Earned Value Management System Reliability: Development of an EVMS Rating Index

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BLUF

A genuine collaborative partnership by Government and Industry is required for this research to succeed

- People – expert knowledge, proper attitude, communication skills
- Time – commitment to three year effort
- Data – sharing of EVMS successes/failures

Essentially……

This research and development activity will result in a method to assess both the *maturity* of the ten (10) program/project management processes which comprise the EVMS and the *environment* in which the EVMS operates (i.e., people and culture, processes, and resources).

Using CII's Front End Engineering Design (FEED) Maturity and Accuracy Total Rating System (MATRS) as a guide in its methodology

EVMS Program/Project Management Processes

- Organizing Process
- Planning and Scheduling Process
- Budget & Authorization Process
- Accounting Process
- Indirect Cost Management Process
- Management Analysis Process
- Change Control Process
- Subcontract Management Process
- Material Management Process
- Risk Management Process

Research Study Leadership

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*PI – Principle Investigator

Research Team

Role	Name	Organization	Name	Organization
Chair/Vice-Chair	Melvin Frank	DOE/PM-30	Amy Basche	Mission Support Alliance/EFCOG
Chair/Vice-Chair	Karen Urschel	DOE/PM-30/CS	Craig Hewitt	Contract Support/EFCOG
Principle Investigator (PI) /Co-PI	Edd Gibson	ASU	Mounir El Asmar	ASU
Grad Students	Namho Cho	ASU	Vartenie Aramali	ASU
Govt. /Industry Reps	Dave Kester	DOE/PM-30	~~Vicki Frahm~~	~~Sandia National Lab~~
Govt. /Industry Reps	Zac West	DOE/PM-30	Doug Marbourg	Los Alamos National Lab
Govt. /Industry Reps	Garrett Richardson	DOE/PM-30	Derek Lehman	Washington River Protection Solutions
Govt. /Industry Reps	Betsy Ballard	DOE/EM	Robert Sudermann	Fluor
Govt. /Industry Reps	John McGregor	DoD/AAP	Tony Spillman	WRPS
Govt. /Industry Reps	Ivan Bembers/ Barry Levy	NRO/CS	John Post	Lawrence Livermore National Lab
Govt. /Industry Reps	Jerald Kerby/ Stefanie Terrell	NASA/CAIWG	Tom Carney/ Vaughn Schlegel	Lockheed Martin
Govt. /Industry Reps	Danielle Bemis	DoD/DCMA	Russ Rodewald	Raytheon
Govt. /Industry Reps	Ben Pina	DOE/NNSA	Paul Sample	CACI
Govt. /Industry Reps	Bill Weisler	DoD/DCMA	Jeffrey King	BAE

Research Schedule

	Research Schedule	PHASE 1												PHASE 2																					
		2019												2020												2021									
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
	NDIA IPMD Conf.		♦						♦						♦						♦						♦						♦				
	Team meetings (tentative)		♦			ASU			♦		ASU			ASU	♦			♦			♦		ASU		♦		♦			ASU			♦			♦	♦
	Interim Reports								♦				♦						♦						♦						♦						
	Training																																	♦		♦	
1	**Review of Literature and State of Practice**	■	■																																		
2	**Recruit Team**	■	■	■	■																																
3	**Define Project**	■	■	■	■	■																															
4	**Finalize Scope and Objectives**		■	■	■	■																															
5	**Questionnaire**				■	■	■	■	■																													
6	**Develop Draft Assessment Tool**					■	■	■	■	■	■	■	■																									
7	**Identify Data Sample**								■	■	■	■	■																									
8	**Conduct Workshops**													■	■	■	■	■	■	■	■	■	■															
9	**Finalize and Test**													■	■	■	■	■	■	■	■	■	■	■														
10	**Synthesize Results into Guide**																			■	■	■	■	■	■	■	■	■	■	■	■	■	■				
11	**Develop Publications and Presentations**																										■	■	■	■	■	■	■	■	■	■	■

