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Understanding Municipal AI Governance: Practitioner Perspectives on AI Policy and Enactment

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Abstract

Municipal AI governance is often presented as a matter of policy design and compliance, yet in practice it unfolds through ongoing interpretation, negotiation, and adaptation by local government practitioners. This study shows that municipal AI governance is enacted not as a linear process of policy implementation, but as a cyclical and learning-oriented practice shaped by institutional context, organisational capacity, and practitioner judgement. Drawing on in-depth interviews with local government practitioners from Australia, the US, Spain, Saudi Arabia, and Hong Kong, the study adopts a grounded theory approach to develop an empirically grounded model of municipal AI governance. The analysis identifies five interrelated dimensions that shape policy enactment in practice: policy governance, policy objectives, policy implementation, policy challenges, and policy requirements. Central to the model is the role of policy governance as a structural anchor that shapes how policy objectives are interpreted, how policy implementation is operationalised, and how policy challenges and policy requirements evolve over time. By foregrounding practitioner perspectives, this study reconceptualises municipal AI governance as an adaptive and context-sensitive process rather than a static set of rules. It advances AI governance scholarship by explaining how policy meaning is constructed in everyday municipal practice and offers evidence-based insights for policymakers seeking to design governance frameworks that are operationally feasible, ethically grounded, and responsive to local conditions.

1. Introduction

As AI technologies increasingly permeate the operations of local governments (Yigitcanlar, et al., 2024a), they are reshaping how municipalities plan, deliver, and regulate public services. Ranging from predictive analytics in waste management to automated decision-making in urban planning, AI has become central to improving administrative efficiency and citizen engagement (Lakhouit, 2025). Nonetheless, the adoption of AI in municipal contexts raises critical governance challenges, including ethical accountability, transparency, and public trust (Criado & Zarate-Alcarazo, 2022; Kinder et al., 2023). Municipal AI policies have therefore emerged as key instruments in guiding responsible technology integration (Taeihagh, 2021).

In this context, AI governance refers to the structures, processes, and practices through which municipal authorities ensure that AI technologies are used responsibly, ethically, and effectively in public service delivery (Taeihagh, 2021; Yigitcanlar et al., 2024b). Understanding AI governance at the municipal level therefore requires examining not only formal policies but also the interpretive and operational practices of local practitioners who enact them (Knill et al., 2023; Uziel, 2025).

Practitioners serve as the key actors translating policy frameworks, high-level guidelines, and technical rules into visible actions in municipal operations (Hudson et al., 2019; Haddad et al., 2022). Their interpretations of AI policies directly influence how these policies are realised on the ground, influencing implementation practices, data management standards, ethical safeguards, and overall service delivery outcomes (Wang & Siau, 2018; Hudson et al., 2019).

Understanding practitioners' perspectives is essential because they bridge the gap between policy intent and operational reality (Abdullahi & Othman, 2020). Consistent with established implementation theory, the study finds that municipal practitioners play a central role in determining whether AI policies achieve their intended outcomes. As Lipsky's (1980) street-level bureaucracy framework and subsequent implementation scholarship (O'Toole, 2000; Hill & Hupe, 2002) suggest, practitioners act as interpretive agents who translate formal policy directives into operational decisions. Recent work in digital government and AI governance further reinforces this view, highlighting that successful AI adoption depends on practitioner capacity, understanding, and contextual judgement (Mergel et al., 2019; Young et al., 2019; Babšek et al., 2025).

Despite the rapid expansion of AI policy discourse, empirical research rarely captures the lived experiences of municipal practitioners. Existing studies predominantly analyse AI governance through policy documents, technical frameworks, or national strategies, often neglecting the on-the-ground realities of policy enactment (Papagiannidis et al., 2022; Corrêa et al., 2023; Roberts et al., 2024). The perspectives of those tasked with interpreting and operationalising municipal AI policies remain underexplored. In local government contexts, there is limited understanding of how practitioners navigate institutional constraints, ethical considerations, and community expectations when interpreting and operationalising AI policies. This absence of practitioner-focused evidence limits the development of empirically grounded AI governance models that can respond to the complexities of municipal administration.

