



ACQUISITION RESEARCH PROGRAM SPONSORED REPORT SERIES

Why do Programs Fail? An Analysis of Defense Program Manager Decision Making in Complex and Chaotic Program Environments

December 2018

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Prepared for the Naval Postgraduate School, Monterey, CA 93943.



The research presented in this report was supported by the Acquisition Research Program of the Graduate School of Business & Public Policy at the Naval Postgraduate School.

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ABSTRACT

Department of Defense (DoD) program managers' ability to make effective decisions are critical to a program's performance. This qualitative study of two DoD program managers shed light into their decision-making processes in complex and chaotic programmatic environments. Additionally, this study specifically focuses on four aggregate categories—leadership, attitude, bureaucracy, and reputation. These categories have profound influences on the program manager's ability to process information, make sense of a situation, and make decisions accordingly. By understanding how program managers perceive reality when facing challenges, we could potentially introduce necessary changes, adopt proven practices, and redirect resources toward efforts that would help program managers make more effective decisions.



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ACKNOWLEDGMENTS

First and foremost, we would like to thank our families for their constant support while studying here at the Naval Postgraduate School and throughout our careers. Second, we would like to thank the NPS Acquisition Research Program and the NPS Graduate Writing Center for all of their persistent support with our MBA project. Last, we would like to especially thank Dr. Robert Mortlock and Professor Raymond Jones, our MBA project advisors, for going above and beyond in continuously supporting us with this milestone.



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LIST OF ACRONYMS AND ABBREVIATIONS

DoD	Department of Defense
FOIC	First Order Informant Code
GAO	Government Accountability Office
ISR	Individual Situational Reality
MBA	Master of Business Administration
PM	Program Manager
RAND	Research and Development
SOAC	Second Order Analytical Code



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I. INTRODUCTION

A. BACKGROUND

The United States has been the world's only superpower since the collapse of the Soviet Union. There are many factors that have contributed to the U.S. dominance on the global stage including diplomacy, information, military, and economics. Of these factors, possessing a dominant military has been the key to executing the U.S. National Security Strategy. The Department of Defense (DoD) has successfully deployed many major weapons systems in recent decades: nuclear aircraft carrier, nuclear submarine, F-16, and Black Hawk. These weapon systems are among the most lethal in the world, and have played critical roles in protecting U.S. interests, both at home and abroad. Some of these weapon systems also have international implications as some of United States' closest allies also operate them to protect their interests against common adversaries.

The importance of acquiring superior weapon systems in a timely manner while keeping costs under control is of great importance for protecting U.S. national security. In recent decades China has enjoyed unprecedented growth in terms of economy and military. As the country becomes wealthier and its military becomes stronger, China becomes more assertive in its immediate region as well as on the global stage. Another alarming sign of the danger posed by China was reported in a RAND report *The U.S.–China Military Scorecard* (Heginbotham, 2015). The report pointed out that China has been narrowing the military gap with the United States in virtually every area and even moved ahead in some. The trend indicates that China's military is well on the trajectory of matching or even surpassing the United States' military capacity.

In addition to the Chinese threat, Russia has been using its military might in the Baltic region and is wreaking havoc in the Middle East, especially in Syria. Russia has been spending tremendous amounts of money modernizing its military to reclaim some of the glory that it enjoyed as the Soviet Union. A portion of Russia's military assets includes its vast nuclear arsenal, advanced air defenses, and high-tech submarines. All these systems pose considerable challenges for the United States and its allies to overcome. Even though Russia does not have the resources to fight a prolonged campaign against the United States



and its allies, Russia still possesses the firepower to pack a great punch. One of the most effective ways to keep the Russian military in check is for the United States to continue to develop, produce, and deploy state-of-the-art weapon systems. The DoD's mission is to provide "military forces needed to deter war and ensure our nation's security" (Department of Defense [DoD], n.d.). The United States' national security can be better protected as long as the U.S. military remains dominant.

In the worst-case scenario, in which the United States must engage in a military conflict, it would want to possess the capabilities to make it a one-sided war where the enemy can be defeated entirely at minimal costs to American lives and treasure. In his speech to the Corps of Cadets at West Point, General Douglas MacArthur (1962) said, "Yours is the profession of arms, the will to win, the sure knowledge that in war there is no substitute for victory, that if you lose, the nation will be destroyed, that the very obsession of your public service must be Duty, Honor, Country." The DoD must develop and acquire superior capabilities to guarantee victories in future armed conflicts.

Historically, the DoD has had many successes in developing, producing and deploying major weapon systems; however, the DoD also had its share of unsuccessful programs due to a combination of underperformance, excessive cost overruns, and delays. During the Obama administration, the military experienced sequestration, which meant a decrease in the military budget while the military's presence around the world remained mostly unchanged. In his prepared testimony to Congress in 2013, the Army Chief of Staff, General Raymond T. Odierno, stated, "Major weapon programs will be delayed, and while we tried to protect certain programs, the impact on the industrial base is likely to be severe" (The Impact of Sequestration on the National Defense, 2013). Sequestration negatively affected the U.S. military's ability to procure critical capabilities that its warfighters needed to carry out their missions successfully.

Many DoD programs fall short of meeting the objectives of delivering required capabilities on schedule while keeping costs under control; the DoD pays more than planned, can buy less than expected, and in some cases delivers less capability to the warfighter later than planned. For example, the F-22 program was initially estimated to cost \$12.6 billion in research and development within nine years (Vertabedian, 2013).



However, the F-22 research and development ended up costing the government \$26.3 billion and took 19 years to complete. To make matters worse, only 183 of the 750 originally planned aircrafts were delivered.

The F-22 program is a classic example of a major weapon system being influenced by political forces. From the very beginning, “the F-22 was built to be politically bulletproof, where subcontractors from 44 states were involved in building the airplane” (StartLoving2, 2009). As a result, the F-22 program gained support from most elected officials; especially, officials from states that were involved with producing parts for the airplane. However, the challenge of piecing together parts from more than forty states to build the most advanced weapon system of its era further contributed to the difficulties that the F-22 program manager (PM) faced.

The F-22 weapon system was initially designed to deal with the USSR weapon systems and to maintain air superiority. Today, the F-22 could arguably defeat any fighters in existence. However, the massive cost overrun and schedule delay that the program experienced is part of the trend that most major weapon systems face.

At the head of the U.S. government is the president of the United States. The decisions that he makes could impact the lives of millions of people. This is especially true when the president makes decisions that would put American lives in harm’s way. Perhaps this is one of the main reasons why presidents have a long tradition of writing condolence letters to the families of fallen service members. The act of writing these letters would remind presidents that their decisions could have life and death consequences and that they should make the best decisions possible in any given situation.

Similarly, at the head of any major program is a PM. A program’s performance largely depends on the PM’s ability to make effective decisions in any given situation, especially when the military’s budget faces increasing constraints. The DoD procurement budget fluctuated over the years in response to the military’s operational tempo and changes in the political landscape. However, the DoD has consistently failed to achieve its objectives of procuring capabilities in a timely manner while keeping costs under control. For example, the U.S. Army put together the requirements for the RAH-66 Comanche in the early 1980s. This program was ultimately canceled in 2004 because it “faced significant



risks related to cost overruns, scheduling delays, and degraded performance” (General Accounting Office [GAO], 2001).

Failing to achieve program management objectives has become a big problem for the United States and its allies as competitors such as China and Russia are rapidly modernizing their militaries and are increasingly exerting influence at the United States’ expense. Therefore, for the United States to protect its interests, it needs to be able to develop, produce, and deploy superior weapon systems rapidly. By studying the PM’s decision-making process, the DoD may be able to better understand the underlying correlations between major weapon system program performance and a PM’s decision-making process

B. PROBLEM STATEMENT

DoD PMs, for the most part, receive similar education and training. It would make sense to think that PMs would process complex problems and make decisions in the same manner and therefore, would yield identical program performances. However, that is not the case. The DoD has a mixed record of having successful weapon programs as well as programs that were deemed to be disastrous. The problem is that there is a gap of understanding in how DoD PMs process and formulate their decisions.

C. PURPOSE

In this MBA project, we attempt to examine the fundamental DoD program challenges from a practical and observable perspective, instead of from the policy point of view. Acquisition policies and processes have evolved over the years, especially during the 1990s, to streamline and make DoD acquisition more efficient and effective (Fox, 2011). In 2010, the DoD introduced the Better Buying Power initiatives to address some of the challenges that the acquisition community faced (Kendall, 2014). The intended result of these changes, however, did not materialize as major weapon system programs consistently failed to deliver intended capabilities on time and within projected costs.

With the expectation of either slow-growing or flat budgets in the foreseeable future, the DoD must make necessary changes to get a better return on its investments and find ways to deliver superior capability on time and within budget (Keller, 2016). The



GAO’s 2017 High-Risk Report identified “examine best practices to integrate acquisition decision-making processes” as one of the top action items that the DoD should take. Future researchers can build upon data gained from this study to develop a decision-making process that future PMs can utilize to make more effective programmatic decisions that would result in improved return for investments made in major weapons programs.

D. RESEARCH QUESTIONS

One primary assumption in this study is that the decision makers are all senior leaders in their respective professions. These individuals are seasoned leaders with a wealth of experience and knowledge. In this report, we attempt to address the following questions:

1. What are the most critical factors that influence a leader’s decision?
2. How do PMs gain insight in complex and chaotic environments, and how do insight and decision-making process correlate with overall program performance?

E. METHODOLOGY

This study’s preliminary effort is to review existing literature to understand decision making further. Part of the literature review includes various widely accepted models that helped individuals to be more effective at making decisions. In addition to the decision models, we also attempt in this project to answer how leaders from other career fields and or professions made sense of complex problems and made arguably optimum decisions.

This MBA project utilizes an interpretive approach to analyze the answers that the two DoD senior PMs provided in the interviews that we have conducted to understand how they interpret a situation and make decisions in complex and chaotic environments. To participate in this study, the DoD PMs needed to satisfy the following selection criteria. First, they had to be active duty United States military officers or DoD General Schedule employees who had been assigned to at least three previous DoD PM positions. Second, they needed to be considered a senior DoD PM; therefore, we recognized O5-O6 active duty military officers and GS14–GS15 employees. All participants must be managing at least one major DoD program.



As a result, we interviewed two active duty military senior DoD PMs. The participants were selected at random, based on the condition that each had completed several assignments in program management. We conducted a face-to-face interview with each participant that lasted approximately 60 to 90 minutes.

While the overall purpose of this project is focused on how PMs make decisions in complex and chaotic environments, we also developed a theory based on information gained from the literature review as well as data obtained from our interviews. This theory could potentially explain how a PM gains insight into complex problems and make satisfactory decisions.

The decisions that people make every day shape their own lives as well as the lives of others; especially, those who are in positions of power, such as DoD PMs. These leaders' decisions would impact their programs' performance and are consequential to stakeholders such as the warfighters. As part of any major program, some programmatic decisions were already made by others such as the program's former PMs. Some decisions made by the current PM may shape the program's performance as well as the decisions that successive PMs will make. It is critical to understand the decision maker's thought process as well as the key factors that influence their decision-making. Understanding a PM's thought process would potentially allow us to understand why their decision does not consistently help improve a program's performance.

Two senior PMs were interviewed to answer the following six questions:

1. Describe a time when your program was experiencing programmatic difficulties.
2. How do you feel about the overall DoD Acquisition process and do you feel it is helpful in the successful execution of complex programs?
3. Do you think commercial industry is more efficient than the DoD in developing products?
4. What do you think are some of the key challenges in developing a successful capability in the Acquisition process?
5. Which phases of the Acquisition process do you think are the most challenging in the Acquisition process?
6. What would you like to see change in the DoD Acquisition process that might improve the process?



In addition to these questions, follow-up questions were also asked to ensure interviewers fully understood the points that the participants were trying to make. This qualitative study provides data that we grouped into different aggregate categories. The data gained from these interviews were analyzed to provide quantitative measurements that were useful in determining the level of importance of each category when these PMs made decisions. Moreover, we also compared how PMs and other leaders make sense in complex and chaotic environments to arrive at satisfactory decisions.

1. Data

The intent of this MBA project was to be a part of a broader research collection from our advisor, Professor Raymond Jones. As part of this effort, we were instructed to interview two PMs and analyze the data gathered from the interviews to further expand on his analysis. To protect the two PMs' identity, their PII will be discussed, including their gender. However, we will assign the gender of these two PMs as male for the purpose of simplifying the writing of this MBA Project.

Data collection for this MBA project includes three primary sources: (1) tapes and transcripts of the two interviewees, (2) research and briefings from professionals who specialize in analyzing decision-making, and (3) existing literature review on both military and private sector executives who had tremendous success. To evaluate and analyze the data, we coded it by categorizing it into SOACs and aggregate categories. This coding provided us with a qualitative, comprehensive and in-depth analysis of how each of the DoD PMs made sense of situations.

2. Data Analysis

The transcripts from the interviews revealed 18 analytical codes that came up repeatedly throughout the two interviews: team building, personnel management, communicate, mentor, recruit, arrogant, confident, flexible, risk management, expectation, politics, constraint, frustration, stakeholder, luck, foundation, trust, and networking. These 18 codes neatly fit into the four aggregate categories that we have identified to play critical roles in shaping the PMs Individual Situational Reality (ISR).



This study interpreted the data by utilizing the ISR theory that we have developed. PMs' ISR is shaped by how much weight they assign each of the aggregate categories identified. Each of these aggregate categories comprised various SOACs, and both were analyzed by the statements made and categorized accordingly, thereby, creating data based on interviews conducted.

F. SCOPE

The primary objective of this MBA project is to analyze how the two interviewed PMs gained insight in making program management decisions in complex and chaotic environments. By using the data gathered from the two interviews, this MBA project identified aggregate categories and second-order aggregate categories (SOAC) that these PMs appear to have deemed as important. These categories do not apply to all PMs because the data gathered was collected from only two PMs. However, the data collected provides indications into how DoD PMs gain insight into complex environments and make decisions accordingly.



II. LITERATURE REVIEW

For many years, experts have tried to formulate decision-making methods that would allow humans to overcome cognitive biases and distortions to arrive at perfect rational decisions. Many methods have been published attempting to aid people to make more effective decisions. In the first section of this chapter, we define decision-making and different approaches that people use to make decisions. In the second section, we analyze the seven steps to effective decision making. In the third section, we explore cognitive biases and how they influence our decision making. In the fourth section, we examine Simon's bounded rationality model and the limitations and constraints that may prevent people from arriving at optimal decisions.

In the fifth section, we explain the ISR model that we created. We used this ISR model to analyze the data and test our hypothesis. The last section of this chapter comprises an in-depth analysis of two civilians. The purpose of examining these leaders is to illustrate that the ISR model can be applied to professionals from different career fields. Additionally, the analyses of these leaders demonstrate the importance of being flexible and adaptable to make necessary adjustments to the decision-making process to make the best decision in complex and chaotic environments.

A. DEFINITION OF DECISION-MAKING

We make tens of thousands of decisions every day; perhaps decision making is the single activity that we do more than any others. According to Nobel Prize winner, Professor Daniel Kahneman from Princeton University, there are two ways that we can make decisions: analytical and automated (Macdonald, 2014). The analytical approach requires thoughtful analysis of the problem and formulation of a rational answer. The automated approach relies heavily on our intuition to make decisions quickly. Some decisions need more efforts and more careful thoughts than others, such as whether to buy or rent a house. These kinds of decisions require the decision maker to have a good understanding of the situation, deliberate between different potential solutions and choose among the most



satisfactory options. Mistakes are often made when we use the automatic decision-making approach to address complex issues that require more careful consideration.

