DOE Benchmarking Study of Project Management Career Development Best Practices

U.S. Department of Energy

Office of Engineering and Construction Management

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Acronyms

APMC	Advanced Program Management Course
APPL	Academy of Program and Project Leadership
BPA	Business Purchase Agreement
BS	Bachelor of Science
BS/BA	Bachelor of Science/Bachelor of Arts
CD-ROM	Compact Disk - Read Only Memory
CEO	Chief Executive Officer
CFO	Chief Financial Officer
DAU	Defense Acquisition University
DAWIA	Defense Acquisition Workforce Improvement Act
DOD	Department of Defense
DOE	Department of Energy
DSMC	Defense Systems Management College
ESI	ESI International
GPRA	Government Performance and Results Act
GSA	General Services Administration
HR	Human Resources
IDP	Individual Development Plans
IPMA	International Project Management Association
IPT	Integrated Product Team
IT	Information Technology
KSA	Knowledge, Skills, and Abilities
MBA	Masters of Business Administration
MOBIS	Management, Organizational and Business Improvement Services
NASA	National Aeronautics and Space Administration
NAVFAC	Naval Facilities Command
NPR	National Performance Review
PM	Project Management
PMBOK	Project Management Body of Knowledge
PMDP	Project Management Development Process
PMI	Project Management Institute
PMP	Project Management Professional
PO	Purchase Orders
PPMI	Program and Project Management Initiative
PR	Purchase Request
SOP	Standard Operating Procedure
USACE	United States Army Corps of Engineers

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Executive Summary

The U.S. Department of Energy (DOE) conducted a benchmarking study of the public and private sector for the purpose of identifying common project management (PM) career development practices and processes, benchmarking standards and best practices. The objective of the benchmarking study was to collect and analyze qualitative data to identify categories of common elements that can be applied in the design and development of a project management and career development and certification program for the DOE.

Two qualitative methods of data collection were applied in this benchmarking study. The first method was a structured interview of process owners. The second method was a focus group discussion with representatives from different levels of the organizations. Based on input from internal DOE stakeholders, questions were developed that guided the discussions in a structured format for the individual interviews and focus groups.

Several organizations from the public and private sector agreed to participate in the study. These included:

Federal Agency

- U.S. Department of Defense (DOD)
  - Naval Facilities Command (NAVFAC)
  - U.S. Army Corps of Engineers (USACE)
- General Services Administration (GSA)
- National Aeronautics and Space Administration (NASA)

Industry

- Bechtel National
- International Business Machines Corporation
- Lockheed Martin Corporation
- Motorola Corporation
- United Services Automobile Association
- URS Griner

Results

The participating organizations were at various stages of maturity in their project management career development and certification processes. All industry partners surveyed identified competitive advantage and customer service as the reason why project management development programs were established. In addition, several elements emerged that were consistent with all of the benchmarking partners:

- A competency-based approach formed the basis for developing a comprehensive training and certification program.

- Organizations possessed a formalized and rigorously defined PM assessment and certification program or are moving toward such a program.

- Organizations possess or are driving toward mandatory certification.

- Integration of PM career development and certification into Human Resource processes is deemed critical to program success.

- Project management tools and techniques are viewed as valuable elements of the program.

- Organizations are using Web-based platforms for delivery of training and PM tools.

- "Grandfathering" certification of project managers was considered and rejected.

- Project management development is viewed as professional career development, not just a training activity.

Recommendations

Based on the results of this study, four separate courses of action have been identified that DOE may pursue in the development of a PM Career Development Program. Several courses of action are available to DOE in developing a project management career development and certification program. These alternatives, based on the data collected in this study, are:

A. Continue with the current voluntary status and structure of the various PM development programs in place across DOE.

Benefit: This approach is the least disruptive to the laboratories, departments, programs, and projects. This alternative also requires the least amount of coordination and resources across DOE.

Weakness: This approach maintains the status quo and does not promote improvement of project performance and project manager capability. The approach also conflicts with the study findings. All of the organizations in this study are moving toward or possess a mandatory, formal PM development and certification process. The study reveals that organizations make a conscious effort to improve project management capability and that decision requires a commitment by the entire organization.

B. Concentrate on introducing project management tools and techniques and external certification designed to increase the individual capabilities of DOE project managers in the mechanics of managing a successful project.

Benefit: There are several project management training and development vendors. One example is certification of DOE project managers in a system such as that offered by the Project Management Institute (PMI). Tools and techniques include PM

Enterprise software and other tools that enhance the ability of project managers in the areas of cost, schedule, quality, and customer satisfaction.

Weakness: The approach does not seek to modify the DOE management culture and, consequently, may reduce the return-on-investment of improving PM quality. This approach encourages a piecemeal application of external certification with each organization having different implementation tools and techniques.

C. Implement a tailored approach over a specified period with all programs to design a program that adheres to fundamental DOE requirements while addressing the interests and core competencies of each program office.

Benefit: A level of consistency can be maintained across DOE programs and projects, while at the same time specific interests are addressed.

Weakness: It takes time to work with each stakeholder to develop a tailored model that will meet DOE requirements while addressing specific interests. The majority of organizations studied, implemented or plan to implement a tailored approach; however, the time and effort that will need to be expended will be significant for DOE. This approach also requires visible senior leadership emphasis and support in order to succeed.

D. Develop and implement a DOE-mandated PM training and certification system, with specific requirements, standardized tools and techniques, and a centralized database of certified project managers that can be used as DOE resources for any program or project according to defined scope and resource allocation criteria.

Benefit: Correctly developed and implemented, this approach guarantees the development of standard, enforceable criteria that can be applied to measure the capability of project managers across DOE. This is the most rigorous and thorough of the alternatives comprising a mandatory certification of project managers to a formal DOE certification standard.

Weakness: The approach will neglect the culture of specific stakeholders in favor of an overall DOE-defined threshold of capability, and will require rigorous enforcement of these defined centralized standards.

Synopsis

The charts on the following page show a breakdown of the government and industry benchmarking partners Career Development Programs by identified attributes.

Government

Organization Attribute	GSA	NASA	DOD
Status of Program	Draft	Active	Active
Basis of Program	PMI	Study	DAWIA
Number of Levels	N/A	4	3
Grandfathering Provision	No	No	No
External Certification	No	No	No
Internal Certification	No	Voluntary	Mandatory
Equivalencies Granted	No	Yes	Yes
Hours of Required Classroom Training	N/A	224	500
Web Training Available	No	Yes	Yes
Recertification and Annual Continuing Education Hours	No	40	40
Mentoring	Yes	No	No

Industry

Organization Attribute	A	B	C	D	E	F
Status of Program	Active	Active	Draft	Draft	Active	Active
Basis of Program	ESI	NASA, DOD	N/A	N/A	DOD	N/A
Number of Levels	5	5	N/A	2	5	3
Grandfathering Provision	No	No	No	No	No	No
External Certification	Yes (PMI)	Yes (PMI)	No	No	No	No
Internal Certification	Voluntary	Mandatory	No	No	Mandatory	Voluntary
Equivalencies Granted	Yes	Yes	Yes	Yes	Yes	Yes
Hours of Required Classroom Training	200	232	N/A	N/A	64	40
Web Training Available	Yes	Yes	Yes	Yes	Yes	Yes
Recertification and Annual Continuing Education Hours	40	40	N/A	N/A	40	N/A
Mentoring	Yes	Yes	No	No	Yes	Yes

I. Introduction

Congress and the Executive Branch have taken several steps to fundamentally change the way that government agencies conduct their business. This has been in response to recurring management problems with Federal organizations, the requirement to reduce the yearly budget deficits, and public demands for a leaner and more efficient and effective government. Congress passed the Chief Financial Officer's (CFO) Act of 1990, the Government Performance and Results Act of 1993 (GPRA), the Government Management Reform Act of 1994, and the Information Technology Management Reform Act of 1996 in response to these demands for government reform. The Executive Branch has initiated several initiatives, including the National Performance Review (NPR) in 1993, most recently called the National Partnership for Reinventing Government. Efforts to improve the effectiveness and efficiency of Federal government agencies are expected to continue.

The Acts referenced above require Federal agencies both to focus on results and to create a business-like environment for management and accountability. The initiatives embrace several different methodologies that claim to improve organizations, such as Total Quality Management, Business Process Reengineering, and Full Cost Accounting and Empowerment. As a result, concepts such as customer service and performance measurement have moved to the forefront. Work force development has become a critical issue, because organizations will be unable to perform unless they tie strategic planning activities to personnel development. Performance is a key element.

