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EXPLORING PRODUCTIVITY AND WORKPLACE SATISFACTION OUTCOMES FOR EMPLOYEES PARTICIPATING IN TELEWORK AT THE AIR FORCE ACQUISITION MANAGEMENT AND INTEGRATION CENTER (AMIC)

June 2022

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OUTCOMES FOR EMPLOYEES PARTICIPATING IN TELEWORK AT THE
AIR FORCE ACQUISITION MANAGEMENT AND INTEGRATION CENTER
(AMIC)**

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ABSTRACT

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LIST OF ACRONYMS AND ABBREVIATIONS

ACC	Air Combat Command
AFFARS	Air Force Federal Acquisition Regulation Supplement
AFICC	Air Force Installation Contracting Center
AFIMSC	Air Force Installation and Mission Support Center
AMIC	Acquisition Management and Integration Center
BLS	Bureau of Labor Statistics
CDC	Center for Disease Control
COG	continuity of government
COOP	continuity of operations plan
CSAF	Chief of Staff, United States Air Force
DAF	Department of the Air Force
DET 2	detachment 2
DOD	Department of Defense
FAR	Federal Acquisition Regulation
FDA	Food and Drug Administration
FEVS	federal employee viewpoint survey
FPDS-NG	federal procurement data system-next generation
FTLM	Federal Telework Logic Model
GAO	Government Accountability Office
HEW	Department of Health, Education, and Welfare
HSC	Homeland Security Council
NIH	National Institutes of Health
O2F	office of the future
OL-C	operating location c
OMB	Office of Management and Budget
OPM	Office of Personnel Management
PDA	personal digital assistant
PGI	procedures, guidance, and information

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I. INTRODUCTION

A. BACKGROUND

In May 2006, under the leadership of President George W. Bush, the United States government's Homeland Security Council (HSC) published the *National Strategy for Pandemic Influenza Implementation Plan*, which included specific guidance to allocate resources as needed, including information technology infrastructure, to support employee telecommuting during a pandemic (Homeland Security Council [HSC], 2006). Based on that strategy, in August 2006, the Department of Defense (DOD) released the *Department of Defense Implementation Plan for Pandemic Influenza*, establishing that a viable continuity of operations plan (COOP) includes “planning that carefully considers the use of laptops, high-speed telecommunications links, Personal Digital Assistants (PDAs), and other systems that enable employees to perform essential functions while teleworking” (Department of Defense [DOD], 2006, p. 75).

The planning initially established for pandemic influenza proved useful for the DOD's response to the novel coronavirus disease by providing a baseline expectation for telework preparedness during a pandemic. On March 17, 2020, in response to COVID-19, the Acting Director of the Office of Management and Budget (OMB) released a memorandum for the heads of department and agencies to “maximize telework across the nation for the Federal workforce (including mandatory telework, if necessary), while maintaining mission-critical workforce needs” (Vought, 2020, p. 2). The Air Force Acquisition Management and Integration Center's (AMIC) leadership and workforce quickly adopted these requirements for the safety of their acquisition workforce, shifting from their pre-pandemic telework policy to 100% telework for non-essential employees.

AMIC leadership has faced ongoing decision-making challenges related to increased teleworking after the start of the COVID-19 pandemic in March 2020. AMIC employee telework policy pre-pandemic allowed employees to telework on a situational basis, with telework only authorized for special circumstances such as inclement weather, personal appointments, and special projects (Air Force Acquisition Management and

Integration Center [AMIC], 2019). The pandemic forced the majority of AMIC employees to accomplish 100% of their work in an at home telework environment. In July 2021, once more information was known about COVID-19, AMIC introduced new guidance related to telework in the form of a beta test, which permitted employees to telework eight days per pay period (AMIC, 2021c).

Given the ongoing changes described, as the scientific community builds its research-based knowledge surrounding COVID-19, a more nuanced application of pandemic safety has emerged. Major changes to the work environment, spurred by pandemic-induced telework, present the challenge of determining how organizations will support flexibility for workplace arrangements post-pandemic. For leaders, it also raises the question of whether employees are as productive in their job or as satisfied with their job when they telework as compared to completing their work from the office.

B. RESEARCH QUESTIONS

After the DOD and the Department of the Air Force (DAF) transitioned to an era of maximum telework in response to the COVID-19 pandemic, AMIC shifted from its pre-pandemic telework policy that allowed up to 30% telework per pay period on a situational basis, to 100% telework for all non-essential employees. In July 2021, the policy shifted to a beta test allowing 80% telework for AMIC employees (AMIC, 2019, 2021c). The initial shift to full-time telework in response to the pandemic was unprecedented.

This mixed methods study will analyze data before and during the COVID-19 pandemic with two purposes: first, to explore how changes to the amount of telework permitted at AMIC impact employee perceptions of productivity and workplace satisfaction, and second, to assess the relationship between available quantitative productivity measurements and AMIC employee perceptions of productivity. This research will provide context and recommendations for AMIC decisions related to telework in the future.

1. Primary Question

What are AMIC employees' perceptions regarding the role of teleworking in their productivity and satisfaction?

2. Secondary Question

What is the relationship between available quantitative productivity data and AMIC employees' perceptions of productivity?

C. METHODOLOGY

To provide context for the study, this research uses current and historical data and literature related to pandemic planning, telework, productivity, and satisfaction for federal employees. The study also uses qualitative and quantitative survey and workload data from AMIC focused on the following dates:

- Baseline, pre-pandemic, March 2019 – March 2020
- Pandemic, March 2020 – July 2021
- AMIC telework beta test, July 2021 – March 2022

First, the study documents changes to the amount of telework permitted at AMIC during the COVID-19 pandemic and identifies and assesses the drivers of those changes. Next, the research uses the Office of Personnel Management's (OPM) Federal Telework Logic Model (FTLM) to guide the evaluation of the inputs, outputs, and outcomes-impacts surrounding telework changes at AMIC (Office of Personnel Management [OPM], 2021c). The research sorts and analyzes the survey data to understand AMIC employees' perceptions of their productivity and satisfaction as it relates to the amount of telework allowed. Finally, quantitative data on AMIC employee productivity is weighed against survey findings to identify both common outcomes as well as points where they diverge. This data is used to determine whether perceptions of productivity and satisfaction at AMIC have changed in relation to the amount of telework allowed and whether quantitative productivity measures align with those perceptions.

D. REPORT ORGANIZATION

This report is organized into the following chapters:

- Chapter I establishes the background and research questions for this project, while providing an overview of the study's methodology.
- Chapter II reviews literature related to pandemic planning, federal telework, telework in the Air Force, telework at AMIC, and establishes appropriate research-based definitions for productivity and satisfaction.
- Chapter III provides the detailed methodology and data sources used for this project and presents the OPM's FTLM, which is used as a conceptual model for analysis.
- Chapter IV analyzes the data and presents the findings.
- Chapter V presents research conclusions, recommendations, limitations, and areas for future research.

E. SUMMARY

Chapter I provided the background for the use of telework in a pandemic situation and identified challenges that the COVID-19 pandemic has presented to AMIC leadership. These challenges, in turn, established the purpose for this study and corresponding research questions. A brief overview of the methodology used to assess this case is presented. The following chapter will present a review of existing literature on pandemic planning and applicable telework history with a focus on employee productivity and satisfaction to provide useful context for this study.

II. LITERATURE REVIEW

A. INTRODUCTION

This chapter focuses on a review of literature related to pandemic planning and telework in the federal government, Air Force, and AMIC. The literature review also establishes definitions of both productivity and satisfaction used for the purposes of this study. The review of the applicable literature is foundational to understanding the context of decisions made in relation to telework at AMIC. This chapter starts with a review of the government's pandemic influenza planning and the adaptation of that planning to the COVID-19 pandemic. Next, the literature review explores publications and experiences related to telework in the federal government, the Air Force, and at AMIC. Lastly, the chapter reviews research on productivity and satisfaction to establish definitions used to organize this study.

B. PANDEMIC PLANNING

While history will forever remember the 2020 COVID-19 pandemic as an unprecedented experience across the globe, national pandemic planning is nothing new. In 1977, a working group which included the Center for Disease Control (CDC), the National Institutes of Health (NIH), and the Food and Drug Administration (FDA), was tasked with preparing “a contingency plan to address all aspects of preparation for the next influenza pandemic” (Department of Health, Education, and Welfare [HEW], 1978, p. 1). The Interagency Work Group on Pandemic Influenza published the first *Plan for Pandemic Influenza* in 1978, and different iterations and updates were adapted throughout the 1980s and 1990s (Iskander et al., 2013). In 2006, the Homeland Security Council published the *National Strategy for Pandemic Influenza Implementation Plan*, with the first explicit mention of the use of telework and flexible work hours as a response mechanism related to social distancing in a pandemic (HSC, 2006). This strategy led the DOD to release its own implementation plan in August 2006, detailing specific guidance for continuity of operations and continuity of government (COG). This document provides specific guidance related to a pandemic, stating:

Unlike other catastrophic events, a pandemic will not be geographically or temporally bounded, and will not affect directly the physical infrastructure of an organization. These facts lead to unique planning considerations. Institutional planning efforts should build upon existing continuity of operations planning by the organization, but be expanded to address the following questions:

- How will the department protect the health and safety of its employees, especially those critical to mission essential functions?
- What are the department's essential functions and services, and how will these be maintained in the event of significant and sustained absenteeism?
- How will the department support the Federal response to a pandemic, and States and communities?
- How, when and what will the department communicate to its stakeholders during a pandemic? (DOD, 2006, p. 71)

The DOD's implementation plan also describes components of viable COOP capabilities related to managing increased absences. Specific concerns were that a pandemic could bring extended absenteeism because of personal illness, could increase time off because of the need to care for family members, or could require additional time off to decrease the likelihood of exposure to the virus (DOD, 2006). The DOD describes several additional elements of a viable COOP which include planning to ensure the performance of essential functions to aid in national recovery as well as delegating authority to ensure decision makers are in place in the event of increased absenteeism during a pandemic wave. The DOD also recommends making succession plans in the event decision makers are inaccessible. Another key element of the plan describes the need to establish alternate operating facilities, including consideration for social distancing through the use of telework. A final consideration endorses preparing for the use of interoperable systems allowing employees the ability to perform essential job functions while teleworking (DOD, 2006).

A recent article assessing existing pandemic planning in relation to the response to the COVID-19 pandemic found that "expectations, policies, and procedures focused on addressing influenza pandemics shaped responses to COVID-19" (Kirlin, 2020, p. 467). Preparedness for pandemic influenza failed to translate entirely to preparedness for the unexpected COVID-19 pandemic, in part because the novel coronavirus was both more

complex and more deadly than former virus spreading events (Kirlin, 2020). Nonetheless, the similarities between pandemic influenza guidance related to telework and the actions taken by the DOD in response to COVID-19 are evident, thus laying the groundwork for this study's review of telework literature.

