Implementation of Federally Mandated Technology: A Successful Case Study

T. Janel Paulk, DBA, MBA – Georgia State University
Lars Mathiassen, Ph.D. – Georgia State University

ABSTRACT:

Organizations implementing federally mandated technology (FMT) encounter significant challenges and could benefit from empirical and theoretical research to understand effective implementation strategies. This study investigates how a highly distributed Human Health Services organization (HHS Inc.) navigated the challenges of implementing FMT through the lens of the Technology, Organization, and Environment (TOE) framework. This research employs a retrospective, case study design, as proposed by Yin (2018), in conjunction with an engaged scholarship approach, as advocated by Van de Ven (2007) to investigate how the organization overcame the barriers to implementation. The findings of this study 1) outline effective strategies to overcome implementation barriers, such as feedback mechanisms and phased rollout approaches and 2) provide a tool to determine the degree of assimilation of FMT into standard business practices. The findings provide strategies to address end-user resistance and increase institutionalization of FMT, while the tool provides critical information for management to adjust interventions and proactively implement FMT. The insights gained from this research offer valuable guidance for organizations and practitioners leading FMT implementation projects and provide actionable recommendations for approaches to facilitate the successful assimilation of FMT in complex organizational settings.

SYNOPSIS:

Purpose

The purpose of this study is to investigate how organizations can effectively navigate the challenges associated with the implementation of federally mandated technology (FMT).

Problem of Practice

The problem of practice in this study centers on the organizational challenges faced when implementing FMT. The central focus is that the mandate is imposed by an external federal government agency upon an organization that is forced to comply with the regulations or risk breaking the law, breaching a formal governmental contract, and possibly facing financial penalties imposed by government regulations (Carugati et al., 2018). Organizations forced to comply with FMT implementations face technological, organizational, and environmental challenges.

Results

The findings of this study 1) outline effective strategies to overcome implementation barriers, and 2) provide a tool to determine the degree of FMT assimilation. The findings were revealed based on an in-depth study of how a Human Health Services organization (HHS Inc.) overcame the challenges in implementing FMT across three states using the TOE framework as an investigative lens. The findings were empirically drawn from the analysis of semi-structured interviews and secondary data such as field observation notes, utilization data, and timeline and release data.

The findings highlight implementation strategies that include feedback mechanisms and phased rollout approaches. The feedback mechanisms were categorized into three types: usability studies, stakeholder meetings, and release communication. Usability studies involve formal qualitative research methods that test the functionality and features of the technology by observing end users as they attempt to complete tasks. Stakeholder meetings involve organizational stakeholders who provide requirements and receive status updates. Release communication pertains to the dissemination of enhancement release information. These feedback mechanisms play a crucial role in countering end-user resistance and ensuring the successful implementation of the technology.

In addition to the feedback mechanisms, three phased rollout approaches were observed to overcome barriers in implementing FMT. The first approach was the state-by-state rollout, where the FMT was implemented sequentially rather than all at once. The second phased approach involved a pilot implementation followed by the remaining areas in an order determined by leadership, and included a train-the-trainer component where middle managers were trained on the FMT and subsequently trained their staff. The third phased approach was the adoption of Agile customization informed by the feedback mechanisms. These approaches allowed the organization to incrementally institutionalize the FMT into business operations.

Finally, the findings provided a tool to determine the degree of assimilation of the FMT into standard business practices. Utilization statistics provided a tool to detect when the organization moved beyond a trial stage toward routinizing the technology for daily use. The utilization data

graphically depicts the percentage of end-users who utilized the technology out of the total population of end-users for each state. In the case of HHS Inc., the utilization rate of 90% or better reflects extensive utilization that fundamentally altered organizational processes, structures, and culture.

Conclusions

In conclusion, the findings of this research underscore the multifaceted nature of implementing FMT. Despite initial resistance and challenges, organizations can implement FMT by 1) outlining effective strategies to overcome the implementation barriers, and 2) utilizing a tool to measure the degree of assimilation of the FMT into standard business practices throughout the implementation. Despite initial resistance and challenges, HHS Inc. successfully implemented the mandated technology by strategically addressing the concerns of its stakeholders, customizing the technology to fit existing workflows, fostering an organizational culture supportive of change through middle management, and deploying Agile software development to incorporate changing regulations. The success of the implementation was attributed to the organization's phased approach to technology implementation, which included state-by-state implementation, offering comprehensive training by middle managers, ensuring continuous IT support, and engaging stakeholders in the co-creation process through feedback mechanisms.

