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WHY DO PROGRAMS FAIL? AN ANALYSIS OF DEFENSE PROGRAM MANAGER DECISION-MAKING IN COMPLEX AND CHAOTIC PROGRAM ENVIRONMENTS

December 2018

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MANAGER DECISION-MAKING IN COMPLEX AND CHAOTIC PROGRAM
ENVIRONMENTS**

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ABSTRACT

This research attempts to understand potential root causes and underlying factors that influence defense acquisition program managers' decision-making. Using qualitative data gathered through in-person interviews and through review of multiple case studies as a research design, this project focuses on how program managers gain insight in the decision-making process. Results indicate that program manager decision-making is impacted by process, control, relationships, motive, and risk. Analysis of findings suggests that defense acquisition oversight and policies create an environment of risk avoidance, causing program managers to utilize interpersonal methods of management and decision-making as a method of control within their sphere of influence. Additional research into decision-making methodology of program managers during critical program milestones is warranted for a more thorough analysis.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACAT	Acquisition Category
AT&L	Acquisition, Technology, and Logistics
COA	Courses of Action
DAU	Defense Acquisition University
DAWIA	Defense Acquisition Workforce Improvement Act
DoD	Department of Defense
EVM	Earned Value Management
EDM	Ethical Decision Making
IOC	Initial Operating Capability
IPT	Integrated Product Team
LOE	Levels of Effort
MDAP	Major Defense Acquisition Program
NDM	Naturalistic Decision Making
PM	Program Manager
WBS	Work Breakdown Structure

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I. INTRODUCTION

With an annual \$100 billion Department of Defense (DoD) procurement budget, the stakes are high for program managers (PMs) to adequately navigate the defense acquisition process. Defense acquisitions delivers the latest, most technically advanced warfighting capability through a complex, multi-layer process that delicately balances budget restrictions (cost), product delivery timelines (schedule), and required operational capability (performance). Changes to any one of these variables (cost, schedule, or performance) affects the others, and it is the responsibility of DoD PMs to orchestrate these trade-offs. Add to that balance different external complexities—such as unclear priorities, new threats, budget constraints, new or changing technology, regulatory and statutory requirements, layers of oversight, federal contracting regulations, changing requirements, organizational culture, personal bias, leadership priorities, and federal policy objectives—and the PM decision-making environment becomes quite complicated.

A. BACKGROUND

The DoD has historically struggled to deliver new capabilities, on time and within budget. Early on, Congress leveraged little oversight over defense budgets and acquisition programs; however, beginning in the late 1960s these struggles gained congressional attention. During that time, only 2% of the defense budget required congressional authorization (Fox, 2011). Between 1961 and 1983, congressional budget oversight for the DoD increased from 2% to 100% (Fox, 2011). Some might suggest that the change was due to distrust in the DoD's ability to execute major acquisition programs, and that congressional members utilized the opportunity to leverage control over projects benefitting their constituents (Sorenson, 2009).

Much of the distrust and policy oversight changes began during the tenure of Defense Secretary Robert McNamara, although acquisition reform has been a focus item of every Secretary of Defense since World War II. As a result, Congress instituted over nine major acquisition reform initiatives designed to improve processes, reduce risk, and reduce program failure rates (Cantwell, Sarkani, & Mazzuchi, 2013). Notable reform

efforts include the 1990 Defense Acquisition Workforce Improvement Act, the 1994 Federal Acquisition Streamlining Act, the 1996 Clinger-Cohen Act, and the 2009 Weapons System Acquisition Reform Act (Congressional Research Service, 2014; Fox, 2011). The outcome is a complex defense acquisition process filled with layers of sub-processes for budget approvals, design and development, testing, technical readiness, and production, as depicted in Figure 1. These reform efforts, while largely beneficial in solidifying process control, add additional complexities to an already convoluted process. In review of recent DoD programs, data suggests that performance may not be improving.

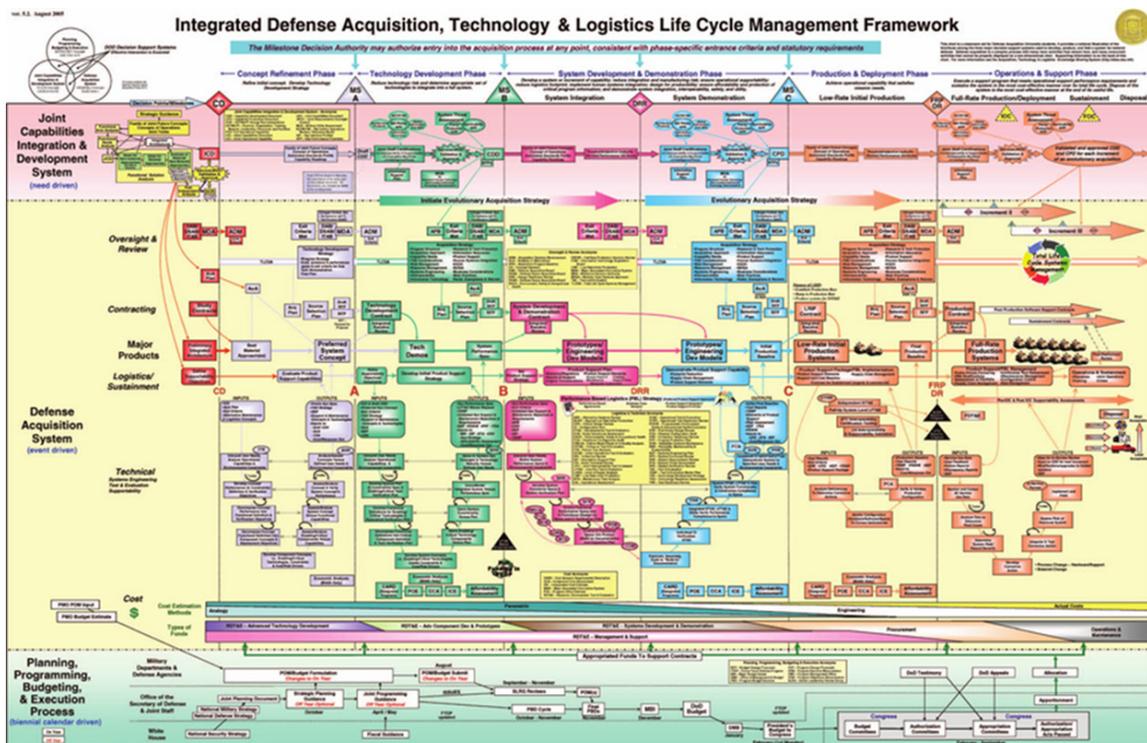


Figure 1. Process Map of Defense Acquisition, Technology, and Logistics Framework. Source: DAU (2018).

Established by the DoD Authorization Act of 1982, the Nunn-McCurdy legislation established reporting thresholds for major acquisition program cost growth. A review of 21 recent programs that breached those thresholds, as seen in Figure 2, reveals that during program execution, poor contractor and/or government PM performance accounted for

nearly half of the breaches. Some of these breaches listed include poor performance in systems engineering, interface management, limited situational awareness, and inadequate contract incentive.

Root Causes	Fraction	Count	Programs																							
			WGS	ATRCM	CMWS	RMS	AB3	DDG-100	F-35 JSF	FAB-T	Escalibur	ACWA Chem-Demil	RO-4A/B GH	Navy ERP	GCSS-MC	JTRS GMR	JLENS	P-8A	EELV	ECSS	JPALS Inc. 1A	MQ-8 VTUAV	OCX			
Discretionary analysis	24%	5																								
Department		21	AF	Army	Army	Navy	Army	Navy	DoD	AF	Army	DoD	AF	Navy	Navy	Army	Army	Navy	AF	AF	AF	Navy	Navy	AF		
Milestone B Year (original)			2000	1995	1995	1999	2006	2005	2001	2007	1997	2003	2001	2004	2007	2002	2005	2004	1993	none	2007	2000	2012			
Critical Breach (SAR Year)			2009	2009	2009	2009	2009	2009	2009	n/a	2010	2010	2010	n/a	n/a	2011	2011	n/a	2012	n/a	2013	2013	2016			
Unrealistic performance expectations	10%	2		X																X						
Poor performance by government or contractor personnel responsible for program management	48%	10				X		X	X			X	X	X	X			X	X				X			
• Systems engineering	43%	9				X		X	X			X	X	X	X					X			X			
– Requirements management	33%	7							X			X	X	X	X					X			X			
> Ambiguities in combining requirements documents	5%	1														X										
> Development, translation and allocation of requirements	14%	3							X						X					X						
> Inadequately funding the program for all requirements	5%	1										X														
– Interface and environmental management	10%	2						X	X																	
– Holistic performance attributes (e.g., reliability, weight)	10%	2				X			X																	
– Risk assessments	5%	1							X																	
• Inadequate contract incentives	38%	8						X	X			X		X	X			X	X				X			
• Limited situational awareness	29%	6				X		X	X					X	X					X						
• Failure to act on information	29%	6						X				X	X	X						X			X			
Other	19%	4	X																X		X	X				
		21																								
PAUC Growth (%) **			18.4	290.6	25.0	79.5	25.5	86.5	57.2	25.1	198.7	39.2	14.0	—	—	92.1	215.7	-1.6	68.0	—	104.3	55.2	48.6			
APUC Growth (%) **			27.2	281.5	32.4	54.6	31.2	24.9	57.2	—	129.6	—	22.9	—	—	23.2	—	-1.1	58.0	—	128.0	71.5	—			
RCA Memo Year (CY)			2010						2011						2012		2013	2014	2016							

Figure 2. Root Cause Analysis of Recent Nunn–McCurdy Breaches as described by O’Neil (2011). Adapted from OUSD(AT&L) (2016).