C. FEDERAL TELEWORK AND COVID-19

On March 17, 2020, in response to COVID-19, the Acting Director of the OMB released a memorandum for the heads of departments and agencies stating, "The Federal Government, in partnership with state and local governments and the private sector, is adopting a concerted near-term operations posture that will appropriately align critical resources to slow down the transmission of COVID-19, while also ensuring that Government operations continue" (Vought, 2020, p. 1). This posture included actions such as adjusting non-mission-critical services to alleviate capacity for critical services, maximizing telework, extending telework ability to government contractors where feasible, and adjusting policy to prevent federal employees and contractors infected with COVID-19 from accessing federal facilities (Vought, 2020). Reducing face-to-face interaction where possible was necessary to maintain essential government operations while allowing for greater social distancing.

The history of federal telework reveals that prior to the execution of many federal emergency plans in response to COVID-19, there was a gradual establishment of and increase in the use of telework across federal agencies dating back to the 1990s, including its use in relation to emergency preparedness (OPM, n.d.-c). OPM maintains the official website of the federal government's telework program, providing details on the history, legislation, studies, and resources related to telework in the federal government (OPM, n.d.-b). OPM defines telework as "a work arrangement that allows an employee to perform work, during any part of regular, paid hours, at an approved alternative worksite" (OPM, n.d.-a, para. 1) and states that telework is "an important tool for achieving a resilient and results-oriented workforce" (OPM, n.d.-a, para. 1). President Barack Obama signed the key piece of legislation related to flexible workforce management into law on December 9, 2010. The Telework Enhancement Act of 2010 (the Act) applies to all federal agencies,

established the requirement for all executive agencies to incorporate telework into their COOP plans, and established the OPM as a source of guidance related to telework policy (Telework Enhancement Act, 2010). A requirement of the Act was that within 18 months of enactment, and then every 12 months thereafter, OPM would submit a report to Congress outlining progress for each executive agency. The report was to detail participation, methods for gathering telework data, and an assessment of each agency's progress and goals including the impact of telework on, as the Act states, "emergency readiness, energy use, recruitment and retention, performance, productivity, and employee attitudes and opinions regarding telework" (Telework Enhancement Act, 2010, p. 3170).

Because of the requirements of the Act, OPM has amassed extensive research and data on telework in the federal government, and more recently has added data obtained throughout the COVID-19 pandemic. OPM's newly released *2021 Guide to Telework and Remote Work in the Federal Government* states:

The COVID-19 pandemic forced even more adoption of telework and sparked a nationwide focus on telework as an important tool for safely and efficiently delivering mission-critical services in the public and private sectors during both short- and long-term emergencies. We know the benefits of telework for organizations and employers. A robust and well-practiced telework program improves employee performance and engagement and supports mission productivity and efficiency. Telework can serve as a critical workplace flexibility that enables agencies to meet mission-critical needs of the organization. And it can help Federal workers balance work and personal responsibilities and make use of beneficial work environments, thereby enhancing employee satisfaction and wellbeing, aiding retention, and serving as a draw to potential applicants. We also have an imperative to plan for a variety of contingencies, be them severe weather events, public health emergencies, and more. It's critical that the Federal government – and our workforce – remain flexible, resilient, and ready to continue our critical work on behalf of the American public, no matter the challenge. And as we saw during the past twenty months, never was the need for this increased flexibility and resiliency more important. (OPM, 2021a, p. 1)

A comparison between OPM's most recent results and their first yearly report to Congress and first yearly *Federal Employee Viewpoint Survey* (FEVS) released after the Act in 2012 reveals an 86% to 93% increase to agencies incorporating telework into their COOP (OPM, 2012b, 2021c), a 29% to 90% increase to eligible employees teleworking

(OPM, 2021c), and a 73% to 79% increase in positive satisfaction with telework (OPM, 2012a, 2020a).

A February 2022 report from the Government Accountability Office (GAO) also supports the sharp increase in the number of eligible employees teleworking because of the COVID-19 pandemic. In this report, the GAO collected and analyzed data provided by 24 federal agencies and found the amount of telework used increased significantly amongst them all (Government Accountability Office [GAO], 2022). The GAO analyzed data compiled from various systems across differing agencies which limited comparability. Because of this diversity of data sources, the GAO chose to report the data using ranges. The GAO report states that “the data, with the appropriate discussion of limitations, were sufficiently reliable for describing agencies’ use of telework during the pandemic” (GAO, 2022, p. 3). The Department of Defense reported telework hours as a percentage of total work hours increased from “about less than 5%” pre-pandemic to “about 30 to 50%” during the pandemic (GAO, 2022, p. 9). The percentage of DOD employees teleworking pre-pandemic was less than 25%, early pandemic percentages rose to about 50–75%, and during the pandemic the percentages hovered at 25–50% (GAO, 2022, p. 12). The GAO report also notes longstanding data issues related to the reliability of government-wide data provided by agencies, and more specifically, highlighted ways in which OPM could improve their own data collection related to telework across agencies to improve oversight (GAO, 2022).

This review of the history and recent reports on federal telework establishes that the use of telework has increased since the implementation of the Act in 2010 with a more substantial increase in response to the COVID-19 pandemic. It also highlights OPM’s research that a well-practiced telework program positively impacts employee performance and productivity, while boosting employee satisfaction and wellbeing.

D. TELEWORK IN THE AIR FORCE AND COVID-19

The Air Force has seen similar increases to the use of telework. The OPM yearly report to Congress shows the percentage of eligible Air Force employees teleworking averaged about 22% between fiscal years 2016 and 2019 (OPM, 2017, 2019, 2020b,

2021b). In fiscal year 2020, in light of the COVID-19 pandemic, the percentage nearly tripled, showing that 65% of eligible Air Force employees participated in telework (OPM, 2021c).

The Air Force AF/A1 is responsible for carrying out the manpower, personnel, and services functions for the Department of the Air Force (Department of the Air Force [DAF], 2019). Historically, AF/A1 has released telework fact sheets to provide information, guidance, and clarifications on telework in the Air Force. Most recently in May 2021, AF/A1 published the *Air Force Telework and Remote Work Guide* providing updated guidance considering lessons learned during the COVID-19 pandemic period (Headquarters Air Force AF/A1, 2021). One noted change in language from AF/A1's June 2011 *Telework Fact Sheet* to their May 2021 *Telework and Remote Work Guide* is the greater flexibility in determining eligibility for telework. The June 2011 fact sheet notes certain positions as being "not eligible" (Headquarters Air Force AF/A1PC, 2011, p. 2) for telework, while the May 2021 guide states those same positions are "not typically suitable for tele/remote work" (Headquarters Air Force AF/A1, 2021, p. 4). The latest Air Force guide also provides examples of the types of work most suited for telework. These examples include job tasks such as reading or drafting reports, accomplishing online training, participating in virtual meetings, reviewing documents and studies, preparing written correspondence, providing services where face to face interaction is not required, or similar tasks that do not require physical presence at a worksite (Headquarters Air Force AF/A1, 2021).

One example of an Air Force center taking advantage of the flexibilities provided by the COVID-19 pandemic is Colonel Kevin Mantovani, Vice Commander of the Air Force Installation and Mission Support Center (AFIMSC) at Joint Base San Antonio. During a January 2022 FCW Workshop titled "Telework – Hybrid and Forever?" Colonel Mantovani discussed the Office of the Future (O2F) initiative at AFIMSC. He mentions that like all other businesses in government and industry, AFIMSC has largely been in a telework status since spring of 2020 (Mantovani, 2022). Colonel Mantovani starts with a description of the type of work performed by the 3,900 AFIMSC staff. He mentions that at AFIMSC headquarters, most staff work in cubicles, providing engineering infrastructure,

contracting and acquisition, base services, finance, chaplain corps, logistics, communication, and public affairs related work. The nature of the work accomplished at AFIMSC fits the Air Force's 2021 guide describing the types of jobs that work well for telework (Headquarters Air Force AF/A1, 2021). Colonel Mantovani mentions the nature of the work as being one of several key factors for success. The others include leadership buy-in to support a hybrid model, the infrastructure and floorplan to support restructuring of space to include shared cubicles and group meeting space, technology to support mobility (e.g., laptops, computer screens, docking stations), and a positive culture focused on collaboration (Mantovani, 2022). Since the implementation of O2F, AFIMSC has reduced its physical footprint by 40%, has improved its ability to attract and retain talent, and has maximized flexibility allowing telework, hybrid, and permanent office space solutions (Mantovani, 2022). Colonel Mantovani concludes that the AFIMSC is trying to take the lead in the Air Force by providing an example and experimenting with the Office of the Future to allow the workforce to be better than it was pre-pandemic (Mantovani, 2022).

A recent article, published by the Air Force on May 18, 2021, discusses the updated guidance related to the use of telework. John Fedrigo, the acting assistant secretary of the Air Force for manpower and reserve affairs states, "the pandemic has shown we can be successful using telework in many areas of our mission, and it helps bridge our current force structure to the force we need in the future" (Secretary of the Air Force Public Affairs, 2021, para. 3). Lt. Gen. Brian Kelly, the Air Force deputy chief of staff for manpower, personnel, and services mentions some of the benefits to flexible work arrangements, saying,

with remote work, we can now attract someone with the specialized skills we need and not require them to relocate when it makes sense for the mission, the individual and a member's development. We recognize the value these flexible work arrangements can have, in some circumstances, to enhance work-life balance and maximize organizational productivity. (Secretary of the Air Force Public Affairs, 2021, para. 5)

Even more recently, General Charles Q. Brown, Jr., the Air Force Chief of Staff, released updated CSAF Action Orders with one action item calling on leaders across the Air Force to:

Assess lessons from USAF response to COVID-19 pandemic. Eliminate or re-prioritize low-value activities or processes not critical to Service function and mission success. Where feasible, propose modifications to military and civilian mission execution processes to leverage expanded telework and collaborative IT tools. Capture best practices to maximize effectiveness, efficiency, and minimize redundancy. (Brown, 2022, p. 5)

This review outlined the Air Force's increased use of telework in response to COVID-19, resulting in greater flexibility to telework guidance. As a direct result, many organizations are incorporating flexibilities introduced by the pandemic into their workplace. This literature review focused on perceived benefits across the Air Force, including mission improvements, improving work-life balance, and maximizing productivity in organizations where telework is well suited.