Most organizational improvement theories and methodologies focus on personnel and processes, and their management in an organizational structure that is guided by mission: The reason for being. The management of this organizational improvement involves several dimensions of activities, including the processing and deployment of information, the timing and synchronization of efforts, the technical structure that supports the implementation of business processes, the defined functions that the technical structures perform, the resources required for the system, and increasing the capability of the individuals and teams that operate the business processes.

Reductions in workforce size and budget have affected operational effectiveness and employee working conditions in the Department of Energy (DOE). New information technology has flattened the DOE hierarchy and pushed information availability and access to the project team level, requiring strong project leadership skills in all team members. Thus, DOE is shifting to an information-based organization, with information available to every employee. As a result, DOE project managers must possess both business skills and technical expertise for a project to succeed. PM frequently requires acquisition of completely new skill sets.

The project environment at DOE has grown increasingly fragmented and complex in terms of the number of stakeholders, customers, international issues, support requirements and resources, performance requirements, testing requirements, public interest requirements, scientific expectations, technology resources and impact, budgetary issues, and private-public sector teaming arrangements. Changing attitudes and values that exist between the genders, between cultures, between organizations, between nations, between disciplines, and between individuals have further complicated this environment. Interdependence and networking are keys for success in projects, as expectations of management, stakeholders, and customers continue to rise.

In the face of accelerating change and mandated flexibility for government employees, managers across the private and public sector are turning to workforce career development and certification methodologies that ensure basic levels of capability across project portfolios. These methodologies, in order to be successful in government organizations, must integrate the technical bureaucratic organization with the cultural aspects of governmental organizations.

Based on their study of project management at DOE, the National Research Council study entitled *Committee to Assess the Policies and Practices of the DOE to Design, Manage, and Procure Environmental, Waste Management, and Other Construction Projects*, provided recommendations on improving DOE's oversight and management of projects. DOE is faced with implementing these recommendations to significantly improve project delivery and performance. The *Committee to Assess the Policies and Practices of the DOE to Design, Manage, and Procure Environmental, Waste Management, and Other Construction Projects* specifically recommends that DOE address the following elements for improved PM career development:

1. Organization-wide project management policy;
2. Clear definitions of responsibility and accountability;
3. Identification, dissemination, and implementation of lessons learned;
4. Objective performance-based incentives;
5. Performance measurement and progress reports;
6. Selection, training, and qualification of project managers; and
7. Project management core competency and organization.

Project management involves numerous skills that are measured in a variety of ways. The trend in training project managers has been to cover the two critical levels of basic and advanced project management, with qualitative behavioral components achieving an increasingly larger emphasis in addition to the quantitative analytical components (Kerzner, 1998). Certification of project managers has also achieved increased importance due to the desire to guarantee a minimum level of capability. J. Hale (2000), however, cautions that development and certification must be approached with caution. She specifies three common mistakes in developing a certification program:

- Failure to identify the business driver, consequently preventing the development of appropriate performance measures and supporting skills and training.

- Failure to appreciate the level of discipline required of the organization, in terms of agreement on program competencies, goals and standards.

- Failure to establish reasonable expectations with all stakeholders on what certification can and cannot accomplish.

Edum-Fotwe and McCaffer (2000) studied the construction industry's project manager certification requirements and found many of the three preceding deficiencies. They concluded that even though project managers were certified, the traditional engineering orientation of the requirements in construction project management were insufficient.

Despite these three potential pitfalls, many organizations have discovered that the development and certification of project managers pay big dividends in business, revenue, and customer satisfaction. The following identifies what DOE can learn from other organizations in the private and public sectors.

II. Methodology

Two qualitative methods of data collection were employed in this study. The first method was a structured interview with personnel identified as process owners, responsible for project management development within their organization. The second method was a focus group discussion designed to identify project management career development practices and processes across different levels of the organization.

Based on input from internal DOE stakeholders, questions were developed that guided the individual interviews and focus group discussions in a structured format. Anonymity of results and right of first review prior to publication ensure that competitive advantage will not be compromised for private sector organizations.

The questions that were asked to guide the interviews and discussion in the focus groups were as follows:

A. Describe the organizational PM development and certification process, to include consideration of the following topics:

    1. Brief history of process development and implementation, to include partnerships;
    2. Structure/levels of the process;
    3. Functional/knowledge areas;
    4. Eligibility requirements, competency requirements, standards at each level;
    5. Training requirements;
    6. General education requirements;
    7. Developmental experience requirements;
    8. Typical paths of project management careers (for Federal partners, interest in creating a designated PM job series);
    9. Certification procedures; and
    10. Technologies that support PM content and business processes.

B. How is the project management development and certification process integrated into other business processes within the organization, such as:

    1. Recruiting (announcement and selection);
    2. Retention;
    3. Skills and career development;
    4. Rewards and incentives; and
    5. Performance metrics.

C. What are the benefits of developing and certifying project managers for the organization, and what are the metrics, in terms of:

1. Human resources, career development, and organizational culture (achieving input and buy-in at all organizational levels);
2. Business practices;
3. Business strategy;
4. Gains in efficiency and effectiveness; and
5. Bottom-line accomplishment of project goals.

D. What are the problems that project management development and certification present to the organization in terms of:

1. Human resources, career development, and organizational culture (achieving input and buy-in at all organizational levels);
2. Business practices;
3. Business strategy;
4. Gains in efficiency and effectiveness; and
5. Bottom-line accomplishment of project goals.

E. What would the organization do differently in developing and certifying project managers in light of the history of the process to this point?

F. What would the organization recommend to DOE in considering the development and implementation of a PM development and certification process?

Several organizations agreed to participate in this study, both private and public sector. The process owners were identified for each organization, and interviews and focus groups were scheduled according to a 60-day study window. Participating organizations included:

Federal Agency:
- Department of Defense (DOD)
  - Naval Facilities Command (NAVFAC)
  - U.S. Army Corps of Engineers (USACE)
- National Aeronautics and Space Administration (NASA)
- General Services Administration (GSA)

Industry:
- Motorola
- International Business Machines Corporation
- United Services Automobile Association
- URS Griner
- Lockheed Martin Corporation
- Bechtel National Corporation

III. Results

The organizational PM development and certification processes of the participating organizations were at various stages of maturity. Several programs were long-standing, however continuous improvement in education, training, and experience criteria were an ongoing process. These improvements were commonly valued as a strategic imperative by senior management. Several organizations were not able to answer all study questions in a comprehesive fashion due to the level of PM (training and certification) maturity.

A. Department of Defense, Naval Facilities Command, U.S. Army Corps of Engineers

The Department of Defense (DOD) Acquisition Personnel Development system was originally driven by a need to educate and train defense systems acquisition personnel. Previous failures in defense systems acquisitions convinced the United States Congress that legislation was needed to improve the effectiveness of the military and civilian acquisition workforce through a formalized set of training and career development requirements. The Defense Acquisition Workforce Improvement Act was passed in November 1990 to promote DOD-wide improvement. It established a DOD Acquisition Corps that tied Acquisition Corps from each service together and guaranteed that promotions would be at least equivalent to those of line officers. Position standards were identified and approved, and personnel were certified as having met the standards set forth for the multidisciplinary acquisition workforce. A minimum set of criteria that the personnel would be required to achieve, independent of additional education, training and experience was established for discrete positions. In addition, certain positions are identified as critical, generally requiring the assignment of senior experienced personnel. Certification is recognition of having achieved professional status in the acquisition workforce.

1. Program Overview and Description

Certification is a process by which a DOD component organization (e.g., U.S. Special Operations Command, the Defense Logistics Agency, Defense Finance and Accounting Service) determines that an employee has met the minimum standards established for training, education, and experience in the DOD acquisition career model. The Defense Acquisition Workforce Improvement Act (DAWIA) requires that the DOD and the Services establish formal acquisition career paths and career development activities for military and civilian personnel. This is implemented through 11 career fields and 15 acquisition position categories, covering the entire range of acquisition-related jobs such as information technology (IT), finance, contracts, logistics, and testing and evaluation.

The DOD Defense Acquisition University (DAU) specifies certification standards for acquisition positions for personnel from the 11 acquisition career fields and 15 acquisition position categories. The certification process serves a diversified workforce of approximately 135,000 personnel, with approximately 9000 serving in the program management career field. Specific qualifications in education, experience, and training for each acquisition position category are defined for three career levels:

Level 1: Basic or entry (GS-5 through GS-8)
Level 2: Intermediate or journeyman (GS-9 through GS-12)
Level 3: Advanced or senior (GS-13 and above)

Supervisors and employees prepare a standardized Individual Development Plan for Level 1 and Level 2 employees to outline how mandatory and desired certification standards will be met.