Furthermore, between 1998 and 2005, Major Defense Acquisition Program (MDAP) per-unit cost estimates grew approximately 250% from baseline to delivery (O’Neil, 2011). Between 1997 and 2015, MDAP schedules grew approximately 3% from program initiation to Initial Operating Capability (IOC), delivering new capabilities on average in about seven years. During that same time, the DoD cancelled approximately 17% (136) of new MDAPs, resulting in approximately \$53.5 billion dollars in sunk costs (Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics [OUSD(AT&L)], 2016).

B. PROBLEM STATEMENT

As shown, attempted acquisition reform efforts to facilitate program efficiencies, reduce risk, and infuse cost savings using best practices in process improvement and additional oversight have failed to produce their intended results. This begs the question then, if there is an established framework for cost, schedule, and performance for PMs to follow, why do programs continue to struggle and fail? A review of published research to identify factors that influence the success and failure of DoD programs identified how quantitative measures are used to find predictive variables that might influence outcomes. A review of previous studies (Clowney, Denver, & Stuban, 2016) identified variables such as project efficiencies, leadership, staff experience, policy and strategy, poor planning, and risk analysis, among others, as leading drivers. While research highlights lagging indicators that resulted in project failure, the problem identified by our team suggests that there is a lack of data to supporting potential root causes, through collection of qualitative, cognitive data.

This question is never more important than today. Rapidly evolving space and software technology development and implementation by American adversaries threatens the nation's security. As a result, the defense acquisition processes must adapt to deliver advanced operational capabilities faster to meet the changing threat environment.

During his testimony to the House Armed Services Committee (HASC), Assistant Secretary of the Air Force for Acquisitions Dr. William Roper agreed with calls for change. He suggested that the DoD must expedite how systems are designed and acquired, especially when they support advancing space and software capabilities (HASC, 2018). The under secretary of defense for AT&L (USD[AT&L]) also recently stated that we must “learn from our experience and work to improve our ability to make sound acquisition decisions” (OUSD[AT&L], 2016, p. iii).

While we acknowledge that process and organizational reform is necessary, we also suggest that examining PM decision-making within the DoD acquisition framework is necessary to help contribute a three-dimensional understanding of the factors impacting DoD acquisition programs, and to influence future acquisition reform changes.

C. PURPOSE STATEMENT

A deeper understanding of how PMs make decisions and the mitigating impacts of those decisions is necessary to change the acquisition framework in a way that will result in an improved return on investment for defense materiel and development programs. The purpose of this research is to seek a better understanding of why PMs in high visibility programs make decisions and take action during critical program milestones. Therefore, this research attempts to identify root causes and underlying factors that influence PM decision-making in pursuit of their specific course of action.

D. SCOPE

For this study, we gathered qualitative data through multiple, semi-structured interviews. The team interviewed two subjects. The interviewees were both Air Force, civilian PMs experienced in managing Acquisition Category (ACAT) Level I programs. As such, each are current and qualified to Defense Acquisition Workforce Improvement Act (DAWIA) PM Level III training certification standards. The interviews attempted to glean an understanding of the environment in which the PMs operate and some of the complexities influencing their decision-making. We acknowledge that the data collected is not statistically significant as time and other restrictions limited the effort. The scope of our research is intended to be compiled into a larger set of research on the same topic.

E. METHOD

In an effort to find explanations of root causes, the team based our data collection methods on the grounded theory framework of preparation, data collection, analysis, and theory establishment. Our team gathered qualitative data through in-person interviews consisting of nine unrestricted questions to allow the subjects' flexibility in responding to the problem statement, as they deemed appropriate. The interviews were conducted in a secured facility, limiting data collection to detailed note taking by the team members. Follow up interviews were conducted over the phone to clarify any assumptions or miss interpretations collected by the team. The team conducted post interview collaboration of data to refine the entirety of data collected.

The team then utilized a simple coding method to analyze and interpret the data collected during interviews. Key objectives, points and patterns expressed in the interviews were recorded and analyzed against themes identified during the team's literature reviews of different decision-making methods and processes. The team established five main categories to encompass aspects of the decision-making process. These five categories included motive, culture, process, relationship, and risk. These categories encompassed potential influencers and decision-making styles the subjects used in their programs based on specific words or phrases (sub-categories) that relate to a style of decision-making. The frequency of the categories used in the interview helped to determine the primary type or style the subjects use to make their decisions. We then used the framework to conduct a comparison against theoretical models identified in literature in an effort to draw conclusions related to the problem statement and potential hypotheses and theory.

II. LITERATURE REVIEW

Data analytics, process reviews, and course of action (COA) selection, among other decision-making efforts, consume a significant amount of a PM's time. The framework and influences used to analyze, select, and implement a decision may be based on several factors; therefore, a review of research into decision-making theories is necessary to understand these potential influences. Decision-making research is not new. Philosophers studying choice, thoughts, and processes extends back hundreds and perhaps thousands of years. While outside the scope of this research, the study of the decision-making process is more recent. More recent still is the study of decision-making and its impact on various intellectual disciplines such as mathematics, sociology, psychology, economics, and program management (Buchanan & O'Connell, 2006). For this application, a review of four key areas of study was conducted through the lens of decision-making, sensemaking, naturalistic decision-making (NDM), and finally through the concept of trust is explored, followed by decision-making within organizations. These four areas were selected due to the anticipated application to decision-making in an ambiguous and complex environment.

A. DECISION-MAKING

The act of decision-making describes a process one takes to establish a position, as is the case in the DoD acquisition environment. Decision-making is undertaken utilizing three different types of processes, including logic, probability, and heuristics (Gigerenzer, 2018). Logic theory argues that the answer to any decision-making is based solely on logic. Computers and artificial intelligence are examples in that decisions are made objectively, without the input of emotion. Probability theory, also known as expected value theory, uses mathematics and the probability of potential outcomes to make the decisions based on the ones with the highest probability of occurrence. In his interview, Gigerenzer does not prefer this method: "Probability theory is useful when there are large amounts of data or simple problems. In an uncertain world it has its limits." Last is heuristics, or tools utilized to make efficient decisions. Gigerenzer defines heuristics as a particular stimulus individuals feel

that influences the decisions they make. These emotional stimuli create a shortcut for individuals to make quick and possibly accurate decisions.

B. SENSEMAKING

Decision-making is more than the act of making the decision. Decisions in a chaotic, high payoff environment such as DoD acquisitions are made based on several internal, external, known, unknown, and personal factors that are often not easily quantified. Some decisions are made based on tacit knowledge, while others are made based on similar experiences or even perhaps gut feelings. Sensemaking in decision-making could be considered an application of those factors, knowledge, and experiences to a given scenario, for a given outcome. Although conceptualized in the 1970s, its applicability to computer interaction, information science, and organizational behavior is more recent. Simply put, sensemaking is making sense of a situation or giving meaning to an experience.

1. Klein, Moon, and Hoffman

Klein, Moon, and Hoffman (2006a, 2006b) published two articles on the applicability of sensemaking to artificial intelligence and computing. While computing was not a focus of this research, their use of NDM and cognitive modeling aid in understanding.

a. Psychology Perspective

In their article *Making Sense of Sensemaking I*, Klein, Moon, & Hoffman (2006a) caution the broad-brush use and applicability of sensemaking in data analytics. In doing so, they challenge assertions that sensemaking is a reinvention or merger of previous research into decision-making processes. The authors use five examples of decision-making from psychology to highlight differences: situational awareness, curiosity, comprehension, creativity, and mental modeling (Klein et al., 2006a). Specifically, while each example can be included across the seven principles of sensemaking, neither stands alone as they can in decision-making. Klein et al. (2006a) acknowledge that sensemaking can be a linking function to help understanding; however, they argue that when viewed through those five lenses (p. 71), the fusion of ideas might lead to diluted understanding.

To further make their argument, they used empirical examples rooted in NDM to challenge those assumptions. Specifically, they use observations and cases grounded in NDM that are attributable to sensemaking. Of the six examples provided, three are applicable to this research. The first observation refutes that data fusion aids sensemaking. Klein et al. suggested that while data fusion can reduce information overload, not having the mental model of the data could actually add confusion in understanding the outputs. The second observation goes further and refutes the assertion that sensemaking enables connecting the dots. For this, they argued that the notion downplays the importance of sensemaking by suggesting: “It misses the skill needed to identify what counts as a dot in the first place” (Klein et al., 2006a, p. 72). The last observation suggests that more information enhances sensemaking. They point to research by Oskamp (1965) and Omodei, M. McLennan, J., Elliott, G., Wearing, A., & Clancy, J.. (2005) highlighting the diminishing return on performance through information saturation. Klein et al. (2006a) suggested that information results in increased confidence. As the amount of information increases “people become increasingly overconfident rather than increasingly correct” (p. 73).

b. Cognitive Model

In their second article, *Making Sense of Sensemaking 2*, Klein, Moon, & Hoffman (2006b) introduced data/frame theory as an application of technology to sensemaking. Their theory utilizes framing during decision-making, suggesting individuals utilize several frames in a looping process, as a grounding mechanism to hypothesize information. The act of framing occurs during the sensemaking cycle as ideas are accepted or rejected (reframed), as seen in Figure 3.

