Healthcare.gov and Sociotechnical Barriers: An ANT Approach

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction:

On October 1, 2013, millions of Americans attempted to access Healthcare.gov, the federal government's new health insurance marketplace and cornerstone of the Affordable Care Act. Within hours, the platform crashed. Over the next several weeks, users encountered error messages, endless loading screens, and corrupted enrollment data, leading to what President Obama would later call a "well-documented disaster" (Goldstein, 2016). The launch failure not only threatened the ACA's implementation but also became a stark example of government technology mismanagement, as costs ballooned from an initial 93.7 million to over 1.7 billion (ABC123, 2016). Most analyses of Healthcare.gov's troubled launch focus on technical failures—inadequate testing, poor system architecture, insufficient server capacity—or point to policy constraints such as rigid federal requirements and aggressive deadlines (Levinson, 2016). However, these explanations, while valid, overlook the complex web of social interactions and organizational dynamics that ultimately undermined the platform's development and deployment. Understanding Healthcare.gov's failure through this socio-technical lens offers crucial insights into how communication patterns and relationship networks shape the success or failure of large-scale government technology implementations. This paper argues that Healthcare.gov's launch failure resulted primarily from unstable networks between key actors—including contractors, government officials, and technical systems—characterized by poor translation of requirements and misaligned interests rather than purely technical shortcomings. Using Actor-Network Theory (ANT), which examines how human and non-human actors interact within socio-technical systems (Cressman, 2009), I analyze how these network instabilities developed and ultimately led to the platform's collapse. To support this analysis, I draw on government oversight reports,

contractor documentation, congressional testimony, and contemporary media coverage that reveal the complex interactions between key actors in the Healthcare.gov network.

Literature Review:

Despite extensive documentation of Healthcare.gov's launch failure, academic scholarship has primarily focused on technical and managerial aspects. The literature has paid limited attention to how social and technical elements interacted to shape the outcome. Most analyses treat the technical failures and organizational issues as separate concerns rather than examining how they collectively contributed to the platform's collapse.

Anthopoulos et al. (2016) examine the Healthcare.gov project through a management lens, documenting how project management failures and organizational barriers contributed to the system's collapse. Their analysis reveals that e-government projects face unique challenges due to "their complexity in terms of organizational size; corresponding resistance to change; novelty; end-users' impact and politics" (p. 161). Through systematic analysis of project documentation and outcomes, they demonstrate how fragmented leadership and competing priorities created an environment where technical problems could flourish undetected. However, while their research effectively identifies organizational and management failures, their framework primarily treats technical systems as outcomes of administrative decisions rather than active agents that shape organizational relationships. This limitation reflects a broader tendency in e-government project analysis to separate technical and organizational factors rather than examining their mutual influence.

Building on this organizational perspective, Piper (2013) analyzes Healthcare.gov's failure as a case study in public sector innovation. He argues that the government's traditional procurement processes and rigid requirements created inherent barriers to successful technology

implementation. While Piper acknowledges the role of technical challenges, his analysis primarily attributes the failure to bureaucratic constraints and policy requirements, overlooking how these elements interacted with technical decisions and system design choices.

Technical analyses, such as those documented in government oversight reports (Levinson, 2016), focus primarily on system architecture flaws, inadequate testing protocols, and capacity planning failures. These studies detail how specific technical decisions, such as the choice of a complex hub architecture and inadequate load testing, contributed to the platform's collapse. However, they generally treat these technical choices as isolated decisions rather than examining how they emerged from and influenced relationships between various stakeholders.

Current scholarship thus fails to adequately explain how the interplay between technical systems, organizational structures, and human actors collectively contributed to Healthcare.gov's failure. While existing analyses acknowledge both technical and organizational factors, they treat these as separate rather than interconnected elements. This gap in understanding is particularly significant given the increasing complexity of government technology implementations and their importance to public policy execution. My analysis aims to address this limitation by examining how networks of human and non-human actors shaped the platform's development and ultimate failure, offering insights into how technical and social elements collectively influence large-scale government technology projects.

