project performance against strategic benefits as opposed to expectations at the time of its selection as part of the optimal portfolio under constraints.

As risk or probability of failure of a project increases, expected benefit decreases. On the other hand, a project that has avoided or successfully mitigated risks and is nearing completion demonstrates reduced uncertainty, and thus expected benefit that increasingly approaches the anticipated benefits resulting from prioritization. Once a risk is avoided, or encountered and addressed with some specific degree of success or failure, its likelihood of occurrence must be removed from consideration of project risk; at that point, only the impact of the risk event matters.

An example risk breakdown structure (RBS) for the ABU example was discussed on Chapter 9. A risk breakdown structure with prioritized impacts can be developed for each type of project, e.g., a construction company that undertakes new construction and renovation projects might complete an RBS for new construction projects and a different RBS for renovation projects. Another organization might use the same RBS for the two types of projects, but simply prioritize the impacts differently. Figure 12.2 shows an example of another prioritized RBS for construction projects that are time-critical; other priorities or even another RBS might be used for projects that are, for example, cost-critical.

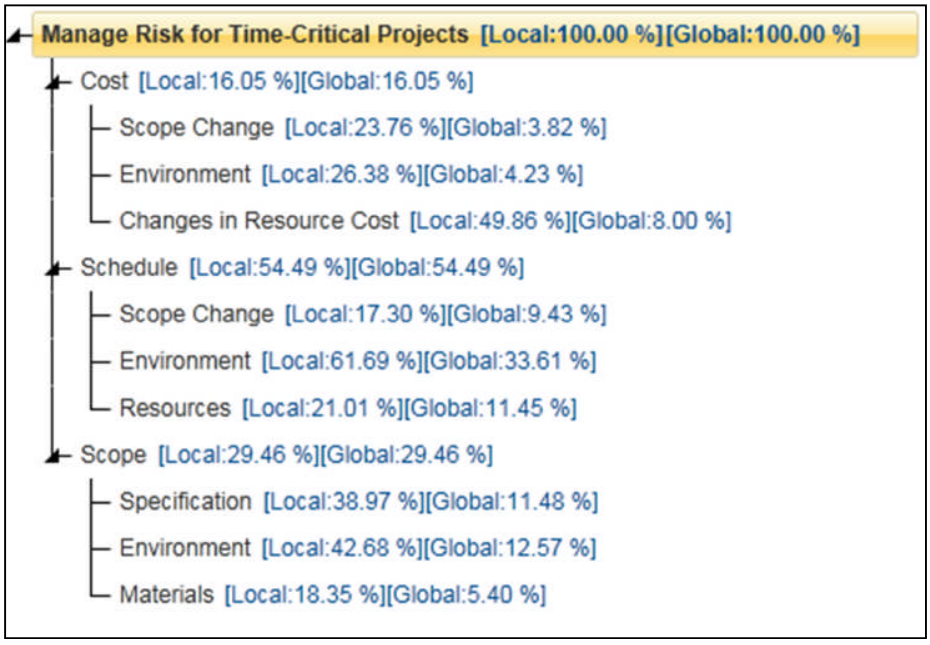

Figure 12.2. Prioritized RBS for Time-Critical Funded Projects

This RBS can be used to evaluate the current probability of success of the projects in the portfolio using a rating scale to evaluate the impact of risk events that have occurred, such as that shown in Figure 12.3.

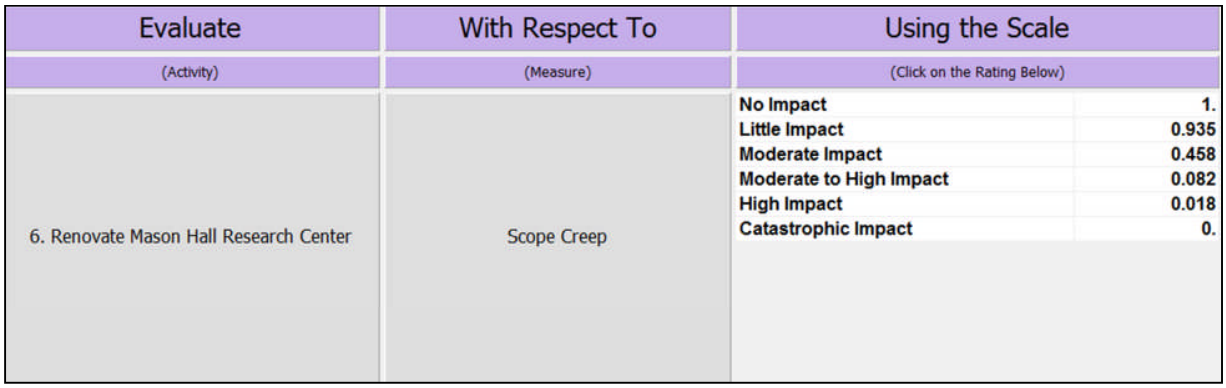

Figure 12.3. Evaluating the Impact of Risk Events that Have Occurred

From this example, a dashboard showing risk performance with the color representing risk performance and the amount of priority fill within the node representing the relative priority of each project can be developed, as shown in Figure 12.4.

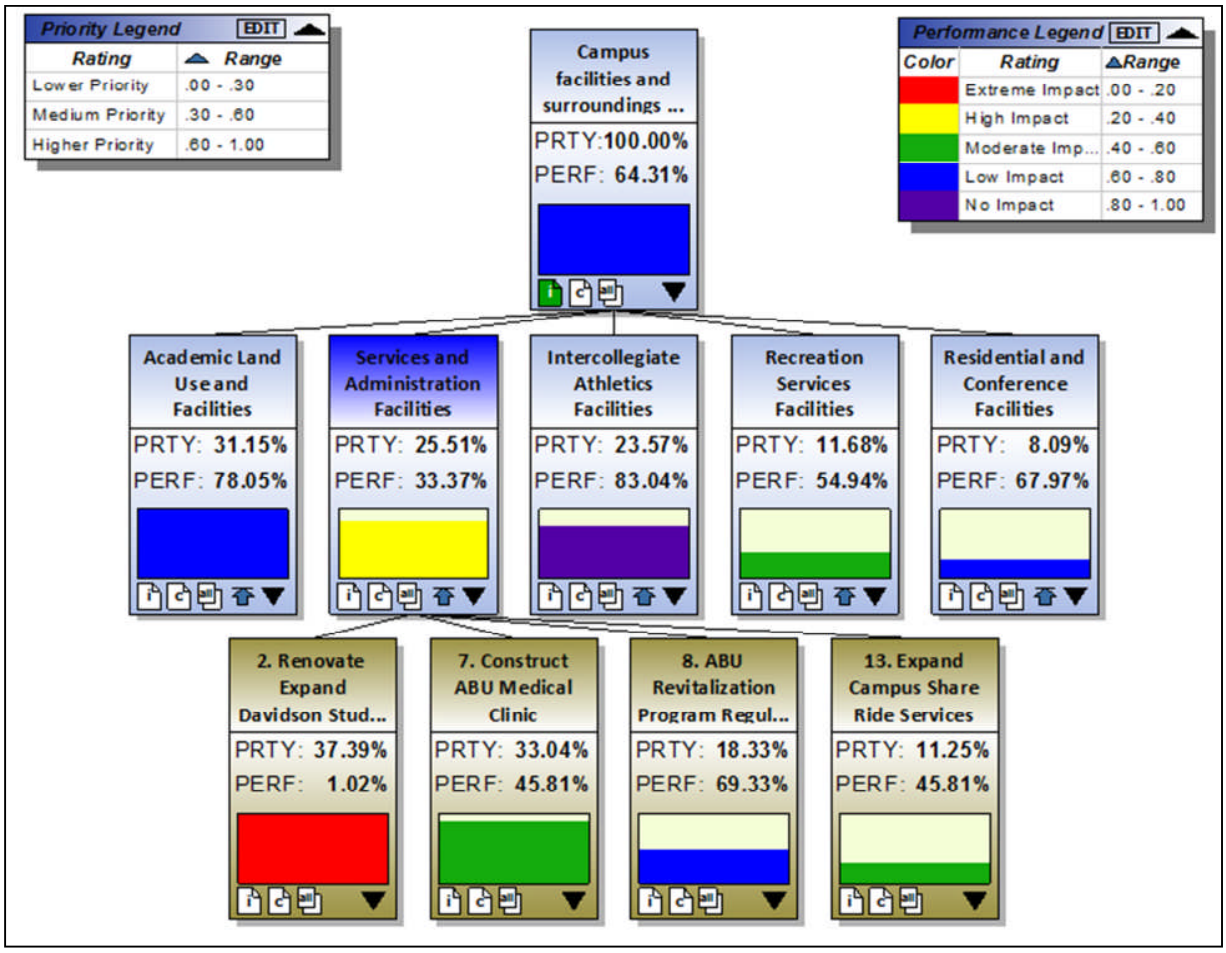

Figure 12.4. Dashboard with Drill Down Showing Risk Impact Ratings and Relative Priorities

Based on the current evaluation of risk in this example, the impact of encountered risk has considerably reduced the probability of success of Project 2 (Renovate and Expand Davidson Student Services Center). As the highest priority project supporting the Services and Administration objective, Project 2 has negatively influenced the risk performance of the synthesized project results for the objective. The actual ratings against the sample RBS shown in Figure 12.2 can be seen by drilling down in the dashboard, as shown in Figure 12.5.

