**George Washington University**

# Choosing Just the Right Level of Project Management for Small Projects

**BY**

Jeff Thorn and Colleen Dixon

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# ABSTRACT

In many companies, the project management office (PMO) provides project managers to manage many projects each year. Some of the projects are large, and complex, while some are short and straight-forward. The PMO manager must decide what the right level of project management effort is to deliver each of these projects. Project Management has many benefits for a project, but also uses resources. The PMO manager must balance the benefits of assigning a project manager to a project against the resources used. In this analysis, we have explored three different approaches to resourcing project management on a project: full project management, streamlined project management, and no project management. A decision model was developed to help a PMO manager answer this resourcing question. The model was developed using the Analytic Hierarchy Process, a process that facilitates making decisions on the basis of objectives. The authors have defined seven key objectives that are satisfied through the application of project management. These include project priority, duration, complexity, risk, resources, business drivers, and financial. To explore the utility of the model, three sample projects have been identified and analyzed in the model. The samples projects are a Regulatory Project, implementation of a New Performance Management System across the company, and developing New Product X. The results of this evaluation matched our expert intuition. For the Regulatory project the model suggested using streamlined project management. The result for New Product X is to apply no formal project management. The result for the third sample project, the New Performance Management System Project, was to apply full project management.


# INTRODUCTION

## Background

Project management is a discipline that uses standardized methodologies to deliver complex, limited duration projects within given time, cost and quality constraints. Many companies that have implemented project management as a strategy for managing their portfolio of projects create a Project Management Office (PMO). The PMO is responsible for setting standards for how project management will be done at the company. Typically, these standards are based upon external standards set by the Project Management Institute (PMI), an international, professional organization for project managers. PMI has documented their standards in a publication titled A Guide to the Project Management Book of Knowledge (PMBOK). In addition to setting standards, the PMO trains new project managers, and provides project management expertise to project teams. The PMO is often responsible for managing capacity for project management staff. The authors of this paper each work in the Project Management Office (PMO) of a large company.

## Problem Statement

The PMO is asked to manage many projects every year—some large, some small. While huge, multi-million dollar, multi-year projects clearly require the application of full-scale project management as

defined by PMBOK, smaller, less complex projects may not warrant this effort. It would be simple to just assign a project manager to each project, and ask them to follow the full project management methodology, but doing so would waste resources. Instead, it is preferable to expend just the right amount of project management effort on each project. But, what is the right amount?

To answer this question, we must first understand what the pros and cons of applying more project management effort are. For the purposes of this analysis, we have assumed that more project management effort will yield more of the benefits touted for employing project management methodology. As described by experts in the field of project management such as Harold Kerzner and Jack Meredith, these include: completing the project on budget and on time, managing the project to the original scope and quality, employing effective risk management, managing communication and integration points, managing human resources, and procurement. These are consistent with the project management knowledge areas defined by PMI in PMBOK. Full project management should bring all these to the project. Here, applying some of the project management methodology is assumed to bring some of the benefits, with the benefits increasing in a proportional manner to the effort expended. For example, just assigning a project manager should bring benefits such as communication and integration management and managing the triple constraint of time, budget and scope. But, without employing the full methodology, it may not yield benefits such as effective risk management and quality management. While projects may successfully be managed without a project manager or employing the project management methodology, there are some risks to doing so. The probability of successfully accomplishing the project goals is much lower except in the case of small, low complexity projects of short duration, and few integration points. This statement is backed up by an enormous quantity of data supporting the benefits of applying project management principles to manage projects as documented in Kerzner, Meredith, and elsewhere in the literature. However, there are some disadvantages of applying project management. First, it is more expensive to use project management due to the costs of both hiring a project manager and the administrative burden of the methodology. In many cases, these increased costs will be offset by lower projects costs, but for many small projects this will not be true. In an organization that does not routinely use project management, these costs could be prohibitive. Setting up project management in an organization involves substantial start-up costs including training, creating or buying tools, and gaining acceptance of the methodology. Another disadvantage is that experienced project managers are essential to gaining the benefits of the methodology, and there won't always be an experienced project manager available to manage every project. Third, applying project management effectively requires considerable start-up

time devoted to planning. Again, this may pay off for large, complex projects, but may simply add to the timeline for smaller, more straight-forward implementations.

## Solution Alternatives

In looking at what level of project management effort to expend, there are many options. In this analysis, we have explored three: Full Project Management, Streamlined Project Management and No Project Management. Larger projects with longer durations, more complexity, more integration points and so on are assumed to require more project management effort and more rigorous application of project management principles than is needed for simpler, smaller projects. The dilemma here is what is ‘larger’--what is the threshold or cutoff point? This cannot be easily answered. However, in this paper we will illustrate a way this question can be answered for each and every project.

**Full Project Management** involves assigning a project manager and asking the project manager to follow the full methodology for project management according to standards set by the PMO. The project manager is expected to provide a high level of reporting, full budgeting processes, complete quality reviews, major risk management, and so forth. Applying full project management takes advantage of all the benefits of project management. Projects managed this way are much more likely to complete on time, within the allotted budget, and within the given quality standards. Also, there is clear accountability for the project’s success or failure. Assigning full project management has the disadvantage of requiring more resources than the other alternatives, requiring extra planning time to get the project started, and requiring the availability of an experienced and capable project manager. Further, experienced project managers can charge higher rates and so can be expensive.

