



**Using Advanced Data Analytics to Transform the
Aviation and Missile Command Financial Community
into a Data-Centric Enterprise**

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Abstract

Data analysis, or the process of understanding data (to include Big Data) is challenging every aspect of business today. Big Data involves large volumes of structured and unstructured data. Data analysis is growing at such a rapid pace, leaving many organizations behind. The ability to keep up with this exponential growth is important for competitive advantage and survival. Not only are private industries affected by the demands of understanding data, but the United States (U.S.) Federal Government is also under scrutiny. Pressure was placed on agencies to get connected and involved with data analysis immediately. As a result, the federal government published a Federal Data Strategy in 2020 and an update in 2021 calling all federal agencies to get on board with conducting data analysis. As a result, this study is to understand how leveraging data analytical tools can assist with optimizing financial resource allocations for effective management of Operation and Maintenance - Army (OMA) funding for the Aviation and Missile Command (AMCOM) G-8 Resource Management Directorate. AMCOM G-8 has made great strides in accomplishing the goals of the federal strategy by developing an AMCOM G-8 Resource Management Analytics Academy (AA) Data Analytics Certification Program for its employees. However, a critical element may be missing with effectively deploying these data analysis tools to AMCOMs Resource Management community. This research will take a closer look at what industry is doing as it relates to data analysis and compare their efforts to those of AMCOM G-8 to determine what other opportunities may exist for the Command.

Chapter 1 - Introduction

“When searching for the solution, step away from the problem. You cannot solve a problem in the same frequency in which it was created.” ~Lynn Grabhorn

Background

The scope of this research paper is to explore how advanced data analytical tools can be used within the United States (U.S.) Aviation and Missile Command (AMCOM) financial management community to optimize financial resource allocations and to make informed financial decisions. AMCOM is a Department of Defense Major Subordinate Command (MSC) governed and led by the U.S. Army Materiel Command (AMC), one of four Army Commands (U.S. Army Materiel Command, 2019). AMC is charged with providing global materiel readiness solutions for the Army by managing its supply chain, logistics, and sustainment activities. As a MSC assisting in accomplishing AMC's goal, AMCOM's mission is to provide readiness to the warfighter (i.e. soldier) by developing and quickly delivering aviation and missile parts; and calibrated materiel (U.S. Army Aviation & Missile Command, n.d.)

Due to a drastically changing environment, the Army is facing an internal battle of diminishing resources (Data Lab, 2021). Currently, the U.S. is facing a \$3 trillion budget deficit that continues to climb as the U.S. Army faces the uncertainties surrounding an enemy we were unprepared for, a global pandemic. The Covid-19 continues to ravage through our land with no end in sight. However, prior to this environment, the U.S. was facing budget uncertainties (Data Lab, 2021). It has become a normal course of business for AMCOM to begin each fiscal year (FY) without an appropriation (U.S. Army Materiel Command, 2019). An appropriation is a congressional law that gives agencies authority to spend funds out of the U.S. Treasury account. The Federal Government operates its financials on a fiscal year basis that commences 1 October

and concludes 30 September. AMCOM mainly manages from three of the five major Department of Defense (DoD) appropriations. The five major appropriations includes: (a) Research, Development, Test and Evaluation (RDT&E), (b) Procurement, (c) Operation and Maintenance, (d) Military Personnel (MILPERS), and Military Construction (MILCON). For the purpose of this paper, we will only focus on Operations and Maintenance – Army (OMA) funding.

AMCOM executes OMA funding in support of recruiting, organizing, equipping and training of soldiers and equipment sustainment (U.S. Army Materiel Command, 2019).

Congress is in charge of passing an annual appropriation act that essentially sets the budget for the upcoming fiscal year (Field, 2021). When the new Defense Appropriation Act is not passed prior to the fiscal year beginning, Congress must pass a Continuing Resolution Authority (CRA) to avoid shutting down the government. A CRA restricts any and all new program starts, provides ongoing spending authority for a specific period, and requires agencies to operate under specified limits until the new fiscal year appropriation is passed (Field, 2021). Due to budgetary constraints, AMCs appropriation has been drastically declining each fiscal year; which directly affects AMCOMs funding capacity (U.S. Army Materiel Command, 2019). As a result of declining resources during the year of execution, AMC has become more strategic in the management of its financial portfolio. In addition to AMCOM, AMCs enterprise consists of nine additional MSCs as shown in Appendix A; all of which have stock in this OMA portfolio. Therefore, AMC continually tries to determine ways to optimally allocate its resources to the various Commands (U.S. Army Materiel Command, 2019). Optimizing allocations is the process in which limited financial resources are effectively distributed to provide commanders with the greatest buying power (The Assistant Secretary of the Army (Financial Magement & Comptroller), n.d.). As a result in FY18 (e.g. 1 Oct 2017 thru 30 Sept 2018), AMC established an

initiative called Command Accountability and Execution Reporting (CAER) program under the direction of the Secretary of the Army (SecArmy). CAER is a fiscal stewardship program of assessing each commands financial health with regards to their OMA funding. According to the Assistant Secretary of the Army for Financial Management and Comptroller (ASA(FM&C) n.d.),

We are changing the Finance and Comptroller culture from one of executing budgets to one of optimizing commander purchasing power and enabling mission readiness while driving modernization analytics across the enterprise and subordinate echelons to more effectively inform senior leaders and teams across all levels. (para. 3)

The CAER program metrics include assessing each Command using nine Key Performance Indicators (Department of the Army, 2018). However, the main focus of CAER covers three financial areas: (a) de-obligation of OMA funds in the year of appropriation, before it expires; (b) under-execution of OMA funds in the year of the approved appropriation, which degrades the Army's buying power once funds expire; and (c) uncollected reimbursable funding (referred to as UFCO – Unfilled Customer Orders) that has not been collected from customers to pay for current year bills (e.g. funds payroll expenditures). Therefore, in order to prevent and/or limit the decrements to its annual appropriations; AMCOM is diligently seeking the assistance of better data analysis to fully understand how well funding is disbursed through program statuses and identifying data integrity issues (Smith & Dempsey, 2020).

Statement of Purpose

The purpose of this study is to understand how leveraging data analytical tools can assist with optimizing financial management of Operation and Maintenance - Army (OMA) funding for the Aviation and Missile Command (AMCOM) G-8 Resource Management Directorate.

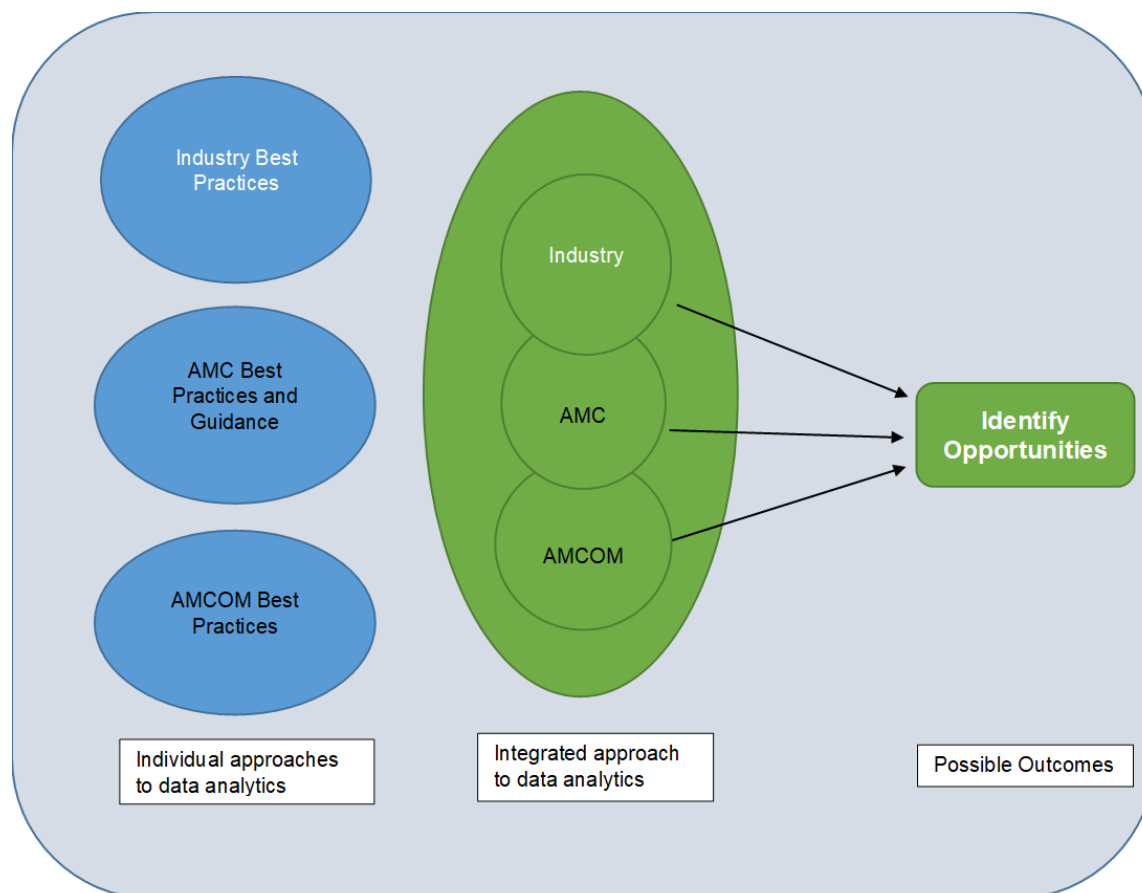
Research Questions

To fully understand the many facets of data analysis and how various tools can be effectively deployed at AMCOM, the following questions must be assessed:

1. What is Data Analytics? What is Big Data?
2. Why are Data Analytics and Big Data important to improving financial management?
3. How receptive is AMCOM G-8 to take full advantage of these data analytical tools to optimize its' financial management processes?
4. How can AMCOM G-8 use change methods to institutionalize data analytics tools within the Resource Management Directorate's day-to-day operations?

Conceptual Framework

Figure 1 – Research Conceptual Framework



Significance of This Research

Data analysis is a significant topic for not only the Army community, but the Federal Government as a whole. Leveraging data analytics was written as part of the March 2018 President's Management Agenda (PMA). As a result of this new agenda item, the first Federal Data Strategy (FDS) was established as an enterprise solution to fulfill their Cross-Agency Priority Goal: *Leveraging Data as a Strategy Asset* (Federal Data Strategy Development Team, 2020). To accomplish this goal, a FDS development team was organized consisting of 50 staffers from across the Federal Government. This integrated team worked to develop a suitable action plan from June 2018 to August 2019. As a result, the "Federal Data Strategy 2020 Action Plan" was codified. According to the Federal Data Strategy Development Team (2020):

The use of data is transforming the economy, government, and society. If the Federal Government does not maintain its role as a preeminent supplier and sophisticated and ethical user of data, it will no longer be able to fulfill its civic duty to the public. While the Federal Government leads globally in many instances in developing and providing data about the United States and the world, it lacks a robust, integrated approach to using data to deliver on mission, serve the public, and steward resources (p. 11)

When we give consideration towards the FDS Cross-Agency Priority Goals and along with the SecArmy's CAER initiative; this is why it is important for AMCOM to invest in its data analysis processes. Since CAER was originated, AMCOM has made some great strides with initiating the usage of data analysis tools. In FY19, the first full year under CAER directives, AMCOM successfully reduced the first expired year de-obligations by \$18M and UFCOs by 24% (Smith & Dempsey, 2020). Historically, this has never been achieved and AMCOM would not have been able to accomplish these metrics without attempting to utilize advanced data analysis

tools and/or methods. Initially, AMCOM created a De-obligation Dashboard to help track prior year de-obligations and the Outbound Military Interdepartmental Purchase Request (MIPR) Tool to assist with analyzing the performance of projects/programs by focusing mainly on disbursement trends. However, these methods were deployed by truncating advanced excel capabilities which depended on large data extractions and advanced formulas. Both tools were produced in-house (Smith & Dempsey, 2020).

Even with these initiatives at the forefront of how AMCOM currently does business, AMCOM was still assessed a \$31M mid-year decrement in FY21 (the third budget cut of the year), of which \$8.7M was due to prior year excessive de-obligations (Freese, 2020). The Army had ~\$6B in Unfunded Requirements (UFRs), basically requirements without funding, but only recognized ~\$4B in financial resources (Freese, 2020). As time passed, the amount of resources available internally changes as Commands execute their funds. During the mid-year processes, AMC decided to offer up \$411M back to the Army to assist with the UFRs, which resulted in the MSCs being cut 2.7% from their OMA appropriation (Freese, 2020). However, that percentage increased to a 3% cut that included a de-obligation tax to the Commands. The de-obligation tax was based on an average of de-obligations for the last 2 years incurred by the individual Commands. For AMCOM, this resulted in the \$31M OMA decrement. The 3% equated to \$22.3M mid-year assessment and the remaining \$8.7M was the result of the de-obligation tax assessment. Total decrement assessed to the MSCs was approximately \$500M. With resources declining due to regular and recurring overall Army unfunded bills and other requirements; optimizing resources continues to be very important (Field, 2021). Therefore, AMCOM has to incorporate the best data analytical strategies to help them solve and/or rectify CAER concerns to make every dollar

received usable in the most advantageous manner possible (The Assistant Secretary of the Army (Financial Management & Comptroller), n.d.).

Overview of the Research Methodology

In keeping with the conceptual framework depicted in Figure 1, the research seeks to compare the data analytical advancements made in industry with AMC's best practices and directions given to their MSCs along with practices utilized at AMCOM to identify opportunities for improvements. This will be accomplished through reviewing published Operation Orders (OPORDs), Command Policies (CPs), other Army directives/memorandums, and industry trends along with collecting other data analytical processes adopted by AMC to assist with determining possible data advancement opportunities for AMCOM G-8 to consider.

Limitations of the Study

Several limitations have been identified that may hinder the inclusion of all relevant factors surrounding this research topic. Due to a limited timeframe to conduct this study, advances in this research may be hindered. Additionally, the researcher is not authorized to conduct primary research such as interviews, surveys, or research studies. As such, this study will rely on secondary research in the form of observations made by other researchers in the data analysis field and discovered in the literature review process. Another limitation involves the limited research area. The defined area of research is constrained to one organization, the Aviation and Missile Command G-8 Resource Management Directorate.

Summary

The overarching topic for this research paper is to reveal how data analysis is currently being deployed in industry and other government agencies and to explore ways AMCOM G-8 can leverage these capabilities to optimize its financial management processes. Through this

paper an understanding of the various facets of data analysis will be uncovered along with their benefits.

Chapter 2 – Literature Review

Introduction

The literature review for this research paper explores how data analysis is handled and what advanced data tools are currently within industry; and compare those advances to the tools available and data processes currently within AMCOM G-8. This review will also express why data or data analytics is important to the survival of organizations in today's digital and interconnected society, the varying benefits of deploying such processes for any industry, and how to make it valuable for business. This review will also include the pitfalls of utilizing data analytic procedures without properly laying out the foundation through managing culture changes, training, and employing the correct skill sets and/or appropriate blend of expertise. The literature reviewed consists of journal publications and books; and a host of government documents such as guidance memorandums, policies and procedures, presentations, etc.