Practical Relevance

The practical relevance is that organizations and those responsible for implementing FMT gain insights from a real-world observation of how one organization effectively managed internal resistance to surmount hurdles encountered while implementing FMT initiatives. Through this

exploration, the study contributes to the broader discourse on the effective implementation of FMT, offering practical insights for organizations navigating similar regulatory landscapes.

METHODS

Research Question: "How did a highly distributed organization implement FMT?"

Method and Design

The research followed a retrospective case study (Yin, 2018) of HHS Inc.'s FMT implementation in three states. The case study approach was suitable as it provides a lens into aspects of the organization and is useful when several individuals are selected to participate (Miles & Huberman, 1994; Yin, 2018). An engaged scholarship approach was taken, as espoused by Van de Ven (Van de Ven) to ensure the acquisition of comprehensive organizational data.

Data Collection, Sample and Analysis

Data was collected by conducting in-depth research on the mandate, research site, semi-structured interviews, and secondary data such as field observation notes, utilization, and timeline data. Interviews were conducted with twenty employees from multiple levels within HHS Inc. A snowball sampling approach was used to identify end-users to participate in the interviews. The data analysis was conducted using a five-step inductive approach including: 1) constructing a chronological timeline detailing major project events and releases, 2) analyzing utilization data that represents the percentage of compliant end-users to the total population of end-users, 3) coding interviews to identify key themes, patterns, and insights, and 4) integrating and synthesizing of additional notes.

PRACTICAL PROBLEM

In an era where technology plays a pivotal role in delivering services and products, organizations under federal regulations are increasingly required to implement systems and tools to comply with federal mandates. In this study, we investigate the CMS mandate to electronically verify visits (EVV) using "global positioning system" technology to record home health and personal care services (Miller, 2021). CMS enacted the mandate to address improper payments, fraud, waste, and abuse in the human health services industry. However, health service organizations struggled to implement EVV systems and were left with disparate tools that failed to integrate with legacy systems and made patient care jobs even more difficult (Miller, 2021). In addition, end users were often suspicious of installing EVV technology on their personal cellular devices, fearing continuous GPS tracking both during and outside of work hours. Despite communications from IT clarifying that GPS data was only captured to mark the start and end times of patient services, these concerns persisted. As a result, organizations discovered trends where end users turned off location services to avoid being tracked, ultimately affecting staff satisfaction and EVV compliance (Miller, 2021).

Despite the challenges, this research investigates the case of HHS Inc. that achieved high utilization rates across multiple state locations. As such, it contributes to practical insights captured in a 'real-life' investigation with implications for organizations forced to implement FMT.

LITERATURE REVIEW

There are four major bodies of scholarly literature that constitute the background for this research. The first provides a review of organization-level frameworks to describe the relationship between technology and organizational behavior. The second focuses on the power of coercion in mandated environments and the third reviews the organization-level theories that analyze the implementation process over time. Lastly, the fourth analyzes the resistance to technology utilizing the technology frames of reference (TFR) in organizational technology implementations.

The two most common theories used to investigate organizations are the diffusion of innovation (Rogers, 1962) and the technology-organization-environment (TOE) (Tornatzky et al., 1990) frameworks. Roger's DOI theory provides a framework to explain how, over time, new technologies spread throughout communities (Oliveira & Martins, 2011). The TOE framework, developed by Tornatzky and Fleischer in 1990, investigates technology implementation decisions based on organizational characteristics (Li, 2020). Comparably, the TOE framework is consistent with the DOI theory as both refer to the technology and organizational context, although the TOE framework also includes the environmental context (Oliveira & Martins, 2011) which makes it more applicable to this research. The environmental context presents the opportunity to explain government mandates as a key factor for technology implementation. In general, the strength of the TOE framework is that it recognizes the external factors (government mandate) which are important in shaping organizational technology and further justifies utilizing the TOE framework as a basis for this research.