Scores of research and experiments have been conducted on the topic of decision making. One of the most famous experiments in decision making was designed by two psychologists, Dr. Bryan McCrae, and Dr. Lance Mortimer (Harding, 2017). The purpose of this research was to determine how much people were willing to pay for the same champagne bottle. Participants were randomly selected, and one by one were asked a series of questions. The interviewer began by asking the participants to choose a ping-pong ball out of a bag that contained a hundred ping-pong balls. The participants were told that each ping-pong ball included a unique number between 1 and 100; that was not the case. All the ping-pong balls in the bag contained number 10. The participants were then asked if they were willing to pay £10 for the champagne bottle. Some answered yes, while others answered no. The interviewer then proceeded to ask the participants to name a maximum price that they were willing to pay for that champagne bottle. Some participants were willing to pay as high as £20 for that bottle of champagne.

The same process was then repeated for the second set of participants; the only difference was the number displayed on each ping-pong ball was increased to 65. The result was surprising; some participants were willing to pay as high as £80 for that bottle of champagne. The psychologists concluded that humans often resort to the automatic decision-making approach even when facing more complex situations. We usually try to make connections between the information presented to understand a situation, even when those connections do not exist. Additionally, as illustrated in the experiment, we tend to base our future decisions on our previous choices even though there are no real connections between those decisions.

In program management, past decisions could influence future decisions. There are times, however, when previous decisions should not have any impact on future decisions. For example, the government spent \$500 million on developing a weapon system that is not making any progress in technical development. When it comes time to make a recommendation whether to continue the program, the PM can decide to either terminate



the program or provide an additional \$200 million to keep the program alive for another two years.

The PMs recommendation would depend on numerous factors ranging from his personal pride to national interests. If the PM put more emphasis on his pride and his career progression, then he would probably recommend keeping the program alive because a failing program does not reflect positively on its PM. On the other hand, if the PM puts more weigh on national interests, then he would probably recommend terminating the program because throwing good money after bad is not the best way to spend taxpayers' money. The PM can make this recommendation in one of two ways. He can use the automatic approach and heavily depend on his intuition to decide, or he can carefully analyze different courses of action and select the one that makes the most sense.

B. AGGREGATE CATEGORIES

In the context of this MBA project, aggregate categories are the groupings that have the most influence on how a person interprets a situation and then creates a reality from that specific situation. The groupings begin by interpreting the data and selecting terms that best reflect what program managers are saying. The first level of groupings is the first order informant codes (FOIC), the second level of groupings are the second order analytical codes (SOAC) and we call the highest groupings the aggregate categories.

The FOICs are the terms that came to mind as we analyze segments from the transcript. Based on these FOICs, we identified the SOACs that can be used to divide FOICs into smaller groups. From the SOACs that we have identified, we chose the aggregate categories that would include all the SOACs that we have identified. We came up with the aggregate categories of Leadership, Attitude, Bureaucracy and Reputation. We then chose these four categories over other categories because they cover all identified SOACs. These four aggregate categories played a major role in shaping the two DoD PMs' decision-making process.

1. Leadership

According to Rothman, a history professor at the University of Alabama, “people have been thinking about leadership for a long time” (2017). Different civilizations have



exhaustively studied leadership for centuries by iconic historical figures from every corner of the world such as Confucius, Plato, and Machiavelli have studied and stressed the importance of leadership in governance and different aspects of society. Prominent figures in the subject like Dr. Barbara Kellerman, a founding director of Harvard Kennedy School's Center for Public Leadership stated that leadership had been thoroughly studied for many generations; our ability to grow decent leaders, stop or slow bad leaders is not different compared to a thousand years ago (Kottler, 2018, p. 35).

Throughout history, we have seen many examples of prominent figures that we consider to be great leaders. In our modern era, iconic figures such as Steve Jobs and Jeff Bezos are among the best leaders; they are also believed to possess the right qualities that make them successful. The problem is many people possess some of the same desirable leadership qualities who fail as leaders.

There are multiple definitions for the term "leadership," *Merriam-Webster* dictionary defines leadership as "the office or position of a leader; the capacity to lead; the act or an instance of leading" (2018). Prominent leadership expert Warren Bennis stated that "leadership is the capacity to translate vision into reality" (Kruse, 2015). The U.S. Army defines leadership as "the process of influencing people by providing purpose, direction, and motivation while operating to accomplish the mission and improve the organization" (Sewell, 2009). The legendary author of *The Art of War*, Sun Tzu, defined "leadership as a mix of five traits: intelligence, credibility, humaneness, courage, and discipline" (Fox, 2010).

What exactly is leadership? The Project Management Institute defines leadership as "the knowledge and skill needed to guide, motivate, and direct a team, to help an organization achieve its business goals" (Mulcahy, 2017 p. 56). It appears that people or organizations from different backgrounds have different definitions for the term "leadership." For this study, we define leadership as the ability to build a team, influence others and solve complex problems to accomplish program objectives. The PMs' approach to leadership and their ability to lead their team would potentially have an impact on how they make decisions.



2. Attitude

The term “attitude” is used in many ways. For this study, the term “attitude” is defined as a “feeling or emotion toward a fact or state” (“Attitude,” n.d.). A positive attitude is among the most critical factors in determining a person’s success. Psychologist Carol Dweck concluded that there is a stronger correlation between a person’s attitude and his/her success than a person’s IQ and his/her success (Bradberry, 2016). For instance, one of the most essential tasks for major weapon system PMs is risk management. There are many ways to manage risks. Some PMs might choose to minimize risks at all costs and play it safe. They operate under the belief that they should not further complicate a highly complex program; their leadership would probably not punish them for failing because they never attempt anything out of the ordinary which they could fail. Some might choose to take manageable risks with the expectations of improving program performance. A very few might deliberately embrace risks because they operate under the belief that if they put forth their best effort on a project, then they would be rewarded regardless of whether they succeed or fail. Additionally, those who have failed but have survived will have valuable experience and persistence for future efforts.

Another aspect of attitude is PMs is how people deal with unanticipated complex problems. Some PMs are rigid in their problem-solving methodology, regardless of the nature of those problems. They operate under the belief that the methods that they have successfully employed in the past can be used to solve all problems. The problem is that there are no one-size-fits-all solutions. There will be times when the PMs face issues that they cannot resolve using their experience and current knowledge. To solve these problems, the PMs must have a flexible mindset and make necessary changes until they get desirable results.

Perhaps the most critical aspect of attitude is confidence, especially for military leaders or DoD PMs. Overseeing a major weapon system program is synonymous with overseeing a team that is charged with delivering lethal capabilities that are vital to our national security. The PMs must have confidence in their leadership ability as well as in their people’s ability to carry out their assigned jobs. Additionally, the team members, as



well as other stakeholders, must also have confidence in the PMs' ability to successfully achieve their assigned program objectives timely and within reasonable costs.

3. Bureaucracy

The term “bureaucracy” is often used to describe barriers that hinder or slow down progress. The U.S. government is one of the world’s largest bureaucracies and has experienced many challenges regarding efficiency and effectiveness. The GAO’s 2016 Government Efficiency and Effectiveness report found that there are “fragmentation, overlap, and duplication” in numerous agencies within the U.S. government. The report also stated that the government could potentially save billions of dollars and shorten processing time by taking actions to manage and address fragmentation, overlap, and duplication.

Regarding major weapon system program management, the term “bureaucracy” refers to a “specialized organization composed of non-elected, highly trained professional administrators and clerks hired on a full-time basis to perform administrative services and tasks” (Mandal, 2007). For instance, a major weapon system program consists of members from many specialized departments such as engineering, contracting, finance, legal, end users, and other stakeholders. Each of these departments has its own set of priorities, which do not always line up with the program’s objectives of delivering superior capabilities in a timely manner and within reasonable costs. The PM must understand their organizational landscape to choose the most appropriate method to influence and negotiate with others.

4. Reputation

Reputation is among the most important asset or liability that PMs bring to the team. According to Beth J. Kaplan, a former director at Reliant Technologies, Inc., “Your reputation is everything” (Mulcahy, 2015). A person’s reputation can loosely be interpreted as the perception that others have of them. As Benjamin Franklin famously said, “It takes many deeds to build a good reputation, and only one bad one to lose it” (Eccles, Newquist, & Schatz, 2014). In other words, a good reputation takes a lot of time and effort to build; it could also be easily destroyed with just one act.



How others perceive PMs' reputation depends on their foundation, ability to network and the level of trust that they have established. The term "foundation" refers to the level of relevant education and experience that a PM has. For the PMs' words to be highly credible, they would have to have an adequate level of relevant certification and experience. Senior PMs, for the most part, have worked in the government for at least a decade. The reputation that they have established and the network that they have built throughout their career would have an impact on how the PMs form their decisions. For instance, Participant 1 said that the only reason why he was picked to be in charge was that of the reputation that he had built throughout his career. Once in the position of power, the PM utilized his reputation for strengthening his network with stakeholders. The PM had a reputation of taking his stakeholders' interests seriously and did everything he could to help his stakeholders be successful; thus, further strengthening the level of trust that the stakeholders have for the PM.

In this information age, email, teleconference, texts, and phone calls account for most of the communication that takes place in most agencies. These forms of communication are vital to transmitting information; however, they do not help build networks or strengthen professional relationships. By realizing the importance of physical presence in building trust, Participant 1 spent much of his time traveling to meet his stakeholders to enhance the professional relationships that would be vital for the PM to solve complex programmatic problems.

In the context of program management, a positive reputation is built upon three primary factors: foundation, trust, and networking. PMs are in the business of customer service; their primary mission is to support their stakeholders. PMs must have a strong foundation and be able to demonstrate that they are proficient at doing their jobs. Additionally, the PMs must also be trustworthy; the stakeholders would be more likely to cooperate if they know that they can trust the PM. The last factor is networking; effective program management cannot happen in a vacuum. Having a strong network would greatly help the PMs to solve complex problems more effectively.



C. MODELS AND THEORIES

This section discusses two widely used decision-making models: *Seven Steps to Effective Decision-Making* and *Bounded Rationality*. Additionally, we also discuss cognitive biases and how they influence the PMs' decision-making process. Lastly, we discuss Darwin's evolutionary theory and an in-depth analysis of two modern business titans, who have successfully applied this theory and created superior products that changed how people live.

1. Seven Steps to Effective Decision-making

One of the most widely used decision-making models is the seven steps to effective decision-making. Figure 1 depicts seven steps to effective decision-making model that was published by the University of Massachusetts.

Figure 1. Seven Steps to Effective Decision-Making. Source: University of Massachusetts, Dartmouth (n.d.).



According to the University of Massachusetts, the purpose of this decision-making process is to help decision-makers “make more deliberate, thoughtful decisions by organizing relevant information and defining alternatives” (Decision-making process, n.d). This model provides a logical path for a decision-maker to make the most satisfactory decision among identified alternatives. The first step of this model is to identify the decision. This can be confusing because logically there are a few steps that needed to be done before a decision can be identified. What the author is alluding to in step one is to identify and define the nature of the decision that needs to be made. Additionally, this model also recommends that the decision-maker review his decision by evaluating the result of his decision.

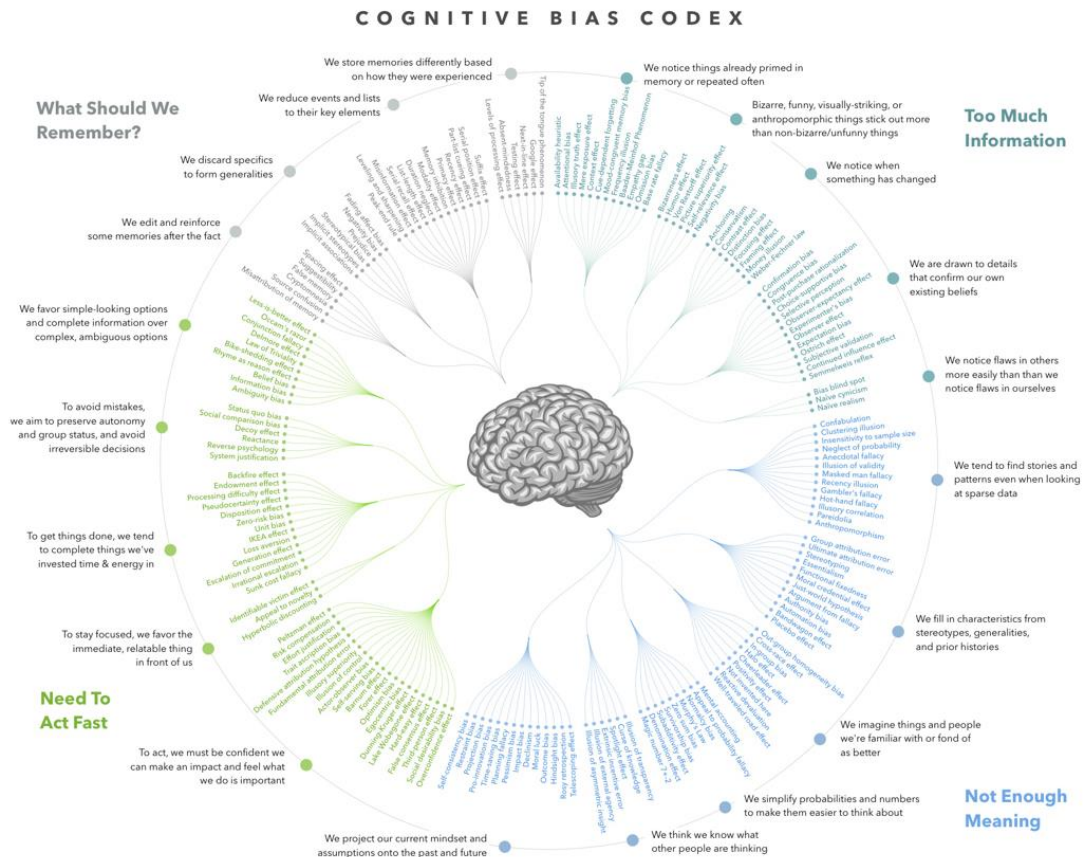
This decision-making process probably works best for simple problems where constraints are minimal. However, when dealing with complex problems, this process does not consider or address cognitive biases that affect how a decision is made. Additionally, this decision model does not address the factors that would affect the decision-making process.

2. Cognitive Biases

There is no complete official list of cognitive biases available. In his textbook *Think Critically*, Peter Facione identified 17 biases, while some authors indicate that there are as many as 53. John Manoogian, an engineer by trade, took a list of 188 cognitive biases that was compiled by Internet users and turned it into a visual map as demonstrated in Figure 2 (Gholipour, 2016).



Figure 2. Cognitive Bias Codex. Source: Gholipour (2016).



This chart is quite intimidating and requires a tremendous amount of time and effort to master, let alone recognizing and take proper steps to prevent those identified biases from having an impact on our decision making. The next question is can decision makers avoid being bias and make better decisions. To answer this question, Professor Laurie Santos of Yale University experimented to see how monkeys make economic choices (Adler, 2008). The experiment involved teaching the monkeys to use tokens as a form of currency to exchange for grapes. The monkeys were introduced to a range of economic trials that humans often face. Oddly enough, the monkeys displayed the same biases as humans when determining whether to be risky or to be risk-averse.

If the evolutionary theory is accurate, and that today's humans evolved from the same species as other primates, then the biases that we possess today have been genetically passed down for millions of years. Santos concluded that even though human beings are

relatively smart, it would be tough for them to overcome the biases that have been passed down from our ancestors since the very early days of their evolution (Adler, 2008). Since humans are incredibly smart, we have time and again demonstrated that we could overcome our limitations with the help of technology and other means.