Statement of Purpose

The purpose of this study is to understand how leveraging data analytical tools can assist with optimizing financial management of Operation and Maintenance - Army (OMA) funding for the Aviation and Missile Command (AMCOM) G-8 Resource Management Directorate.

Data Analysis

First, let's explore what data analytics is and the different characteristics of analyzing data. Data Analytics consists of a variety of multi-faceted processes and techniques that create valuable insights of information for stakeholders to make informed decisions (Fitz, Hauer III, & Steinhoff, 2015; Sims & Sossei, 2012). Herden (2020) says data analytics consists of not only data, but facts and reasonable estimations that can solve business problems. The handling of data has become increasingly important. "The 2012 World Economic Forum declared data an economic asset, like

currency or gold. Facing long-term fiscal sustainability shortfalls; government must fully leverage all its assets, including vast untapped data resources” (Fitz et al., p. 41). As time goes on, many other companies have started to view data as one of their strategic assets (Kiron, Kirk, & Boucher, 2014). But what data is and is not is still up for debate. According to Herden (2020),

A vague distinction of Analytics is being focused on decision support in business processes, business intelligence being either an overarching term or the provision of information, big data being a technological advancement, and data science being advanced models and algorithms, but this distinction cannot be applied consistently and each concept draws from or depends on the others. (p. 172)

Big Data

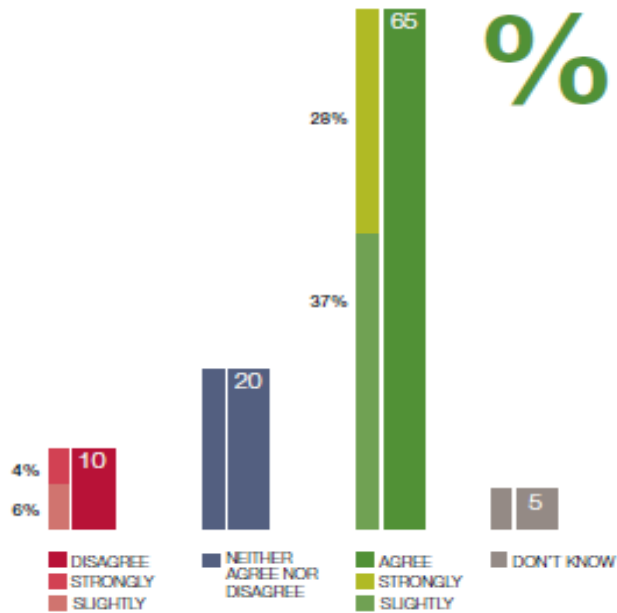
A new powerful industry of data analytics emerged into what is referred to as Big Data (Beer, 2018). It consists of massive volumes of structured, semi-structured, and unstructured data that goes far beyond the level of data organizations are traditionally used to handling (Fitz, Hauer III, & Steinhoff, 2015). Note that data is diverse in nature, meaning it is not easily understood by all; therefore, it has to fit with people and organizations in order to be beneficial (Herden, 2020). It is not one size fits all (Fitz et al.). According to Capgemini (2015), “Big data is increasingly about business disruption” (p. 6). Big data is considered disruptive because it changes the business process. The traditional boundaries are no longer ‘visible,’ instead the data territory is limitless (Capgemini, 2015). Trying to discover something significant or comprehensive to say about this mass level of data calls for the next generation of analytics (Beer, 2018). Therefore, the goal or outcome should be made clear. Organization leaders and their staffs should understand their operations for the outcome of big data analysis to be beneficial. “We will need ways to slice and

dice data differently, sort it differently, see and communicate it differently” (Glenn, Hill, & Wetklow, 2018-19, p. 46).

Industry Applications

The world is fast-moving, digital, and complex with a lot of connections (Capgemini, 2015). Therefore, analyzing data is increasing more and more across business sectors (Glenn, Hill, & Wetklow, 2018-19; Herden, 2020). “Analytics creates knowledge, makes it usable, and benefits from it” (Herden, 2020, p. 172), which results in creating this competitive advantage. It is transforming the way companies do business. The size of the data being analyzed is irrelevant. What is most important is to understand that without the tools to effectively manage the data, data can determine the survivability of an organization (Capgemini, 2015; Herden, 2020). It is no longer a matter of “if” but “when” to move into this data environment. Without doing so, will be the demise of an organization and it can be seen in Figure 2 how many are starting to embrace this truth (Capgemini, 2015). Capgemini conducted quantitative online surveys and qualitative interviews across several industries in 10 countries to capture rather or not companies were beginning to understand their future outlook without embracing Big Data. The results are below.

Figure 2. If We Do Not Embrace Big Data We Risk Becoming Irrelevant/Uncompetitive (Capgemini, 2015)



Decision Making. Organizations are being called to move from the “backroom to the boardroom” by creating an environment that is able to have the right data available at the right time to inform decisions (Fitz, Hauer III, & Steinhoff, 2015, p. 42; Glenn, Hill, & Wetklow, 2018-19, p. 43). And over time, this perspective is shifting dramatically. According to Capgemini (2015),

Businesses have been realizing that big data is more than a “nice to have”. It is critical to surviving and prospering in an increasingly digital world. As the findings of this study reflect, big data can be utilized to drive productivity, enhance existing revenue, and even create entire new lines of business, based on new business models. (p. 5)

The ability of stakeholders to make quality decisions relies on being able to make valuable insights. The insights give stakeholders the ability to connect the dots and to see the bigger

picture (Fitz et al., 2015). The leaders within organizations will still rely on their ability to use their industry experiences and intuition; however, with the use of data analytics, they will be more fact-based and easily explainable. The art of the possible displayed in Figure 3, depicts the evolution of the decision making process as organizations becoming increasingly sophisticated with its understanding and processing of data to a level that was not previously possible (Glenn, Hill, & Wetklow, 2018-19). With this new competitive advantage, businesses are able to improve their performance due to the insights revealed (Capgemini, 2015).

Figure 3. Data Visualization Enhances Analysis (Glenn, Hill, & Wetklow, 2018-19)



Cost Savings. In addition to providing competitive advantage, many companies have begun to realize the cost benefits of generating these data insights. Capgemini (2015) identifies four opportunities in which data insights can change businesses for the better: (a) cost savings, (b) exponential business growth, (c) new business streams of income, and (d) market disruption as a result of these new revenue streams. However, due to the characteristics of the main player (e.g.

federal government), this research will focus on the cost savings aspect. Cost management is important and drastically improved through advanced data visualizations as it allows organizations to compare prices of the vendors in their surrounding areas (Fitz, Hauer III, & Steinhoff, 2015). Companies can also catch people in the act as it relates to fraudulent activities taking place; as well as catching a machine failure before it shuts down (Capgemini, 2015).

Government Revelations

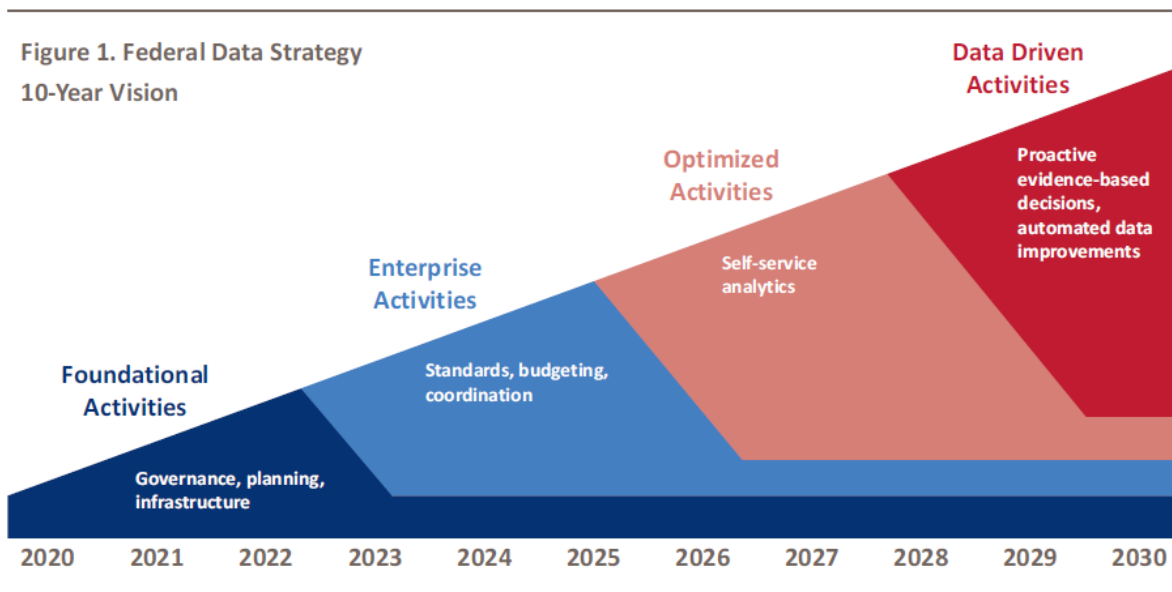
Contrary to popular beliefs, data analytics is not new to the federal government. According to Fitz, Hauer III, & Steinhoff (2015), “Data analytics already play an important role in government. In some areas, government leads, such as in the development of high-powered analytic approaches by the intelligence, defense and homeland security communities to protect the U.S. from domestic and foreign threats” (p. 43). Examples provided are the U.S. Navy’s use of analytic tools to reduce flight costs, the U.S. Coast Guard’s use to assess mission readiness, and the Social Security Administration’s use of data models to understand disability payment continuation models calculated in seconds (Fitz et al., 2015). Even with this level of activity, many government leaders still do not have a clear understanding of its importance and therefore, many are not champions of these processes (Sims & Sossei, 2012). Just as many industries, some government leaders are beginning to come to the realization of the demand for better analytics (Kiron, Kirk, & Boucher, 2014). The interesting thing is that many advanced technologies already exist to transform financial management; however, it is not widespread in use (Glenn, Hill, & Wetklow, 2018-19; Sims & Sossei, 2012).

While conducting this research, a new Federal Data Strategy was released. This strategy provides additional guidance for achieving advanced government data through lessons learned

from the original strategy as well as providing an incremental maturity ladder (see Figure 4) that comprises the following activities to achieve the 2030 complete data vision:

Foundational activities of governance, planning, and infrastructure (~2020-2022), to Enterprise activities of standards, budgeting, and coordination (~2023-2025), to Optimized activities of self-service analytics (~2026-2028), and finally, to Data-Driven activities of proactive evidence-based decisions and automated data improvements (~2029 and forward). (Federal Data Strategy Development Team, 2021, p. 1)

Figure 4. Federal Data Strategy 10-Year Vision (Federal Data Strategy Development Team, 2021)



Agencies are encouraged to use this framework with the understanding that flexibility is allowed and expected depending on the organization's current positions and abilities. This is explicitly expressed within the strategy,

Some agencies (or their components) may be further along the ladder in 2021, and many federal programs and offices are actively engaging in Data-Driven activities today. Agencies that can make progress more quickly than outlined in the strategy are encouraged to continue promoting enhancement opportunities. The goal of the FDS, however, is to

ensure that these activities do not happen in an ad hoc way, but rather are integrated into agency culture and become standard practice across all federal government programs. (Federal Data Strategy Development Team, 2021, p. 2)

One important facet revealed within the lessons learned from the 2020 FDS strategy, surrounds the knowledge of existing capabilities. The new strategy requires agencies to conduct assessments to explore existing capabilities. The assessments will produce meaningful improvements to the things already being deployed within the organizations. AMCOM deployed a survey in October of 2021, also during the course of this research. This survey will provide insights into potential gaps in skills, training, and access to data analytical tools for the analysts (MG Todd Royar, 2021).

The government was challenged by the President's Management Agenda (PMA) to modernize how financial managers handle data across all agencies through compelling reforms (Federal Data Strategy Development Team, 2020, 2021; Glenn, Hill, & Wetklow, 2018-19). Even through this PMA, data is referred to and considered a strategic asset. The PMA documented a detailed process of effectively and efficiently managing and using data (these practices can be found in Appendix B). As a result of the President's Management Agenda, OMB prescribed a memorandum for executive departments and agencies giving instructions to be consistent with deploying the PMA within their respective jurisdictions (Office of Management and Budget, 2019). The main principle of this strategy is repeated within the memo and described as motivational guidelines of "Ethical Governance, Conscious Design, and Learning Culture". This message was further extrapolated by AMC through the Operation Order 21-139 to the Major Subordinate Commands (MSCs), which includes AMCOM, where this particular research derives (HQ, Army Materiel Command, 2021). Within this order, the situation at hand was described as:

The rapid advance of technology, complexity of modern Army systems and a resource-constrained environment demand the most advanced data systems and analytic capabilities to enable mission success. Decision makers need advanced analytics to help them keep pace with changing dynamics and to proactively set conditions for future success. AMC's analytic approach is plagued by latent or low quality data that require significant effort to produce the basic analysis needed to understand the current operating environment. AMC needs an analytically supported workforce to ensure data driven decisions become routine. (HQ, Army Materiel Command, 2021, p. 1)

Technological Investments. Agility is a prerequisite of creating a diverse data analytical environment (Capgemini, 2015). Agility is needed to address the many different data-driven scenarios faced by these government organizations. According to Capgemini (2015), to achieve this strategy, it must be backed up by reliable technology. This new domain of technology, referred to as digital transformation, includes using such things as social media and mobile devices to enhance customer experience by understanding all aspects of operations. Glenn, Hill, & Wetklow (2018-19) confirms that this rapidly changing technology environment is currently requiring every field of study to get on board especially those within financial management because it (data analytics) is currently having profound effects on governmental accounting.

Financial based analytical tools already exist; however, not very widespread as it is required or recommended. The full potential remains untapped at the local, state, and federal level of the government (Glenn, Hill, & Wetklow, 2018-19). The U.S. Treasury analyzed its common processes and estimated that up to 40% of their accounts payable and accounts receivable processes would benefit from being automated through robotic process automation tools. Robotic processing is a form of artificial intelligence that artificially replicates the

keystrokes made by a human operator to generate reports or tasks. Mechanizing routine reports or tasks is the process of getting work done faster with less errors; which frees up the employees to put efforts towards higher-value tasks such as decision making or strategic thinking (Glenn, Hill, & Wetklow, 2018-19).

Current Workforce. In addition to a solid platform, Capgemini (2015) reveals organizations must have the culture and expertise to use this technology. Sims & Sossei (2012) interviewed several federal government organizations that included; but not limited to, the U.S. Department of Agriculture, Food and Nutrition Service (FNS), the U.S. Department of Defense, Defense Finance and Accounting Service (DFAS), and the U.S. Postal Service, Office of Inspector General (USPS-OIG). A third of their respondents admitted that only a third of their agencies were implementing data analytics at the time. At that time, it was primarily due to not having the financial resources and appropriate staff combined with not knowing how to develop and deploy such analytical processes. However, this has changed dramatically for many organizations. Herden (2020) recognizes Logistics and Supply Chain Management (which is the main function of AMCOM), as an early adopter of using data analytics. Within the fields of logistics and supply chains; data analytics is used to optimize inventories, facilities, and transportation costs (Herden, 2020). But interestingly, even as an early adopter, it is stated that many organizations are still reluctant to use data analytics simply because of the lack of knowing how to achieve better results such as those being aggressively advertised and displayed (Herden, 2020). However, to achieve better results, it remains imperative that logistics and supply chain (to include financial management) communities make further improvements in their ability to analyze data due to their “complex, diverse, dispersed, and error-prone processes distributed across several business units, organizations, and decision makers” (Herden, 2020, p.165). Glenn,

Hill, & Wetklow (2018-19) adds that incorporating daily analytical tools to improve government financial management plays a crucial part in improving the government relations. Not only are the tools evolving but the role they play in the government continues to evolve, as well.

