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Industry Perceptions of Department of Defense Program Manager Competencies

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Abstract

Large, complex Defense Department weapons system acquisition programs have been plagued by cost overruns, delayed schedules, and subpar performance. Much of the blame has been placed on government program managers (PMs). This study provides a new perspective on government PM competencies by surveying defense industry managers who work with the government PMs on a day-to-day basis. 146 industry managers rated the importance of PM competencies and assessed how well, from their perspective, their government PM counterparts met those competencies. The data gathered from this survey revealed several surprising insights, including a conclusion that government program managers' performance on several key *technical* skills may need improvement. The results of this study may be useful in updating training and development strategies for government PMs to improve program outcomes.

Introduction

The US Department of Defense uses a program management structure to acquire its sophisticated sea-, land-, air-, and space-based systems. Under this management paradigm, a civilian or military program manager, leading a team of government engineers, logisticians, business and financial managers, contracting officers, and administrative personnel, is responsible for the development and delivery of his or her system. The GAO reported in 2005 (p. 14) that there were 729 program managers executing programs in the DoD.

In a typical defense project, the government team works closely with representatives of the operational (warfighter) community to understand new system needs and requirements and to translate these needs into performance or technical specifications. The government team is responsible for cost and schedule estimates for the program, as well as for describing the procurement and contracting approaches, test and evaluation plan, and the strategy for supporting the system over its lifecycle. These plans and strategies evolve within a complex bureaucracy of checks and balances that provides oversight and assistance in creating the program.

After plans are in place for the acquisition, the government program team creates a contract solicitation and accepts proposals and bids from companies in the defense industry. After a contract is awarded, the government team works closely with its industry partner to proceed to system development. This process is typically slow and methodical, proceeding through a series of decision milestones in which progress is gauged by an oversight official above the program manager's organizational level. Throughout the development program, the government PM must advocate and negotiate for his or her program's funding, requirements, program scope, schedule, personnel, and myriad other details. The PM must also work closely with the contractor to evaluate alternative technologies and industrial processes, monitor contractor spending and adherence to program schedule, evaluate progress and quality of workmanship, and provide general oversight to protect the government's equities. Since the end of the Cold War, defense acquisition has undergone significant transformation and downsizing, and the government relies more heavily on contractors for detailed designs to meet program objectives (Nissen, Snider & Lewis, 2002). This has created greater partnering and closer relationships between government program teams and their industry counterparts (Jones, 1997).

The government program manager must be technically competent, able to manage technology and system engineering as well as software and information systems, and understand manufacturing and industrial processes. He/she must demonstrate key business competencies such as financial management, contracting, and cost estimating. The PM must exercise management acumen in developing and executing the program strategy, managing core processes, and dealing with the day-to-day management challenges of a large, complex program. The PM must also exhibit leadership competencies when leading blended government-industry teams or engaging in negotiations and advocacy with customers and stakeholders. Fox and Miller (2006) summed up the management challenge this way:

> Managing [a large complex project] is more than a science; it is a continually evolving art… Managers must augment a strong foundation of conventional management skills in planning, organizing, and controlling, with knowledge of the requirements, resources, and constraints of a specific project as it progresses. (p. 109)

Purpose of the Study

Given that PMs must possess an expansive portfolio of required competencies, it is natural to ask whether some competencies may be more important in helping to assure program success. For example, research by Bauer (2006) asserted that *management competence* is perceived to be more important for defense and aerospace industry program managers than technical skills. One might assume that the same would be true for government PMs in the same industry, and this is one key aspect that this study sought to examine.

The purpose of this study, then, was to (a) determine the relative importance of key competencies of government PMs and (b) assess PM performance against these competencies. In this way, it would be possible to rank-order competencies according to their perceived importance to program success and to compare these to PM performance. In this way, a reasonable path forward might be identified to help strengthen PM competencies through training and development.

Most PM competency studies in the literature, however, are either self-studies in which PMs rank-order the competencies and rate their own performance against them, or they are studies in which immediate supervisors of the program managers are surveyed. This study took a different approach. Leveraging the close working relationship between the government and industry program manager, this study captured opinion data from industry managers to provide a more objective *peer assessment* and to avoid potential "blind spots" in the self-assessed competency data contained in the current literature.

Research Questions

The research questions for this study were:

1. Which project management competencies are perceived by industry managers as most important in government program managers?
2. How well are government program managers perceived by their industry partners to be meeting those competencies?

Competency Theory and Program Management Competencies

The roots of competency theory originate in Frederick Taylor's studies of scientific management, breaking complex tasks into manageable constituents, and assigning specialized workers using standardized manufacturing processes to each task to increase efficiency and effectiveness (1911). Implicit in Taylor's study was the assumption that the more competent the worker becomes at each specific work task, the more successful the overall job will be. These work studies, however, tended to be highly detailed and task-oriented, rather than focused on the skills and abilities of the individual worker. Indeed, optimizing tasks and training individuals to become specialists, as with a manufacturing assembly line, may create a workforce with little flexibility or incentive for creativity (Womack, Jones & Roos, 1991).