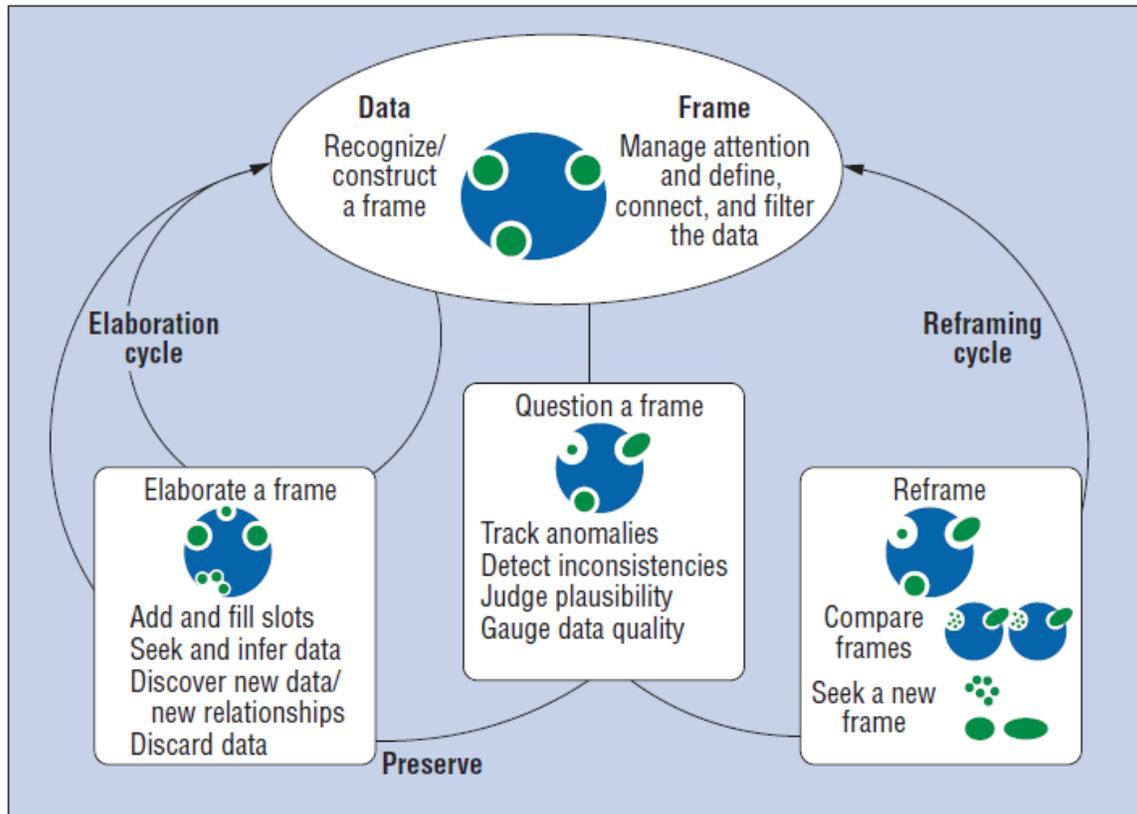


Figure 3. Sensemaking Model Depicting Framing. Source: Klein et al. (2006b).

Their research offered four observations applicable to this thesis. The first they call “causal reasoning,” suggested that multiple causal factors are necessary to affect change in decision-making. The second observation counters beliefs that establishing early hypotheses is detrimental. Klein et al. (2006b) asserted that early understanding and framing allows decision-makers to gather and process data necessary for acceptance or reframing. Some might argue that early hypotheses setting might lead to confirmation bias; however, Klein et al. found that decision-makers often search for clues to counter their framing assumptions. Last, they addressed a decision-maker’s ability to adapt sensemaking as a skill. While their research did not reveal one’s ability to learn sensemaking, they found decision-makers with an “adaptive mind-set” were more likely to utilize sensemaking (Klein et al., 2006, pp. 88–89).

2. Weick: Organizational Approach

Karl Weick, considered to be one of the founders of sensemaking, utilized the concept in his research to better understand traditional organizational decision-making theories. His work described sensemaking as an “interplay of action and interpretation rather than the influence of evaluation on choice” (Weick et al., 2005, p. 409). This is an important distinction as he cautioned not to equate sensemaking as simply a method of understanding through translation; doing so would be an oversimplification of its use (Weick, 1995). Weick acknowledged that sensemaking is broadly applicable; however, he focused largely on its application through an individual and social framework (Weick, 1995).

In *Sensemaking in Organizations*, Weick (1995) explained his use of “action and interpretation” as an active, exploratory engagement of understanding through seven properties. The process is not intended to be linear in nature, rather more a guide or manual. The first is identity, or the recognition that understanding one’s self and one’s organization determines the view. In this context, Weick (1995) was careful to note that identity is often both individual and organizationally aligned. Sometimes the identity of the individual is similar to the organization, but not always. The second is retrospection. Weick offered both caution and optimism, suggesting that reflection of the past to make sense of the current situation may be distracting if ones’ values are not grounded over the elapsed experience. The first two properties differ from the others as they are more closely aligned with the “sense” or understanding.

The final five properties are more action oriented, or as Weick (1995) suggested, they are the “making” portion of sensemaking. The third property is the enactment of experiences to help understand and reduce complexity. Enactment is the first step in comparing experiences and understanding to current environments. The fourth property suggests that sensemaking is social. Weick (1995) recognized influences from organizational habits, stereotypes, roles, and responsibilities, among others, as having inputs to enactment. The fifth property suggests that sensemaking is always ongoing, with no start or stop. The sixth property is the recognition that cues extracted during the process help with understanding and serve as a linking function to the larger network of meaning

and understanding. The last property is the notion that sensemaking is more about plausibility than accuracy. Weick described what he means by saying, “A good story holds disparate elements together long enough to energize a guide action, plausibly enough to allow people to make retrospective sense of whatever happens” (p. 61).

3. Thiel, Bagdasarov, Harkrider, Johnson, and Mumford: Ethical Decision-Making

Thiel, Bagdasarov, Harkrider, Johnson, and Mumford (2012) model ethical decision-making (EDM) through the lens of sensemaking to expand on questions raised by others looking to answer fundamental organizational theory questions about processes and misconduct. Specifically, following the 2007–2008 subprime mortgage collapse, the natural question was, how was such gross misconduct allowed to infiltrate a system where standards, laws, and process oversight ensure rule following. These researchers suggested that when complex forces and high-risk situations affect the environment, leaders/managers use sensemaking to counter the ambiguity of the situation (Thiel et al., 2012). Therefore, they argued that to better understand the actors’ decisions, traditional decision-making models (EDM specifically) should include attributable factors grounded in sensemaking, as seen in Figure 4, to capture complexities and constraints often ignored in other models.

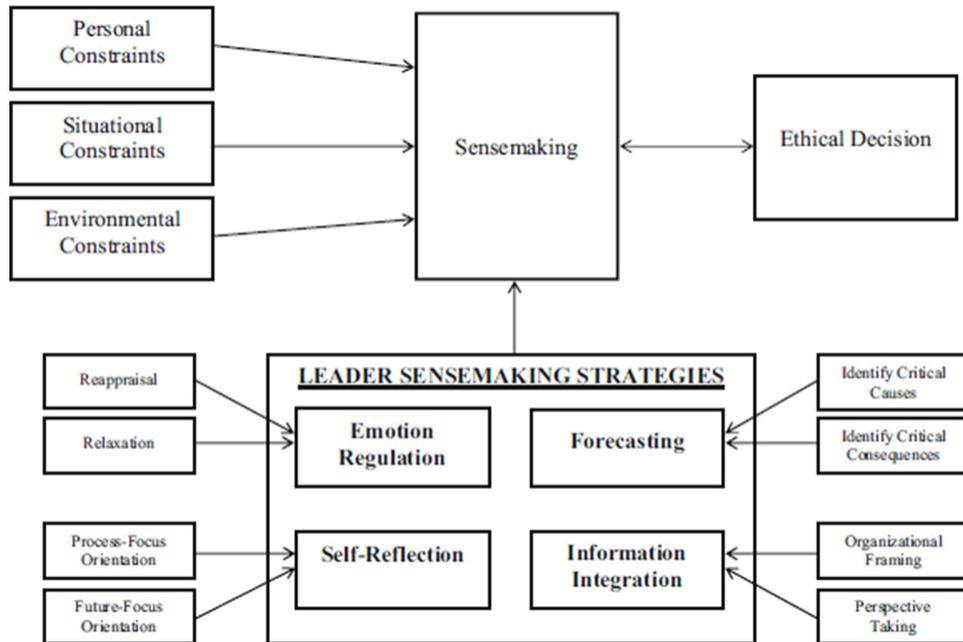


Figure 4. Leader Sensemaking Model with EDM. Source: Thiel et al. (2012).

Similar to DoD acquisitions, ethical dilemmas offer “ill-defined problems that have high-stakes consequences” (Thiel et al., 2012, p. 50). Navigating the decision space during such dilemmas requires multiple, decision-making inputs such as, recognition of the problem, intuitive judgement, the environment, and experiences, among the many. Therefore, Thiel et al. (2012) recommend that leaders understand the tenants of sensemaking in an effort to better interpret situations and potential constraints found during complex decision-making.

C. NATURALISTIC DECISION-MAKING

Naturalistic decision-making (NDM) is a type of intuitive strategy versus an analytical strategy that focuses on experienced personnel making decisions based on the recognition of critical information and prior knowledge. Within defense acquisitions, PMs performing at an ACAT Level I program have risen through the ranks, earning knowledge and experience to potentially lead large programs. Analytical decision-making is a useful tool when there are specific goals, complete information, and less pressures such as time that allow individuals make the optimal solution. NDM and other versions of intuitive

decision-making focus on situations where time pressures and high risks push individuals to make rapid and non-perfect solutions instead of spending valuable time and resources into looking for the “optimal” solution.

In the article “Naturalistic Decision-Making in Aviation Environment,” Simpson (2001) divulges how NDM is the most effective type of decision-making to use for pilots and aircrew inside an aircraft. He states, “It has been discovered through several studies that experienced operators in their operational settings (including pilots) make many decisions using intuitive rather than analytical strategies.” (p. 20). Simpson also expands upon the environment many pilots face: “The cockpit is considered a naturalistic environment due to characteristics such as experienced operators, multiple players and teams, dynamic conditions, shifting and competing goals, high risks, time pressure, and ambiguous or missing data” (p. 1). Due to the dynamic environment and the ever-changing information and conditions, NDM cannot provide an optimal solution; rather, it provides a solution that satisfies the current need until new conditions, pressures, and restrictions reveal a possible new solution.