Even with technological advancements, individuals operating in high-tech environments such as PMs still have a set of limitations that they have yet to overcome. No one single decision-making method could guarantee that the best decision is made every time, given the PM's constraints and limitations. The constraints and limitations range from the limited information available to their inability to process the vast amount of data within the time constraints to arrive at the optimal decision.

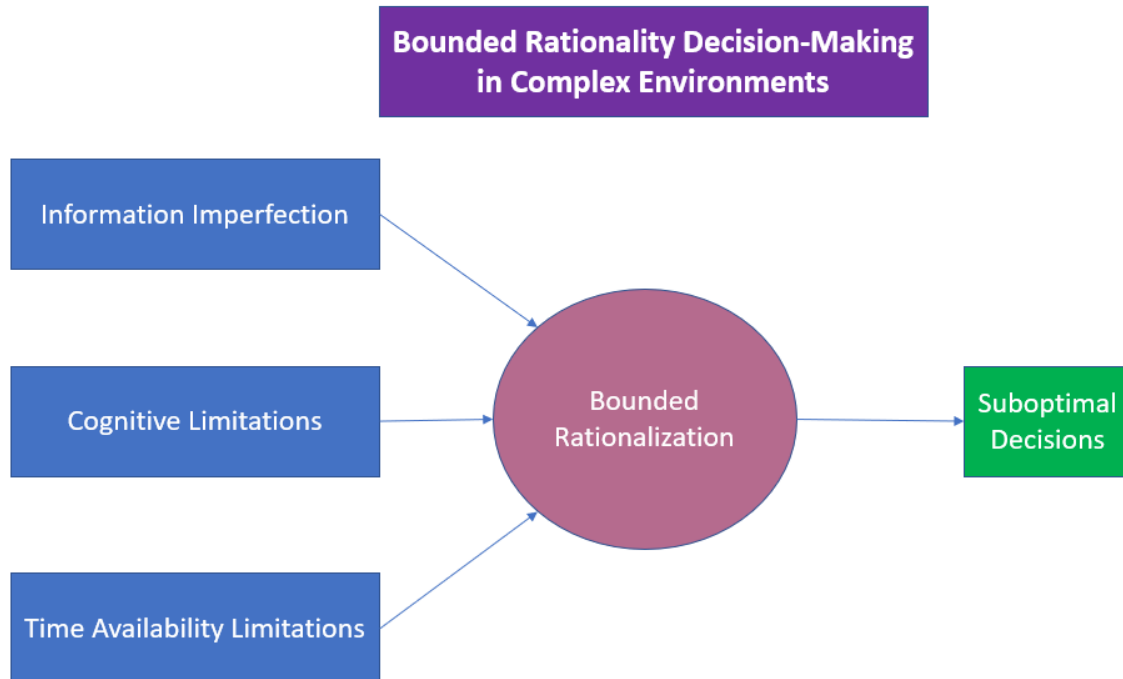
3. Bounded Rationality

Making decisions in a complex and chaotic environment can be challenging due to cognitive, information, and time limitations. Dr. Herbert Simon is most famous for his theory of bounded rationality. This theory was formulated under the assumption that the decision-makers do not have access to all information required and that they cannot process all available data within the allotted time (Canton, n.d.). These are the kind of limitations that DoD PMs face when dealing with complex problems.

Simon introduced the bounded rationality theory to point out that people are only partly rational when it comes to formulating and solving complex problems (see Figure 3). The limiting factors that keep us from making optimal decisions in complex environments are our cognitive capacity, the amount of information available, and the amount of time that we have to decide.



Figure 3. Bounded Rationality Decision-Making. Source: Caton (n.d.).



To a large extent, the bounded rationality theory changed the way decision-makers view decision-making. Instead of striving for an optimal solution to all complex problems, decision-makers strive to make satisfactory solutions to the extent of their cognitive limitations, information imperfections, and time constraints. DoD PMs, for the most part, operate under these three limitations and constraints. Additionally, DoD PMs' decisions are further limited by many factors, including leadership, approach, bureaucracy, and reputation.

4. The Evolution Theory

Charles Darwin proposed the theory of evolution in his book *On the Origin of Species*. This theory introduces the process of natural selection where species evolve to adapt to their environments (Darwin, 2008). The species that are more adaptable will become more successful; therefore, their population will grow. On the other hand, the species that are less adaptable will be less successful, and in some extreme cases, a lack of adaptability could lead to extinction. This theory can be applied to virtually all professions and career fields; especially, program management. The PMs who can adapt to their

environment and make necessary adjustments to their decision-making process would have a better chance of making effective decisions that would ultimately lead to desirable program outcomes.

Hypothesis 1: The leaders who can adjust their ISR decision-making process to specific complex problems will be more successful.

D. ANALYSIS OF TWO SENIOR PRIVATE SECTOR EXECUTIVES

Part of this study is to learn about the decision-making process of four senior leaders in specific situations that have had lasting global impacts. Two leaders were successful executives from the private sector: Steve Jobs and Jeff Bezos.

1. Steve Jobs Managing the iPhone Program

Steve Jobs, the co-founder of Apple Inc., was a business leader whose career provides many examples of how to be successful in complex and chaotic business environments. One can look at his career to analyze his decision-making process and see how he made decisions. Jobs' perception and his reality of the situations he faced can conceivably be compared to DoD PMs and how they make decisions. For this study, we consider some of Jobs's past experiences, and career milestones and the evolution of his decision-making process where he led Apple to create the iPhone.

Based on *Steve Jobs*, a biography by Walter Isaacson (2011), and other resources, we have identified four major categories that can be assigned for how Jobs made sense of creating the iPhone. These categories made up his perception of reality and how he made everyday business decisions. The four categories were placed in order of precedence based off the importance he assigned to each category: (1) Innovation, (2) Revolutionary Attitude, (3) Legacy and (4) Risk Management. Throughout his career, he was able to learn from his mistakes, and he adapted his decision-making process by changing the weight he put on each category. Being a good PM, Jobs's ability to be flexible in his decision-making process allowed him to make more effective decisions when facing challenging problems.

Innovation: Jobs, during the course his career, always pushed his companies to use *Innovation*, by creating products that were esthetically pleasant, appealing and functional. The major part of Jobs's decision-making process that made up his perception of reality



can be attributed to his longstanding goal of always being innovative. Isaacson (2011) wrote that Bill Atkinson, one of Jobs's early Apple engineers, stated that Jobs "was adamant that everything on the interface had a good feeling to the user" and this statement can reaffirm his thought process of whether the best possible product was being created (p. 100). This statement can also be applied to Jobs's drive to make the iPhone as innovative as possible. From the program management perspective, being innovative played a significant role in forming Jobs's perception of reality to create the iPhone eventually.

Revolutionary Attitude: Jobs consistently used a *Revolutionary Attitude* as a business leader. Not only was he excellent at recognizing good ideas but he was able to take full advantage of them. For instance, when he visited Xerox in 1979, he discovered that this company had invented the mouse, a technology, that when integrated into a computer would revolutionize the computer industry (Who really, 2016). He bought this technology from Xerox and applied it to his Lisa Computer. He continued to effectively utilize this revolutionary attitude as he pursued his other endeavors, even when he left Apple in the 1980s. Being a good PM, he was able to recognize that this boldness was among the best practices that he employed to form his perception of reality to make effective decisions, including the decision to create the iPhone.

Legacy: Jobs's *Legacy* weighed heavily on his decision-making process. Early in his career, Jobs built an excellent reputation for being innovative and revolutionary through the creation of the Apple Computer Company and its products. At that time, his reputation rivaled that of Microsoft co-founder Bill Gates. He continued to pursue his legacy, even at the risk of getting fired from the company that he co-founded. Taking on those risks eventually led to his ousting at Apple by his board of directors. Nevertheless, he continued to solidify his reputation through the creation and management of other companies, such as NeXT and Pixar Motion Pictures. His reputation of innovation and being revolutionary was solidified into legacy after he came back to Apple and managed a line of successful products such as the iPod, iTunes and eventually the iPhone.

Risk Management: *Risk Management* was the critical element that led to Jobs's early downfall at Apple and ultimately his reemergence as one of the greatest innovators of all time. His inability to effectively manage risk caused his downfall from Apple in the



1980s. He placed so much weight on building his company's legacy of reshaping the world that it cost the company unnecessary financial exposure, leading to his ousting. After coming back as Apple's CEO, he was able to manage risk better because he had multiple executive experiences in running several companies and projects. He was able to be flexible and assign more weight to risk management which ultimately allowed him to create a much more accurate picture of reality in a complex environment.

The main takeaway when analyzing Steve Jobs is that he was a flexible and highly adaptable PM. Not only did he recognize the practices that worked for him in the past, but he continued to emphasize and utilize those practices in all of his projects, including the iPhone. Additionally, he was able to learn from his past mistakes and manage the risks that his company was exposed to when deciding what product line to pursue. Being highly flexible and adaptable in complex and chaotic environments allowed Jobs the ability to make decisions effectively that contributed to his success, as well as the creation of the iPhone.

2. Jeff Bezos Creating Amazon.com

In July 1994, Jeff Bezos, a vice president of the Wall Street Firm D. E. Shaw & Co. decided to open an online bookstore company called Cadabra, Inc. (Stone, 2013). A few months later, he renamed it Amazon.com. Amazon has since grown to be one of the world's largest retailers and an e-commerce behemoth. Bezos has grown Amazon into the second trillion-dollar business in the United States, which made Bezos the world's richest person with a net worth of \$156 billion, as of August 2018 (Kiersz, 2018).

After reviewing various literature sources, such as *The Everything Store: Jeff Bezos and the Age of Amazon* by Brad Stone (2013), we have assigned three major categories that form a picture of Bezos's reality and how he made sense out of the specific situation of creating Amazon. The following categories are in order of precedence, and we believe makeup Bezos's decision-making process and interpretation of the environment when he decided to develop Amazon: (1) Bold (2) Customer Service, and (3) Engage.

Bold: One of Bezos's favorite words is *Bold*, and he tries to apply this idea to everything Amazon does (Hall, 2018). Out of the three categories that make up his



perception of reality, Bezos consistently used this approach the most. When developing Amazon, his initial motivation was to create an online platform, where people could purchase books at the lowest price possible, a bold endeavor for the mid-1990s. After Amazon switched over to an “Everything Store,” Bezos undertook bold programs such as the creation of Kindle and Amazon Prime. Bezos understood the financial risks that he was getting Amazon into by executing these programs; these are, however, manageable risky programs that he made the company take on.

The boldest thing about the Kindle was not necessarily the creation of the device itself, but it was Kindle e-books were sold for less than what Amazon was paying the publishers. Therefore, Amazon was taking a financial loss while gaining control of the e-book industry (Stone, 2013). Bezos adopted this forward-thinking mentality from Steve Jobs to dominate the book industry, by drastically lowering prices to increase Amazon’s market share in the book industry. Publishers previously made the majority of their sales in hardcover books, but quickly found themselves in a position where they were rushing to publish their books electronically to meet Bezos’s requested amount of 100,000 books in his initial Kindle catalog debut. Once the debut occurred, publishers were flabbergasted because Bezos boldly mentioned that all Kindle e-books would be sold for \$9.99, specifically without their knowledge. Many of the publishers were astonished because this meant that they would eventually have to come down to Bezos’s price so they could have their books in the Kindle catalog, changing their business model to the core (Stone, 2013).

Subsequently, the complexity of managing the Amazon Prime program presented Bezos and Amazon with unique challenges that transformed the U.S. retail industry. The problems of Amazon Prime consisted of how to implement logistics and build enough Amazon fulfillment centers to allow customers to receive their purchases faster with “free” two-day shipping; as long as they were paying Prime members. To accomplish this goal, Amazon invested a substantial amount of money in strengthening the company’s logistics and supplying chain to make Amazon Prime effective and profitable. Bezos envisioned that Amazon would be the first to deliver products within two hours of an order being placed (Ladd, 2018). Amazon Prime’s promise of fulfilling an order within two days is a stepping stone towards that bold goal.



Customer Service: Bezos believed he created value within his company by always providing excellent *Customer Service*. He is known for making convenience possible for his customers and implementing Amazon programs such as one-click ordering, free two-day shipping for Prime customers, customer-friendly refund policies, and an Amazon platform that shows customer reviews of all products to include both positive and negative reviews (Stone, 2013). Bezos said, “Amazon’s success is an ‘obsessive compulsive’ focus on the customer over competitor” (Premack, 2018). He believed that his company should not care about competition as much as they should care about providing excellent customer service. When J.K. Rowling’s fourth Harry Potter book, *Harry Potter and the Goblet of Fire*, was released, Bezos boldly decided to take a strategic loss by selling these books for 40% off to customers and promising they would be delivered on the release date (Stone, 2013). He made this decision with strong opposition from his senior executives. His commitment to excellent customer service resulted in Amazon gaining more loyalty from customers with a minimal short-term financial loss.

Engage: Bezos is well known for his meticulousness and his desire to actively *Engage* in all aspects of the business. When he started Amazon, the company only had a handful of staff. He was able to engage in the day-to-day operation of the company and make most of its key decisions. However, as the company grew, Bezos had to take a step back from Amazon and depend more on his senior executives. Bezos delegated some of his authority to his second in charge, Joe Galli Jr., Amazon executives then reported to Galli rather than Bezos himself (Stone, 2013). Bezos changing his role as a CEO was a significant milestone in Bezos’s career because he had to adapt to his new position as the top-leader of a multi-conglomerate corporation. According to Stone (2013), he learned how to remain fully engaged with the company by utilizing his senior executives and holding them accountable to his demands.

Throughout Bezos’s career, his decision-making process largely remained unchanged. However, he made changes to how he engages and deals with different complex problems. In Amazon’s earliest days, Bezos was able to be engaged and be part of the solutions for all of the difficulties Amazon was facing. As Amazon grew into a more complex corporation, he could no longer be involved in solving all of Amazon’s problems. He had to rely more on his senior executives to make those decisions and provide him with



regular updates. Our biggest takeaway from evaluating Jeff Bezos is that good leaders must be flexible and be able to make changes to the way they interpret data to have the ability to make the best decisions for their organizations and programs.

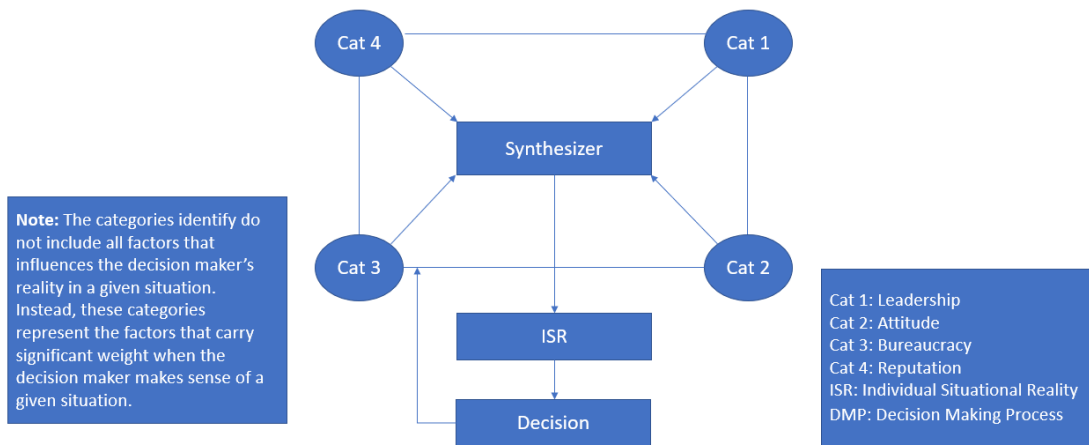


III. DATA

A. INDIVIDUAL SITUATIONAL REALITY

Given the limitations described in the bounded rationality model shown in Figure 3, we have formulated our own model that we named ISR decision-making model (see Figure 4) to quantify how much impact each category has in influencing the PMs' ISR.