"Grandfathering" is not permitted; however, equivalencies are granted based on previous experience, education, and alternative training that is successfully completed and documented in accordance with course competency standards and specific procedures of the DAU and by the procedures of the particular component organization. Exceptions are defined and approved according to the component organizations, and their processes for certification vary according to the needs of the particular component.

The DAU curriculum is extensive and covers both elective and mandatory elements defined by each career field for its employees. The DAU 2001 catalog of courses can be found online (www.dau.mil). The DAU homepage provides links to the various Directors of Acquisiton Career Mangement websites. These cover specific program guidance for the individual services and civilian workforces. Fundamentals courses are required for everyone and consist of approximately 14 weeks of resident training. There are also extensive selections available in the areas of auditing, business and financial management, contracting, property administration, information systems, logistics, program management, quality, system engineering, and testing. There is an initiative to transfer basic and intermediate courses to the Web, allowing for a combination of mandatory resident and Web-based courses to fulfill certification requirements. There is a mandatory continuing education requirement of 40 hours annually.

To achieve additional professionalization of program management within DOD, the DAU publishes a journal called *Program Manager* that addresses issues and research pertaining to managing programs within the defense environment. The journal serves as an important mechanism to publicize rewards and incentives given to DOD project managers, and provides notification for meetings and symposia that promote the development of a professional cadre of DOD project managers.

The DOD program management career development process is tightly integrated with organizational business processes and the Individual Development Plans are a supplement to the required annual performance reviews. Personnel records establish certification as a criterion for selection of assignments and promotion.

2. Benefits, Barriers, and Recommendations

DOD identified the following benefits of a strong certification process:

- Increases workforce flexibility and mobility.

- Promotes a consistent and recognized definition of capability across the organization, allowing for a systems perspective.

- Enhances the dissemination of knowledge about rapidly developing technology (e.g., new software tools).

- Allows for the development of communities of practice and effective mentorship, which in turn develops a knowledge management infrastructure.

- Encourages the asking of hard questions in a non-attributional environment.

DOD identified the following problems with implementing a certification process:

- Technical management requirements in functional areas are difficult to capture and time-consuming to define, with many similar concepts holding different names.

- Underestimation of the power of resident courses in creating and maintaining an effective culture. It is often sacrificed simply due to budgetary pressure and inability to quantify the difficult metrics of organizational impact of training.

- Mid-level employees commonly resist change brought about by the certification program.

- Continuing education requirements beyond Level 3 are usually non-existent.

- A tendency for over-reliance on tools is prevalent rather than a true integration of the cultural and system elements.

DOD recommended that organizations considering a PM development and certification process:

- Define common knowledge and common requirements across the entire organization and create strong competency frameworks.

- Adopt an existing career development process, if possible, because all models tend to have common components.

- Discourage "grandfathering," because it impedes the transmission of organizational culture. Carefully define equivalencies and exemptions with each component organization.

- Incorporate a strong team leadership component, emphasizing Integrated Product Team processes, and train at the team level as part of the development process.

B. National Aeronautics and Space Administration (NASA)

The NASA Academy of Program and Project Leadership (APPL) has been in existence in earlier incarnations since 1987. Originally, it was the Program and Project Management Initiative (PPMI) and was established as one solution to address concerns stemming from the *Challenger* accident. A career development model was applied to the PPMI initiative (Duarte et al., 1995). PPMI promoted educational and training resources that enhance project management knowledge and skills. The PPMI transitioned to become NASA APPL. APPL's mission is to train project managers to adapt to an environment requiring a significantly different mindset and a new methodology for successfully managing projects safely, with speed, quality, and at low-costs.

1. Program Overview and Description

The early years of the PPMI were focused on establishing a robust and relevant curriculum of courses. Through early and thorough training and development, the intent was to provide a baseline of knowledge and competence that would better prepare a future generation of NASA project professionals. The genesis of the NASA Academy was therefore based on an understanding that the goal was to provide sound fundamental skills. These fundamental skills would then be developed and further honed through years of incrementally more challenging assignments. Capability would be nourished through safe learning on increasingly challenging work with an abundance of experienced mentors ready and willing to offer any necessary guidance, tips and encouragement. PPM1 was well conceived for the organizational setting. NASA, in 1990, was still a traditional leader in managing large, expensive, long-duration programs and projects. The initial career development efforts were clearly limited in scope to traditional training approaches that reflected the current status of Adult Learning theory and technology.

A new era of revitalization started in 1992 with the appointment of a new NASA administrator. The era of managing projects that were smaller, faster, and cheaper was established. In this era, the emphasis was on doing more with less, greatly increasing the volume of project work and doing it in a way that emphasized safety, innovation, low cost, speed, and quality. It was no longer reasonable to generate courses without a clear link to mission success and requirements. A major effort was, therefore, undertaken to identify the core competencies required for success at different stages of a career.

The competency-driven approach centered on a formal career development strategy (eventually called the NASA Project Management Development Process or PMDP) that was intended to link critical project competencies to NASA sanctioned learning and education. These competencies are regularly updated using surveys that address frequency and importance. A systematic analysis of curriculum content linked to organizational customer requirements, created an opportunity to tie mission success to training thereby tying human resources directly to mission success for the strategic plan enterprise elements. These elements are described in the NASA Strategic Plan at www.nasa.gov (under Welcome to NASA Web). For the philosophy, competency descriptions, and career path levels, refer to the NASA *PMDP Guide*.

NASA APPL functions are grouped into five main areas in order to deliver PM developmental activities:

- Project Management Development Process (PMDP): A voluntary NASA career development process for NASA employees involved in projects, provided to engineers, scientists, and professional administrative support personnel.

- Accredited Project Management Curriculums: Provides the educational and training foundations for project success.

- PM Tools and Knowledge Management: On-line availability of PM information and automated tools.

- Performance Support for Intact Teams: Delivers what is needed, when it is needed, where project professionals need it, tailored to project mission requirements. Current topics include project planning and scheduling, work breakdown structure, risk management, business management, team development and facilitation, and inside-out coaching.

- Research, Studies and Publications: Maintaining adaptability and proficiency through benchmarking and research in PM.

2. Benefits, Barriers, and Recommendations

The benefits of using a systematic approach for PM development in the organization are:

- The utilization of a comprehensive training and development Standard Operating Procedure geared to cost comparison, cost avoidance, and cost savings in order to achieve the best return-on-investment.

- Curriculum quality inspected by independent recommendation for accreditation by the American Council on Education.

- Participants certified for course attendance, thus ensuring that the skills and abilities taught will transfer to the workplace.

- Contractual mechanisms established for curriculum development, technology, facilities and course management (Management, Organizational and Business Improvement Services, Business Purchase Agreement, Purchase Request, Purchase Order, and traditional), reducing costs and raising efficiency in procuring products and services.

- Metrics established for all business processes and customer satisfaction, eventually tying PM training and development to mission success.

NASA did not identify any barriers to their PM career development and certification process.

NASA recommends that any organization considering the creation of a PM development and certification program emphasize the following elements:

- Performance support through increased delivery in the situated learning environment of project teams, with project deliverables as outcomes.

- PM tools and information technology that reduce the costs of PM training and enable fast, on-demand reliable information transfer to project teams.

- Allegiances and partnerships with industry, academic institutions, and government agencies to exchange/share resources, ideas, and solutions to common PM challenges.

- Computerized developmental simulations that support organizational programs and projects, and provide accurate gap analyses.

- Lessons learned and using practitioner experiences by using them as teachers that facilitate and guide the development of individuals and teams (capturing these in a lessons learned database).

- Mandatory PM certification by consolidating and integrating PM capability and oversight of development through a robust certification model.

C. General Services Administration

Project management has been identified as the primary way that the General Services Administration (GSA) conducts business. The organization began developing and certifying their project managers approximately 10-15 years ago. The organization, like other Federal agencies, has progressed through different approaches depending on government and business imperatives.