Addressing this gap is crucial for developing effective and context-sensitive AI policy frameworks. Insights from practitioners can reveal how municipal AI policies function in practice, where they succeed, where they falter, and how they might be improved to align with local values and operational capacities (Taeihagh, 2021; Yigitcanlar, et al., 2022). Understanding these perspectives can inform the creation of adaptive policy mechanisms that encourage responsible innovation while maintaining public accountability (Voegtlin & Scherer, 2015; Dreyer et al., 2017). Moreover, incorporating practitioner insights strengthens participatory policy design, ensuring that AI governance reflects the everyday realities of municipal operations rather than remaining a top-down directive (Attard-Frost et al., 2024). Such an on-the ground approach contributes to both the theoretical advancement of AI policy scholarship and the practical refinement of municipal governance systems.

To address this need, this study explores how local government practitioners understand, interpret, and practice municipal AI policies. Drawing on in-depth interviews with 14 practitioners from Australia, the US, Spain, Saudi Arabia, and Hong Kong, the research adopts a grounded theory approach to generate a conceptual understanding of how municipal AI policies are enacted in diverse governance contexts. The study empirically derives 98 concept codes, 23 categories, and five overarching clusters that explain practitioners' interpretations and strategies, providing a theoretical lens on municipal AI policy practice. By capturing practitioner perspectives, this research contributes to building more responsive and contextually informed frameworks for responsible AI adoption at the local government level. By doing so, the study not only enhance theoretical understanding but also provides practical pathways for

municipalities to ensure that AI technologies serve the public good in ethically responsible and locally meaningful ways.

This study forms part of a broader global comparative research programme examining the governance and implementation of artificial intelligence in local government contexts. Over the past four years, the authors have developed sustained research engagement with municipal authorities and public-sector organisations across diverse international settings, particularly those involved in digital transformation and community-facing governance. This experience informed the study design and supported a context-sensitive interpretation of practitioner perspectives presented in this paper.

The remainder of the paper is structured as follows. Section 2 provides literature background. Section 3 presents the methodological approach. Section 4 shares the analysis and results. Section 5 offers a discussion of the findings. Section 6 concludes the paper.

2. Literature background

The growing integration of AI into local government operations has intensified the need for governance mechanisms that ensure transparency, accountability, and ethical compliance (Yigitcanlar, et al., 2024a). Early research on municipal AI primarily focused on technological readiness, regulatory standards, and risk management (Yigitcanlar, et al., 2024b). More recent research, however, emphasises the human and institutional dimensions of AI governance, particularly the role of municipal practitioners in translating policy intentions into operational realities (Oduro et al., 2025). This shift reflects growing recognition that responsible AI implementation depends as much on organisational interpretation and administrative capacity as on the formal quality of policy design (Walter, 2024; Oduro et al., 2025).

Within this emerging body of work, practitioners are increasingly understood as interpretive agents who navigate the complex intersection of policy, technology, and public value (Yigitcanlar et al., 2021). Studies show that their engagement determines how abstract ethical principles, such as fairness, transparency, and accountability become embedded in day-to-day administrative practices and digital service delivery (Kinder et al., 2023; Papagiannidis et al., 2025). However, the process through which practitioners enact these responsibilities is far from uniform (Mergel et al., 2023; Murray-Rust et al., 2025). Local government contexts are often characterised by limited resources, political pressure, competing performance demands, and evolving community expectations (Phillimore et al., 2022). These contextual factors shape practitioners' discretion and decision-making, producing varied and locally specific interpretations of responsible AI (Goldsmith et al., 2025; Papagiannidis et al., 2025). For instance, practitioners may prioritise operational efficiency over ethical deliberation due to time and budget constraints or adapt general policy frameworks to fit local regulatory or community contexts where AI-specific knowledge, skills, and governance capacity are often limited. Consequently, municipal AI governance becomes an adaptive process, continually negotiated between ideal policy aspirations and practical realities on the ground (Almulhim & Yigitcanlar, 2025; Heinisuo et al., 2025).

