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IMPLEMENTING GENERATIVE AI UNDER REGULATORY CONSTRAINTS: TENSIONS AND ADAPTATIONS IN PUBLIC SECTOR ORGANIZATIONS

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Abstract: **Generative Artificial Intelligence (gen AI) is increasingly gaining interest for public sector application due to its potential to improve administrative efficiency and support knowledge-intensive work. However, public sector organizations face substantial difficulties implementing gen AI because experimentation and deployment must comply with strict regulatory and bureaucratic requirements. To examine how regulatory constraints shape gen AI implementation, we conducted qualitative interviews in the context of a gen AI-based administrative assistant for German public organizations. We identify three persistent tensions: First, the data-intensive nature of gen AI versus data protection regulation, second, AI experimentation environments versus hierarchical and multi-actor bureaucratic governance structures, and third, the use of flexible cloud environments for testing versus the requirement for secure and sovereign on-premises infrastructures for operational deployment. We conceptualize gen AI implementation in the public sector as regulation-guided experimentation. Our findings provide empirically grounded insights into how regulation shapes the trajectory of gen AI implementation.**

Keywords: **Generative AI, Public Sector, Public Administration, AI Implementation, Regulation, Digital Innovation, Organizational Flexibility**

I. INTRODUCTION

AI-driven innovation has made its way into the public sector and is expected to profoundly shape how public sector organizations operate and how administrative institutions deliver services (Madan & Ashok, 2023; van Noordt & Misuraca, 2022). Public sector organizations progressively seek to advance AI-enabled transformation, and gen AI is increasingly seen as a promising technology for improving administrative efficiency and augmenting civil servants' workflows (Kim, 2026; Mergel et al., 2023; Uba et al., 2023; Valle-Cruz & García-Contreras, 2025). As gen AI advances, the range of administrative tasks that might potentially be supported continues to expand, including drafting, summarizing, analyzing documents, facilitating administrative decision-making, and assisting knowledge-intensive work, thereby reinforcing its growing relevance for public sector transformation (Bright et al., 2025; Kim, 2026). Concurrently, the highly regulated administrative environment presents substantial challenges to innovation and, consequently, AI implementation. Public sector organizations operate within rigid bureaucratic structures characterized by regulatory procedures, hierarchical decision-making, and strong requirements regarding accountability, transparency, and data protection (Weber, 1978; Wirtz et al., 2020). Due to AI's inherent uncertainties and black-box characteristics, ensuring responsible and compliant deployment of AI technologies through governance measures and regulatory processes has therefore become a central concern for policymakers and public organizations (Dafoe, 2018). Nevertheless, gen AI development requires exploratory and iterative approaches in order to identify meaningful use cases and assess their business value (Gupta, 2024; Te'eni et al., 2026). These requirements are difficult to reconcile with the strict legal, organizational, and infrastructural constraints under which public administrations operate in order to ensure compliance (Hietala et al., 2024). Consequently, gen AI implementation in public sector organizations is shaped by the tension between exploratory innovation and strong regulatory oversight (Selten & Klievink, 2024). Existing research highlights both the transformative potential of AI in public administration and the governance challenges associated with its adoption (Madan & Ashok, 2023; Mergel et al., 2023). However, empirical insights into how regulation not only constraints but actually shapes the implementation trajectory of gen AI in practice remain limited, particularly as public sector organizations move from early experimentation towards operational deployment. To

address this gap, we ask the following research question: How do regulatory constraints shape the implementation of generative AI in public sector organizations?

To answer this question, we conducted a qualitative interview study in the context of an AI pilot project in German public administration, developing a gen-AI based assistant for administrative work. Our findings reveal three persistent tensions: (T-1) data-intensive experimentation versus data protection constraints, (T-2) AI experimentation versus multi-actor bureaucratic governance structures, and (T-3) flexible cloud experimentation environment versus secure and sovereign operations infrastructure. Based on these insights, we conceptualize gen AI implementation in the public sector as regulation-guided experimentation, showing how regulatory mechanisms actively shape organizational flexibility and the trajectory of AI implementation.