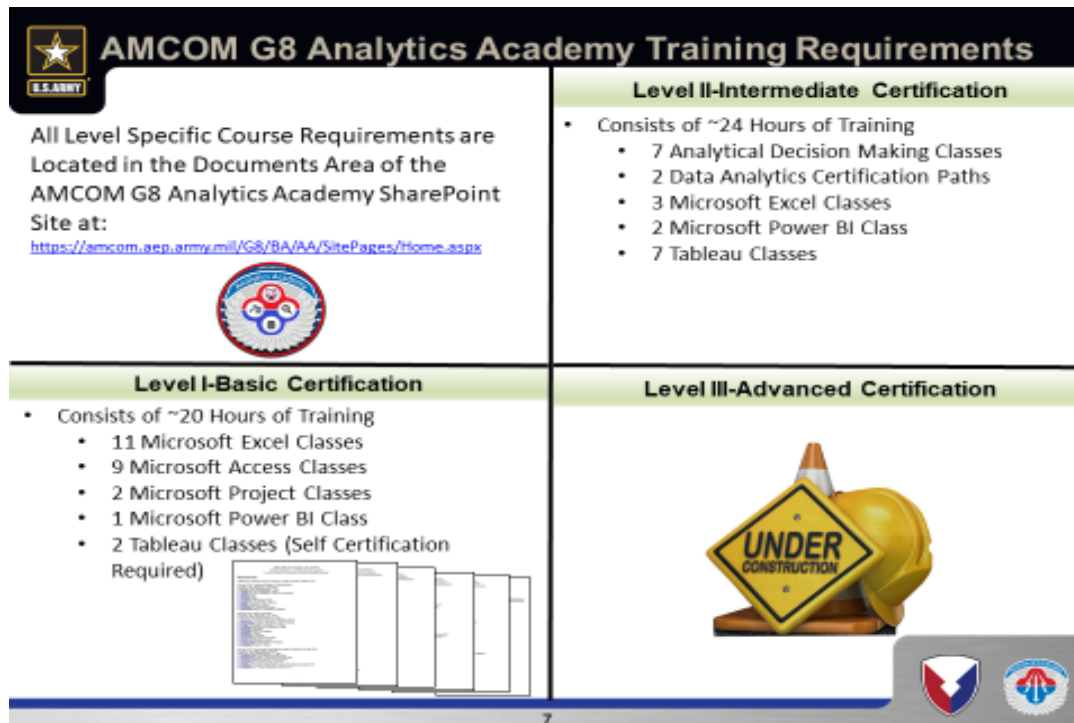
AMCOM's Data and Analytics Strategy was approved and signed by AMCOMs Commanding General on June 30, 2021 with his parting comment: "The full realization of the potential benefits of this strategy and the enabling capabilities will require leadership engagement at all levels to increase awareness, create understanding and support implementation" (AMCOM Data and Analytics Center, 2021, "Forward" para 4). Therefore, this strategy proved to be very timely. The strategy assisted in unveiling this critical piece of missing information that steered the direction of this research. As a result, change management and/or organizational development concepts are included to assist AMCOM with reaching their data analytics goals.

From reviewing the AMCOM Data Analytics Strategy and AMCOMs briefing given to the Senior Executive Service (SES) Resource Manager for AMC on 25 May 2021 in conjunction with the conversation with the Commands Data Analytics Officer, it is revealed that AMCOM is between the Foundational activities that include establishing the governance board, planning, and infrastructure and the Enterprise activities of standards, budgeting, and coordination (~2023-2025) (AMCOM Data and Analytics Center, 2021). The foundational activities are being carried out by the Data Analytics Officer while the Resource Manager for AMCOM has taken the initiative to spearhead the campaign for the enterprise level activities for the G-8 (resource management) community by standing up the G-8 Analytics Academy (AMCOM Data and Analytics Center, 2021; Smith, Ms. Freese Visit, 2021). See the basic framework in Figure 5 and the layout of training requirements in Figure 6.

Figure 5. G-8 Analytics Academy Framework (Smith, 2021)



Figure 6. AMCOM G-8 Analytics Academy Training Requirements (Smith, 2021)



AMCOM's Resource Manager designed this academy, not as a response to the department's data FDS, but in response to the Secretary of the Army's CAER initiative (Smith, Ms. Freese Visit, 2021). CAER is grading the financial books by aggressively reviewing de-obligations on prior year programs/contracts, disbursement rates on internal programs (i.e. MIPRs), and the quality of execution on the reimbursable programs within the Command (The Assistant Secretary of the Army (Financial Magement & Comptroller), n.d.). Developing the academy appears as if it was happenstance that such analytics would be mandated upon agencies through the department.

Gradually understanding the importance of data analytical tools, AMC and the MSCs (to include AMCOM) began to adopt such changes which was seen through current organization structures (HQ, Army Materiel Command, 2021). The organization structures are designed to encompass adding unique personnel such as data scientists and Operations Research/System Analysts (ORSAs) among resource managers (see Appendix C and D). However, currently many within these current structures are not civilian employees, but instead contractors due to the government inability to hire/recruit such a unique skillset such as data scientists (Smith, Ms. Freese Visit, 2021).

Through the standing up of this new division (referred to as the Business Analytics Division) within AMCOM Resource Management Directorate, a comprehensive training curriculum was designed (Smith, Ms. Freese Visit, 2021). The training is designed to improve and advance the directorates' current capability levels of performing analysis and visualizations by using industry leading software tools such as Vantage and Tableau. Currently, to handle the demands of CAER, analysts have settled for advanced extrapolations of Microsoft Access and Excel (Smith, Ms. Freese Visit, 2021). However, the goal is to drive the analysts towards

advanced skills in data analysis such as using Big Data techniques and other tools to make effective decisions. Details of this professional, internal academy can be found in Appendix E for Level 1 and Appendix F for Level 2 training course requirements.

When a company's technology and its people are taken into consideration; it is important to note the organizational changes that need to take place for long-standing effectiveness of data analysis (Capgemini, 2015). Organizational change begins at the top of every organization with its leadership. Sims & Sossei (2012) notes that strong leadership is needed to champion the project and to effectively communicate the vision and goals of the data analytical projects. Therefore, in the Federal Data Strategy Development Team (2020), leaders are called out to set the example by using data analytics to make decisions and to go out and secure the resources to maximize data usage throughout their organizations. The Army Materiel Command also demonstrates this within the operation orders to their subordinate Commands to champion the development of visualization tools and/or dashboards within their respective Commands (HQ, Army Materiel Command, 2021). This digital push through organizations is confirmed by Andren, Dadhich, Treutiger, & Kjellen (2017) with the following statement: "Digitalization is a cross-societal megatrend, affecting and challenging all sectors, from manufacturing to local government. Consequently, executive interest in digital transformation is increasing rapidly, as more and more organizations face agile disruptors harnessing new technologies to compete against them" (para. 1). Therefore, a by-product of this research may reveal if AMCOM G-8 has the ability to become the data frontier to assist the department with achieving DoDs goal #3 (See Figure 7 below) through AMCOM's workforce capability and capacity for data analytics.

Figure 7. The Enterprise Data Strategy for Army Business 2018-2022 (The Office of Business Transformation, 2018-2022)

Goal 1: Army Data Analytics doctrine and policy adapt new capabilities to the Army's circumstances. The Army is oriented and organized around fast experimentation to understand, learn and improve its business operations through data analytics and, as a result, continuously improves Army readiness. Objective 1.1: Establish formalized governance for the Army to develop overarching policy and guidance for the Army enterprise approach to data analytics, translate strategic leadership questions into data projects, and harmonize previously disparate analytics management efforts. Objective 1.2: Provide authoritative direction for the Army's approach to data analytics.
Goal 2: The Army establishes a federated approach to data analytics and data science that provides a mandate, incentives and opportunity for the growth and maturation of this capability while supporting the further development of establishment of data analytics cells at other echelons and leveraging existing capabilities currently dispersed across the Army. Objective 2.1: Establish a data analytics cell resident within HQDA with leadership formally designated as the Army's Chief Analytics Officer (CAO) to focus on enterprise-level questions. With the addition of expertise in the areas of data science, data management, communications, and subject matter expertise, and with the stand-up of the Data Analytics Board, the cell evolves to become the Army's Analytics Center of Excellence (ACE) with responsibility for developing and deploying related strategic direction throughout the Army, solving the hardest enterprise questions and maturing the broader data analytics community. Objective 2.2: Organize and conduct collaborative Army-wide events such as Unified Quest or similar challenges to engage and build relationships across, government, industry and academia in advancing the Army's data analytics/data science capability. Objective 2.3: Strengthen the Army's data analytics community of practice through a federated organizational structure where there is a balance of centralized and distributed coordination and a centralized group of advanced analysts, strategically deployed to enterprise-wide initiatives. Objective 2.4: Systematically pursue relationship building opportunities and collaborative agreements with academia and industry in advancing the Army's data analytics capabilities and optimizing the benefits derived from them. Objective 2.5: Establish HQDA-level incentives for data analysis cells at all echelons to innovate and create value.
Goal 3: Through collaborative teams and a range of competencies the Army expands, matures and sustains a data analytics capability that captures the full business value of its information resources with a broad range of descriptive, diagnostic, predictive and prescriptive analytics. Objective 3.1: Catalyze and support the currently decentralized data analytics community to meet the evolving demand for enterprise-level data analytics solutions. Objective 3.2: Identify positions and roles needed to establish an organic data analytics capability within the Army, the competencies required by these positions, and opportunities for training and developing data analytics competencies. Objective 3.3: Ensure the rate with which the Army acquires and develops data analytics expertise is congruent with the scaling and growth of its data analytics capabilities and initiatives.
Goal 4: Both uniformed and civilian Army Leaders have a working understanding of data analytics. This understanding, coupled with their knowledge of business problems increases the demand signal for data analytics capability and solutions. Objective 4.1: Develop opportunities for executive/leadership data analytics training. Objective 4.2: Enterprise-level performance measures are established to determine value of the emerging data analytics capability. These measures are routinely reviewed by Army senior leaders through the ABC. Objective 4.3: Leaders at all echelons are incentivized to use data analytics to innovate, create value and find solutions to their most pressing organizational challenges.
Goal 5: The Army's materiel solutions for enterprise data analytics continue to address the needs of the broader Army data analytics community and balance technology solutions with the human resources required to employ them in a cost effective manner. Objective 5.1: The Army systematically evaluates its current tools and infrastructure against new options for effects on automation, costs, manpower and business processes associated with data analytics activities and makes appropriate adjustments to its related approaches. This evaluation is conducted in concert with HQDA-level human resources planning to include an assessment of workforce capability and capacity, and professional development plans and programs. Objective 5.2: The acquisition and development of Army data systems and tools are shaped by inputs from Army data analytics professionals including leadership, data engineers and data scientists both at the enterprise level and through distributed communities of practice. Materiel support responds with agility to these demand signals and is prepared to provide the scale, access, and governance required to enable the success of the data analytics mission. Objective 5.3: The Army operates a centralized and de-centralized scalable, trusted data environments with tools that provide automation, governance, and a full range of descriptive, diagnostic, predictive and prescriptive analytics on both historical and real-time data.

Change Management

Through the strides AMCOM G-8 has made with the creation of Analytics Academy; AMCOM G-8 may have the potential to lead this data analytical charge for DoD by way of AMC. However, how does one actually make data analytics a process that is readily adopted within the organizations? As noted, change is rarely welcomed and often times than not, transformational changes of this magnitude are often abandoned in the implementation phase (Capgemini, 2015). Several change intervention methods are available for organizations to explore. Below briefly introduces two change methods discovered during the literature review.

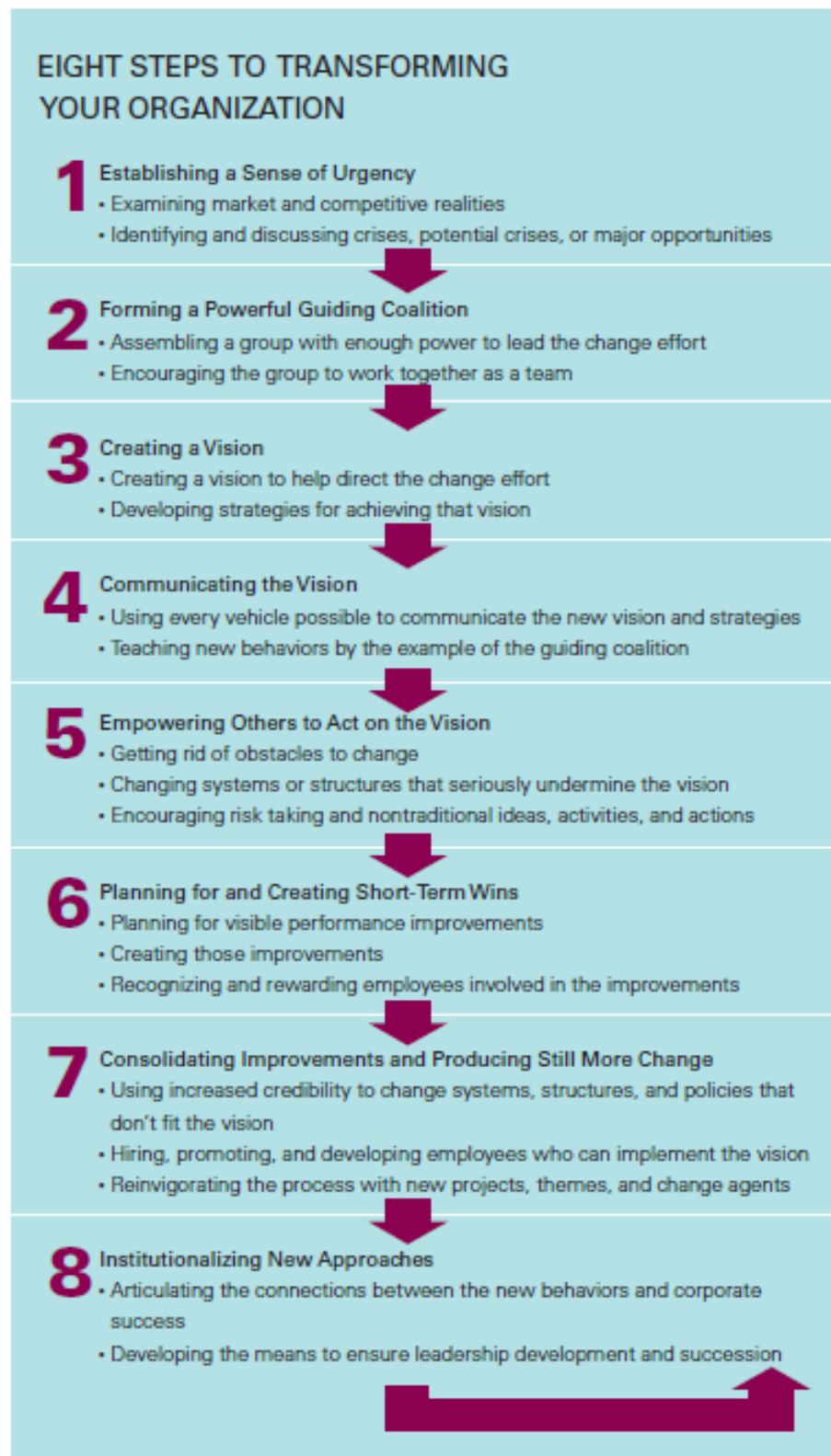
Kotter's 8-Steps. When considering transformative level of change, an organization should consider Kotter's 8-Steps as part of implementation. John Kotter, Harvard Business School Professor of Leadership, has authored several leadership books; however, he took center stage with his change intervention method that is known as his 8-Step process in 1996 (Kotter J. , n.d.). The 8-Steps are illustrated in Figure 8 and Figure 9 below. According to Kotter:

Our methodology, far from the norm in management consulting, generates extraordinarily fast quantitative and qualitative results in efficiencies, innovation, growth, culture, digital transformation, and other areas that demand change despite what often seem like impenetrable barriers. And it is done by harnessing the power of your people, mobilized to achieve unimaginable results at unprecedented speed. (Kotter, 2007, Home page section, para. 1)

Figure 8. Kotter's Leading Change 8-Steps (Kotter J. , n.d.)