Figure 4. ISR Decision-Making Model



At the heart of this model is the synthesizer which interprets a given situation from various perspectives or categories. These categories are the factors that have a significant amount of influence on how a leader makes sense of a presented situation as well as the options available to respond to that specific situation. Under the bounded rationality theory, a decision-maker operates under an environment where limited cognition, time, and information dictates how the decision-maker interprets a situation. The leader may not know what they had inadvertently missed.

Under the ISR approach, how a leader interprets a situation depends on the level of focus he puts on each category. The level of emphasis placed on each category is numerically assigned and summed up to 100. A leader's interpretation of a situation is uniquely based on his level of experience, knowledge, and ability to process information. As the weight on one category increases, the weight placed on one or more other categories

decreases. The bottom line is that the leader knows precisely the level of importance put on each category to help them synthesize the situation.

The PMs' ability to accurately interpret a situation would ultimately help them make better decisions. For instance, when facing a technical issue that the PM is not exactly familiar with, he should probably put more weight on leadership. By doing this, he would have to rely on his leadership style as well as his communication skill to get his team involved in solving the problem. As leadership becomes more important, one or more of the remaining three categories become relatively less important in shaping the PM's ISR.

The most crucial task that PMs must complete is to decide. Even when the PMs appear not to decide, they have chosen not to decide. The PMs can make decisions in one of four forms: decide, delegate, consult, or facilitate (Enners, 2012). One decision can simultaneously impact multiple other decisions, as well as future decisions. For instance, in a major weapon system program, the decisions made during the Technology Maturation & Risk Reduction phase may influence how decisions will be made in later phases of the program. Additionally, these programmatic decisions would impact the program's performance which ultimately affects how other stakeholders such as the warfighters make their decisions.

By utilizing this ISR model, PMs would be able to evaluate better and understand not only how their decision is made, but also the factors that carry the most weight in shaping their ISR. Equipped with this understanding, PMs would be able to make necessary category weight adjustments to one or more of their four categories so that their ISR of a given situation would be more aligned with reality. Ultimately, this model would help the PM to decide, delegate, consult or facilitate when a decision needs to be made. This brings us to our first hypothesis:

Hypothesis 1: Four major categories that appear to shape a PM's individual situational reality in a complex situation are leadership, attitude, accomplishment, bureaucracy, and reputation.



Table 1. Summary of the Four Aggregate Categories and Their Respective Associated Attributes

#	Second Order Analytic Code	Aggregate Category:
1	Team Building	Leadership
2	Personnel Management	
3	Communicate	
4	Mentor	
5	Recruit	Attitude
6	Arrogant	
7	Confident	
8	Flexible	
9	Risk Management	
10	Expectation	
11	Politics	Bureaucracy
12	Constraint	
13	Frustration	
14	Stakeholder	
15	Luck	
16	Foundation	Reputation
17	Trust	
18	Networking	

SOACs were selected by interpreting the two participant’s interviews through initially using First Order Informant Codes (FOIC). Using the transcripts from the two interviews, we interpreted the data and summarized what the participants meant in the FOIC section of our spreadsheet. Examples are in the appendix for Participant 1 and Participant 2. Based off the FOIC interpretations, we assigned 18 SOACs to categorize all the information. As discussed, we then grouped SOACs into aggregate categories.



Hypothesis 2 will be tested in the data that we have collected from the interviews with the two PMs. This data will provide statistics that will enable us to assess our hypothesis.

The following definitions for the four categories demonstrate the connections with their SOACs. The data collected from the two interviews is coded accordingly.

1. *Leadership*: Leadership is more than just position, seniority, title, or personal attributes. Having positions of power or seniority may help people be more effective leaders; however, there are many examples where people who are in leadership positions failed at leading. Peter G. Northouse believes that “leadership is a process whereby an individual influence a group of individuals to achieve a common goal” (Northouse, 2013). PMs’ highest priority is to acquire superior capabilities in a timely manner and within reasonable costs. To be effective leaders, PMs must be able to mobilize their team members and program stakeholders to take actions and make decisions that would benefit the program.



Table 2. Leadership SOAC Definitions

Aggregate Category	Second Order Analytic Code	Literature Definition
1. Leadership	Team Building	“To be effective people need to work together toward a common goal in a coordinated and cooperative way. Therefore, you could say that team building is a systematic process designed to improve working relationships and team functioning such as problem-solving, decision-making and conflict resolution that enables the group to overcome any goal blocking barrier” (Priestley, 2015).
	Personnel Management	“Can be defined as obtaining, using and maintaining a satisfied workforce. It is a significant part of management concerned with employees at work and with their relationship within the organization” (Juneja, n.d.).
	Communicate	“Communication theory states that communication involves a sender and a receiver (or receivers) conveying information through a communication channel” (Communicate, 2018).
	Mentor	“Employee training system under which a senior or more experienced individual (the mentor) is assigned to act as an advisor, counselor, or guide to a junior or trainee. The mentor is responsible for providing support to, and feedback on, the individual in his or her charge” (Zust, 2017).

2. *Attitude*: The term “attitude” is used in many ways. For this study, the term “attitude” is defined as a “feeling or emotion toward a fact or state” (Attitude, 2018). Different PMs may have different attitudes when making decisions; however, this is part of program management. For instance, PMs often rely on their team members for advice on dealing with specific problems. There are many ways that PMs can fill positions on their teams. These positions can be filled by recruiting experts from outside of the organizations; or by promoting and rotating personnel that are already in the organization.

Table 3. Attitude SOAC Definitions

Aggregate Category	Second Order Analytic Code	Literature Definition
2. Attitude	Recruit	“Recruitment means finding and hiring people to fill job openings at an organization. It involves determining the job’s requirements, attracting or sourcing qualified candidates, screening and selecting finalists, and negotiating the terms of employment” (Recruiting social, 2016).
	Arrogant	“Exaggerating or disposed to exaggerate one’s own worth or importance often by an overbearing manner” (Arrogant, 2016).
	Confident	“Full of conviction, having or showing assurance and self-reliance” (Confident, 2018).
	Flexible	“Characterized by a ready capability to adapt to a new, different or changing requirement” (Flexible, 2018).
	Risk Management	“The identification, analysis, assessment, control, and avoidance, minimization, or elimination of unacceptable risks. An organization may use risk assumption, risk avoidance, risk retention, risk transfer, or any other strategy (or combination of strategies) in proper management of future events” (Risk Management, 2018).
Expectation	“To consider bound in duty or obligated” (Expectation, 2018).	

3. *Bureaucracy*: The United States government is among the largest bureaucracies in the world. This bureaucracy has many organizations, each with different specializations and missions. Managing bureaucracy is often the hardest task that PMs face to acquire the necessary resources and support from stakeholders.



Table 4. Bureaucracy SOAC Definitions

Aggregate Category	Second Order Analytic Code	Literature Definition
3. Bureaucracy	Politics	“Relations or conduct in a particular area of experience especially as seen or dealt with from a political point of view” (Politics, 2018).
	Constraint	“The state of being checked, restricted, or compelled to avoid or perform some action” (Constraint, 2018).
	Frustration	“A deep chronic sense or state of insecurity and dissatisfaction arising from unresolved problems or unfulfilled needs” (Easvaradoss, 2015, p. 177).
	Stakeholder	“One who is involved in or affected by a course of action” (Stakeholder, 2018).
	Luck	“A force that brings good fortune or adversity” (Luck, 2018).

4. *Reputation*: Reputation is among the most essential quality that good PMs bring to their teams. It can be loosely defined as the perception that others have on the PMs. This perception can be influenced by the PM’s ability to network and the level of trust that he has established among the stakeholders.

Table 5. Reputation SOAC Definitions

Aggregate Category	Second Order Analytic Code	Literature Definition
4. Reputation	Foundation	“The basis (such as a tenet, principle, or axiom) upon which something stands or is supported” (Foundation, 2018).
	Trust	“A firm belief in the reliability, truth, or ability of someone or something” (Patel, 2017, p. 990).
	Networking	“The exchange of information or services among individuals, groups, or institutions” (Networking, 2018).



Table 6. Interview Data

		Team Building Personnel Management Communicate Mentor Recruit Arrogant Confident Flexible Risk Management Expectation Politics Constraint Frustration Stakeholder Luck Foundation Trust Networking																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
Number of instances for each SOAC		(1) Leadership				(2) Attitude						(3) Bureaucracy					(4) Reputation				
Average Percentage of Each Category for Both Participants		13%				33%						32%					21%				
Average Aggregate Category for Both Participants		82.5				211.5						206					144.5				
TOTAL Aggregate Category for Both Participants		1289		165				423						412					289		
TOTAL of each SOAC for Both Participants		44	39	59	23	4	46	112	100	71	90	77	144	104	77	10	158	82	49		
Percentage for Participant 1:		11%				32%						31%					26%				
TOTAL Aggregate Category for Participant 1:		793		89				251						248					205		
TOTAL of each SOAC for Participant 1:		30	12	42	5	4	30	73	43	37	64	48	82	54	59	5	97	63	45		
Percentage for Participant 2:		15%				35%						33%					17%				
TOTAL Aggregate Category for Participant 2:		496		76				172						164					84		
TOTAL of each SOAC for Participant 2:		14	27	17	18	0	16	39	57	34	26	29	62	50	18	5	61	19	4		



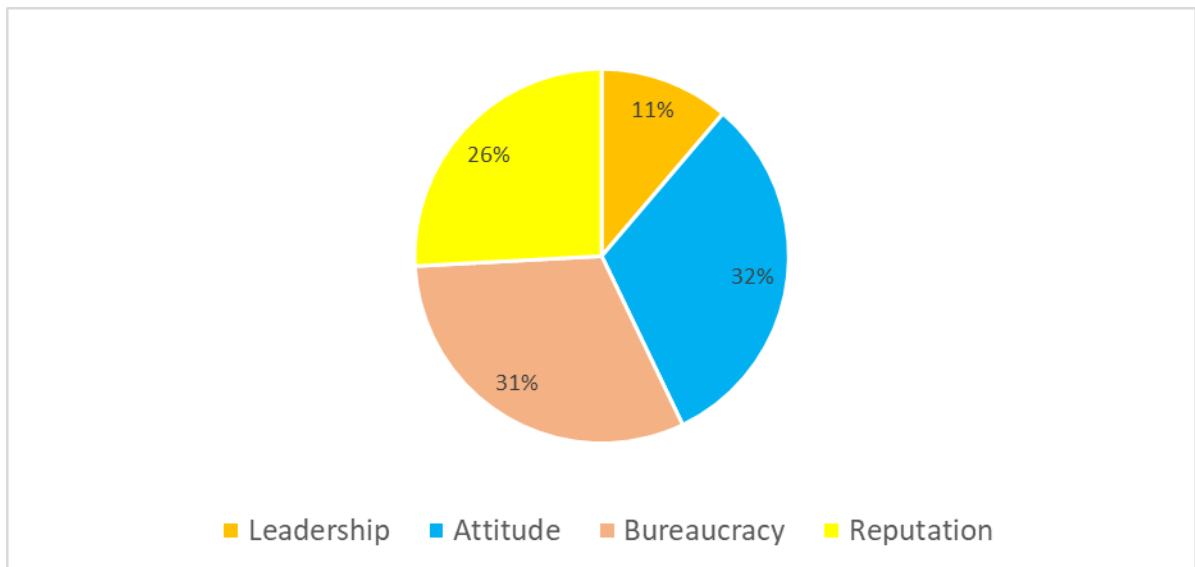
IV. DATA ANALYSIS

We have interpreted the data by utilizing the ISR model. The PMs' ISR are shaped by how much weight they assign each of the aggregate categories. The four categories that we have determined to have the most influence on both study participants' decision-making process are leadership, attitude, bureaucracy, and reputation.

A. PARTICIPANT 1

Figure 5 indicates that Participant 1's decision-making processes depend most on attitude and bureaucracy, 32% and 31% respectively (see Figure 1). Reputation carries significant weight at 26%, and leadership has the least amount of influence on this PM's decision-making process at 11%.

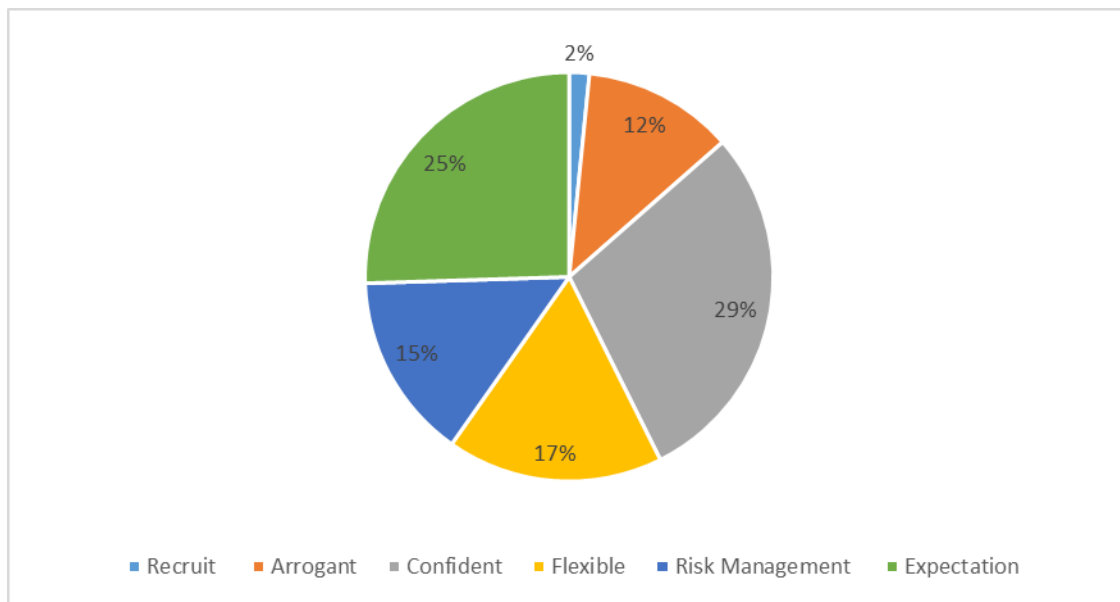
Figure 5. Participant 1's ISR Distribution



Attitude: The data indicates that attitude carries the most weight in Participant 1's decision-making process at 32%. Within this attitude category, confidence and expectation are the two SOACs that the PM alluded to more than the four remaining codes combined (as shown in Figure 6). The PM repeatedly stressed the importance of having a high level of confidence when making decisions. The PMs must make decisions knowing full well

the consequences that would result from those decisions. The data indicates that in order to meet his stakeholders' expectations, the PMs must be flexible in his decision-making process.