E. TELEWORK AT THE ACQUISITION MANAGEMENT AND INTEGRATION CENTER AND COVID-19

A review of literature specific to AMIC and its mission shows the organization is as an acquisition and management integration center comprised of a combined active duty and civilian team with a vast range of expertise related to acquisition and program management (AMIC, 2021a). The team of AMIC professionals provide service acquisition solutions to Air Force Major Command, Air Combat Command (ACC), with cradle to grave contract and program management (AMIC, 2021a). AMIC's Strategic Management Plan states, "the AMIC Mission is to deliver responsive, cost-effective, mission-focused acquisition solutions to maximize joint warfighter effectiveness" (AMIC, 2021a, p. 2). AMIC leadership boasts a culture of "people first, mission always," and pledges to "[arm] AMIC personnel with the tools and equipment, and quality of life" required to support the AMIC and ACC mission (AMIC, 2021a, p. 3).

Prior to the pandemic, a review of policy shows AMIC allowed up to 24 hours of telework per pay period on an ad hoc/situational basis only, providing examples such as "weather, home repair or similar appointments, special projects, etc." (AMIC, 2019, p. 3).

Because of the administrative nature of contracting, the job series saw quick and effective implementation of telework in response to the COVID-19 pandemic. A review of personal email communication between March 11, 2020, and March 24, 2020, highlights the ever-changing nature of an unfolding pandemic:

- Email dated March 11, 2020: From ACC Civilian Personnel, Employee Management Relations to employees of the 688th Cyber Wing. Communication attaching a memorandum dated March 8, 2020, signed by The Under Secretary of Defense, Personnel and Readiness. Provides updated guidance with a temporary waiver of policy through December 31, 2020, allowing civilians to telework during an emergency with a child or other persons requiring care or supervision present at home. This memo allowed local commanders to utilize the waiver upon declaration of a COOP for a pandemic health crisis (K. Bunton, email to author, March 11, 2020).
- Email dated March 19, 2020, 4:17 PM: From leadership at AMIC Detachment 2, Operating Location C (DET 2 OL-C) to all personnel of DET 2 OL-C. Communication highlighting guidance from the Wing Commander to maintain 50% presence to sustain mission capabilities, noting that leadership would assess unique circumstances requesting 100% telework on a case-by-case basis (D. Romo-Garza, email to author, March 19, 2020).
- Email dated March 19, 2020, 5:13 PM: From leadership at AMIC DET 2 OL-C to all personnel of DET 2 OL-C. Communication noting that all employees will continue to operate at 50% telework with updated safety guidelines to ensure the safety of the unit. The communication notes a process for requesting to telework more frequently than the approved 50% based on unique or special situations (D. Romo-Garza, email to author, March 19, 2020).
- Email dated March 22, 2020: From leadership at AMIC DET 2 OL-C to all personnel of DET 2 OL-C. Communication highlighting resiliency through the COVID-19 pandemic noting several key items including the safety of

team members being the top priority, encouraging the team to not allow COVID-19 to degrade our unit's capabilities, and highlighting this was the time to demonstrate commitment to the Air Force's core values (D. Romo-Garza, email to author, March 22, 2020).

- Email dated March 24, 2020: From leadership at AMIC DET 2 OL-C to all personnel of DET 2 OL-C. Communication noting that based on high-risk guidelines established by the CDC, the operating location would implement key and essential personnel measures effective March 24, 2020. This plan required non-essential personnel to shift to 100% telework until further notice to ensure the safety of the group (D. Romo-Garza, email to author, March 24, 2020).

Toward the end of March 2020, all divisions began to posture themselves for maximized telework, shifting to 100% telework for all non-essential personnel across AMIC. Employees remained in a position of maximized telework for the safety of the workforce through July 2021.

Effective July 5, 2021, after almost a year and a half with non-essential personnel teleworking at 100%, AMIC introduced a beta test, permitting employees to remain teleworking up to 64 hours per pay period (AMIC, 2021c). The goal of the beta test was for "AMIC [to] embark upon a more robust telework/remote work beta-test period incorporating lessons learned from COVID-19 pandemic" and "to continuously evaluate the efficiency and effectiveness of this new operational model during the beta-test period and make refinements as necessary to improve mission effectiveness and mission-partner support" (AMIC, 2021c, p. 1). As part of the beta test, all AMIC employees would begin working in their respective offices at least two days per pay period.

AMIC wanted to objectively assess the new operational model in this beta test. In an email, sent to the division in February 2022, the AMIC Director looked at the objectives set before the beta test: first, he noted success in increasing the safety of AMIC personnel by mitigating challenges of the pandemic, but second, he mentioned the continued need for data to evaluate AMIC's effectiveness supporting the mission under the expanded telework

posture (T. Applegate, email to author, February 11, 2022). The changes to the amount of telework allowed at AMIC would require evaluation to determine any impacts to mission requirements and workforce effectiveness, and to also assess workforce productivity and satisfaction.

This review outlined AMIC’s increased use of telework in response to COVID-19, and its shift to a telework beta test in July 2021. The changes to the amount of telework allowed at AMIC establishes the need for objective evaluation of the success of this new operational model.

F. DEFINING PRODUCTIVITY AND SATISFACTION

This literature review shows that across all levels of the federal government, the COVID-19 pandemic has brought some level of change to the previous understanding of “business as usual.” Increases to the amount of telework supported by government agencies, including AMIC, highlights the need to determine whether teleworking employees are still meeting mission requirements. Existing telework research mentions productivity, job satisfaction, and connections between the two as items positively related to effective implementation of telework programs (Gajendran & Harrison, 2007; Harker Martin & MacDonnell, 2012).

To sort and assess AMIC’s survey data effectively, research-based definitions for productivity and satisfaction are necessary. Existing research describes productivity and satisfaction broadly and in diverse ways depending on the context in which the research applies their use. Telework assessment models in research literature, including the FTLM used for this study, mention productivity and satisfaction as focus areas for assessing the outcomes and impacts of telework programs (Campbell & McDonald, 2007; OPM, 2021c).

1. Productivity

OPM’s FTLM states that agencies should “adopt location-independent ways of measuring performance and productivity” (OPM, 2021c, p. 41). In the private-sector, existing economics research, and supported by the Bureau of Labor Statistics, productivity is most often defined as a ratio related to an organization’s outputs and inputs: productivity

= units of output / units of input (Bureau of Labor Statistics [BLS], n.d.; Somani, 2021). Productivity is more difficult to measure in the public-sector, and AMIC faces the same concern. Somani's report confirms that "many public good and services are relatively complex, requiring multiple (often immeasurable) inputs from multiple individuals and sources" (Somani, 2021, p. 8). AMIC contract execution sees input from end users, contracting officers, contract administrators, program managers, policy experts, lawyers, finance, and more, which makes clear measurements of inputs and outputs difficult. Research finds that productivity in the federal workforce is often closely related to the existence of cohesive employee teams and how employees are treated in the workplace (Jung & Lee, 2015). In the context of telework, a 2015 study on working from home in a call center environment showed a sharp 21–28% rise in productivity (Bloom et al., 2015).

A review of productivity research in 2016 found that several of the top factors affecting productivity were related to what an organization provides their employees. These items included (1) encouragement, motivation, rewards, and recognition, (2) training courses and improvement options, (3) tools and equipment to raise productivity, (4) positive management involvement, (5) encouragement and effective communication, and (6) good working conditions (Kumar et al., 2016). With such a range of factors contributing to either productivity or feelings of productivity, a combination of assessment factors may provide better understanding of overall productivity. Somani's 2021 research recommends capturing both productivity and performance via a combination of macro- and micro-approaches. Macro approaches are defined by his report as "those that can only provide aggregate information – at the level of an organization, sector, or the whole public service" (Somani, 2021, p. 10) and micro approaches are defined by his report as "those that can extend down to individual employees, tasks, and processes" (Somani, 2021, p. 10).

2. Satisfaction

Paul Spector, in his 1997 book titled *Job Satisfaction: Application, Assessment, Causes, and Consequences*, says, "job satisfaction is simply how people feel about their jobs and different aspects of their jobs. It is the extent to which people like (satisfaction) or dislike (dissatisfaction) their jobs" (p. 2). Research also finds that employees in federal

agencies who share and understand the goals of their organization often have improved intrinsic and extrinsic motivation. These factors produce positive organizational outcomes, including improved job satisfaction (Kim & Park, 2014). Research looking at data reported in the *Survey of Federal Government Employees* collected by OPM in the early 1990s found that certain job characteristics and organizational characteristics have a significant impact on job satisfaction. Findings show that satisfaction with pay, growth opportunities, task understanding, skill utilization, commitment to the organization, and relationships with supervisors and co-workers all affected job satisfaction (Ting, 1997). A more recent review of determinants of job satisfaction looked at ten variables including overall satisfaction, workplace participation, intrinsic satisfaction, employee development, recognition for good work, organizational justice, pay satisfaction, relationships with coworkers, diversity management, and relationships with supervisors (Lee et al., 2020, p. 349). While this research intended to compare elements across racial and gender differences, results were statistically similar across all participants. The researchers found that all factors other than supervisor relationship related positively to job satisfaction and conclude, “participation and intrinsic motivation are the top two factors, while diversity management and relationships with coworkers and supervisors are the bottom three factors” (Lee et al., 2020, p. 354).

G. SUMMARY

This chapter provided a review of all literature relevant to the purpose of the study. The review established that pandemic planning in the federal government dates to the late 1970s and shaped the response to the COVID-19 pandemic. It also reviewed telework in the federal government and the Air Force, finding steady increases in the use of telework since 2010, with a sharp increase in the use of telework in response to the COVID-19 pandemic. Research revealed that both the federal government and Air Force are supportive of more expansive telework plans, where feasible. A review of AMIC, its mission set, its response to the pandemic, and policy related to the amount of telework allowed highlighted the need for a more robust assessment via a telework beta test. This chapter also reviewed the existing research related to productivity and job satisfaction. The recommendation to use a combination of macro- and micro-level measures to capture a more holistic

understanding of an organization's productivity provides a basis for determining the qualitative productivity measures used in this study. This research also revealed that employee feelings of productivity are underscored by what an employee feels they can provide to the organization's mission (output) based on their feelings about what their organization provides to them (inputs). A review of the determinants of job satisfaction showed positive relationships with both intrinsic and extrinsic motivators.

In short, this understanding of both productivity and job satisfaction will provide a basis for sorting and assessing AMIC's survey results. This review of existing literature provides a fundamental understanding of the relevant factors moving forward in this study.

III. METHODOLOGY

A. INTRODUCTION

This chapter provides details on the methodology used for this study, including the organization of data, approach to assessing it, and sources. The framework for this research is based on OPM’s FTLM, represented in Figure 1. The FTLM is a model developed by OPM in 2011 “to guide evaluation of the overall change initiative pursued under the Telework Enhancement Act” (OPM, 2021c, p. 40). While there are several theoretical frameworks related to telework, the FTLM provides a methodical approach to assessing the inputs, outputs, and results of telework implementation in a way that is specific to the setting of the federal government.