Figure 9. Kotter's Leading Change 8-Steps (Kotter J. P., 2007)

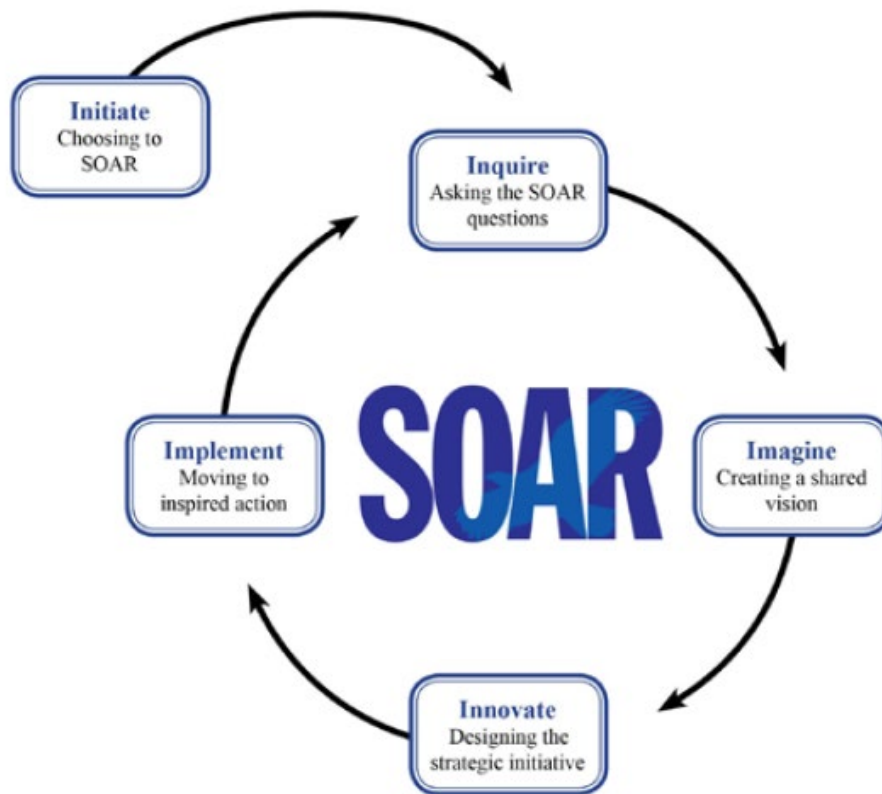


One of the major differences with Kotter's method from the other studied methods is that it is a more structured approach. All steps must be adhered to in the order in which they appear (step-by-step) (Kotter J. , n.d.). According to Kotter, deviations from this process could lead to a regression in progress.

Strengths, Opportunities, Aspirations and Results (SOAR). SOAR was introduced as an organizational change method in 2003 (Stavros & Hinrichs, 2019). It is known for its, “profoundly positive approach to strategic thinking, planning and leading...” (Stavros, 2020, p. 66). Stavros and Hinrichs (2019) are credited for creating the SOAR change model that is used within many organizations today (see Figure 10 below): for-profit, non-profit, and even government agencies across continents. According to Stavros and Hinrichs,

SOAR is distinguished from traditional strategic planning approaches due to its generative nature and the inclusion of stakeholders. Generative conversations create a positive frame for individuals, organizations, and communities because they produce new perspectives, creativity, and ideas. They inspire and move people forward with curiosity, imagination, and engagement. Stakeholders are those people who have a stake in the organization's success – employees, board members, customers, suppliers, and the communities where the organization resides. While every stakeholder may not be able to participate in the conversations, each stakeholder group is invited to send a representative. (2019, p. 6)

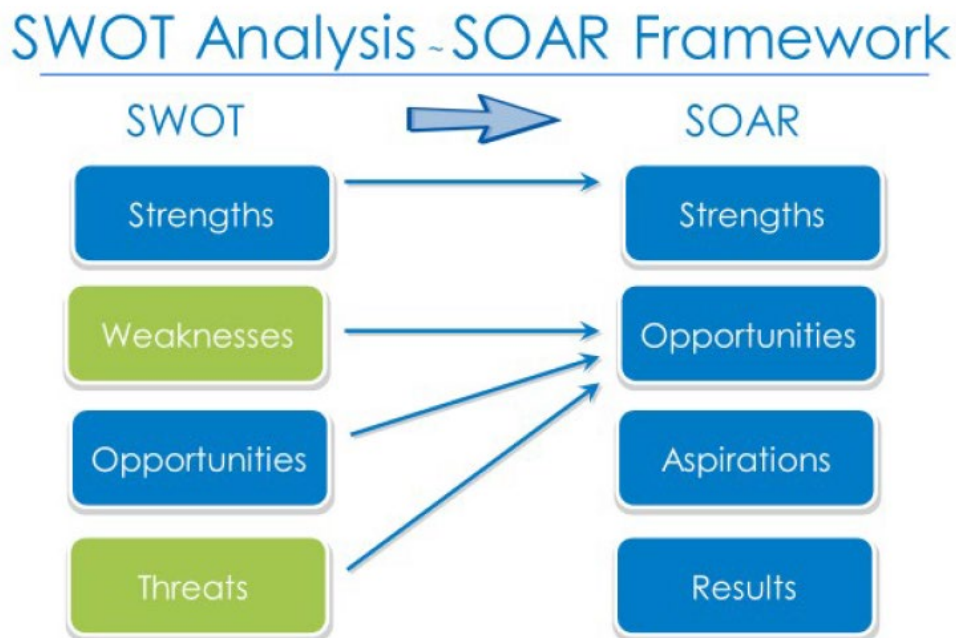
Figure 10. SOAR (Stavros, 2020)



SOAR is a strategic combination of Appreciative Inquiry and generative questions (Stavros & Hinrichs, 2019). Appreciative Inquiry is a change approach that is built on recognizing strengths and all of the positive aspects of situations instead of the negative aspects. For instance, if sales are low, a manager would not approach their staff asking questions about their possible lack of performance; instead ask them about their amazing contributions thus far in their career. Turning the conversation into a positive discussion is the key to Appreciative Inquiry due to this nature of ‘positive framing’ (Stavros & Hinrichs, 2019). Generative questions is essentially a state of curiosity that begins with their strengths and what stakeholders care about; and then it creates a continual list of questions that essentially leads to innovation and creativity through the employees’ passion and engagement (Stavros, 2020).

SOAR, for many, closely resembles another strategic tool referred to as Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. SWOT has been around for many decades. “SWOT focuses on diagnostics assessment and analysis. SOAR focuses on dialogue and planning that builds upon the strengths and opportunities from SWOT as a foundation” (Stavros & Hinrichs, 2019, p. 14). Figure 11 below shows the way SWOT essentially becomes SOAR from an Appreciative Inquiry perspective.

Figure 11. SWOT becomes SOAR (Stavros, 2020)



Another depiction of their differences are shown in Table 1 below with the comparison of SWOT analysis versus SOAR framework.

Table 1. SWOT Analysis versus SOAR Framework (Stavros & Hinrichs, 2019)

SWOT Analysis	SOAR Framework
Analysis oriented: Focus on diagnostic assessment	Action oriented: Focus on strategic conversations
Competition focus - Just be better	Possibility focus - Be the best!
Incremental improvement	Innovation and breakthroughs
Top down	Engagement of all levels
Focus on analysis - planning	Focus on planning - implementation
Energy depleting - There are so many weaknesses and threats!	Energy creating - We are good and can become great!
Attention to gaps	Attention to results

Research confirms that organizations are 1.5 times more successful focusing on strengths and opportunities instead of focusing on weaknesses and threats. Focusing on what others are doing can hinder an organization from identifying what they are truly capable of and what they could possibly be achieving in absence of a known threat (Stavros & Hinrichs, 2019).

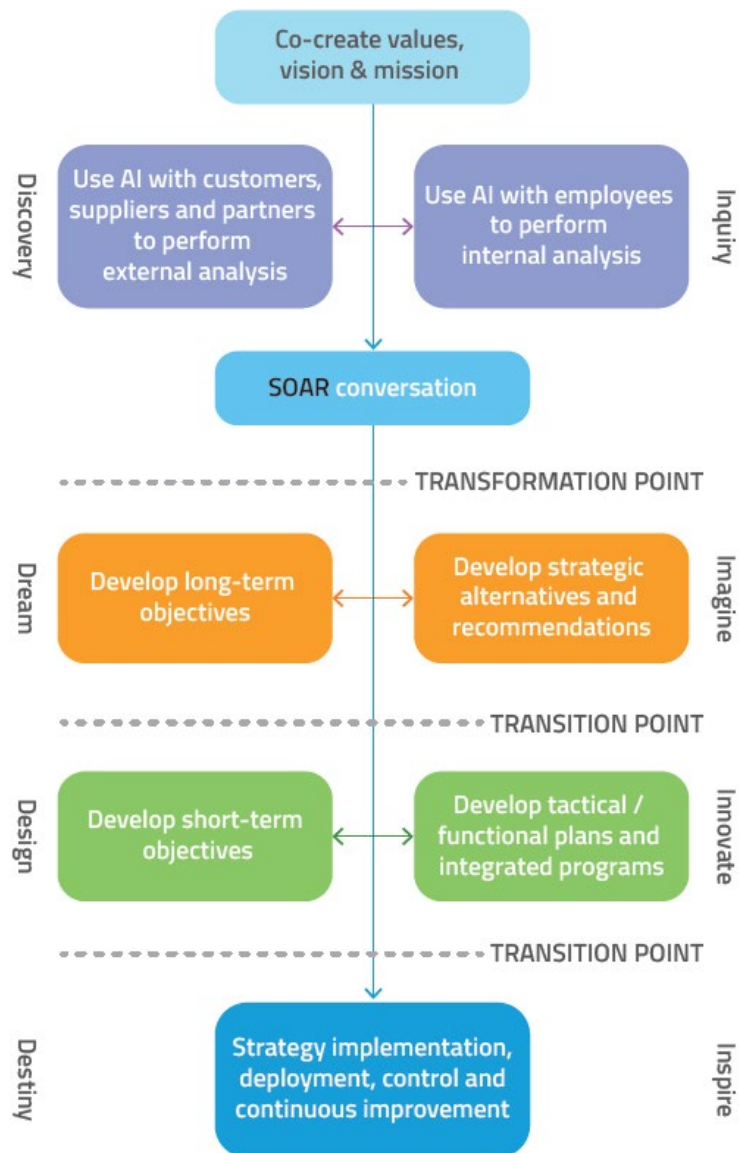
And finally, unlike Kotter, SOAR is scalable and flexible. According to Stavros and Hinrichs (2019), SOAR participation can be as small as 7 to 12 individuals or as large as 1000 or more people, if desired or necessary. The process can start with a small group and then expand into a larger group context at the same location, virtually, or a combination of both. A day or a few days can be set aside to accomplish this technique; as well as a few minutes known as Quick SOAR (i.e. 30 minute sessions) (Stavros & Hinrichs, 2019).

Once the decision is made to use the SOAR framework, the organization would then seek out the proper stakeholders and use Appreciative Inquiry to ask generative questions (See Figure 11 for a more detailed framework. With using this research paper topic as an example, the following questions are recommended for AMCOM G-8 as a guide:

- What are we (e.g. G-8) known for? What do we do really well?
- What tools do you desire that would make your job easier?
- Is there anything you'd like to see done differently within your organization?
- What do you enjoy most about our position (or organization)?

- What goals would you like to set for us?
- How would you describe a perfect day in the life of a financial (or budget) analysis?

Figure 12. SOAR Strategic Framework (Stavros, 2020)



Summary

The Literature Review is instrumental in laying out the foundation of data analytics and Big Data. The Literature Review also shares how data analytics and Big Data has become increasing importance today; and how organizations can construct their own data paradigm that would be most advantageous for their environments. Through the various initiatives that have been put forth, the Federal Government is in a good position to leverage data analysis by building upon the advances already made (Sims & Sossei, 2012). Analytics is the gateway to improving, but not limited to, the following: decision making, predictions, trend analysis, mission performance, applied governance, cost reductions, transparency, and detecting fraud, waste and abuse (Federal Data Strategy Development Team, 2020; Fitz, Hauer III, & Steinhoff, 2015). According to Glenn, Hill, & Wetklow (2018-19),

If “information is power” and data analysis and visualization can provide users with useful information, then federal financial executives, who have sought more influential seats “at the table” of their agencies for years, can follow data analysis and visualization right to the head of said table! (p.5)

Chapter 3 – Research Methodology

Statement of Purpose

The purpose of this study is to understand how leveraging data analytical tools can assist with optimizing financial management of Operation and Maintenance - Army (OMA) funding for the Aviation and Missile Command (AMCOM) G-8 Resource Management Directorate.

Research Methodology

Thorough observation led the researcher towards a qualitative style of conducting this study using the literature review method. According to Creswell and Guetterman (2019), “a literature review is a written summary of the findings of articles, books, and other documents that describes the past and current state of knowledge about a topic, organizes the literature into topics, and documents a need for a proposed study” (p. 105). Of note, is the difference between how qualitative and quantitative literature reviews are conducted. Qualitatively, the researcher uses a limited amount of literature initially, in comparison to the detailed literature used in quantitative reviews. The qualitative approach allows the researcher to use the literature review in support of their findings. Another characteristic of qualitative research that differentiates it from quantitative research overall is that the writing is more “flexible, emerging structures, and evaluative criteria and including the researchers’ subjective reflexivity and bias” (Creswell & Guetterman, 2019, p. 26). Reflexivity allows the researcher to reflect and question their own biases and assumptions actively within the research.