Figure 6. SOACs within the Attitude Category for Participant 1

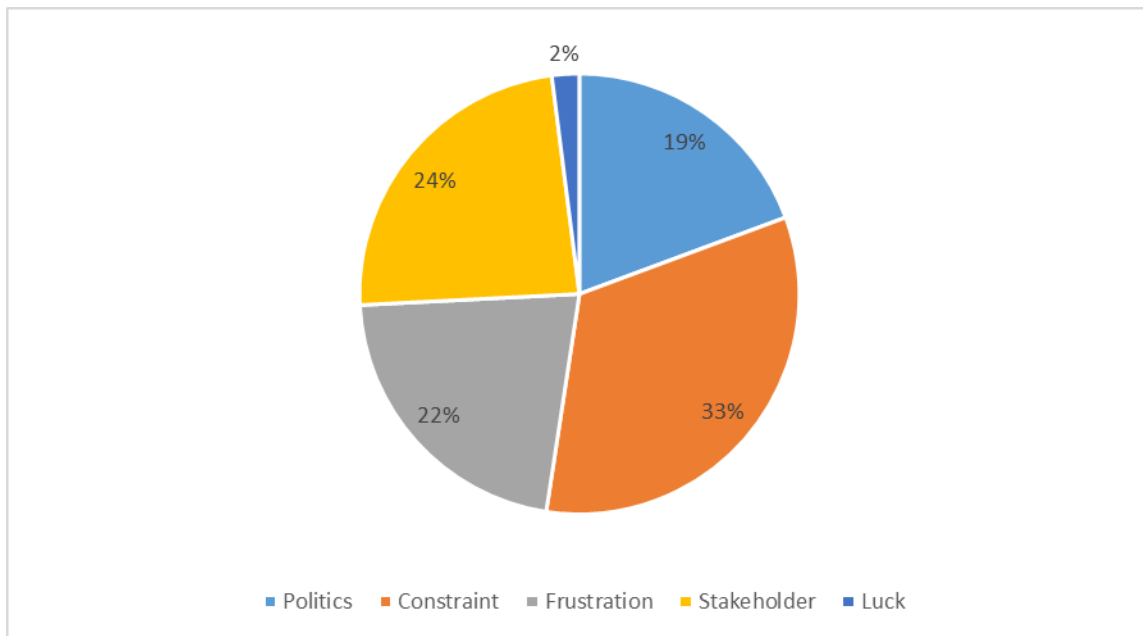


Bureaucracy: Participant 1 spent a significant amount of time talking about the importance of utilizing bureaucracy in such a way that would benefit programs. The PM mentioned that some people would view bureaucracy in a negative light because it can hinder progress. However, bureaucracy is nothing more than people with whom the PMs must work to obtain needed resources for his programs. While PMs can get resources by working well within a bureaucracy, the bureaucracy can also put constraints on the program because different agencies have different priorities and those priorities can conflict with each other, thus further increases the constraints of the programs. As shown in Figure 7, constraint received the most weight in this bureaucracy category: 33% of Participant 1's bureaucracy category.

Bureaucracy increases constraints for a program by stakeholders, organizations and the end user having different objectives. For instance, a contracting officer is responsible for ensuring all contractual actions are executed under laws and regulations, and ensuring

prices are fair and reasonable for all acquisitions. PM's tend to be more focused on making programmatic progress and managing risks. Meanwhile, the warfighter's priority is to obtain state of the art capabilities that would be useful to carry out their missions. Consequently, a PM must navigate through the bureaucracy to manage conflicting objectives from different stakeholders.

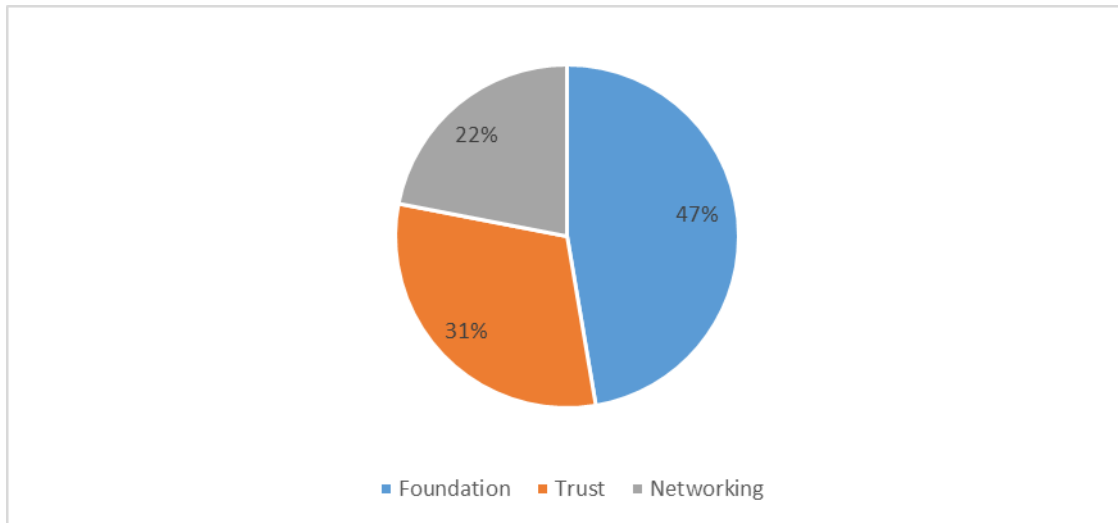
Figure 7. SOACs within the Bureaucracy Category for Participant 1



Reputation: This category weighs 26% for the total of Participant 1's decision-making process. Participant 1 stressed that reputation is perhaps the most valuable asset that any PM has. A good reputation takes a very long time to develop, especially in program management. We have identified three primary SOACs that influences a PM's reputation: foundation, trust, and networking. Of the three codes identified, a foundation is perhaps the most important in determining a PM's reputation. In program management, the term "foundation" is made up of a person's education and experience. The more knowledge and experience the PMs have, the stronger their foundation will be. Foundation is defined as "the basis (such as a tenet, principle, or axiom) upon which something stands or is supported" (Foundation, 2016). Having a strong foundation would only help the PM's

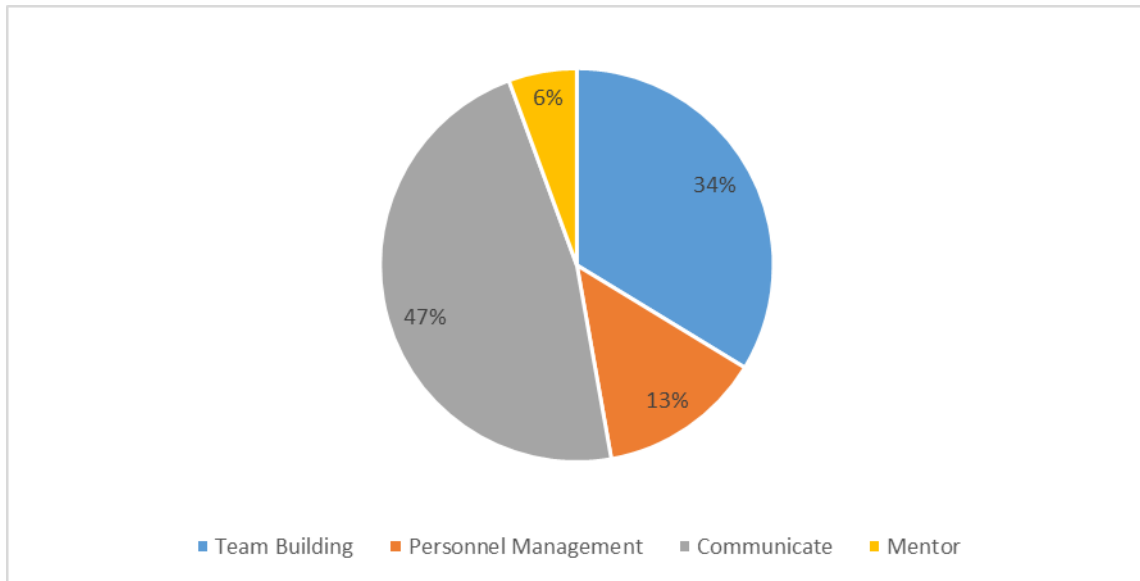
reputation. As shown in Figure 8, foundation accounts for 47% of the reputation category, further emphasizing the importance of foundation in a PM's decision-making process.

Figure 8. SOACs within the Reputation Category



Leadership: This category weighs the least amount for Participant 1 at 11%. Participant 1 did not appear to emphasize the importance of mentoring his subordinates; this PM placed a considerable amount of emphasis on building a strong team by recruiting competent people. Participant 1 also emphasized the importance of replacing ineffective people with people who are competent in program management and can do his jobs effectively. Of the four SOACs in the leadership category, communication appears to be the most important at 47% as shown in Figure 9. The PM placed an exceptional level of importance on giving his subordinates a high degree of autonomy to do their jobs. However, being kept up to speed and in the loop by the participant's subordinates was critical to this PM. For this PM to receive and share information timely within his team, the participant needed to have an enhanced communication network in place and therefore had an open-door policy where any subordinate could come and speak openly with him.

Figure 9. SOACs within the Leadership Category for Participant 1



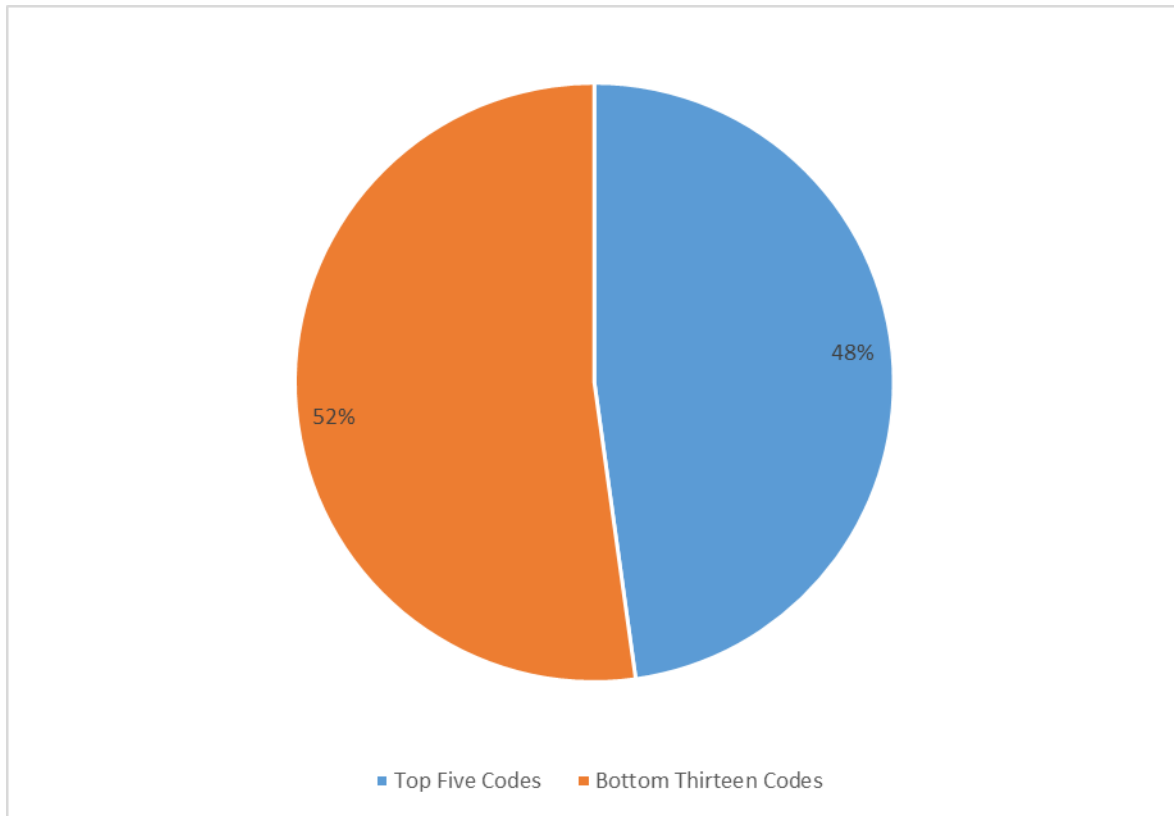
In going back to the problem statement, there is a gap exists in understanding the PM’s decision-making process. After interviewing this PM, it appears that the more senior an individual becomes in program management, the less direct involvement the PM would have in making decisions at a tactical level.

Additional Considerations for Participant 1’s Data

After further analyzing Participant 1’s data, we realized that although reputation carries 26% of the total weight, it is the category with the least amount of SOACs, only 3, in comparison to the attitude category that has 6 SOACs. The average score for each of the SOACs in the reputation category is 68.3, whereas the average rating for each of the SOACs for the attitude category is 41.8. If more related SOACs were to be included for reputation, this category could potentially carry more weight in the PM’s decision-making process.

Another approach to analyzing our data consists of comparing the top 5 SOACs to the bottom 13 SOACs for Participant 1. As shown in Figure 10, what we found was that the top 5 SOACs were 48% and the bottom 13 SOACs were 52%. We wanted to highlight this statistic because the SOACs individually can have an enormous amount of influence on the PM’s decision making.

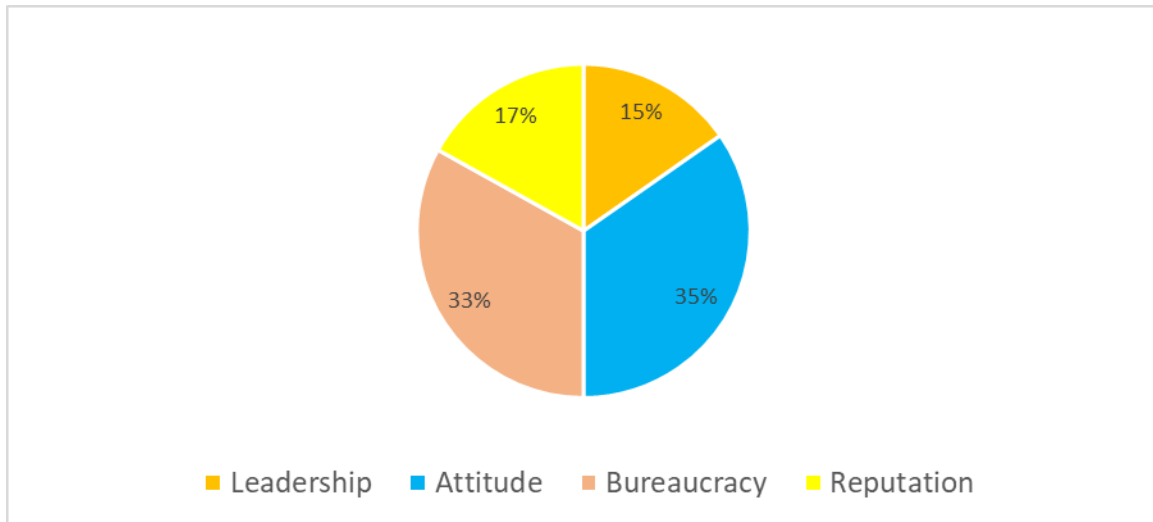
Figure 10. Significant SOACs for Participant 1



B. PARTICIPANT 2

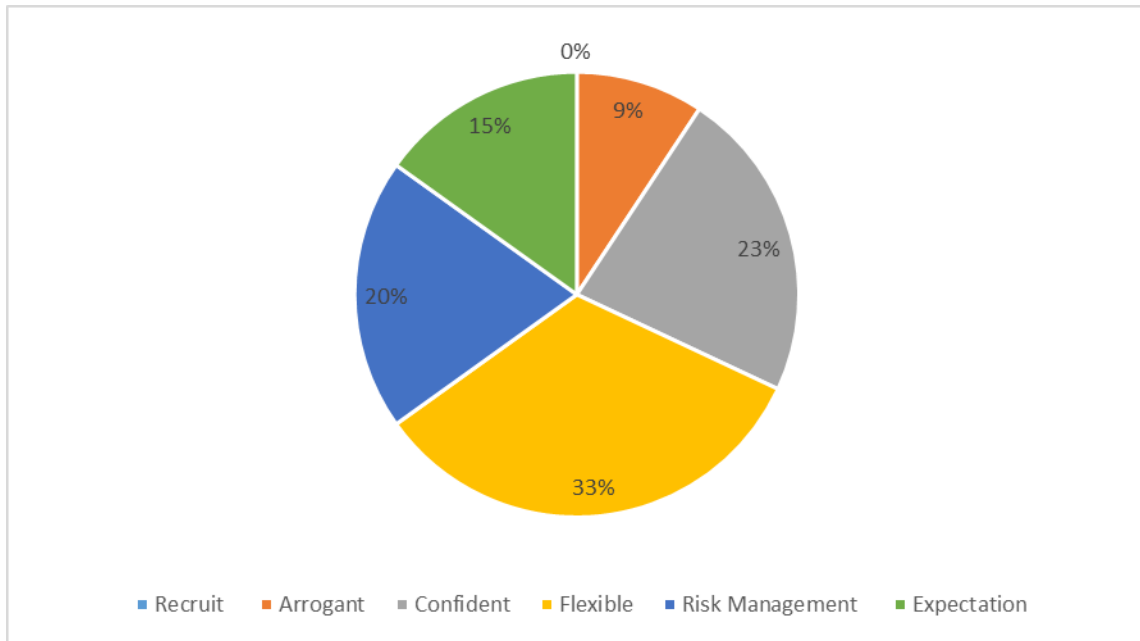
As shown in Figure 11, the bureaucracy and attitude categories individually carry slightly more weight each than the leadership and reputation categories combined. It appears that attitude and bureaucracy have the most influence on this PM's decision-making process at 35% and 33%, respectively. Reputation and leadership carry roughly the same amount of impact on the PM's decision-making process at 17% and 15%, respectively.