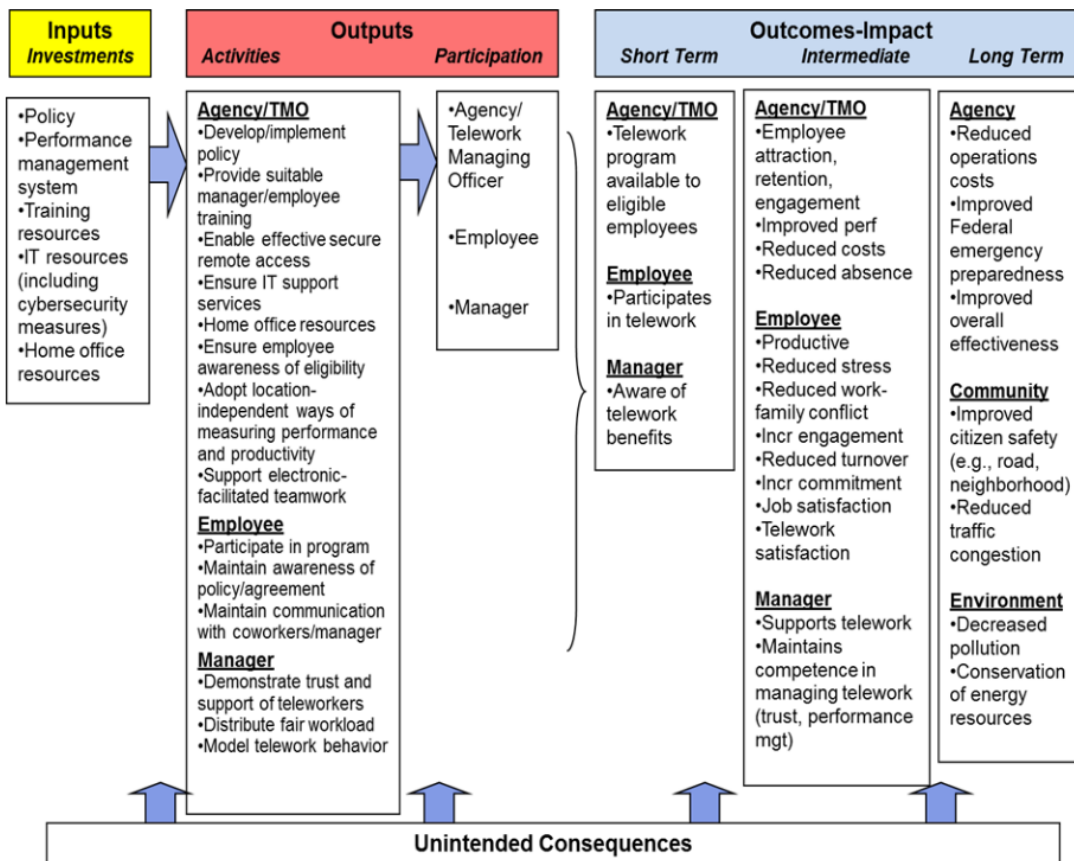


Figure 1. Federal Telework Logic Model (FTLM). Source: OPM (2021c, p. 40).

B. DATA ANALYSIS APPROACH

First, this study documents changes to the telework hours per pay period permitted at AMIC during the COVID-19 pandemic and identifies and assesses the drivers of those changes. Next, the research uses the OPM's FTLM, to evaluate the inputs, outputs, and outcomes-impacts surrounding telework changes at AMIC. This study also identifies any unintended consequences across inputs, outputs, or outcomes and impacts. The list below describes in detail this study's steps for analysis:

1. Identify and describe the changes to the amount of telework authorized at AMIC.
2. Identify and assess the drivers of telework policy changes at AMIC.
3. Identify processes in place to manage and support telework. The FTLM defines these as inputs, or "the resources that go into a program," and outputs, or "the direct results or products that result from the activities of participants" (OPM, 2021c, p. 40).
4. Assess outcomes and impacts to AMIC employees. The FTLM defines outcomes and impacts as "changes or benefits resulting from the program at multiple levels" (OPM, 2021c, p.41). This research will specifically look at the following:
 - Employee perceptions of productivity
 - Employee perceptions of satisfaction
 - Quantitative productivity measures
 - How quantitative productivity data relates to employee perceptions of productivity
5. Identify any unintended consequences across inputs, outputs, or outcomes and impacts.

While all steps in the analysis are important to provide a holistic evaluation of AMIC's implementation of telework, to answer the research questions for this study the primary

focus of analysis is in step four, assessing the outcomes and impacts to AMIC and its employees.

C. DATA SOURCES

This study completed its data collection on March 18, 2022. To accomplish step one, the research compiled previous and current AMIC telework policy documents to identify changes to the amount of telework allowed for AMIC employees. Step two utilizes the existing telework research described in Chapter II, which explored the drivers of telework changes at AMIC. To complete step three, this research collected Air Force documents and AMIC communication related to capabilities and improvements in systems to identify inputs and outputs related to telework.

Step four necessitated the most detailed data for analysis. To aid in this study's analysis of outcomes and impacts, AMIC provided access to qualitative and quantitative survey and workload data which this study sorts, where feasible, using the following dates:

- Baseline, pre-pandemic, March 2019 – March 2020
- Pandemic, March 2020 – July 2021
- AMIC telework beta test, July 2021 – March 2022

Since the start of the COVID-19 pandemic, AMIC has deployed several surveys to assess how telework has impacted its workforce. This research sorts and assesses selected responses to the following surveys described in detail below:

- AMIC released its first survey in March 2021, after all non-essential employees had been teleworking at 100% for a year. The survey had 298 responses. This group of survey questions makes direct comparisons related to productivity while physically in the office as opposed to productivity while teleworking from home, explores respondents' thoughts on telework related policy and workspace preferences, asks questions related to technology and connectivity expectations, and explores telework as it relates to quality of life (AMIC, 2021b). This study selected four questions from this survey for use in its analysis.

- The second survey provides responses from AMIC newcomers with 24 months of experience or less at the center. The survey was open for two weeks in November 2021 and received 122 responses from the 188 targeted personnel. The questions in this survey are closely related to job satisfaction and used a Likert scale, which allows respondents to choose from a series of answers that span extremes. The survey allowed responses ranging from Strongly Agree to Strongly Disagree (AMIC, 2021d). While the responses to this survey are closely tied to workplace satisfaction, this study did not use any of these survey responses in its analysis because the results represented only a fraction of AMIC personnel.
- The third survey was a poll administered via a Zoom meeting in November 2021, during AMIC's beta test, when all AMIC employees were reporting to the office 16 hours per pay period. This survey also used a Likert scale and allowed responses ranging from Strongly Agree to Strongly Disagree. The survey asked questions related to telework and morale at the time of the survey, and had 227 participants (AMIC, 2021e). This study selected seven questions from this survey for use in its analysis.
- The final survey was a poll administered via a Zoom meeting in February 2022, again during the time of AMIC's beta test, where employees continued to go into the office 16 hours per pay period while teleworking the other 64 hours. This survey had 316 participants and included eight questions with various response formats (dichotomous, Likert, and scaled). These questions were specific to satisfaction with AMIC, morale, communication, camaraderie, and mission partner interactions while teleworking (AMIC, 2022). This study selected one question from this survey for use in its analysis.

This study sorts the survey questions based on when AMIC employees completed each survey and assesses whether the survey question is related to job satisfaction or productivity using the understanding of productivity and satisfaction described in

Chapter II. The study then uses the analysis of those responses to assess whether AMIC perceptions of productivity and satisfaction have changed in response to the amount of telework allowed. This assessment provides insight into the primary research goal for this study: understanding AMIC employees' perceptions regarding the role of teleworking in their productivity and satisfaction.

As previously discussed in Chapter II, accurately assessing productivity in the public sector is best accomplished using several micro- and macro- approaches (Somani, 2021). While the scope of this study cannot use these measurements as an unequivocal assessment of productivity, this research was able to gain access to two macro-approaches, providing aggregate information at the level of the AMIC organization, and two micro-approaches, extending down to specific contracts. These measurements provide insight related to productivity at AMIC. This research sorts and assesses the quantitative productivity measures described below:

- Macro-approach one and two: number of contract actions and dollar value of contract actions. Federal Acquisition Regulation (FAR) subpart 4.6 defines contract action as “any oral or written action that results in the purchase, rent, or lease of supplies or equipment, services, or construction using appropriated dollars over the micro-purchase threshold, or modifications to these actions regardless of dollar value” (Federal Acquisition Regulation [FAR] 4.6, 2022). Contract actions and their dollar values are two macro-level measurements of productivity in acquisition, providing aggregate information related to the number of contract awards or modifications accomplished by the acquisition workforce and the total dollar value of the corresponding actions. The contract action and total dollar value data collected for AMIC used available SAM.gov Data Bank Standard Reports. The Standard Report used in this data collection was the Workload Report which provides actions and dollars for all federal government contracts. The workload report data was retrieved for this study on March 18, 2022, and the following report criteria was used to collect contract data specific to AMIC:

- Baseline, pre-pandemic: To obtain the number of contract actions and dollar values pre-pandemic, the date range corresponding to the date signed on procurement awards was set to pull contract actions from March 17, 2019, to March 16, 2020; Organization selections were 5700 – Dept of the Air Force (Sub Tier), AMIC-AMIC (Sub Command 1), and AMICDET2-AMICDET2 (Sub Command 2).
- Pandemic: To obtain the number of contract actions and dollar values during the pandemic, the date range corresponding to the date signed on procurement awards was set to pull contract actions from March 17, 2020, to July 16, 2021; Organization selections were 5700 – Dept of the Air Force (Sub Tier), AMIC-AMIC (Sub Command 1), and AMICDET2-AMICDET2 (Sub Command 2).
- AMIC telework beta test: To obtain the number of contract actions and dollar values during the beta test, the date range corresponding to the date signed on procurement awards was set to pull contract actions from July 17, 2021, to March 16, 2022; Organization selections were 5700 – Dept of the Air Force (Sub Tier), AMIC-AMIC (Sub Command 1), and AMICDET2-AMICDET2 (Sub Command 2).
- Micro-approach one: self-inspection results. AMIC provided internal contract self-inspection results from 2018 to 2021, which correspond roughly to pre-pandemic and pandemic timelines. The AMIC self-inspection process utilizes the Federal Procurement Data System–Next Generation (FPDS-NG) to pull select contract files for review in accordance with the requirements outlined in the Air Force Installation Contracting Center (AFICC) procedures, guidance, and information (PGI) 5301.601-91 (AFFARS PGI 5301.601-91, 2022). The referenced PGI notes the self-inspection process is “iterative and requires proactive trend and issue identification with the goal of improving the quality of the resultant contract files as well as the overall acquisition health of the unit” (AFFARS PGI

5301.601-91, 2022, para. 2). While self-inspection data is not yet available for beta test timelines, the study found this micro-measurement useful in providing well-rounded insight into the quality of related contract actions across timelines.