1. Program Overview and Description

GSA's current approach centers on the two main populations of design and construction project management, and the related support elements. GSA does not possess a multi-level competency framework, but is working towards a defined model. Skills and traits for project managers have been developed by the GSA Project Management Center of Expertise, *Desired Traits for Project Managers in GSA.* The proposed model covers the following areas:

- Business Skills (e.g., negotiation, project cost management, and project management)

- Communication Skills (e.g., written, oral and conflict management)

- Influence Skills (e.g., teaming and change management)

- Managerial Skills (e.g., project coordination and political awareness)

- Problem Solving Skills (e.g., analyzing and assessing)

- Technical Skills (e.g., PM for one or more prospectus-level projects within the last 10 years; understanding the entire construction process)

- Personality Traits (e.g., agreeableness, assertiveness, confidence, conscientiousness, judgment, and trustworthiness)

The majority of PM courses are outsourced. Each department maintains a list of training vendors that meet the requirements of the organization for project management development. Other developmental activities are offered by the Human Resources (HR) department through the University for People, covering basic-level project management. The Central Office identifies organization-wide business imperatives and contracts for activities such as Sustainable Design, a required activity for all GSA project managers. Web-based programs are currently generic, however, plans are to develop and organize PM tools and techniques for on-demand accessibility. GSA is developing a project management template that will integrate the existing tools and databases.

GSA considered PMI Certification but rejected the idea when the majority of employees were upset at the content of the program and that the certification process tested knowledge, not capability. GSA is now reviewing other programs that are more construction-specific. GSA will continue to view external programs as only part of a comprehensive project manager developmental approach. GSA will continue to sponsor and pay for a corporate membership with PMI for all of their project managers. GSA is concerned about the training and development of their contractors, and views external certification as a possible discriminator in contract performance, though this is not a formal requirement.

Individual Development Plans (IDPs) for project managers are used by GSA to identify gaps in capability, and to develop a training plan. The IDPs are tied into the biennial performance reviews and cover: (1) Budget, (2) Schedule, (3) Customer Satisfaction, and (4) Management.

Rewards and incentives are controlled at the department level by the payment of bonuses through the achievement of performance-based targets in terms of project scope, schedule, and cost. GSA has developed a voluntary grass-roots developmental activity, Project Management Guild, consisting of project managers, architects, and engineers from GSA and other Federal agencies. The Guild focuses on identifying and developing best practices, and promotes employee development and recruitment. The program is very successful and GSA wants to formalize the process. The Guild is sponsored by executive management and is managed by a cross-functional steering team. The budget for this activity is provided by senior management to each major project department. The Guild is organized as follows:

- Technical Task Force: Responsible for meetings, seminars and training sessions.

- Training and Development Task Force: Responsible for recommending training criteria, developing mentorship, sponsoring and implementing New Employee Orientations, developing the Co-op program, and developing the Intern program.

- Human Resources Task Force: Responsible for recommending basic qualifications, developing standard criteria for Knowledge, Skills, and Abilities (KSAs), participating in workload analysis and resourcing strategies, reviewing and standardizing Position Descriptions and Job Analyses

and crediting plans, developing Interview Guides, and recruiting and training Guild members for evaluation and interview panels.

- Communications and Professional Liaison Task Force: Responsible for working with IT personnel to maintain the Guild Website and increasing Guild membership participation in professional associations.

The organization has a mentoring process in place that formally assigns junior project managers to senior project managers. Although there is no evaluation of the effectiveness of the program, the concept is valued as a necessary component of their PM development and certification program.

2. Benefits, Barriers, and Recommendations

The benefits of the PM development for the organization are a common PM vision and language that can be used by GSA and enhanced confidence in the capabilities of project managers that are assigned to projects. One concern is that several reorganizations eliminated entire divisions, eliminating improvements that never had a chance to come to fruition. Another issue is that senior management tends to reassign personnel that show PM capability, thus removing talented people from managers who are left with a less than optimal view of developmental and certification activities.

GSA recommended the following elements in the development of a PM development and certification program:

- Tie the program to the strategic plan.
- Include a strong mentoring capability.
- Create strategic partnerships with external partners (e.g., universities, government agencies, and the private sector).
- Create a strong competency-based training model.
- Concentrate on culture change or the effort will fail.

D. Organization A

Organization A is a product-oriented company, providing clients in the government and private sectors with products and services from the areas of computer technology, semiconductors, and corporate services to include research and development laboratories and communications products and services. The organization initiated development of the Project Management Professional Development Program approximately five years ago under the auspices of a Corporate University. Poor project performance, lack of knowledge and skills of project managers, and costly production delays led to the development of the program as a strategic imperative, thus enjoying the support of

senior management. A needs analysis identified that very few of the organization's project managers had attended specific PM-related training.

1. Program Overview and Description

The organization currently collaborates with ESI International (ESI) to develop and implement their PM development and certification process. ESI develops and manages project mangement programs and courses. As part of the relationship, George Washington University approves course content and awards course completion certificates and a Master's Certificate in Project Management. In addition, the Project Management Institute (PMI) defines and publishes the Project Management Body of Knowledge (PMBOK), administers the Project Management Professional (PMP) examination for company personnel, and certifies project managers who pass the examination and meet the qualifications. Risk management training was piloted in 1996 and the PM curriculum in 1997. The peak year was in 1998 with approximately 65,000 - 68,000 training days worldwide. In addition to resident offerings, the company offers web-based and CD-ROM-based training for distance-learning students. For project support personnel, there are two-day interactive and team training workshops. The courses are open to all employees, even those not planning to pursue professional credentials.

The company defines five organizational levels of Project Management competency and capability. At each level the trainee must satisfy the PM competency requirements defined as customer/market relationship, manageable risk/impact, defined span of influence, and experience, education, and knowledge. The latter ranges from a minimum of a BS/BA Degree, four to seven years experience, and training defined as six credit hours of PM courses at Level 1 to 20+ years experience, 10+ as PM, and six additional credit hours of PM courses at Level 5. Abilities, skills, knowledge, experience, and defined characteristics increase with each level of competency which are identified in the box below.

Level 5 - Vice President, Projects
Level 4 - Director, Projects
Level 3 - Principal Project Manager
Level 2 - Senior Project Manager
Level 1 - Project Manager

Organization A has defined nine project management competencies in their model. The competencies are:

- Building customer relationships and stakeholder expectations;
- Leadership;
- Project management tools and information technology;
- Monitor project performance;
- Business acumen;
- Management skills;
- Project execution;
- Project management knowledge; and
- Project planning.

The organization identified twelve management competencies that are not classic components to PM; however, these are fundamental to effective management and become increasingly vital as the project manager climbs the career ladder. The competencies are identified in the box below:

- Communications
- Creativity
- Decision-making
- Flexibility
- Influence and persuasion
- Initiative
- Negotiation
- Relationship
- Change management
- Integrity
- Strategic Thinking
- Loyalty

The organization offers four options (in partnership with ESI and PMI) for employees to earn PM credentials:

- Master's certificate in PM
- Master's certificate in Technology
- Master's certificate with a Specialty in Global Business Management
- PMP certification by PMI

The organization offers formal training to employees to assist in passing the PMP test. PMI has certified 850-900 employees since 1995.

The development and certification process has been integrated closely with the business imperatives. Originally, they had difficulty finding a corporate sponsor, but found the Corporate Vice President for Engineering to agree to sponsor the PM initiative. From this, a Corporate Engineering and Project Management Council was established to serve as a Business Review Board to establish disciplines, funnel selections of project managers, sort requests for participation in the program, create screening criteria, and advise on the curriculum.

The organization recruits project managers from inside the organization, only occasionally recruiting externally. A predictive assessment tool also used by NASA to select astronaut teams is used in PM workshops to identify and select PM recruits, creating a personal and communications profile that identifies whether or not a person would perform well as a PM.

PM technology includes a Portfolio PM Tool, an Interface Management Tool, and "Dante," a database that collects and maintains core project information. For project support personnel and projects that need assistance, the organization provides consulting and mentoring services to help implement PM as a core competency within the organization. Consulting, mentoring, and training support is provided directly to project teams in the topic areas of project management, risk management, strategic planning, team building, change management, problem solving, and organizational and business development.

Project managers are evaluated by project slippage, cost delays, project milestones, meeting scope, staying within budget, and team skills in their performance reviews. Rewards and recognition are regularly awarded in formal and informal settings for both successes and failures. The organization has challenged and empowered the PM and engineering communities to develop methods and processes to complete projects ten times faster, supporting efforts such as Six Sigma and 10X or Cycle Time Improvement. Project managers report to the Corporate Council every six weeks to show improvements by percentage. Gains are measured against cycle time baselines, number of projects completed on time, slippage of late previous periods, meeting scope, and staying on budget.

2. Benefits, Barriers, and Recommendations

The organization identified several benefits of the project management development process:

- An established process provides time for continuous improvement.
- The process provides discipline, sponsor involvement and customer satisfaction.
- The process provides consistency in knowledge, skills, and abilities.
- An increase in number of projects completed on time and within budget.

