

CASE STUDY 3.2

Project Selection at Nova Western, Inc.

Phyllis Henry, vice president of new product development, sat at her desk, trying to make sense of the latest new project proposals she had just received from her staff. Nova Western, Inc., a large developer of business software and application programs, had been experiencing a downturn in operating revenues over the past three quarters. The senior management team was feeling pressure from the board of directors to take steps to correct this downward drift in revenues and profitability. The consensus opinion was that Nova Western needed some new product ideas, and fast.

The report Phyllis was reading contained the results of a project screening conducted by two independent groups within the new product development department. After several weeks of analysis, it appeared that two top contenders had emerged as the optimal new project opportunities. One project, code-named Janus, was championed by the head of software development. The other project idea, Gemini, had the support of the business applications organization. Phyllis's original charge to her staff was to prepare an evaluation of both projects in order to decide which one Nova Western should support. Because of budget restrictions, there was no way that both projects could be funded.

The first evaluation team used a scoring model, based on the key strategic categories at Nova Western, to evaluate the two projects. The categories they employed were: (1) strategic fit, (2) probability of technical success, (3) financial risk, (4) potential profit, and (5) strategic leverage (ability of the project to employ and enhance company resources and technical capabilities). Using these categories, the team evaluated the two projects as shown here. Scores were based on: 1 = low, 2 = medium, and 3 = high.

Project Janus

Category	Importance	Score	Weighted Score
1. Strategic fit	3	2	6
2. Probability of technical success	2	2	4
3. Financial risk	2	1	2
4. Potential profit	3	3	9
5. Strategic leverage	1	1	1
			Score = 22

Project Gemini

Category	Importance	Score	Weighted Score
1. Strategic fit	3	3	9
2. Probability of technical success	2	2	4
3. Financial risk	2	2	4
4. Potential profit	3	3	9
5. Strategic leverage	1	2	2
			Score = 28

The results obtained by this first team suggested that Project Gemini would be the best choice for the next new project.

The second team of evaluators presented an NPV analysis of the two projects to Phyllis. In that analysis, the evaluators assumed a required rate of return of 15% and an anticipated inflation rate of 3% over the life of the project. The findings of this team were as follows:

Project Janus

Initial investment = \$250,000	
Life of the project = 5 years	
Anticipated stream of future cash flows:	
Year 1	= \$ 50,000
Year 2	= 100,000
Year 3	= 100,000
Year 4	= 200,000
Year 5	= 75,000
Calculated NPV = \$ 60,995	

Project Gemini

Initial investment = \$400,000	
Life of the project = 3 years	
Anticipated stream of future cash flows:	
Year 1	= \$ 75,000
Year 2	= 250,000
Year 3	= 300,000
Calculated NPV = \$ 25,695	

Thus, according to this analysis, Project Janus would be the project of choice.

The analyses of the two projects by different means yielded different findings. The scoring model indicated that Project Gemini was the best alternative,

and the financial screening favored the higher projected NPV of Project Janus. Phyllis, who was due to present her recommendation to the full top management team in the afternoon, was still not sure which project to recommend. The evaluations seemed to present more questions than answers.

Questions

1. Phyllis has called you into her office to help her make sense of the contradictions in the two project evaluations. How would you explain the

reasons for the divergence of opinion from one technique to the next? What are the strengths and weaknesses of each screening method?

2. Choose the project that you think, based on the two analyses, Nova Western should select. Defend your choice.
3. What does this case suggest to you about the use of project selection methods in organizations? How would you resolve the contradictions found in this example?

Internet Exercises

- 3.1 Go to the Web sites for the following organizations:

- a. Merck & Company Pharmaceuticals: www.merck.com/about/
- b. Boeing Corporation: <http://www.boeing.com/boeing/companyoffices/aboutus/index.page>
- c. Rolls-Royce, Plc.: www.rolls-royce.com
- d. ExxonMobil, Inc.: www.exxonmobil.com/Corporate/about.aspx

Based on your review of the companies' posted mission and strategic goals, what types of projects would you

expect them to pursue? If you worked for one of these firms and sought to maintain strategic alignment with their project portfolio, what project options would you suggest?

- 3.2 Access the Web site www-01.ibm.com/software/awd-tools/portfolio/. What is IBM's philosophy regarding project portfolio management as demonstrated by this software product? What do they mean by stating that their goal is to help clients overcome the influence of the loudest voice in the room and use objective information to support decision making?