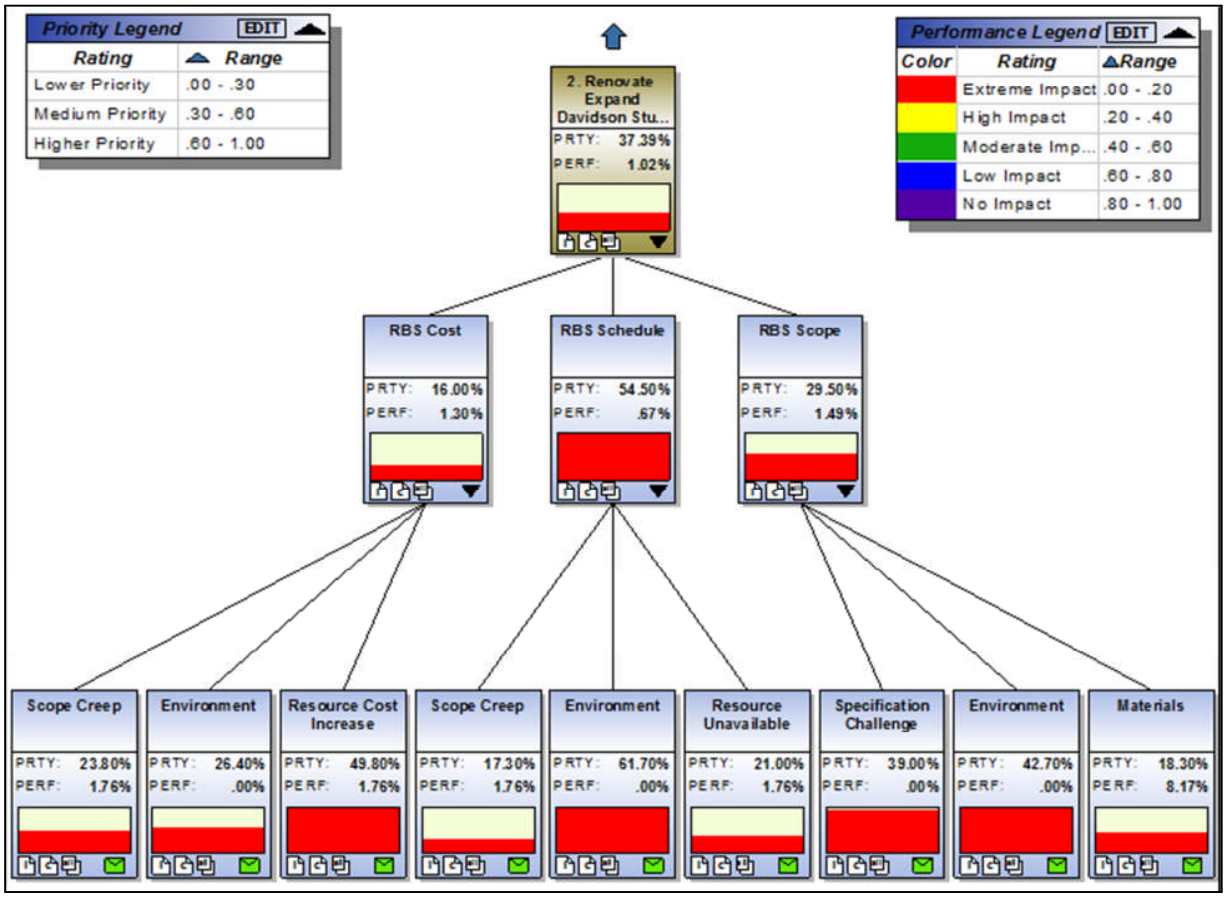

Figure 12.5. Drill Down to RBS Ratings for Project 2 (Expert Choice Periscope)

From the diagram, it is clear that as of this reporting period, risk events have occurred that management has been unable to successfully address, thus severely affecting the likelihood that Project 2 can deliver the benefits for which it was chosen. Aggressive investigation of these events is mandatory, with corrective action likely escalated to the PMB. Note that the priority fill represents the relative importance of the risk element at each level of the RBS hierarchy, just as in prior dashboard examples.

12.4 Strategic Benefit Indices

Project and portfolio strategic performance can be evaluated using indices that compare current expected benefit to baseline expected benefit. Measuring risk for each reporting period to discount anticipated benefit produces a current expected benefit for the reporting period that can be compared to the baseline expected benefit used to select the project in the first place.

Each project's expected benefit, or risk-discounted anticipated benefit, represents the evaluators' judgments of the project's expected contribution to achieving objectives. Conceptually, if all projects within the portfolio are successfully completed, the organization will realize the anticipated benefits of the portfolio as planned and will achieve strategic objectives

within the timeframes specified in the strategic plan. An important point to acknowledge is that project benefits are not realized until the project (or an operational phase of it) is completed and transitioned to operations or accepted by the customer. However, the timeframe from project portfolio selection to operational transition can be extensive. It can span several years as, for example, is often the case for major defense acquisition programs for the Department of Defense. The extended duration can lead to changes in perceived or actual project risk compared to perceived risk when the project was originally selected into the portfolio; these changes occur because of changes in market conditions, project risks that have successfully been avoided or mitigated, newly identified risks, and other factors.

Organizational perceptions of project risk during project portfolio selection are based on imperfect information as well as assumptions and expectations of future conditions. As projects and portfolios are implemented and work progresses, the organization's state of nature will change, as well as its view of project risk. The risk for a project previously thought to be low risk can change dramatically if previous "unknown unknowns" are realized or new risk factors are identified. These factors, combined with the fact that individual project performance will vary during implementation, require a measurement method that accounts for the changing probability of failure or success and the impact on the project expected benefit.

We define the Project Expect Benefit Index (EBI_{PRO}) and the Portfolio Expected Benefits Index (EBI_{PORT}) as metrics to aid the PMB in evaluating projects and portfolios against baseline expected benefits (i.e. risk discounted benefits at the time of selection or re-baselining). The fundamental purpose of project portfolio indices is to measure and evaluate current and trending project portfolio performance in terms of current expected benefits, against baseline expected benefits, which are tied to existing strategic goals and objectives.

One assumption for these indices is that project risk can and will change after project portfolio selection and as project work progresses. Indexing current project and portfolio expected benefits to baseline expected benefits can help portfolio management evaluate a project's and a portfolio's progress in delivering expected benefits and continued relevance to achieving strategic objectives. Another assumption for these indices is that project and portfolio managers are not directly responsible for achieving "realized benefits". Roberts (2007) notes benefits realization follows the closure of the project; it is when the intended benefits are expected to be delivered. That is, once a project is completed, it is transitioned to the organization's operations or to the external customer. The method presumes that once the project is transitioned out of the portfolio, it is no longer under the auspices or control of project and portfolio managers as that responsibility shifts to the operational owner. This does not mean that project and portfolio managers are immune to the need to focus on benefits; they must manage such that project performance does not negatively impact the future benefits. Managing risk during project execution is crucial to maintaining anticipated benefits, and is an important element of project management, while the actual realization of benefit is managed later by others. As projects enter or are removed from the portfolio, their baseline anticipated and expected benefits may also be added or removed, if the organization determines that a change to the portfolio's baselines for anticipated and expected benefits is warranted. When to re-baseline portfolio benefits is documented in the project portfolio management plan; we recommend re-baselining benefits when objectives are reprioritized, alternatives are reprioritized, or both, at minimum. This subject is discussed further later in the chapter.

Baseline Project Expected Benefit

The traditional view of project expected benefits (i.e., risk discounted anticipated benefits) is that they are static. That is, once established during portfolio selection, expected benefits do not change. This perception is likely more convenience than reality. Would a real estate project provide the same benefit if the organization unexpectedly discovered during the early part of implementation that it would only produce half the expected revenue? The point is that expected benefits may or may not continue to reflect initial perceptions. In the world of rapidly changing markets, customer demands, and competition; organizations should be open to the idea that their original perceptions of project benefits can change over time as more information becomes known and uncertainty transitions to certainty. Moreover, a change in perceived expected benefit is due to a change in risk, or a change in organizational strategy or both; if these factors remain unchanged, then the expected benefit of a project or portfolio remains unchanged.

During project portfolio selection, potential project benefits are a primary factor in portfolio selection. Benefits reflect the organization's view of the project's anticipated contribution to achievement of objectives. In determining how to judge the projects' relative benefits, assumptions and expectations of the future were determined from imperfect information, for instance a certain assumed payback period, or net present value. As illustrated in Chapters 4 and 7, the evaluation model for selecting projects can include both qualitative and quantitative, and monetary and non-monetary objectives, with synthesized judgments resulting in some projects anticipated to contribute more or less than others to achievement of objectives. Regardless of the evaluation model used to evaluate and determine benefits, the combination of projects providing the greatest benefit, subject to organizational constraints and risk, was chosen.

Baseline Project Risk

While the aim during portfolio selection is to select projects providing the most benefits, the organization also wants to undertake projects with an expectation of being successfully completed so the benefits can be realized. In essence, by discounting anticipated benefits to account for risk, i.e. expected benefits, the organization selected a portfolio, or portfolios, with the greatest expected benefits under constraints to provide a better chance of success. However, risk is not static, as evidenced by the continuous update of the project's risk register by the project management team. Risk is dynamic and the potential impact of risk changes with the passing of time and the addition of new information. During periodic project performance measurements, new information is acquired to help clarify and reduce some uncertainties while identifying new uncertainties. Some risks are successfully mitigated or avoided, while other risks are realized and unsuccessfully addressed. Whether or not risk events are realized, new information can impact the perception of a project's risk and its likelihood of achieving its original benefits. In some cases, managers may realize they underestimated or overestimated risk in selecting the portfolio. For these reasons, and their impact on project and portfolio benefits, it is important to recognize the project's current risk index as part of the project and portfolio performance measurements. The risk index may be a single or multiple indicators of risk, ideally derived from periodically assessing the project's risk against the risk breakdown structure for the portfolio or the type of project. The process of deriving a risk index is outside the scope of this book; nevertheless, it is derived in the same manner used to assign risk during portfolio optimization.

12.4.1 Project Expected Benefits Index (EBI_{PRO})

The Project Expected Benefits Index (EBI_{PRO}) is a metric to evaluate periodic project performance with regard to the project's current expected benefits based on the project's updated risk assessment, compared to original baseline expected benefits established during portfolio selection. In essence, this metric helps the decision maker determine the degree to which the project is still on track to achieve the benefits intended and thus to achieve strategic objectives. The index comprises two major elements, (1) the Baseline Expected Benefits Value (EB_{BV}) and (2) the Current Expected Benefits Value (EB_{CV}). The index calculates the current expected benefits by discounting the original anticipated benefits from the portfolio selection evaluation by the current risk index (probability of success) and compares it to the project's original expected benefits when the portfolio was selected.