Figure 11. Participant 2's ISR Distribution



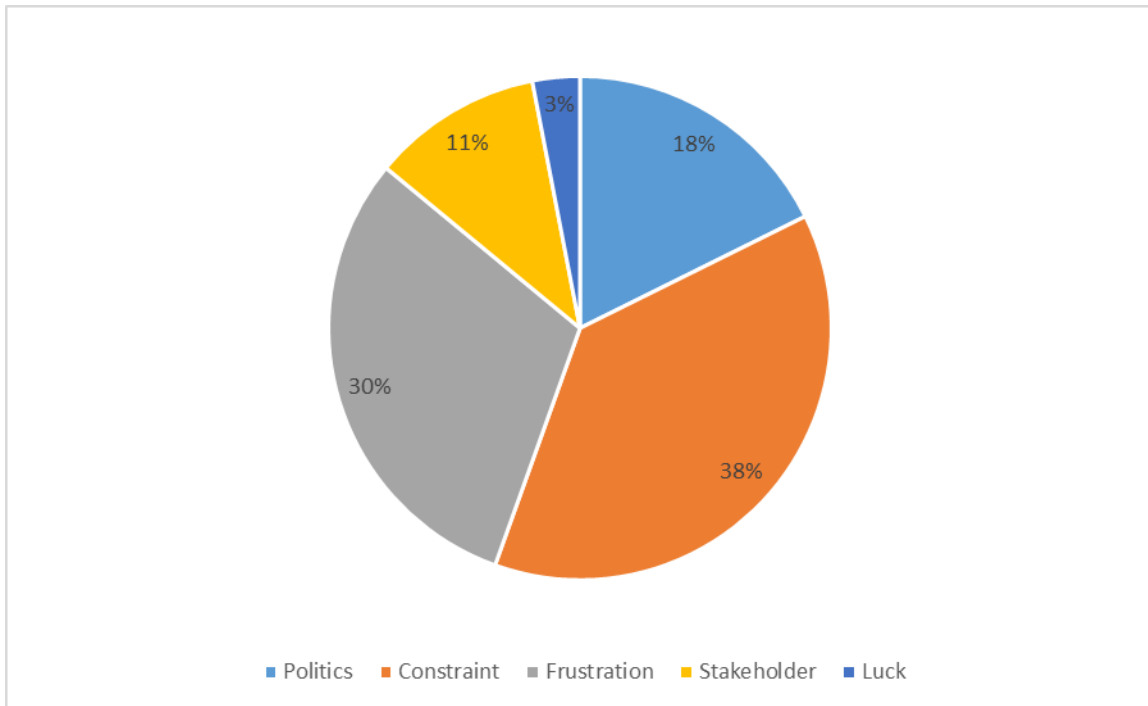
Attitude: The data indicates that attitude carries the most weight in Participant 2's decision-making process at 35%. The top SOAC, flexible, carries 33% of the total weight in the attitude category, as shown in Figure 12, thus indicating that being flexible is essential in the PM's decision-making process. Flexibility, concerning program management decision-making process, refers to the constraints that PMs must work through to properly execute his program's mission and deliver results for the warfighters. According to Dr. Rich Fernandez, a co-founder of Wisdom Labs, flexibility is a valuable skill that a leader would need to manage high-performance workplaces (2016). Participant 2 did not appear to recruit the most qualified personnel actively, and therefore the SOAC received a 0%. Instead, he took the approach to mentor and grow his junior personnel into competent subject matter experts in their respective specialties.

Figure 12. SOACs within the Attitude Category for Participant 2



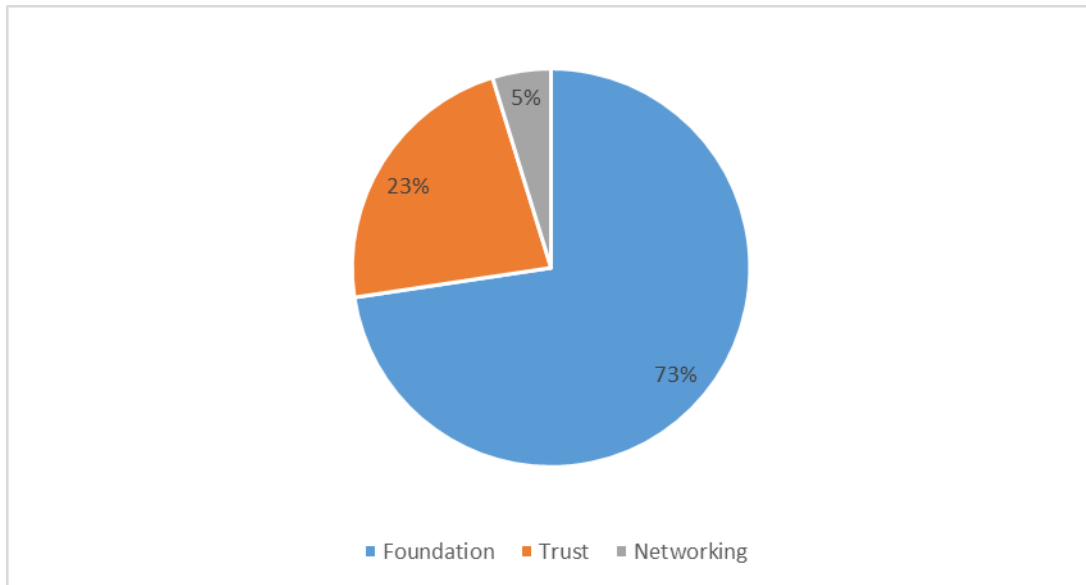
Bureaucracy: Participant 2 spent a significant amount of time talking about how to overcome bureaucracy, so the PM would be able to execute his programs successfully. This PM viewed constraints and frustrations as the two biggest hurdles that would have an impact on how he makes decisions. As shown in Figure 13, frustration and constraint account for 68% of this category for Participant 2. This PM only mentions luck five times throughout the interview, but the PM emphasized that luck was an essential element of his success. The PM went on to discuss what he learned to include “cost, schedule, performance, people and polarities” from his program management training. Of note, this PM specifically used the word “polarities” because it was the word he liked, rather than using the word politics because politics can have a negative notation.

Figure 13. SOACs within the Bureaucracy Category for Participant 2



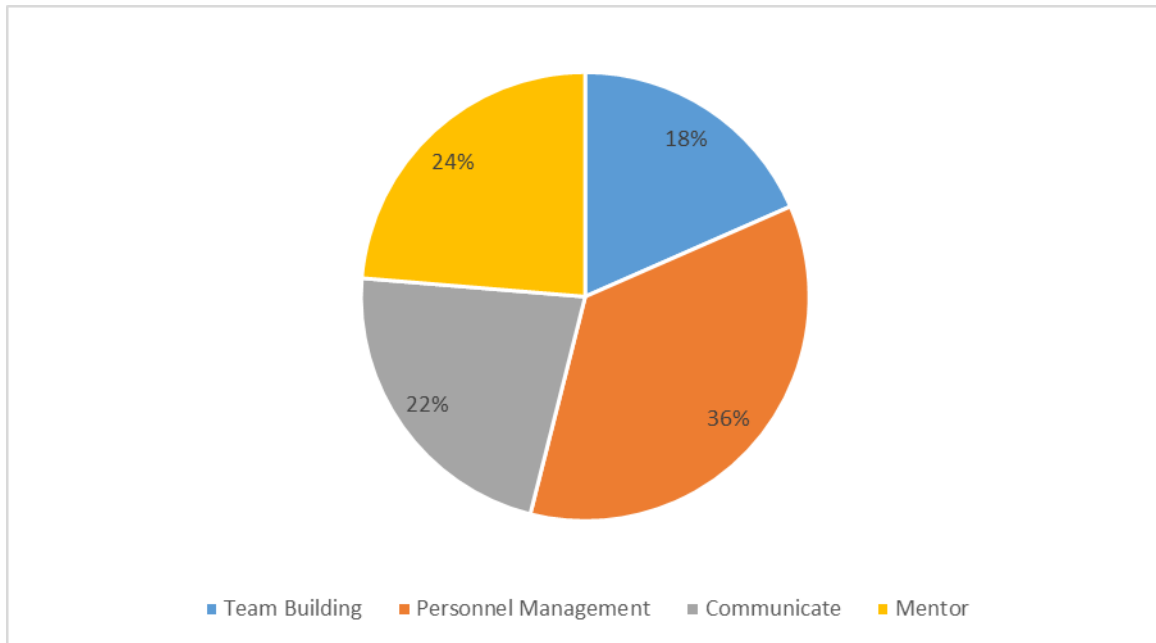
Reputation: As shown in Figure 14 this category weighs 17% for the total of Participant 2's decision-making process. Participant 2 emphasized that reputation is perhaps the most valuable asset that any PM has, and a leader's reputation is primarily built upon foundation and trust. This PM consistently discusses his program management foundation and how in his early days that the education he received was paramount in setting his up for success in program management. As shown in Figure 14, foundation accounts for 73% of Participant 2's reputation category. The data indicate that having a strong foundation is essential to Participant 2's positive reputation. What can be derived from this data, is that this PM's reputation is not formed instantly; instead, reputation was developed over time through constant demonstration of trust, competency, and foundational knowledge.

Figure 14. SOACs within the Foundation Category Participant 2



Leadership: This category weighs the least amount for Participant 2 at 15%, as shown in Figure 15. However, the PM stated that effective leadership is essential to successful program management; this data does not give more weight to all factors that the PM considered to be important. The PM placed a high level of importance in taking the time to mentor and lead his people properly. Though the data only shows that leadership is a minor part of this PM’s decision-making process, but the PM made it clear that leadership is among the top influencing factors that influenced his decision-making.

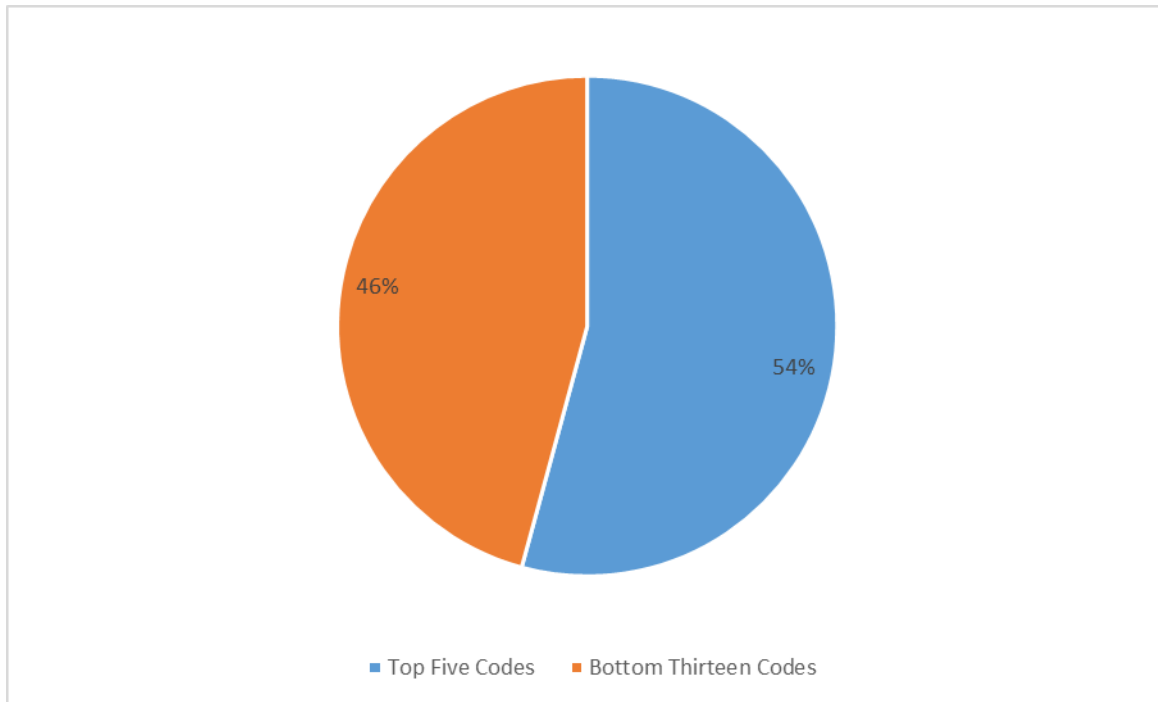
Figure 15. SOACs within the Leadership Category for Participant 2



Additional Considerations for Participant 2's Data

Another approach to analyzing our data for Participant 2 consists of comparing the top 5 SOACs to the bottom 13 SOACs for Participant 2. As shown in Figure 16, we found that the top 5 SOACs were 54% and the bottom 13 SOACs were 46%. The data indicates that the SOACs individually can have an enormous amount of influence on the PM's decision-making.