Maturity

MANAGEMENT ANALYSIS PROCESS	Definition Level				
	WORST		MEDIUM		BEST
Analyze Significant Variances	1	2	3	4	5
The ability to analyze deviations from the established Performance Measurement Baseline (PMB) permits management, at all levels, to implement corrective actions rapidly and effectively, to regain contract objectives. Insight into future cost and schedule performance, based on the analysis of cost, schedule, and at complete variances, will be facilitated. The communication of programmatic earned value performance status enables program management to manage and control the execution of the program and assess whether deviations from the technical, schedule, and budget baselines require management action. Without visibility into and the understanding of plan deviations, the success of the project can be jeopardized. Typical Attributes: ▫ Schedule (time-based) and cost (budget-based) variances are identified at an actionable level. ▫ The variance analysis identifies the factors causing the variance (e.g., efficiency, rate, and timing) and potential impacts. o Labor cost variance analysis is substantiated from source records evaluating rate and volume variances. o Material cost variance analysis is substantiated from source records evaluating price and usage variances. ▫ Schedule variance analysis is supplemented with Integrated Master Schedule (IMS) analysis and assesses the impact to future activities on the critical path, near-critical paths, and driving paths. ▫ Variance causes and impacts are identified in sufficient detail needed for project management. ▫ Corrective actions are implemented in a timely manner. ▫ Price/usage analysis, as applicable, for production material efforts. ▫ Other. Typical Outputs: ▫ Variance analyses (budget-based schedule variances and cost variances). ▫ Management action plans. ▫ Updated schedule task completion and cost-at-completion forecasts. ▫ Project schedules and schedule analysis outputs. ▫ Internal monthly cost and schedule performance/variance reports. ▫ Integrated Program Management Report (IPMR). ▫ Management reports from cost tool. ▫ Integrated Master Schedule (IMS). ▫ Control account plans. ▫ Other.	Not yet started.	Development of the process to Analyze Significant Variances has started. Some items included in the process have been identified, but not fully integrated. Initial thoughts have been applied to identifying the Significant Variances from the PMB. Some are identified, but variance analysis has not been conducted. Factors causing the variances and their impacts have not been studied. Little or no meeting time or development hours have been expended on this element and nothing has been documented.	Some of the process to Analyze Significant Variances has been defined, with open items. There are a number of open issues in identifying and analyzing the Significant Variances from the PMB. The variance analysis includes some of the deviations from technical, schedule and budget baselines. Some of the factors causing the variances are not known and their impacts on future forecasts are not studied. Other issues may include coordination between key disciplines, the inability to integrate changes, the inability to take corrective actions in timely manner, or other critical interface issues. These is a plan in place to complete the required outputs such as variance analyses and management action plans.	The process to Analyze Significant Variances is mostly complete. It is defined, documented, and under review, but not fully approved by key stakeholders. The process for analyzing the Significant Variances from Performance Measurement Baseline (PMB) has been established. However, it has minor issues that require resolution, such as not identifying potential impacts to future activities, corrective action plans, or missing updated cost forecasts.	The process to Analyze Significant Variances is defined, documented, and approved by key stakeholders (e.g., the business unit, sponsor, and operations). The Significant Variances from Performance Measurement Baseline (PMB) are identified at an actionable level, documented and approved by the key stakeholders. These measures include all deviations from technical, schedule and budget baselines. The factors causing the variances are known and their impacts on schedule, cost, critical path and other are discovered in sufficient detail. Future forecasts can be performed, using tools such as Integrated Master Schedule analysis. Based on variance analysis, corrective actions can rapidly and effectively be taken to regain contract objectives. Completed outputs include variance analyses (budget-based schedule variances and cost variances), management action plans, updated schedule task completion and cost-at-completion forecasts, project and schedule analysis outputs, variance reports, Integrated Program Management Report, management reports from cost tool, Integrated Master Schedule and control account plans.

MANAGEMENT ANALYSIS PROCESS	Definition Level				
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Analyze Significant Variances	1	2	3	4	5
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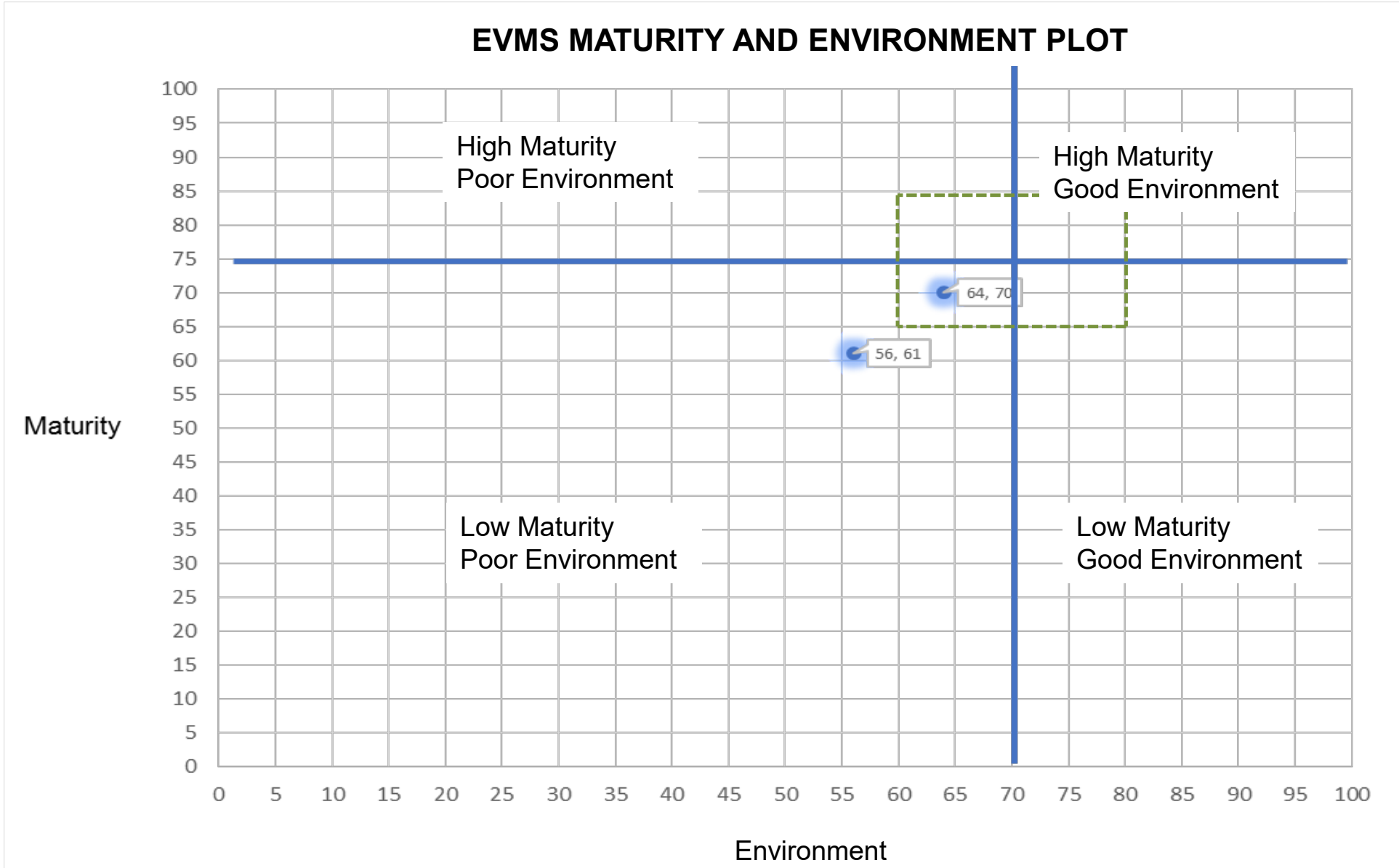
Environment