12.4.2 Project Expected Benefits Baseline Value (EB_{BV})

The project's Baseline Expected Benefits Value (EB_{BV}) serves as the anchor from which to measure the project's current performance and current expected benefits in relation to that expected when the project was selected. The EB_{BV} equates to the original benefits discounted by risk; or expected benefits value during selection. As mentioned earlier, the EB_{BV} only changes as part of the organization's formal PPM process. For instance, during annual review of the strategic plan, new information may result in changes to the organization's strategic plan, e.g. new goals and objectives, which result in reevaluation of candidate projects and can change the project's previous original anticipated and expected benefits. In this case, as the strategic plan changes, projects within the portfolio and other projects are evaluated to determine the best mix to maintain the optimal portfolio using the process described in chapters 7, 8 and 9. In any case, the baseline expected benefits cannot be adjusted unless as a result of the organization's PPM process; this also applies to the original anticipated benefits.

12.4.3 Project Expected Benefits Current Value (EB_{CV})

The project's Current Expected Benefits Value (EB_{CV}) represents the current relative expected contribution of the project toward achieving strategic objectives. EBI_{PRO} does not assume expected benefits (i.e. risk discounted benefits) remain static once established during selection. Rather, as new information is provided regarding current risks, through project performance reports, the organization's perceptions of original expected benefits may change as a result of new risk(s), or anticipated risk that was successfully avoided or mitigated, and allows a mechanism from which to measure current perceptions. Each project's current expected benefits value should be evaluated periodically, e.g. monthly or quarterly, by project portfolio benefit evaluators using the organization's PPM process and previous monthly performance reports. Again, this evaluation does not change the baseline expected benefits value established when the project was selected. Rather, it only assesses original assumptions and expectations based on new information provided through the project's risk performance reports.

Most importantly, in our view any change in expected benefits is solely because of a change in the risk index applied to the original anticipated benefit, and not because of a change in anticipated benefit for the project, which occurs at the time of reevaluation. Projects reporting performance monthly provide risk information that results in adjustment of the risk index, and thus a change in expected benefits. Periodic project risk performance reports provide an opportunity to confirm or deny initial perceptions of project benefits on an ongoing basis. For instance, baseline expected benefits were determined to be 0.549 for Project A during selection.

In this instance, the project's anticipated benefits were evaluated as 0.610 but the probability of successful completion of the project was assessed at 90% (the risk index) based on risk analysis performed during the selection process. This resulted in the expected benefit of 0.610 * 0.90 = 0.549 for Project A. Based on new information reported during project execution, and understanding of a competitor's progress in releasing a competing product similar to that being developed by Project A, risk management evaluators determined that current risks were greater than expected and assessed the project's probability of success, or risk index, to be only 0.70 (70%) because of the newly identified competitive risk. This resulted in an Expected Benefits Current Value (EB_{CV}) of 0.610 * 0.70 = 0.427. In this example, the downward revision to the current benefits recognizes the impact of the potential lost opportunity to be first to market. Again, no changes to baseline anticipated benefits were made, nor should they be made, outside the formal organization's formal PPM evaluation process, but the probability of success of individual projects, and thus the portfolio, can change through regular evaluation of project risk.

12.4.4 Project Expected Benefits Index (EBI_{PRO}) Calculation

EBI_{PRO} is derived by dividing the current Expected Benefits (EB_{CV}) by its Baseline Expected Benefits Value (EB_{BV}). The formula's numerator accounts for changes in project risk that impact current perception of expected benefits, based on new information provided in the project risk performance report. As the numerator values change, as expected during periodic performance measurements, the index will change in relation to the expected benefits baseline value. The denominator always reflects the baseline expected benefits value during project selection.

$$EBI_{PRO} = \frac{EB_{CV}}{EB_{BV}}$$

When analyzing the result of EBI_{PRO}, a value above 1.0 indicates the project is performing better than expected when compared to baseline expected benefits while a value below 1.0 indicates the project is not performing to expected benefits because of increased risk index. As project risk increases (i.e. probability of project success decreases), the project's current expected benefit index (EBI_{PRO}) will drop further below 1.0. Benefits represent the relative anticipated value the project provides toward achieving strategic objectives, while risk represents the probability of successful completion of the project; combining current perceptions of risk with original anticipated benefits provides a suggested new metric in evaluating a project's performance in terms of expected benefit.

12.4.5 Synthesizing EBI_{PRO} Performance Index Measurements

To obtain a better understanding of the portfolio's overall health with respect to expected benefits, the expected benefits index for the portfolio can be calculated using the sum of the products of the EBI_{PRO} and the priority for each project. The "priority" is simply the anticipated benefit normalized as a fraction of 1.000. Table 12.1 shows the calculation of EBI_{PORT} for a portfolio of 10 projects in a sample month, for example, January, 2011. The "Benefit" column contains the ratio-scale anticipated benefit for each project; the "Priority" column contains the normalized anticipated benefit; the "Risk" column contains the baseline risk value and the "Baseline Expected Benefit (EB_{BV})" column contains the EB_{BV} for each project, derived as Priority * (1 – Risk). The next two columns show the current risk and the current value of the

expected benefit, derived as current probability of success (1 – Risk) multiplied by the original priority. As described earlier, the expected benefit index is calculated as $EBI_{PRO} = EB_{CV} / EB_{BV}$. Note that the risk indices for Project 4 and Project 5 have increased considerably, resulting in a drop in expected benefits and values for EBI_{PRO} that are considerably less than 1.000. On the other hand, the current risk index for Project 2 has decreased from 0.20 (80% probability of success) to 0.10 (90% probability of success), thus driving up the current expected benefits; thus, the EBI_{PRO} for Project 2 is well above 1.000. Recall that the probability of success is 1.00 minus the risk index. Here the term "probability of success" means the probability that the project benefits will be achieved.

Table 12.1. Project and Portfolio Expected Benefits Index (EBI_{PRO} and EBI_{PORT})

Project #	Benefit	Priority	Baseline Risk	EB_{BV} Priority	Baseline Expected Benefits EB_{BV}	Current Risk	EB_{CV} Priority	Current Expected Benefits (EB_{CV})	EBI_{PRO}
1	0.450	0.115	0.40	0.069	0.270	0.40	0.069	0.270	1.000
2	0.320	0.081	0.20	0.065	0.256	0.10	0.073	0.288	1.125
3	0.650	0.165	0.35	0.108	0.423	0.40	0.099	0.390	0.923
4	0.210	0.053	0.10	0.048	0.189	0.30	0.037	0.147	0.778
5	0.430	0.109	0.05	0.104	0.409	0.50	0.055	0.215	0.526
6	0.540	0.137	0.25	0.103	0.405	0.25	0.103	0.405	1.000
7	0.330	0.084	0.20	0.067	0.264	0.20	0.067	0.264	1.000
8	0.270	0.069	0.15	0.058	0.230	0.15	0.058	0.230	1.000
9	0.410	0.104	0.10	0.094	0.369	0.10	0.094	0.369	1.000
10	0.320	0.081	0.10	0.073	0.288	0.10	0.073	0.288	1.000
								EBI_{PORT}	0.934

In analyzing the EBI_{PRO} column, with respect to risk and its impact on anticipated benefits, some projects are encountering and managing risks to the degree evaluated prior to selection (= 1.000) or better than expected (> 1.000), while other projects are performing below expectations (< 1.000); especially projects 4 and 5. $EBI_{PORT} = 0.934$ in the Table 12.1 example, indicating that the portfolio is performing below baseline plan as measured against expected benefits when the portfolio was selected. Further analysis identifies projects that have contributed to the reduced performance with respect to expected benefits. Projects with risk increases such as those encountered by Project 4 and Project 5 bear further inspection.

12.4.6 Project and Portfolio Benefits Index Trends

One way of determining project performance with regard to expected benefits is to examine trends. Table 12.1 provided a snapshot in time, with EBI_{PRO} and EBI_{PORT} compared to baseline for a single reporting period. Table 12.2 allows trends in these two measures to be examined over a period of three quarters (or other interval). (*Note that in this table, there is no "Priority" column, which has been used to simplify the calculations in previous examples. Instead, the same portfolio results (EBI_{PORT}) are produced by dividing the sum of the EBI_{PRO} * Benefit calculations by the sum of the Benefit column, without previously normalizing the "Benefit" to 1.000 or percent of total*).

Table 12.2. Project and Portfolio EBI Trends Over Three Quarters

Project Portoflio Selection				Project Portfolio Implementation								
Baseline Expected Benefits (EB_{BV})				Q1			Q2			Q3		
Project #	Benefit	Risk	Baseline Expected Benefits EB_{BV}	Current Risk	Current Expected Benefits (EB_{CV})	Current EBI_{PRO} Index	Current Risk	Current Expected Benefits (EB_{CV})	Current EBI_{PRO} Index	Current Risk	Current Expected Benefits (EB_{CV})	Current EBI_{PRO} Index
1	0.450	0.40	0.270	0.40	0.270	1.000	0.40	0.270	1.000	0.40	0.270	1.000
2	0.320	0.20	0.256	0.10	0.288	1.125	0.10	0.288	1.125	0.10	0.288	1.125
3	0.650	0.35	0.423	0.40	0.390	0.923	0.40	0.390	0.923	0.35	0.423	1.000
4	0.210	0.10	0.189	0.30	0.147	0.778	0.10	0.189	1.000	0.10	0.189	1.000
5	0.430	0.05	0.409	0.50	0.215	0.526	0.40	0.258	0.632	0.70	0.129	0.316
6	0.540	0.25	0.405	0.25	0.405	1.000	0.25	0.405	1.000	0.25	0.405	1.000
7	0.330	0.20	0.264	0.20	0.264	1.000	0.20	0.264	1.000	0.20	0.264	1.000
8	0.270	0.15	0.230	0.15	0.230	1.000	0.15	0.230	1.000	0.15	0.230	1.000
9	0.410	0.10	0.369	0.10	0.369	1.000	0.10	0.369	1.000	0.10	0.369	1.000
10	0.320	0.10	0.288	0.10	0.288	1.000	0.10	0.288	1.000	0.10	0.288	1.000
					EBI_{PORT}	0.934		EBI_{PORT}	0.957		EBI_{PORT}	0.935

In the table, examine the EBI_{PRO} for each project in each quarter to examine risk trends, especially negative ones that might impact the project's opportunity to achieve expected benefits. The EBI_{PORT} provides a trend for the portfolio benefits as impacted by risk. In this example, note that at the end of the first reporting period the risk index for Project 4 and Project 5, respectively, has increased from 10% to 30%, and from 5% to 50%. In each case, scrutiny of the project risk register or status report should identify the specific reasons for the increases in risk. At the end of the second reporting period in this example, the risk index for Project 4 has gone back to baseline level (EBI_{PRO} = 1.000) and has improved from 50% to 40% for Project 5, but remains very high compared to the baseline of 5%. The project manager reports that the unanticipated risk is being managed successfully, but further scrutiny of the project and its other metrics is warranted. By the end of the third reporting period, the risk index for Project 5 has soared to 70%, indicating not only a precipitous drop in expected benefits but a high likelihood of project failure. Upon further investigation, if infusion of resources or a new approach is not deemed appropriate the PMB will likely recommend elimination of the project.