Figure 5 shows how the perceived NDM method goes through the phases of perceiving the information at hand, analysis, assessment, and action. Depending on the severity and the pressures of the situation, some routes in the model are pursued while others are not. The first phase, perceiving the situation, is taking all of the information presented, complete or incomplete, and evaluating all aspects of the situation. The second phase is the knowledge-based analysis and pattern match. This stems from past experience of the individual or from the team and noting the similarities to the current situation. Knowledge of the situation at hand, past experiences, and connections between the two are drawn together during this phase to help establish the courses of actions for the next phase.

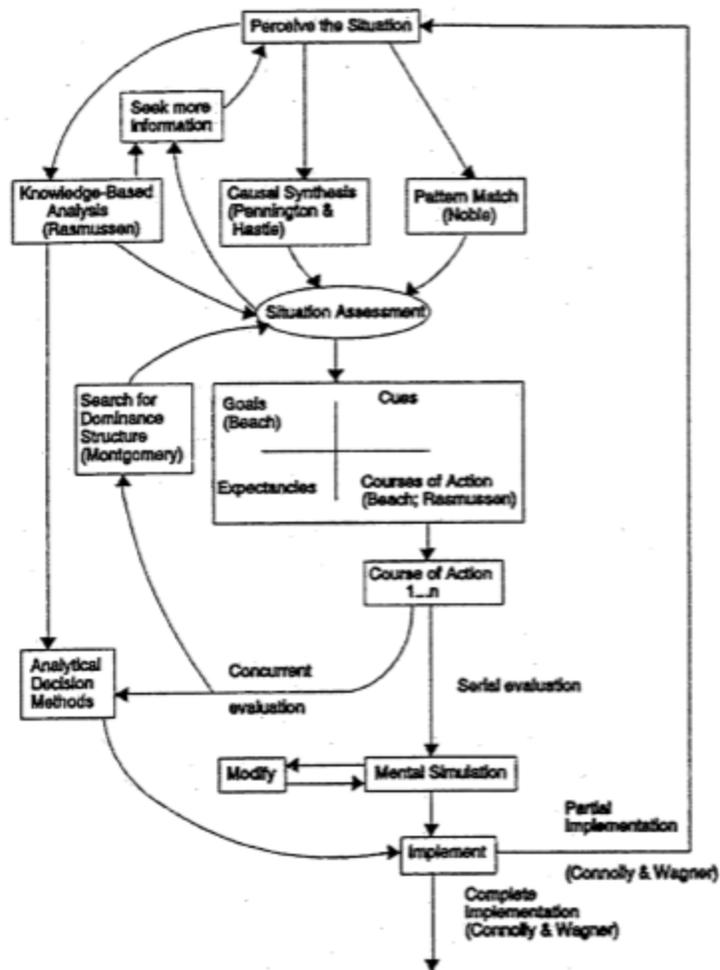


Figure 5. Synthesized Process Model of NDM. Source: Klein (1993).

Courses of action is the assessment phase of the model. This takes the four parts of the middle figure—goals, cues, expectations, and courses of action—while laying out which is the best fit for the current situation, including the high or low pressures that will be affecting the decision. Low pressures will shift to an analytical method in the courses of action, as show on the left side of the figure, where higher pressures play more to the mental simulation and NDM method. After the preferred method is conducted, action plays into the implementation of the chosen course. With some environments being very static and refined, once implementation of the action is taken and completed, work does not have to be further evaluated and improved

upon. However, in high pressure, ever-changing dynamic situations where NDM is used, the loop is continued and starts back at perceiving the situation.

1. Militello: Naturalistic Decision-Making and Macro Cognition

Militello (2008) uses an example of firefighters in a burning house to illustrate how NDM is used to make challenging and high-risk situations. She explains, “Under time pressure where more than one plausible option does exist, but the decision makers use their experience to immediately identify the typical reaction. If they cannot see any negative consequence to adopting that action, they proceed with it, not bothering to generate additional options or to systematically compare alternatives” (p. 4). In high-pressured situations, options cannot typically be deeply weighted against one another and evaluated in which is the most optimal solution. Experience and similarities to past events help individuals make quick decisions with an acceptable level of confidence on the possible anticipated outcome. Militello (2008) stresses that the challenging conditions that are presented in each situation make the weighted analysis unachievable, and the most effective decision-making process is NDM, using past experiences and past outcomes to make a quick, semi-suitable decision.

2. Klein: A Naturalistic Decision-Making Perspective on Studying Intuitive Decision-Making

Intuition as defined through NDM is the “expression of experience as people build up patterns that enable them to rapidly size up situations and make rapid decisions without having to compare options” (Klein, 2013, p. 164). Much like previously stated, it is the patterns and outcomes of the past experiences which propel individuals to make current decisions under high pressures. Individuals do not make a majority of their decisions based on optimal performances, but by their past situations and emotional outcomes. Klein (2008) expands on this idea, stating that, “Conditions such as amount of information and time available determine where decisions fall ... whether people rely more on patterns or on functional relationships” (p. 457). This expands upon the idea that the pressures faced in decision-making affect whether an NDM method or a more analytical method is performed. Higher pressures result in the NDM method along with patterns of past relationships where

fewer pressures result in the analytical methods and relationships between the multiple decision options.

D. TRUST

Many aspects of defense acquisitions include ambiguous and undefined elements where collaborative teaming is necessary. As such, understanding confidence in relationships is necessary for this thesis. “Trust,” when used to describe an act or action, is defined as placing confidence or reliance on someone or something without fear or misgiving (“Trust,” 2011). Trust in organizations may manifest itself through variables such as empowerment, resistance to change, conflict, and innovation, among others (Vinebuger, 2010).

1. Sun: The Decision-Making Dilemma

Sun offers practical suggestions for building trust in an organization based on personal knowledge and experiences. His insights provide wisdom for PM decision-making. In his article, he asserts that decision-making must not always be based on pure data and offers that doing so could result in overlooked intuition. Sun recounts a time where his data-driven business model suggested taking the company in a certain direction. Around the same time, his engineering and marketing team asked for funding to experiment on ideas that were not in line with the model. He reluctantly approved, and the resulting idea proved wildly successful. From his experiences, he offers the following advice:

1. Data is good for analysis, but it cannot be blindly trusted. Likewise, blind experienced-based decision-making could also be detrimental.
2. Do not discount the human factor. While automated intelligence and data analytics capabilities increase, the skills and abilities of the human brain are far superior.
3. Cultivate a culture of experimentation. Despite his initial skepticism, his team proved the data wrong, and in doing so, instilled a sense of pride and buy-in from the team.
4. Trusting one’s gut (instinct) gets better and easier with experience, as tacit knowledge is converted to explicit knowledge. (Sun, 2018)

2. Stamp: Trust and Judgment in Decision-Making

Gillian Stamp is a member of Bioss, a consulting firm focused on people and organizational development. The firm claims,

Organizations that induce anxiety, confusion, mistrust and incompetence are costly and less likely to achieve their purposes in the long term. They may be effective for some years but they eventually fail their initiators (by for instance destroying shareholder value or failing to provide essential services to citizens), and thus the confidence the wider society has placed in them. (Bioss, 2018, About us)

During complex, high-stress, or chaotic times, however, PMs might depend on gut instinct or best judgement decision-making when data analysis and experience is absent. Stamp suggests that when organizations build a framework to cultivate and promote confidence in judgement making, it creates buy-in and incentivizes individual performance toward the larger goal. Organizations build “confidence and respect, people work together in ways that strengthen bonds of mutual trust and fairness, enhance imagination and innovation, and ensure competence; thus the organization achieves its purposes and contributes to the wider society” (Bioss, 2018, About us).

Stamp calls organizations who adopt trust in judgement making being “in flow,” based on an adapted model from Csikszentmihalyi (1990), as seen in Figure 6.

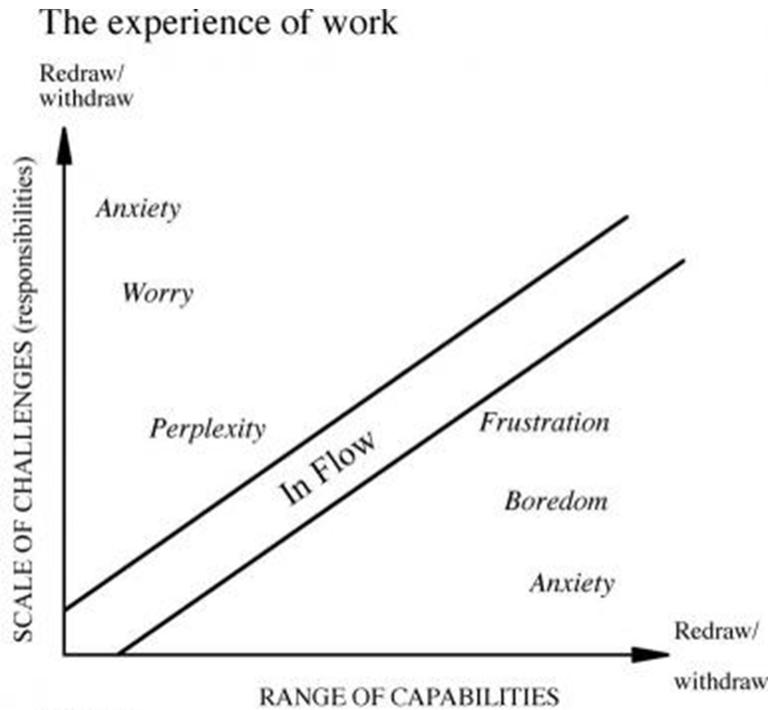


Figure 6. Depiction of Being in the Flow. Source: Stamp (2007).