Conceptual Framework:

My analysis draws upon Actor-Network Theory (ANT), which enables me to examine how the interactions between human and non-human actors contributed to Healthcare.gov's failure. A core principle of ANT is that networks are formed by network builders who assemble and coordinate human and non-human actors to accomplish specific goals. In this case, the

Centers for Medicare and Medicaid Services (CMS) acted as the network builder, attempting to create a stable network of government agencies, contractors, technical systems, and users to achieve the goal of implementing a functioning health insurance marketplace. Developed by sociologists Michel Callon and Bruno Latour, ANT provides a framework for understanding how social and technical elements form networks that either stabilize or collapse based on the strength of their relationships. Unlike traditional analyses that treat technical and social factors separately, ANT considers both human and non-human actors as equally capable of influencing network outcomes (Cressman, 2009).

Central to ANT is the concept of "translation," which describes how actors interpret and transmit interests across a network. Translation occurs through four key processes: problematization (defining the problem and identifying essential actors), interessement (aligning actors' interests), enrollment (defining and coordinating roles), and mobilization (ensuring actors properly represent their constituencies). When translation fails at any stage, the network becomes unstable and may ultimately collapse (Callon, 1986). For example, in the Healthcare.gov case, translation failures occurred when technical requirements were misinterpreted between government officials and contractors, leading to misaligned expectations and system design choices.

Another crucial ANT concept is "inscription," which refers to the way technical artifacts embody and enforce certain relationships or behaviors within the network. In Healthcare.gov's development, various inscriptions—such as the system architecture, coding protocols, and user interface designs—embedded assumptions about how different actors would interact with the platform (Akrich, n.d.). These inscriptions often created barriers rather than facilitating smooth interactions between users, systems, and administrators.

In the analysis that follows, I will use ANT to examine Healthcare.gov's failure by tracing how CMS as network builder attempted to assemble various actors—including government officials, contractors, technical systems, procurement policies, and deadlines— into a functioning network, but ultimately created an unstable network through failed translations. I will focus particularly on three aspects: how technical requirements were translated between different actors, how the platform's architecture inscribed certain relationships between users and systems, and how the network's instability ultimately manifested in the platform's launch failure. This approach will reveal how the interplay between social and technical actors, rather than just technical or organizational factors alone, led to the platform's collapse.

Analysis I: Failed Translations

The Healthcare.gov network failed primarily because CMS was unable to achieve successful translation during the problematization and interessement phases. This failure led to misaligned interests and unclear roles among key actors. As Callon (1986) explains, successful translation requires actors to accept defined roles and align their interests toward common goals through four critical processes: problematization, interessement, enrollment, and mobilization.

The problematization phase reveals CMS's fundamental misunderstanding of network building through its contracting decisions. This aligns with Anthopoulos et al.'s (2016) finding that e-government projects often fail due to "design-reality gaps, ineffective project management and unrealistic planning" (p. 161). Levinson's (2014) documentation shows striking patterns in how contracts were distributed: 60 contracts spread across 33 vendors, creating an average of nearly two contracts per vendor. The specific distribution - 26 firm-fixed-price contracts, 13 time-and-materials contracts, and various cost-plus contracts - established contradictory incentive structures. Firm-fixed-price contracts encouraged vendors to minimize costs while

meeting predetermined specifications, while time-and-materials contracts rewarded hours worked regardless of outcomes. Cost-plus contracts further complicated this dynamic by allowing contractors to earn more by spending more. These conflicting incentive structures meant vendors were literally being rewarded for working at cross-purposes, creating a fundamental barrier to network formation.