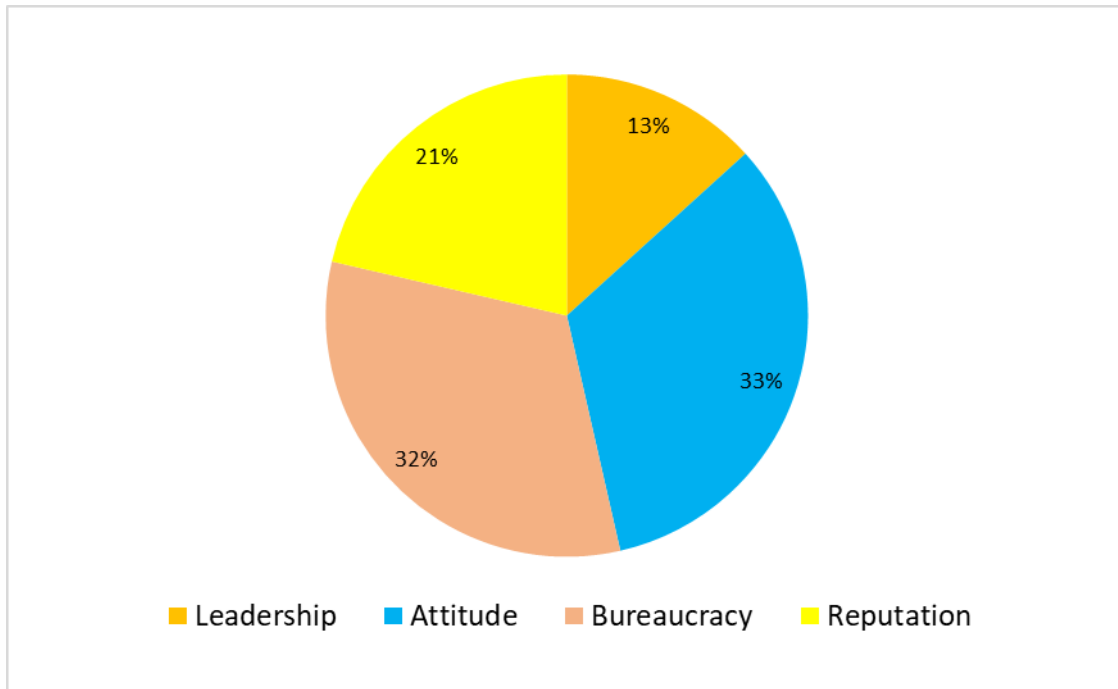
Figure 16. Significant SOACs for Participant 2



C. CONSOLIDATED DATA

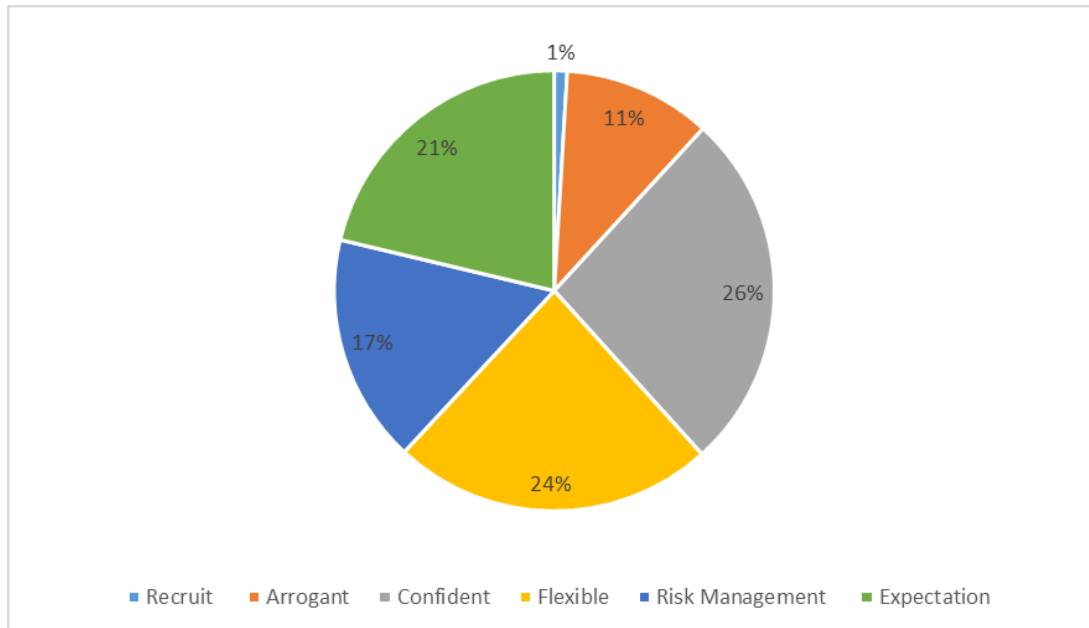
When combining the data for both Participants 1 and 2, as shown in Figure 17, the two heaviest-weighted categories in a PMs decision making process are attitude and bureaucracy, with 33% and 32% respectively, followed by reputation and leadership, at 21% and 13% respectively. Our most significant takeaway from this combined data is the similarity in the participants' four categories and how they followed in the same order of attitude, bureaucracy, reputation, and leadership. However, there are notable inconsistencies at the SOAC level between the two participants; the SOACs that we have analyzed in this section are recruit, flexible, mentor, trust, and networking.

Figure 17. Combined Data



Attitude: We found that both participants weighed the attitude category as having the most influence in their decision-making process. The SOAC that weighed the most in this category was confidence. Our data shows us that confidence weighs the most in this category, which indicates that confidence is one of the most essential characteristics that DoD PMs must have. Confidence weighed in at 112 collectively for both participants for a total of 9%. Both PMs made multiple arrogant statements, significantly higher than the average of 72 for the 18 SOACs. Their approach was to be flexible and to meet expectations. Being flexible was a SOAC for both participants at 100 collectively or 8% out of all 18 SOACs combined. Meeting expectations is very important to both participants; however, Participant 1 weighed meeting expectations as a higher factor than Participant 2, at 8.1% compared to 5.2% of his total individual aggregate values.

Figure 18. SOACs within the Attitude Category

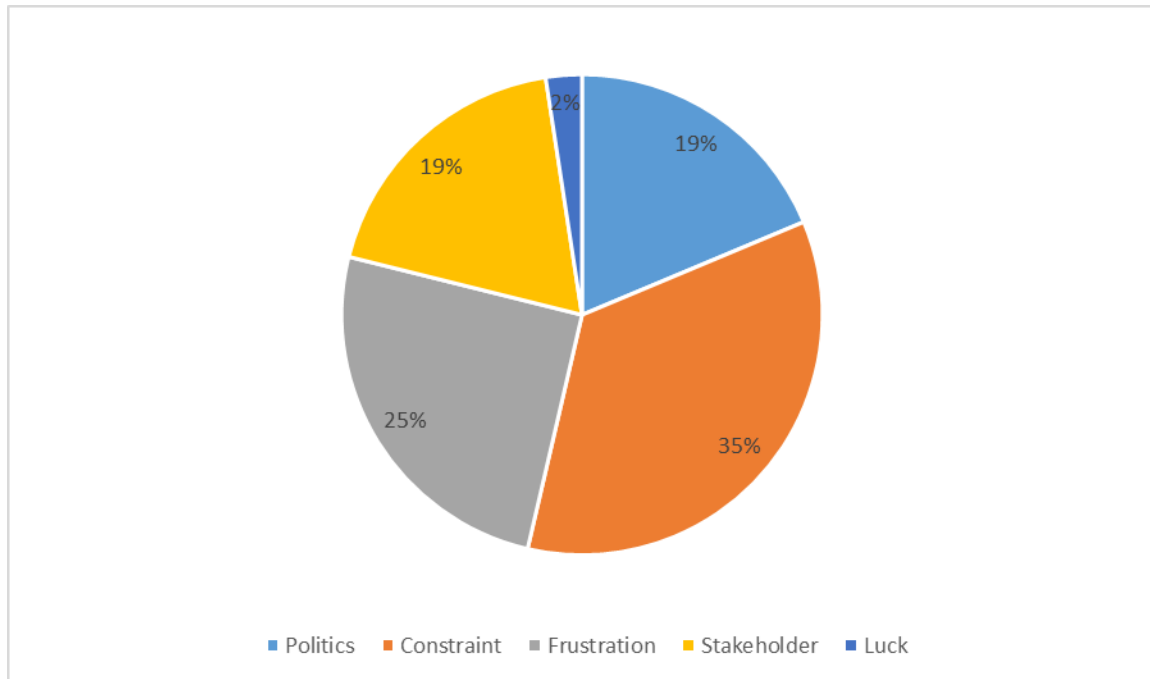


Bureaucracy: One of the biggest takeaways from this study is that the PMs’ decisions are greatly influenced by the enormous amount of constraints and frustrations they face. If frustration and constraint SOACs were to be combined, then it would make up a total of 19.2% of the 18 SOACs. On the opposite end of the spectrum, there is luck, which is the second lowest SOAC with a total of 10 out of 1289, an outlier with only .7% of the SOACs. Understanding how to deal with bureaucracy thoroughly and efficiently is an important factor in making an effective decision in program management.

Both PMs repeatedly stressed the importance of luck and being lucky. If they had not been lucky throughout their career, they both believed things would have been different. The PM’s considered both luck and timing as important factors in program acquisition. Luck refers to a “force that brings good fortune or adversity” (Luck, 2018). The data indicates that both participants believed that they were lucky to be part of the forefront of programs that were of top priority and vital to the DoD. With luck comes timing, and both PMs mentioned how lucky they were to have the right timing throughout their careers to build a strong relationship and trust within their organizations. They never planned to be in their current positions, and they stated they were both lucky to be there.

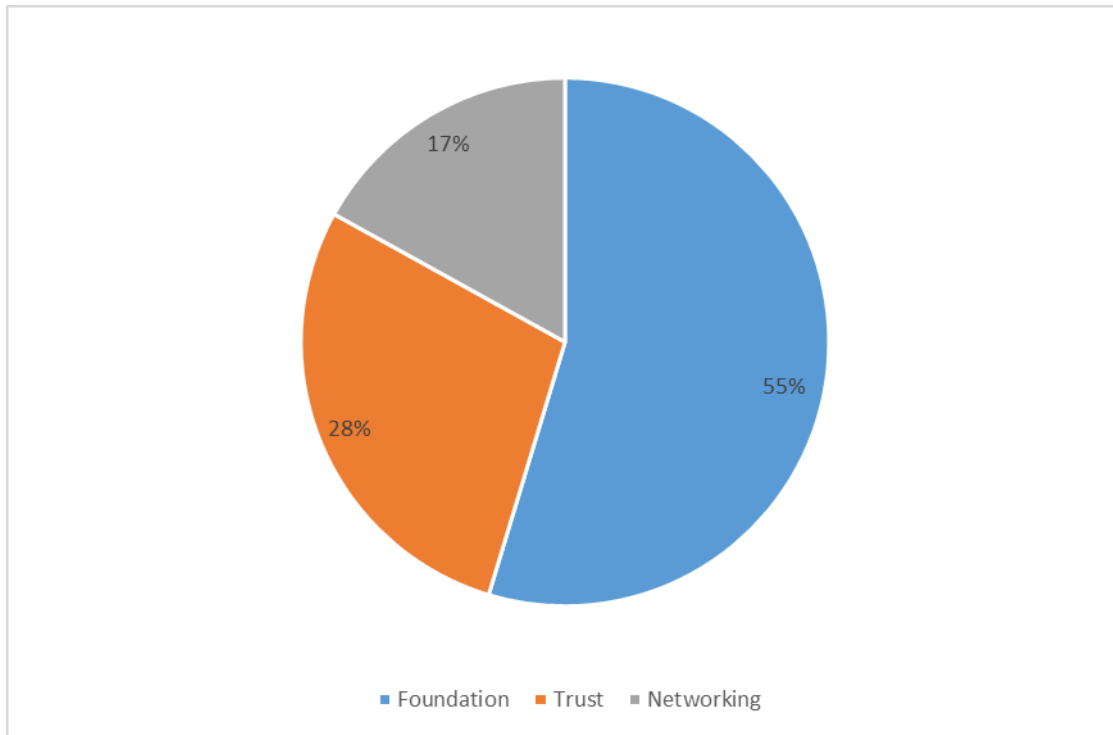
Participant 2 hinted to being lucky that he did not have to ever fire anyone throughout his career.

Figure 19. SOACs within the Bureaucracy Category



Reputation: Our data shows that foundation is the dominant factor in the reputation category, with 55% total for the category when combining both participants' data. Out of the 18 SOACs, the highest tallied SOAC was foundation, accounting for 12% of the total value that has the most significant influence on the two PMs' decision-making process. The data indicate that both participants would agree that having a strong foundation is essential to building a positive reputation, which could potentially influence how PMs make their decisions.

Figure 20. SOACs within the Reputation Category



Leadership: The data shows that both participants spent the least amount of time talking about leadership in comparison to the other three categories. However, both participants indicated that leadership is among the most important skill sets that PMs must have. Additionally, they also said that leadership is one of the primary factors that influence how they make their decisions. The most dominant SOAC for leadership is communicate with 36%, as shown in Figure 21. The data indicate that effective communication is a central part of program management.

Figure 21. SOACs within the Leadership Category

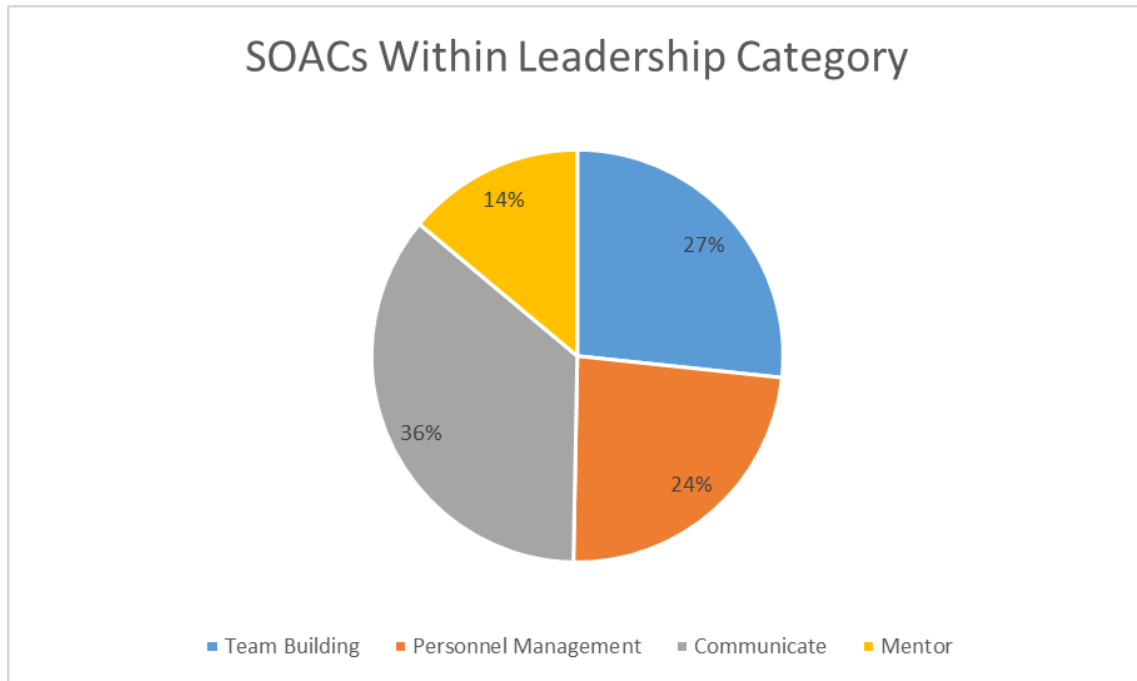
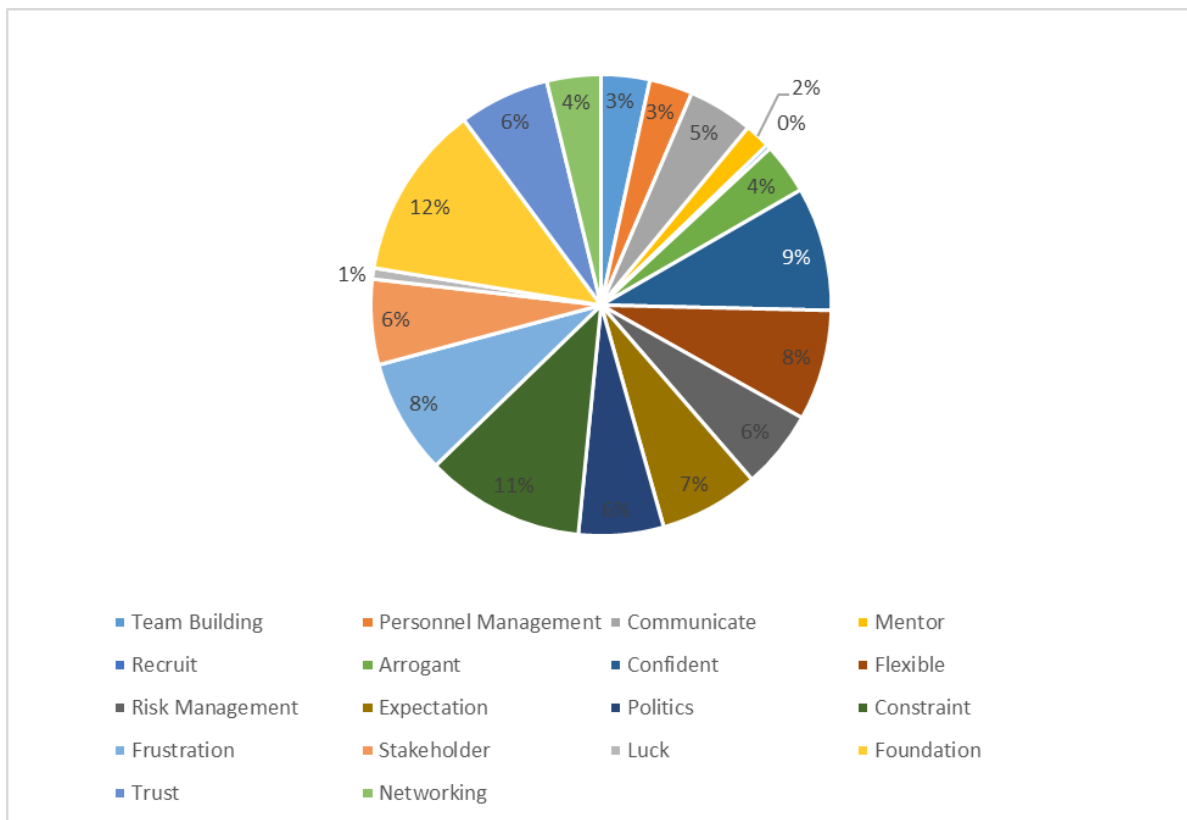