The search for competence is more closely focused on the individual and attempts to identify the ideal attributes of a high-performing worker (McClelland, 1973). Early efforts to understand what makes individuals competent focused primarily on human intelligence factors. It was reasoned that the more intelligent a person is, the better he or she will learn, adapt, and perform on any given job. Research on intelligence testing and improvement ensued, but in the end, yielded few real gains for organizations (Berger & Berger, 2003).

Harvard psychologist David McClelland was one of the first to argue effectively against the prevailing intelligence-centric view of job competence. He is considered by many to be the pioneer of modern competency theory (Draganidis & Mentzas, 2006; Garman & Johnson, 2006; Ruth, 2006). In his seminal work, McClelland (1973) argued that competence—work-related knowledge, skills, behaviors, and abilities—was a better practical predictor of superior work performance than was intelligence. McClelland further argued that intelligence tests were discriminatory and therefore largely invalid, "favoring certain ethnic and socioeconomic groups" (Gale, 2007, p. 143). McClelland suggested the more direct approach of testing job performance against required skills, which is the approach still used in most modern competency methodologies.

However, universal definitions of *competence, competency,* and *competencies* are difficult to find in the literature and are not generally agreed upon (Whiddett & Hollyforde, 2003). Gale (2007) argued that defining competence is difficult because "competence is a

normative concept rather than a descriptive one" (p. 145). He went on to say that competence is being "concerned with the capacity to undertake specific types of actions, and it can be considered a holistic concept involving the integration of attitudes, skills, knowledge, performance, and quality of application" (p. 145). In a similar, but more practitioner-focused vein, Parry (1998) defined competency as "a cluster of related knowledge, attitudes, and skills that affects a major part of one's job (i.e., one or more key roles or responsibilities); that correlates with performance on the job; that can be measured against well-accepted standards; and that can be improved via training and development" (p. 60).

Operationally, managing competence in an organization involves identifying a set of highly desirable attributes that can positively influence desired organizational outcomes. Researchers and practitioners seek to create competencies and competency models that can be used to influence hiring, retention, and training practices to improve the quality of the organizational workforce. To meet this desire, the most common working definitions in the literature have included some aspects of technical, social or interpersonal, and cognitive or problem-solving that, ideally, can be measured and improved over time. In practice, many organizations, like the American Society of Training and Development (Bernthal et al., 2004, p. xix), and the Project Management Institute (PMI, 2002) have adopted working definitions relating individual behaviors with job performance, which they believe can be of value as the starting point for identifying specific competency-related attributes and developing effective competency models.

Program Manager Competencies

Project management is a relatively new field of professional endeavor. Much of the research into those things that make projects successful is also relatively recent. Crawford (2006) summarized this brief history:

> The first signs of project management as a distinct field of practice were the network analysis and planning techniques, like PERT and CPM, that emerged in the 1950s for use on major projects in construction, engineering, defense, and aerospace industries. Users of these tools and techniques recognized shared interests leading to the formation of project management professional associations in the 1960s, initially to facilitate knowledge sharing between practitioners. The mid-1990s were a crucial point in the development of project management standards and related certification programs (p. 75).

In the United States and many international locations, project manager standards and certifications have been developed by the Program Management Institute (PMI). The PMI identified the knowledge, skills, abilities, and behaviors needed to be an effective project manager through its Project Management Competency Development Framework (PMI, 2002). This framework operationalizes Parry's definition of competencies and describes PM competencies along three dimensions: knowledge (what PMs know), performance (what PMs do with the knowledge), and personal competency (how PMs behave—their attitudes and personality traits) (PMI, 2002). The overall approach and goal of the PMI is consistent with Toney's (2002) view that "application of validated competencies assures project customers and stakeholders that the probability of project success is improved" (p. xix). Crawford (1997) advanced the idea that there is a causal relationship between PMI competencies and job performance, lending a strategic notion to competency identification and development.

The Need for Competent Defense Program Managers

For the past several decades, news reports of $600 toilet seats, poor performance of battlefield equipment, and cancelled programs have been all too commonplace (Besselman, Arora, & Larkey, 2000; Samuel, 2003). The Defense Acquisition Program Assessment (DAPA) Report of 2006 asserted that:

> Both Congress and the Department of Defense senior leadership have lost confidence in the capability of the Acquisition System to determine what needs to be procured or to predict with any degree of accuracy what things will cost, when they will be delivered, or how they will perform. (Kadish, p. 1)

"Program manager's expertise" was identified in the report as one of the top five issues contributing to the poor performance (Kadish, p. 3). In 2008, there was sharp criticism of both poor performance of the defense acquisition system and the program managers who run those acquisition programs. The Government Accountability Office (GAO), an independent research arm of the US Congress, commented recently that the DoD needed to "strengthen training and career paths as needed to ensure program managers have the right qualifications for running the programs they are assigned to" (Sullivan, 2008, p. 16).