**Streamlined project management** still involves assigning a project manager, but the expectations for following standard methodology are less. The project manager is given latitude to use only the project management processes that are appropriate given the size and complexity of the project. For example, reporting and budgeting are done at lower levels or using simpler formats. Risk management and quality reviews are more limited. Less effort is spent on process but the PM still has good control over the project. The advantage of streamlined project management over full project management is that it can provide some of the key benefits using project management with less expense and planning time than full project management. It is still potentially more costly than doing no project management, and for very small projects, even this alternative may not make sense.

Projects that have **No Formal Project Management** don't have a project manager assigned. Instead one team member is designated as accountable for getting the project done with a minimum of reporting and controlling activities. There is no expectation that standard project management methodology will be followed. The disadvantages of not using formal project management are poorer cost control, more risk that the project will exceed the projected timeline, and often lack of clear accountability. The advantage is cost savings, and the ability to run a small project without using one of the company's experienced project managers for a project for which they are not needed.

Assigning the right level of project management is challenging because projects come in all sizes and levels of complexity. Furthermore, a given project may be challenging in some aspects, and straightforward in others. For example, a short-duration project, with a small budget may seem like it does not require a project manager. However, if that project is high risk, is being sponsored by senior management and requires many integration points across a broad set of internal and external stakeholders, not assigning a project manager could be disastrous. In order to tackle this question, we have applied a decision-making methodology called the Analytic Hierarchy Process.

# METHOD

## Analytic Hierarchy Process

Dr. Thomas Saaty developed the Analytic Hierarchy Process (AHP) almost 40 years ago. The process focuses on making decisions on the basis of the objectives of the decision makers. This distinguishes it from some other types of decision-making tools that focus on criteria or attributes. AHP defines a process for breaking down a problem (analysis), and managing the complexity of the problem by organizing its elements into a hierarchy or structure. After the elements are analyzed in chunks that the human brain can manage, they are measured against each other using pair wise comparisons, rating intensities or utility curves. Finally, it uses mathematical principles to synthesize the result that helps to guide decisions. However, to make a real-world decision using AHP, the number of calculations that must be performed would daunt even a devoted mathematician equipped with pencil and paper. To perform these complex calculations and present them in a user-friendly form, the Expert Choice software was developed.

For this analysis, an AHP model was built using Expert Choice software. First the hierarchy was developed. The overall goal was defined. In this case the goal is to determine the right level of project

management effort for a given project from among the three alternatives described above, full, streamlined and no project management. The goal was broken down into objectives and sub-objectives to create the hierarchy. These objectives were based upon the 9 project management knowledge areas defined by the PMBOK, and the experience of the authors managing projects in the PMO. Once the model was built, pair-wise comparisons were made at each level of the hierarchy, rating the relative importance of each lowest level objective or sub-objective with respect to the alternatives. Also, pair-wise comparisons of all combinations of the objectives were made according to their importance with respect to the goal. The software was then used to synthesize the results. The output was an ordered list of preferences for the alternatives. The results were analyzed, a decision was made, and this decision was then translated into actions.

## Developing the Model

Seven objectives that are satisfied through the application of project management methodology, processes and personnel were defined. These are priority, duration, complexity, risk, resources, business drivers, and financial.

**Priority.** The priority of a project within the company's portfolio of projects impacts how much project management is needed. Projects that have a high priority get a great deal of management oversight, and thus require more tracking, statusing and reporting.

**Duration.** Duration is important because longer projects require more careful planning and monitoring in order to ensure their successful execution.

**Level of Complexity.** More complex projects require more project management primarily because they involve more integration management. The Level of complexity breaks down into 3 sub-objectives: systems, business, and technical. As the number of systems that are impacted increases, it increases project complexity. Projects cause changes in processes and procedures for various business units; call centers, sales, finances, HR, and so on. Here business complexity is defined by how many business units are impacted. Technological complexity is driven by the type of technology being used in the project and the familiarity of the company with that technology. For example, use of current technology that is already available will typically have a lower complexity than developing a new technology.

**Risk.** Project risk comes in many forms, but can be divided into two basic categories. There is the risk to the stakeholders (political risk) of involvement in the project, as well as risk that the project itself will not be completed (failure risk.) Political risk encompasses both internal (department and corporate) and external (social, government) risks. Failure risk encompasses a broad set of risks,

other than political risks, that would cause the project to fail. These include things such as testing risks, environmental factors.

**Resources.** Resources impact the level of project management needed in two ways. First, the level of control that a project has over the resources is important. Some types of staff, such as external contractors, require more careful management. The level of sponsorship is a second facet of resources. A high level executive sponsor can easily provide the necessary resources to fund a project, but they will also expect frequent project updates.

**Business Drivers.** Business drivers are 'why' the project is being done. Here four types of reasons for the project define the business driver objective: right to operate, competitive advantage, infrastructure upgrades, and enhancements. Because we are much more concerned with the success of a project that is designated as “right to operate” than one that is an enhancement, we would want a higher level of project management applied.

**Financial.** The financial objective has two sub-objectives: total cost of the project (including planning, development, and implementation and opportunity costs), and how much value is gained from completing the project. Here value is defined in terms of Return on Investment (ROI), which is a measure of how much time must elapse after the project ends, before the profits or savings from the product offsets the cost to implement the project. Since projects with a better or faster ROI are more valuable to the company, we would generally like to allocate more project management effort to these projects to ensure they are successfully completed.

## The Projects

To explore the utility of the model, three sample projects with known values for all the objectives and sub-objectives in the model, have been defined for evaluation in the model: These are Implementing a New Performance Management System, a Regulatory Project, and Developing New Product X. Detailed information for the three sample projects described below is included in Table A in the Appendix.