Therefore, the research will conduct a qualitative literature review to address the research questions which are:

1. What is Data Analytics? What is Big Data?
2. Why are Data Analytics and Big Data important to improving financial management?

3. How receptive is AMCOM G-8 to take full advantage of these data analytical tools to optimize its' financial management processes?

4. How can AMCOM G-8 use change methods to institutionalize data analytics tools within the Resource Management Directorate's day-to-day operations?

When exploring AMCOM's current data analytical position, the researcher will assess and answer the research questions. The researcher desires to gain a better understanding of AMCOM's current data readiness position as it relates to DoDs data transformational goals for federal agencies. The researcher also wants to determine how this research can better assist with reaching those goals of establishing this imagined analytical environment.

Summary

In summary, with conducting a qualitative literature review, this research will explore and reveal the data analytical advancements made by industry and compare to the advancements made within AMC and compare them all to the strides made by AMCOM G-8. This will be accomplished through reviewing published Operation Orders (OPORDs), Command Policies (CPs), other Army directives/memorandums, and reviewing journal publications and books within the last decade (2011 through 2021). Various points of view on data analysis and big data in industry and government contexts will be described. AMCOM's current data readiness posture will be examined through various government documents in order to make recommendations for OMA resource optimization.

Chapter 4 – Findings

“Do nothing about me without me.” ~ Valerie Billingham

Statement of Purpose

The purpose of this study is to understand how leveraging data analytical tools can assist with optimizing financial management of Operation and Maintenance - Army (OMA) funding for the Aviation and Missile Command (AMCOM) G-8 Resource Management Directorate.

Summary of Findings

To assess the progress of AMCOM G-8’s efforts, it is pertinent to address the findings of the research questions. As part of a qualitative literature review, properly addressing these questions will provide the researcher confidence in recommending the path forward and/or corrective actions (if necessary) in which the Command should consider.

Question 1. What is Data Analytics and Big Data? The AMCOM Data Analytics Strategy provided a list of terms and definitions. In considering how the literature review has defined these two concepts, the researcher finds this portion befitting to use the Command’s definitions to address how AMCOM views these key terms and what the Command understands these terms to mean for their operations. This is important as it reveals the work the Command has put forth with determining its need, as it relates to how data analysis is viewed and how data analysis continues to evolve. According to AMCOM Data and Analytics Center (2021),

Analytics uses data and math to answer business questions, discover relationships, predict unknown outcomes and automate decisions. This diverse field is used to find meaningful patterns in data and uncover new knowledge based on applied mathematics, statistics, predictive modeling and machine learning techniques. Analytics can be descriptive, predictive or prescriptive. (p. 10)

The term “Big Data” describes data sets with high volume (large sample size), variety (many types, categories), and velocity (high-speed collections, cleansing, and integration). These data sets are so voluminous that traditional data processing software just can’t manage them. Big Data must be processed with advanced tools (analytics and algorithms) to reveal meaningful information and has the potential to help organizations improve operations and make faster, more intelligent decisions. (p. 10)

Question 2. Why is Data Analytics and Big Data important to improving financial management? One key insight that was uncovered was the importance of knowing the problem the organization is trying to solve with the data (Herden, 2020). What is the problem statement and how will the data assist with a solution? Often, organizations are convinced that data or the understanding of the data is key. However, the real challenge is understanding the problem your organization or unit is trying to solve and then, how can the data assist with getting to the solution? For example, AMCOMs Resource Management office is being held to a new set of metrics called CAER (Command Accountability and Execution Reporting) (The Assistant Secretary of the Army (Financial Management & Comptroller), n.d.). In order to report, analyze, and properly address the trends shown within the data, it is imperative that the Command has a reliable process of extracting, grouping, and analyzing the data in order to present and to make informed decisions. Such decisions are determining the competitiveness, or the lack thereof, and survivability of companies today (Capgemini, 2015). For AMCOM, without the ability to make informed financial decisions through the results derived from the CAER program, organizations are in threat of losing the funding needed to support its’ customers (Smith & Dempsey, 2020). For AMCOM, its’ customer is a warfighter on the battlefield (AMCOM Data and Analytics Center, 2021). Therefore, improving its’ financial management through the use of data is very

important to the survival, of not just profits or competitiveness, but the life of its customers, the warfighter. According to AMCOM Data and Analytics Center (2021),

Collecting and analyzing data is fundamental to our work, from maintenance support and materiel readiness, to budgeting and workforce development. The explosion of data-driven innovations from commercial industry presents AMCOM with a great opportunity to enhance its mission performance. AMCOM must keep pace with technology advancements and make better use of the Army's vast and growing data resources. (p. 1)

Question 3. How receptive is AMCOM G-8 to take full advantage of these data analytical tools to optimize its' financial management processes? Currently, the Commands data strategy was provided 30 June 2021 as a framework for the Command to establish its data capabilities. Through this framework, a special staff office was formed called AMCOM Data and Analysis Center. This center will be led by a senior manager (e.g. GS-15) and is referred to as the Command Data Analytics Officer. In an effort to not lose translation, according to AMCOM Data and Analytics Center (2021):

Until now, analytics and data flow within AMCOM have been exactly as described, historically based, predominantly transactional and a tool to evaluate past performance. In addition to those descriptors, data analysis within AMCOM is limited to action officers with system access and the ability to add verbal/written context to the data. Complicated requests can take anywhere from days to weeks for the action officers to compile the data, synthesize it and apply context prior to routing through the appropriate channels in order to answer the leadership's questions. (pg. 2-3)

In aligning with the strategic priorities established by Federal, DoD and Army strategies, AMCOM has established a Data and Analytics Governance Program to allow for and

facilitate command-wide data-driven decision-making. This program seeks to identify what data exists or needs to exist in the future (removing redundancy), define what responsibilities exist related to the management of data and information and assign accountability for those responsibilities to specific groups or individuals within the command. It will take a group effort to incrementally build partnerships and organizational knowledge within AMCOM. The Program provides an organizational perspective to governing our data but does not necessarily centralize control of our data; rather, it creates systems for identifying individual and departmental functional data managers and provides guidelines and resources for these individuals to use as they curate data. (p. 3)

Using the AMCOM Data Analysis Strategy as a guide to understand their current position and the challenges they face, it is evident that the Command is in the beginning stages of executing the DoD intent of transforming the department into a data-centric enterprise. In reference to the Federal Strategy's 10-year vision displayed previously in Figure 4, AMCOM is on track. However, from analyzing AMCOM's strategy and current position, it does not appear the Command has a complete execution strategy on getting beyond the first two phases of the 10-year vision into the Optimized Activities; nor does the Federal Data Strategy of 2021 provide any insights on how to achieve this level and beyond. Actually the federal strategy alludes to future annual plans being generated to address this within the last section titled "Looking Ahead" (Federal Data Strategy Development Team, 2021). The committee will gather feedback from agency stakeholders on their progress, results from cross-agency collaboration efforts, and continue to foster information sharing to develop these annual plans.

Question 4. How can AMCOM G-8 use change methods to institutionalize data analytics tools within the Resource Management Directorate's day-to-day operations? Should AMCOM wait until these annual plans are published to stay on track with the 10-year vision? They can wait; however, according to the literature review, getting the workforce to embrace such transformative changes has always proved challenging to the federal government (Sims & Sossei, 2012). Through these strategies the senior leaders (to include AMCOM's Commanding General) are calling for leaders to get engaged, collaborate, and strategically determine just how the Command should and will accomplish this huge historic goal that has been put forth by the department. Will the workforce resist this massive undertaking? Possibly, as this is the norm for all organizations, not just the federal government. Does AMCOM have the current workforce to accomplish this great mission? Yes and No.

Ten steps to implementing a data analytics program specifically to the government financial managers was provided by Fitz, Hauer III, and Steinhoff (2015) in their article called *"Calling All Government Financial Managers to a More Analytic Role as Highly-Valued Business Advisors!"* The steps are listed below (see Table 2) along with a response answering if this recommendation is fulfilled or if significant progress is completed (e.g. yes or no) from the researcher's findings and assessment of the G-8 Resource Management's current program of using data analytics to optimize financial management of the OMA appropriation.

Through the initiation of the CAER program challenge that was levied upon the G-8 Resource Management communities throughout AMC's enterprise, AMCOM's Deputy Chief of Staff's actions puts the Command at a great advantage. As a result of their efforts, AMCOM G-8 has a strong blueprint that allows them to successfully answer those critical steps that have been recommended to the G-8 communities. Achieving step 10 will take some time; however, while

AMCOM G-8 is on the road to meeting that recommendation; they can collaborate with other directorates within the Command until the majority or all that need data analytics can operate successfully in that arena.

Table 2. Assessing AMCOMs Implementation of a Data Analytics Program

Assessing AMCOMs Implementation of a Data Analytics Program			
Step Fulfilled / Significant			
10 Steps to Implementing Progress			
a Data Analytics Program: Made?		If yes, how?	
1	Accept responsibility and obtain top management sponsorship	YES	The Commanding General is the Sponsor for this program and has approved and signed off on AMCOMs Data and Analytics Strategy (~signed 30 June 2021).
2	Know what questions need to be answered	YES	Through the CAER program the Command is being assessed on the following financial metrics/trends on a monthly basis: Prior Year de-obligations, Open Supply Orders, Open Miscellaneous Obligation Documents, Unfilled Customer Orders, Contract Workload, Disbursements, Outbound MIPRs (Military Interdepartmental Purchase Requests), etc. Note: This list is not exhaustive.
3	Understand the full range of available analytic capabilities	YES	The Commands Resource Management office has implemented a Data Analytics Academy which features a vast amount of analytical capabilities at the Commands disposal.
4	Perform a comprehensive gap analysis to identify data strengths and weaknesses	YES	The Command has conducted a survey called "Voice of the Analyst Assessment" to highlight the potential gaps in skills, training, and assess the technical tools and platforms facing the workforce as it relates to Army data.
5	Define your transformation strategy and obtain stakeholder buy-in	YES	The Command has established a leadership structure by creating an office called "AMCOM Data and Analytics Center". Through this Center, a Data and Analytics Governance Program was established to promote organization participation, knowledge sharing, and buy in throughout AMCOM.
6	Get the right data and get it right	YES	Functional Data Managers or Subject Matter Experts have been identified within business areas to make sure the right data is used appropriately.
7	Begin with lower-hanging fruit	YES	Through the Resource Management office, AMCOM has deployed advanced excel capabilities: a De-obligation Dashboard and an Outbound MIPR Tool, which have already proved successful.
8	Keep your finger on the pulse	YES	The Command continues to collaborate with other government entities as it works diligently to modernize its digital environment.
9	Constantly reevaluate and challenge the status quo	YES	The AMCOM Data and Analytics Center is a special staff office designed to use the Data and Analytics Governance Program to encourage innovation and to deliver these technologies throughout the Command.
10	View this as change management	NO	Recommend AMCOM considers this as a formal change management opportunity.

AMCOM G-8 has made strides towards achieving this mission of creating an environment that utilizes data analytical tools. However, success truly depending on transformation, will hinge on the Command's ability to deploy change management. Change management is just a process of helping people or organizations to actually change or transform (Rothwell, Stavros, & Sullivan, 2016). The authors reveal that "people have different ways of responding to information overload and change. One approach is go give up" (Rothwell et al., 2016, p. 15). Transforming an organization into a data-centric enterprise is a massive project from the 10-year vision plan that will be updated annually (Federal Data Strategy Development Team, 2021). With the greatest technologies and training available, achieving change management will reign supreme to an organization's success or lack thereof. According to Fitz, Hauer III, and Steinhoff (2015):

Change management prepares organizations and employees to navigate the change process and sustain transformation initiatives. The goal is to optimize the collective ability and willingness to adopt sustainable change, while proactively mitigating resistance, thereby driving accelerated, measurable results. Change management includes technical, process, and procedural elements and issues impacting deeply-rooted organizational cultures and employee roles and responsibilities. Building a highly-analytic CFO workforce, which the aforementioned AGA research found not yet to be in place, is paramount. Put the talent quest on the front burner. Team data scientists, who can apply leading-edge tools while thinking outside-the-box, with program experts, who — as the ultimate users — provide context sophistication related to data needs. As with any transformation, top leadership must personally own and drive change. Finally, communication, communication, communication and more communication is essential to engage employees and

stakeholders and achieve needed understanding and buy-in across the organization. (pg. 45-46)

Summary

In summary, the research discovered that AMCOM has taken action to implement the Federal Data Strategy put forth to the departments. Similar to the FDS, an actual plan to put the concepts into place within the organizations or how to get the staffs to effectively adopt these strategies as the new way of doing business, was not located. Therefore, the research explored adaptable change methods that may assist AMCOM with organizational development of their data analytical efforts in such a way that will allow them to meet the goals set by the department. Through the exploration of Kotter's Leading Change 8-Steps and SOAR intervention change methods; the most effective method will be proposed to AMCOM as a tool to assist them with utilizing data analytics to optimize its financial management of the OMA appropriation. This is pertinent to their success as the department is currently mandating leaders to define the best path to creating a data-centric enterprise solution. However, the researcher has confirmed that AMCOM has the G-8 Analytics Academy as a model, as it has been approved and adopted by AMC. But this training strategy is currently just optional (Smith, 2021). Obtaining a Level I Certification is just a formality. In order to meet the departments intent, such transformation may not be achievable, if training is considered just an option.

Chapter 5 – Conclusions and Recommendations

“If you want to go fast, go alone. If you want to go far, go together.” ~ African Proverb

Introduction

In an effort to address the challenge faced by AMCOM (and the federal government as a whole) with implementing these data analytical changes designed to create a data-centric enterprise, the research explored several change intervention methods. However, to make an effective recommendation, a deep analysis into two methods was conducted. The researcher took a deep dive into a well-known method, Kotter’s Leading Change 8-Steps, which was compared to a method called SOAR.

Conclusions

AMCOM has performed its due diligence and has identified a path to achieving the goal of becoming a data-centric organization by creating the appropriate offices, hiring contractors as temporary gap measures to compensate for the lack of skilled data scientists, and designing a robust training curriculum for employees. However, a plan for initiating this huge level of change transformation is missing or incomplete.

Recommendations

Through this qualitative literature review research effort, it is recommended that AMCOM utilize the SOAR framework to implement effective change to create the data-centric environment recommended by the department. This has the ability to send a strong signal throughout the organization that change is important and change is vital for the Command. Through this focus, the organization will have the ability to learn from their most critical asset; it’s employees. Through these efforts, the employees may get to know their leadership better and have opportunities to provide the leaders with their innovative ideas. These interactions may place the employees in an

optimal position, as it gives them ample face time with leaders they may not interact with on a regular basis. SOAR is recommended as the way to becoming a data centric organization, as

SOAR invites employees (and other stakeholders) to have a strategic conversation that is grounded in values, strengths, purpose, vision, and action. As a result, employees are motivated by the strategic initiatives that they helped created rather than merely convinced to buy in to what a group at the top envisioned. (Stavros & Hinrichs, 2019, p. 11).