Empirical research on technology adoption and public sector innovation repeatedly identifies a policy–practice gap as a disjuncture between the formal design of governance frameworks and their realisation in practice (Raipa & Giedraityte, 2014; Rekunenko et al., 2025). In the context of AI, this gap often emerges when policy guidelines lack clarity or fail to align with institutional capacity and operational needs (Elliott & MacCarthaigh, 2025). Practitioners' agency is thus pivotal in mediating this gap. They act as sense-makers who interpret policy ambiguity, balance ethical imperatives with performance targets, and navigate competing organisational priorities (Hudson et al., 2019; Haddad et al., 2022). Their discretion can determine whether AI policy serves as an enabler of innovation or a constraint on implementation (Morley et al., 2021). Ignoring practitioners' interpretive and adaptive role risks producing AI policies that remain aspirational and disconnected from municipal realities, thereby limiting their effectiveness in fostering responsible technology adoption (Sandoval-Almazan et al., 2024; Yigitcanlar, et al., 2024a).

Recognising these challenges, recent studies have emphasised the importance of participatory and co-creative governance models that involve practitioners throughout the policy lifecycle, from formulation to evaluation (Halbe et al., 2020; Godinho et al., 2021). Such engagement ensures that policies are both technically sound and contextually relevant. Including practitioners in governance design helps align ethical objectives with operational feasibility, strengthens accountability and transparency, and enhances trust among internal and external stakeholders (Madanchian & Taherdoost, 2025). In turn, this participatory approach supports the development of adaptive governance frameworks capable of evolving alongside technological and societal change (Madanchian & Taherdoost, 2025; Papagiannidis et al., 2025).

In sum, advancing responsible AI governance at the local level requires moving beyond top-down, compliance-oriented frameworks toward more inclusive and evidence-based approaches that foreground practitioner perspectives. Municipal practitioners not only implement policy but also interpret, reshape, and recontextualise it in ways that define the practical meaning of responsible AI (Wang & Siau, 2018; Hudson et al., 2019). Understanding their experiences, constraints, and innovative capacities is therefore essential to bridging the policy-practice divide and ensuring that AI governance produces ethical, effective, and sustainable outcomes for communities.

3. Research design

This study adopts a grounded theory (GT) approach to data collection and analysis, a systematic and iterative qualitative methodology designed to generate concepts and theoretical relationships directly from empirical data rather than imposing predefined frameworks (Glaser & Strauss, 1998; Glaser & Strauss, 2017). This approach was particularly suited to the present study, which explores how local government practitioners interpret and enact municipal AI policies. Reflexivity, a critical element of GT was maintained throughout the research to ensure conscious awareness of the researchers' analytic lenses, assumptions, and positionality, as we engaged with the data and the construction of theory (Mruck & Mey, 2007).

Given that municipal AI policy is an emerging and insufficiently theorised field (Marcucci et al., 2022; Papadakis et al., 2024), GT offered the analytical flexibility needed to capture the complex, evolving, and context-dependent nature of policy practices (Charmaz, 2000). Its strength lies in uncovering underlying social processes, generating explanatory concepts, and developing theoretical models grounded in participant lived experiences (Mruck & Mey, 2007). By systematically examining narratives and interactions, GT facilitates the discovery of relationships among actors, organisational processes, and institutional contexts, allowing researchers to move beyond surface-level descriptions toward a deeper, conceptual understanding (Charmaz, 2000; Mruck & Mey, 2007).

3.1. Data collection

The study is a part of a larger global comparative research project on emerging AI and local government. Over the past four years, the authors have developed substantial experience in collaborating with local governments across diverse international contexts and with organisations that are directly engaged in community affairs. For this study, participants were recruited through targeted email invitations outlining the research aims and interview process. The primary selection criterion was active involvement with local government or governmental organisations implementing AI technologies.