Organizations seeking to achieve stability (in flow) must balance what Stamp (2007) calls the trellis or framework of tasking, trusting, and tending, as seen in Figure 7. Tasking or delegating provides prescriptive trust by establishing trade space for others to explore. “Trust” or “discretionary trust” refers to the amount of latitude given within the trade space. Through prescriptive and discretionary trust, organizational leaders signal their faith in one’s ability to deliver. As Stamp (2007) highlights, “Prescriptive trust is trust without space, and discretionary trust is trust with space.” (para. 16). The last leg of the trellis is tending. Just like a farmer in their field, organizational leaders can reap a harvest through diligent communication, guidance, and “nudging.” PMs who reinforce purpose, shared goals and outcomes, and relevance are better able to lead, and they also create incentives for others to explore. Then, when necessary, PMs can nudge or guide progress rather than micromanage.

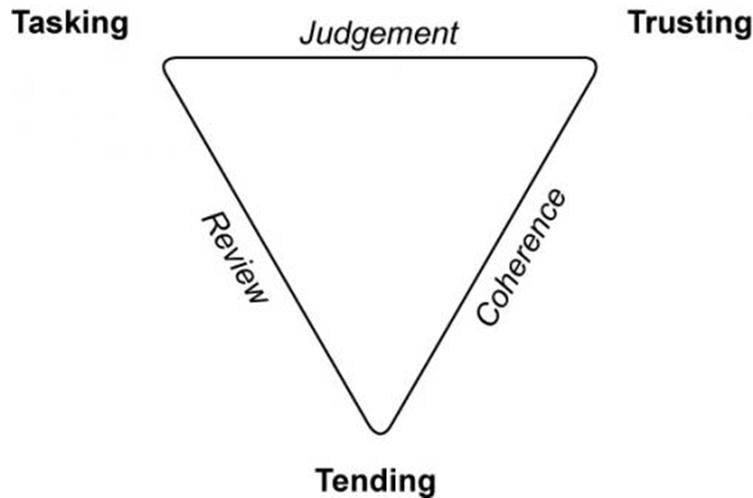


Figure 7. Task, Trust, and Tending Balance. Source: Stamp (2007).

3. Hurley: Culture Setting

Robert Hurley studied executives from 30 different companies to determine outcomes of trust in organizations. Hurley's (2006) definition of trust mirrors that found in dictionaries, as "confident reliance on someone when you are in a position of vulnerability" (p. 2). Additionally, he asserts that when individuals or organizations chose to trust, it is an indicator that they have gone through a deliberate, decision-making process where the analysis of alternatives are identified, analyzed, and influenced. Hurley's decision-making model attempts to serve as a predictor for trust, based on 10 factors including risk tolerance, level of adjustment, relative power, security, similarities, alignment of interests, benevolent concern, capability, predictability/integrity, and communication. He identifies and aligns these factors under the trustor (decision-maker factors) and trustee (situational factors) seen in Figure 8. Hurley defines the trustor as the decision-maker, suggesting that one's risk tolerance, ability to adjust, and level of authority or power dictates the environment for the trustee. Depending on the other situational factors, then, will allow the trustee to choose between trust and distrust.

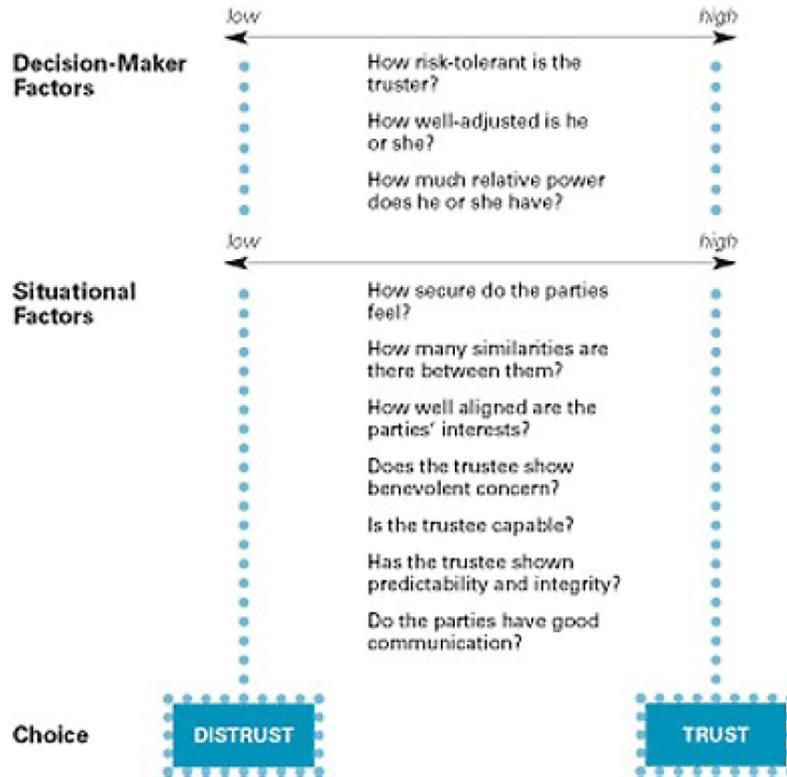


Figure 8. Predictive Model of Organizational Trust. Source: Hurley (2006).

Hurley’s (2006) research concludes that organizations with a “strong unifying culture enjoy higher levels of trust particularly if their culture values include candor, integrity, and fair process than companies without one” (p. 2). Additionally, he concludes that when organizations fail to establish a culture of trust, “expensive and sometimes terminal problems” emerge through stress, divisiveness, unproductiveness, and threats (p. 1).

E. ORGANIZATIONAL DECISION-MAKING

Understanding how decision-making is conducted in organizations is an important variable in this research, as organizational processes, norms, and culture may drive PM behavior.

1. Proveda-Bautista et al.: Analysis of Decision-Making Models for Project Management

Proveda-Bautista, Garcia-Melon, and Gonzalez-Cruz (2018) conducted a quantitative analysis study of PM decision-making maturity of various organizations. To do that, the team compared and contrasted the level of maturity (experience) of the PM decision-makers to the cultures of their organizations. Their goal was to assess if research existed suggesting that advantages of applying a defined process approach was applicable across different business types. The team assessed PMs and their organizations using interviews and surveys and then classified them according to size and decision-making structure. Their data suggested that there is a positive relationship between a company's PM's level of maturity and their decision process, such that companies tend to use a more structured approach to decision-making at higher levels of maturity.

Though not well refined in the text, the team concluded that well-defined decision-making models benefit companies, especially as they mature. To draw such a conclusion, the team highlighted several probable outcomes:

- Defined processes aid in building and enforcing process structure
- Defined processes aid communication from common language setting
- Defined processes help align and coordinate goals
- Increased use of databases help project planning (Proveda-Bautista et al., 2018)

2. Kim and Mauborgne: Fair Process: Managing in the Knowledge Economy

While not directly applicable in the context of PM decision-making, the findings by Kim & Mauborgne (2003) also provide tangible benefit to our thesis. Their work centered on outcomes of fair processes within organizational decisions. They espoused that employee motivation suffers when workers do not trust management decision-making processes. Conversely, worker buy-in increases, even when workers disagree with the outcome, when they perceive the decision-making process to be fair.

Kim and Mauborgne's research across 19 organizations identified three guiding organizational decision-making principles that are applicable in today's DoD acquisition environment: engagement, explanation, and expectation clarity. They defined "engagement" as "involving individuals in the decisions that affect them by asking for their input and allowing them to refute the merits of one another's ideas and assumptions." (p. 9). They define "explanation" as "everyone involved and affected should understand why final decisions are made as they are." Finally, they define "expectation clarity" as "once a decision is made, managers state clearly the new rules of the game" so that employees "know up front by what standards they will be judged and the penalties for failure" (Kim & Mauborgne, 2003, p. 10). In the end, they concluded that processes, attitudes, and behaviors are linked with communication and trust, and in their absence, personnel and project performance is likely to suffer.

F. CHAPTER SUMMARY

This chapter presented the different versions of decision-making methods that our team looked into in order to help explain the decision-making process that PMs go through. The various methods our team looked into and expanded upon include sensemaking, naturalistic decision-making, trust, and organizational decision-making, to name a few. Reviewing the different forms of decision-making in this section helps cover the spectrum of decision-making, from an analytical style decision-making method to an intuitive style decision-making method. Describing all versions of decision-making here ensures that the method presented by the interviewees is captured in one or possibly more types of decision-making, while also helping to explain the thought and calculation process that PMs conduct for their unique style of decision-making.

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III. DATA

A. CHAPTER OVERVIEW

The purpose of this chapter is to disclose the data collected during the research. Qualitative data collection consisted of conducting four interviews of two subjects. The two subjects were chosen based on acquisition experience, position, and rank/grade within the DoD acquisition system. Both subjects were DoD civilians in the grade of NH-4/GS-14 or above and assigned as Air Force PMs in software intensive programs. Both have experience working ACAT I Level programs and are still working high-level programs within the DoD. Confidentiality of both subjects limits the amount of identifying information used; therefore, the first subject is identified as Subject A, while the second is identified as Subject B.

In preparation for the interviews, the team generated a set of nine broad questions to elicit conversational responses from both subjects. The questions mostly prompted the subjects to describe scenarios when they faced complex or challenging problems in their programs. Follow-up questions were asked to expand on the subjects' decision-making process to overcome those challenging situations. Other questions asked the subjects to offer their opinions on how to improve DoD acquisition challenges.