The interessement phase evidence reveals deep cultural and organizational barriers to translation. Piper's (2013) observation that "in today's Washington, optics trump honesty and transparency" and that "staff within CMS always knew that the ACA implementation would be problematic" contains several critical details. First, CMS staff possessed early awareness of potential problems, indicating technical expertise existed within the organization. Second, the phrase "stay-on-message-at-all-costs mode" suggests an institutional priority of maintaining consistent public communications regardless of internal realities. Third, the contrast between staff knowledge and organizational messaging shows active suppression of technical concerns in favor of political messaging. Lee and Brumer's (n.d.) documentation adds another layer: their description of "contractors' input... left out of CMS's decision-making process" and "expert perspectives... routinely dismissed" demonstrates systematic exclusion of technical expertise from key decisions. The problem extended beyond individual agencies, as Dolfing (2023) identifies a "fractured leadership across multiple government agencies," including CMS's Deputy CIO, White House CTO, Executive Office of Health Reform, and Department of Health and Human Services officials. This fragmentation wasn't just an organizational chart problem—it represented the failure to create effective translation points between different institutional logics and priorities, resulting in a network where no actor had complete visibility of critical milestones or the authority to align competing interests.

The enrollment and mobilization phases reveal how early translation failures created self-reinforcing barriers. The USDS (n.d.) report highlights several critical technical oversight patterns: systems operating without monitoring, components failing silently, and no mechanisms for tracking user experiences. These details point to more than just poor monitoring - they reveal a system designed without basic feedback mechanisms. Lee and Brumer's (n.d.) documentation of rejected project management practices provides specific examples: ignored risk assessments, bypassed testing protocols, and dismissed quality controls. Each rejected practice represents a lost opportunity for network adaptation and learning. Tabbaa's (2018) observation that CMS's management was "dismissive of technical setbacks and unwilling to listen to the experts who were flagging concerns" reveals a pattern of active resistance to feedback, where technical warnings were not merely overlooked but systematically rejected. This systematic rejection created a form of institutional deafness, where each dismissed warning further isolated actors from each other.

The consequences of these translation failures manifested not just in financial terms but in the progressive breakdown of network relationships. The cost escalation from 292 million to 2.1 billion (Lee & Brumer, n.d.) represents more than budget overruns—it reflects the increasing resources required to maintain a network that lacked proper translation mechanisms. The stark contrast between four million visitors and six successful enrollments (Piper, 2013) demonstrates how completely the network failed to translate user needs into technical capabilities. Levinson's (2014) documentation of contract overruns, particularly CGI Federal's increase from 93.7 million 204.4 million, shows how the network's instability created a feedback loop of escalating costs and diminishing effectiveness. Each attempt to fix problems without addressing the underlying translation failures only added more complexity and cost to the system.

The project's recovery phase demonstrates how proper translation mechanisms can transform a failing network into a functional one. The USDS (n.d.) description of bringing technical contributors together in one location represents more than a change in physical arrangement—it created a new translation space where different actors could develop shared understanding and aligned purposes. The improvement in conversion rates from 55% to 85% and the 99.99% uptime of the new login system reflect not just technical improvements but the successful translation of user needs into technical solutions. The "one-team mentality" that emerged wasn't simply a cultural shift; it represented the establishment of effective translation mechanisms that allowed different actors to align their interests and actions. The growth from 8 million to 12.7 million enrollments demonstrates how a properly translated network can scale and evolve while maintaining stability.

This transformation illustrates a crucial insight about actor-networks: their success depends not just on the individual capabilities of actors but on the quality of translations between them. When Healthcare.gov finally succeeded, it wasn't because the technical problems were solved in isolation, but because the network had developed effective ways to translate between policy requirements, technical capabilities, user needs, and organizational processes. This suggests that future government technology projects should focus not just on technical specifications or project management practices, but on creating robust translation mechanisms that can align diverse actors toward common goals.

As I have argued, Healthcare.gov's failure stemmed primarily from CMS's inability to achieve successful translation between key actors in the network, particularly in establishing clear roles and aligning interests. Some might argue, however, that the project's failure was primarily a result of technical complexity and compressed timeframes. Indeed, Piper (2013)

characterizes the ACA as "a giant social experiment with few precedents," suggesting that the unprecedented scope and technical challenges were the primary barriers to success.