Several barriers were identified in implementing their project management development and certification process:

- Achieving buy-in at all organizational levels, where it is easier to intellectually agree but not truly support the effort.
- The mentality that a formalized PM development and certification process gets in the way of creative collaboration.
- Cross-company teams that involve management, technical, and project manager skills must resolve integration issues in career progression, with PM skills possibly cutting across functional areas.
- Organizational issues impact the practice of PM, such as centralized versus decentralized control, horizontal and vertical integration issues, and matrixed resources.

The organization would do the following differently in implementing a project management development and certification program:

- The PM development and certification program would be established on a faster schedule, if possible.
- A stronger effort would be taken to convince management of the value of the process. Selling the benefits of the process is critical.

- The program design would concentrate more on the selection and retention of project managers.

The organization recommended specific actions in order to succeed in the development of a project management development and certification process:

- Find a partner such as ESI International and George Washington University.
- Carefully define valid competencies, capabilities, and the requirements at each level. Development will naturally follow once a strong foundation has been created.
- Create a total environment with a strong supporting structure.
- Use a systems approach to integrate people, processes, tools, and techniques.
- Managers must be encouraged to embrace new behaviors, such as mentorship.
- Create a strong vision of the desired end-state with major milestone components along the way in training, methods, and tools. A systems perspective is critical. Focusing exclusively on one element may result in failure.
- Develop sophisticated metrics as the maturity of the process continues.
- Carefully define equivalencies, but do not "grandfather" project managers. Offer Fast Start courses for more experienced Senior Management personnel to speed up the certification process.

E. Organization B

Organization B began their PM development process in 1990 as a worldwide initiative for software developers, and followed the DOD model in initially establishing the minimum criteria. As the business grew, the company soon realized that they needed common processes across the organization to handle training new personnel to requirements. The entire organization formally committed corporate investment to project manager development and formal certification in 1996. Corporate commitment included executive-level champions for services and products, serving on the PM Center of Excellence Steering Committee, hundreds of hours spent with organizational teams, and quarterly progress reports at the Chief Executive Officer level.

There was a two-year phase-in period where "grandfathering" was not permitted, however, equivalencies, self-assessments, and condensed fast-track curriculums for experienced project managers were made available. The PMI examination was mandatory in this transition period. "Grandfathering" was viewed as defeating the purpose of mandatory certification. There were many complaints during this transition period.

The organization has identified project management as the way work is conducted within the entire organization. Managers usually shoot from the hip and make mistakes before moving to a

formalized project management process. The company realized that it takes more time to do things from a project management perspective. It has taken the company ten years to fully conclude that project management is a better paradigm than gut feeling and intuition.

1. Program Overview and Description

The company model comprises a mandatory PM certification process and a corporate PM competency model that define capabilities at each PM level, with functional area professional requirements identified and integrated for particular disciplines such as IT and finance. They have a five-tier PM career system that formally certifies project managers at the top three levels. Project management is viewed as a full-time career field with clearly defined career paths and specified minimal levels of education and experience at each level. Career paths for project managers have always existed in the organization, however, the organization has moved from 57 different project management jobs to five. This makes the promotion path clearer and emphasizes that project management is not simply an administrative function.

In this system, managers determine whether they want to track a person as a project manager. There are, however, still problems convincing the manufacturing and development divisions in the benefits of the PM program. Project support personnel are classified as IPT members. This framework is imposed as a series of checkpoints and life cycle elements that are employed for cross-functional teams under a Product Development Team Leader, a position that currently requires no certification.

To be certified, project managers must defend how and where they achieved their capability and defend their level of performance through documentation of three project profiles in a standard format at the third level, and four project profiles at each of the next two higher levels. There are 29 mandatory days of resident tier one education that is designed to drive consistency in knowledge and behavior across the organization. In addition, there is a minimum yearly lifelong learning requirement and mandatory recertification every three years through standard project reports. PMI certification is required as an input at the third level and is paid for by the organization.

The PM development and certification process is closely tied into other business processes using an integrated approach of people, tools and methods. It crosscuts management processes and is ingrained in all business and technical processes. Personnel commented on the huge challenge of having to look at diverse company processes to define the fit with PM development and certification. There is a strong integration with HR, resulting in clear job descriptions, improved recruiting, improved retention, and clearer specific job family assignments for project managers. There is a voluntary tie-in of the PM process to performance appraisals, however, it is clear that certification is required for promotion within the organization. The PM records are maintained in a central corporate database, signed off by supervisors and reviewed by a certification board of peers drawn from eight different specialty areas, i.e., hardware development, software development, strategic business. Each certification board possesses a business process focus. Board members can nominate new members or executive management can nominate board members depending on business imperatives. Some company divisions view the PM development and certification process as a promotion review board, although that is not the intent. Incentives were pulled out of the process once it became mandatory as a condition of employment.

2. Benefits, Barriers, and Recommendations

The company specified clear benefits of their mandatory development and certification program, to include:

- Consistency in abilities, skills, and knowledge.
- External validation by organizations such as PMI.
- Transportability of capability in services and products, with the ability to move capable project managers from one part of the company to another.
- Giving company management flexibility and confidence in their subordinates.
- Transforming the company to become project-based, well beyond simply running projects.

No barriers were identified in the development and implementation of their project management development and certification program.

Recommendations from the organization in developing an effective and efficient project management development and certification process include:

- Ensure high-level executive sponsorship.
- Ensure full integration into HR.
- Treat and emphasize major PM program business transformation challenges.
- Emphasize mid-level management education as critical.
- Practitioners must be educated about the level of commitment required.
- Have tools available to roll out the process synchronously when the methodology begins implementation.
- Recognize that an excellent PM training and certification program goes beyond “a good PM tool.”
- Establish communities of practice as the process matures and maintains the momentum in changing from a prescriptive mode.
- As the process matures, require other communities to buy into the process, such as the consultant community and architect community for the company.
- Foster mentoring as a key component of the process. Mentoring needs to be measured as a give back activity, reviewed at the board level.
- View knowledge management as a give back activity that needs to be measured at the board level.

F. Organization C

Organization C has developed their PM program as a business change coincident with the appointment of a new CEO. The organization does not currently have a formal position defined for project managers, except in the IT sector. More and more positions are being created and identified as project management related, with compensation identified as a critical issue. The organization envisions an internal group of project managers who possess deep skills and can act as mentors and another group that will move in and out of project management. This means that a professional core of project managers will manage more complex projects while others will manager smaller, less risky projects. The organization is looking at defining career paths later in 2001.

1. Program Overview and Description

The organization has a basic PM curriculum in place covering leadership, project management tools and techniques, and teaming skills. This curriculum is internally developed and training is externally contracted with vendors. PMI certification was originally encouraged but feels that it complicates the internal process. The organization stays true to about 70 percent of the PMBOK, with internal emphasis on the more applicable elements driving creation of internal solutions. The company encourages self-development and reimburses personnel to pass the PMP examination if they desire.

The organization considers its PM career development program to be in its early stages of development. They are still defining the PM process and their proprietary draft PM competency model has not been approved by all company sectors. The corporate goal is standardization of the PM process and language, achieving buy-in across all business processes and functional areas, and expanding to include project support personnel. The original project management development process was overhauled to effect quicker turnaround of business imperatives, primarily market responsiveness. The new model emphasizes the development of project managers who can work within a self-funding project cycle requiring tangible benefits at each phase of the project in order to fund the next cycle of related projects. The organization does not currently certify their project managers, but is driving towards certification through the design of a tailored proprietary model that emphasizes 1) different levels of capability split across different business processes and functional areas; 2) building in flexibility through overarching processes; and 3) allowing discretionary practices and requirements, as needed.

The organization views the systems approach of project management as critical, with integration into the HR processes as essential. Currently, PM training is under HR. HR does not control the business processes for PM within the organization and relies on the business divisions to communicate accurate resource requirements. The business metrics for evaluating the impact of project management development are not in place. The initial metrics will focus on the project managers at the level of training and development. Improved organizational success is viewed as an increased capability by project managers to select projects based on more realistic and pragmatic outcomes. The success metrics and lessons learned are used in the development and certification process as examples for others to learn from.

2. Benefits, Barriers, and Recommendations

The organization views benefits of a PM development and certification process to be:

- Increased capability by project managers to select projects based on more realistic and pragmatic outcomes.
- Standardization of the PM process and language.

The organization has identified several barriers to an effective and efficient PM development and certification process, to include:

- Bureaucratic and administrative requirements can make PM development and certification difficult.
- Management education on the benefits of the PM development and certification. It is particularly difficult to convince the middle management level to overcome reliance on intuition.
- Creation of a trusting environment and encouraging management culpability in failures.
- Convincing management to allow project managers to be trained and certified.
- Using currently overtaxed leaders as teachers and mentors.