The first project involves implementing a new performance management system across the company. The new performance management system project is high priority, but it is only an enhancement project as the company currently has a performance management system in place. Its estimated duration is only 2 months, since we are purchasing off-the-shelf technology. It impacts only one computer system, but since it is corporate-wide, it impacts many business areas. It is a low cost project with an expected ROI of less than 1 year. It will be implemented entirely with internal

resources. It is being sponsored at a low level by the director of the PMO. It is a high-risk project with both high political and implementation risks.

The second project has been made necessary by changes in the regulatory environment. The Regulatory Project is a medium priority, right-to-operate project. Its estimated duration is long, nearly 8 months, due to the large number of systems impacted. Fortunately only 1 business area is impacted, and it will utilize current, available technology. It is a high cost project with an expected ROI of 1 to 2 years. It will be implemented using on site contractors. It is being sponsored at a high level by the Vice President of Regulatory Affairs. It is a fairly low risk project with little political risk and only moderate implementation risk.

The third project involves developing a new product for the company. The New Product X project is a low priority project that will yield a modest competitive advantage in the product X market, and will deliver over a medium time-frame of 4 months. Its complexity is modest, impacting only 1 system, involving 2 to 3 business areas, and using new, but commercially available technology. It is modest in cost with an expected ROI of more than 2 years. It will be implemented using internal resources as well as external consulting resources. It is being sponsored at the middle management level by the Vice President of Project Management. It is a low risk project with no political risk and low implementation risk.

# RESULTS

## Making Pair-wise Comparisons

As described above, the decision was broken down into objectives and sub-objectives to create the hierarchy that is shown below (Figure 1.) This is the tree view in Expert Choice.

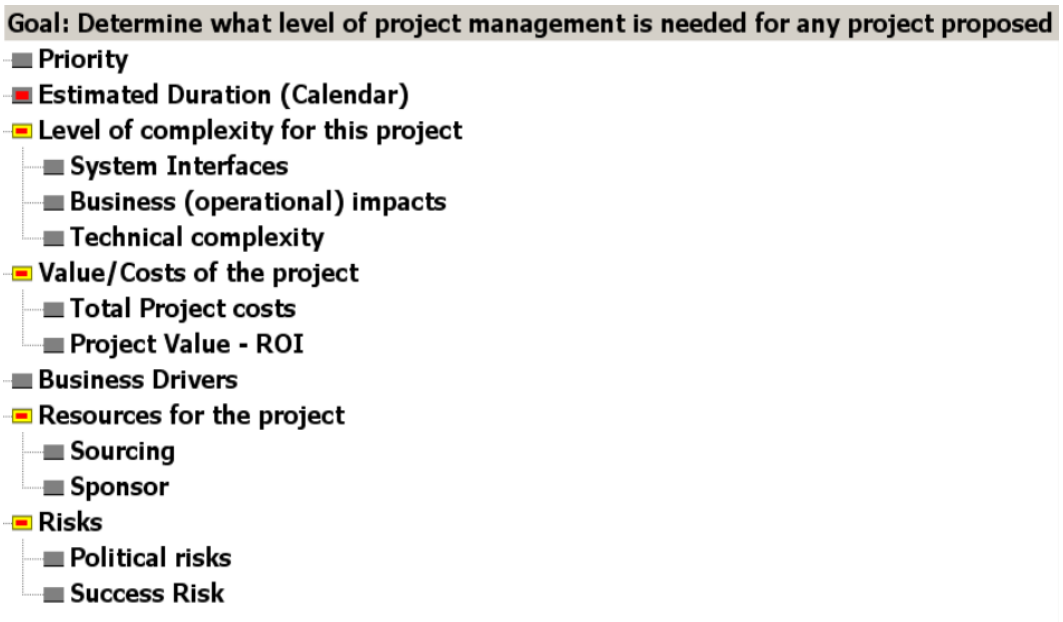



*Figure 1. Tree View of Objective Hierarchy*

The three alternatives were entered into Expert Choice as shown in Figure 2. This snapshot shows the Expert Choice screen that shows the "alts pane."

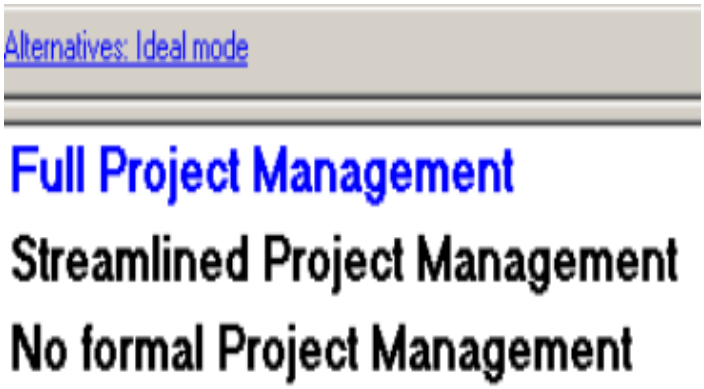



*Figure 2. Alternatives Pane*

The preference for each alternative with respect to each low level objective was compared. Figure 3 shows the screen in Expert Choice where pair-wise comparisons were made among the alternatives. The text in the middle states the objective, in this case "priority" of the project. Above and below the objective are shown two alternatives to compare. On the right there is a sliding scale. There are three possible scales that can be used in Expert Choice: graphical, verbal and numerical. The scale shown

here is verbal. The two objectives are evaluated, determining which alternative is preferred for this objective. The scale allows the user to determine to what extent the choice is preferred.