The responses provided for data collection through identification of potential causal factors encountered by both subjects during their time as ACAT I PMs. It also enabled comparative analysis of the data identified in the research from literature. The interviews were conducted in a secure facility, so recording and transcription of the interviews is limited. Therefore, key discussion points were noted and detailed notes taken to collect data subsequent analysis. Follow up interviews were conducted by telephone to expand on information and clarify assumptions of key points identified during the first interviews. This chapter presents and interprets the collected data.

B. CODE METHOD

Data collection and codifying took place both during and after the interviews to arrange, categorize, and subcategorize the information. Answers were carefully dictated to

capture phrases, key words, themes, subject ideas, and other responses to the interview questions. Utilizing a qualitative coding structure method identified by Saldana (2009), the team identified and coded 27 subcategories within the combined responses to sort the data seen in Table 1. Several coded subcategories are applicable across different categories, depending on the theme used by the subject.

Table 1. Coding Summary of Collected Interview Data

Category	Code	Code Count	Category Count
Motive	Buy-in	5	15
	Empowerment	5	
	Reward	2	
	Fear	2	
	Incentive	1	
Culture	Bureaucracy	9	28
	Expectations	5	
	Value	5	
	Trust	4	
	Perception	3	
	Oversight	2	
	Value	0	
Process	Control	8	30
	Freedom	6	
	Design	5	
	Structure	4	
	Compliant	3	
	Rules	3	
	Lack of buy-in	1	
	Policy	0	
Relationship	Trust	5	20
	Respect	5	
	Communication	3	
	Experience	3	
	Oversight	2	
	Strengths	1	
	Development	1	
Risk	Fear	5	17

Category	Code	Code Count	Category Count
	Control	4	
	Compliant	3	
	Oversight	3	
	Test	2	

From the 27 codes, the team then consolidated the data under five major categories of motive, culture, process, relationship, and risk. The data was populated into Excel, and utilizing structuring techniques identified by Ose (2016), the codes were then quantified for analysis.

C. CATEGORIES

The categories selected offer a broad range to encapsulate the topics discussed during the interviews and those identified in literature. The categories selected were based both on findings from literature and on the anticipated major themes identified during the interviews. The categories ultimately serve as the foundational basis for the theories identified in the next chapter.

1. Motive

When considering possible motives in decision-making, the team established the possible external influences that might affect one’s motives in weighing decision options. Research by Thiel et al. (2012), Sun (2018), and Kim & Mauborgne (2003) highlight how empowering and rewarding positive behaviors may be positive motivators within organizations. Likewise, fear may encourage negative behaviors, resulting in self-serving motives. Therefore, themes related to buy-in, empowerment, reward, fear, and incentive were categorized under motive.

2. Culture

Similar to motive, the organizational culture may have an impact on decision-making. Research by Proveda-Bautista et al. (2018), Stamp (2007), and Sun (2018) touch on culture and culture setting as having both a positive and negative influence. Likely

themes discussed under this category include the impacts of bureaucracy, management oversight, and values of or perceived values of the organization. Other themes might include individual expectations, or the perceived value and trust offered to the decision-makers.

3. Process

Process control as highlighted by Proveda-Bautista et al. (2018) increases as organizations grow and mature. As noted, the DoD acquisition process is highly regulated and controlled, especially as applicable to ACAT I programs. Therefore, the team anticipated much discussion around effects of decision-making freedoms within the acquisition system. Other related themes may include process design and control, or process design and structure. Additional discussions about rules and compliance in relation to organizational culture and buy-in could also be applicable.

4. Relationships

In any program office, relationships play a key role in both understanding the problems or task and managing them from different levels. The fourth major category focuses on relationships due to the interpersonal connections that PMs and their teams often make with each other, their customer, and the contractor. The team anticipated having discussions on relationship disconnects and breakdowns in communication, and what the potential effects on program performance during design, development, and production of an end item would be. Proveda-Bautista et al. (2018) and Klein (2013) highlight the importance of relationships in helping to create an understanding through expectation setting between what is being requested from the user and what will eventually be produced. Coded phrases or words used under relationship included trust, respect, communication, experience, oversight, strengths, and development. These words relate back to the main concept of relationship, and when the interviews are conducted, these words in context are recorded and tallied to reflect the importance relationships in the program office.

5. Risk

The last major category is critical to understanding the impacts of risk on PMs' decision-making. The basic understanding of risk for a program office is the uncertainty of an event or condition that, when realized, has a negative effect on a least one of the project's crucial objectives. For any program, PMs must identify and assess the risks to their programs and work toward minimizing the impact on the project. For this category, the team selected key words and phrases that include fear, control, compliant, oversight, and test. These indicators might suggest the span of how PMs view risk and manage the risk when realized. Some PM teams fear the possible uncertainties that risks pose to programs and employ risk avoidance instead of other risk management methods. Others may try to control the risk through additional tests and evaluation methods.

D. FINDINGS

As discussed previously, the team interviewed two Department of the Air Force civilian PMs with over 70 years of combined experience. Questions used to elicit dialogue about their experiences with program difficulties, overcoming challenges, the acquisition process, best practices, and process improvement yielded useful data. The data provided in Figure 9 shows the PMs are most impacted by processes, followed by culture, then relationships, risks, and motives. The following text highlights, by category, the PMs most impacting aspects of decision-making within defense acquisitions.

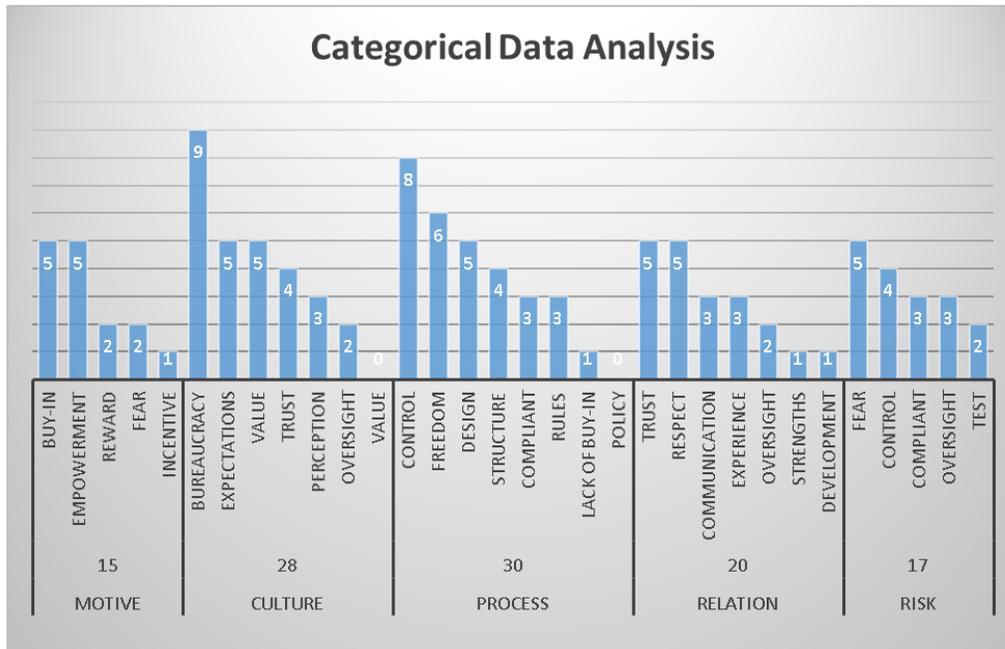


Figure 9. Summary of Categorical Data

1. Interview Summary—Subject A

Subject A is an ACAT Level I PM with over 40 years of acquisition experience across the military, industry, and civil service spectrum. Subject A was interviewed twice, both face-to-face and over the telephone. The second interview was conducted to clarify and amplify information collected during the first. Data analysis reveals that most of Subject A’s responses focused on the three major categories of process, culture, and relationships.

a. Process and Culture

During the first interview, Subject A was asked for their opinion on ACAT 1 level programs and their experience during successes and difficulties. The subject focused much of their responses on bureaucracy and oversight, describing the regulatory steps that DoD programs must navigate during the project life cycle. The opinion expressed suggested that they believe oversight is a large problem, as it adds little value while causing significant time and effort to program personnel. The responses contrast Proveda-Bautista et al.’s (2018) research on process maturity within organizational decision-making, by describing

how process control and cultural norms add complexity and disruption in the PM decision-making processes. Subject A offered a recent example about staffing a document for approval. The document was signed and approved after approximately 60 days in staffing, with nearly 30 comments for recommended action. After conferring with the Integrated Product Team (IPT), they implemented very few recommendations. When asked why, Subject A said that many of the comments were either already implemented as part of the program maturity, or not viable due to the individual's unfamiliarity with the program specifics. Despite the frustration of the process, the demonstration of compliance (by evaluating the recommendations) with rules and norms suggests that the PM utilized trust and perception during the process of determining the implementation of the changes.

When asked to clarify how decision-making influenced the process, Subject A suggested that their experience played a large part. Experience allows PMs to “separate the chaff from the flare” when evaluating change recommendations. Based on the PM's experience, they were able to frame the problem, understand the external perceptions, and then implement a decision. The description aligns with the sensemaking framing processes defined by Klein et al. (2006b), combined with synthesized process in naturalistic decision-making by Klein (2008). Subject A said that while bureaucratic processes are established with good intentions, too many processes and too many inputs from outside oversight organizations slows down the program schedules and leads to unnecessary delays.

b. Culture and Relationships

Subject A offered additional details on the possible impacts of oversight to PM decision-making. Throughout both interviews, Subject A discussed the necessity to communicate program details with both internal and external stakeholders and members of oversight staffs. Subject A felt strongly that an open and ever-flowing communication between offices and teams is critical to program success and mitigating potential program risks. Communication also sets expectation baselines for the program teams. Subject A stressed that close communication is necessary between the DoD program (the PM), the contractor, and the customer (end user) the program is supporting. The use of

communication in this context suggests that communication builds a trusting or positive relationship between the members of the project team.