Fourteen participants consented to take part in the study, comprising eleven local government practitioners from the US, Australia, Spain, and Saudi Arabia, and three government experts from Hong Kong. These cases were intentionally selected to capture a continuum of governance contexts relevant to AI adoption and regulation, rather than a single model of municipal government. The US and Australia represent federal systems (Verney, 1995), with the US historically relying on a relatively decentralised, multi-level approach to AI governance and an evolving set of federal initiatives rather than a single comprehensive national framework for AI adoption (Kashefi et al., 2024). Spain operates within a multilevel governance structure as a member of the European Union, where municipal AI practices are shaped by both national and supranational regulatory frameworks (Bonillo, 2022). Saudi Arabia represents a more centralised governance system, in which local government AI initiatives are closely guided by national strategies and oversight (Ibrahim, 2024). In contrast, Hong Kong does not operate a conventional local government system but relies on a centralised administrative structure supported by advisory District Councils (Scott, 2006). Accordingly, the Hong Kong experts offer perspective from district-level interaction between communities and government rather than autonomous local governance.

Nine of the participants possess more than ten years of professional experience in local government and digital technologies. For anonymity and clarity, each participant was assigned a unique code (Interviewee#1–14), as shown in Table 1.

Table 1
Summary information of interviewees

Interviewee ID	Organisation and country	Experience (years)	Position
Interviewee#1	Gold Coast City Council, Australia	17	Technology Application Manager
Interviewee#2	Ipswich City Council, Australia	8	Digital Transformation Manager
Interviewee#3	Ipswich City Council, Australia	4	Senior Governance Officer
Interviewee#4	Tempe City Council, USA	2	Director of Information Technology
Interviewee#5	Tempe City Council, USA	11	Chief Data and Analytics Officer
Interviewee#6	Mesa City Council, USA	17	Deputy Chief Innovation Officer
Interviewee#7	Ávila City Council, Spain	2	Environment and Sustainability Councillor
Interviewee#8	Salamanca City Council, Spain	12	Economic Development Councillor
Interviewee#9	Jeddah Municipality, Saudia Arabia	15	Enterprise Architecture Director
Interviewee#10	Madinah Municipality, Saudia Arabia	16	Head of the Enterprise Architecture (EA)
Interviewee#11	Hail Municipality, Saudia Arabia	2	AI Applications Programmer
Interviewee#12	Planning Department, Hong Kong	26	Principal Town Planner
Interviewee#13	Planning Department, Hong Kong	12	Senior Town Planner
Interviewee#14	Spatial Data Office, Hong Kong	30	Head of Spatial Data Office

3.2. Interview structure

Participants first completed a preliminary survey with two key questions: (a) Does your organisation employ AI technologies? (with sub-questions about types and purposes); and (b) Does your organisation have a specific AI policy?

Building on these responses, data were collected using a semi-structured interview design guided by open-ended questions intended to elicit rich narratives and unanticipated insights (Salomon & Cairns, 2011). The interview guide focused on participants' perceptions of local government understanding of AI

policies, the perceived role and objectives of such policies, the organisational supports and resources required for effective implementation, anticipated or experienced challenges, and strategies used to monitor compliance and alignment with AI policy goals. Questions were framed to encourage reflection on institutional practices, governance processes, and contextual constraints rather than technical AI development.

Interviews commenced with rapport-building questions relating to participants' professional roles and experience, and informed consent was obtained prior to data collection. Question phrasing was adapted to participants' organisational and national contexts. Real-time probing was used during live interviews to explore emerging themes, while written responses followed tailored prompts designed to elicit comparable analytical depth and conceptual insight. Where additional clarification was required, examples drawn from comparable government settings were provided to support understanding and encourage elaboration.