Notes

1. Texas Department of Transportation (2013). Project Selection Process.
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5. Meredith, J. R., and Mantel, Jr., S. J. (2003). *Project Management*, 5th ed. New York: Wiley.
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10. Saaty, T. L. (1996). *The Analytical Hierarchy Process*. Pittsburgh, PA: RWS Publications.
11. Millet, I. (1994, February 15). "Who's on first?" *CIO Magazine*, pp. 24–27.
12. Mian, S. A., and Dai, C. X. (1999). "Decision-making over the project life cycle: An analytical hierarchy approach," *Project Management Journal*, 30(1): 40–52.
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vague goal of “improving billing and record-keeping operations” in a large insurance firm. The IT department interpreted that goal to develop a project that provided a complex solution requiring multiple interactive screens, costly user retraining, and the generation of voluminous reports. In fact, the organization simply wanted a streamlined link between the billing function and end-of-month reporting. Because the problem was articulated vaguely, the IT department created an expensive system that was unnecessarily complex. In reality, the optimal project solution begins with creating a reasonable and complete problem statement to establish the nature of the project, its purpose, and a set of concrete goals.

A complete understanding of the problem must be generated so that the projects themselves will be successful in serving the purpose for which they were created. A key part of the problem statement is the analysis of multiple alternatives. Locking in “one best” approach for solving a problem too early in a project can lead to failure downstream.

Also, to be effective, problem statements should be kept simple and based on clearly understood needs in search of solutions. For example, a clear project goal such as “improve the processing speed of the computer by 20%” is much better than a goal that charges a project team to “significantly increase the performance of the computer.” A set of simple goals provides a reference point that the team can revisit when the inevitable problems occur over the course of project development. On the other hand, project goals that are vague or excessively optimistic—such as “improve corporate profitability while maintaining quality and efficiency of resources”—may sound good, but do not provide clear reference points for problem solving.

The Statement of Work

The impetus to begin a project is often the result of a statement of work. The **Statement of Work (SOW)** is a detailed narrative description of the work required for a project.⁶ Useful SOWs contain information on the key objectives for the project, a brief and general description of the work to be performed, expected project outcomes, and any funding or schedule constraints. Typically, in the case of the latter, it is difficult to present schedule requirements past some “gross” level that may only include starting and ending dates, as well as any major milestones.

An SOW can be highly descriptive, as in the case of a U.S. Department of Defense Request for Proposal (RFP) for a new Army field communication device that is “no greater than 15 inches long by 15 inches wide by 9 inches deep, can weigh no more than 12 pounds, has a transmitting and receiving range of 60 miles, must remain functional after being fully immersed in water for 30 minutes, and can sustain damage from being dropped at heights up to 25 feet.” On the other hand, an SOW can be relatively general, merely specifying final performance requirements without detailed specifics. The purpose of the SOW is to give the project organization and the project manager specific guidance on both work requirements as well as the types of end results sought once the project is completed.

A Statement of Work is an important component of conceptual development, as it identifies a need within the firm or an opportunity from an outside source, for example, the commercial market. Some elements in an effective SOW include:

1. **Introduction and background**—a brief history of the organization or introduction to the root needs that identified the need to initiate a project. Part of the introduction should be a problem statement.
2. **Technical description of the project**—an analysis, in clear terms, of the envisioned technical capabilities of the project or technical challenges the project is intended to resolve.
3. **Time line and milestones**—a discussion of the anticipated time frame to completion and key project deliverables (outcomes).

A useful Statement of Work should clearly detail the expectations of the project client, the problems the project is intended to correct or address, and the work required to complete the project.

For example, the U.S. Federal Geographic Data Committee recently developed an SOW for purchasing commercial services from government or private industry as an independent contractor. The Statement of Work contained the following components:

1. **Background**—describes the project in very general terms; discusses why the project is being pursued and how it relates to other projects. It includes, as necessary, a summary of statutory authority or applicable regulations and copies of background materials in addenda or references.