Improving program manager competencies is believed to be essential to improving the overall performance of the defense acquisition system. Identifying key competencies that drive program performance and specific shortfalls in program manager knowledge, skills, and abilities is an important first step and the aim of this study.

Research Methodology

The independent variables in this study were the competencies of government PMs. These included 20 technical (hard) skills and 15 behavioral (soft) skills, as described below:

Technical Project Management (Hard Skills) Competencies (C1-20)

C1. Determine program goals. The ability to work with program stakeholders in order to understand the program's requirements and specifications.

C2. Determine program deliverables. The ability to work with program stakeholders to generate a scope of work, requirements, and/or specifications for the program.

C3. Technical ability. The ability to understand and be conversant in the core technologies of product/deliverables of the program.

C4. Document program constraints. The ability to lead the program team to uncover and document possible program constraints that could affect program completion.

C5. Document program assumptions. The ability to lead the program team to determine information that must be validated or situations that must be controlled during the program process in order to facilitate program planning.

C6. Define program strategy. The ability to evaluate possible strategies or

alternative approaches to meet the program's requirements and/or specifications.

C7. Quality assurance. The ability to identify performance criteria using product/service specifications, technical expertise, and standards to ensure performance standards are met, customer expectations are met, and processes are analyzed for further improvements.

C8. Identify resources requirements. The ability to identify key resource requirements needed to support planning and decision-making.

C9. Develop a budget. The ability to complete cost estimates and produce a program budget to support planning and decision-making.

C10. Create a work breakdown structure (WBS). The ability to use the scope of work and other project documents to develop a work breakdown structure to facilitate project planning.

C11. Develop a schedule. The ability to complete a program schedule that supports planning and decision-making.

C12. Develop a resource management plan. The ability to develop and publish a resource management plan (human resources, procurement, etc.) by identifying resource requirements and obtaining commitment from internal and external assets that enable completion of all program activities.

C13. Establish program controls. The ability to establish program controls by establishing targets and plans, measuring actual performance, comparing actual performance against planned performance, and taking necessary actions to correct the situation.

C14. Develop program plan. The ability to develop a formal comprehensive program plan documenting deliverables, acceptance criteria, process, procedure, and tasks to facilitate program completion.

C15. Communicate program status. The ability to produce program reports and presentations that provide timely and accurate program status and decision-support information to upper management, customers, and fellow team members.

C16. Measure program performance. The ability to compare actual results to a documented baseline in order to identify program trends and variances.

C17. Implement corrective action. The ability to take timely corrective action by addressing the root causes in the problem areas in order to eliminate or minimize negative impact to the program.

C18. Implement change control. The ability to track and document all potential improvements and other changes in scope, specifications, cost, or schedule and analyze the consequences of these changes in relation to the overall project.

C19. Respond to risk. The ability to respond quickly to risk event triggers in accordance with the risk management plan in order to keep the program on schedule and within budget.

C20. Conduct administrative closure. The ability to conduct financial closure and publish formal program closure documents.

Personal (Soft Skill) Competencies (CS1-15)

CS1. Project leadership. The ability to set a vision, identify the action steps, and motivate others to maintain their commitment to program success. The ability to influence a team to willingly work toward predetermined program objectives.

CS2. Flexibility. The ability to adapt and deal with situations and manage expectations during periods of change and uncertainty during a program.

CS3. Sound business judgment. The ability to stay focused on the business target. The program manager knows the organization's business purpose of program and makes decisions within that context.

CS4. Trustworthiness. The ability to build positive working relationships and credibility with team members, upper management and stakeholders.

CS5. Communication style. The ability to adapt one's communication style to fit the situation and the audience. The ability to present information without bias and exchange information in a clear and unambiguous manner.

CS6. Listening Skills. The ability to ensure all team members have a chance to provide input to the program. The ability to read body language and perceive group dynamics.

CS7. Setting and managing expectations. The ability to communicate with all program stakeholders, especially customers, and address program objectives, timelines, budgets, risks, and estimates. The ability to clearly communicate program changes and/or adjustments with support rationale to the customer in a proactive manner.

CS8. Negotiations. The ability to develop win-win situations that culminate with both parties being satisfied with the final agreement.

CS9. Issue and conflict resolution. The ability to understand and implement conflict resolution models for resolving issues and preventing the conflict from affecting the program's outcome.

CS10. Organizational skills. The ability to arrange program activities in such a way that they systematically contribute to the program's goals.

CS11. Coaching. The ability to provide feedback to team members and stakeholders in a positive manner that builds trust and credibility.