However, this view fails to consider evidence that reveals how technical problems were themselves symptoms of failed translation. Tabbaa (2018) documents that CMS lacked the organizational experience for developing and managing large IT systems, unlike other agencies such as the Department of Defense and NASA that had decades of institutional experience in delivering reliable IT systems. More significantly, Piper (2013) reveals that "staff within CMS always knew that the ACA implementation would be problematic," but the organization's "stay-on-message-at-all-costs mode" prevented effective communication about these risks. These findings suggest that the technical challenges, while significant, were exacerbated by the fundamental inability to translate concerns, requirements, and priorities between different actors in the network.

The successful recovery effort further supports this interpretation. When project management was centralized under Jeffrey Zients and a dedicated Tiger team was formed, they were able to fix around 400 system defects and improve system performance within six weeks (Tabbaa, 2018). This rapid turnaround demonstrates that when proper translation mechanisms were established—allowing for clear communication, aligned priorities, and coordinated action—even significant technical challenges could be overcome.

Analysis II: Problematic Inscriptions

The failure of Healthcare.gov also stemmed from problematic inscriptions—the way technical artifacts embodied and enforced certain relationships within the network. As Akrich (n.d.) explains, inscriptions represent how designers' assumptions, values, and intended uses are embedded into technical systems, shaping how different actors can interact with and through

them. In the case of Healthcare.gov, these inscriptions created barriers rather than bridges between users, systems, and administrators.

The GAO's 2014 report reveals several critical patterns in CMS's development approach. First, the timing of task orders shows CMS proceeding without fundamental information: the number of states to be supported was unknown, the potential enrollee population was undefined, and key technical requirements remained unspecified. Second, the choice of cost-reimbursement contracts established specific relationships between CMS and contractors: contractors could bill for work regardless of outcomes, while CMS assumed most of the financial risk. Third, the cost trajectory tells a revealing story: FFM costs nearly quadrupled from 56 million to 209 million, while data hub costs almost tripled from 30 million to 85 million. These patterns show how early development decisions embedded specific assumptions and relationships into the system's foundation.

The technical architecture evidence reveals specific manifestations of these problematic foundations. Tabbaa's (2018) performance analysis provides concrete metrics: basic web pages required 8 seconds to load - eight times the industry standard for acceptable page load times. User registration pages showed 71 seconds of latency - more than a minute of dead time for users attempting to access the system. These metrics demonstrate how architectural decisions created specific barriers to user interaction. Piper's (2013) documentation adds context: the Obama administration's underestimation of state pushback meant the system architecture had to be repeatedly modified to accommodate unexpected state decisions, creating a cascade of technical adjustments. The system's architecture also reflected fundamental flaws in the ACA legislation itself, with Piper (2013) noting how the delegation of decisions to federal agencies created a fragmented development process. These technical and managerial inscriptions created a self-

reinforcing cycle: rushed development led to poor architectural choices, which led to performance problems, which led to more rushed fixes. The system's inability to handle basic functions—like accurate data transmission to insurers—inscribed distrust and confusion into the relationships between users, insurers, and the government.

The system's problematic inscriptions manifested most dramatically in its handling of contractor relationships and performance management. Goldstein's (2016) report reveals a specific pattern in HHS's response to system warnings: technical staff identified security vulnerabilities, contractors reported integration failures, and testing revealed performance issues - yet HHS maintained original deployment schedules without addressing these concerns. Piper's (2013) documentation shows how this played out: when contractors reported failed testing, HHS modified testing criteria rather than fixing problems; when staff raised capacity concerns, HHS adjusted public messaging rather than increasing technical resources. The pattern of delaying ACA provisions further illustrates this approach: when technical components weren't ready, the administration would postpone policy requirements, creating a cascade of shifting specifications and development targets. These decisions - maintaining deadlines despite warnings, modifying success criteria rather than fixing problems, and repeatedly shifting requirements - inscribed a system where political considerations consistently overrode technical necessities.