In addition to these theories, a subsequent body of literature rooted in social change is the institutionalization theory (DiMaggio & Powell, 1983), which investigates the power of coercion both upon and within organizations. Institutionalization describes the process where new policies or technologies become widely accepted within an organization or group of organizations (Tolbert & Zucker, 1983). The change process could occur in different ways but ultimately result in the new policy or technology becoming legitimized or institutionalized within the organization (Tolbert & Zucker, 1983). Previous research identifies that "(1) initial endogenous change may take place when the process is gradual and not required and/or (2) exogenous change may take place later in the process or when the process is required" (Tolbert & Zucker, 1983). Institutionalization studies argue that external forces cause organizations to adopt new practices and technologies because they have a viable interest or "stake" in the technologies and the administrative practices that organizations adopt.

Furthermore, the studies submit that external entities have sufficient coercive power to impose or mandate specific IT systems and related practices on others (Carugati et al., 2018). As a result of the coercive power of the external entities, organizations are forced to adopt new policies and technologies or risk "breaking the law or formal contracts," and the enforcing entities monitor the extent to which the organizations comply with the rules (Carugati et al., 2018, p. 10). Previous studies within this body of research have investigated the resulting tension of institutionalization by inspecting the intricacies of the social process change within networks (e.g., Carugati et al., 2018), industries (e.g., Tolbert & Zucker, 1983), or organizational fields (Nielsen et al., 2014); however, in this research, the phenomenon is investigated with a case study of an organization as the unit of analysis. The duality of the mandated technology being

exogenously forced and endogenously required provides further validity to utilizing the TOE framework to analyze the environmental and organizational contexts of implementing FMT.

Fichman (Fichman) asserted that organizational implementation of technology was not typically a binary event but rather a process that unfolds over time. The temporal dimension of the implementation process is defined as the sequence of activities that originates at the organizational level and leads to utilizing the new technology at the individual level (Karahanna et al., 1999). In this study, implementation is defined as the broad overarching concept and is identified in each step of the process through the lenses of the TOE framework.

Throughout IT literature, technology implementation is defined as "an organizational effort directed toward diffusing IT within a user community" (Cooper & Zmud, 1990). Rogers (1962) highlighted the need to further investigate implementation beyond the primary decision of management, to capture and identify whether the organization has moved beyond a trial stage toward routinizing the technology for daily use (Gallivan, 2001; Rogers, 1962). Researchers refer to this as the degree of assimilation of technology into the organization. Assimilation is defined as how extensively the technology is used and how deeply it alters processes, structures, and organizational culture (Gallivan, 2001) . In this study, interviews with managers, end-users, and the IT department were incorporated with the goal of tracking the assimilation of the FMT for each state from the beginning of the implementation until months later. Additionally, secondary data in the form of utilization statistics provides insight into the degree of assimilation.

This research also explores the challenges of resistance from a subset of employees who responded with non-compliance through avoidance, workarounds, or deviations (Carugati et al., 2018). The TFR literature provides a theoretical lens to better understand resistance and proposes that organizational employees' acceptance, deployment, and actions are informed by their shared interpretations of that technology (Orlikowski & Gash, 1994; Young et al., 2016). The shared interpretations are defined as TFR, which are used to interpret, assume, and anticipate the impact of implementing new technology (Ghobadi & Mathiassen, 2023). As a result, different groups of users may have different expectations and perceptions of the impact, struggles, and roles of the new technology (Ghobadi & Mathiassen, 2023). Incongruence in the TFR of key organizational stakeholder groups has the potential to result in problems such as misaligned expectations, contradictory actions, resistance, skepticism, and poor appropriation of resources (Orlikowski & Gash, 1994; Young et al., 2016).

The literature review of TFR identified three strategies by which the resistance to the implementation of mandated technology could be viewed and addressed. The first is that incongruence and misalignment can be identified so that differences can be reconciled early in the process (Ghobadi & Mathiassen, 2023). The second is that changes in TRF can be tracked over time throughout the implementation to correct misaligned interpretations. Finally, the third is the use of TFR analysis through action research projects conducted jointly by academic researchers and practitioners (Davidson & Pai, 2004).