CS12. Facilitation. The ability to facilitate or guide team members through a process that helps them discover answers and overcome barriers to successful program completion.

CS13. Decision making. The ability to make the best choice from among many alternatives.

CS14. Problem solving. The ability to identify issues, to conduct accurate assessments of the issues, and propose viable solutions to issues.

CS15. Team building. The ability to encourage and enable people to work together toward a common goal

Competency Survey

An online survey questionnaire was developed for this study that consisted of three parts: (a) ratings for technical (hard) skills, (b) ratings for management/leadership (soft) skills, and (c) demographic questions about the participant and program. The survey used in this study was a modification of one used by Golob (2002) to identify competencies that might be useful in hiring or promotion decisions for project managers. The modified survey instrument was subjected to an expert review. Pilot study data were validated through item analysis, and Cronbach's alpha tests.

The survey instrument asked industry participants to assess the importance of the 20 technical and 15 management (soft-skill) competencies to program success, and then to assess how well, in his or her judgment, their government counterpart performed in those competencies. Each of the responses was based on a 5-point Likert-type scale. Participants were asked to assess the importance of each competency to program success with ratings from 1 (indicating that competency is *unimportant/not needed*) to a value of 5 (indicating that the competency is *extremely important*). In assessing performance against each competency, the participant rated each from 1 (indicating that the government PM is *not meeting the competency*) to a value of 5 (indicating that the PM is *working at an expert level*). Four additional demographic questions were asked about the study participant and his/her program experience.

Survey Responses

Using the 2005 GAO (p. 14) estimate of 729 programs in the Department of Defense, an appropriate sample size was calculated. Alreck and Settle (1995) suggest a non-probability sample of about 10% of the parent population, or approximately 73 respondents, based on the estimated population. Another, more conservative, approach was to calculate the number needed for a probability sample. In this case, assuming a 95% confidence level with a ±10% confidence interval, as shown in the calculation below, the minimum sample size would be 85 participants.

To protect the anonymity of participants and their companies, senior executives from several defense industry corporations were asked for assistance in referring potential study participants in their companies who were managing defense programs. Since, by some estimates, only about a 30% response rate could be expected from Internet surveys (Sue & Ritter, 2007), each executive was asked to refer 75 to 100 program managers to the online survey to assure a sample size of at least 85 participants. In all, 146 surveys were completed, well exceeding the original 85 target. An additional 71 were started but abandoned, and 83 were started but not completed by the survey closeout date.

Demographics

The survey asked four questions to help understand the study participants and the programs they managed:

1. How many years experience do you have as a program/project manager?
2. What is the Acquisition Category (ACAT) rating of your program?
3. What is the acquisition phase of your program?
1. On average, how often do you communicate with the government Program Manager (face-to-face, telephone, e-mail, other)?

Over 78% of participants reported that they had 10 or more years of experience, and nearly half (48%) reported that they managed some of the largest, most complex programs (ACAT I or II) in the Department of Defense. These responses indicate that the participants were highly experienced project managers with significant responsibility for managing challenging programs, thus they should be expected to have a good practical understanding of the competencies involved in complex program management.

Almost half the participants indicated that their programs were beyond development and into the later, more mature production and deployment phases. When asked to rate the frequency of interaction with their government counterparts, over three quarters of participants indicated that they communicated with their government counterparts often, very often, or daily, indicating that responses were generally well informed. Demographic responses are shown in Table 1 below.