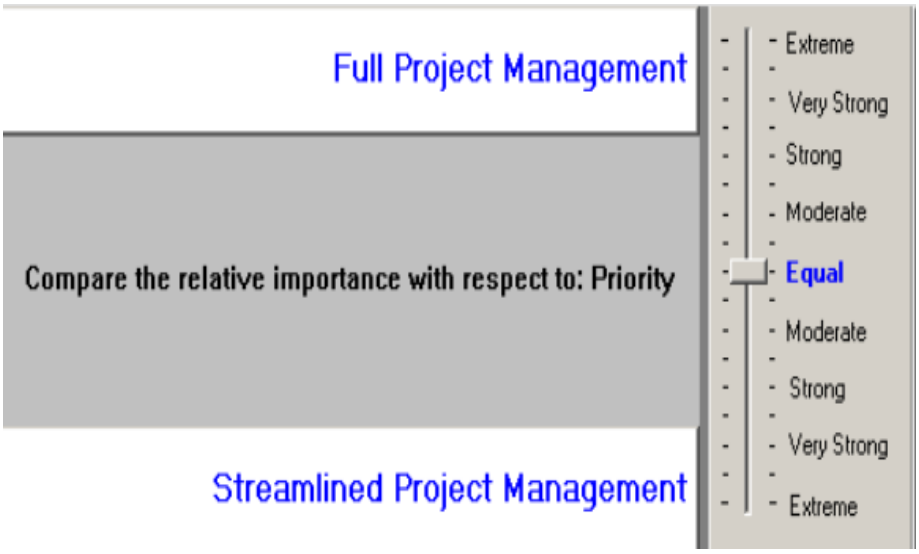



*Figure 3. Verbal Comparison Screen in Expert Choice*

Figure 4 shows a specific example of the pair-wise comparison done for the New Performance Management System project. Since this project is high priority, the preference to use Full Project Management over Streamlined is strong. Selecting this preference sets a numeric value in the EC tool that is shown at the bottom highlighted in yellow.

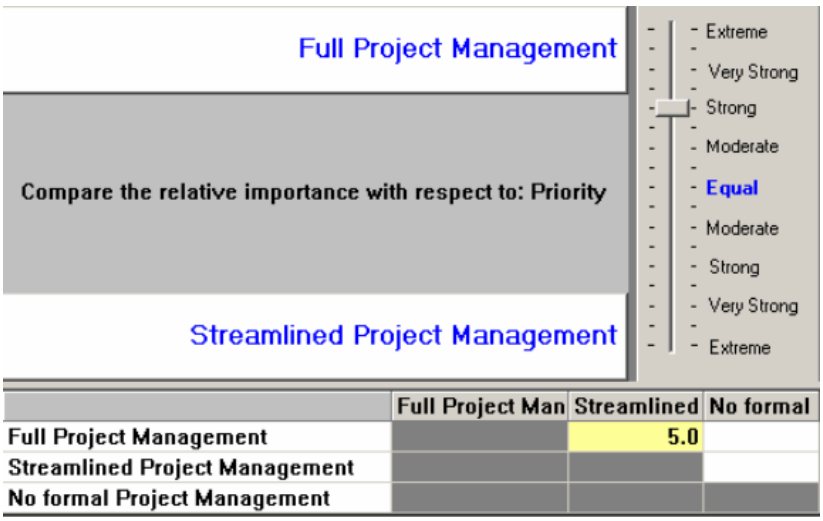



*Figure 4. Example of Pair-wise Comparison for New Performance Management System Project*

Likewise, pair-wise comparisons are performed for the sub-objectives with respect to the objectives.

In Figure 5 one of the pair-wise comparisons for the sub-objectives for Level of Complexity is shown. The comparison is the same regardless of which project we are evaluating. Here System Interfaces is considered moderately more important in evaluating Level of Complexity of the project than business impacts.

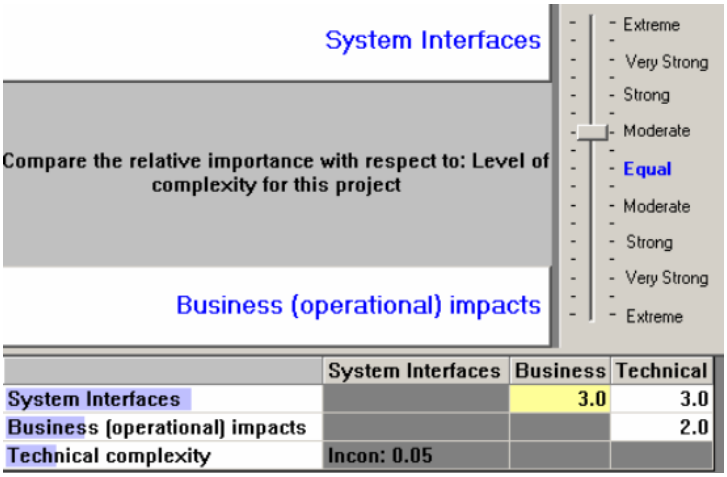



*Figure 5. Example of Pair-wise Comparison of Sub-Objectives.*

This pair-wise comparison process was followed for all the objectives and sub-objectives in the model for each of the three sample projects. Once the pair-wise comparisons were made, the Expert Choice software synthesized the results. Priorities were derived for each sub-objective with respect to it's objective. Figure 6 shows the relative priorities of the sub-objective for the objective Level of Complexity.