When such a decision is made, it may or may not result in reprioritization of the projects. Other candidates that were not originally funded may be chosen from the same optimization pool; as long as organizational strategy is unchanged and new projects are not entered for consideration, the relative priorities remain the same and no reprioritization is necessary. On the other hand, in a dynamic environment with new projects to consider, or on the cusp of a new planning cycle, the PMB and ERB may elect to re-screen and reprioritize projects. Reprioritization of the objectives is contingent upon changes in strategy.

Examination of the EBI_{PORT} over the three periods indicates that in each quarter, the portfolio has more risk than expected when compared to baseline and is thus underachieving in terms of expected benefits at the portfolio level. It improves at the end of the second period from

0.934 to 0.957, but then drops to 0.935 at the end of the third period. Drilling down to performance of the individual projects can clarify the reasons. Trends of expected benefit performance in organizations with multiple portfolios can be plotted and even synthesized to provide an overall measure of the performance of an organizations project portfolios with respect to benefits, or any other selected performance indicator metrics.

12.4.7 Portfolio Performance Indices Advantages and Disadvantages

Advantages of portfolio indices are (1) they overcome the limitations of traditional measures by accounting for current assessment of expected benefits (evaluated anticipated benefits discounted by current risk index), (2) they provide a method to directly correlate current performance with that expected during portfolio selection, (3) they can be combined with EVM and other traditional metrics, and (4) they can provide a consistent method to measure changes that impact the portfolio's ongoing performance and relevance in a dynamic environment. By regularly evaluating benefits and risks, the organization is better positioned to assess the impact of current performance during periodic reviews and provide valuable input during updates to the strategic plan.

However, there are disadvantages to using these indices. First, for short duration projects, e.g. few months, the EBI_{PRO} index may not be as useful when compared to projects of longer duration, e.g. years. For short duration projects, organizational perceptions are less likely to change and thus will not result in changes to perceptions of baseline expected benefits as compared to longer duration projects. Second, these indices are likely to be less useful on less unique, standard projects, that is, projects bordering on processes -- for instance, building a house from a standard set of drawings. In this instance, the scope of work is well known and the type of work required to complete the project is well understood and thus, there is less uncertainty. Although these indices can still be used, their benefit is tempered when compared to using them on larger, more complex and unique projects spanning several years where changes in the state of nature have greater opportunity to impact perceptions and are subject to unknown unknowns. In more complex projects of long duration, the probability of changes to the strategic plan, benefits, and risk are more likely as uncertainty turns to certainty and as organizational strategy is revised; under these circumstances, such risk and benefits metrics are of greater value.

12.5 EBI_{PRO} Performance ABU Example

The reassessed risk index and the anticipated benefits for the ABU Campus Revitalization Program at the end of the first quarter are shown below in Table 12.3, along with the calculation of EBI_{PRO} for each project.

Table 12.3. ABU Expected Benefit Performance of Projects and the Portfolio for First Quarter

Project Portfolio ABU Campus Revitalization Program						
Project Portoflio Selection				Implementation		
Baseline Expected Benefits (EB_{BV})				Q1		
Project #	Benefit	Risk	Baseline Expected Benefits EB_{BV}	Current Risk	Current Expected Benefits (EB_{CV})	Current EBI_{PRO} Index
2. Renovate & Expand Davidson Student Services Cente	0.255	0.15	0.217	0.30	0.179	0.824
3. Construct Dr. Mary Haven Student Housing	0.051	0.20	0.041	0.20	0.041	1.000
4a. (GOLD) Renovate & Expand Benson Library	0.260	0.10	0.234	0.10	0.234	1.000
6. Renovate Mason Hall Research Center	0.114	0.40	0.068	0.30	0.080	1.167
7. Construct ABU Medical Clinic	0.154	0.10	0.139	0.10	0.139	1.000
8. ABU Revitalization Program Regulatory	0.400	0.05	0.380	0.05	0.380	1.000
11c. (BRONZE) Construct ABU Indoor Athletic Complex	0.019	0.10	0.017	0.20	0.015	0.889
13. Expand Campus Share Ride Services	0.236	0.05	0.224	0.05	0.224	1.000
Sum of Benefits	1.489				EBI_{PORT}	0.981

Note that the EBI_{PORT} was calculated by dividing the sum of the products of the EBI_{PRO} and the Benefit for each project by the "Sum of Benefits" instead of creating a "Priority" column to establish the benefits relative to 1.000. Of course, both methods yield the same result.

The reassessed risk indices for the projects and their effect on expected benefits for each project and for the portfolio for each of the first three quarters are shown below in Table 12.4.

Table 12.4. ABU Expected Benefits Baseline and Current Values for First Three Quarters

Project Portfolio ABU Campus Revitalization Program												
Project Portoflio Selection				Project Portfolio Implementation								
Baseline Expected Benefits (EB_{BV})				Q1			Q2			Q3		
Project #	Benefit	Risk	Baseline Expected Benefits EB_{BV}	Current Risk	Current Expected Benefits (EB_{CV})	Current EBI_{PRO} Index	Current Risk	Current Expected Benefits (EB_{CV})	Current EBI_{PRO} Index	Current Risk	Current Expected Benefits (EB_{CV})	Current EBI_{PRO} Index
2. Renovate &	0.255	0.15	0.217	0.30	0.179	0.824	0.60	0.102	0.471			
3. Construct D	0.051	0.20	0.041	0.20	0.041	1.000	0.10	0.046	1.125	0.10	0.046	1.125
4a. (GOLD) Ren	0.260	0.10	0.234	0.10	0.234	1.000	0.15	0.221	0.944	0.15	0.221	0.944
6. Renovate M	0.114	0.40	0.068	0.30	0.080	1.167	0.20	0.091	1.333	0.10	0.103	1.500
7. Construct A	0.154	0.10	0.139	0.10	0.139	1.000	0.10	0.139	1.000	0.10	0.139	1.000
8. ABU Revital	0.400	0.05	0.380	0.05	0.380	1.000	0.05	0.380	1.000	0.05	0.380	1.000
11c. (BRONZE)	0.019	0.10	0.017	0.20	0.015	0.889	0.20	0.015	0.889	0.10	0.017	1.000
13. Expand Car	0.236	0.05	0.224	0.05	0.224	1.000	0.05	0.224	1.000	0.05	0.224	1.000
9. Construct P	0.095	0.15	0.081							0.15	0.081	1.000
10. Renovate D	0.050	0.10	0.045							0.10	0.045	1.000
					EBI_{PORT}	0.981		EBI_{PORT}	0.928		EBI_{PORT}	1.035

Note that Project 6 – Renovate Mason Hall Research Center, was initially thought to be high risk (40%) because of uncertainty about whether the existing structure could support the high technology equipment required. As more information was provided in performance reports indicating that this risk would not become an issue, the current risk index eventually dropped to a more acceptable 10%, thus raising the EB_{CV} for the project. On the other hand, the risk index for Project 2 – Renovate & Expand Davidson Student Services Center increased dramatically from 15% to 60% during the first two quarters of the project because the soil for the expansion was discovered to be subject to liquefaction. This discovery thus was deemed an unrecoverable issue. The project was terminated after architects and engineers confirmed that the current building could not be expanded due to the soil instability on the expansion site. The status of Project 2 was changed to "Must Not", and Projects 9 and 10 were selected in the Resource Aligner optimization model. They were chosen by the optimizer because they provided the greatest expected benefit under the existing constraints and could be accommodated within the original budget. Note that after dropping precipitously from the baseline to 0.928 by the end of the second quarter, primarily because the risk index for a project with high expected benefits (Project 2) rose from 15% to 60%, the portfolio expected benefit index began to rise again, to 1.035 when Project 2 was terminated and Projects 9 and 10 were added in the third quarter. But is that 1.035 really correct?

Note that in many organizations, after a project is terminated its anticipated benefits no longer apply to any algorithm to calculate future indices for the portfolio. Conversely, when projects are added to the portfolio, their anticipated benefits are included in any algorithm to calculate indices for the portfolio. In this case, for Quarter 1 and Quarter 2, the total anticipated benefit is the sum of the anticipated benefits for Projects 2, 3, 4a, 6, 7, 8, 11c and 13 = 1.489; this value is the denominator for normalization. Similarly, for Quarter 3, after dropping Project 2 and adding Projects 9 and 10, the total for anticipated benefits is the sum of the anticipated benefits for Projects 3, 4a, 6, 7, 8, 11c, 13, 9 and 10 = 1.379.

Re-Baselining When Portfolio Components Change

It is up to the organization to determine whether to re-baseline the anticipated benefits when portfolio membership components change. Performing adjustments to the anticipated benefits baseline changes the results for the indices; the amount of change depends on the difference between the original total benefit and the new total benefit. Table 12.5 shows the two approaches and the resulting EBI_{PORT}; as can be seen, re-baselining the total anticipated benefit in this case reduces the denominator (total anticipated benefit) in the EBI_{PORT} calculation and thus inflates the EBI_{PORT} for the 3rd Quarter from 0.959 to 1.035; when in fact the original portfolio was anticipated to better meet strategic objectives. In this case, a re-baseline was deemed to improperly inflate the indices, and a decision was made to recommend retention of the original baseline. Whichever approach is taken, it should be applied consistently to all indices, including the EVM indices.