Leadership	Project/Program leadership roles will vary across organizations and typically include a venture manager, project sponsor, project director, execution/ manufacture manager, operations manager, and others. Additionally, organizational structure typically follows the hierarchy of executive steering committee, project leadership team and project execution team. The project sponsor and executive leadership can dramatically affect the accuracy of EVMS implementation. These individuals ultimately will be held accountable for project success.
High Performing	High Performing leadership is defined, effective and accountable. It follows the hierarchy of executive steering committee, project leadership team and project execution team. The leadership team has good knowledge related to EVMS, technical requirements, risks, and a good understanding of related business critical success factors. The leadership has the capacity to determine and align the needs of the key stakeholders.
Meets Most	Leadership that is assessed as Meets Most is generally defined, effective and accountable, and follows the organizational structure hierarchy. The leadership has reasonable knowledge related to EVMS, technical requirements, risks, and related business critical success factors. For the most part, leadership has the capacity to determine and align the needs of the key stakeholders.
Meets Some	Leadership that is assessed as Meets Some is sometimes defined, effective and accountable, and often follows organizational hierarchy, with some inconsistencies. The leadership has sufficient knowledge related to EVMS, technical requirements, risks, and related business critical success factors. Leadership sometimes has the capacity to determine and align the needs of the key stakeholders.
Needs Improvement	Leadership that is assessed as Needs Improvement is only occasionally defined, effective and accountable, and rarely follows organizational hierarchy, with major inconsistencies. The leadership has insufficient knowledge related to EVMS, technical requirements, and risks and little understanding of related business critical success factors. Leadership has little capacity to determine and align the needs of key stakeholders.
Not Acceptable	Leadership that is assessed as Not Acceptable is not defined, effective, or accountable, and does not follow organizational hierarchy. Leadership lacks knowledge related to EVMS, technical requirements, and risks, and does not understand related business critical success factors. Leadership has no capacity to determine and align the needs of key stakeholders. EVMS success cannot be achieved in this current state and major actions are required to improve.