II. CONCEPTUAL BACKGROUND

E-Government refers to the use of information technology to enable and improve information access and the delivery of services to citizens, employees, and other agencies with the potential to improve business operations and public service performance (Carter & Bélanger, 2005; Layne & Lee, 2001). Whereas early e-government research emphasizes the digitization of public services and administrative functions, later work increasingly conceptualizes technology-enabled change as a broader transformation of administrative services, processes, and governance arrangements (Janowski, 2015). However, these change processes unfold within the bureaucratic administrative structures in which public sector organizations operate, characterized by hierarchical authority, formal procedures, and rule-based decision-making (Meyer et al., 2014; Weber, 1978). And although these structures ensure accountability and procedural legitimacy, they may also constrain innovation (Grotherr et al., 2019; Hietala et al., 2024; Selten & Klievink, 2024). Despite these barriers to innovation, public sector organizations have recognized that digital innovation can significantly improve public services and administrative efficiency (Valle-Cruz & García-Contreras, 2025). Through the adoption of digital technologies, public sector organizations aim to improve service delivery, streamline administrative processes, and enhance citizen interaction with government institutions (Mergel et al., 2019; Newman et al., 2022).

AI is increasingly recognized as a transformative technology with the potential to fundamentally reshape public administration (Desouza et al., 2020; Madan & Ashok, 2023). AI systems can support administrative work by automating and augmenting tasks, and assisting decision-making processes (Kim, 2026; Mergel et al., 2023), with public sector-specific tasks that can be facilitated by AI include decision support, policy analysis, service delivery, and evidence-based policymaking (van Noordt & Misuraca, 2022). More recently, gen AI has gained increased interest by organizations due to its ability to generate and process large amounts of textual data (Nikishina et al., 2026). These capabilities are particularly relevant in public administration, where many tasks involve drafting documents, summarizing information, or supporting knowledge-intensive administrative work (Bright et al., 2025). In light of demographic pressures, such as an aging public sector workforce and ongoing skilled labor shortages, gen AI applications therefore have the potential to further augment the capabilities of civil servants and improve the efficiency of internal administrative processes (Mergel et al., 2023). Given that gen AI applications in the public sector are still at an early stage and suitable use cases are still being explored, experimentation plays a critical role in enabling organizations to systematically assess AI capabilities, identify viable applications, and develop organizational knowledge (Gupta, 2024; Te'eni et al., 2026). However, as such experimentation in public sector organizations takes place within highly regulated institutional environments, public sector organizations must balance the flexibility required for experimentation with the regulatory constraints governing the deployment of AI technologies (Madan & Ashok, 2025; Selten & Klievink, 2024). Consequently, despite growing interest in gen AI in the public sector, empirical evidence in these settings on how AI technologies are implemented and governed in practice remains limited, revealing a gap between current implementation practices and research (Mergel et al., 2023).

In the overall context of digital transformation, flexibility represents a critical organizational capability enabling public sector organizations to respond and adapt to dynamic environments and explore emerging digital opportunities while maintaining operational effectiveness (Nurcan, 2008). As organizations approach digital transformation, different forms of flexibility emerge to facilitate progress, including infrastructure flexibility, functional flexibility, process flexibility, worker flexibility, organizational flexibility, and network flexibility (Gong et al., 2020). These flexibilities enable organizations to adjust technical infrastructures, reconfigure processes, and coordinate collaboration across organizational boundaries.

III. METHODOLOGY

To examine how regulatory constraints shape the implementation of gen AI in public sector organizations, we conducted a qualitative interview study in the context of a gen AI pilot project in German public administration (Yin, 2009). Case studies are well-suited for investigating emerging technological phenomena embedded in complex organizational and institutional environments (Benbasat et al., 1987). Since gen AI implementation in the public sector

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is still evolving, our approach enables an in-depth understanding of implementation practices and emerging tensions.