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2. **Objectives**—provide a concise overview of the project and how the results or end products will be used.
3. **Scope**—covers the general scope of work the contractor will be performing.
4. **Tasks or requirements**—describe detailed work and management requirements, and also spell out more precisely what is expected of the contractor in the performance of the work.
5. **Selection criteria**—identify objective standards of acceptable performance to be provided by the contractor.
6. **Deliverables or delivery schedule**—describes what the contractor shall provide; identifies the contractor's responsibilities; and identifies any specialized expertise and services, training, and documentation that is needed. In addition, it clearly states the deliverables required, the schedule for delivery, the quantities, and to whom they should be delivered. Finally, it describes the delivery schedule in calendar days from the date of the award.
7. **Security**—states the appropriate security requirement, if necessary, for the work to be done.
8. **Place of performance**—specifies whether the work is to be performed at the government site or the contractor's site.
9. **Period of performance**—specifies the performance period for completion of the contracted project.

Notice how the Statement of Work moves from the general to the specific, first articulating the project's background, including a brief history of the reasons the project is needed, and then identifying the component tasks before moving to a more detailed discussion of each task objective and the approach necessary to accomplish it.⁷

A more detailed example of a generic statement of work is shown in Table 5.2. The SOW covers the critical elements in a project proposal, including description, deliverables, resource requirements, risks, expected outcomes, estimated time and cost constraints, and other pending issues. Table 5.2 can serve as a standard template for the construction of a reasonably detailed SOW for most projects.

The Statement of Work is important because it typically serves as the summary of the conceptual development phase of the project plan. Once armed with the SOW, the project manager can begin moving from the general to the more specific, identifying the steps necessary to adequately respond to the detailed SOW.

The Project Charter

After a comprehensive SOW has been developed, many organizations establish a project charter. The **project charter** is defined as a document issued by the project initiator or sponsor that formally sanctions the existence of the project and authorizes the project manager to begin applying organizational resources to project activities.⁸ In effect, a charter is created once the project supporters have done the needed "homework" to verify that there is a business case for the project, that they fully understand the elements of the project (as demonstrated through the SOW), and have applied more company-specific information for the project as it begins. The project charter demonstrates formal company approval of the project and that can only occur when all necessary information during conceptual development has been satisfied. For some organizations, the formal signoff of the SOW constitutes the project charter, while other organizations require that a separate document be created. An example of a project charter is shown in Appendix 5.1 at the end of the chapter.

PROJECT PROFILE

Statements of Work: Then and Now

Modern weapon systems have traditionally contained many more specifications and greater detailed SOWs than those of the past. Contrast the Army Signal Corps' SOW for the Wright Brothers' heavier-than-air flying machine in 1908 to the Air Force's SOW for the Joint Strike Fighter, originally approved in 2001. The requirements in the 1908 SOW—for example, that the plane be easily taken apart for transport in Army wagons and be capable of being reassembled in an hour—and other contract conditions were specified on one page. The requirements section in the 2001 SOW for the Air Force Joint Strike Fighter is nearly 100 pages long with more than 300 paragraphs of requirements. Today's SOWs are much more complex and require greater attention to detail, perhaps because the products are so much more complex, the equipment and materials are technically challenging, and legal requirements need much greater specification.⁹

TABLE 5.2 Elements in a Comprehensive Statement of Work

Date Submitted	
Revision Number	
Project Name	
Project Identification Number	
SOW Prepared by:	

1. Description and Scope

- a. Summary of work requested
- b. Background
- c. Description of major elements (deliverables) of the completed project
- d. Expected benefits
- e. Items not covered in scope
- f. Priorities assigned to each element in the project

2. Approach

- a. Major milestones/key events anticipated

Date	Milestone/Event

- b. Special standards or methodologies to be observed
- c. Impact on existing systems or projects
- d. Assumptions critical to the project
- e. Plans for status report updates
- f. Procedures for changes of scope or work effort

3. Resource Requirements

- a. Detailed plan/rationale for resource needs and assignments

Person	Role and Rationale

- b. Other material resource needs (hardware, software, materials, money, etc.)
- c. Expected commitments from other departments in support
- d. Concerns or alternatives related to staffing plan

4. Risks and Concerns

- a. Environmental risks
- b. Client expectation risks
- c. Competitive risks
- d. Risks in project development (technical)
- e. Project constraints
- f. Overall risk assessment
- g. Risk mitigation or abatement strategies

INTEGRATED PROJECT

Developing the Work Breakdown Structure

Develop a Work Breakdown Structure for your project based on the identified goals from the first assignment. Provide a detailed assessment of the various components of the project, going down through the work package stage to tasks and subtasks (if appropriate). Next, assess the personnel needs for the project. How many core team members will be necessary to achieve the project's goals? What are their positions within the organization? Remember to use the project scope as the basis for determining all the elements of the project, the personnel responsible for each component, and the associated budget for each task.