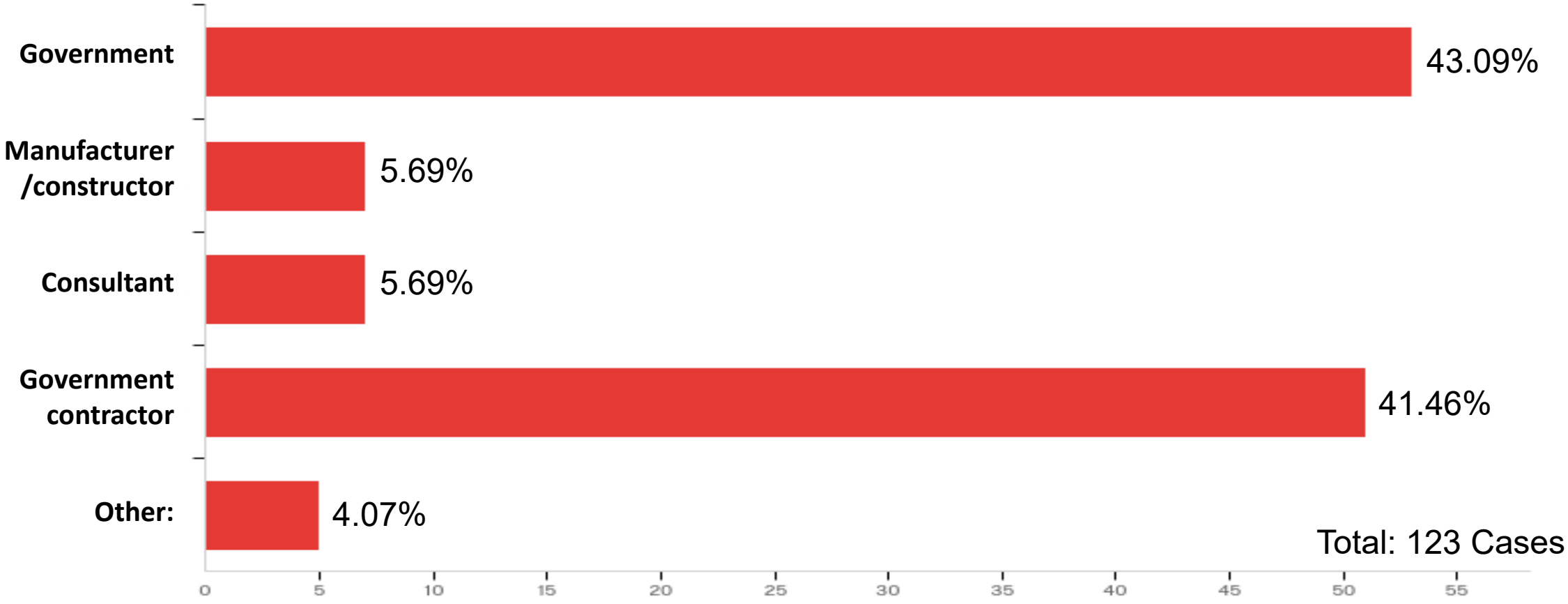
Envisioned Rating Plot



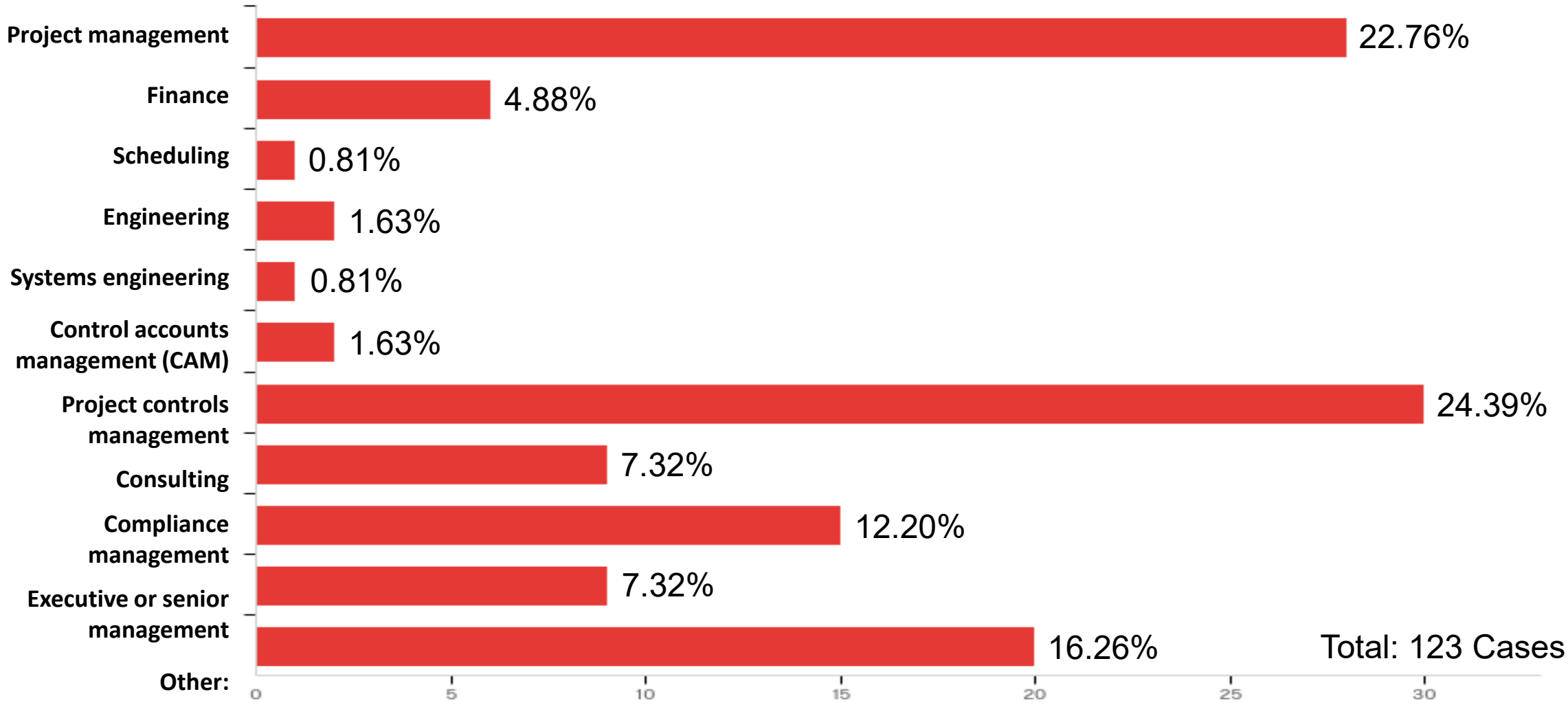
Survey – Preliminary Results

- Sent out end of August
  - Well over 500 personnel
  - Project and program management/leadership
- 123 responses as of Sept 5
  - THANK YOU
- Reminder to be sent
- Goal ~250