FINDINGS:

Through the lens of the TOE framework, the study identifies effective strategies to overcome implementation barriers and presents a tool for assessing the degree of assimilation of FMT into standard business practices. The strategies employed to co-create technology with stakeholders were crucial to overcoming end-user resistance and misalignment of interpretations and expectations of the FMT.

Key among these strategies are feedback mechanisms and phased rollout approaches, which were critical in addressing end-user resistance and ensuring an effective implementation process. They were classified into three main categories: usability studies, stakeholder meetings, and release communication.

- **Usability Studies**: These are formal qualitative research methods that involve testing the functionality and features of technology by observing end users as they complete tasks. Key factors frequently mentioned in usability studies include input from end users, feedback from stakeholders, onsite observation, improved ease of use, agile enhancement/releases, and new feature confirmation. These studies are essential in identifying user experience issues and making necessary adjustments to enhance usability.
- **Stakeholder Meetings**: The meetings involve organizational stakeholders to gather requirements and provide updates on implementation status. Commonly mentioned factors in these meetings include communication, requirements, stakeholder politics, end-user feedback, new feature demonstrations, and release prioritization. Stakeholder meetings are crucial for ensuring that all parties are informed and aligned with the implementation process, thereby facilitating smoother transitions and adoption.

- **Release Communication**: This pertains to the dissemination of information regarding the release of functions and features of the FMT. Factors frequently mentioned in this context include release communication, status updates, and issue management communication. Effective release communication ensures that users are well-informed about new features and updates, reducing confusion and resistance.

In addition to feedback mechanisms, three phased rollout approaches were observed to overcome barriers in implementing FMT:

- **State-by-State Rollout**: This approach involves implementing the FMT sequentially rather than simultaneously across states. By focusing on one state at a time, organizations can address state-specific challenges and learn from each phase, ensuring a more controlled and manageable implementation process.
- **Pilot Implementation**: This involves starting with a pilot implementation at a specific site, location, or division, followed by the remaining areas in an order determined by leadership. This approach includes a train-the-trainer component where middle managers are trained on the FMT and subsequently train their staff. The pilot implementation allows for the identification and resolution of issues in a smaller, controlled environment before a broader rollout.
- **Agile Customization Approach**: This approach begins with the launch of a foundational version of the FMT, followed by incremental enhancements informed by feedback mechanisms. Agile customization enables the organization to make continuous improvements based on real-time feedback, ensuring that the technology evolves to meet user needs effectively.

The phased rollout approaches allow organizations to incrementally institutionalize the FMT into business operations, proving to be an effective strategy to overcome implementation barriers. By combining feedback mechanisms with phased rollouts, organizations can ensure a more efficient implementation process, ultimately leading to greater acceptance and utilization of the FMT.

Lastly, the findings underscore the critical role of utilization data in assessing and enhancing the assimilation of FMT into standard business practices. The utilization statistics provide a valuable tool for determining the degree of FMT integration and identifying when the organization transitions from the trial phase to the routinization of the technology in daily operations. Utilization data, acquired longitudinally, offers insights for management to continuously monitor and make proactive adjustments to ensure higher levels of FMT assimilation and acceptance. By graphically depicting the percentage of end-users who utilize the technology out of the total end-user population, the data serves as an indicator of the technology's adoption across different states or divisions.

In the case of HHS Inc., a utilization rate of 90% or better was indicative of extensive technology use, signaling a significant transformation in organizational processes, structures, and culture. The high level of utilization reflects the successful embedding of FMT into the organization's daily practices, demonstrating that the technology is not only accepted but also relied upon for routine business operations.

The utilization data enables management to make informed decisions and proactive adjustments in attaining levels of FMT assimilation. It allows for early detection of issues and timely adjustments, ensuring that the technology remains aligned with organizational goals and user expectations. By tracking usage patterns and identifying potential areas of underutilization, management can implement targeted interventions, such as additional training, enhanced support, or modifications to the technology itself. Having a proactive approach ensures that the technology continues to meet the evolving needs of the organization and its users, which facilitates integration and higher levels of satisfaction and productivity. By leveraging utilization data as a dynamic tool, organizations can effectively manage the implementation process, address challenges promptly, and ensure that FMT becomes an integral part of their operational framework driving significant organizational transformation.