Table 1. Overview of Interview Participants

ID	Role	Organization / Context
I1	Digitalization Officer	public sector organization
I2	Business Analyst (Data Driven Public Unit)	consulting firm
I3	Project Management Officer	public IT service provider
I4	Project Management Officer	public IT service provider
I5	Senior Manager (Data Driven Public Unit)	consulting firm
I6	Senior Engagement Manager, Project Manager	consulting firm
I7	Deputy Head of Division	public sector organization
I8	Enterprise Architect, Business Analyst	consulting firm
I9	IT Administrator & Deputy Chair Staff Council	public sector organization
I10	Manager (Data Driven Public Unit)	consulting firm
I11	Product Owner, Management Role	public IT service provider

3.1 Research Context & Data Collection

The empirical study was conducted in the context of a pilot project centered on a gen AI-based administrative assistant developed for public administration in Germany. The system was developed through a collaboration between a public IT service provider responsible for digital infrastructure across municipal and ministerial government levels as well as an IT consulting firm with specialized expertise in data- and AI-driven solutions for the public sector, supporting the conceptual and technical development, and public administration units providing context and user-base for which the assistant was designed. The objective of the project was to enable the legally compliant and secure use of gen AI within administrative environments. The administrative assistant supports knowledge-intensive tasks such as document summarization, text generation, document analysis, and research assistance, as well as conversational interaction, retrieval-based search, and the integration of domain-specific knowledge collections. The project unfolded through three stages: (1) initial public cloud-based testing environment with restricted data use, (2) a subsequent on-premise secure piloting phase, and (3) a planned broader rollout across different administrative units.

The empirical data was collected through semi-structured expert interviews (Meuser & Nagel, 2009; Myers & Newman, 2007). This allowed for systematic guided questioning on the interviewees' roles, project involvement, experimentation practices, perceived challenges and possible solution or adaption practices observed in pilot projects, while retaining openness to capture unique experiences, knowledge, and contextual explanations from actors directly involved in the implementation process. All interviews lasted between 45 and 60 minutes and were conducted in German. Each interview was recorded and fully transcribed. Quoted excerpts were translated into English for reporting. To capture diverse perspectives on gen AI implementation, we purposefully interviewed all three heterogeneous stakeholder groups involved in the project (Table 1).

3.2 Data Analysis

The interview transcripts were coded using MAXQDA and analyzed using thematic analysis (Braun & Clarke, 2006, 2021). The analysis involved iterative engagement with the data, including transcript familiarization, systematic coding of relevant segments, and the development and refinement of themes (Braun & Clarke, 2006). Theme generation was informed by sensitizing concepts from the conceptual background, regarding regulation, experimentation, and public-sector governance. Rather than applying a fixed coding scheme, codes were developed iteratively through repeated engagement with the transcripts and then grouped into candidate themes, with codes and constructed themes repeatedly analyzed and refined, iteratively conceptualizing patterns across interviews and stakeholder perspectives. This way, we reflexively abstracted codes into higher-level themes, identifying recurring tensions that appear as regulation shapes the trajectory of gen AI implementation (Table 2).

IV. RESULTS

4.1 Data-Intensive AI Implementation Under Data Protection Constraints (T-1)

Our study reveals tension between the data requirements of meaningful gen AI implementation and the strict personal-data protection requirements governing administrative data in public sector organizations (T-1) (I1,2,3,4,5,6,7,8,10).

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Developing gen AI prototypes, selecting appropriate use cases, and validating system performance typically require large amounts of realistic, context-rich, and often sensitive textual and administrative data (I2,5). However, because this data frequently contains personal or confidential information entrusted by citizens regulatory requirements prohibit or significantly restrict its use (I4,9), as public administrations in Germany generally operate under extensive regulatory scrutiny regarding data processing of personal data and internal government processes and security (I2). For instance, regulations such as the General Data Protection Regulation (GDPR) and the EU AI Act impose strict requirements on how public sector data may be processed (I10,6).