Not only is communication used to ensure the project team is synchronized, but also to ensure “higher likelihood that you will stop things from occurring that would occur if you weren’t proactive.” Interpreted another way, Subject A viewed communication as a way of regaining program control through message shaping. This process of message shaping may be due to a feeling or culture where trust is absent, as described by Hurley (2006). Additionally, the PM may feel the need to control those processes within their sphere of influence due to the lack of control built into the bureaucracy. Stamp and Hurley (2006) addressed lack of trust in their organizational development research, suggesting that when a framework of trust is absent, performance and personnel buy-in may suffer. Unfortunately, message shaping is an inefficient use of a PM’s time, especially when the payoff is to prevent someone in a non-decision-making oversight role from disrupting program progress. Subject A described it as “frustrating” to ensure that some players are on the team even though “they’re not going to get into the game.”

When asked for ideas to help reduce oversight, Subject A’s responses reflected many of the themes related to relationships. Subject A suggested that for programs to succeed, more emphasis on ownership should be placed on the PM position. Doing so forces PMs to lead and be held accountable to make critical decisions instead of relying on process oversight and direction from their superiors. This echoes the findings described by Stamp (2007), Hurley (2006), Kim and Mauborgne (2003) when assessing trust in organizations. The concept of ownership and buy-in was a major theme for Subject A and Subject B (addressed in the following section), as later in the interview, when discussing challenges in the acquisition processes, Subject A suggested that often during new-start programs there are “many opportunities to find someone to take ownership.”

Digging deeper into the concept of ownership, the team pressed Subject A to elaborate. Subject A stated that communication, initiative taking, and teaming align to create incentives to cultivate PM buy-in, ultimately leading to better decision-making. In his research, Stamp calls it being in balance or in flow. Subject A suggests that when trust is communicated and demonstrated to PMs, they are more likely to feel empowered to take

ownership of their program. The empowerment comes from the PM and their team members having discretionary trust of the program and the relationship built through communication. When asked if they felt empowered in their role, Subject A said that the program office leadership believed strongly in holding PMs accountable. The direction at the local level is to follow the law, but they are encouraged to push the envelope when constrained by rules and regulations, so long as “no one is getting fired, and no one goes to jail.”

2. Interview Summary—Subject B

Subject B is an ACAT Level I PM with over 30 years of acquisition experience in both the military and civil service spectrums. Subject B was interviewed twice, both face-to-face and over the telephone. The second interview was conducted to clarify and amplify information collected during the first. During decision-making, data analysis reveals that Subject B focused on three major categories: motive, relationships, and risk.

a. Motive and Risk

The prevalent focus for Subject B was incentives and motives. Subject B spent a significant portion of the interview discussing incentives and rewards in decision-making. Subject B explained that bad performance in program offices starts with bad incentives, clarifying that many PMs placed in program offices do not have the motivation to lead successful programs due to the rules and policies that are in place. Subject B feels that policies and guidelines that program offices must follow constricts the program teams from creating and exploring new innovative methods to lead programs. For instance, if a PM delivers a marginally effective product on time and on budget, the PM may be rewarded for his or her ability to manage schedule and cost. Conversely, another PM may overrun cost and schedule to deliver a more capable product and be scrutinized. As Subject B stated,

There might be a compelling rationale for why someone needs a little more time. There might be a good reason why overhead associated with artifacts and documents for the staff are essentially meaningless, and we should not be engaged in, because it doesn't add value to the product.

Subject B described the second dilemma as a “decision-making box.” Stamp (2007), in his research, calls this “prescriptive trust” or a lack of trade-space in decision-making.

Taken further, Subject B described Stamp’s box in terms of trust or risk, suggesting, “These policies and guidelines constrict the program managers and how they perceive risk.” Imposing constraints on PMs incentivizes them to remain in a trust safe zone for decision-making, where decisions made outside of that safe zone incur risk. Subject B explained that when PMs are not incentivized, they become complacent and comfortable with the “don’t rock the boat” concept. This suggests that instead of challenging potential constraints imposed through rules and guidelines, PMs avoid mistakes and risk-taking by relying on safe decisions. Viewed through literature, perhaps this risk avoidance behavior is rooted in sensemaking or NDM, as PMs associate risk with failure through learned experiences.

b. Relationships

Understanding the framework through which Subject B views the acquisition environment, the team inquired about potential strategies used to navigate such a chaotic environment, or perhaps why some programs are more successful than others given similar situations. Their response suggests that Subject B utilizes trust and expectation setting, as discussed by Hurley (2006) and Stamp (2007), in relationship-building techniques. Subject B suggests,

Program managers have to take responsibility for their programs and be rewarded for improvement not stagnation. These same program managers have to also build a culture in these programs through their leadership to take an honest approach at their programs they are in.

Subject B explained that experience has taught them the importance of communication between all stakeholders. For their team, Subject B establishes metrics to gauge and track the perceptions and satisfaction of the customer and the relationship with suppliers. While not qualitatively realistic, Subject B is implementing methods described by Sun (2018) and Klein (2013) to intuitively gauge performance through qualitative measures. Additionally, through setting and enforcing expectations with the customer, supplier, and project team,

Subject B is demonstrating trust and organizational decision-making techniques described by Stamp (2007), Hurley (2006), and Kim and Mauborgne (2003).

When asked to offer an experience with a complex, chaotic program, Subject B described an experience where their team was tasked to develop a \$1.5 million software capability. The project faced several challenges early in the development process, ultimately driving the program over budget and over schedule. Prior to project completion, the customer abruptly canceled the program and sourced the capability from a commercial vendor. While the commercial product did not meet all of the customers' needs, the basic capability was sufficient to justify canceling the program. In reflection, Subject B described their failure to recognize the competitor's technological advances. Rather than criticize the team for their failure, Subject B took ownership of the cancelation and then sat with each team member to analyze where they could have identified and predicted potential danger. Subject B conveyed that in following that process, they communicated trust and respect to the team, aided in team development, and, in the end, increased team cohesion.

E. CHAPTER SUMMARY

The two interviews and associated data identified during the coding process support findings in literature that sensemaking, NDM, trust, and the organizational environment affect PM decision-making. The data revealed interesting results to this research team. The team anticipated that the subjects would discuss more about how their experiences and training influenced their decision-making; therefore, it was interesting to find out otherwise. As expected, both of the subjects discussed bureaucratic processes, policy, oversight, and control as elements affecting their decision-making. It was unexpected, however, to uncover the level of impact that relationships, trust, and use of incentives were used during the management of their programs. The next chapter synthesizes the data to hypothesize and offer theories on the findings.

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IV. ANALYSIS

A. CHAPTER OVERVIEW

Utilizing data from the previous chapter, this chapter offers our analysis of the various factors affecting a PM's ability to make decisions. Several conclusions were generated based on coded information. As is explained here, the categories most affecting the PM decision-making are process, culture, and risk, while relationships and motive were revealed as management techniques to navigate the environment. To conclude, this chapter also offers two hypotheses and theories concerning the defense acquisition environment.

B. ANALYSIS OF FINDINGS

Analysis of the data provided good insight into how current PMs view the acquisition environment. The data suggests that the leading cause affecting PM decision-making is the restrictions imposed through processes and oversight within the acquisition environment. This is identified in the two leading categories of process and culture, as was anticipated from the research from organizational decision-making. Data from organizational decision-making shows a positive correlation between organizational maturity and process maturity. Years of acquisition reform highlighted in Chapter I have aided in process maturity within the DoD. Although well intentioned, however, reform efforts to improve oversight, reduce risk, and aid cost control may actually drive negative, unintended consequences. During the interviews, both PMs discussed the challenges caused by these layers of bureaucracy, describing them as little value added to their programs.

C. HYPOTHESIS AND THEORY

Over time, these restrictions create a culture of risk avoidance, decision safety, program inefficiency, and lack of ownership buy-in within the acquisition culture. This is identified in the fourth-highest coded category, risk. From the literature, risk may be an element that spans across sensemaking, NDM, and trust, depending on how it is manifested. Process and oversight as discussed by Hurley (2006), Stamp (2007), and Sun

2018 may demonstrate a lack of trust in PM decision-making by imposing trade space between acquisition policy and acquisition law.