Table 12.5. Re-Baselining Total Anticipated Benefit Upon Project Termination or Addition

	Total Benefit	Q1 EBI_{PORT}	Q2 EBI_{PORT}	Q3 EBI_{PORT}
Orginal	1.489	0.981	0.928	0.959
Re-Baselined End 2Q	1.379	0.981	0.928	1.035

Also in this example, since the projects added to the portfolio had already been prioritized, no re-prioritization of the alternatives (projects) is needed. If ratings scales are used to evaluate projects, the additional projects can be rated with respect to how well they support their covering objectives even if they had not been in the original candidate list, with the caveat noted earlier. In effect, the same optimization model is still in use, with the addition of a "Must Not" constraint on the terminated project. In reality, at such time as a project is terminated and another project or project is substituted, some adjustment to the budget may be made. However, such adjustments can often simply be treated as a different scenario in the optimization model.

The ABU Steering Committee, after reviewing the quarterly status with the Board of Trustees, received approval not to re-baseline the portfolio anticipated benefits when Project 2 was replaced by Projects 9 and 10. Instead, the original baseline anticipated benefit of 1.489 will continue to be used until the strategic plan review and update to be conducted during the fourth quarter.

Following the strategy update, a complete portfolio reevaluation, re-optimization and re-selection is planned, with additional budget to be allocated. For the re-selection, the remaining costs for projects in progress will be substituted for the original costs, and additional projects that have successfully completed the screening process will become candidates along with projects in progress and prior candidates that had not been funded.

ABU EBIPRO Performance Trend Dashboard Example

Once data is available for multiple performance periods, an EBI_{PRO} performance trend dashboard can be developed as shown for the first three quarters in Figure 12.6 using Periscope.

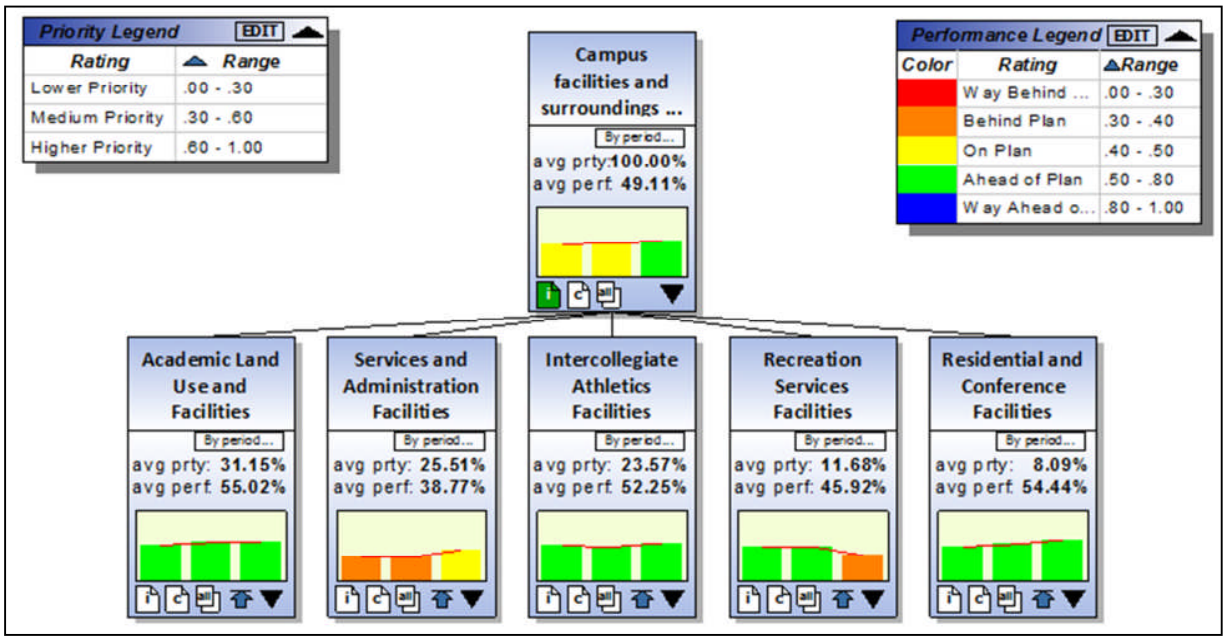

Figure 12.6. EBIPRO Performance Trend Dashboard

As can be seen, performance for the "Services & Administration facilities" projects, in the aggregate, is now back "On Plan" after the elimination of Project 2 and the addition of Projects 9 and 10, while the performance of the Recreation Services Facilities has declined, warranting further investigation.

12.6 Using EVM and Expected Benefits Indices Together

In many cases, a project dashboard or other presentation approach provides a better understanding of project and portfolio performance when multiple metrics are presented, rather than just EBI or one or more of the EVM metrics. Table 12.6 shows the EBI, CPI, SPI and QPI metrics for each of ten sample projects, with the calculation of the same indices for the portfolio shown at the bottom.

Table 12.6. Sample Portfolio with EBI, CPI, SPI and QPI for Projects and the Portfolio

Project Portfolio XYZ										
Project Portoflio Selection					Project Portfolio Implementation					
Baseline Expected Benefits (EB_{BV})					Current Project Performance					
Project #	Benefit	Priority	Risk	Baseline Expected Benefits (EB_{BV})	Current Risk	Current Expected Benefits (EB_{CV})	EBI_{PRO}	CPI_{PRO}	SPI_{PRO}	QPI_{PRO}
1	0.450	0.115	0.40	0.069	0.40	0.069	1.000	1.200	0.870	1.044
2	0.320	0.081	0.20	0.065	0.10	0.073	1.125	1.130	1.020	1.153
3	0.650	0.165	0.35	0.108	0.40	0.099	0.923	0.950	1.010	0.960
4	0.210	0.053	0.10	0.048	0.30	0.037	0.778	0.890	0.970	0.863
5	0.430	0.109	0.05	0.104	0.50	0.055	0.526	0.900	0.900	0.810
6	0.540	0.137	0.25	0.103	0.25	0.103	1.000	1.140	0.890	1.015
7	0.330	0.084	0.20	0.067	0.20	0.067	1.000	1.070	0.900	0.963
8	0.270	0.069	0.15	0.058	0.15	0.058	1.000	0.980	1.090	1.068
9	0.410	0.104	0.10	0.094	0.10	0.094	1.000	1.010	1.030	1.040
10	0.320	0.081	0.10	0.073	0.10	0.073	1.000	1.050	0.940	0.987
					Portfolio Indices		0.934	1.037	0.957	0.989

Examining only the current cost and schedule performance for Project 5, a decision maker might conclude that a corrective action, such as reallocating resources to bring the project back to cost and schedule baselines, is sufficient. However, the extreme increase in perceived risk, from 0.05 to 0.50, and its impact on the expected benefit index tells a different story. Seeing these indices together, and using more than traditional EVM metrics, the decision outcome may be significantly different from simply applying additional resources. A decision based on EBI_{PRO} may result in termination of the project, especially since it has only been recently initiated, is performing poorly, and has significantly increased risk. (Of course such a decision is based on analyzing why this is the case and whether it can be corrected.) So, benefits-based metrics, in combination with traditional EVM metrics, can provide valuable decision input.

Within this matrix, decision makers can quickly identify which projects are performing well and which are not. In the macro, this measurement provides a snapshot in time of the portfolio's performance with regard to baseline expected benefits while factoring risk, as well as traditional project metrics. Some organizations may elect not to discount anticipated benefits by

risk before selecting portfolios because risk may not be considered a distinguishing factor in achieving strategic objectives; this may be the case for those performing only one-of-a-kind risky technology projects, or those performing only routine, low-risk projects. In making portfolio decisions, it is important to understand whether risk is, or is not, a major contributor to how the organization views progress toward achieving strategic objectives. If risk is viewed as important, then the expected benefit performance indices provide a means of understanding the impact of risk, and current project performance, on achieving objectives.

12.6.1 Examples of Weighting and Combining Project Metrics

The following examples are provided to illustrate the impact of combining the use of traditional project performance indicators with metrics that affect expected benefit. The examples illustrate methods for managers to combine multiple metrics and to assign relative importance to each in order to evaluate project and portfolio performance in the context of what is important to them. Metrics are as flexible as managers in organizations can make them, as long as they know what they want to measure and how this fits within the evaluation process. At this point, these suggested metrics are by no means accepted or standard approaches; we are delivering new ideas for consideration in terms of assessing how well projects and portfolios maintain their ability to deliver anticipated benefits over time in combination with traditional measures of performance at a point in time. In addition, these methods rely on a combination of actual past performance and expectations of the future based on new information from events that have occurred. As such, we suggest that these metrics provide a barometer by which the organization can better assess the degree to which it is on track to achieve strategic benefits and, if not, take decisive action early.

Example 1 (Favorable Traditional Project Performance and Risk Decrease)

Project A was determined to have a baseline expected benefits value (EB_{BV}) of 0.448 when selected for the portfolio. While the project's anticipated benefits were evaluated as 0.560 during selection, its anticipated benefits were discounted by 0.20 (20%) as the original risk assessment determined the project had an 80% chance of success resulting in a Baseline Expected Benefits Value (EB_{BV}) of 0.448 (0.560 * 0.80 = 0.448). The original (baseline) risk value was based on the possibility of a critical resource shortage during project execution. During implementation, the first periodic performance report showed Project A with a CPI (cost performance index) of 1.000, SPI (schedule performance index) of 1.100, and QPI (Quality Performance index) of 1.000. Further, the performance report indicated that the original concern about critical resource availability failed to materialize due to a local economic slowdown, providing excess resources rather than a potential shortage. As a result, the PMO revised the project's chances of success (risk index) to 95%, which resulted in a revised current risk value of 0.95 (95%), and a current expected benefit (EB_{CV}) of 0.532 (0.95 * 0.560). Using EBI_{PRO}, the PMO determined the project was currently performing better (0.532) compared to its expected benefits when selected (0.448), giving it an EBIPRO of 1.188 (0.532 / 0.448). Since the risk event failed to materialize, the project is performing better than expected when compared to baseline expected benefits. Remember, the original benefits were discounted for risk; when the risk event was avoided, the risk index was adjusted to reflect greater likelihood of success.