This flexible and responsive approach enabled depth without overwhelming participants, fostering a conversational tone that surfaced underlying motivations, organisational pressures, and resource constraints. Live interviews lasted between 40 and 65 minutes and were conducted with consent for audio recording and subsequent transcription.

3.3. Interview data analysis

Data were collected using three modes to accommodate participants' availability and contextual constraints. Four interviews were conducted face-to-face and audio-recorded using a mobile device, while a further four were conducted via Zoom with explicit consent for recording. In addition, three participants provided written responses to the interview questions via email rather than participating in live interviews. These written responses followed the same semi-structured interview guide to ensure conceptual consistency across all data sources.

Audio recordings were transcribed using automated transcription software (Rev) and subsequently checked for accuracy by three researchers to ensure data integrity. Written responses were imported directly into the qualitative dataset and treated analytically in the same manner as interview transcripts.

Data analysis followed core GT principles, particularly constant comparative analysis, whereby data collection and analysis occurred iteratively to enable ongoing comparison and refinement of emerging concepts (Hallberg, 2006). Transcription and preliminary coding were undertaken shortly after each interview to support this cyclical process. Memoing, which is a key GT technique for systematic reflection on coding decisions and the researcher's evolving interpretations (Tie et al., 2019), played a central role throughout the analysis. Reflexive memos were used to document analytical decisions, conceptual linkages, and category development as themes emerged inductively. NVivo 14 software was used to support data management, coding, and iterative comparison across interview and written response data.

As shown in Fig. 1, the coding process unfolded in four phases (Vu et al., 2025): (a) Open coding: transcripts were segmented into small units and assigned initial labels capturing emerging concepts, resulting in 98 codes; (b) Axial coding: related codes were grouped into broader ‘categories’ using constant comparison to reveal interrelations, yielding 23 categories; (c) Selective coding: core categories were identified and integrated into five overarching ‘clusters’, simplifying data into cohesive narratives; (d) Saturation testing: the point where additional data do not generate new codes or categories (Saunders et al., 2017). Although saturation appeared after analysing nine of the 14 interviews, the remaining interviews were completed to confirm saturation, strengthen conceptual density, and ensure no anomalous insights emerged. This approach aligns with grounded theory’s emphasis on iterative theoretical sampling and enhances the credibility and robustness of the resulting categories (Tie et al., 2019).

Together, these procedures ensured analytical rigour, theoretical sensitivity, and transparency throughout the GT process, enabling the generation of a robust conceptual model grounded in empirical practitioner insights. To enhance methodological transparency, Fig. 2 illustrates of the grounded theory coding process, showing how raw interview statements progressed through open, axial, and selective coding, culminating in the five core clusters that structure the emergent theory of navigating AI policy complexity. Table 2 complements this figure by summarising the axial and selective coding.

Table 2
Axial and selective coding of the study

Axial coding	**Selective coding**
Contractual, hybrid, local, national	Policy governance
Accountability, creating awareness, enablement, equilibrium, guardrail	Policy objectives
Adaptability, communication, compliance, training and capacity building, transparency	Policy implementations
Administrative complexity, digital lag, innovation trade-off, resource limitation, stakeholder unawareness	Policy challenges
Ethical accountability, resource provision, stakeholder engagement, technical framework	Policy requirements

4. Analysis and results

This section presents the findings from the qualitative analysis in a structured manner. It begins with a set of general observations derived from an inductive synthesis of the data, providing an overarching view of how local governments conceptualise and operationalise AI policy. This initial overview is visualised using a hierarchy map to highlight dominant themes and their relative emphasis across participants. Subsequent sub-sections then examine these themes in greater depth, focusing on specific dimensions of policy governance, objectives, implementation, challenges, and requirements.

4.1. General observation

To provide an overarching synthesis of the interview findings, a hierarchy map was used to visualise the dominant themes emerging across participants' accounts (Fig. 3). The hierarchy map does not represent a formal policy sequence or prescribed process; rather, it serves as an inductive analytical tool to summarise how frequently and prominently different aspects of municipal AI policy were discussed, offering a high-level view of recurring priorities and constraints.