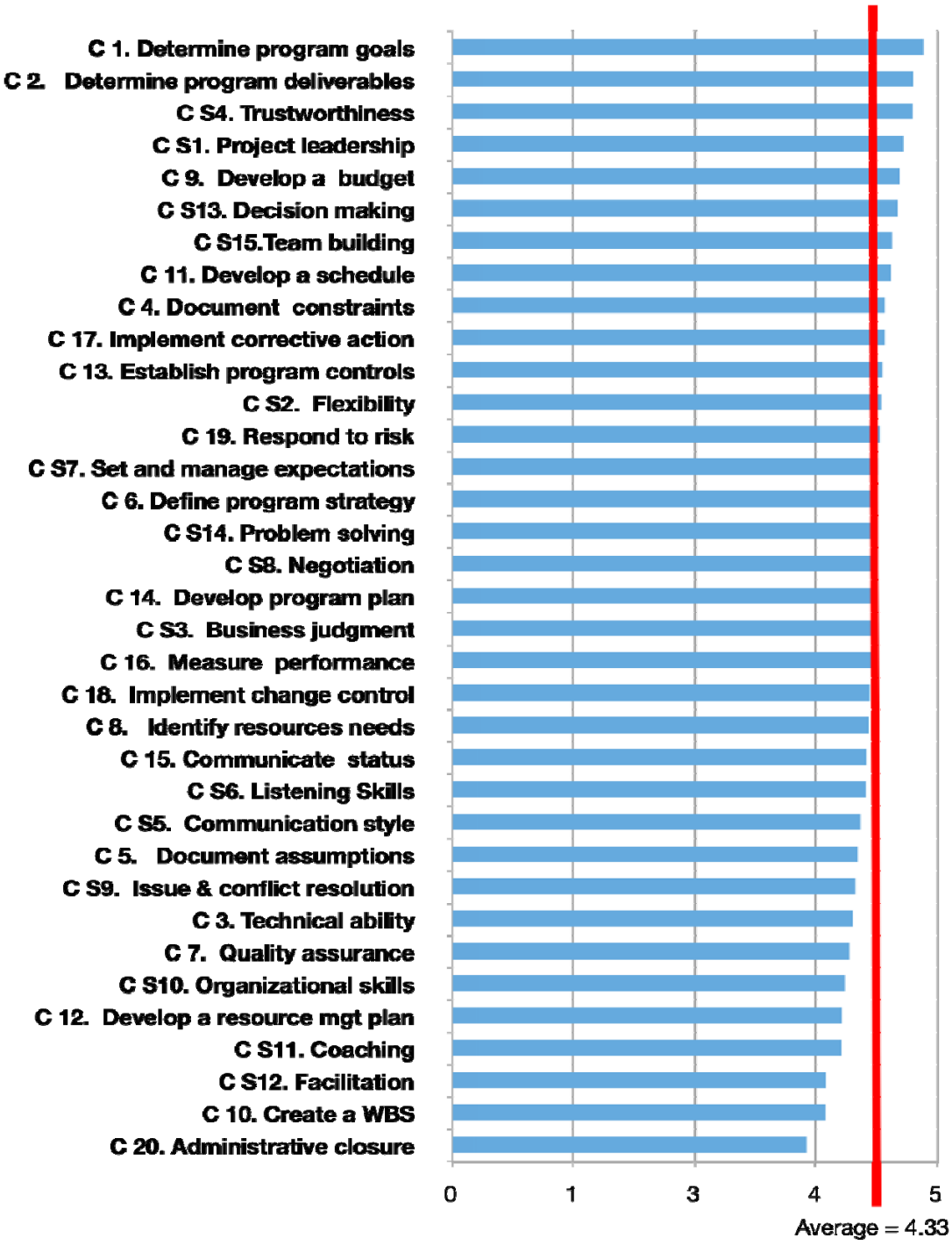
Table 1. Survey Demographics

Category	Variable	*N*	%
Experience Level in Years	15 or more	64	44.1
	10-14	50	34.5
	5-9	19	13.1
	0-4	12	8.3
Program Acquisition Category ACAT	ACAT I	54	37.2
	ACAT II	16	11.0
	ACAT III	7	4.8
	Other	68	46.9
Program Phase	Production & Deployment	71	49.0
	Sys Design & Development	53	36.6
	Technology Development	19	13.1
	Concept Refinement	2	1.4
Communication Frequency with Government PM	Daily	43	30.1
	Very Often	48	33.6
	Often	21	14.7
	Occasional	19	13.3
	Infrequent	12	8.4

Research Question 1

Survey data were analyzed to address the first research question: “Which project management competencies are perceived by industry managers as most important in government program managers?” Participants responded to a list of 20 technical competencies (C1 through C20) and 15 soft skill competencies (CS1 through CS15), rating the relative contribution of each to program success. Each competency was listed on the questionnaire with Likert-type scale choices of *Very Important, Important, Neutral,*

Unimportant, or *Very Unimportant.* Figure 1 shows the average scores for each competency.



Ranking of Competency Importance

The data show that most of the competencies scored quite high for their contributions to program success (mean = 4.33). The high scores affirmed the selection of appropriate competencies that most influence program success, but the close rankings limit the ability to clearly identify only a few competencies from the list that have the greatest impact.

The highest-rated competencies represented a mix of technical and soft skills. The most valued technical skills were the ability to determine program goals and deliverables and to develop a program budget. Such results are not surprising. Among others, Pinkerton (2003, p. 53) pointed out that the first criterion for project success is to have clearly defined goals and objectives. It is important for the government to specify the deliverables from the project, and it is equally important for industry, because deliverables define the government's expectations in concrete terms. Similarly, a sound program budget is important to match resources to goals and deliverables. Fox and Miller (2006) observed how these skills must be related:

> Managing a [large, complex project] is more than a science; it is a continually evolving art. …managers must augment a strong foundation of conventional management skills in planning, organizing, and controlling, with knowledge of the requirements, resources, and constraints of a specific project as it progresses. (p. 109)

The most highly rated soft skills included trustworthiness, project leadership, and decision-making. The importance of trust to proper organizational and inter-organizational functioning has been widely documented in the literature (Jehn & Mannix, 2001; Joseph & Winston, 2005; Wells & Kipnis, 2001). Trust may be particularly important in large, complex projects in which not every expectation can be instantiated in the government-industry contract. Trust and understanding between the government and industry managers are essential to minimizing conflict, fostering cooperation, and succeeding.