- Micro-approach two: AMIC also provided Services Summary Metrics from 2018 to 2021, corresponding roughly to pre-pandemic, pandemic, and beta test timelines. This measurement provides insight into the success of mission critical AMIC acquisitions by measuring whether specific contracts met or exceeded key performance metrics identified by the end user and acquisition multi-functional teams. Again, this micro-measurement provides value by comparing the results of key performance indicators for mission critical contracts across timelines.

This study sorts the data mentioned above using the baseline, pandemic, and beta test timeframes, and then determines how these productivity measures align with the productivity perceptions pulled from AMIC survey data. This assessment provides insight into the secondary research topic for this study: understanding the relationship between available quantitative productivity data and AMIC employees' perceptions of productivity.

Step five is an opportunity to look back on the review of telework changes at AMIC to assess whether there are any clear unintended consequences across inputs, outputs, or outcomes and impacts.

The data above is necessary to ascertain whether perceptions of productivity and satisfaction at AMIC have changed in relation to the amount of telework allowed and whether quantitative productivity measures align with those perceptions. Based on this assessment, this study makes recommendations for the AMIC leadership on future telework investments, activities to improve outcomes, and opportunities to address any unintended consequences.

D. SUMMARY

Chapter III provides detailed steps for use in the data analysis for this study, highlighting the primary focus of this study is assessing the outcomes and impacts of telework to AMIC and its employees. The primary source of survey information for this study comes directly from AMIC, which has obtained survey data from personnel throughout the pandemic. This study also pulled macro-level workload data in March 2022 from the Data Bank Standard Reports at SAM.gov. This macro-level data provides AMIC contract actions and dollar values of those actions from before, during, and since the pandemic. Additionally, the researcher requested and received access to AMIC's self-inspection reports and services summary metrics across identified timelines. This study sorts all data described using baseline, pandemic, and beta test timelines and uses the results to answer the research questions in this study. The following chapter uses the data described above to analyze, present findings, and discuss the implications of the research.

IV. ANALYSIS AND FINDINGS

A. INTRODUCTION

This chapter focuses on each step of the analysis described in Chapter III and presents the findings. These findings include the changes to the amount of telework allowed at AMIC, as well as the drivers of those changes. This study's analysis also provides limited insight into the processes in place, or inputs and outputs, from the Air Force and AMIC to manage and support telework. The findings related to the outcomes and impacts are the focus of this study, providing answers to the primary and secondary research questions. Lastly, the assessment explores unexpected consequences related to telework implementation at AMIC.

B. SUMMARY OF FINDINGS

This study found improvements in both perceptions of productivity and satisfaction when comparing the pandemic and beta test timelines to the pre-pandemic timeline. In addition, this study found that as feelings of productivity increased, most quantitative measurements of productivity also increased from the pre-pandemic timeline.

Key findings show that throughout the pandemic, as AMIC made changes to the amount of telework allowed, the organization continued to invest in essential resources in support of the telework program. When AMIC employees were teleworking 100% of the time during the pandemic, most employees indicated they felt more productive and more satisfied because of telework. These increased perceptions of productivity and satisfaction due to telework continued through the beta test when employees were teleworking 80% of the time. The study did find that feelings of satisfaction decreased slightly during the beta test compared to the pandemic timeframe. In addition to increased feelings of productivity, this study also found that most quantitative measurements of productivity remained stable or improved across timelines. During the pandemic while AMIC employees were teleworking 100% of the time, this study found quantitative productivity measures either stayed the same or increased when compared to pre-pandemic timelines. During the beta test, when AMIC employees were teleworking 80% of the time, productivity measures

were also higher than pre-pandemic measures. The study did find a slight decrease in average contract actions per month between the beta test and the pandemic timeframes. This section presents the detailed analysis described in Chapter III.

1. Changes to the Amount of Telework Allowed at AMIC

The AMIC policy review in Chapter II describes the changes to the amount of telework allowed at the AMIC. Prior to the COVID-19 pandemic, AMIC policy allowed telework only on an ad hoc/situational basis (AMIC, 2019). In March 2020, all divisions shifted to 100% telework for all non-essential AMIC employees. In July 2021, AMIC introduced a beta test, allowing employees to telework up to 64 hours per pay period (AMIC, 2021c). Table 1 shows the amount of telework allowed, organized by this study's pre-pandemic, pandemic, and beta test research timeframes.

Table 1. Changes to Telework at AMIC.

	Pre-Pandemic Previous – March 2020	Pandemic March 2020 – July 2021	Beta Test July 2021 – March 2022
Telework Allowed	Up to 30%	100%	80%

2. Drivers of Telework Policy Changes at AMIC

As described in Chapter II, COVID-19 and the safety of the workforce were the primary drivers for AMIC's shift to 100% telework. After a year of telework in response to the pandemic, AMIC surveyed its workforce in March 2021 with questions related to telework preferences, telework policy, and future expectations. Figure 2 displays survey results from March 2021 showing 98.3% of AMIC employees support continued use of expanded telework and 41.9% of AMIC employees felt their job duties required they go into the office on occasion (AMIC, 2021b). These results, paired with Air Force-wide support for expanded telework, in addition to AMIC's need to assess measurable success drove the implementation of a more robust telework program at AMIC, resulting in a beta test, allowing up to 80% telework.

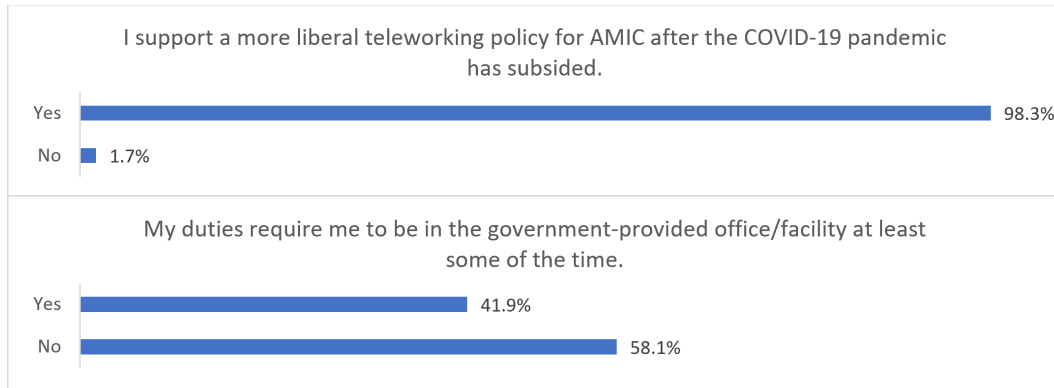


Figure 2. Drivers of Telework Beta Test. Adapted from AMIC (2021b).

3. Telework Inputs and Outputs at AMIC

OPM’s FTLM defines inputs as “the resources that go into a program,” and outputs as “the direct results or products that result from the activities of participants” (OPM, 2021c, p. 40). OPM provides a list of five investments, or inputs, that guide agency efforts for a successful telework program. Additionally, OPM lists several output components from the agency, employees, and managers in a successful telework change initiative (OPM, 2021c). The scope of this study does not include assessing the effectiveness of each component of AMIC’s telework program, but the center’s use of the components described by OPM gives insight into AMIC’s telework program outcomes. AMIC utilized the investments throughout the Air Force to aid in implementing telework, both during the changes related to the emergency pandemic and during the organization’s more intentional move to a well-planned beta test. During this time, AMIC updated policy, communicated eligibility, provided access to training and necessary office resources, all while ensuring that AMIC personnel had access to the tools necessary for telework success. One component described by OPM, and not found readily available in AMIC’s 2021 telework guide, was a clear definition of location-independent ways of measuring performance and productivity in the telework environment (AMIC, 2021c; OPM, 2021c). Table 2 identifies the OPM components used by AMIC throughout telework implementation.

Table 2. AMIC Telework Inputs and Outputs. Adapted from OPM (2021c).

Inputs Investments	Outputs Activities		
	Agency	Employee	Manager
• Policy • Performance management system • Training resources • IT resources (including cybersecurity measures) • Home office resources	• Develop/ implement policy • Provide suitable manager/ employee training • Enable effective secure remote access • Ensure IT support services • Provide home office resources • Ensure employee awareness of eligibility • Support electronic-facilitated teamwork	• Participate in program • Maintain awareness of policy/ agreement • Maintain communication with coworkers/ manager	• Demonstrate trust and support of teleworkers • Distribute fair workload • Model telework behavior

4. Telework Outcomes and Impacts at AMIC

The following findings associated with outcomes and impacts provide insight into the primary and secondary research topics of this study: understanding AMIC employees' perceptions regarding the role of teleworking in their productivity and satisfaction, and whether there is a relationship between available quantitative productivity data and AMIC employees' perceptions of productivity.

Before analyzing perceptions of productivity and job satisfaction, this study first used the research-based understandings described in Chapter II to identify survey questions to include in the study's analysis. Because the unexpected start date of the pandemic didn't allow for a baseline survey to assess AMIC employee perceptions of productivity or satisfaction, this study selected survey questions which were posed in a way that created a

direct connection to teleworking in its response. Because of the comparative nature of the selected survey questions, this study can presume participants are comparing feelings of productivity and job satisfaction while teleworking to feelings of productivity and satisfaction while not teleworking (in-office, pre-pandemic).

The study identified two survey questions related to individual perceptions of their own productivity while teleworking, and eight survey questions which closely relate to this study's understanding of job satisfaction while teleworking. The study selected the two questions related to productivity, because each explicitly mentioned productivity while teleworking. The eight questions selected related to satisfaction were less direct. Because of this, the research used the understanding of satisfaction described in Chapter II to identify survey questions related to telework which reflected the extent people like or dislike their job, their commitment and understanding of the organization, their connections with coworkers or supervisors, or their recognition for quality work (Kim & Park, 2014; Lee et al., 2020; Spector, 1997; Ting, 1997). This study organizes the survey questions into categories based on the dates AMIC received responses from participants, allowing for a comparison of perceptions of productivity and job satisfaction across the study's timelines. Table 3 provides the study's selected survey questions and categorizes them by relation to productivity or job satisfaction while teleworking and by the date participants completed the surveys.

Table 3. AMIC Survey Questions Related to Productivity or Job Satisfaction.

	Pre-Pandemic Previous – March 2020	Pandemic March 2020 – July 2021	Beta Test July 2021 – March 2022
Productivity	None	(1) Consider productivity while physically in the office vs. teleworking from home:	(1) Teleworking increases my productivity.