Let's also suppose that the organization has elected to weight the traditional project metrics of schedule, cost and quality as 0.50, 0.25 and 0.25, respectively, and as representing half the combined project performance index. The other half of the combined project performance

index is based on the expected benefits index. It uses a formula such as the following to determine an overall performance indicator for the project.

Project A Combined = 0.250 * SPI + 0.125 * CPI + 0.125 QPI + 0.500 * EBI

Project A Combined = 0.25 * 1.1 + 0.125 * 1.0 + 0.125 * 1.0 + 0.50 * 1.188 = 1.119

This example illustrates the power of comparing original plans and perceptions against actual performance and risk. When the project was selected, its anticipated benefits were discounted by greater risk. When the risk failed to materialize, combined with the positive project EVM performance, the potential to realize more than the originally discounted benefits increased. It also shows that organizations can determine the relative importance of project metrics and use them to derive a combined index representing the overall performance of a project. The project metrics can then be rolled up to a similar portfolio metric that also considers the relative priorities of the member projects.

Example 2 (Poor Traditional Project Performance and Risk Increase)

Project B was determined to have a baseline anticipated benefit value of 0.750 when selected for the portfolio. However, baseline benefits were discounted by 0.05 (5%) as the risk assessment determined the project had a 95% chance of success resulting in EB_{BV} of 0.7125 (0.750 x 0.95 = 0.7125). The basis of this risk value was that although no significant risks were identified, the benefits were discounted by 5% to account for unknown unknowns. Similar projects had been completed by the organization previously and the organization felt highly confident this project could be accomplished within baselines. During project implementation, the first periodic performance report, after one month, revealed Project B with a CPI of 0.89, SPI of 0.85 and QPI of 1.00. The project was performing below baseline expectations. Further, the performance report indicated that a significant new risk had been identified. During the land survey for the construction project, it was determined the construction site extended onto protected lands; requiring the entire project to be re-planned on a differed plot in the area. In addition, as the project now would not likely be completed on time and within budget, revenue generated from the project would be delayed one year, thus significantly decreasing the monetary benefits of the project. As a result of encountering an unanticipated risk event, the PMO revised the project's chance of success to 50% from the original 95%. Accordingly, the current expected benefits value (EB_{CV}) of the project was revised downward to 0.375 (0.750 * 0.50). This meant that the EBI_{PRO} for Project B was calculated as 0.375 / 0.7125 = 0.526. Using EBI_{PRO} and the traditional metrics, the PMO determined the project was unexpectedly underperforming, and considered in the context of revised risk, would likely have a negative impact on achievement of the portfolio's baseline expected benefits.

Let's also suppose that as with Project A above, the organization has elected to weight the traditional project metrics of schedule, cost and quality as 0.50, 0.25 and 0.25, respectively, and as representing half the combined project performance index. The other half of the combined project performance index is based on the expected benefit index. Such a metric depends equally on past performance in terms of risk events and expectations of future risk to evaluate the project in context of strategic performance. It uses a formula such as the following to determine an overall performance indicator for the project.

Project B Combined = 0.25 * SPI + 0.125 * CPI + 0.125 QPI + 0.50 * EBI

Project B Combined = 0.25 * 0.85 + 0.125 * 0.89 + 0.125 * 1.0 + 0.50 * 0.526= 0.712

The effect of poor project EVM performance combined with increase in risk and subsequent impact to baseline expected benefits has a negative impact on the current reported performance of the project. In this example, original risk estimates were overly optimistic, consequently inflating expected benefit at the time of project selection. The new information provided by the initial performance measurement allows the organization an opportunity to assess whether to continue the project, terminate the project, delay the remainder of the project, or reevaluate other alternatives. It can consider the updated expected benefit with respect to the expected benefit of other funded projects or unfunded project candidates, as well as in light of more traditional measures.

This example illustrates the concept that original expected benefit during project portfolio selection can change as the project work progresses, unknowns become known, and performance measurements are taken. When weighing baseline expectations against new perceptions of risk and traditional measures of project performance, the organization can maintain the connection between project and portfolio performance and strategic objectives and increase the chances of making better decisions during the life of the portfolio, in this case very early in this project's life.

From a decision-making perspective, had the PMO only used the project's SPI or CPI to evaluate Project B's performance, then the corrective action decision might have been different from a decision taken when evaluating performance in context of benefits and the project's current risk index.

Example 3 (Favorable Traditional Performance and Risk Increase)

Project C was determined to have a baseline anticipated benefits value of 0.600 when selected for the portfolio. However, because of concern that the site might contain nesting and feeding ground for a protected species, the risk assessment indicated that the project had only a 80% probability of success, so anticipated benefits were discounted by 0.20 (40%), resulting in EB_{BV} of 0.480 (0.600 * 0.80 = 0.480). During project implementation, the first periodic performance report, after one month, revealed Project B with a CPI of 1.05, SPI of 1.10 and QPI of 1.00. The project was performing at or above baseline traditional performance expectations. However, after a site assessment, the performance report indicated that the environmental risk had been realized because nesting grounds and evidence of habitation were found for the protected species, thus creating a major issue that the project could not continue. As a result of encountering this issue, the PMO revised the project's chance of success downward to 40% from the original 80%. The issue mitigation plan includes relocating members of the species to a similar habitat. If relocation is successful, the probability of success will rise substantially by the time of the next reporting period; if it is not, the probability of success will fall to zero, thus rendering any other performance measurements irrelevant. Accordingly, at this time, the current expected benefit value (EB_{CV}) of the project was revised downward to 0.240 (0.600 * 0.40). This meant that the EBI_{PRO} for Project B was calculated as 0.240 / 0.360 = 0.667. Using EBI_{PRO} and the traditional metrics, the PMO determined the project was performing well using traditional metrics, but is much less likely to deliver anticipated benefits.

Let's also suppose that as with Projects A and B above, the organization has elected to weight the traditional project metrics of schedule, cost and quality as 0.50, 0.25 and 0.25, respectively, and as representing half the combined project performance index. The other half of the combined project performance index is based on the expected benefit index. It uses a formula such as the following to determine an overall performance indicator for the project.

Project C Combined = 0.25 * SPI + 0.125 * CPI + 0.125 QPI + 0.50 * EBI

Project C Combined = 0.25 * 1.10 + 0.125 * 1.05 + 0.125 * 1.0 + 0.50 * 0.67 = 0.865

The effect of favorable project EVM performance combined with experiencing a major risk event has, in this case, a negative impact on the current reported performance of the project. In this example, original risk estimates were unintentionally underestimated during project selection as a result of "unknown unknowns". Expectedly, when this risk event occurred, the project's expected benefits decreased.

This example also illustrates that original expected benefit during project portfolio selection can change as the project work progresses, unknowns become known, and performance measurements are taken. It also shows that aggregating metrics can be somewhat misleading without sufficient supporting information; if the mitigation plan for Project C is unsuccessful, the traditional metrics will become immaterial because the project will likely be eliminated.

Deviations from baseline in single or aggregated metrics can indicate the need to review supporting details. As risks are avoided or encountered and successfully managed, the expected benefit of a project can approach its anticipated benefit. Various combinations of metrics are possible; as always, management must interpret their meaning in order to make appropriate decisions.

12.6.2 ABU Composite Project and Portfolio Metrics Dashboard Example

Earlier in this chapter, a project and portfolio performance dashboard example was shown that include only one metric, the expected benefit index (EBI). Figure 12.7 shows an example of establishing a composite weighted index that includes multiple metrics, each with its relative priority. In the example, the following components and assigned priorities were specified: SPI at 0.250, CPI at 0.125, QPI at 0.125 and the EBI (expected benefit index) at 0.500. In this case, these are ratio-scale numbers and mean that the SPI is twice as important as CPI and QPI, and only half as important as EBI.

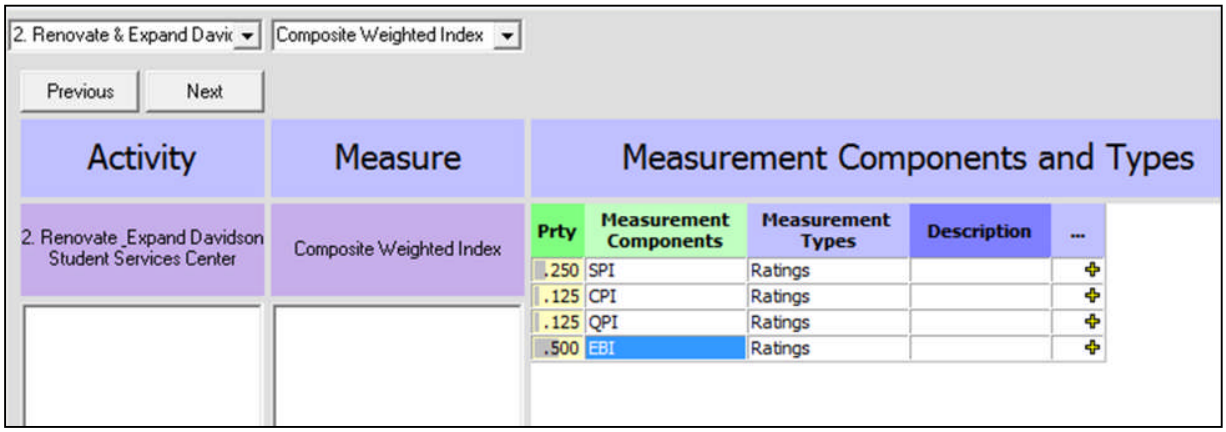

Figure 12.7. Example of Establishing a Composite Weighted Index

When the performance of each metric is evaluated, a capable dashboard tool, in this case Expert Choice Periscope, will calculate the composite performance of the project in accordance with the priorities assigned. Each project or each type of project may have different component metrics and different weights if the organization so desires. Evaluators may be assigned to evaluate all components for all projects or only some components or projects.

In Figure 12.8, an evaluator is asked to assess the EBI for Project 2 – Renovate and Expand Davidson Student Services Center. Recall from Table 12.3 earlier in this chapter that as of the first reporting period, the EBI for Project 2, calculated as EBI_{CV} / EBI_{BV} was 0.824 (0.179 / 0.217), indicating it was on plan. In this case the evaluator selects a rating that indicates a significant risk increase.