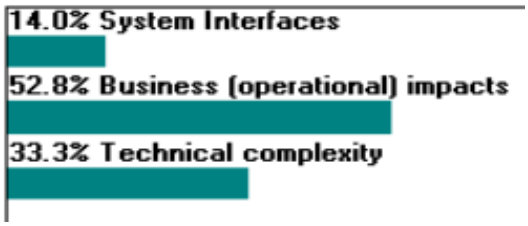



*Figure 6. Relative Priority of the Sub-Objectives for Level of Complexity.*

Priorities were also derived for each of the objectives with respect to the goal. The relative weights for each of the alternatives were derived as well. Pair-wise comparisons of the objectives with respect to the goal were the same regardless of which project is being evaluated. The results of all the pair-wise comparisons of the objectives are shown in Figure 7.

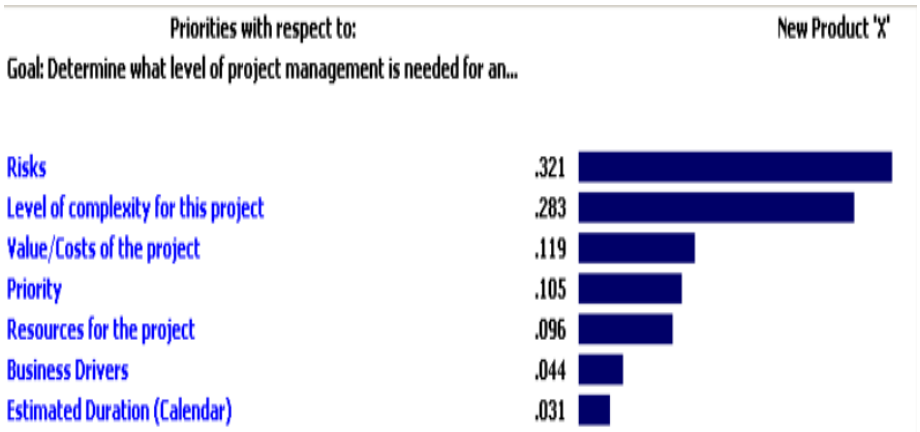



*Figure 7. Relative Priority of Objectives with Respect to the Goal.*

The derived priorities show two objectives have the most impact on the decision --Risks and Level of Complexity. Estimated Duration and Business Drivers play the smallest role in the decision. Each of the projects has it's own result showing the derived weights of the three alternative approaches. Figure 8 shows the result for the New Performance Management System project.


*Figure 8. Results for New Performance Management System Project.*

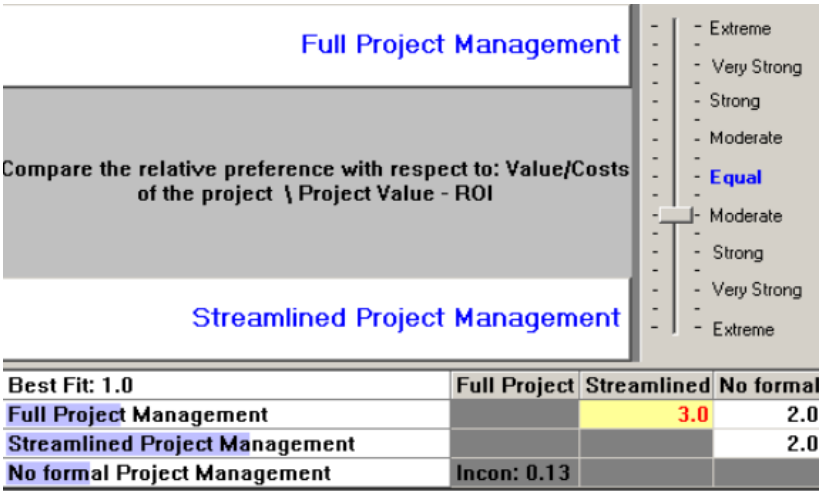
The bars show graphically the relative preference for the three alternatives. The numbers to the left also show the relative preference numerically. For the New Performance Management System Project, full project management is preferred.

# VALIDATING THE RESULTS

## Inconsistency

Evaluating inconsistency is a way of evaluating the results. Highly inconsistent judgments need to be examined, as they may indicate a clerical error or lapse in concentration during the judging process. The inconsistency index is a measure of how inconsistent the judgments are. Random judgments would have an inconsistency that approaches 1. Completely consistent judgments would have an inconsistency of zero. The goal is not to have a consistency of zero, as real-life does not present us with consistent problems. The intent in evaluating inconsistency is to ferret out errors. In this case, we noticed that the results of the regulatory project evaluation were not consistent with our intuition that the project required streamlined project management. Instead, the model suggests that with respect to the ROI objective no formal project management be applied, by a narrow margin of 1.2% over the intuitive choice. Examining the model (Figure 9) there were some inconsistencies in the comparisons.

*Figure 9. Inconsistencies in Pair-wise Comparison for Regulatory Project.*




Looking at the comparisons for Value Cost – on the bottom line it says ‘Incon: 0.13’. The tool has a utility that provides the “best fit” for each judgment. In this case, the best fit was a positive 1. However, that “best fit” does not match the intent of those making the judgments, and so should the value should not be changed to match the best fit. In this case a few errors were made here, indicating a lapse of concentration by the users. The judgments were re-evaluated, resulting in Figure 10.