	Pre-Pandemic Previous – March 2020	Pandemic March 2020 – July 2021	Beta Test July 2021 – March 2022
Satisfaction	None	(1) I support a more liberal teleworking policy for AMIC after the COVID-19 pandemic has subsided. (2) Teleworking improves my quality of life.	(1) I feel connected to my coworkers while teleworking. (2) Teleworking has positively impacted my morale. (3) My supervisor has fostered a culture of trust while teleworking. (4) I feel adequately recognized for the work I do while teleworking. (5) Teleworking has positively impacted the likelihood of staying with the organization. (6) Teleworking has positively impacted communication.

a. Employee Perceptions of Productivity

To answer the primary research topic related to AMIC employees' perceptions regarding the role of teleworking in their productivity, the study identified two survey questions specific to individual feelings of productivity. This analysis included one from a survey administered during the pandemic while AMIC employees were teleworking 100% of the time, and one from a survey administered during the beta test while AMIC employees were teleworking 80% of the time. These two questions were directly related to individual feelings of productivity.

(1) Pandemic Survey Results (100% Telework), Productivity

Figure 3 provides survey results related to productivity obtained during the pandemic while AMIC employees were teleworking 100% of the time. The survey asked participants to consider productivity while physically in the office versus teleworking from home. The participant response to this question indicates 92.3% of AMIC employees feel they are equally or more productive while teleworking 100% in comparison to working in the office pre-pandemic (AMIC, 2021b).

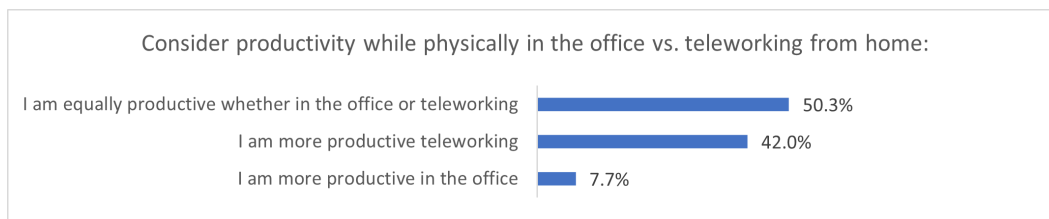


Figure 3. Pandemic Survey Results, Productivity. Adapted from AMIC (2021b).

(2) Beta Test Survey Results (80% Telework), Productivity

Figure 4 provides survey results related to productivity obtained during the beta test while AMIC employees were teleworking 80% of the time. The survey asked participants to assess whether teleworking increases their productivity. The participant response to this question shows 84.1% of AMIC employees agreed or strongly agreed that teleworking increases feelings of productivity when employees were teleworking 80% of the time. Of note, 11.5% of employees selected a neutral response, indicating that teleworking did not impact their productivity. For comparison, because the pandemic survey asked whether employees felt equally or more productive while teleworking, it makes the most sense for the beta test results to group neutral, agree, and strongly agree responses for the comparison of productivity. Thus, 95.6% of AMIC employees felt equally or more productive when teleworking 80% of the time (AMIC, 2021e).

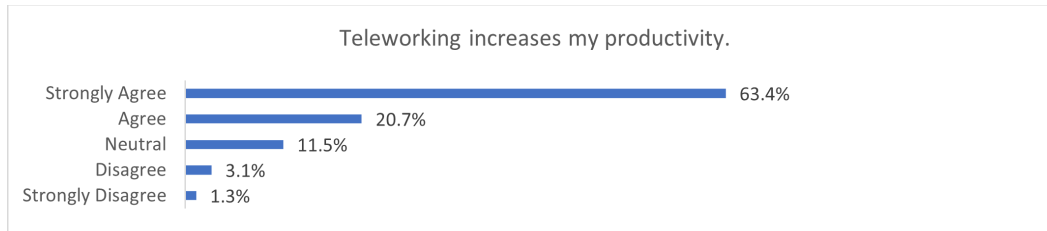


Figure 4. Beta Test Survey Results, Productivity. Adapted from AMIC (2021e).

b. Employee Perceptions of Satisfaction

To answer the primary research topic related to AMIC employees' perceptions regarding the role of teleworking in their satisfaction, the study identified eight survey questions specific to telework and closely related to feelings of job satisfaction. Two questions came from a survey administered during the pandemic while AMIC employees were teleworking 100% of the time, and six came from a survey administered during the beta test while AMIC employees were teleworking 80% of the time. These eight survey questions were related to telework and job satisfaction (Kim & Park, 2014; Lee et al., 2020; Spector, 1997; Ting, 1997).

(1) Pandemic Survey Results (100% Telework), Job Satisfaction

Figure 5 provides survey results related to job satisfaction obtained during the pandemic while AMIC employees were teleworking 100% of the time. The first question asked participants whether they supported a more liberal teleworking policy after the COVID-19 pandemic subsides. The participant response to this question indicates 98.3% of AMIC employees feel more satisfied with an expanded telework policy. The second question asked participants whether telework improves their quality of life. The participant response to this question indicates 93.6% of AMIC employees feel more satisfied with their quality of life while teleworking (AMIC, 2021b).

Using an average of the two positive responses, 96% of AMIC employees responded positively to questions closely related to job satisfaction during the pandemic when employees were teleworking 100% of the time.

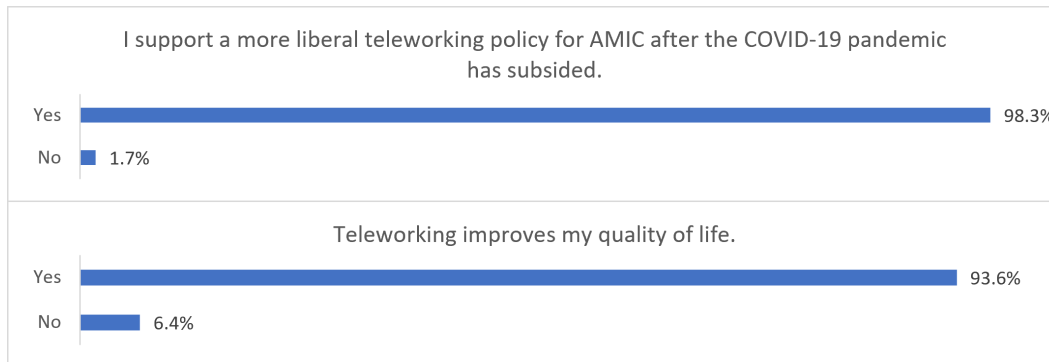


Figure 5. Pandemic Survey Results, Job Satisfaction. Adapted from AMIC (2021b).

(2) Beta Test Survey Results (80% Telework), Job Satisfaction

Figure 6 provides survey results related to job satisfaction obtained from a survey completed during the beta test while AMIC employees were teleworking 80% of the time. The first question asked participants whether they felt connected to coworkers while teleworking. The participant response to this question indicates 80.2% of AMIC employees agreed or strongly agreed they feel connected to coworkers while teleworking. The second question explored whether participants felt teleworking positivity impacted their morale. Responses from AMIC personnel indicate 85.9% of personnel agreed or strongly agreed that teleworking has improved their morale. The third question asks respondents to consider whether their supervisor has fostered a culture of trust while teleworking. The participant response to this question shows 92.5% of AMIC employees agreed or strongly agreed supervisors fostered a culture of trust while teleworking. The fourth question asked participants whether they felt adequately recognized for their work while teleworking. The participant response to this question indicates 86.3% of personnel agreed or strongly agreed they felt adequately recognized for their work. The fifth question asks respondents whether teleworking has positively impacted the likelihood of staying with the AMIC organization. The participant response to this question indicates 87.2% of employees agreed or strongly agreed teleworking has positively impacted the likelihood of staying with AMIC. The last survey question related to job satisfaction explores whether teleworking has positively impacted communication. The responses from AMIC employees show 75.8% agree or strongly agree teleworking has improved communication (AMIC, 2021e).

Using an average of the six responses, 84.7% of AMIC employees responded positively to questions closely related to job satisfaction during the beta test when employees were teleworking 80% of the time.

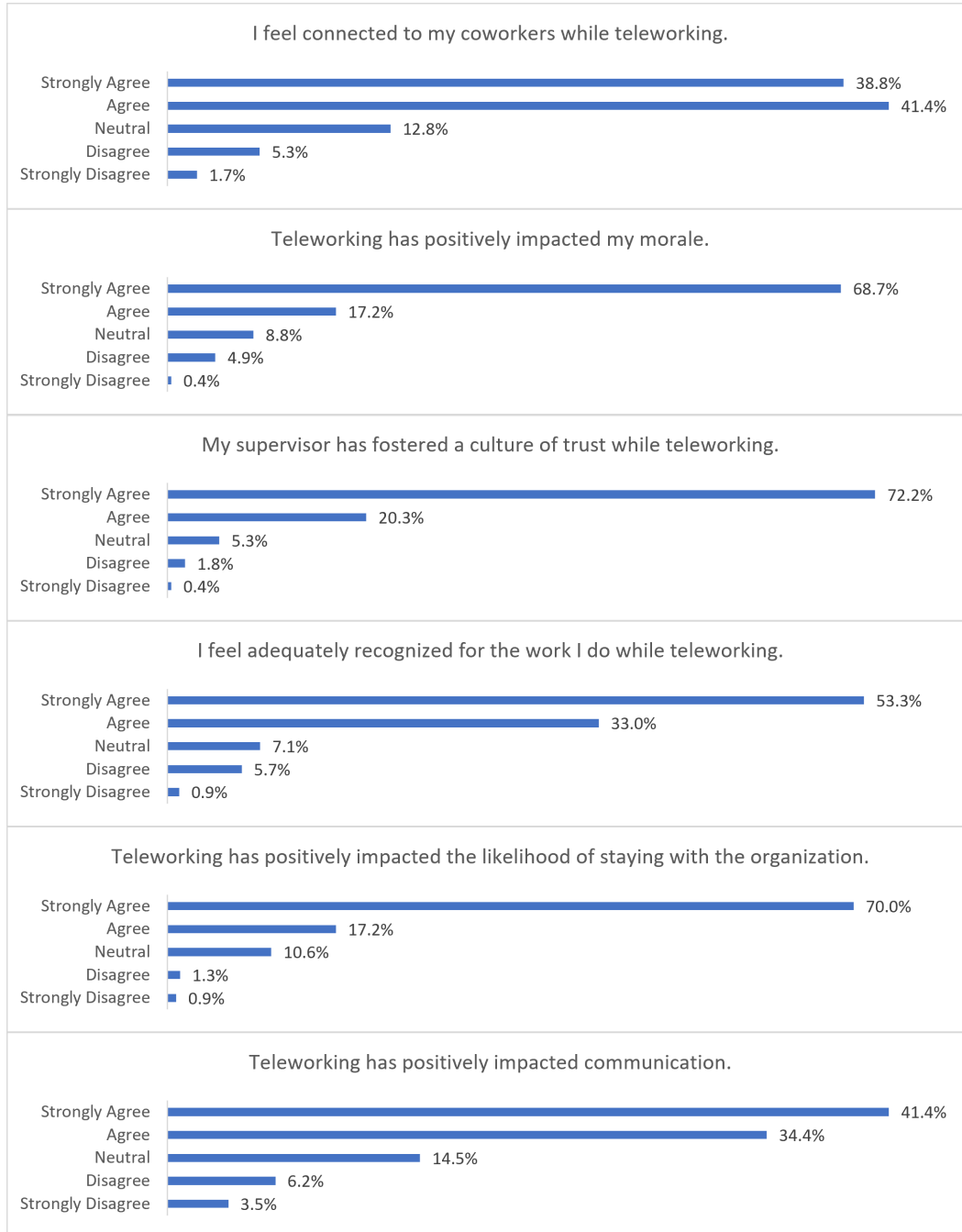


Figure 6. Beta Test Survey Results, Job Satisfaction. Adapted from AMIC (2021e).

c. Comparison of Findings

These findings show that as expanded telework continues at AMIC, perceptions of both productivity and satisfaction have increased from the pre-pandemic timeframe, but positive responses related to job satisfaction decreased during the beta test. Table 4 provides a comparison of the perceptions of productivity and job satisfaction as they relate to the amount of telework allowed and provides insight into employee perceptions regarding the role of teleworking in their productivity and satisfaction.