These regulatory requirements thus restrict how gen AI experimentation can be conducted. Specifically, the processing of administrative data in public cloud environments is frequently prohibited or strongly restricted for public sector organizations. As a result, the first pilot, that was hosted in the cloud, excluded the use of personal or confidential data substantially limiting the range of datasets available for testing gen AI systems. As the consulting firm's business analyst explained reflecting on the initial pilot: „Especially in the public sector in Germany, data protection is always a major issue […] So the instruction to our test users was that they were not allowed to upload any personal data, any confidential data, etc." (I2). These restrictions also appeared to shape how test users interacted with the system during early experimentation. Limiting experimentation to non-sensitive data reduced the perceived usefulness of the tool. At the same time, users often needed to be sensitized and guided to comply with strict usage guidelines. In practice, experimentation during the first piloting stage relied on publicly available or heavily anonymized data. As most administrative tasks either involve citizen-related or other non-public data, the realism of the experimentation scenarios was substantially limited and only partially reflected the realities of administrative work. The IT service providers' project manager detailed: "Because we are only allowed to process publicly available data or data that's intended for publication, test users can only work with this [public] data. As a result, it's impossible to properly demonstrate real use cases, because in practice everything has to be heavily anonymized" (I4).

This reduces the practical relevance during early experimentation in such projects, as it does not fully reflect the conditions under which the system would actually operate. In this case, this was seen as limiting by test users and partly led to frustration, as many users reported difficulties meaningfully integrating the tool into their daily workflows or fully assessing its potential value for administrative work. In this regard, a test user highlighted how these restrictions reduced the practical relevance of the tool: "We do indeed have a real problem here, because we are really only working with data that has already been published – that is, data that is already publicly available somewhere ... But that's not something I need in my everyday work" (I1).

As shown in the case, public sector organizations rely on anonymized datasets, publicly available documents, or manually modified datasets when testing and experimenting with gen AI. While these practices enable experimentation on some level, they limit the ability to evaluate AI systems usefulness early on.

4.2 AI Experimentation Within Multi-Actor Bureaucratic Governance (T-2)

Our findings suggest a tension between the exploratory experimentation practices required for gen AI development and the bureaucratic governance structures through which experimentation initiatives must be organized (T-2) (I1,2,3,4,5,6,10,11).

In the examined case project, the project team encouraged test users to experiment freely with the system in order to explore potential use cases and better understand the capabilities of the gen AI tool. As gen AI systems can generate a wide range of outputs, identifying meaningful applications often requires open testing and iterative experimentation. Reflecting on the piloting stage, a test user noted: "I've also learned that testing relatively freely and unrestricted, is actually what's best for the model. That you should try things out in every direction, to gain the greatest value from it." (I7).

But while the administrative gen AI assistant was reportedly met with curiosity and interest among potential users – once they had been appropriately informed and instructed – openness and willingness to experiment with the application were significantly shaped by hierarchical decision structures. Several interviewees reported that civil servants frequently sought explicit approval from their supervisors before using the system, even when the tool had already been formally introduced. In practice, the hierarchical organization of administrative work shaped how employees engaged with experimentation initiatives. As one interviewee explained:"A lot of people asked me, 'Did my supervisor approve this so I can use it?' […] [and] many basically said, 'Okay, if my boss hasn't given the go-ahead, then I definitely won't use it.'" (I3).

This strict hierarchical culture not only affected tool use but also shaped decision-making and approval processes during project initiation and later modifications to the application, "because there are extremely long hierarchical chains that have to be gone through before a decision can be made" (I4). In addition to the influence of hierarchical structures on decision-making processes, AI innovation projects in public sector organizations require regulation-mandated coordination and participation of multiple oversight actors and committees, such as staff councils, data protection officers, and IT security representatives to review and approve functionalities of the gen AI assistant (I2,4,6,11).