Among policy governance, alignment with national frameworks was most frequently mentioned, highlighting a strong tendency to follow centralised guidance. At the same time hybrid and local approaches illustrate that municipalities also value contextual adaptation. In terms of objectives, 'Guardrail' emerged as the most emphasised concept, signalling a clear focus on risk management, alongside accountability and public awareness, which further underscore the priority given to responsible and transparent AI governance.

Implementation mechanisms were dominated by communication and compliance, both of which were frequently cited, reflecting the critical role of clear information flows and adherence to governance rules in translating objectives into action. Adaptability, transparency, and training were also noted, supporting effective operationalisation. Key challenges centred on resource limitations and administrative complexity, emphasising that capacity constraints and bureaucratic hurdles are major barriers to implementation, while gaps in stakeholder awareness and innovation trade-offs further complicate practice. Correspondingly, the most frequently cited requirements, adequate resources and stakeholder engagement, highlight that effective governance depends not only on rules but also on the institutional and human support needed to enact them. Overall, these patterns illustrate that municipal AI policy is shaped by recurring priorities: risk management, compliance, communication, and resources, which together define the backbone of responsible and actionable AI governance (Ghosh et al., 2025; Jinghua et al., 2025).

4.2. Qualitative analysis

The interview data identified five clusters of practitioner's policy perspectives: (a) policy governance; (b) policy objectives; (c) policy implementation; (d) policy challenges; and (e) policy requirements.

4.2.1. Policy governance

Selective coding identified four primary policy governance structures that municipalities adopt to govern AI usage: national, contractual, hybrid, and local. In this study, policy governance cluster refers to the orientation and source of AI policy that a local government relies on to guide its AI governance practices. Each approach reflects varying levels of autonomy, institutional maturity, and alignment with higher-level regulatory frameworks.

4.2.1.1. National approach

Many municipalities rely on national AI policies and frameworks as the foundation for local AI governance. This approach ensures consistency with legal mandates, ethical principles, and overarching governance standards. For instance, Interviewee#10 highlighted:

In Saudi Arabia, local governments follow AI policies set by national authorities such as Saudi Data and Artificial Intelligence Authority, the Ministry of Communications and Information Technology, and the eGovernment Program. These bodies ensure local governments are well informed and implement policies effectively under their guidance.

Participant also reported dependence on broader legislative or ethical frameworks rather than developing their own AI policies, Interviewee#11 explained:

Our local government has not developed an in-house AI policy but adheres to the regulations and policies established by the Saudi Data and Artificial Intelligence Authority. This ensures alignment with national standards for the use of AI.

This reliance often stems from uncertainty about the appropriate of local policy, coupled with confidence in existing national standards. As Interviewee#8 elaborated:

At the local level, we are not sure how far we can go, so we follow national European legislation to guide us." Also, Interviewee#12 added, *"The ethical AI framework from the Digital Policy Office and the Privacy Commission for Personal Data already covers data security and ethical AI use, which we believe addresses our needs.*

These insights suggest that when robust national or regional frameworks exist, municipalities tend to defer to them, perceiving little need to establish separate local AI policies. Overall, the national approach provides a foundational governance model that promotes compliance, mitigates ethical and legal risks, and ensures policy coherence across jurisdictions.

4.2.1.2. Contractual approach

Some municipalities govern AI primarily through contractual arrangements with external vendors. In this model, compliance with national or regional standards is embedded into procurement processes. As Interviewee#8 described:

The bots we are using are developed by external companies contracted by the town hall, and they comply with national and European legislation.

This approach allows cities with limited technical capacity to leverage external expertise while maintaining legal and ethical assurance. It shifts governance from internal oversight to vendor accountability, ensuring adherence through contract-based obligations.