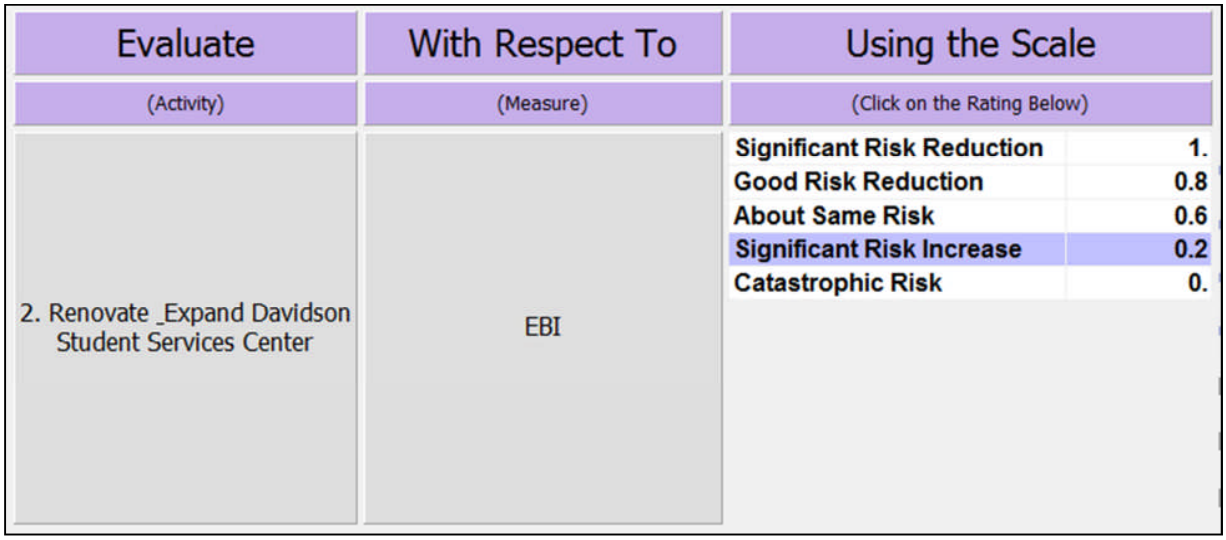

Figure 12.8. Evaluating the EBIPRO for Project 2 -- Expand Davidson Student Services Center

When all performance evaluations are complete for the measurement period, a dashboard showing the relative priorities of the projects and the objectives with respect to the goal, and performance results synthesized with respect to their relative priorities are displayed in the dashboard shown in Figure 12.9. This is similar to the dashboard shown in Figure 12.5, but with different metrics and actual evaluations applied.

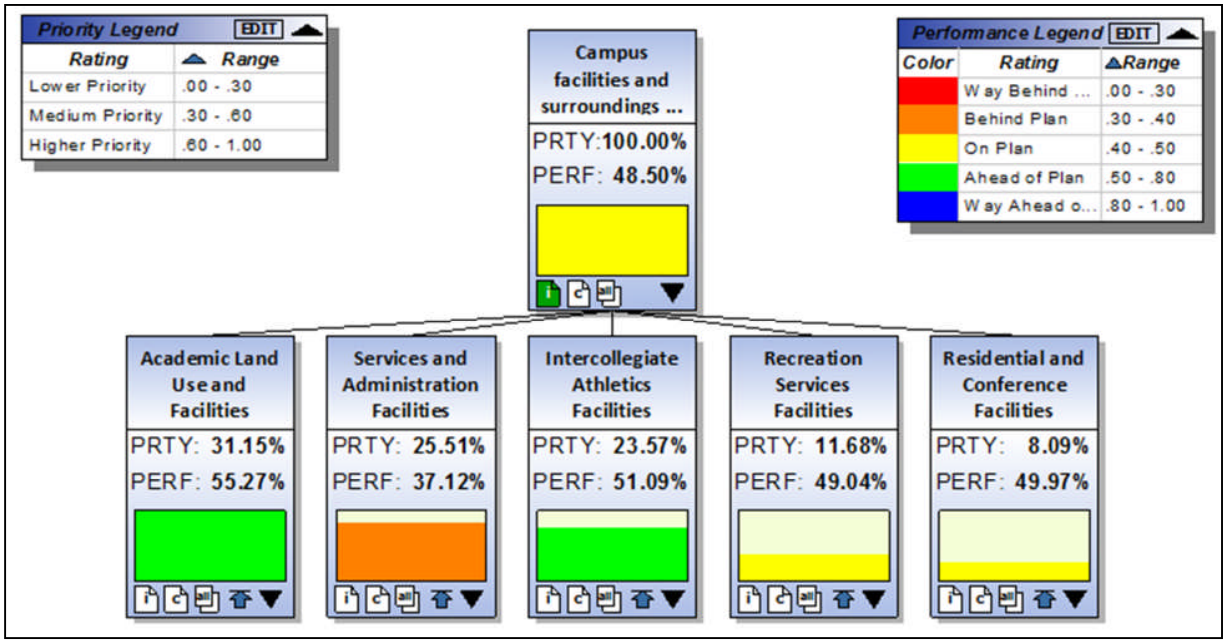

Figure 12.9. ABU Performance Dashboard at the Objectives Level with Composite Metrics

Although it appears that the portfolio is "On Plan", the Services and Administration Facilities objective is "Behind Plan" with respect to the combination of metrics used. In Figure 12.10, we have drilled down into the projects supporting that objective to take a closer look.

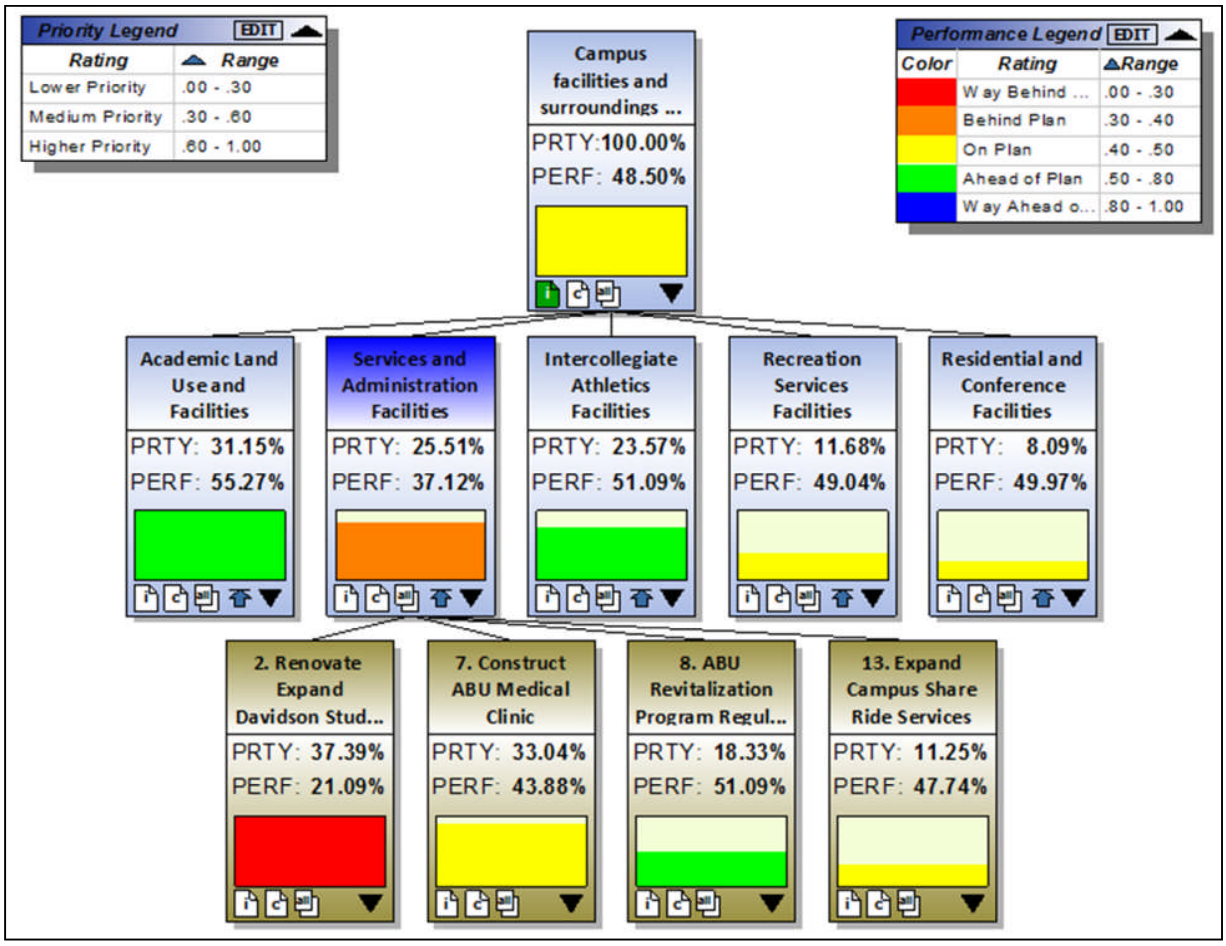

Figure 12.10. ABU Dashboard Drill Down to Services Facilities Projects

The figure shows that of the four projects supporting the Services and Administration Facilities objective, Project 2 – Renovate and Expand Davidson Student Services Center, appears to be "Way Behind Plan". Drilling down deeper into the evaluated performance metrics for Project 2, shown in Figure 12.11, we discover that although the schedule and cost performance components are on plan, the QPI is "Behind Plan", and more importantly, the expected benefit has plunged because of the occurrence of an environmental risk event that eliminates expansion of the current building. The risk is no longer an uncertainty; it has become an issue that decision makers must evaluate in terms of determining the fate of the project.