In a complex defense project, the government program manager must be the leader who sets the vision and goals, motivates the team, and is committed to program success. This role cannot be assumed by the industry manager or by any other member or stakeholder in the program. Related to this idea, the government PM must be willing and capable of making and influencing the myriad daily decisions and choices that shape the outcomes of a program. Imparting a good deal of wisdom, Fox and Miller (2006) noted, "Skilled project managers focus more on monitoring and influencing decisions, and less on giving orders. Clearly, project managers have substantially more responsibility than authority" (p. 124).

In such a complex environment that requires delicate balancing of program goals and powerful stakeholder interests, it is unlikely—perhaps impossible—for program manager decisions to be entirely based on rational, stepwise decision making aimed at clear-cut outcomes. Rather, it is more likely that program manager decision-making is better explained by behavior theory (Cyert & March, 1992). In this theory, complex decisions are the outcome of organizational behavioral factors such as quasi-resolution of conflicting program goals and avoidance, when possible, of uncertainties that create program risk.

Program Complexity and Experience

One question arising from the data was whether or not the program complexity or the experience level of survey participants might affect the ranking of competencies for

importance. Programs that are higher in cost and complexity are generally considered to be more challenging to manage. Program management teams for more complex programs are typically larger, with more stakeholders who have greater influence. Larger programs are subjected to higher levels of oversight and scrutiny; they are required to do more formal planning and documentation and are subject to more frequent and detailed reports on status. Program managers of large, complex programs have a greater scope of responsibility and a substantially larger span of control, and, conceivably, these program managers require a different set of skills and competencies.

To determine whether program cost and complexity influenced the ranking of competencies for importance, an additional test was performed on the data. A *t-test* was performed on the competency importance means to examine the responses of managers of highly complex ACAT I programs in comparison to those of participants in lower acquisition category programs. The results showed no significant statistical differences (95% confidence level) between the perceptions of these two groupings of industry program managers.

Similarly, the experience level of program manager participants could have influenced the judgment used in rating the importance of competencies. A *t-test* was conducted on the dataset by splitting it between participants with more than 10 years of experience and those with less. As with the ACAT level, experience level seemed to have little effect on perceived competencies, with two exceptions.

From the *t-test*, experience seemed to influence the rating of competencies CS5 (Communication style) and CS13 (Decision-making). Communication style was more highly rated by less experienced participants with a 4.39 mean, versus a 4.16 mean for participants with greater than 10 years of experience. Conversely, decision-making was rated more highly by more experienced participants with a mean score of 4.65. Less experienced participants rated this competency 4.39.

The importance of decision-making skills in a government program manager is critical to program success. That this skill is more highly valued by experienced industry managers is an insightful finding. Similarly, the ability to exchange information in a meaningful way, especially in the collaborative environment of a government-industry project, seems to resonate with less experienced managers who may feel a greater need or appreciation for the government PM to clearly articulate program direction. It may be noteworthy that improving communication between government and industry was recognized as a key factor in program success and one of the motivating forces behind the Department of Defense acquisition reform initiative of the late 1990s (Jones, 1997).

Research Question 2

Survey data were also collected to answer the second research question: “How well are government program managers perceived by their industry partners to be meeting those competencies?” The questionnaire asked participants to respond to each of the competencies with their assessment of how well their government PM counterpart met the competency. The Likert scale observations included ratings of *Expert, Good, Average, Fair, Poor,* and a no-response choice. Figure 2 summarizes the rank-ordered response for each competency.