LESSONS FOR PRACTICE

There are also practical implications of this research for leaders and managers in organizations forced to implement FMT with the threat of revenue penalties for non-compliance. Leaders, managers, and professionals responsible for implementing FMT should embrace the following measures in the pre-adaptation, adaptation, and post-adaptation phases.

In the pre-adaptation phase, defined as the phase prior to when the mandated technology is developed, installed, and maintained, organizations should adopt and continue the following proactive measures throughout the implementation phases:

- Preemptively plan strategies for FMT implementation: Organizations should develop strategic plans tailored to the unique contextual challenges of implementing FMT, which

are aligned with the business objectives and regulatory mandate. The plans should incorporate an understanding of the specific requirements of the mandate and align them with organizational goals and capabilities.

- Align technology with organizational culture: Understanding and aligning the FMT with the existing organizational culture can facilitate integration, greater acceptance, and utilization among employees.
- Establish effective communication channels: Open and effective communication channels between different levels of the organization and among various stakeholders are crucial. The channels should include setting up feedback stakeholder meetings to capture and address end-user concerns and suggestions.

During the adaptation phase, when the mandated technology is being developed, installed, and maintained, organizations should develop the following procedures and policies to advance the implementation through to completion and to ensure utilization of the FMT:

- Employ effective rollout strategies: Practitioners should consider state-by-state or phased rollout strategies to manage the complexities of large-scale implementations. The phased approach allows for gradual adaptation, learning, and adjustment.
- Empower stakeholders: Middle management and empowered stakeholders play a critical role in implementing and championing FMT. Organizations should empower these managers with the necessary resources and authority to effectively lead and support the implementation process.
- Manage resistance through customization: To mitigate resistance to FMT, practitioners should explore customization options and ancillary functionality that align with the

mandate yet cater to the specific needs and contexts of different organizational units or regions.

- Balance compliance and flexibility: Organizations need to strike a balance between adhering to federal mandates and maintaining operational flexibility. The goal should be to understand the core requirements and specifications of the mandate and identify areas where flexibility is possible without compromising compliance.

During the post-adaptation phase, organizations should continue the policy and procedures and conduct the following activities to ensure the utilization of the FMT:

- Continue training and support: Comprehensive training and technical support are essential to ensure that all stakeholders are adequately prepared to utilize the FMT as intended. Ensuring a continuous training and technical support system not only aids in improving utilization and assimilation but also enhances acceptance and reduces resistance.
- Monitor and evaluate performance: Continuous monitoring and evaluation of the implementation process through feedback mechanisms are vital. Identifying and resolving issues early, assessing the effectiveness of the implementation strategies, and making necessary adjustments are pivotal in ensuring continued utilization of the FMT.
- Learn from experience: Organizations should document lessons learned from the implementation process. Documenting and referencing insights from the implementation can be valuable for future technology implementations.

CONTRIBUTIONS TO THEORY

The strategies employed to overcome end-user resistance to the implementation of FMT were multifaceted and grounded in extant literature. Key among these strategies were feedback mechanisms such as usability studies, stakeholder meetings, and release communication, each playing a crucial role in reducing resistance and fostering acceptance.

Usability studies facilitated local customization and the co-creation of FMT with stakeholders, which has been noted in previous research to counter resistance. According to Carugati et al. (2018) and Nielsen et al. (2014), resistance can be lessened or even avoided if the mandated technology can be tailored to meet local needs. By allowing end users to provide input and see their suggestions implemented, usability studies help bridge the gap between the technology and its users, aligning the technology more closely with user requirements and expectations. Customization not only enhances usability but also fosters a sense of ownership and acceptance among users, thus mitigating resistance.

Stakeholder meetings were instrumental in aligning the TFR among different stakeholders. By bringing together organizational stakeholders to identify requirements and provide updates on implementation status, these meetings facilitated increased communication and collaboration. As noted by Ghobadi & Mathiassen (2023), stakeholder meetings decreased resistance by aligning TFR and enhancing the flow and frequency of communication. The communication channel created a shared understanding of the technology's purpose and benefits, thereby reducing stakeholder resistance, and promoting a collaborative environment.