This necessitated additional time and resources. Elaborating on this one interview participant explained: The staff council and the data protection officers always have a great many questions about what we do and what we plan to do. We regularly receive questionnaires that have to be answered in great detail before anything can even be done or is allowed to be done" (I2).

Beyond being time-intensive and shaping decision processes, these governance processes also influence the technical resources and infrastructure. In the studied case, this meant that specialized hardware, such as GPU-based computing resources (I5,8), had to be procured through formal procurement procedures. For German public sector organizations, this involves coordination between multiple administrative units, often including additional approval cycles and formal public bidding procedures, which in turn further delay the establishment of suitable development and deployment environments (I2,5,6). While these bureaucratic procedures were time-consuming, they were not perceived solely as negative, serving important administrative functions, as the project manager noted: "The problem isn't actually creating all these bureaucratic documents. They're actually very useful […], [because] you've proven everything, and you ensure the necessary level of security. [The problem is] you're usually dependent on internal stakeholders, to whom you have only indirect or limited access. And all of that just takes a very, very long time." (I6). Thus, such regulatory mechanisms can ensure transparency, accountability, and procedural security. However, because these processes frequently involve multiple stakeholders and formal coordination cycles, they substantially extend the timelines and increase the required resources of gen AI initiatives in public sector contexts.

4.3 From Cloud Experimentation to Sovereign and Secure Operational Infrastructure (T-3)

The third tension we identify reflects a tension between the flexible cloud environments that often support gen AI development and the secure and sovereign IT infrastructures required for operational deployment in public sector organizations (T-3) (I1,2,3,5,6,8,9,10). Especially gen AI experimentation often relies on cloud-based solutions that enable rapid testing, access to state-of-the-art foundation models, and computational resources, providing the scalability and flexibility required for developing gen AI application (I4,6,10).

In the studied case, the first extensively tested version of the administrative assistant was initially deployed in a public cloud environment in order to facilitate experimentation. However, as experimentation progressed, infrastructure requirements related to data security and technological sovereignty became increasingly important (I1,2). Public sector organizations must ensure that sensitive administrative data and personal data are processed within controlled and secure environments. Once realistic use cases are being implemented, purely public cloud architectures thus are insufficient. As a senior manager explained: „And by then, at the very latest, you're dealing with highly sensitive areas where there's really no way around processing everything in a completely isolated, on-premises environment." (I5).

Consequently, cloud-based experimentation environments in public sector organizations often need to be replaced or complemented with sovereign on-premises infrastructure solutions before operational deployment with administrative data can occur. In the examined case, this meant that the application was moved from the cloud to an on-premises architecture. As a consultant detailed from his experience in various public sector projects, moving from experimentation to operational deployment requires an appropriate operating model and infrastructure that can support long-term use in administrative contexts.

V. DISCUSSION

The findings of this study highlight how regulatory constraints actively shape the implementation trajectory of generative AI in public sector organizations. Rather than viewing regulation solely as a barrier, our conceptualization of regulation-guided experimentation illustrates how regulatory mechanisms channel organizational flexibility and guide the path from early experimentation toward operational deployment.

The three identified tensions—data protection constraints, multi-actor bureaucratic governance, and the transition from cloud to sovereign infrastructure—demonstrate persistent structural conditions under which public sector organizations must innovate. These tensions are not temporary obstacles but enduring features of the institutional environment that require continuous adaptation.

VI. CONCLUSION

This paper examined how regulatory constraints shape the implementation of generative AI in public sector organizations through a qualitative study of a German public administration pilot project. We identified three persistent tensions and conceptualized gen AI implementation as regulation-guided experimentation. Our findings contribute empirically grounded insights into the interplay between exploratory innovation and regulatory compliance in the public sector.

Future research should further investigate how public organizations develop organizational capabilities for regulation-guided experimentation and how regulatory frameworks themselves may evolve to better support responsible AI innovation in administrative contexts.

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