Change Management. “We are apparently pretty hopeless at managing change, and we’re not getting any better” (Lawrence, 2014, p. 1). Failure rates are reported being between 60-90 percent; and 15 plus years later after Kotter’s review article, two-thirds of initiatives are still failing. Lawrence (2014) posed a series of questions:

- a) Why are we not getting better at change?
- b) Is it proving difficult to engage the broader organization with the value of the ‘new’ approach?
- c) Or is it that these change models are difficult to implement?
- d) Or is it that these models are actually no more effective than the approaches that preceded them?
- e) What is going on? (p. 1)

The old, linear change models that organizations followed are not as successful today as they once were. These models, such as Kotter’s 8-steps, were successful because of the presumed control possessed from those sequential and analytical processes (Lawrence, 2014). However, through current research, it was discovered that one revolving theme was attributing to this high level failure rate: lack of stakeholder engagement. Stakeholder engagement is “based on the belief

that those closest to a problem have important insights that will help shape solutions” (Bourns, 2010, p. 4). Success is dependent on maximizing the appropriate level of involvement which involves defining the decision(s) to be made and then identifying those that should be involved. It is just as important to have the right stakeholders, than eliminating the option for stakeholder involvement. According to Bourns (2010),

This means conducting a “stakeholder analysis” that identifies potential stakeholders and answers such questions as the following:

- What do they bring to the process in terms of resources, expertise, etc.?
- What is their interest in this work, that is, what would motivate them to participate?
- To what extent is their support and engagement essential to the ultimate success of the work?
- To what extent will their work, their lives, their neighborhoods, etc., be affected by the decision?
- Do they have the time, the skills and the resources to participate in an active way?
- Have we included people who can be viewed as connectors in the community or the network in which we are operating?
- Have we included organizations that can be viewed as hubs within the community or network in which we are operating?
- Have we sought out unusual voices and diverse perspectives? (p. 19)

Allowing for such engagements to take place may add more time; however, it could potentially save time and increase positive impacts of the project. Stakeholder engagement can assist the project with moving forward by reducing resistance to change and creating opportunities for greater buy-in as a result of their (stakeholder) involvement. In addition, a deeper understanding

of the real issues or problems, needs, and challenges can or will be revealed when stakeholders are at the table.

A better question is, “What are the risks of not engaging stakeholders?” (Bourns, 2010, p. 17). Understanding these risks can assist organizations with understanding why ‘change’ is not working or why change initiatives continue to take off successfully (or the appearance thereof) and dwindle down without reaching the desired goals. According to Bourns (2010),

Perhaps the foundation did not have the right people on board at the right time. Perhaps too much distrust among the individuals and organizations involved prevented the players from working toward a common cause. Perhaps the foundation already decided on a strategy before launching a series of community meetings to tell the community what the strategy was. Perhaps the strategy was based too much on academic models and not on genuine input from people working on the ground. (p. 17)

The old adage says, “Communication is key.” However, the heart of change is not communication; instead it is reflective dialogue which includes communicating, listening, voicing, and reflecting (Lawrence, 2014). Not the top-down approach where senior leaders stand before their audiences (employees and other supervisors/managers) to deliver their visions and goals to fix issues that are foreign to the leaders’ day-to-day operations. But instead two-way communication involving the senior leaders to listen and hear the perspectives of those they serve. This is effective communication, which leads to the transformative change that is necessary.

Areas for Future Research

This research can be further beneficial to AMCOM G-8 if private industry experience with change management, as it relates to implementing their data analysis processes, was known. Through the literature review of this research, the importance of data, data analysis, and Big Data

was revealed along with organizations' investment in such tools. However, actual implementation of those tools has not been a relevant topic of discussion or research. As mentioned, organizations have been warned to take time to know what the data tool is trying to accomplish and/or issue to solve. Without knowing the end-state, a lot of time and resources will be wasted. However, achieving that end-state has not been discussed to truly know how companies were able to accomplish their goals.

Other areas of consideration, internal to the department, is to analyze how AMC Subordinate Commands use and accept data analytical tools. What tools have they or are they considering to adopt? What successes and failures have those Commands experienced since adopting those tools? External to AMC's enterprise, what tools are the other services using and what best practices have they realized as a result?

Summary

"All of us want to be involved in important decisions that affect our lives. To the extent that we are not, we're more likely to feel excluded and ignored, and less likely to support whatever decisions are made" (Bourns, 2010, p. 25). The Federal Data Strategy Plan of 2020 and 2021 intent is to create a data-centric enterprise within the federal government footprint. This plan is impressive, feasible, and extremely important to the survival and competitiveness of the DoD agencies. This plan has laid out a 10-year vision along with recognizing that assistance is needed from these DoD agencies throughout the process. The importance of the evolution of data within the federal government is further exemplified in Christine E. Wormuth's, current SECARMY, six objectives listed:

My second objective is to ensure the Army becomes more data-centric and can conduct operations in contested environments, which will enable our ability to prevail on the future

battlefield. Doing so will allow us to embrace emerging technologies to become a more effective and efficient force that can project power in cyberspace and defend our networks, weapons, and data from cyber threats. (Wormuth, 2022, para. 3)

Therefore, with all of the great advances made by AMCOM G-8, the research shows their processes and procedures could be applied beyond the Command once successfully implemented. As a result of using the SOAR model, change is given permission to enter into our organizations and transform them into the ‘living organism’ that they embody. It is at this point, when change starts to be threaded throughout the fabric of organizations and is no longer considered a threat.

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Appendix A – U.S. Army Materiel Command Enterprise

Depicts AMC's structure and area of responsibilities.



Appendix B – 2020 Federal Data Strategy Practices

Practices

The Federal Data Strategy's Practices are designed to inform agency actions on a regular basis, to be continually relevant, and to be sufficiently general so as to broadly apply at all federal agencies and across all missions. The Practices represent aspirational goals that, when fully realized, will continually challenge and guide agencies, practitioners, and policymakers to improve the government's approach to data stewardship and the leveraging of data to create value.

Building a Culture that Values Data and Promotes Public Use

1. **Identify Data Needs to Answer Key Agency Questions:** Use the learning agenda¹ process to identify and prioritize the agency's key questions and the data needed to answer them.
2. **Assess and Balance the Needs of Stakeholders:** Identify and engage stakeholders throughout the data lifecycle to identify stakeholder needs and to incorporate stakeholder feedback into government priorities to maximize entrepreneurship, innovation, scientific discovery, economic growth, and the public good.
3. **Champion Data Use:** Leaders set an example, incorporating data in decision-making and targeting resources to maximize the value of data for decision-making, accountability, and the public good.
4. **Use Data to Guide Decision-Making:** Effectively, routinely, transparently, and appropriately use data in policy, planning, and operations to guide decision-making; share the data and analyses behind those decisions.
5. **Prepare to Share:** Assess and proactively address the procedural, regulatory, legal, and cultural barriers to sharing data within and across federal agencies, as well as with external partners.
6. **Convey Insights from Data:** Use a range of communication tools and techniques to effectively present insights from data to a broad set of audiences.
7. **Use Data to Increase Accountability:** Align operational and regulatory data inputs with performance measures and other outputs to help the public to understand the results of federal investments and to support informed decision-making and rule-making.
8. **Monitor and Address Public Perceptions:** Regularly assess and address public confidence in the value, accuracy, objectivity, and privacy protection of federal data to make strategic improvements, advance agency missions, and improve public messages about planned and potential uses of federal data.

9. **Connect Data Functions Across Agencies:** Establish communities of practice for common agency data functions (e.g. data management, access, analytics, informatics, and user support) to promote efficiency, collaboration, and coordination.
10. **Provide Resources Explicitly to Leverage Data Assets:** Ensure that sufficient human and financial resources are available to support data driven agency decision-making, accountability and the ability to spur commercialization, innovation, and public use.

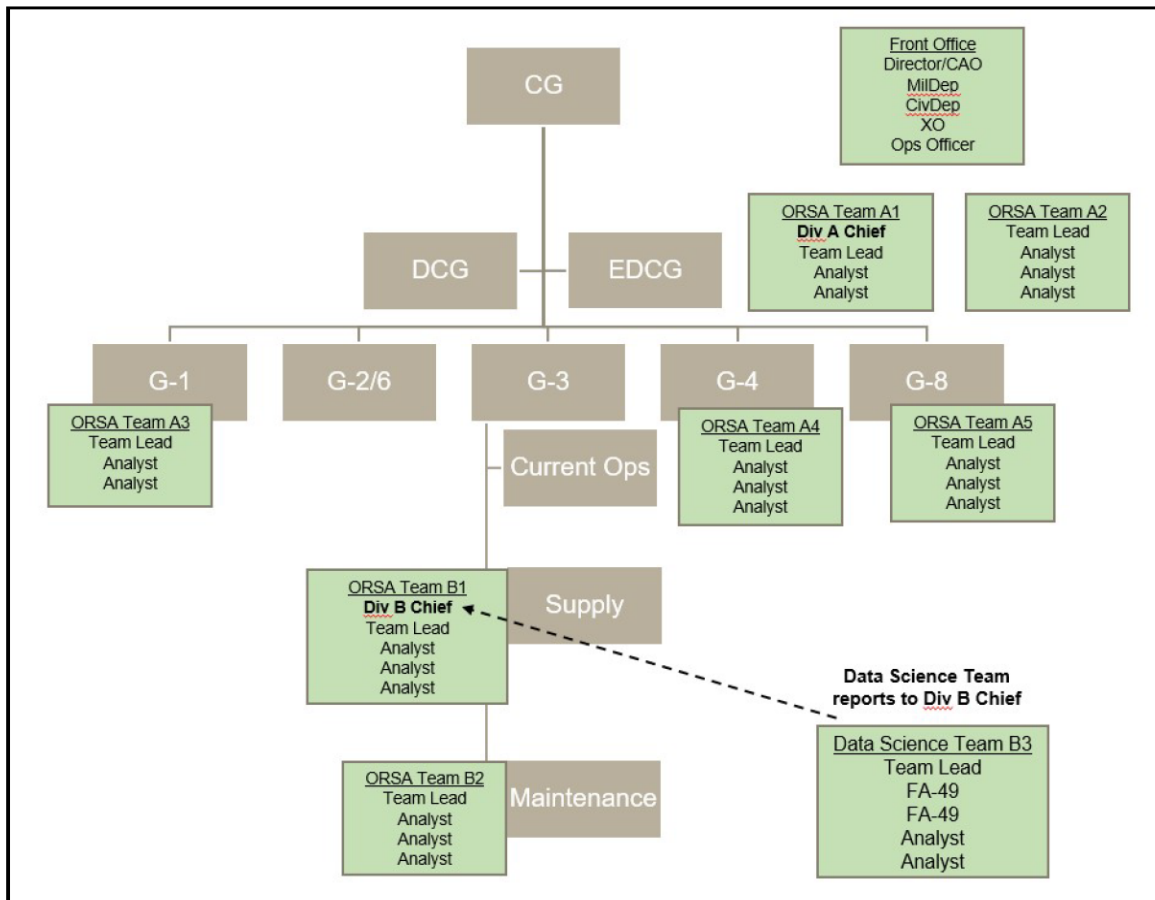
Governing, Managing, and Protecting Data

11. **Prioritize Data Governance:** Ensure there are sufficient authorities, roles, organizational structures, policies, and resources in place to transparently support the management, maintenance, and use of strategic data assets.
12. **Govern Data to Protect Confidentiality and Privacy:** Ensure there are sufficient authorities, roles, organizational structures, policies, and resources in place to provide appropriate access to confidential data and to maintain public trust and safeguard privacy.
13. **Protect Data Integrity:** Emphasize state-of-the-art data security as part of Information Technology security practices for every system that is refreshed, architected, or replaced to address current and emerging threats; foster innovation and leverage new technologies to maintain protection.
14. **Convey Data Authenticity:** Disseminate data sets such that their authenticity is discoverable and verifiable by users throughout the information lifecycle, consistent with open data practices, and encourage appropriate attribution from users.
15. **Assess Maturity:** Evaluate the maturity of all aspects of agency data capabilities to inform priorities for strategic resource investment.
16. **Inventory Data Assets:** Maintain an inventory of data assets with sufficient completeness, quality, and metadata to facilitate discovery and collaboration in support of answering key agency questions and meeting stakeholder needs.
17. **Recognize the Value of Data Assets:** Assign value to data assets based on maturity, key agency questions, stakeholder feedback, and applicable law and regulation to appropriately prioritize and document resource decisions.
18. **Manage with a Long View:** Include data investments in annual capital planning processes and associated guidance to ensure appropriated funds are being used efficiently to leverage data as a strategic long-term asset.
19. **Maintain Data Documentation:** Store up-to-date and comprehensive data documentation in accessible repositories to facilitate use and document quality, utility, and provenance in support of informing key agency questions and meeting stakeholder needs.