Do not do a detailed assessment of the various components of the project, going down through the work package stage to tasks and subtasks (if appropriate). Next, assess the personnel needs for the project. How many core team members will be necessary to achieve the project's goals? What are their positions within the organization? Remember to use the project scope as the basis for determining all the elements of the project, the personnel responsible for each component, and the associated budget for each task.

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SAMPLE WORK BREAKDOWN STRUCTURE—ABCUPS, INC.

Personnel Table

Name	Department	Title
Carol Johnson	Safety	Safety Engineer
Bob Hoskins	Engineering	Industrial Engineer
Sheila Thomas	Management	Project Manager
Randy Egan	Management	Plant Manager
Stu Hall	Industrial	Maintenance Supervisor
Susan Berg	Accounting	Cost Accountant
Marty Green	Industrial	Shop Supervisor
John Pittman	Quality	Quality Engineer
Sally Reid	Quality	Jr. Quality Engineer
Lanny Adams	Sales	Marketing Manager
Kristin Abele	Purchasing	Purchasing Agent

WORK BREAKDOWN STRUCTURE—ABCUPS' PROCESS MODIFICATION

Process Modification Project		1000
Deliverable 1	Feasibility Study	1010
Work Package 1	Conduct feasibility study	1011
Work Package 2	Receive technical approval	1012
Work Package 3	Get administrative sign-off	1013
Deliverable 2	Vendor Selection	1020
Work Package 1	Research equipment	1021
Work Package 2	Qualify suppliers	1022
Work Package 3	Solicit quotes from suppliers	1023
Work Package 4	Negotiate price and terms	1024
Work Package 5	Approval and contracts	1025
Deliverable 3	Design	1030
Work Package 1	Factory floor redesign	1031
Work Package 2	Drawings	1032
Work Package 3	Process redesign approval	1033
Deliverable 4	Engineering	1040
Work Package 1	Conduct process flow evaluation	1041
Work Package 2	Determine site for equipment	1042

INTEGRATED PROJECT

Developing the Work Breakdown Structure

Develop a Work Breakdown Structure for your project based on the identified goals from the first assignment. Provide a detailed assessment of the various components of the project, going down through the work package stage to tasks and subtasks (if appropriate). Next, assess the personnel needs for the project. How many core team members will be necessary to achieve the project's goals? What are their positions within the organization? Remember to use the project scope as the basis for determining all the elements of the project, the personnel responsible for each component, and the associated budget for each task.

In addition to identifying the tasks and key personnel requirements for the project, construct a Responsibility Assignment Matrix (RAM) that demonstrates the interrelationship among project team members.

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Deliverable 4	Engineering		1040
Work Package 1	Conduct process flow evaluation	1041	
Work Package 2	Determine site for equipment	1042	

Work Package 3	Retooling	1043	
Work Package 4	Final layout approval	1044	
Deliverable 5	Prototype Testing		1050
Work Package 1	Build inventory bank	1051	
Work Package 2	Set up trial run	1052	
Work Package 3	Trial run	1053	
Work Package 4	Quality assessment	1054	
Work Package 5	Process documentation	1055	
Deliverable 6	Packaging		1060
Work Package 1	Design new packaging	1061	
Work Package 2	Coordinate with marketing	1062	
Work Package 3	Part assembly	1063	
Work Package 4	Packaging approval	1064	
Deliverable 7	Sales and Service		1070
Work Package 1	Beta-test products	1071	
Work Package 2	Sales approval	1072	
Work Package 3	Customer approval	1073	
Deliverable 8	Initiate Changeover		1080
Work Package 1	Assemble inventory	1081	
Work Package 2	Cancel vendor contracts	1082	
Work Package 3	Close out project	1083	
Work Package 4	Develop lessons learned	1084	

Responsibility Assignment Matrix

	Sheila	Susan	Bob	Lanny
Del 1010	○	□		★
Del 1020	★	○		□
Del 1030	★		□	○
Del 1040	⊕	□	○	★
Del 1050		○	★	□
Del 1060	□		⊕	○
Del 1070	○	★	□	
Del 1080	⊕		○	★

○ Responsible

★ Support

□ Notification

⊕ Approval