The organization recommended that organizations consider the following:

- Develop a competency-based PM development model.
- Leverage the Web as much as possible for training and tool delivery.
- Standardize the language and PM processes as much as possible.
- Achieve buy-in with all stakeholders early in the process.
- Obtain senior management sponsorship.
- Develop metrics that mature simultaneously with the PM development and certification program.

In describing their vision of a PM development and certification process, the organization said they are developing a program that is well-understood, systematic, incorporates effective rewards and incentives, possesses a formalized internal certification requirement, and contains a toolbox to support business processes. The process will be measured with metrics that promote lessons learned and maximizes the Web for efficiency.

G. Organization D

Organization D has had a PM development process since the inception of the company in the 1950s due to the complex nature of their work and the sophistication of their clients. The company has discovered that project management is the best way to handle change and complexity. Office managers are driving the requirement for a PM development and certification program because they are looking for a tool to communicate expectations to the staff and require them to acquire core PM competencies. The program is seen as a valuable management initiative and has the backing of senior executives.

1. Program Overview and Description

A formal PM competency model is recognized as a critical element for their program. Organization D is therefore moving towards creating a proprietary competency model. Presently, individual courses are offered in project management and there is an informal distinction between junior and senior competency levels. The organization is in the process of developing incentives and formally identifying milestones for a PM career, and is coordinating with the HR department to identify career paths. Upcoming initiatives include defining eligibility requirements, creating competency definitions, and driving towards the goal of creating a mandatory PM certification process.

The current project management training initiative is Web-based with new modules being fielded on a regular basis. Convenience and the timing of training delivery (just what's needed, just in time) is driving the curriculum development process. Consequently, Web-based module development is being pursued aggressively. All of the training modules are internally developed because the company discovered that the majority of off-the-shelf products were not tailored towards company requirements, were boring, and generic. The company collaborated with a web authoring company to install training materials and tools. The distance learning curriculum covers the topic areas in the box below:

- Functional technical skills
- Consultative selling
- Risk management
- Finance and budget
- Team management

In addition to training, the Web site identifies experts from across the company in particular subject areas.

2. Benefits, Barriers, and Recommendations

The company recognizes that training is seen as an important benefit for new employees. New employees seek training and development to improve their skills that allow them to become more productive, and promotes their importance to the company. There is an intuitive sense that PM

development is related to retention. The performance rating system and PM development system will be integrated to identify gaps in capability.

The company states that the primary benefit of an effective PM development and certification program is enhanced capability in successfully managing critical projects for the company and an increased level of customer satisfaction. These benefits are clearly seen and supported by management and employees.

The biggest problem for the company is the lack of an "owner" to make it happen. It is very difficult to administer an effective program that does not have a centralized champion within the company ensuring that the program is meeting the objectives set out for it. Another problem is that employees are accustomed to attending traditional training as a break from work. Employees now realize it is a different environment where performance is critical and will be measured. A final problem is that it is difficult to define a common language and processes for 16,000 employees, including support staff.

The company recommends that DOE consider the following when developing a certification process:

- Carefully set criteria for outsourcing Web-based content.
- Use in-house subject matter experts to develop the content and outsource the Web-formatting of the lesson plans.
- Integrate performance ratings and developmental plans.
- Try to establish a system that forces usage of materials.

H. Organization E

Organization E developed a project management development and certification process in 1993, when project management was identified as a key core competency. The group of companies formalized project management as a profession with clear career paths, comprehensive position descriptions, and established job aids such as a "PM Guide" to help the employees advance or transition to the project management profession. Minimum qualifications were established as criteria to enter the project management profession and standards were set to define how employees would be considered qualified, certified, and recertified.

1. Program Overview and Description

The PM development and certification program was standardized throughout the participating companies within the corporation. Each organization defined their project managers' roles and responsibilities along with their particular project management career path. To emphasize the program and ensure integration into other business processes, a PM Executive Steering Group was created to oversee the process for all participating companies and to grant certification and recertification approvals. Similar steering groups were created at each participating company.

The PM development and certification program follows a specific cycle so that employees can achieve two separate program plateaus: Qualification and certification. For qualification as a project manager, an application that includes a self-assessment of capabilities and experience is completed and forwarded to management for approval. The company PM Steering Group then reviews and approves the application. Once approved, the employee is presented with a certificate signifying achievement of the first plateau as a qualified project management professional. The self-assessment, completed as part of the application, becomes the foundation for future development towards the goal of achieving the second plateau: A certified project management professional.

The certification cycle begins with completion of an application that is forwarded for management review and approval. The approved application, including a self-assessment, is submitted to the company PM Steering Group for review and recommendation for approval. The application is presented to the company president for review and approval, and is finally presented by the company representative to the PM Executive Steering Group for review and approval. Once approved, the employee is presented with a certificate signifying achievement of the second plateau as a certified program management professional. Recertification is required every three years to verify that certified project managers have continued to perform successfully in the profession. The self-assessment instrument consists of:

- Eleven Major Categories (e.g., quality/process, PM, technical skill, risk, proposal);
- Thirty-one Sub-Categories (e.g., leadership, planning, organizing, preparation, strategy, relationship); and
- One hundred fifty-seven specific components and skills (e.g., vision, empowerment, communication, analysis, assessment, metrics).

Each of these assessments is based on particular skill competency levels that are defined in the box below:

Level 1 - Entry
Level 2 - Basic knowledge and awareness
Level 3 - Ability to perform with assistance
Level 4 - Ability to perform without assistance
Level 5 - Ability to advise and lead others

There are numerous PM-related training courses recommended in the Guide, but only four are specified as required for consideration as qualified or certified. These four courses are one-time resident training and are identified in the box below:

- Program Management
- Subcontract Program Management
- New Manager Leadership
- Systems Engineering

For certification, an experience equivalency may be acceptable in lieu of certain classroom training but employees will not be "grandfathered" into the program. These equivalencies are made at the discretion of the PM Executive Steering Group and non-company-specific training may be acceptable in lieu of company training if the applicant can demonstrate equivalency between the course material and the company-specific training. Key external PM training and certification programs may be substituted for the self-assessment requirement when applying for certification. These substitutions include PMI Project Management Certification and DOD Level III Program Management Certification.

The experience summary is the primary focus used for the Steering Group reviews and follows a standard format. The Steering Group looks for a minimum of three years of program management experience. The employee is expected to cover all related experience (industry and military), to include program name, type, value, responsibilities, challenges, and successes. This summary is required regardless of a DOD Level III or PMI certification and is used to address any gaps between those programs and the organization's.

2. Benefits, Barriers, and Recommendations

The organization views their PM development and certification program as providing very clear benefits to the organization. These benefits are:

- Providing a foundation for an effective PM development and mentor program.
- Defining clear professional career paths for project management professionals.
- Achieving competitive advantage for individuals for promotions and assignments.
- Providing an opportunity to add another dimension to recognition and retention programs.
- Providing an effective basis to measure the PM skills and experience of individuals and organizations.
- Improving overall PM effectiveness of the greater organization.
- Improving cost, schedule, technical and risk management performance.
- Improving the overall competitive position of the greater company.
- Using performance as a discriminator in decision-making.
- Providing assurance of capability through the PM certification program being recognized by industry and customers.

The organization did not identify any barriers to the development and implementation of their PM career development and certification process.

The organization recommended that DOE carefully consider the following when developing a certification process:

- Plan towards mandatory certification.
- Involve management in the development of the program and in the delivery.
- Balance Web-based elements with traditional resident training modules.
- Distinguish between qualification and certification with the latter being more advanced.
- Use a steering committee at the senior management level to achieve continued emphasis and buy-in.

I. Organization F

Organization F is an engineering and construction company that provides support in all phases of projects (e.g., design, build, operate, and dismantle). In the late 1960s, the organization introduced project management as a better way to conduct business, instead of having a design manager tossing a work package over the fence to the construction side of the house. It proved to be a difficult transition as designers and engineers did not want to give up their responsibilities without a fight.

1. Program Overview and Description

Today, Organization F uses project management to exploit new business areas, e.g., operation of industrial plants. The company is organized as a matrix, with functional areas (e.g., engineering, procurement, safety, contracts, project operations) responsible as keepers of the knowledge for each of their particular disciplines. The matrix format provides a stable organization for project managers to stay informed and in control of their particular area. HR provides general organizational training, however, the specific disciplinary training design rests with each functional area. Upon receipt of a new project, a project team is staffed from the functional organizations, selecting the basic team and assigning personnel as required, with the number and expertise of team members changing according to the life-cycle status of the project A corporate PM committee looks after the welfare of organizational project managers, and assignment to projects that range from six months to seven plus years.