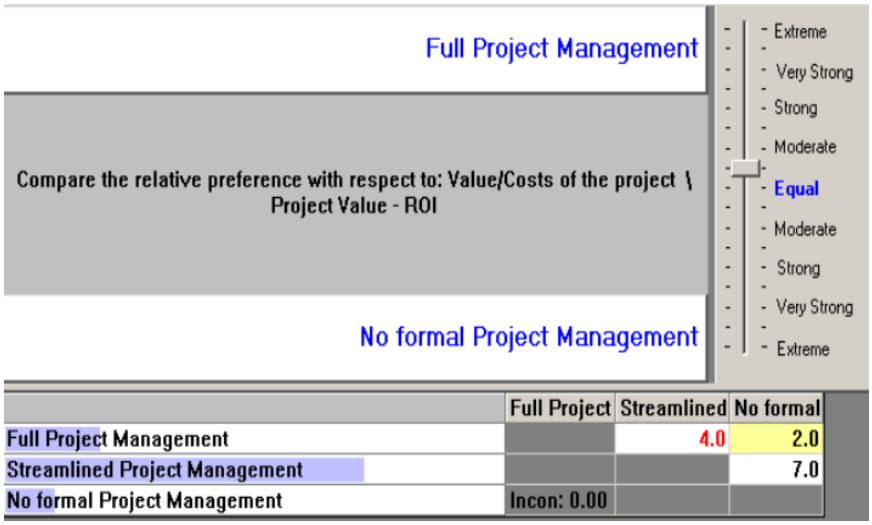



*Figure 10. Inconsistencies in Pair-wise Comparison for Regulatory Project After Corrections.*

Re-evaluating these judgments in this case gave results that more accurately reflect the actual preferences. Further, the inconsistency has now dropped below 0.1. Because of finding this error, judgments for Sponsor and the Political Risks were similarly reviewed. With the corrected judgments, we got the following result, consistent with our intuitive expectation to apply streamlined project management to the Regulatory Project.

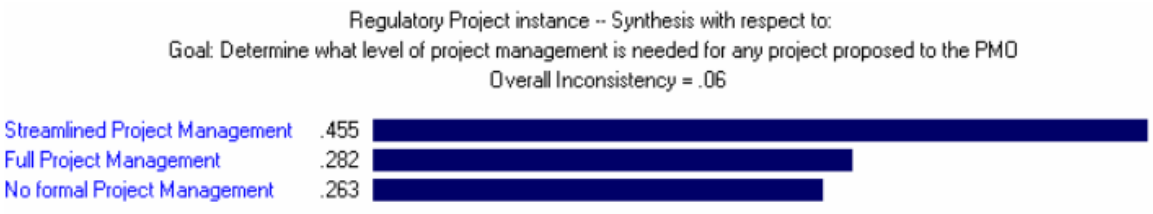



*Figure 11. Results for Regulatory Project.*

The results for New Product X, to not apply formal project management, are consistent with our expectations. This project is not urgent and is low risk.

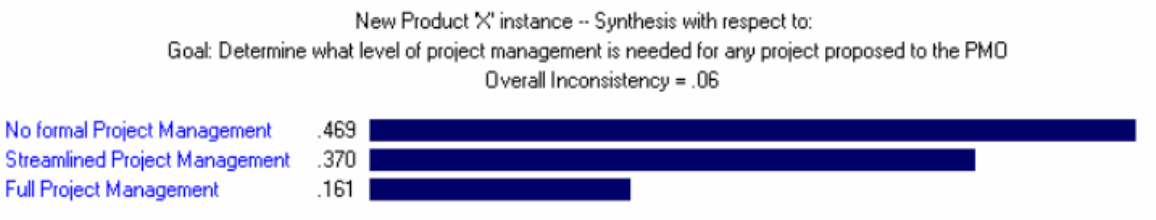



*Figure 12. Results for New Product X.*

## Intuitive Evaluation

One way of validating the results of the model is to compare the results to the intuitive decision that an expert would have made. This will help to determine that mistakes weren't made during the evaluation, either due to clerical errors, or a lapse in concentration. For example, the result for the New Performance Management System Project to use full project management is not surprising. Intuitively, the authors would have assigned full project management level to this project. This agreement between the intuitive result, and the recommendation from the model gives some a level of assurance that the model is constructed well, and that errors weren't made in the judgment process that negatively impacted the results.

## Sensitivity Analysis

A second way to evaluate the results is sensitivity analysis. Sensitivity analysis allows us to look at each of the objectives and evaluate how small and large changes to the priority of these objectives would change the priorities of the alternatives. If small changes in the priority of an objective have an effect on the final decision, then further evaluation of that objective to ensure that judgments made for the objective are accurate is warranted. Further, the sensitivity of the objectives should make sense intuitively. If they don't, this would require further evaluation to determine what is missing from the model, or which judgments might need to be revisited.

In Figure 13, a sensitivity analysis, the performance graph, is shown for the New Performance Management System. The Performance Graph not only shows us the view of the 'overall' result (right-hand side), but also shows how each of the objectives weighed into that result. Following the

blue line from left to right shows that full performance management is preferred based on project priority, level of complexity, value/costs and risks. No PM is preferred based upon estimated duration, business drivers or resources. As described above, the objectives for Estimated Duration and Business Drivers were the least important in the priorities.