Effective release communication was crucial for ensuring that end-users were well-informed about the new features and updates of the FMT. This ongoing communication included regular status updates and issue management communication, which helped maintain transparency and manage expectations. By keeping users informed and engaged, release communication helped alleviate uncertainties and built trust in the technology.

The feedback mechanisms collectively addressed end-user resistance by creating an environment of continuous improvement and responsiveness. Local customization, facilitated by usability studies, allowed the technology to be adapted to specific user needs, reducing friction, and enhancing acceptance. Increased communication through stakeholder meetings aligned different technical perspectives, fostering a unified approach to implementation. Finally, continuous engagement through release communication ensured that stakeholders were informed and solicited their acceptance of enhancements, mitigating resistance by promptly addressing concerns.

Moreover, utilization data acquired throughout the project provided critical information for management to adjust and proactively address the utilization of FMT. By graphically depicting the percentage of end-users utilizing the technology, this data served as a valuable tool for detecting when the organization moved beyond the trial stage and began routinizing the technology for daily use. This comprehensive approach enhances the effectiveness of the implementation and drives significant organizational transformation.

KEYWORDS: Implementation Strategies, Federally Mandated Technology, Assimilation, End-User Resistance

APPENDIX on METHOD:

Data collection was facilitated by conducting semi-structured interviews and was supplemented with rich data such as field observation notes, meeting notes, utilization data, and release notes. Interviews were conducted with twenty employees from multiple levels within HHS Inc. involved in the implementation, including corporate executives, regional managers, local supervisors, and end-users. Participants were selected based on their level of participation during the project, and all had first-hand knowledge of how the new technology was implemented based on their roles. Individuals from three states representing multiple departments, including operations, management, quality, and field services, were interviewed to identify how the organization implemented FMT. Employees from the IT department were interviewed to gain insight into the implementation strategies and to better understand how the FMT was developed and adapted in collaboration with end-users. Data collection through interviews ended when redundancy in responses was reached, and the effort to obtain additional interviews could not be justified (Miles & Huberman, 1994).

With the participants' consent, interviews were recorded digitally, in video and audio, to facilitate data collection and analysis. I took notes during the interviews to record insights from verbal and body language responses. After each interview, the recordings were professionally transcribed or digitally transcribed by AI in Zoom. See Table 1 for the matrix of interviews.

Table 1: Interviews

Interview Grid		
Participant Number	***State***	***Role***
1	State 1	End User
2	State 1	Management
3	State 1	Management
4	State 1	Management
5	State 1	End User
6	State 2	End User
7	State 2	End User
8	State 2	Management
9	State 2	Management
10	State 2	Management
11	IT	Development
12	IT	Development
13	IT	Development
14	IT	Management
15	IT	Management
16	IT	Management
17	State 3	End User
18	State 3	Management
19	State 3	Management
20	Sate 3	Management

In addition to the interviews, secondary data sources were utilized to provide a multi-faceted understanding of the implementation. The secondary data encompassed a retrospective review of organization-level initiatives, releases, and utilization data from April 2021 to April 2023. Table 2 provides a matrix of the secondary data and intended purpose.