The majority of individuals selected for development as a project manager are recruited internally and average five to seven years with the company. Approximately 30-40 percent come from external recruitment efforts. Performance and a successful record of accomplishment are key, in addition to a display of leadership traits. The PM training program is a three-tier model consisting of:

- A basic level program: Five day course that orients project managers and support personnel to the overall organization and operations. The program is competency-based, covering the basics including contracting and procurement. It is a resident course with a valuable networking

element and 25-30 personnel per course, with four courses per year in San Francisco at corporate headquarters.

- A middle tier program: Emphasizes hands-on experience and additional PM tools and techniques. This tier is currently under development with the majority of content placed on the Web. An internal PM simulation is being considered with mandatory certification at this level for all project managers.

- A third level program: Emphasizes management of project portfolios and strategic considerations.

Direct outcomes from training are not measured. There is an intuitive confidence demonstrated by managers based on a current average of nine on a ten-point scale. Courses are taught by the functional managers and paid for out of the managers' budget for support personnel. Project operations pay for the training of project managers. Managers have identified all attendees as excellent performers. To capture experience, the organizaiton uses resume files and an internal skill assessment tool, and relies heavily on the knowledge of personnel by the operations managers.

There is a requirement for all outside people to go through the basic level, regardless of experience. "Grandfathering" is not allowed due to dilution of the organizational culture. A separate component to the training program is the PM career path that contains responsibilities at each level, job descriptions, and the corporate PM career path. This element is coordinated with HR and consists of a defined PM career path, positions for development at each level, and job descriptions for each level. The PM population is approximately 500-600 personnel, with the majority possessing a B.S. in Engineering and an M.B.A. Potential project managers may be assigned as Deputy Managers on projects to provide "real-world learning" in a performance-based environment.

External certification is not required but is supported if pursued, particularly with PMI. Future plans include requiring internal certification at tier two. This company has a centralized database to track training and experience of project managers. Training metrics, pre-tests and post-tests are given for courses.

The training and career development programs are tied into HR. Yearly performance reviews are tied to individual development plans. Attendance at training that addresses identified capability gaps requires supervisor approval. Individuals indicating an interest and capability for project management are referred to the project operations area, and this effort is coordinated with functional management as well as with HR. HR is tasked with identifying, developing and retaining excellent people across the entire organization. A program, *People Days,* allows senior managers to highlight their important people, who are then considered as candidates for project manager positions.

New tools and techniques are being developed internally: 1) a Project Portal, 2) a Project Knowledge Matrix, 3) Project Team Workbooks, and 4) checklists for project life cycles of smaller projects that typically have less experienced personnel. Enterprise tools are also employed (e.g., Primavera® for schedules, Expedition® for subcontracting, and an internal PM tool for contracting). The preference is to use commercial products as much as possible because internal tools require a high level of maintenance.

Retention of project managers is based on flexibility and mobility. Standard relocation policies outline how and when project managers will be assigned and reassigned. A capable and mobile person is the most valuable asset for the company. The organization also tries to implement standard tools and practices across all projects so that individuals going from one project to another have an easier transition. Rewards and incentives include promotions, annual bonuses, assignments, and merit increases. The bottom line in retention and rewards is performance over all other criteria, in terms of safety, cost, schedule, customer satisfaction, and meeting specifications.

The company uses a three-element model in ensuring project success for project managers:

- Standard organizational tools and processes;
- Effective and efficient training; and
- Implementation of Readiness Reviews and Management Assessments.

The reviews and assessments are jointly sponsored by the project operations and quality control areas. Functional and operations managers conduct a two- or three-day team review of a project. The team reviews the project's use of tools, if they are accomplishing what they signed up to do, and collection and sharing of best practices. Reviews are conducted two to three months after an award, and usually once or twice a year.

2. Benefits, Barriers, and Recommendations

The organization did not identify specific benefits to the PM career development and certification program. The major issue identified by the organization in implementing a systematic project management development and certification program is that it simply takes time for project managers to learn and perform, and that the organization takes a risk in assigning new project managers. The organization must be tolerant of mistakes, and must build in safety nets (e.g., management emphasis in using organizational resources to solve project problems).

Organization F plans to continue exactly the way they are going in terms of project management development and certification. They are considering, however, using evolving technology as delivery platforms for training (e.g., CD-ROM and Web-based methods), despite the concern about losing the driving force and networking of more traditional approaches.

The organization recommends several elements to DOE:

- Develop clear goals, roles, and responsibilities for both contractors and DOE.
- Develop trust and synergy through a systems approach.
- Develop a PM career path that covers roles and responsibilities, rotation assignments, and readily available standard tools and techniques.
- Develop a contractor and client contingency.

- Develop a review process that discourages “dog and pony shows,” uses knowledgeable people, and is supportive rather than an audit.

- Emphasize contract administration.

- Identify a strong process for change management.

IV. Discussion

Several criteria of PM development and certification programs emerged from the interviews with the benchmarking participants. One primary criterion was the emphasis on a competency-based approach as the basis for project manager development and certification programs. All organizations identified that a competency-based approach formed the basis of their efforts in developing a comprehensive effort.

PM Competencies

Competencies are specific knowledge, skills, abilities, characteristics, attitudes and behaviors that enhance job performance for particular roles within an organization (Lucia and Lepsinger, 1999). Organizations that manage the development of capabilities through competencies can gain critical competitive advantage in business processes such as recruiting, retaining, and motivating high-performers. The researchers specify that competency models also address such business needs as clarifying job and work expectations, maximizing productivity, enhancing feedback processes, allowing the organization to adapt to change, and aligning individual and team behaviors with organization strategies and values. They point out that the natural progression from the development of an accurate and valid competency model is to assess employees according to the requisite competencies for their specific job position, and provide tools to develop professional capabilities based on employee assessments.

Crawford (1999) makes the case that assessment links learning outcomes and learning objectives in a meaningful way. Several standards are identified against which the assessment can be made, including the PMI PMBOK, the International Project Management Association (IPMA) Competence Baseline, and the Australian National Competency Standards for Project Management. The researcher goes on to note that there are several problems with these external standards of certification:

- Standards are based on a static interpretation of the past, neglecting continuing professional development.

- Standards are generic and do not capture the complexities and variations of specific project environments.

- Personality and attitude components may be de-emphasized or neglected.

For project managers, an effectively designed competency development process includes identifying top performers and determining what they do and how they do it by identifying factors that lead to superior performance. The most useful models are customized for individual divisions and roles within the greater organization. Crawford (1999) notes that the application of external project management standards must be "contextualized" if the potential benefits of assessment, certification, and ongoing development are to be realized. In tailoring competency models for organizations, they can have a variety of scopes. Some models can identify required core competencies for all levels of a workforce, while other models focus more on developing competencies for a specific unit, type of job, or position (e.g., programmers working in IT). This competency-based framework is the backbone of an effective PM development and certification program, and all organizations had models ranging from two-level basic and advanced models to five-level models emphasizing a progression from basic knowledge to the ability to teach others at the top level.

PM Assessment and Certification Program

Another common element was the finding that all organizations were moving toward a formalized and rigorously defined PM assessment and certification program, or already possessed one. Assessment and certification were viewed as a management tool that allowed managers to have faith that a minimum level of capability is present and that a common language and set of tools is used across the project management workforce. The organizations varied in their levels of certification, use of external assessment and certification organizations and resources (e.g., PMI), the level of enforcement of assessment and certification standards, the definitions of various stages of certification and recertification, and how equivalencies are defined and granted. The strongest programs had tailored their approach across different elements of the greater organization, and had devoted tremendous amounts of time and effort in collaborating and updating the stakeholders. In terms of granting equivalencies for identified components of a development and certification model, all organizations permitted waivers and exceptions, but universally prevented "grandfathering" of experienced personnel into the programs. "Grandfathering" was seen as diluting the potential and cultural importance of the programs.

Executive-level support was a common thread across the organizations, however, it did not necessarily come at the beginning of a PM development and certification program. In fact, most programs were started as pilot programs or voluntary efforts, beginning at a grass-roots level, that eventually attracted the attention of senior management. When the programs achieved senior management visibility, the maturity of the process was sufficient to export across the greater organization. It is especially important to note that all organizations identified initial resistance to any perceived mandated developmental program, and ongoing resistance at middle management level. Small successes along the way ensured that the best programs were integrated into the culture of the greater organization, and that the process owners were spread across the organization, incorporating the majority of functions.