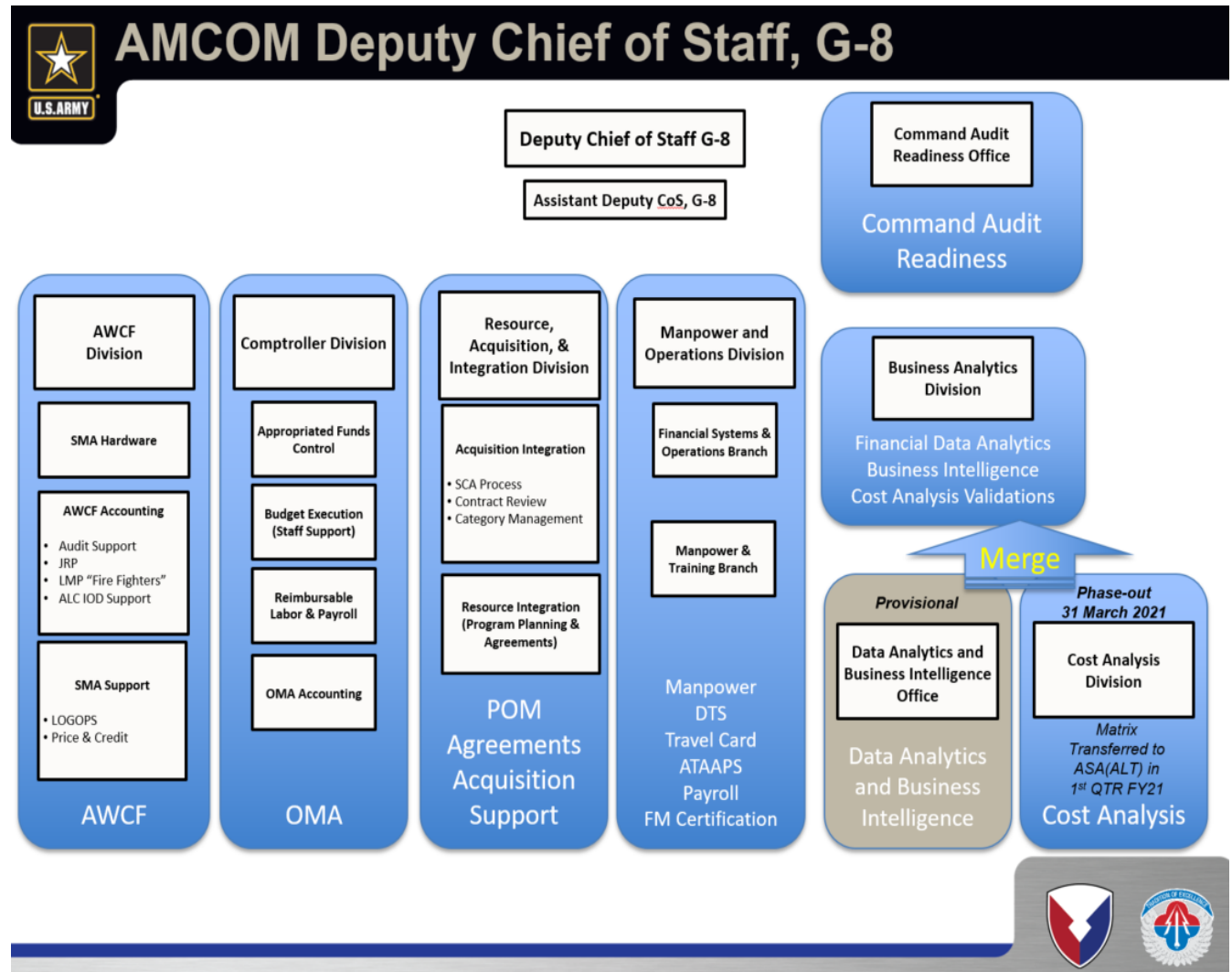
20. **Leverage Data Standards:** Adopt or adapt, create as needed, and implement data standards within relevant communities of interest to maximize data quality and facilitate use, access, sharing, and interoperability.
21. **Align Agreements with Data Management Requirements:** Establish terms and conditions for contracts, grants, cooperative agreements, and other agreements that meet data management requirements for processing, storage, access, transmission, and disposition.
22. **Identify Opportunities to Overcome Resource Obstacles:** Coordinate with stakeholders to identify mutually-acceptable cost recovery, shared service, or partnership opportunities to enable data access while conserving available resources to meet user needs.
23. **Allow Amendment:** Establish clear procedures to allow members of the public to access and amend federal data about themselves, as appropriate and in accordance with federal laws, regulations and policies, in order to safeguard privacy, reduce potential harm from inaccurate data, and promote transparency.
24. **Enhance Data Preservation:** Preserve federal data in accordance with applicable law, regulation, policy, approved schedules, and mission relevance.
25. **Coordinate Federal Data Assets:** Coordinate and share data assets across federal agencies to advance progress on shared and similar objectives, fulfill broader federal information needs, and reduce collection burden.
26. **Share Data Between State, Local, and Tribal Governments and Federal Agencies:** Facilitate data sharing between state, local, and tribal governments and the Federal Government, where relevant and appropriate and with proper protections, particularly for programs that are federally funded and locally administered, to enable richer analyses for more informed decision-making.
30. **Communicate Planned and Potential Uses of Data:** Review data collection procedures to update and improve how planned and future uses of data are communicated, promoting public trust through transparency.
31. **Explicitly Communicate Allowable Use:** Regularly employ descriptive metadata that provides clarity about access and use restrictions for federal data, explicitly recognizes and safeguards applicable intellectual property rights, conveys attribution as needed, and optimizes potential value to stakeholders to maximize appropriate legal use.
32. **Harness Safe Data Linkage:** Test, review, and deploy data linkage and analysis tools that use secure and privacy-protective technologies to address key agency questions and meet stakeholder needs while protecting privacy.
33. **Promote Wide Access:** Promote equitable and appropriate access to data in open, machine-readable form and through multiple mechanisms, including through both federal and non-federal providers, to meet stakeholder needs while protecting privacy, confidentiality, and proprietary interests.
34. **Diversify Data Access Methods:** Invest in the creation and usability of multiple tiers of access to make data as accessible as possible while minimizing privacy risk and protecting confidentiality.
35. **Review Data Releases for Disclosure Risk:** Review federal data releases to the public to assess and minimize the risk of re-identification, consistent with applicable laws and policies, and publish reviews to promote transparency and public trust.
36. **Leverage Partnerships:** Create and sustain partnerships that facilitate innovation with commercial, academic, and other partners to advance agency mission and maximize economic opportunities, intellectual value, and the public good.
37. **Leverage Buying Power:** Monitor needs and systematically leverage buying power for private-sector data assets, services, and infrastructure to promote efficiency and reduce federal costs.
38. **Leverage Collaborative Computing Platforms:** Periodically review and optimize the use of modern collaborative computing platforms to minimize costs, improve performance, and increase use.
39. **Support Federal Stakeholders:** Engage with relevant agencies to share expert knowledge of data assets, promote wider use, improve usability and quality, and meet mission goals.
40. **Support Non-Federal Stakeholders:** Engage with industry, academic, and other non-federal users of data to share expert knowledge of data assets, promote wider use, improve usability and quality, and advance innovation and commercialization.

Promoting Efficient and Appropriate Data Use

27. **Increase Capacity for Data Management and Analysis:** Educate and empower the federal workforce by investing in training, tools, communities, and other opportunities to expand capacity for critical data-related activities such as analysis and evaluation, data management, and privacy protection.
28. **Align Quality with Intended Use:** Data likely to inform important public policy or private sector decisions must be of appropriate utility, integrity, and objectivity.
29. **Design Data for Use and Re-Use:** Design new data collections with the end uses and users in mind to ensure that data are necessary and of high enough quality to meet planned and future agency and stakeholder needs.

Appendix C – AMC Analysis Group Organization to Operation Order (OPORD) 21-139

Appendix D – AMCOM G-8 Organizational Structure



Appendix E – AMCOM G-8 Analytics Academy Data Analytics Certification Program**Level I-Basic Training Course Requirements (Office 2016 Version)****Microsoft Excel 2016**

Register for Microsoft Excel Classes at <https://usarmy.skillport.com>

- Microsoft Excel 2016 Essentials: Formatting Data
 - ☐ Cell Formatting
 - ☐ Positioning Data
 - ☐ Practice: Format an Excel 2016 Workbook

- Microsoft Excel 2016 Essentials: Formulas & Functions
 - ☐ Basic Formulas
 - ☐ Formula Operators
 - ☐ Order of Operations
 - ☐ Defining Named Cell Ranges
 - ☐ Using Named Cell Ranges in Formulas
 - ☐ The SUM Function
 - ☐ AutoSum Functions
 - ☐ Basic Logical Functions
 - ☐ The IF Function
 - ☐ The IFERROR Function
 - ☐ Practice: Formulas & Functions

- Microsoft Excel 2016 Essentials: Charts, Tables, & Images
 - ☐ Using & Modifying Tables
 - ☐ Creating & Modifying Charts
 - ☐ Adjusting the Appearance of a Chart
 - ☐ Inserting & Modifying an Image
 - ☐ Inserting a Screenshot
 - ☐ Adding Header & Footer Information
 - ☐ Practice: Adding Charts & Tables to a Worksheet
 - ☐ Practice: Adding Images, Headers, & Footers to a Worksheet

- Excel 2016: Finding, Sorting, & Filtering Data
 - ☐ Using the Find & Replace Tools
 - ☐ Using the Find & Replace Tools in a Formula
 - ☐ Sorting Data
 - ☐ Filtering Data
 - ☐ Sorting & Filtering by Color
 - ☐ Using Slicers in Tables
 - ☐ Using Advanced Filter Options
 - ☐ Hiding Duplicate Values
 - ☐ Freezing & Unfreezing Panes
 - ☐ Grouping Items & Creating an Outline

●Excel 2016: Referencing Data

- ☐ Referencing Cells
- ☐ Using Data Across Multiple Worksheets
- ☐ Choosing Between Absolute & Relative Cell References
- ☐ Naming Data Ranges
- ☐ Performing Calculations Using Constant Values
- ☐ Using Cell References Indirectly
- ☐ Keeping an Eye on the Data
- ☐ Activating Automatic Updates
- ☐ Using Formula Auditing
- ☐ Understanding Formula Errors

●Excel 2016: Basic Formulas

- ☐ Inserting a Formula Using the Function Library
- ☐ Performing Simple Calculations with Formulas
- ☐ Using Automated Formulas in a Table
- ☐ Creating Automated Cumulative Totals
- ☐ Inserting Subtotals
- ☐ Counting Cells in a Range
- ☐ Ranking a Value
- ☐ Rounding a Number
- ☐ Using Replacement Formulas
- ☐ Converting Number Types
- ☐ Factorizing the Results of a Division
- ☐ Creating Random Values

●Excel 2016: Working with Formulas

- ☐ Calculating the Interest on a Loan
- ☐ Simulating a Loan
- ☐ Reaching a Target Value
- ☐ Solving a Problem
- ☐ Using the Forecast Tool
- ☐ Creating Automatic Reports
- ☐ Finding Identical Values in a Spreadsheet
- ☐ Finding Duplicates in a Document
- ☐ Visualizing Duplicate Values
- ☐ Preventing Duplicate Values

●Excel 2016: Creating Charts & Graphics

- ☐ Inserting a Chart
- ☐ Labeling a Chart
- ☐ Formatting a Chart
- ☐ Customizing Charts & a Chart Axis
- ☐ Creating a Chart Template
- ☐ Presenting Negative Values in a Chart
- ☐ Creating a Pie Chart

- ☐ Creating a Scatter Chart
- ☐ Creating a Bubble Chart
- ☐ Creating a Radar Chart
- ☐ Combining Two Types of Charts
- ☐ Creating a Comparative Chart Using Symbols
- ☐ Inserting Trend Lines
- ☐ Customizing Trend Lines

- Microsoft Office 2016 Intermediate Excel: Pivot Tables & Advanced Charts
 - ☐ Creating a Pivot Table
 - ☐ Editing Pivot Table Data
 - ☐ Styling Pivot Tables
 - ☐ Filtering Pivot Table Data
 - ☐ Creating a Pivot Chart
 - ☐ Creating a Pivot Chart from a Pivot Table
 - ☐ Modifying Pivot Charts
 - ☐ Using Trend Lines
 - ☐ Dual Axis Charts
 - ☐ Chart Templates
 - ☐ Practice: Pivot Tables & Pivot Charts

- Excel 2016: Custom & Conditional Formatting
 - ☐ Customizing Number, Text, Date, & Time Formats
 - ☐ Creating Conditional Custom Formats
 - ☐ Using the Conditional Formatting Tools
 - ☐ Using Advanced Conditional Formatting
 - ☐ Applying Color to the First New List Entry

- Excel 2016: Extracting Information with Formulas
 - ☐ Retrieving Information with Dates
 - ☐ Finding a Date Automatically
 - ☐ Finding the Largest & Smallest Values in a List
 - ☐ Separating Data into Multiple Cells
 - ☐ Combining Data Values in a Single Cell
 - ☐ Retrieving Information in a Cell
 - ☐ Retrieving Information in Text
 - ☐ Cross-Referencing Two Data Lists
 - ☐ Inserting Data Automatically
 - ☐ Finding a Value in a Double Entry Table
 - ☐ Performing a Search Across Two Tables
 - ☐ Finding Data in a Database
 - ☐ Performing Calculations Using a Database

Microsoft Access 2016

Register for Microsoft Access Classes at <https://usarmy.skillport.com>

- Access 2016: Introduction to the Access 2016 Interface, Database Management, & Tables

- ☐ Introduction to Databases
- ☐ Database Organization & Management
- ☐ Building Tables
- ☐ Practice: Creating Databases

- Access 2016: Creating Relationships, Queries, Forms & Reports in Access 2016

- ☐ Setting Relationships
- ☐ Building Forms
- ☐ Construct Queries
- ☐ Designing Reports
- ☐ Import & Export
- ☐ Practice: Working with Queries

- Access 2016: Creating Forms & Queries

- ☐ Creating a Data Entry Form Using the Wizard & From Scratch
- ☐ Using Different Form Types
- ☐ Inserting Text, Data Entry Fields, a List Box, a Check Box, & Buttons in a Form
- ☐ Reorganizing & Adding Information to the Form
- ☐ Customizing the Appearance of the Form
- ☐ Editing Form Properties
- ☐ Creating a Simple & Crosstab Query
- ☐ Performing a Simple Calculation
- ☐ Creating a Calculated Field

- Access 2016: Working with Databases

- ☐ Creating a Database
- ☐ Using Database Templates
- ☐ Understanding the Interface
- ☐ Customizing the Interface
- ☐ Customizing the Quick Access Toolbar
- ☐ Customizing the Ribbon

- Access 2016: Saving, Printing, & Exporting Databases

- ☐ Saving Data
- ☐ Saving Regularly
- ☐ Protecting the Database
- ☐ Printing Items in the Database
- ☐ Exporting the Database
- ☐ Sending the Database Table Via Email

- Access 2016: Tables, Fields, & Entries

- ☐ Understanding the Data
- ☐ Creating a Table
- ☐ Organizing Database Items
- ☐ Inserting & Formatting Fields in a Table
- ☐ Editing Database Field Properties
- ☐ Linking Data in Tables
- ☐ Managing Data Relationships
- ☐ Visualizing Object Dependencies

- Access 2016: Inserting, Importing, & Formatting Data

- ☐ Inserting Data into a Table
- ☐ Modifying the Default Editing Settings
- ☐ Using External Data in the Database
- ☐ Importing the Address Book from Outlook
- ☐ Formatting Data
- ☐ Creating Dropdown Menus
- ☐ Creating Data Validation Rules
- ☐ Creating Labels

- Access 2016: Finding & Organizing Data

- ☐ Sorting Data
- ☐ Filtering Data
- ☐ Locating a Data Value
- ☐ Replacing Data Values
- ☐ Editing Database Indexes
- ☐ Finding Duplicates in the Database

- Access 2016: Report & Analysis Tools

- ☐ Creating a Quick Report
- ☐ Creating Personalized Database Reports
- ☐ Customizing Reports
- ☐ Cleansing a Database
- ☐ Analyzing a Database

Microsoft Project 2016

Register for Microsoft Project Classes at <https://usarmy.skillport.com>

- Microsoft Project 2016: Setting Up Projects

- ☐ Creating a New Project
- ☐ Understanding the Structure of the Project
- ☐ Using the Built-In Chart Displays, Changing Display Modes, & Managing Display Modes
- ☐ Using Project Templates
- ☐ Using Spell Check for Projects

●Microsoft Project 2016: Managing Resources & Views in Project 2016

- ☐ Managing Project Plan Resources
- ☐ Assigning Task Resources
- ☐ Working with Views
- ☐ Practice: Working with Resources

Microsoft Power BI 2016

Register for Microsoft Power BI Classes at <https://usarmy.skillport.com>

●Data Analytics Using Power BI: Concepts

- ☐ Describing the Purpose of Business Intelligence
- ☐ Determining What the Data is Describing
- ☐ Describing How Data Visualizations Portray Meaningful Messages
- ☐ Using Self-Provisioning to Work with Power BI
- ☐ Defining Excel Functionality Related to Power BI
- ☐ Recognizing Power BI Capabilities
- ☐ Explaining the Power BI Cloud Service
- ☐ Creating a Personal Power BI Service Account
- ☐ Explaining the Power BI Desktop
- ☐ Installing the Power BI Desktop
- ☐ Using Mobile Device Apps to Interact with Power BI Dashboards & Reports
- ☐ Installing the Power BI App on Windows 10
- ☐ Determining the Region of Power BI Tenancy
- ☐ Recognizing When to Use Power BI Groups
- ☐ Describing Power BI Concepts & Establishing Data Sources