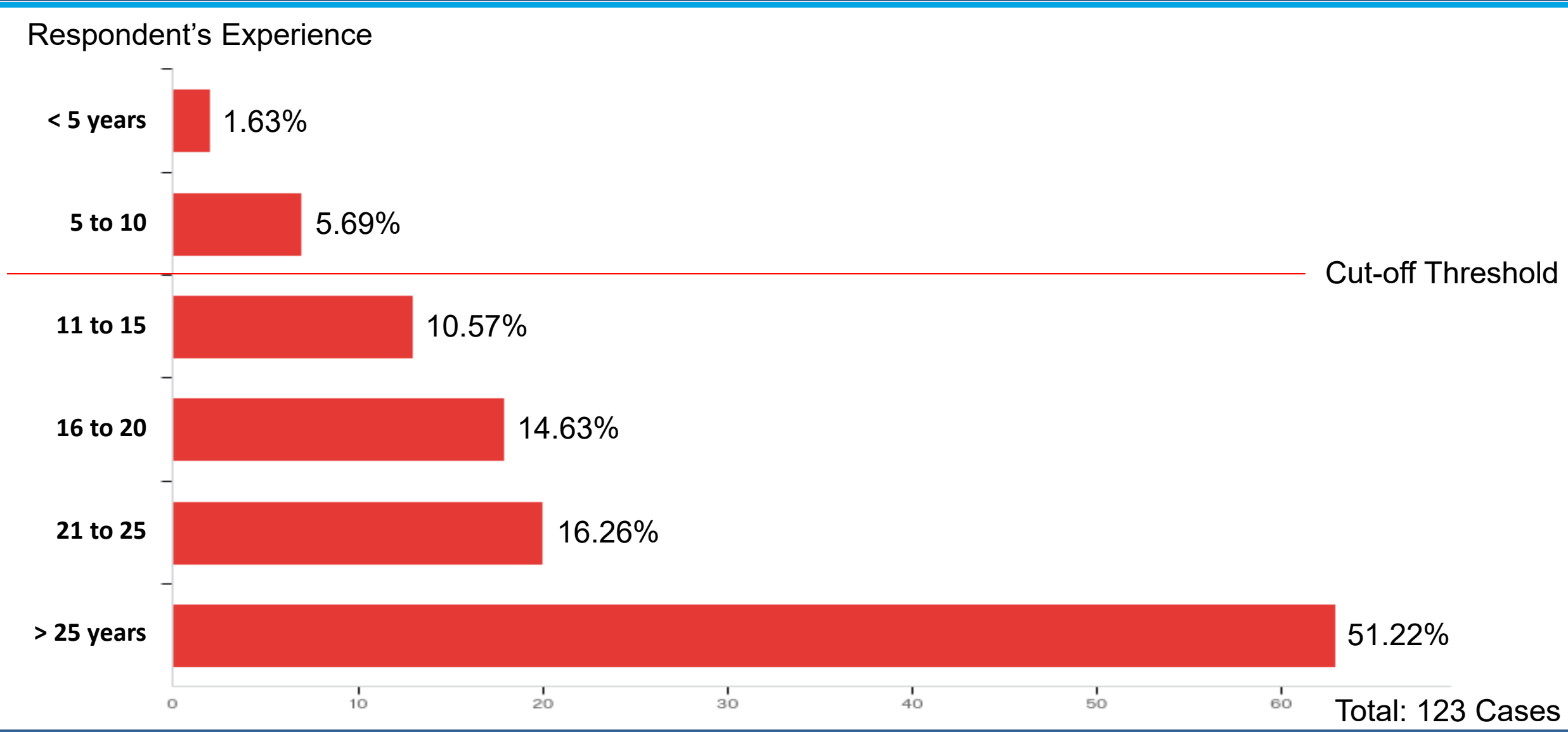
Q1 - Please indicate your **employer**.



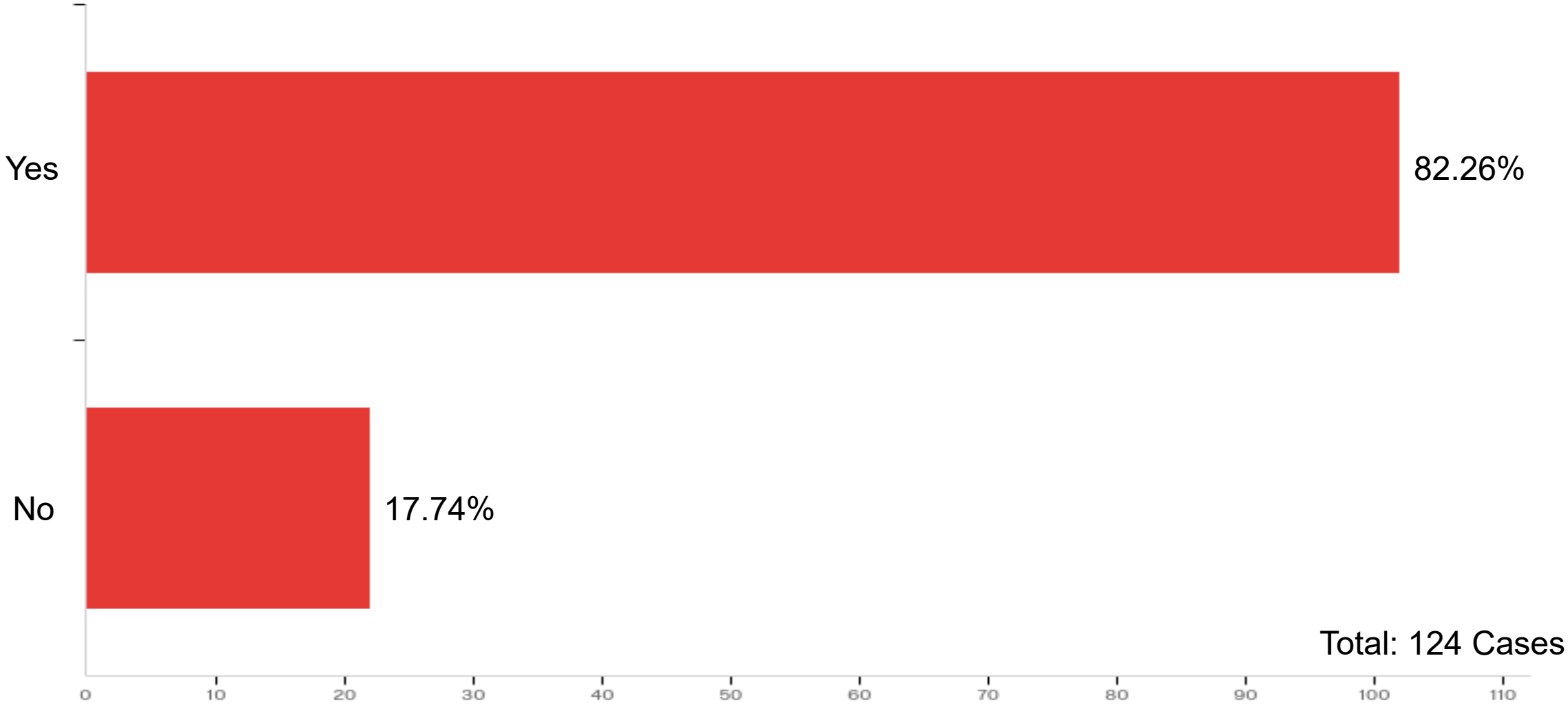
Q2 - Please provide your typical **employment role**.