External resources such as PMI were identified as valuable for organizing the body of knowledge required for project managers. However, were deemed as only part of the solution. Several organizations supported external certification as part of their internal program, while others required an external certification at certain levels of their development model. Both approaches seemed to satisfy the respondent organizations, but extensive tailoring was accomplished in order to

"contextualize" the competency model for the organization. The majority of organizations devoted resources for employees who wanted to pursue external certification. PMI was cited as the most popular alternative. All organizations cautioned that a certification program (e.g., PMI PMP program) should be identified as only one part of a larger comprehensive PM development and certification approach for the organization. Many organizations make the mistake of trying to take the easy way out through a quick fix of requiring external certification.

HR Integration

Integration into HR processes was deemed critical by all organizations. It seems that the tighter this integration was, the better the alignment of the organization in terms of strategic business goals. Zemke and Zemke (1999) specified that the decisive test for any type of competency development model is whether and how well the model fits into the organization's performance management system. For the organizations in this study, this systems view of PM development and HR business processes is seen as an ongoing requirement in order to clearly articulate the relationship between job descriptions, recruiting of new personnel, retention of seasoned project managers, and proper compensation, incentives, and rewards for exceptional performance.

PM Tools and Techniques

Project management tools and techniques were seen as valuable elements of the programs studied, and the most successful programs attempted to field tools and techniques in parallel with the developmental and certification programs. Several organizations warned of the trap of using tools and techniques (e.g., enterprise-wide PM information technology system) as the definition of the total program. Education about emerging new tools and techniques was also seen as a major element in any ongoing career development activity in terms of recertification and continuing education.

Mentoring

Mentoring was identified as a critical component of several programs. This was situated in the organization as giving back and as a critical element in creating strong communities of practice, allowing for the transfer of best practices and leading to creation of a knowledge management framework. The mentoring activity was used as a feedback loop into these PM development and certification models, adding the value of perspective on successes and failures to the development of new project managers within the organizations in the study. The majority of organizations did not have a formal mentoring process in place that includes metrics on the effectiveness of their mentoring process.

APPENDIX A

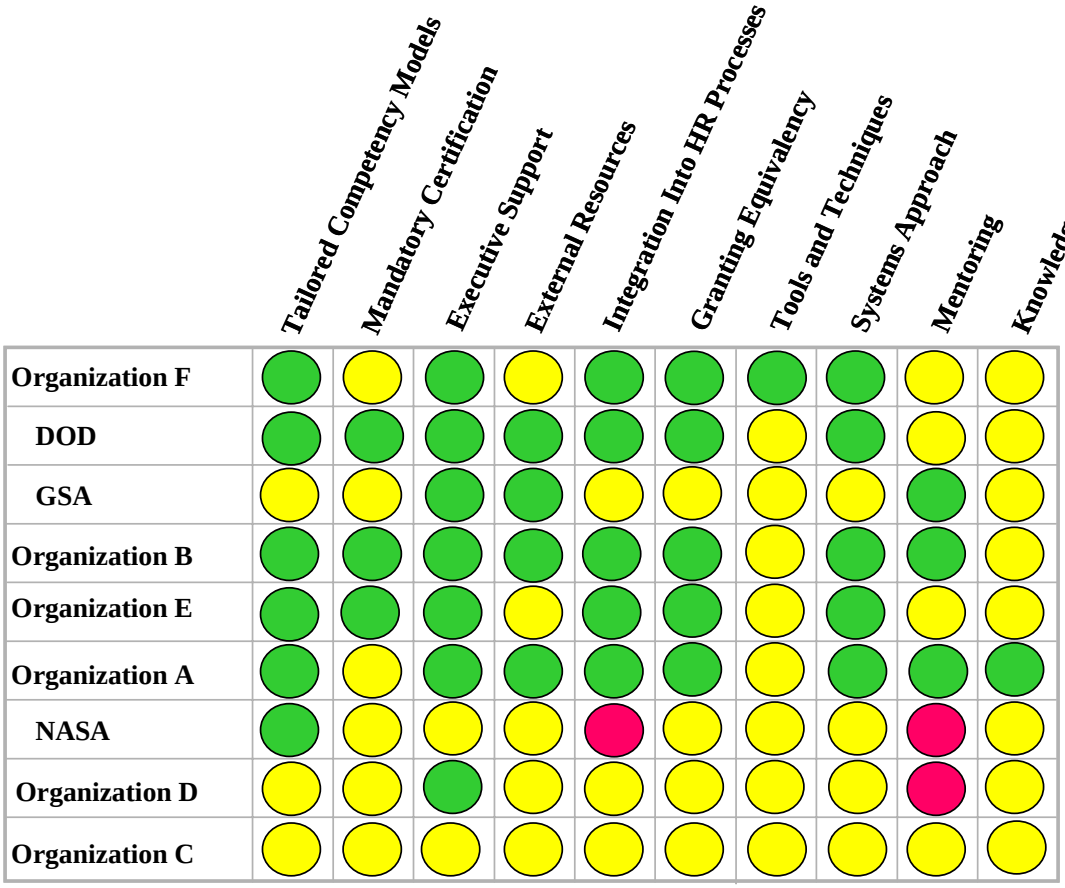
Certification Program Criteria

This study identifies several criteria that were deemed important in a project manager development and certification program. Each organization has been rated according to a red-yellow-green scale in the attached table, with the following criteria applied to the responses received in the interviews and the focus groups:

Criteria	Rating	Criteria Applied to Responses
A. The development of a tailored PM competency-based development model	Red	The organization is considering the development of a tailored PM competency model.
	Yellow	The organization recognizes the importance of a tailored PM competency model, and is in the process of defining the components.
	Green	The organization possesses an operational tailored PM competency model.
B. Internal PM certification process	Red	The organization is considering the development of a PM certification process.
	Yellow	The organization is developing either a voluntary or mandatory PM certification process.
	Green	The organization possesses an operational mandatory PM certification process.
C. Executive-level support for the PM development and certification model	Red	The organization does not have executive-level support for the PM development and certification program.
	Yellow	The organization has executive-level interest in a PM development and certification program.
	Green	The organization possesses the commitment and representation of executives for the PM development and certification program
D. Use of external PM development and certification resources	Red	The organization is considering the inclusion of external resources.
	Yellow	The organization recognizes the importance of external resources, and uses them on a voluntary basis.
	Green	The organization leverages external resources and applies them at specific levels and components of the PM development and certification program.
E. Integration into HR business processes	Red	The organization is developing a PM development and certification program independent of the HR department.
	Yellow	The organization recognizes the importance of integration into the HR business processes, and is in the process of developing the working relationship.
	Green	The organization integrates the PM development and certification program into HR performance management business processes.

Criteria	Rating	Criteria Applied to Responses
F. Issues concerning the granting of equivalencies	Red	The organization does not have equivalencies and waivers defined.
	Yellow	The organization is in the process of determining what the appropriate equivalencies and waivers should be at each level and component of the PM development and certification program.
	Green	The organization possesses an operational system of definitions and processes for the granting of equivalencies and waivers.
G. Identification, development, and application of PM tools and techniques	Red	The organization has not identified, developed, or implemented PM tools and techniques in a centralized, systematic fashion.
	Yellow	The organization is in the process of identifying, developing, and implementing PM tools and techniques.
	Green	The organization fields PM tools and techniques in parallel with their PM development and certification program.
H. Implementation of a systems approach	Red	The organization does not possess an integrated vision and plan of the interfaces required for the PM development and certification program.
	Yellow	The organization is defining the interfaces required for their PM development and certification program.
	Green	The organization possesses an operational vision and definition of required interfaces for their PM development and certification program, and possesses an action plan to meet their needs.
I. Use of mentoring	Red	The organization is considering the development of a mentoring component for their PM development and implementation program.
	Yellow	The organization recognizes the importance of mentoring, and is developing a voluntary mentoring component for their PM development and certification program.
	Green	The organization possesses an operational mentoring component, to include metrics.
J. Development of a knowledge management infrastructure	Red	The organization is considering the development of a knowledge management infrastructure to capture best and emerging practices.
	Yellow	The organization is developing a knowledge management infrastructure for capturing best and emerging practices.
	Green	The organization possesses an operational knowledge management system that captures best and emerging practices.

Certification Program Criteria



Organization fully meets specified criteria.

Organization is aware of specified criteria and is working towards meeting criteria.

Organization may or may not be aware of specified criteria, and may or may not be working toward process.

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APPENDIX B

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