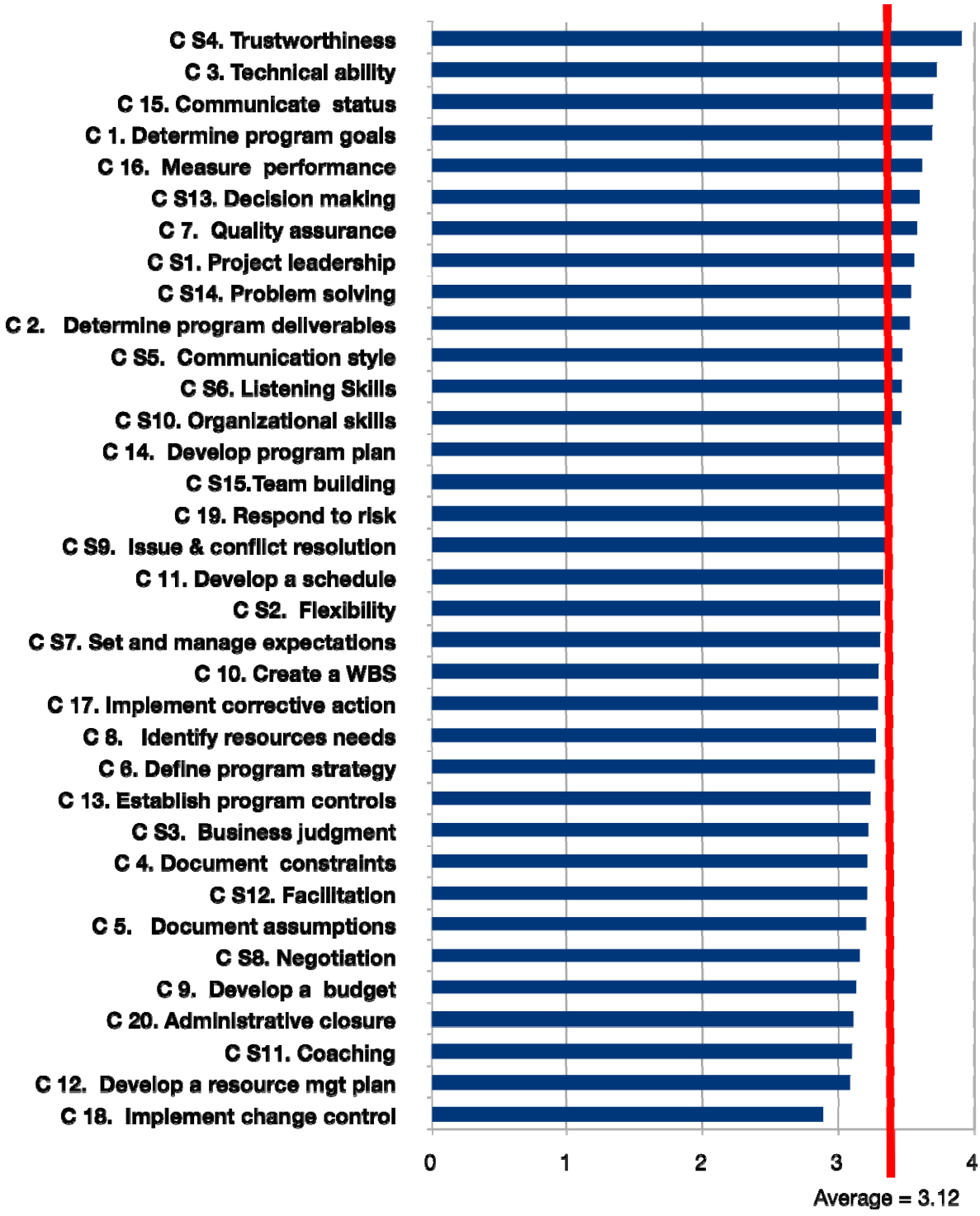


Figure 1. Ranking of Competency Performance

It is noteworthy that the average from all the participants rates government PM performance between *fair* and *good,* with most nearer *average* performance. This was disappointing, given the high stakes and expectations for managing billions of taxpayer dollars to provide critical defense systems to the battlefield.

Sensitivity to Program Phase and Contact Frequency with Government PM

To help understand whether the performance assessment responses provided by the industry participants may have been influenced by the program phase or the frequency of contact with government counterparts, additional statistical tests were conducted. It was considered possible that the phase of the program could have limited whether participants had the opportunity to observe the government PM performing some activities.

For example, programs in production and deployment may have fewer planning activities required, such as developing a work breakdown structure or schedule, and less opportunity for these skills to be observed and assessed. Similarly, and perhaps more intuitively, the frequency of interaction between the government program manager and the industry counterpart could have affected the assessment of competencies. An industry manager who rarely worked directly with a counterpart may not have had the exposure to be able to formulate accurate assessments. Conversely, a situation providing closer observation could result in scores that are more reliable.

To assess these eventualities, *t-test* calculations were used to check the competency performance against the participants' program phase and frequency of communication. A *t-test* of competency performance means versus program phase was performed first. The data set was bifurcated into (a) production and deployment (PD) and (b) data from earlier design and development intensive phases. In these two groupings, 67 participants reported programs in production and deployment, while 71 reported programs in earlier phases. The results showed no significant statistical differences (95% confidence level) between the perceptions of these two groupings of industry program managers in these different program phases.

Similarly, a *t-test* was performed to determine if the performance means differed significantly with frequency of communication between industry participant and government PM. The data set was bifurcated between those who responded *Daily* or *Very Often* and those who had less frequent contact with their government counterpart. Here, too, there were no significant differences among responses from those who had daily or frequent contact with their government counterparts and those who had less contact, with two exceptions.