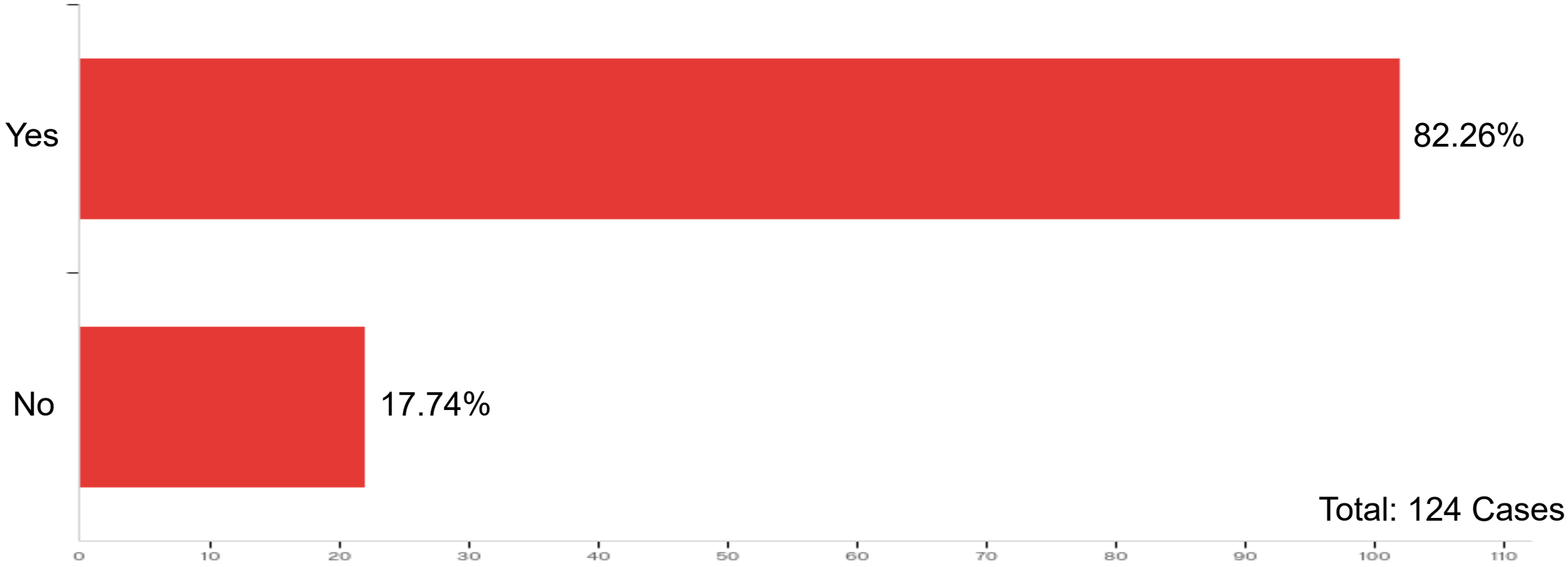
Q3 - How many **years of work experience** do you have in total?