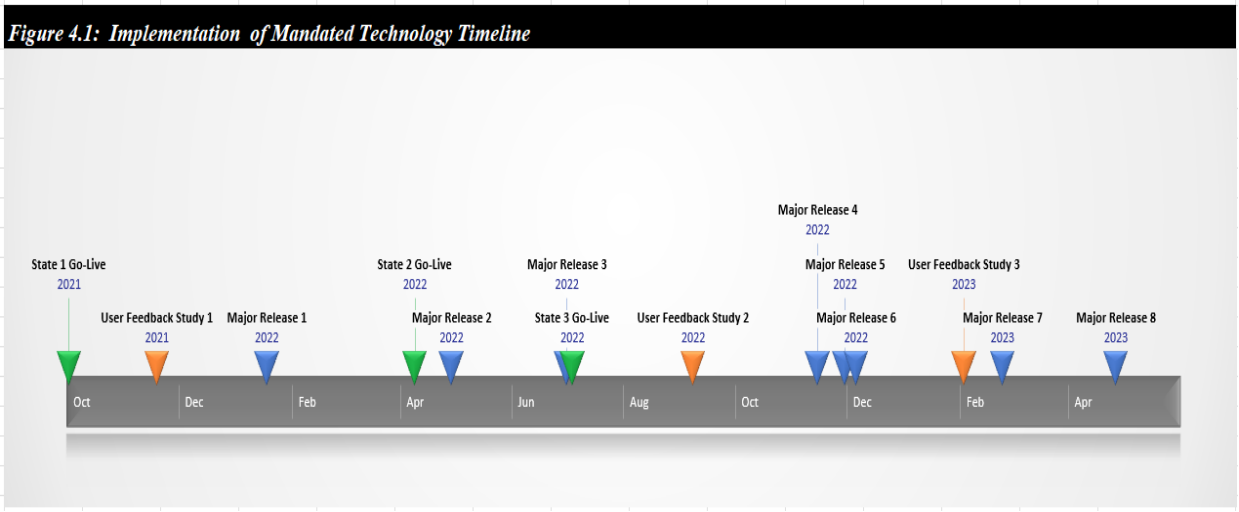
Table 2: Data Collection Overview

Data Collection	*Period*	*Description*	*Purpose*
Semi-structured interviews	August 2023 to October 2023	The researcher conducted 20 interviews with participants from all levels of the organization and from all three states	To understand from the stakeholders perspective how the mandatory technology was implemented and the factors which facitated or distracted from the implementation.
Field Observation	September 2021 to October 2023	The researcher took notes, observed group interactions, participated in meetings and held conversations with stakeholders that participated in the implementation.	To obtain further details on the implementation and observe how stakeholders perceived and reacted to the mandated technology
Video conferences and phone calls	September 2021 to October 2023	The researcher participated in video conferences and meetings with stakeholders who implemented and developed the mandatory technology.	To understand how the mandated technology was developed and implemented and how issues were acknowleged, tracked and resolved.
Utilization Data	October 2021 to July 2023	Monthly reports on the utilization of the mandated technology.	To obtain detailed data on the utilization of the mandated techology by intended users.
Timeline and Release Data	October 2021 to April 2023	Record of implementation events and technology releases.	To understand the chronological order of implementation events and technology releases.

Step 1: Chronological Timeline Construction

A comprehensive timeline of the project, detailing major events and releases was constructed to establish a chronological context for the implementation of the FMT. The timeline served as a foundation for understanding the sequence and timing of significant milestones, enabling a more straightforward analysis of subsequent data. See the timeline in Figure 1 below.