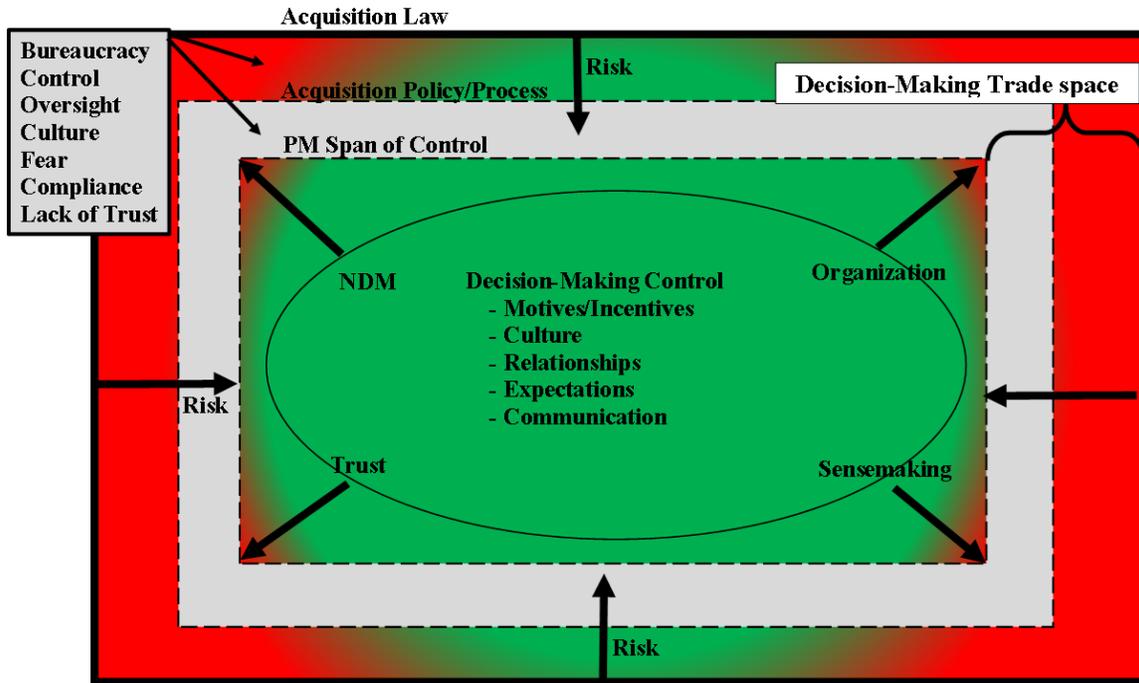


Figure 10. Depiction of the Acquisition Environment

PM decision-making is bounded in defense acquisitions by law. Shown in Figure 10 as the outermost black box. Decisions made within the box, may be done with some latitude. As highlighted in Chapter 1, when defense acquisition programs fail, layers of implemented defense acquisition reform, policy, and process control are implemented, restricting decision-making trade space in an effort to avoid and prevent risk. However, these external pressures unintentionally create a decision-making box as described by Stamp (2007) and discussed by Subject B. PMs are incentivized to make decisions within “safety” of the box, depicted in Figure 10 with the green shaded area. Decisions made outside the box incur risk, and therefore PMs are disincentivized from doing so. The perpetuation of risk avoidance occurs as PMs develop within defense acquisitions, causing many to become reluctant to take risks due to past experiences in similar situations (NDM)

or blunt potential framing abilities (sensemaking). One can conclude that this breeds inefficiencies, stifles innovation, and promotes lack of trust within the culture.

The data also suggests that due to process oversight, PMs utilize interpersonal methods of management and decision-making as a method of control within their sphere of influence. This is most evident in the motive and relationship categories, as both PMs described this phenomenon during their interviews. Subject A described a necessity to proactively over-communicate in an effort to preempt any unforeseen distraction or derailment of their efforts. Some call this expectation management or expectation setting. Within NDM, expectations may be external to the organization, while in organizational decision-making, expectation setting is conducted in an effort to build internal trust. Subject B described utilizing empowerment and incentives in an effort to gain buy-in and drive innovation, or as Stamp describes, “in flow.” When asked, both Subject A and Subject B suggested that their experiences played a key role in their understanding of the environment and approach to managing their programs. Motive and relationships tie back to Klein and NDM through trust, respect, and experience, as it is an “expression of experience as people build up patterns that enable them to rapidly size up situations and make rapid decisions without having to compare options” (Klein, 2013, p. 164). Therefore, we offer the following hypotheses and theories. While understandingly simplistic to grasp and intuitive in approach, they warrant deeper understanding and further research to better understand their impacts.

- **Hypothesis:** PM decision-making is heavily dependent on the experience and culture of the program office.
- **Theory**

With restrictions in place on program offices by regulations and policies, PMs combat the limitations by shifting the culture of their office to better fit their objectives and views. As explained by both subjects, the culture in their office is more open and based on mutual trust and communication with team members. This contradicts the personal experience the subjects have had with other offices stating that the previous offices were restrictive, with too much oversight that stifled the program team’s production and

ingenuity. As explained by Subject A, there is too much process control and approvals that a PM needs to go through for the program to move forward, regardless if the approvals affect the program or not:

I think it's probably just a process. I think there's a definite lack of trust, you know, from the bureaucracy because, to me, it's the message of 5000.2 and everything else is—as I told you all before, to me, you only give accountability to the PO and the PM and get out of the way. But they seemed to have an overall lack of trust because you gotta come in at various milestones. How are you doing? Come back again with, you know, a boatload of documents for approval. It doesn't seem like that was really directly affect[ing] your program, but you have to go through the gauntlet for approval nonetheless.

To shape the culture of the office and avoid the type of restrictions placed on the office from policies, the PMs have given leniency to the processes conducted by team members, as well as asked individuals for their own input and perception of the tasks. As quoted by Subject A, a baseline expectation for the program must be met and understood by all team members for this type of unrestricted culture to flourish. Both Subject A and B come to their team with the expectations that each individual will get their own work done with no or as little oversight as possible. Subject A said,

I'm expecting you (project team) to do it without a lot of management. So, there's a trust there, right, because you could just sit back, but things won't be getting done, and eventually that'll come to a head. But I'm not gonna sit there and necessarily direct every step of the way and write your musical notes for you. So, we have an overall type of music that we're thinking about from a higher level, right.

Of all the elements that make a culture these PMs created, one of the most important is the experience of the team members. The experience in programs and tasks similar to the ones in their current program face allow the team members to modify or fall back on past methods. This experience allows the PMs to have the level of open trust that requires less oversight, control, and policy restrictions. Subject A stated,

I'd say I definitely rely a lot on experience, but I rely on the organization because I frequently tell everyone that if I'm in the room and the only one talking, that's a bad thing. I really want others to bring in their views and opinions of which way we think this should go because there's always many different ways. So, even though I'm fortunate and I have a lot of experience,

sometimes I can—you know, I can see that, well, this probably should go this way, but I try to bring in the organization to let them come up and, you know, make that recommendation on which way to go.

The culture created by each team member's past experiences allows the program team to attempt other processes that could be more beneficial to the program as a whole. This culture created reflects a hybrid method between sensemaking and NDM method.

Sensemaking is the application of tacit knowledge, experience, and intuition of a given situation, whereas NDM is based on the concept of similar past experiences that the individual uses for quick, decisive choices based on the limited knowledge available at the time. Both of these methods describe the culture created by the using experience, and other personal factors not easily quantified. This fits the new culture and methodology that the two subjects use in their offices to create an office that is both effective and productive. PMs use a hybrid approach of these two decision-making methods for their program offices, because of the bureaucracy that limit them. For PMs in high visibility programs to make critical decisions, the hybrid decision method provides the key experience, knowledge, and instinct for programs to be successful.

- **Hypothesis:** Highly regulated environments restrict decision-making trade space, causing PMs to utilize relational and motive-based methods to manage programs.
- **Theory**

As discussed in the introduction, defense acquisition reform efforts instituted over the last 50 years created a heavily regulated environment. The policy, oversight, and bureaucracy growth eroded trust and constricted trade space for PM decision-making. As a result, the culture in defense acquisitions program management has transformed into one that disincentivizes efficient decision-making, leading to program inefficiencies and cost expansion, thereby negating the improvements anticipated by the reform effort. Evidence collected through our interviews and literature review supports this theory.

Subject A and Subject B talked extensively about the acquisition process and its inefficiencies. Supported in organizational decision-making and trust literature, this

suggests that there is a lack of trust in the external culture between major defense acquisition oversight and the PM. Additionally, both PMs highlighted the importance of instituting trust and international methods to manage programs within their span of control. In the end, the data analysis really reveals two differing cultures within defense acquisitions, the first being the external environment, defined by processes, control, policy, and oversight. The second is the internal environment, defined by relationships, trust, and incentives. It is in the internal environment where PMs have most control. This was most evident to the team during the second round of interviews. When asked if the PMs felt empowered, both affirmed trust and empowerment at the local levels. The conclusion is that these two cultures, as shown in Figure 10, work in opposition to each other. The external restricts PM decision-making and the internal—utilizing NDM, sensemaking, and organizations of trust—pushes back in an effort to gain back lost trade space. The resulting friction between the external and internal environments prevents the defense acquisition organization from operating in flow.

D. CHAPTER SUMMARY

This chapter provided analysis of the data gathered for this limited research project. It highlighted how the five categories of processes, culture, relationships, motives, and risk affect PMs in the defense acquisition environment. The chapter concluded by introducing two hypotheses. The first claims that decision-making is heavily dependent on a PM's level of experience and the culture around them. The second claims that regulated environments restrict decision-making, causing PMs to compensate with interrelation management and decision-making techniques. The last chapter concludes the research and offers recommendations for further study.

V. CONCLUSION

A. SUMMARY OF RESEARCH

The purpose of this research was to seek a better understanding of why PMs in high visibility programs make decisions and take action during critical program milestones. The research also identified root causes and outlying factors that influence PM decision-making in pursuit of their specific course of action. From our results and data pulled from both interviewees, our team identified five categories that influence PMs' decision-making: motive, culture, process, relationship, and risk. Our hypotheses suggest that a combination of both culture and regulated environments shape and greatly influence the critical milestone decisions for a PM. Further understanding of the five categories and the outliers behind PMs' decisions can guide future DoD acquisition programs to become more successful in the eyes of the customer and the DoD.

B. RECOMMENDATION

This project was designed to be limited in scope due to the time allotted for completion. Therefore, the first recommendation for continued research into decision-making methodology of PMs during critical program milestones is warranted in an effort to build statically significant data for a more thorough analysis. Additional data will help identify these root causes and outlying factors that influence the PM's decision-making in their programs. The information provided by this team's two interviewees sheds light into the methodology of their decision-making process; however, the more interviews and individuals participating in the research can provide further data and help expand upon the data provided in this thesis and others similar to the purpose. Additional recommendations include a comparative analysis of PM decision-making over time to determine how decision-making evolves throughout an individual's growth in DoD acquisition. The potential growth and change from one type of decision-making method to another throughout PMs' time in DoD acquisition will help shed insight on how different experiences, programs, and other outliers can potentially shape PMs' decision-making before they become leaders of ACAT I level programs.

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