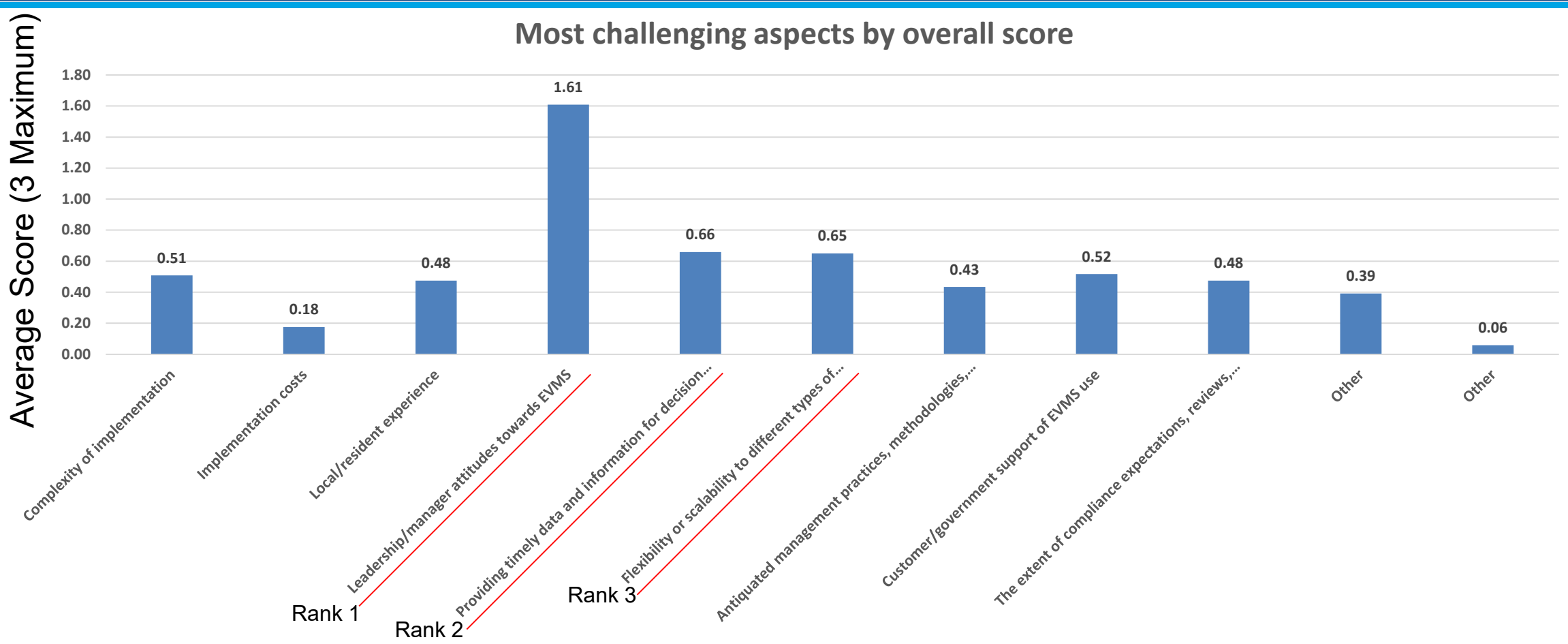
Q6 - Research team's working definition of Earned Value Management (EVM): "EVM is the use of performance management information produced from the EVM system, to plan, direct, and control the execution and accomplishment of contract/project cost, schedule, and technical performance objectives." **Do you agree with this EVM definition**?



Q12 - Team's working definition of Earned Value Management System (EVMS). "EVMS is an organization's management system for project/program management that integrates a defined set of associated work scopes, schedules and budgets for effective planning, performance, and management control." Do you agree?



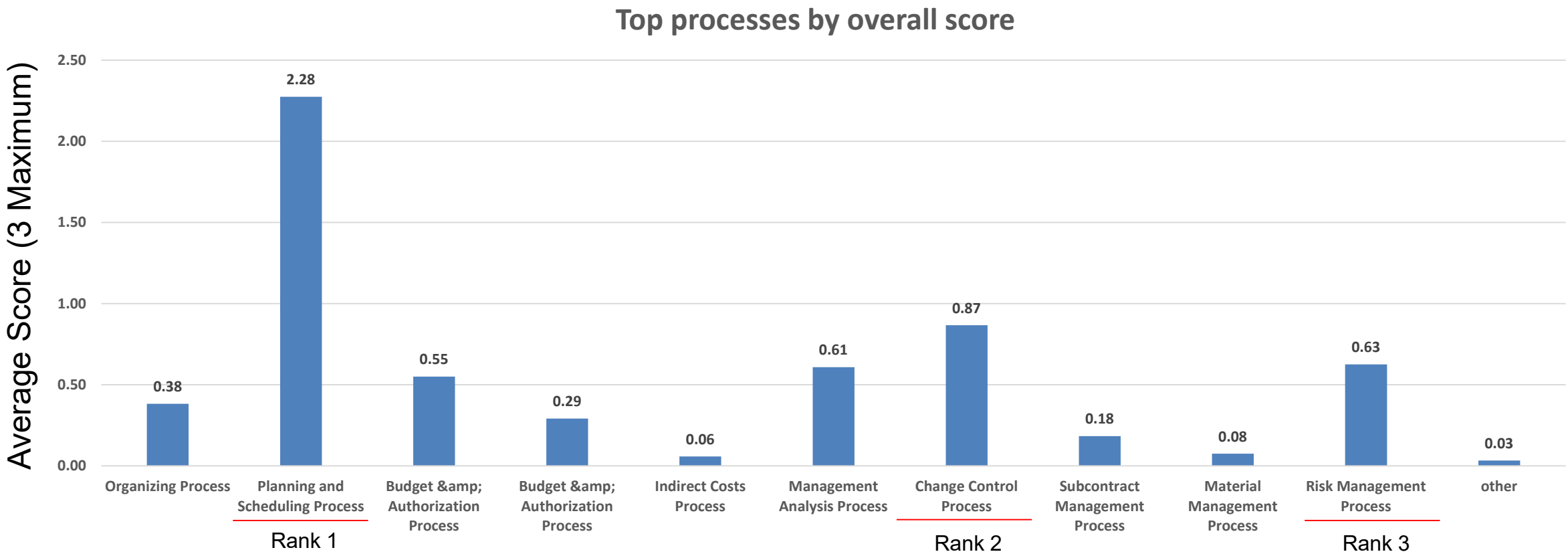
Q19 - What are the most challenging aspects of managing a project/program using the Earned Value Management System (EVMS). Please rank the top three, with 1 being the most challenging aspect.