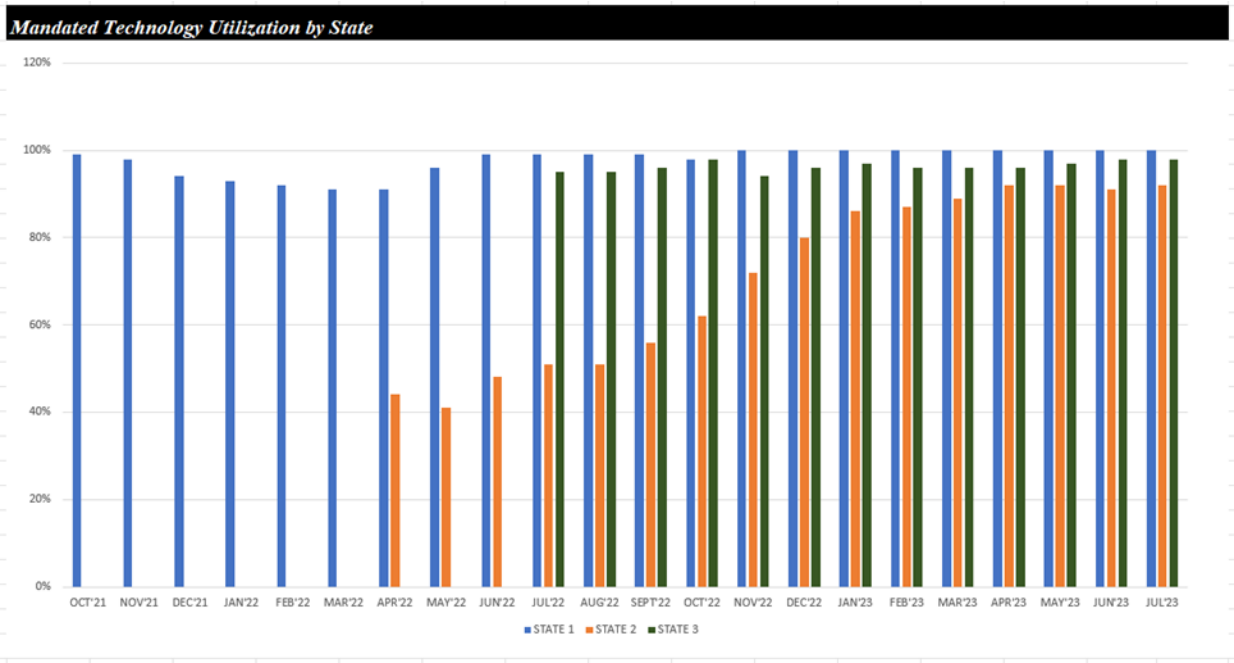
Figure 1: Implementation Timeline



Step 2: Utilization Data Analysis

The second step focused on organizing and graphical representation of utilization data for the three states where the FMT was implemented. The utilization chart graphically depicts the percentage of end-users who utilized the technology out of the total population of end-users for each state. The data was systematically ordered to create visual graphs depicting usage patterns over the specified timeframe. The visual representation was instrumental in identifying trends in the utilization and engagement of end-users with FMT.

Figure 2: Utilization by State



Step 3: NVivo® Coding of Interviews

The third step involved the use of NVivo®, a qualitative data analysis software, to code the interviews and analyze the transcripts to identify key themes, patterns, and insights. Once all transcripts were deemed accurate by the participants, I loaded them into NVivo® for data analysis. The software provided a construct with which to analyze unstructured, qualitative data by organizing, sorting, and arranging information in a coherent fashion. I categorized and appropriately labeled interviews within the software. I conducted three rounds of coding the interviews. The first round consisted of a priori or open coding, which is the initial stage of making a list of all possible themes. The second consisted of axial coding, which is a method of grouping themes or concepts into summaries or a smaller number of categories (Miles & Huberman, 1994). The final round was selective coding, whereby I identified quotes or examples that illustrated the themes and noted frequencies (Miles & Huberman, 1994). Internal validity

was confirmed by pattern matching, explanation building, addressing rival explanations, and using logic models (Yin, 2018).

Step 4: Integration and Coding of Additional Notes

The fourth step included importing meeting notes, conversation records, and field observation notes into NVivo® using the same thematic structure developed for the interview data. Integrating the notes facilitated the triangulation of the findings, ensuring that insights were corroborated and enriched by multiple data sources. The integration of diverse forms of data provided a more rounded and nuanced understanding of the themes, trends, and inter-relationships of the data.

Step 5: Inductive Analysis for Pattern Identification

Finally, inductive reasoning was used to analyze the coded data from all sources, which required an in-depth examination of the data to identify overarching patterns, trends, and themes. Through this process, I synthesized findings from the timeline, utilization graphs, and coded qualitative data, enabling the drawing of comprehensive conclusions about how the organization implemented the mandated technology. The inductive approach was pivotal to allowing themes and narratives to emerge organically from the data, providing a grounded understanding of the implementation process.

IV.5 Coding Themes

The coding frequency of the themes from the Feedback Mechanisms are presented below in Table 3:

Table 3: Summary Codes

Category	*Definition*	*Factors Frequently Mentioned*
Usability Studies	Formal qualitative research methods that involve testing the functionality and features of technology by observing end users as they attempt to complete tasks	Input from End Users
		Feedback from Stakeholders
		Onsite Observation
		Improved Ease of Use
		Agile Enhancement/Releases
		New Feature Confirmation
Stakeholder Meetings	Meetings involving state and organizational stakeholders to gather requirements and provide updates on implementation status.	Communication
		Requirements
		Stakeholder Politics
		End User Feedback
		New Feature Demonstrations
		Release Prioritization
Release Communication	Communications regarding the release of functions and features in the implemented technology	Release Communication
		Status Updates
		Issue Management Communication

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