Table 4. Changes to Perceptions of Productivity and Job Satisfaction at AMIC

	Pre-Pandemic Previous – March 2020	Pandemic March 2020 – July 2021	Beta Test July 2021 – March 2022
Telework Allowed	Up to 30%	100%	80%
Productivity	N/A	92.3%	95.6%
Job Satisfaction	N/A	96.0%	84.7%

Conclusions on the decrease in job satisfaction percentages should be made with caution. The survey questions available for assessment related to pandemic job satisfaction were dichotomous in nature, only allowing agreement or disagreement with the survey question, whereas the survey questions available for assessment related to job satisfaction during the beta test used a Likert scaled response, allowing for more choices between two extremes. Across the six beta test survey questions, an average of 9.9% of AMIC employees selected neutral responses. Neutral responses were not included in the 84.7% of positive responses, but also do not indicate negative feelings related to job satisfaction.

Because of this limitation, this study considered one additional survey question, which did not directly tie responses to telework, but did relate directly to job satisfaction when AMIC was teleworking 80% of the time. AMIC administered this survey in February 2022 and asked participants whether they are happy working at AMIC. Figure 7 shows the participant response to this dichotomous question indicates 94.6% of AMIC employees felt satisfied working at AMIC during the telework beta test (AMIC, 2022).

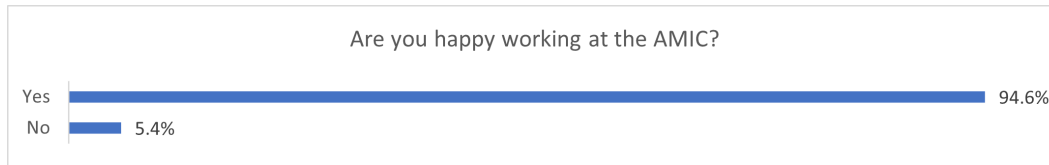


Figure 7. Beta Test Survey Results, Dichotomous Job Satisfaction. Adapted from AMIC (2022).

Updating the findings to include the additional survey responses and averaging the two positive response percentages shows an average of 89.6% of AMIC employees responded positively to questions closely related to job satisfaction during the beta test when employees were teleworking 80% of the time (AMIC, 2021e, 2022). The addition of this survey question provides better understanding of job satisfaction at AMIC during the telework beta test, but still results in a slight decrease in positive responses related to job satisfaction. Table 5 provides the updated comparison of the perceptions of productivity and job satisfaction as they relate to the amount of telework allowed at AMIC.

Table 5. Updated Changes to Perceptions of Productivity and Job Satisfaction at AMIC

	Pre-Pandemic Previous – March 2020	Pandemic March 2020 – July 2021	Beta Test July 2021 – March 2022
Telework Allowed	Up to 30%	100%	80%
Productivity	N/A	92.3%	95.6%
Job Satisfaction	N/A	96.0%	(84.7% + 94.6%/2) 89.6%

d. Quantitative Productivity Measures

The study uses the findings on feelings of productivity and available quantitative productivity data to explore the secondary research topic. This topic aims to understand whether there is relationship between available quantitative productivity data and AMIC employees' perceptions of productivity.

This study compares four quantitative measures of productivity, described in detail in Chapter III, across pre-pandemic, pandemic, and beta test timelines. Two measurements

provide aggregate information on productivity across the AMIC organization. These macro-approaches provide the total and monthly average of the number of contract actions and the total and monthly average of the dollar value of those actions. While not every contract action is a quality contract action, and the dollar value of actions encompass many factors that are outside of the direct control of AMIC personnel, these measurements provide a baseline for comparison over time and represent work completion at AMIC. To ensure this research has a holistic assessment of productivity, the study also assesses two additional granular measures of productivity, self-inspection results and services summary metrics. These micro-approaches focus on specific contract quality results and key performance metric success. Chapter III provides details on each measurement used in this analysis. The combination of these macro- and micro- approaches represent public sector productivity measurements necessary for the scope of this research (Somani, 2021). Table 6 provides each measurement categorized by date to show productivity changes over time at AMIC.

Table 6. Macro- and Micro- Productivity Measures at AMIC

		Pre-Pandemic	Pandemic	Beta Test
Contract Actions	Total	664	1641	765
	Average/Month	55	103	96
Dollar Value of Actions	Total	\$362.7M	\$584.6M	\$328.3M
	Average/Month	\$30.2M	\$36.5M	\$41M
Self-Inspection Findings per Action		1.81	1.82	N/A
Service Summary Metrics Success Rate		98.1%	98.8%	99.1%

e. How Quantitative Productivity Relates to Employee Perceptions of Productivity

Table 7 compares AMIC employee perceptions of productivity and available AMIC productivity measures providing insight into the relationship between the data. The comparisons show a predominantly positive relationship between employee perceptions of productivity and quantitative productivity measures at AMIC.

Table 7. Perceptions of Productivity and Productivity Measures

	Pre-Pandemic	Pandemic	Beta Test
Employee Perceptions of Productivity	N/A	92.3%	95.6%
Average Contract Actions/Month	55	103	96
Average Dollar Value of Actions/Month	\$30.2M	\$36.5M	\$41M
Self-Inspection Findings per Action	1.81	1.82	N/A
Service Summary Metrics Success Rate	98.1%	98.8%	99.1%

5. Unintended Consequences at AMIC

OPM's FTLM recommends assessing unintended consequences throughout telework implementation (OPM, 2021c). The pandemic was unexpected, but AMIC adapted quickly to the needs of its workforce. In assessing inputs and outputs, this study did not identify any significant unintended consequences related to telework that AMIC did not quickly overcome. AMIC could benefit from improving one recommended output from OPM by adopting a location-independent way of measuring performance and productivity (OPM, 2021c). While this study uses a mixture of available micro- and macro-approaches to measure productivity, this only provides a snapshot of productivity over time. More detailed data internal to the organization could improve AMIC's understanding of its productivity.

This study's primary focus was outcomes and impacts specific to productivity and satisfaction at AMIC. While minor, the data suggests a slight decrease in the percentage of positive responses related to job satisfaction at AMIC between the pandemic and beta test timeframes. AMIC should monitor this decrease in positive responses related to satisfaction to determine more specific causes. Additionally, the study found a minimal decrease in the average contract actions per month at AMIC between the pandemic and beta test timeframes. Because other productivity measures remained consistent or increased across the same time period, this is likely not indicative in an overall reduction in productivity.

C. DISCUSSION OF FINDINGS

This study found overall positive results related to telework at AMIC. The amount of telework allowed at AMIC quickly adapted to the changing environment of the COVID-19 pandemic. AMIC initially adjusted from its pre-pandemic policy, allowing up to 30% telework on a situational basis, to emergency implementation of 100% telework, setting up all non-essential AMIC employees with the ability to telework in response to the pandemic. The center later moved toward AMIC's telework beta test implementing policy allowing personnel to telework up to 80% of the time. Across these changes, AMIC invested in supporting its workforce throughout the pandemic with the tools and resources necessary to establish a robust telework program. These actions were undoubtedly part of the outcomes and impacts assessed in this study, which showed promising results.

Feelings of productivity and job satisfaction at AMIC improved significantly with the increase to 100% telework during the pandemic. In March 2021, after teleworking at 100% for one year, 92.3% of AMIC's 298 survey participants felt they were either equally or more productive teleworking compared to working in the office. Increased telework also impacted job satisfaction positively, with 98.3% of the 298 survey participants supporting a more liberal telework policy after the COVID-19 pandemic has subsided, and 93.6% agreeing that telework improves their quality of life. When teleworking at 100% during the pandemic the vast majority of AMIC personnel felt more productive and more satisfied because of telework.

Improved feelings of productivity and satisfaction continued during the telework beta test. In November 2021, four months after implementation of the beta test requiring personnel to return to the office twice per pay period, 95.6% of the 227 survey participants felt productivity stayed the same or improved when teleworking. Again, teleworking also continued to impact job satisfaction positively, showing that an average of 84.7% of the 227 survey participants responded positively to questions related to job satisfaction while teleworking. In February 2022, seven months into the beta test, 94.6% of the 316 survey participants responded that they were happy working at the AMIC. During the beta test, when employees were teleworking 80% of the time, the majority of AMIC personnel continued to feel more productive and more satisfied because of telework. While overall

feelings of satisfaction related to teleworking during the beta test were positive when compared to the limited amount of telework allowed pre-pandemic, this study found there was a slight decrease in positive perceptions of job satisfaction between the pandemic and beta test results. Because of the overwhelmingly positive responses to telework at AMIC, it is possible that personnel who responded positively to questions related to satisfaction while AMIC was teleworking at 100% could feel less satisfied after the organization shifted to its beta test, reducing the amount of telework allowed to 80%. It is also likely that the difference between dichotomous and Likert scaled response options impacted the percentage of positive responses.

As this study's findings describe, feelings of productivity are only a piece of this assessment. This study's findings identified both improved feelings of productivity at AMIC and examples of quantitative productivity measures supporting increased productivity. During the pre-pandemic timeline, AMIC averaged fifty-five contract actions per month, with an average monthly dollar value of \$30.2M. The quality of these actions was consistent, with AMIC self-inspection results showing an average of 1.81 findings per reviewed action and AMIC's contract service summary metric showing a 98.1% success rate. During the pandemic timeline, as feelings of productivity increased, AMIC averaged 103 contract actions per month, with the average monthly dollar value increasing to \$36.5M. During the same time, AMIC self-inspection results identified an average of 1.82 findings per reviewed action and its contract service summary metrics saw a 98.8% success rate. Lastly, during the telework beta test timeline, AMIC survey results continued to show increased feelings of productivity, average contract actions per month decreased slightly to ninety-six, and the average monthly dollar value of those actions increased to \$41M. While self-inspection results were not available for the beta test timeline, AMIC's service summary metrics increased to a 99.1% success rate.