1. Leadership/manager attitudes towards EVMS
2. Providing timely data and information for decision making
3. Flexibility or scalability to different types of organizations and projects

Rank 1 – 3 points
Rank 2 – 2 points
Rank 3 – 1 point

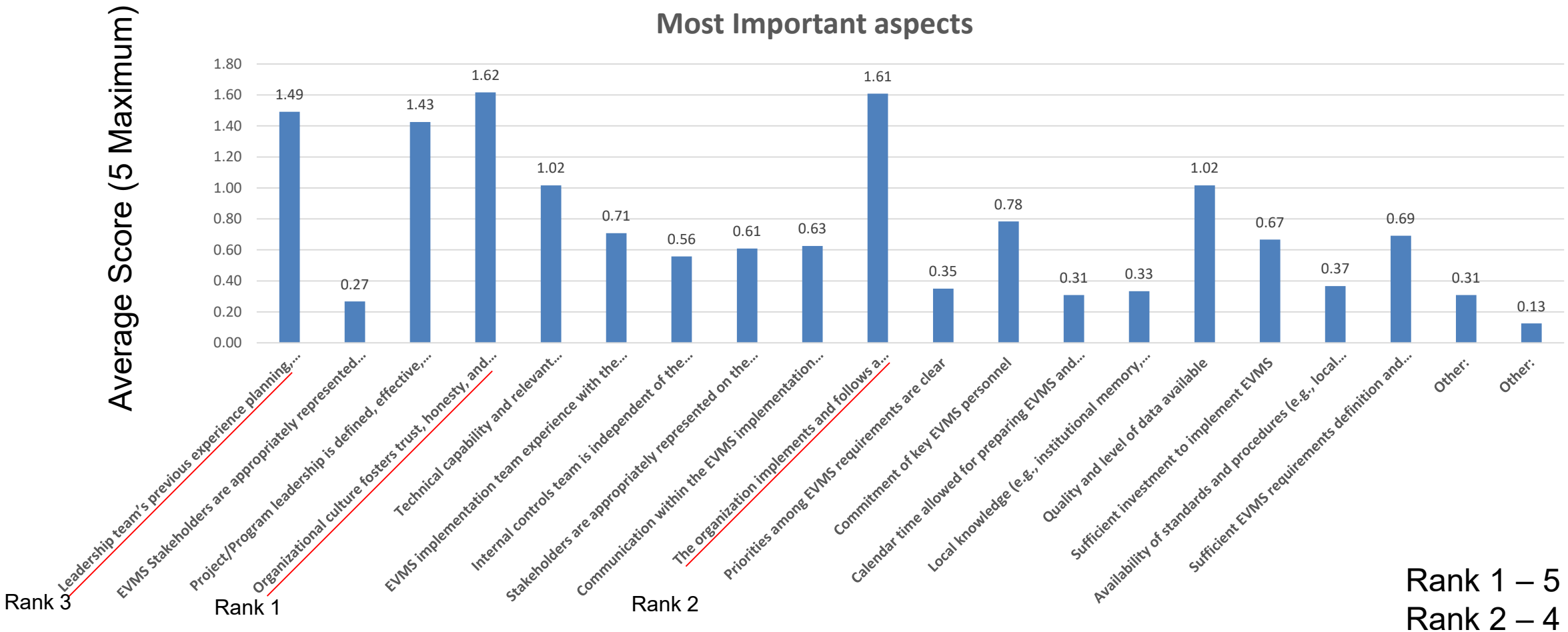
Q20 - The following core processes typically make up an Earned Value Management (EVM) system. In your opinion, please rank the top three in the list below in terms of their impact on EVMS effectiveness.



1. Planning and Scheduling Process
2. Change Control Process
3. Risk Management Process

Rank 1 – 3 points
Rank 2 – 2 points
Rank 3 – 1 point

Q21 - The following factors can impact the **Accuracy** of Earned Value Management (EVM) systems. Based on your experience, please rank the top 5 factors in order of importance (#1 is the most important). “Earned Value Management System (EVMS) Accuracy is the degree of confidence in the outputs of the EVM system, associated processes, and deliverables that serve as a basis for effective program/project management and decision making.”



Rank 3

Rank 1

Rank 2

1. Organizational culture fosters trust, honesty, and shared values
2. The organization implements and follows a standard EVMS Development process, has a formal structure or process to prepare EVMS, and implements planning tools that are used effectively
3. Leadership team’s previous experience planning, designing and executing an EVMS on a project/program of similar size, scope, and/or location

Rank 1 – 5 points
Rank 2 – 4 points
Rank 3 – 3 points
Rank 4 – 2 points
Rank 5 – 1 point

Survey

- Please complete if not yet done so
- Contact us if you would like to but did not receive
- Share with associates and friends in this field
- Greater than 10 years experience preferred

Path Forward

- **Finalize Survey Analysis**
- **Develop Maturity Elements and Environment Factors**
- **Test in Workshops**
  - Late Spring 2020
  - Adjust Model
  - Follow-on Workshops
- **Collect Empirical Data**
- **Test on Real EVMS Implementations**
  - End of CY 2020
- **Publications**
- **Presentations**
- **Training**
  - Spring 2021

Products

Create a high-value and innovative assessment and rating mechanism that specifically applies to the EVMS with high usage and impact for government and industry. Deliverables include:

- A proven EVMS implementation and assessment mechanism/process;
- Automated Toolset with associated user instruction documentation;
- Research summary giving an overview of the research and key findings;
- Research report providing a detailed discussion of all research work;
- Informs EIA-748E update;
- Training sessions; and
- EFCOG/NDIA conference presentations.

Will You Be Able to Handle the Results?

QUESTIONS