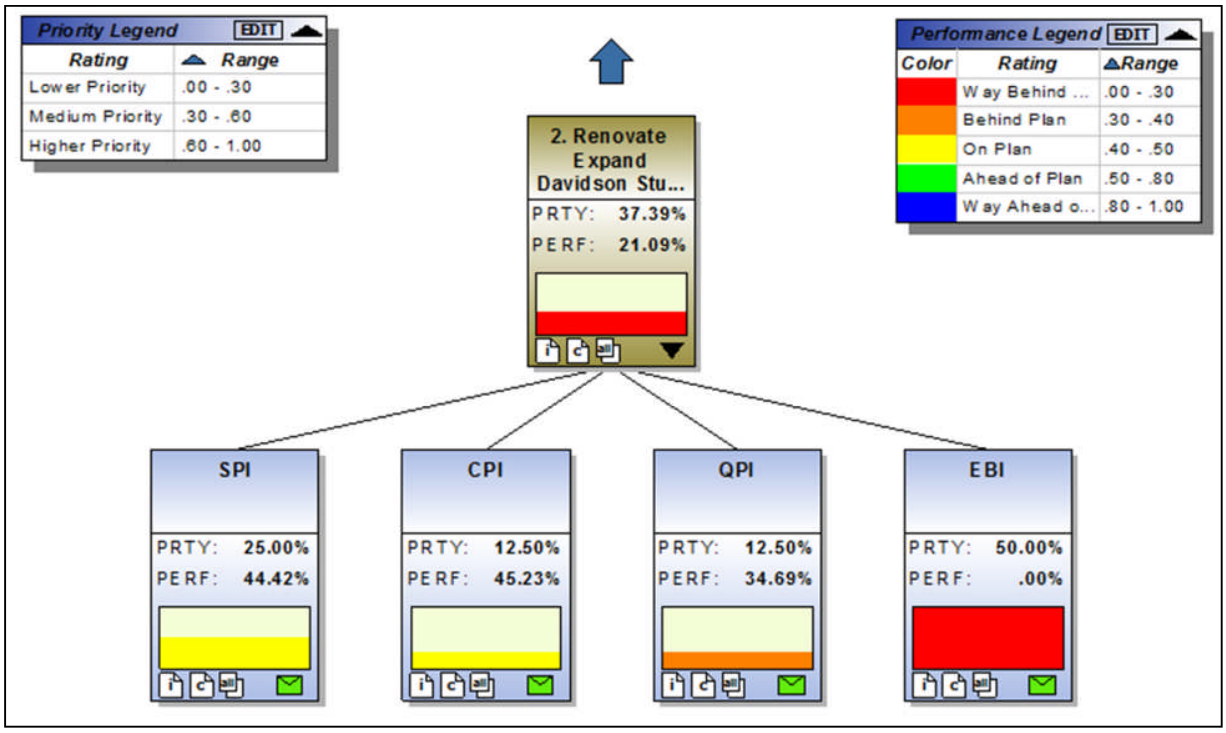

Figure 12.11. Project Drill Down Showing Relative Priorities of Metrics and Reduced Expected Benefit

The dashboard above provides an example of the flexibility provided to organizations to establish and evaluate project and portfolio metrics, and to reflect the relative priorities of the alternatives in affecting performance outcomes for each of the hierarchical levels above them. In addition, it demonstrates the inclusion of a metric that reflects perceived changes over time in a project's continued ability to deliver strategic benefit along with other, more traditional metrics.

12.7 Portfolio Performance within the PPM Process

Monitoring and evaluating portfolio performance over time is useful in identifying performance trends, confirming project relevance to strategic objectives, and identifying negative trends early in order to take appropriate corrective action. Figure 12.12 illustrates project portfolio performance measurements, reported using the EBI_{PORT} index, over a two year period. Recall that the EBI_{PORT} index is the sum of the EBI_{PRO} indices weighted by the priority of the projects. In that respect it is similar to the dashboard shown in the previous section. In addition, Figure 12.12 shows how portfolio performance, through effective monitoring, evaluating and controlling in relation to the strategic plan, can support the PPM process and act as an input to the organization's strategic planning process. Recall the discussions from Chapter 10 about the iterative and cyclical nature of PPM, and responding to changes in organizational strategy. Figure 12.12 also illustrates the PPM review process overlaid upon the periodic performance measurements where the strategic plan is reviewed annually and current project expected benefits are evaluated quarterly using monthly project performance reports and real-time strategic information.

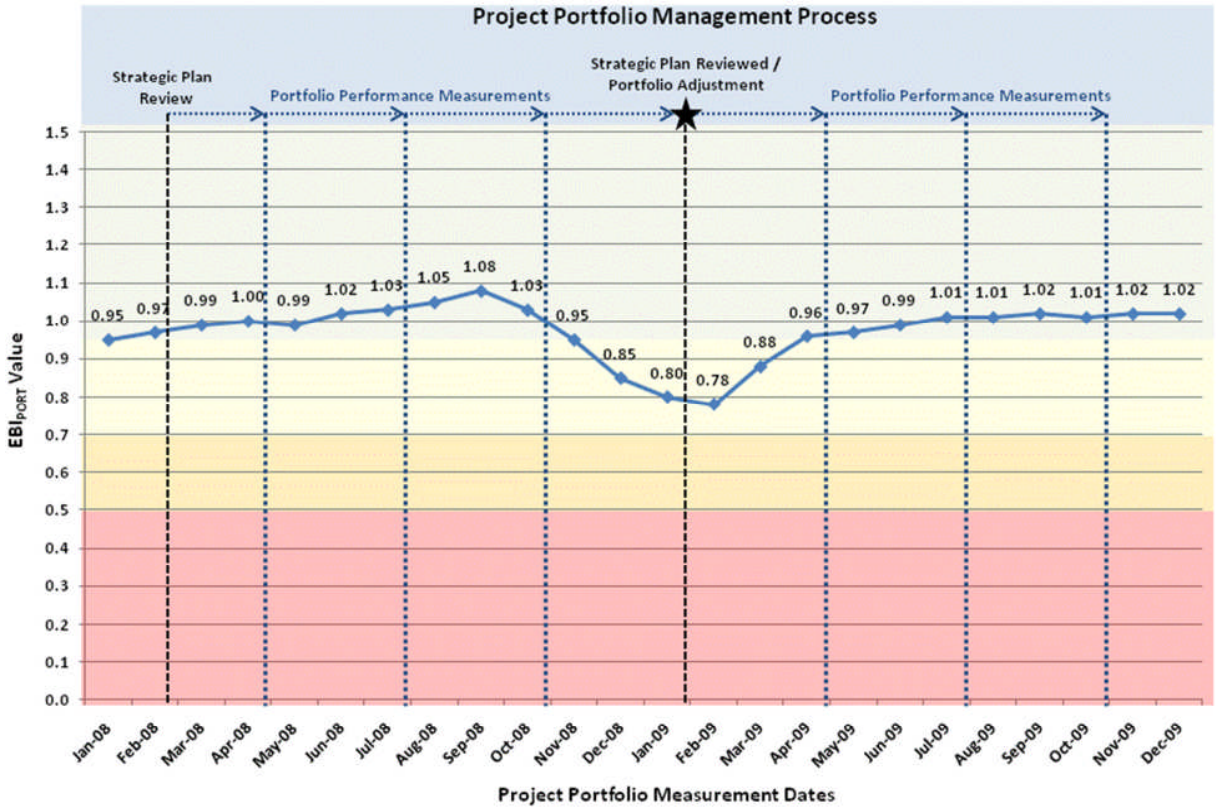

Figure 12.12. Portfolio EBI (EBIPORT) Performance Trend Chart

12.8 Evaluating Performance and Determining Portfolio Corrective Action

Monitoring performance is a key aspect of and contributor to the PPM process. Monitoring provides the information necessary for project and portfolio managers to evaluate performance and from which to take corrective actions within their decision authority, which is normally confined to changes not affecting cost, schedule, and specification baselines. Monitoring also provides valuable input to the evaluation phase to help decision-makers determine changes affecting portfolio baselines. Figure 12.16 shows how project portfolio performance is monitored over time. This portfolio performance reporting information is used to support strategic planning and ongoing evaluation process.

As each project's performance information is reported to the portfolio, it is combined with other projects and reported to the organization (e.g. ERB and PMB) to provide a snapshot of the portfolio's health. Every month, quarter or other interval as established in the PPMP, portfolio evaluators re-evaluate projects within the portfolio based on information contained in the performance reports and derive performance measurements for the portfolio, as illustrated in Figure 12.16. Periodic review of the organizational strategy can also affect the membership of the portfolios. Whether the strategic plan changes or remains the same, the PPM process yields useful information to support the strategic planning process and from which to adjust the portfolio, if necessary. Using techniques such as those described above, the organization can evaluate portfolio and project performance against baselines to identify unacceptable deviations from baselines and determine adjustments.

12.9 Implementing Changes

Changes to the portfolio baseline can include a wide variety of corrective actions ranging from complete termination to simple reallocation of resources. The goal of portfolio adjustments is to maximize continued progress toward achieving strategic objectives by ensuring resources are applied to the projects most relevant to strategic objectives and with a reasonable chance of success. While a last resort, deciding to terminate a project is not an admission of defeat, but rather a proactive action to ensure success in achieving strategic objectives. Objectively identifying when a project no longer contributes to achieving objectives, or has minimal chance of success, is better accomplished as early as possible in the implementation phase to prevent utilization of scarce resources that could be better applied to projects providing more value toward contributing to strategic objectives.

With poorly performing projects and portfolios, decision makers are better positioned to weigh the benefits of reallocating resources among projects and portfolios when evaluating their performance in relation to benefits. Other adjustments may include addition of new projects to replace terminated projects. Terminating a project results in a change to the portfolio's total benefits and may necessitate reevaluation. Note that when portfolio reevaluation and reselection occurs, costs for existing projects represent remaining costs, or estimates to complete as described earlier, rather than total costs.

12.10 Summary

Project portfolio management does not guarantee success in achieving strategic goals and objectives. However, as this book illustrates, implementing an effective PPM process, can increase the chances of successfully identifying, evaluating, and selecting the right projects for the portfolio that when completed successfully, best contribute to accomplishing objectives and achieving the organization's vision. Process effectiveness is achieved by developing an infrastructure to facilitate PPM throughout the organization, providing appropriate governance to oversee and guide the process, and by using the best tools and techniques to support better PPM decision making.

Even when an organization does PPM right, its assumptions and strategy must be right, and operations must deliver the results anticipated. PPM is the front end of the best chance of implementing the organization's strategy. In the best case, with the right strategy, effective PPM results in selecting, executing and delivering the right projects successfully – driving the organization toward the achievement of its vision.

12.11 References

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