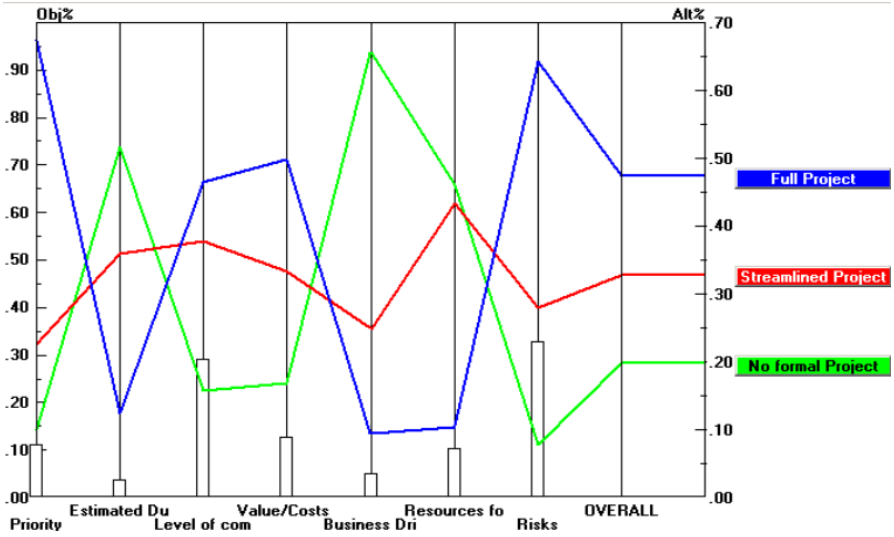



Figure 13. Performance Sensitivity Graph for New Performance Management System Project.

If they were very important, then we would see the following result shown in Figure 14.

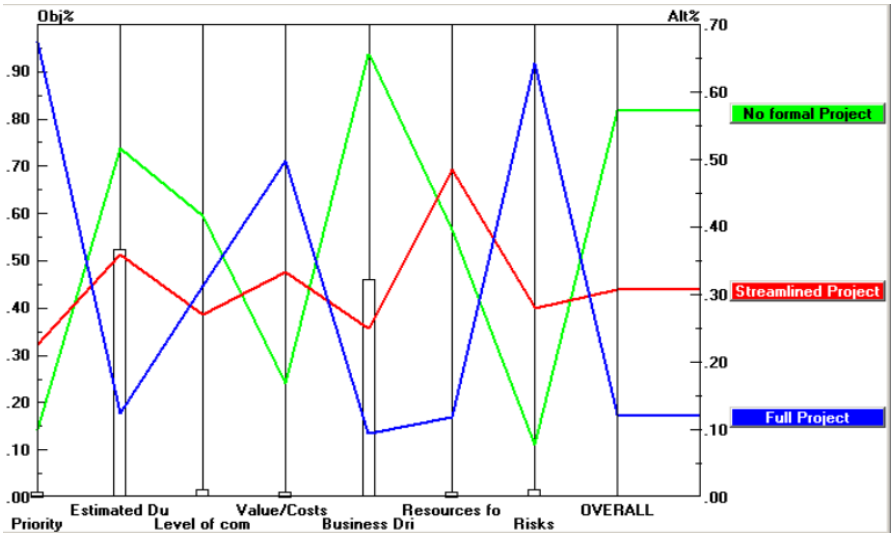



*Figure 14. Performance Sensitivity Graph for New Performance Management System Project, if Duration and Business Drivers Were Most Important Objectives.*

No formal project management becomes the favored choice. This allows us to dynamically evaluate our decision for each objective and is one measure of the robustness of the recommended decision.

This same kind of sensitivity analysis can be applied to the Objectives with respect to the Sub-Objectives to evaluate the robustness of the contribution of each sub-objective to the priority of the objective.

## Evaluation by External Experts

Another way of evaluating the validity of the model is to seek feedback from experts in project management not involved in the construction of the model or making the pair-wise comparisons. The authors have identified an expert to evaluate the model. Ms. Jenny Vessels from Eli Lilly and Company is an experienced project manager who works in the PMO and has experience in assigning project managers to PMO projects. She reviewed the objectives hierarchy and deemed that it included the appropriate objectives and that the hierarchy was appropriately constructed. However, she also voiced a concern that the authors had judged risk and level of complexity too strongly above the other objectives. She suggested that the authors review and adjust the intensity of preference for these two objectives with respect to the goal and re-synthesize to see if this would impact the outcome. To determine the impact of this, the authors adjusted the preferences using the pair-wise numeric comparisons in the EC tool, decreasing the preference by 2-fold for these two objectives. Risk and Level of Complexity were equal to each other in derived weight, just as they had been in the original model. This modification to the model (not reflected in the model presented) did not change the overall decisions. It did change the weights of the final preferences. For the New Performance Management System, the preference for Full Project Management went from 0.473 to 0.448 as shown in figure 15 below.

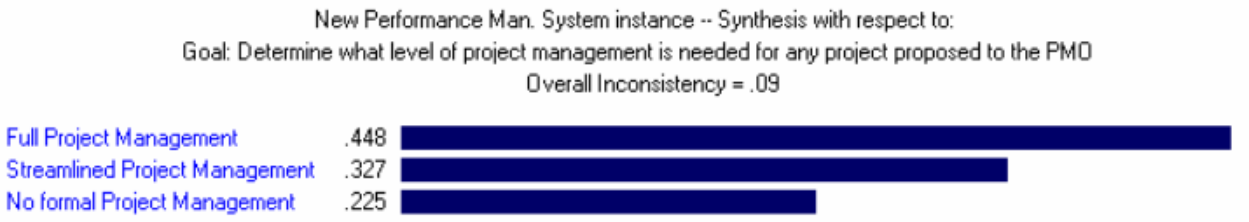



*Figure 15. Synthesis Results for New Performance Management System with preferences modified per expert evaluation.*

For the Regulatory Project, the preference for Streamlined Project Management went from 0.455 to 0.465, a slight increase.