For competency C14 (the ability to develop a program plan), those participants with more frequent contact had a higher average score of 3.30, versus 2.83 for those participants who communicated with their government counterpart less frequently. The other competency, CS15 (team building), differed, with participants who said they had more frequent contact with their government PM counterparts ranking this competency higher, with an average of 3.26 versus 2.89 for those participants reporting less frequent contact. Possible explanations of these differences are discussed in Chapter 5.

Competency Performance Shortfall

To answer the second research question in a manner that could provide insights for improving PM competency, the *performance shortfall* was determined. The most simplistic method used was to examine the lowest-rated competencies without regard to perceived importance. To do this, the difference was calculated between the best possible rating of 5.0 and the average reported rating for each competency from the survey. By this measure, the top 10 competencies needing improvement are shown in Table 2 below.

Table 2. Competency Performance Shortfall

	Competency	Rating	Shortfall 5.0-Rating
C 18	Implement change control	2.676	2.324
C 12	Develop a resource mgt plan	2.860	2.140
C S11	Coaching	2.874	2.126
C 20	Administrative closure	2.884	2.116
C 9	Develop a budget	2.902	2.098
C S8	Negotiation	2.927	2.073
C 5	Document assumptions	2.971	2.029
C S12	Facilitation	2.977	2.023
C 4	Document program constraints	2.988	2.022
C S3	Business judgment	2.985	2.015

The downside to simply choosing the lowest-rated competencies, however, is that such a method does not consider the perceived importance of each competency toward program success. The competency *implement change control,* for example, ranked lowest in performance but was considered only moderately important. Similarly, while *administrative closure* ranked fourth lowest in performance, it was also last in importance. In identifying competencies for possible improvement, not only should performance itself be considered, but performance in relation to importance should be heeded as well. This was the aim of the next calculation.

To ensure that the competency *importance* was considered more heavily when ranking competency shortfalls, a more complex computation was used to add more weight to competency importance. Employing a weighting model used by Borich (1980), the difference between competency importance and competency performance was multiplied by the mean competency importance. In other words:

Step 1: mean competency importance - mean competency performance = discrepancy

Step 2: discrepancy × mean competency importance = weighted discrepancy score

The top-10 list derived from the Borich model is shown in Table 3. Using this method of weighting the shortfalls creates a different ranking of the competencies, favoring those with higher importance scores. Note that in this ranking, *develop a budget* ranked first because of its high importance ranking and low performance score.

Table 3. Competency Shortfalls Using Borich Model

		Competency	Importance (I)	Performance (P)	Difference I x (I-P)
9	C	Develop a budget	4.616	2.902	7.913
2	C	Determine program deliverables	4.753	3.268	7.060
18	C	Implement change control	4.308	2.676	7.030
1	C	Determine program goals	4.863	3.420	7.016
4	C	Document program constraints	4.466	2.978	6.643
11	C	Develop a schedule	4.527	3.088	6.519
13	C	Establish program controls	4.438	3.000	6.384
S15	C	Team building	4.538	3.132	6.378
S8	C	Negotiations	4.377	2.927	6.345
17	C	Implement corrective action	4.466	3.051	6.316

In this list, a surprising number of technical skills topped the list, including *develop a budget*, *implement change control*, *document program constraints*, and *determine program deliverables*. Of the top 10 items, only two identified shortfalls were soft skills, and even these were near the bottom of the list: *negotiation* and *team building*.

Conclusions

The current study appeared to be the first in the literature to explore the competencies of Department of Defense program managers from the perspective of their industry counterparts. The data allowed for the ranking of competencies believed to contribute most importantly to program success and for an assessment of how well defense program managers met those competencies. From these results, a priority-ordered list was developed of competencies that could be candidates for improvement through training and development. The competencies ranking in the top 10 for importance represented a relatively even mix of technical and soft skills, as did the raw rankings of PM performance.

However, when analysis was done to discover the variance between competency importance and performance, the results ranked many of the technical skills at the top of the list of candidates for improvement. This appeared contrary to assertions by Bauer (2006) and Golob (2002) that soft skills may be the most important to program success, and it contradicted Gadeken (2004), who suggested that defense PMs should seek soft-skill

training. These findings seem to refute the conventional wisdom and may provide a valuable new insight and contribution to the literature.

Practitioner Application

The implications of this study are clear for the practitioner. From the data, there appears to be a need for greater technical training and development in government program managers. The specific competency shortfalls identified in the analysis may be helpful in directing program managers and the training establishment toward specific skills that would benefit most from remediation.

By extension, since government program managers depend upon their functional staffs for support in many of the technical skill areas, the current study may point toward shortfalls within those functional areas. For example, to help remedy the highest ranked shortfall, budget development, additional training may be needed in the business and financial management career field to provide better support to the program manager in this critical area. This may include instruction and practice on developing detailed program cost estimates, allocating budget appropriately to critical tasks in the work breakdown structure, and finding ways to respond to funding needs for emergent or evolving program changes.

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