The technical components themselves reflected these problematic inscriptions in their very code. As Tabbaa (2018) notes, the website contained excessive typos, bloated directories, and placeholder text, physically inscribing the fragmented development process into the user interface. These technical artifacts weren't merely symptoms of poor development practices; they were inscriptions that actively shaped how users, administrators, and contractors interacted with and through the system. The decision to require user registration before allowing insurance plan

browsing, as noted by Dolfing (2023), inscribed political priorities over user needs, creating unnecessary barriers to system adoption.

The recovery process demonstrates how changing inscriptions can transform network relationships. Anthopoulos et al. (2016) identify this type of transformation as crucial for e-government success, emphasizing how projects must bridge design-reality gaps and establish effective management practices to achieve their intended outcomes. CMS's implementation of new oversight mechanisms and quality assurance plans, as reported by the GAO (2014), began to inscribe clearer lines of authority and responsibility into the system. The USDS's (n.d.) development of a new Scalable Login System represents more than just a technical improvement—it inscribed a fundamentally different relationship between users and the system, one based on reliability and user needs rather than political deadlines. The improvement in conversion rates from 55% to 85% reflects how new inscriptions created more effective pathways for users to navigate the system. This success aligns with Anthopoulos et al.'s (2016) research showing that e-government projects must effectively align technical capabilities with user expectations to avoid the common pattern of failing to meet citizen needs. However, the persistence of cost overruns in new contracts—such as the increase from 91 million to over 175 million for continued FFM development—suggests that some problematic inscriptions remained deeply embedded in the network.

This analysis reveals how inscriptions in technical systems can create self-reinforcing patterns of behavior and relationship that are difficult to change once established. The Healthcare.gov case demonstrates that initial inscriptions—whether in contract structures, technical architectures, or oversight mechanisms—can create cascading effects that shape the entire network's development. The recovery process shows that successful government

technology projects must carefully consider how their technical and organizational choices inscribe particular patterns of interaction between actors. More importantly, it suggests that effective inscriptions must balance multiple competing needs: technical performance, accountability, oversight, and user experience. The lesson for future government technology projects is clear: the way we inscribe relationships into technical systems is as important as the technical functionality itself, and early inscription choices can have long-lasting effects on a system's success or failure.

Conclusion:

This paper has examined a critical gap in our understanding of how translation failures and problematic inscriptions contributed to Healthcare.gov's launch failure. While existing analyses have focused primarily on technical issues and project management shortcomings, they have failed to comprehensively consider how the relationships between actors in the network fundamentally shaped the project's outcome. The evidence presented in this paper highlights how failed translations between government agencies, contractors, and technical systems created cascading failures that undermined the platform's effectiveness, leading to widespread system outages and enrollment difficulties. Through the lens of Actor-Network Theory, this analysis exposes how problematic inscriptions in the system's architecture and management structure privileged political deadlines and bureaucratic processes over technical stability and user needs.

By revealing how translation failures and problematic inscriptions shaped Healthcare.gov's development, this study prompts a reevaluation of how large-scale government technology projects should be approached. The case demonstrates that successful implementation requires more than just technical expertise or project management skills—it demands careful attention to how relationships between actors are translated and inscribed into

technical systems. As government services become increasingly digital, addressing these socio-technical dynamics becomes paramount to ensuring effective public service delivery. Moving forward, agencies developing large-scale technology projects must consider how their organizational structures, development processes, and technical choices create and maintain relationships between different actors in the network. Future government technology initiatives must pivot toward more effective translation mechanisms and careful consideration of how technical and organizational choices inscribe particular patterns of interaction, emphasizing the need for balanced relationships between political priorities, technical requirements, and user needs.

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