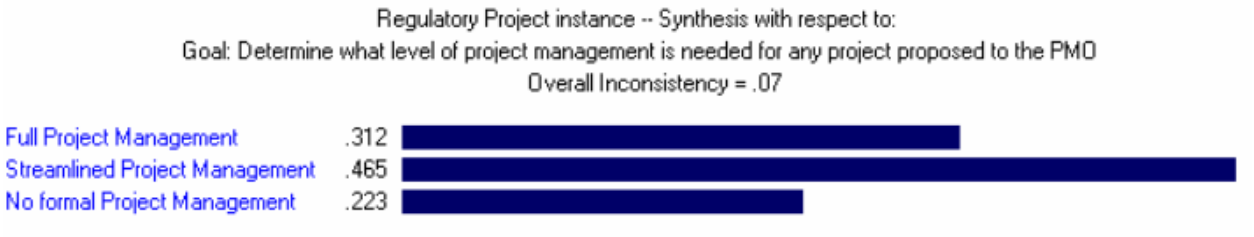



*Figure 15. Synthesis Results for New Performance Management System with preferences modified per expert evaluation.*

For the Product 'X', the preference for No Formal Project Management went from 0.469 to 0.433, a slight decrease.

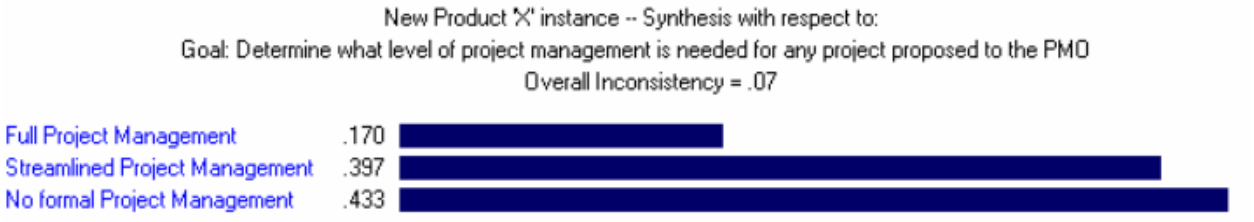



*Figure 16. Synthesis Results for Product 'X' with preferences modified per expert evaluation.*

While this change did not impact the results for these three projects, it might impact the results for some future projects. In putting this model into practice, the priority of Risk and Level of Complexity relative to the other objectives would need to be carefully examined to determine what is the best choice for a given organization.

## SUMMARY, CONCLUSIONS, RECOMMENDATIONS

This model worked well for evaluating the three sample projects. The results matched our expert intuition, judgment inconsistencies were low enough to give assurance that substantial errors had not been made, and the sensitivity analysis did not arise any concerns. We have yet to complete the evaluation by additional experts who were not involved in this project, and hope that effort will bring feedback to improve the model further. Based upon our own experience, and confirmation from the project management literature, the model includes the significant factors that impact the decision about which level of project management effort to apply to a given project. Further, the model is

practical, as in practice; we generally have this level of information about a project when evaluating it. There are still some things we could do in the future to improve the model.

To be truly useable in the long-term, the model needs to be simplified for use by a manager who does not have full background in the Expert Choice tool or theory of AHP. Constructing the model took the authors 20 hours of effort. Testing and refining the model took another 30 hours of effort. However, now that the model is complete, completing the pairwise comparisons necessary to evaluate a proposed project would take only a few hours. However, for many organizations whose current "command" model of decision-making for project assignments takes only minutes of a manager's time, this will seem like a big investment. One way to overcome this would be to collect information regarding proposed projects from management, and have the project management office personnel perform the actual evaluation. On an infrequent basis management could be involved in re-evaluating the goals and objectives, perhaps once a year when priorities are being set for the upcoming year. Another possibility is to adapt the model for use in a common spreadsheet tool like Microsoft Excel or, better yet a web portal. This has an added benefit that it could be used even in companies that are not able to implement Expert Choice software. If the decisions can be built into a questionnaire format with the decision generated by the answers it could be useable for a general audience. In this case it might be necessary to eliminate the objectives that don't contribute much to the decision to reduce the amount of input data needed.

In practice, when we a project is chosen for evaluation, it is almost always found that some of the information the model calls for is missing. Since the synthesis of the final decision can be completed with some data missing, the robustness of the model could be evaluated by withholding a portion of the data, and thus it is possible to improve the model's behavior under less than ideal conditions. While judgments are always required in order to make decisions, this improved model could better support the users' judgments in cases where data is particularly scarce. In conclusion, it this model provides a basis for building a truly useful tool for decision-making.

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# APPENDIX

*Table A. Sample Projects*

| **Objective** | **New Performance Management System** | **Regulatory Project** | **New Product 'X'** |
|---|---|---|---|
| Priority [assigned by the company] | high | medium | low |
| Estimated Duration (Calendar months) | 2 months (short) | 8 months (long) | 4 months (medium) |
| Level of Complexity | | | |
| Systems Interfaces | single system | > 3 systems | single system |
| Business complexity | > 3 business areas | 1 business area | 2-3 business areas |
| Technical complexity | Uses new, available technology | Uses current, available technology | Uses new, available technology |
| Value/Costs of Project | | | |
| Total Cost | $47,000 | $305,000 | $115,000 |
| Project Value (ROI) | < 1year | 1-2 years | > 2 years |
| Business Drivers | enhancement | right to operate | competitive advantage |
| Resources involved in project | | | |
| Sourcing | Internal | on site contractors | Consultants & internal |
| Sponsor | Director PMO | VP of company | VP PM |
| Risks | | | |
| Political risk | Project is controversial | Little or no risk | Little or no political risk |
| Success Risk | High risk of implementation failure. | Moderate risk | Low risk |