Tableau

Register for Tableau Class at <https://usarmy.skillport.com>

●Tableau Server: Introduction to Data Visualization

- ☐ Accessing the Tableau Server Introduction
- ☐ Understanding Tableau: Layout & Interaction Overview
- ☐ Visualizing Data Using Tableau Introduction
- ☐ Using Tableau Data Analytics Overview

●Tableau Server Exercises

- ☐ Connecting to a Data Source Using Tableau
- ☐ Filtering Data Using Tableau
- ☐ Sorting Data Using Tableau
- ☐ Displaying Specific Values Using Tableau
- ☐ Creating Combined Axis Values Using Tableau
- ☐ Creating Scatter Plot Views Using Tableau
- ☐ Saving Workbooks Using Tableau

Appendix F - AMCOM G-8 Analytics Academy (AA) Data Analytics Certification**Program Level II-Intermediate Training Course Requirements****(Office 2016 Version)****Analytical Decision Making-Techniques, Visualizations, & Communications:**Register for the following courses at: <https://usarmy.skillport.com>.**•Business Analysis Analytical Techniques**

- ☐ distinguish between benchmarking and market analysis characteristics
- ☐ distinguish between scope modeling and state modeling
- ☐ identify process modeling and analysis characteristics
- ☐ identify types of organizational models
- ☐ recognize interface definition elements
- ☐ distinguish between data flow diagram elements
- ☐ identify considerations for data mining and modeling
- ☐ recognize prototyping methods
- ☐ identify risk analysis and management characteristics
- ☐ recognize appropriate financial analysis techniques
- ☐ recognize the differences between decision modeling and decision analysis

•Business Analysis Activities and Tools

- ☐ distinguish between brainstorming and mind-mapping characteristics
- ☐ recognize differences between focus groups and workshops
- ☐ identify best practices for using surveys and questionnaires
- ☐ distinguish between interviews and observations; collaborative games and lessons learned activities
- ☐ distinguish between estimation and prioritization methods
- ☐ recognize considerations for assessing vendors
- ☐ identify elements of a business model canvas
- ☐ recognize characteristics of functional decomposition

•Business Analysis Documentation and Criteria

- ☐ distinguish between data dictionary elements
- ☐ recognize concept modeling limitations
- ☐ distinguish between definitional and behavioral rules
- ☐ identify characteristics of business capability analysis
- ☐ recognize use case elements, considerations for user stories and for establishing metrics and key performance indicators
- ☐ demonstrate your understanding of best practices for documentation and criteria creation

• Data Visualization:

- ☐ describe what data visualization is as well as good visualization and perception traits
- ☐ describe designing good narratives to go with the data visualizations
- ☐ distinguish between data visualization audiences and different types of visualization techniques
- ☐ use best practices to create meaningful data visualizations by adding effective visuals, text, functionality and color
- ☐ identify the difference between data visualization and infographics
- ☐ identify the types of interactivity required as well as the types of graphs, charts and maps to use for best results

•Raw Data to Insights: Data Management & Decision Making

- ☐ describe the capabilities and advantages provided with the application of data-driven decision making
- ☐ load data from databases, prepare data and implement exploratory data analysis using R
- ☐ recall and implement the concept of data correction using simple transformation rules and deductive correction
- ☐ describe the various essential distributed data management frameworks used to handle big data
- ☐ describe the approach of implementing data analytics and predictive modeling using Machine Learning

•Effective Team Communication

- ☐ recognize examples of jargon, bluffing, polarizing a team, screening and crushing ideas as verbal barriers to communication
- ☐ match strategies for maintaining and improving open communications during team meetings
- ☐ recognize why active listening is important for healthy team communication
- ☐ recognize examples of inquiring, acknowledging, reflecting and suspending judgement as techniques for active listening in a team setting

•Choosing the Right Interpersonal Communication Method to Make Your Point

- ☐ choose interpersonal communication methods that are most appropriate based on your intention
- ☐ recognize how audience characteristics inform your decision on which method to use for your interpersonal communications
- ☐ identify the best way to format and write e-mails
- ☐ recognize ways to connect with your audience during face-to-face interpersonal communications
- ☐ recognize how to start off on a positive note and keep emotions in check when delivering feedback to a coworker
- ☐ choose effective, efficient communication methods that properly convey intent

Data Analytics:

This section of Data Analytics course requirements can be satisfied by completing one of two training paths. Path 1 consists of a 240 minute Data Analytics Level III Class that is offered via FM Online. Path 2 consists of a set of four classes offered via Skillport. The completion of either path will satisfy the requirement for this section of training. If you choose to follow Path 1, your training certificate must be uploaded in GEARS when you apply for Level 2 certification because completion of the FM Online classes will not appear on your ATRRS transcript.

PATH 1:**•Data Analytics Level III**

- ☐ Review key statistical concepts
- ☐ Identify questions in which linear regression is useful
- ☐ Study the importance of using modelling to understand outcomes
- ☐ Understand the importance of gaining awareness of the pitfalls of statistical techniques
- ☐ Evaluate analyses of time series data and avoid spurious correlation problems
- ☐ Explore the goals of visualization

PATH 2:**•Data Science Statistics: Simple Descriptive Statistics**

- ☐ enumerate objectives of descriptive and inferential statistics, population and sample, and probability and non-probability sampling and distinguish between the two
- ☐ define the mean, median, mode, ranges, variance and standard deviation of a dataset and enumerate its properties
- ☐ differentiate between inferential and descriptive statistics, enumerate the two most important types of descriptive statistics

•Data Science Statistics: Inferential Statistics

- ☐ draw the shape of a Gaussian distribution and enumerate its defining properties
- ☐ enumerate the steps involved in hypothesis testing and define the null and alternative hypotheses
- ☐ describe the role of test statistic and p-value in accepting or rejecting a null hypothesis
- ☐ enumerate types and uses of t-tests in hypothesis testing
- ☐ define the skewness and kurtosis of a normally distributed random variable
- ☐ calculate the autocorrelation of a time series
- ☐ define linear regression, interpret the R-squared, and identify overfitting
- ☐ differentiate between null and alternative hypotheses, enumerate four use cases for t-tests, and calculate the correlation of time series with itself

•Six Sigma Probability and Statistical Distributions

- ☐ calculate the probability of given events using the addition and multiplication rules
- ☐ calculate a permutation and combination
- ☐ distinguish between types of variables and identify characteristics of normal distribution
- ☐ calculate the cumulative probability from the z-value
- ☐ recognize examples of using binomial, Poisson and other common distributions effectively

- ☐ demonstrate Six Sigma probability and statistical distributions
- Data Communication and Visualization
 - ☐ choose appropriate visualization techniques
 - ☐ describe the difference between correlation and causation and define Simpson's paradox
 - ☐ communicate data science results both formally and informally
 - ☐ implement strategies for effective data communication
 - ☐ use scatter plots, line graphs, bar charts, histograms, and box plots
 - ☐ create a network visualization, a bubble plot and an interactive plot

Microsoft Excel 2016 Courses:

Register for the following courses at: <https://usarmy.skillport.com>

•Microsoft Excel 2016 Advanced: Apps and What-if Analysis

- ☐ create and compare scenarios
- ☐ create summary reports of scenarios
- ☐ create single and multiple variable data tables

•Microsoft Excel 2016 Advanced: Power Pivot, Custom Formatting, Fills, and Forms

- ☐ configure Power Pivot and import data
- ☐ create a PivotTable using Power Pivot
- ☐ create custom conditional formatting rules
- ☐ apply complex filtering criteria
- ☐ use custom formats, filters, and fill series

•Microsoft Excel 2016 Advanced: Accessibility, Transforming Data, and Errors

- ☐ prepare workbooks for internationalization
- ☐ use Get & Transform to pull data together from different sources
- ☐ run the error checker
- ☐ troubleshoot formulas using the evaluate formula tool

Power BI Courses:

Register for the following courses at: <https://usarmy.skillport.com>

•Data Analytics Using Power BI: Data Sourcing and Preparation

- ☐ describe where Power BI data comes from
- ☐ recognize how Power BI can use data from files, databases and online sources
- ☐ use Quick Insights in the Power BI Service to quickly generate interactive data visualizations
- ☐ Import file, database and web data sources into Power BI
- ☐ configure the Power BI on-premises Gateway
- ☐ determine when the use of queries is appropriate
- ☐ recognize when data should be combined
- ☐ create an append and merge query
- ☐ ensure data is in a form usable by Power BI for querying and visualization

•Data Analytics Using Power BI: Data Modeling and Visualization

- ☐ recognize when to use Data View and Relationship View and how to navigate through them in Power BI Desktop
- ☐ recognize when to use Data View in Power BI Desktop
- ☐ create a DAX measure formula
- ☐ explain how KPIs are used to measure progress
- ☐ create a report and a custom dashboard in Power BI
- ☐ share a Power BI dashboard with other users
- ☐ filter visualizations using slicers
- ☐ ensure data is in a form usable by Power BI for querying and visualization

Tableau Courses:

Register for the following courses at: <https://usarmy.skillport.com>

•Tableau Desktop: Opening & Connecting Data Sources

- ☐ connect to a desktop source and use single and multiple tables to extract data into Tableau Data Engine
- ☐ directly connect to a Microsoft SQL Server database to enable working with live data
- ☐ configure and use Extract Mode with a Microsoft SQL Server database connection
- ☐ demonstrate how to use a custom SQL query with a database to extract data into the Tableau Data Engine
- ☐ use Google Analytics and Tableau to analyze your web data
- ☐ Work with an OData source to consume data in Tableau
- ☐ demonstrate and implement inner, left, right, cross-database and advanced joins using Tableau

•Tableau Desktop: Preparing & Cleaning Data

- ☐ use unions to combine data from different locations and append values in a single table
- ☐ Work with Data Interpreter to identify data anomalies and clean up data
- ☐ adjust data sources and connections in a Tableau workbook
- ☐ refresh live data sources and data extracts that are connected in Tableau Desktop
- ☐ append data from a data source or file to an existing data extract in Tableau Desktop

•Tableau Desktop: Blending & Managing Data Files

- ☐ describe the purpose of shelves, cards, and marks when building visualizations in Tableau Desktop
- ☐ connect to multiple data sources and use the relationship tool to demonstrate automatic data blending
- ☐ Work with custom geocode data to blend geographical data and import custom geocoding
- ☐ save Tableau workbooks, data extracts and data sources using various compatible formats
- ☐ Import worksheets, dashboards, and workbook contents into a Tableau Desktop file

•Tableau Desktop: Working with Data & Fields

- ☐ describe dimensions and measures, and discrete and continuous data
- ☐ use marks and control how dimensions and measures are used in a view
- ☐ set up default aggregation for a measure and default number format for date and number fields
- ☐ create, edit, and remove dynamic and fixed sets
- ☐ configure, manipulate, and combine sets in a view
- ☐ create bins, hierarchies and calculated fields
- ☐ assign geographic roles to fields

•Tableau Desktop: Creating Data Visualizations

- ☐ create vertical and horizontal bar charts to compare data across identified categories
- ☐ create box plots to depict the distribution of values and configure whiskers to display all points at the maximum extent of data
- ☐ create and configure maps that show quantitative values for individual locations
- ☐ create scatter plots and trend lines to visualize and compare relationships between numerical variables
- ☐ set up dual-axis charts using both number and date fields
- ☐ create a histogram to show data distribution
- ☐ create dynamic filters to depict data from different timeframes
- ☐ Work with reference lines, bands of an axis, trend lines, and forecasts using the Analytics pane

•Tableau Desktop: Performing Calculations

- ☐ Work with the string and date functions using the Calculated Field window
- ☐ use quick table calculations to quickly apply common table calculations to visualizations
- ☐ create simple LOD expressions and use them in visualizations
- ☐ demonstrate the use of EXCLUDE & FIXED LOD expressions in calculations
- ☐ demonstrate the approach to setting default aggregation for any measure which is not a calculated field and disaggregate all measures in the view
- ☐ create logical calculations to determine if certain conditions are true or false
- ☐ use aggregate functions to summarize or change the granularity of data
- ☐ demonstrate how to join calculations to work with data where common fields are missing

•Tableau Desktop: Going Deeper with Maps

- ☐ demonstrate the use of Radial, Rectangular, and Lasso selection tools
- ☐ create choropleth maps to depict ratio or aggregated data
- ☐ demonstrate the steps involved in creating maps using spatial files and geodatabases
- ☐ connect Tableau Desktop to geographical data contained in shape files
- ☐ demonstrate the process involved in creating density heat maps
- ☐ demonstrate the approach of selecting new background maps and setting default background maps
- ☐ group existing locations together to create custom territories or regions
- ☐ use Google Maps to quickly generate directions to the points identified in a map
- ☐ demonstrate how to create map views using Mapbox maps
- ☐ demonstrate the steps involved in blending two data sources and creating primary groups

Appendix G – Author Biography

Prior to her Senior Service College Fellowship selection, Dr. Nakia E. Redmon served as Comptroller for the US Army Aviation and Missile Command (AMCOM) G-8 Resource Management Directorate. As the Chief of the Comptroller Division, Dr. Redmon successfully coordinated, planned, executed, and reconciled AMCOM's one billion dollar annual OMA (Operations & Maintenance, Army) reimbursable and direct operating budgets. Prior to her appointment as the OMA Comptroller, Dr. Redmon departed her position as the Army Working Capital Fund (AWCF) Comptroller where she spent 12 years of her financial career from an intern to Division Chief. More than half of her career in government service has been devoted to supervision; managing anywhere from 10-85 employees, 9 supervisors, and several contractors.

Dr. Redmon was personally selected by Army Materiel Command's (AMC) Deputy Chief of Staff of Resource Management to lead the Army's new initiative, Category Management, on a 6-month detailed assignment in 2020. She was awarded a Civilian Service Achievement Medal by AMC's 4-star Commander for her leadership and results.

Dr. Redmon received a Doctorate in Education with a concentration in Organizational Leadership from Nova Southeastern University. Her dissertation research was titled: Retirement Wave: How to Keep Knowledge In-house Before Retirement Strikes. This research examined and developed strategies that can be implemented in order to capture knowledge from older government workers on an effective and consistent basis before retirement. She also completed graduate studies earning a Master of Business Administration from the Texas A&M University - Texarkana, and undergraduate degree in Business with an Accounting concentration from Jackson State University. Dr. Redmon entered the federal government as an AMC CP-11 Fellows Intern in 2002.

Public speaking is a passion Dr. Redmon possesses as she has participated in financial seminars at local colleges and universities. In addition, she has experience teaching accounting and finance courses at the collegiate level. Dr. Redmon is known for administering the following courses: Principles of Accounting I and II, Financial Analysis, Computerized Accounting (QuickBooks 2015), and Managerial Accounting.

Dr. Redmon is an Army Acquisition Corp Member certified Level III in a) Financial Management, b) Business, Cost Estimating, & Financial Management, and c) Logistics; and Level I in Program Management. She is also an Advanced Leader Investment for Tomorrow (ADVLIFT) graduate.

Dr. Redmon spends her personal time motivating everyone in her path as a public speaker, blogger, author, facilitator, and marriage retreat host. She currently resides in Alabama with her husband and their two beautiful children.