Figure 22. Second Order Analytical Codes



Notable SOAC Inconsistencies

Recruit: Participant 1 expressed the attitude that recruiting was the best approach to find the preeminent program management personnel, who have already been trained, to bring them into his program to make it more successful. Participant 1 found that recruiting the best staff to create an effective team was extremely important to program success. Participant 1 recruited people that best fit for the positions in his programs. This attitude significantly differed with Participant 2, where his mission was to train and develop the people that were already on the team. Participant 2 does not even mention trying to recruit the most talented and qualified people to be on his team; the only zero for any of the analytical codes was recruit for Participant 2.

Flexible: One key observance of the data is how the flexible SOAC differed between the two Participants. Being flexible was inferred to 57 times for Participant 2, which is more than twice of participant 2's average of 27.55 times for each SOAC. Participant 1 indirectly discussed being flexible 43 times, which is close to his average of 44.06 for each of the SOAC's. Therefore, being flexible was emphasized twice as much as any of the other SOAC's by Participant 2, and it was an average SOAC for Participant 2. Participant 2's attitude in his discussion was more focused on being flexible to develop and train his junior personnel. Participant 1's conversation had a view of trying to meet expectations instead of discussing training his junior personnel. Thus, Participant 1's discussion focused on meeting the program's expectations, and Participant 2's discussion focused on training his junior personnel.

Mentor: Mentorship and developing his personnel was undoubtedly the most essential part of his job for Participant 2. Participant 2 was all about properly training his junior staff and stated that he had never fired anyone in his career. He would go above and beyond to invest his time into his junior personnel to ensure his people have adequate knowledge and experience to be proficient in carrying out their assigned work. The PM gave his subordinates a high level of autonomy to do their jobs and an open-door policy to come and speak to the PM at any time. On the contrary, Participant 1 prefer recruiting qualified personnel for all position on his team to spending time and resources helping his subordinates grow.



Trust: Participant 1 emphasized the importance of trust within an organization as well as within his network. One of Participant 1's main objectives was to gain the confidence of all stakeholders. Lastly, with Participant 1, he had implied trust already built within his team because he recruited "his guys" to be on his team. On the contrary, Participant 2 discussed trust in two different major ways:

1. The first being how much trust their boss has in them.
2. How much trust they have in their subordinates and working to build that trust.

Networking: The data indicates that there is a difference in the amount of influence that networking has on their decision-making process. For instance, Participant 1 uses networking 8% of the time, and Participant 2 uses it 4% of the time. We further analyzed the underlying reason for why there is such a significant difference for networking for both participants. Participant 1 places a high level of importance in networking because he wants to be able to rely on the network to benefit his program. For instance, Participant 1 spends most of his time meeting stakeholders and building a strong network with them. In contrast, Participant 2 uses networking in his program strictly for "providing that top cover" for his team.



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V. RECOMMENDATION AND CONCLUSION

The U.S. Department of Defense (DoD) has a mixed record of successful and failed weapon system programs. Many factors influenced these past programs' performance. Regardless of other factors, the DoD Project Managers (PM) are ultimately responsible for their respective program's performance, which means that their decision-making processes matter to program performance. DoD PMs receive similar education and go through the same standardized training curriculum. However, they make decisions differently based off their leadership experience, their attitudes, the bureaucracy they face, and potential effects on their reputations. In researching this topic, we identified a gap of understanding in how DoD PMs process and formulate their decisions.

For our MBA Project, we analyzed two interviews with two senior DoD PMs to understand how the average senior PM makes decisions that have a lasting impact on programs. We also developed a model called Individual Situational Reality (ISR) that further analyzes how PMs perceive their ISR and how that perception influences their decisions. Current and future PMs can use our ISR model to gain a deeper understanding of their decision-making processes and compare their ideas to those of others. We specifically focused our MBA project on building an ISR model for future PMs; however, we thoroughly discussed how this model can be applied to any leader, and we specifically applied it to business leaders such as Steve Jobs and Jeff Bezos.

Our data consisted of transcripts from the interviews of two DoD PMs. By applying our ISR model, we quantitatively demonstrated the level of thought PMs placed on each category throughout their decision-making process. We categorized these transcripts into four categories using 18-second-order analytical codes that we developed based on our literature review. Through our research, we discovered that these two senior PMs both placed attitude, bureaucracy, reputation, and leadership in descending order of importance. We found these categories to be the primary aggregate categories that influence PMs' perception of reality in complex and chaotic environments.

This study has three notable limitations. One, we neither determined whether the PMs that we interviewed have managed successful programs nor did we determine what



would constitute as successful or failed programs; for the sake of scope, we assumed that these two senior DoD PMs have had successful program management careers. Second, we based the level of importance of each category on the number of times the PM alluded to each of the SOACs within that category. However, the model does not consider outlier SOACs that participants considered to be important, talked about very little. For example, “recruit” was alluded to four times by Participant 1 and it was one his most important factors of having a successful program. Third, the ISR model cannot be standardized to fit all leaders; it must be adapted to their personality types and the leadership position in which they serve.

We suggest that future researchers consider the following action items:

1. Conduct additional interviews of senior PMs to acquire data that researchers can compare to gain better insight on PMs’ decision-making process.
2. Use quantitative or mixed method studies to determine the correlation between decision-making biases and program outcomes.
3. Develop theories based on data gathered from additional interviews and have those theories tested.

The value of this MBA Project to the DoD is a better understanding of how PMs make decisions in increasingly complex and chaotic environments. There are several factors a PM must focus on outside of typical cost, schedule, and performance parameters. This study found that leaders make decisions based on multiple factors. Future researchers, as we did, can use our ISR model to identify factors that significantly influence how leaders develop their ISR and make decisions accordingly.



APPENDIX. PARTICIPANT STATEMENTS

A. PARTICIPANT 1

		(1) Leadership	(2) Attitude	(3) Bureaucracy	(4) Reputation														
Percentage for Participant 1:		11%	32%	31%	26%														
TOTAL Aggregate Category for Participant 1:		89	251	248	205														
TOTAL of each Second Order Analytical Code for Participant 1:		30	12	42	5	4	30	73	43	37	64	48	82	54	59	5	97	63	45
		Team Building	Personnel Management	Communicate	Mentor	Recruit	Arrogant	Confident	Flexible	Risk Management	Expectation	Politics	Constraint	Frustration	Stakeholder	Luck	Foundation	Trust	Networking
Statement from Participant	First Order Informant Codes	Second Order Analytical Codes																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
But, there are a lot of factors that go into decision making process. Which one of them you weight more, carries more weight is—sometimes depends on the situation, but, fundamentally, the decision program manager gets to make depends on what phase you're in, but presuming that you already have your requirements and you're making —you're making implementation—architectural, you can make architectural traits to meet your requirements, you can make cost and schedule traits within your requirements, like to defer a capability that might be too hard and just get the easy stuff done upfront and get an initial product out. Kind of depends on your overall program strategy	The PM understands that the decision making process must be flexible. This PM has confidence and a solid foundation to do their best to estimate cost, and the schedule upfront. The ability to estimate the governments risk depends on the PM's flexible approach.								1	1	1						1		
And then, of course, it—you know, I hear when you're talking about cost and schedule and what might be hard to do and the requirements, in the end, the government program manager is there to manage the government's risk exposure in the program and getting the program to delivery.	The main PM priority is to manage government risk, and deliver the product to the stakeholders to meet expectations.										1	1			1				



Statement from Participant	First Order Informant Codes	Second Order Analytical Codes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
I could do my job and finish the project, but I build something that someone else integrates into their weapons systems. So, when they are planning like in the program I am in now, its schedule focused. All of the other services—army, navy, air force, marines, they don't fund or manage the project that I am in, but I provide the common device to all of them.	The end goal for the PM is to build a program that meets stakeholder expectations. The PM has frustration in funding a joint program and the stakeholders present a big constraint with conflicting ideas on how to expand the program. There is Politics among the services for this program.	expectation, frustration, stakeholder, constraint, politics										1	1	1		1				
So, when they start thinking about making all of their upgrades fleet wide, they are asking well, when can we plan our upgrade? How much risk, how much uncertainty is in your schedule so that we know when to plan our upgrade? Because they don't want to plan the upgrade too soon, because they have to budget for it.	This PM has a good foundation in program management that the PM uses to meet expectations. PM has a confident attitude when managing risks and working through constraints. PM was frustrated about cooperation from other services.	foundation, risk management, constraint, expectation, frustration, confident							1		1	1		1	1				1	
if they budget for a schedule that is too optimistic, and I don't deliver, then all of those funds are not useful. If they wait too long, they might miss an insertion point that's natural in their weapons systems upgrade program.	Budget constraints impede on expectations and it is frustrating when money doesn't come through. The PM has a strong foundation in program management.	constraint, expectation, frustration, foundation										1		1	1				1	
So, on like the job I am in right now, I have got—so I have a substantial amount of technical work to accomplish, just to get everything productized to meet that schedule. So, I am managing—trying to close the most important requirements down as soon as possible that are in my operational requirements document, but because my product goes into everyone else's system,	This statement is arrogant and expresses the PM's confidence. There are many stakeholders involved in this program to meet expectations. The PM has a good foundation in program management.	arrogant, confident, foundation, stakeholder, expectation							1	1		1							1	1



B. PARTICIPANT 2

		(1) Leadership	(2) Attitude	(3) Bureaucracy	(4) Reputation															
Percentage for Participant 2:		15%	35%	33%	17%															
TOTAL Aggregate Category for Participant 2:		76	172	164	84															
TOTAL of each Second Order Analytical Code for Participant 2:		14	27	17	18	0	16	39	57	34	26	29	62	50	18	5	61	19	4	
		<div style="display: flex; justify-content: space-between; font-size: small;"> Team Building Personnel Management Communicate Mentor Recruit Arrogant Confident Flexible Risk Management Expectation Politics Constraint Frustration Stakeholder Luck Foundation Trust Networking </div>																		
Statement from Participant	First Order Informant Codes	Second Order Analytical Codes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
I think—I have had a couple of programs that have been going pretty well at various points. This one right now is going quite well. I am not sure that my decision-making process changes between whether its poor performing or not.	PM has a strong foundation in PM. This PM is very confident in their program management abilities.	confident, foundation							1									1		
I think the difference would be the amount of engagement that I have with my subordinates. My philosophy stays the same, decisions are made at the lowest level possible, but sometimes if I have got an officer or civilian who is a little more junior, who might not have as much confidence in; can I really make this decision, is this really the right decision, they tend to come in and talk to me about it first.	Team building and active communication is important to this PM. This PM is a flexible and confident leader engaged and managing their personnel.	team building, personnel management, communicate, confident, flexible	1	1	1				1	1										
But, then at the end of the day, I still try to let them make the decision. I said we will talk about it, lay everything down, we will draw it on a whiteboard, but what would you do?	Mentoring, communicating and team building is important to this PM. This PM is a flexible and confident leader engaged and managing their personnel.	mentor, communicate, team building, flexible, confident, personnel management	1	1	1	1			1	1										
Because my overall job, the way I view things, is that I am to grow the next generation of air force leaders.	This PM is actively engaged in team building and mentoring their personnel. The PM is confident in program management.	team building, personnel management, mentor, confident	1	1		1			1											



Statement from Participant	First Order Informant Codes	Second Order Analytical Codes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
my number one job is to make sure that they have the ability and the confidence and the data to make the decisions that they need to make.	This PM has a strong foundation in PM. Mentorship, communicating and team building is very important for this PM. This PM uses personnel management to adequately teach and train their junior personnel.	mentor, team building, foundation, personnel management	1	1		1													1	
Ideally, if they are doing their jobs and they are making their decisions, there are very few decisions I need to make.	Mentorship, effective personnel management, communicating and team building is very important for this PM. This PM has a strong foundation in PM.	mentor, team building, foundation, personnel management	1	1		1													1	
I would actually argue that, and say that it is cost, schedule performance, people, and polarities.	Politics plays a role in program management. This PM has a strong foundation in program management.	politics, foundation											1							1
I actually used to use the word politics, but that has a negative connotation, and sometimes its not negative.	Politics is sometimes a constraint of program management. This PM has a strong foundation in program management.	politics, foundation, constraint											1	1						1
Cost is traditionally black and white. You either have it or you don't. you know what it is. You have got the resources, you don't. Schedule, you meet it, you don't. pretty black and white.	The PM is confident. This PM lists potential constraints and has a strong foundation in program management. You must be flexible in program management.	confident, constraint, foundation, flexible							1	1				1						1
Performance meets the spec, doesn't meet the spec. People, growing the people, but also do I have the right people in the right jobs? Do I have the right people with the right training? I can't do all of those other things if they aren't	You must be flexible in program management. Overcoming constraints is a difficult part of program management this PM faces. Mentoring, team building and personnel management plays an important role for this PM.	flexible, constraint, mentor, personnel management, team building	1	1		1				1				1						
So, I have always kind of said that there is really five elements of things when you make a decision, you have to look at all five.	This PM has a strong foundation in Program Management to effectively manage risk. It is important to be flexible.	foundation, risk management, flexible								1	1									1
I have that posted on my door, its out on our websites, its up on my wall, but I always tell my folks I said, of those five categories, the cost, schedule, performance is what I really expect them to do.	This PM mentors their junior personnel and is actively engaged in team building and personnel management. The PM has a strong foundation in program management. Effective communicating is essential for the team.	team building, personnel management, mentor, communicate	1	1	1	1														



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