A review of these findings shows that, except for average contract actions per month between the pandemic and the beta test period, all quantitative productivity measures remained the same or improved as feelings of productivity at AMIC improved. The average number of actions per month decreased from 103 during the pandemic to

ninety-six during the beta test, but overall, both were significantly higher than the pre-pandemic average of fifty-five contract actions per month.

D. SUMMARY

Chapter IV describes this study's analysis and findings. The study assessed the changes to the amount of telework allowed at AMIC driven by both the COVID-19 pandemic and the safety of the workforce as well as survey results indicating overwhelming support for a more robust telework program at AMIC. Using the FTLM, the study then evaluated the telework changes at AMIC, looking at inputs, outputs, outcomes and impacts, as well as unintended consequences. The study's assessment of findings showed strong inputs and outputs from AMIC, resulting in positive outcomes and impacts related to productivity and satisfaction, and very few unintended consequences surrounding telework changes at AMIC. The study used this data to discuss changes to feelings of productivity and satisfaction at AMIC and how quantitative productivity measures align with those perceptions. The closing chapter will conclude with answers to both research questions, recommendations related to future telework decisions at AMIC, limitations, and areas for future research.

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V. CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION

This chapter provides answers to both the primary and secondary research questions, providing insight into whether AMIC employee perceptions of productivity and satisfaction have changed in relation to the amount of telework allowed and whether measurable productivity aligns with those perceptions. The results of this study steer the researcher's recommendations for AMIC decisions related to telework in the future. This chapter also describes the study's limitations as well as areas for future research. The conclusion summarizes the key findings and implications of the study.

B. ANSWERS TO RESEARCH QUESTIONS

As a result of experiences during the COVID-19 pandemic, organizations are recognizing the benefits of increased workplace flexibility. These flexibilities, including increased telework, are becoming more prevalent in the federal government. The changes to the amount of telework allowed at AMIC during the pandemic presented unanswered questions about balancing mission success with employee feelings of productivity and job satisfaction, leading to the research questions for this study.

1. Primary Question

The primary research question asked, "What are AMIC employees' perceptions regarding the role of teleworking in their productivity and satisfaction?" Chapter IV, Analysis and Findings, Table 5 presents the study's results showing the overall changes to AMIC employee perceptions of productivity and satisfaction as each relates to the amount of telework allowed.

This study found that AMIC employee feelings of productivity related positively to the implementation of telework during both the pandemic and beta test timeframes. The literature review in Chapter II identified that feelings of productivity were often related to what an organization was able to provide employees to support that productivity (Kumar et al., 2016). This study's assessment of inputs and outputs, in addition to its review of

survey responses provided throughout the pandemic and beta test timeframes, shows that AMIC's actions support its employees' increased feelings of productivity. Feelings of workplace satisfaction also increased overall but decreased slightly during the beta test. The literature review in Chapter II highlighted that items such as organizational understanding, relationships with other employees and supervisors, as well as recognition for quality work impact feelings of job satisfaction (Kim & Park, 2014; Lee et al., 2020; Ting, 1997). Job satisfaction is ultimately a question of how well employees like or dislike their job (Spector, 1997). AMIC employee feelings of job satisfaction related most positively to telework during the pandemic, when employees were teleworking 100% of the time. Although positive responses related to employee feelings of job satisfaction did decrease slightly during the beta test, additional research would be necessary to assess whether the amount of telework, or other components, were determining factors in that decrease. In summary, these findings reveal that compared to pre-pandemic timelines, AMIC employees feel both more productive and more satisfied with increased telework.

2. Secondary Question

The secondary research question asked, "What is the relationship between available quantitative productivity data and AMIC employees' perceptions of productivity?" Chapter IV, Analysis and Findings, Table 7 presents the study's results regarding the relationship between AMIC employee perceptions of productivity and available quantitative measures of productivity.

This study found certain instances where quantitative productivity data and AMIC employees' perceptions of productivity were positively related. Between the pre-pandemic and pandemic timeline, while feelings of productivity improved, the average contract actions per month, average dollar value of actions per month, and services summary metrics success rate also increased. Self-inspection findings per action remained consistent. Between the pandemic and beta test timelines, while feelings of productivity continued to increase, the average number of contract actions per month dropped slightly, and both the average dollar value of actions per month and the service summary metrics success rate continued to rise. Overall, the findings show that compared to pre-pandemic timelines with less telework, AMIC employees feel more productive, are awarding more contract actions,

the dollar value of those actions is higher on average, the quality of the actions remains consistent, and the measurable success rates are improving.

C. RECOMMENDATIONS

The findings of this research lead to three recommendations for future decisions related to telework at AMIC. First, based on the comparison of the inputs and outputs recommended by OPM and described in this study's analysis, AMIC should clearly define and communicate internal measures of productivity so all divisions across the organization know and understand this measure of success while teleworking. This study's assessment of productivity, paired with recent research, provides a potential path forward for better defining productivity at AMIC. Somani's 2021 research, introduced in Chapter II, provides a thorough analysis of how to translate specific measurements into objective calculations of productivity in the public sector. Because this level of analysis is outside of the scope of this study, AMIC should assess whether additional technical and data recommendations for macro- and micro- productivity are available to build a more robust assessment of productivity within the organization (Somani, 2021). Once established, clear definitions related to internal measures of productivity can help identify any gaps between employee perceptions of productivity and AMIC's expectations for employee productivity.

Second, this research shows that AMIC employees feel more satisfied and more productive when teleworking compared to the limited amount of telework allowed during pre-pandemic timelines. The research also shows that throughout the implementation of increased telework at AMIC, there were no obvious detriments to quantitative productivity measures. Both the number of contract actions and the dollar value of those actions increased, while available measurements reflecting the quality of contract actions remained consistent or increased compared to the pre-pandemic timeframe. These findings support the continued use of expanded telework at AMIC. Because of the success of telework at AMIC, the organization should consider whether additional workplace considerations are feasible. For example, expanding work arrangements to support remote work or strategically managing in-office days, would allow AMIC to take advantage of additional benefits described in OPM's FTLM. These additional benefits, which were outside of the

scope of this study, include improvements to employee attraction and retention, reducing operating costs, and reducing employee turnover (OPM, 2021c).

Third, the research findings show a slight decrease in both the average number of contract actions and positive responses related to workplace satisfaction between the pandemic and beta test timeframes. Although both increased compared to pre-pandemic timeframes, the final recommendation is to continue to assess job satisfaction, feelings of productivity, and quantitative productivity as they relate to the amount of telework allowed at AMIC. To measure feelings of job satisfaction and productivity effectively, AMIC should continue to pursue feedback within its workforce at regular intervals. This study recommends the use of standardized Likert scaled survey questions to not only simplify participant understanding, but also to aid in interpretation and comparison of responses over time. To continue to assess quantitative measures of productivity, once AMIC clearly defines internal standards, the organization should track and measure these standards at regular intervals. While the decreases in both the average number of contract actions and perceptions of job satisfaction between the pandemic and beta test were relatively minor, monitoring for trends across all measures will allow AMIC to remain strategic in its efforts to balance workplace flexibility with mission success.

D. LIMITATIONS

AMIC leadership approved the use of AMIC survey and workload data for this project. This study was limited to the survey questions which AMIC wrote and distributed between March 2021 and February 2022. As a result, this study made comparisons across time by grouping questions based on their relation to either productivity or satisfaction and averaging positive responses; the study was not able to make direct comparisons of the same questions over time. This study was also limited to the quantitative productivity measures which were available at the time of analysis in March 2022, because of this, additional measurements of productivity could provide a more robust understanding of productivity at AMIC.

In review, the cognizant Institutional Review Board determined this study was not research in accordance with the Federal Policy for the Protection of Human Subjects

(Common Rule). As a result of this determination, this study is not intended to be generalizable beyond the setting in which the assessment was done. Both the results and the recommendations of this study focus on the evaluation of employee experiences with telework at AMIC and are not intended to apply to a broader setting.

E. AREAS FOR FUTURE RESEARCH

With the expanded use of telework across the DOD, more data availability should allow for the broader application of telework research across an increased number of agencies in the federal government. Productivity in the public sector, specifically as it relates to contracting organizations, is another area where the existing research is limited. Further research within other contracting organizations on perceptions of productivity as it relates to quantitative measures of productivity while teleworking could confirm whether there are consistent findings across similar organizations. The primary focus of this research was specific to feelings of workplace satisfaction and productivity related to telework, but there are additional factors impacted by the expanded use of telework. Research on cost savings, retention, new employee onboarding and training, and employee absenteeism as it relates to the increased use of telework could identify additional benefits and weaknesses which were outside of this study's focus.

F. CONCLUSION

The COVID-19 pandemic created waves across the federal government as agencies and employees shifted to maximize telework while maintaining the capabilities to carry out their mission. In response, AMIC also made changes to their telework program, moving from limited telework pre-pandemic, to 100% telework for all non-essential employees during the pandemic, and later enacting a beta test allowing up to 80% telework per pay period (AMIC, 2019, 2021c). The COVID-19 pandemic often led to more questions than answers, leaving AMIC leadership wondering how telework affected its workforce and whether a more robust telework program was sustainable. Once it was safe to return to the office, the beta test provided a formal mechanism for objectively assessing the success of the increased amount of telework allowed at AMIC. Over the two years following the start of the COVID-19 pandemic, AMIC surveyed its workforce to inquire about topics

including workspace preferences, productivity, satisfaction with telework, morale, communication, and camaraderie (AMIC 2021b, 2021d, 2021e, 2022).

This study pursued a better understanding of productivity and workplace satisfaction outcomes for employees participating in telework at AMIC. Utilizing literature related to pandemic planning, telework, productivity, and satisfaction for federal employees, this study first established a frame of reference for the research. Then, using quantitative and qualitative survey and workload data provided by AMIC, and OPM's FTLM as a framework (OPM, 2021c), this study analyzed AMIC's telework program, focusing on outcomes related to productivity and satisfaction. In its analysis, this study met its two key objectives. First, this study determined that perceptions of productivity and satisfaction increased with the implementation of expanded telework at AMIC. In addition, the study found that as AMIC employee perceptions of productivity increased, available quantitative productivity either stayed the same or increased. This study's findings clearly show the success of AMIC's telework implementation during both the pandemic and beta test timeframes. The implications of these findings led to this study's suggestion to not only continue the use of increased telework, but to also utilize this study to strategically bolster the success of the telework program at AMIC. Recommendations such as clarifying internal measures of productivity, considering whether additional workplace flexibilities could enhance the benefits of the program, and continuing to monitor trends across key measurements to tactically manage future telework decisions will support the ongoing viability of AMIC's already successful telework program.

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