4.2.1.3. Hybrid approach

The hybrid approach combines national guidance with organisation-specific adaptations. It enables municipalities to align with federal or regional frameworks while tailoring policies to local operational needs. As Interviewee#1 put forward:

We're reusing a lot of the federal government's AI guidelines and then just adding the flavour of our organisation on top of it—providing dos and don'ts around proper AI use.

Similarly, Interviewee#14 described:

We observe national strategies but have our own policy embraced by the Hong Kong Digital Policy Office framework.

Hybrid approaches balance compliance and customisation, allowing local governments to integrate organisational culture and context-specific risk management within broader national directions.

4.2.1.4. Local approach

Some municipalities take a local-first approach, developing internal AI policies that are primarily shaped at the local level rather than derived from national framework. These are often pioneering efforts, established ahead of broader regulatory developments. As Interviewee#4 highlighted:

We are the first AI ethics policy adopted in the US… council adoption has allowed us to put governance processes and committees in place.

Local policies demonstrate institutional leadership and innovation, serving as early models for responsible AI governance. They reflect municipalities' capacity to respond dynamically to community needs, technological advances, and contextual priorities.

Together, these four approaches illustrate the spectrum of municipal AI governance from strict compliance with national frameworks to proactive, localised innovation. They demonstrate how municipalities balance regulatory alignment, organisational autonomy, and adaptive governance to implement responsible and contextually relevant AI practices.

4.2.2. Policy objectives

Participants articulated five overarching policy objectives that guide municipal AI governance: accountability, guardrails, equilibrium, awareness, and enablement. These objectives reflect how local governments conceptualise the purpose of AI policies, not merely as compliance instruments, but as frameworks for responsible, informed, and beneficial technology use.

4.2.2.1. Accountability

Participants consistently viewed accountability as the cornerstone of responsible AI policy. They emphasised that human oversight must remain central to AI-assisted decision-making, ensuring that automation does not displace ethical or legal responsibility. Interviewee#6 stated:

The policy… describes to the employees of the city that their ethics, their decision making, their responsibility for their output doesn't change because they're using an AI. It encourages responsible use while maintaining human accountability.

Interviewee#6 also highlighted the deliberate exclusion of AI from formal decision-making processes:

Our current policy is that we do not use AI for decision making… Things that legislatively we've been empowered to do, we don't want to delegate that to AI.

These statements reflect a shared perception that AI should function as an assistive tool rather than an autonomous decision-maker. Accountability-based objectives, therefore, reinforce institutional trust, uphold professional responsibility, and mitigate potential reputational and legal risks.

4.2.2.2. Guardrails

Participants consistently framed policy as a 'guardrail' for protecting both the organisation and the community from the potential risks of AI use. Rather than viewing these restrictions as bureaucratic barriers, municipalities described them as ethical boundaries that ensure AI systems operate safely, and transparently. As explained by Interviewees#6 and #9, respectively:

We put forth a policy laying out what people are and are not allowed to do and what procedures they have to take in order to get an AI tool approved.

AI policies are designed to safeguard the community from potential risks associated with the deployment of AI solutions, ensuring a responsible and ethical approach to technology use.

These statements illustrate a shared understanding of guardrails as socio-technical mechanisms that operate at multiple levels. On the one hand, they serve a protective social function by promoting ethical accountability and preserving public trust. On the other hand, they establish concrete boundaries for acceptable AI use, define standards for responsible outputs, and prevent inappropriate or unethical deployment through procedural and technical controls. In this way, guardrails function as both normative and operational instruments within municipal AI governance.

4.2.2.3. Dynamic Equilibrium

Municipal representatives frequently discussed the need for balance, what participants referred to as finding the "right size" of governance. This aim to prevent excessive control that could inhibit innovation while still maintaining oversight. Rather than a fixed state, participants framed this balance as something that must be continuously adjusted in response to organisational capacity, technological change, and evolving risk. Interviewee#5 stated:

In the policy…the balance between being careful and not blocking innovation… Governance can bog everything down to the point where you can't make progress.

Similarly, Interviewee#3 emphasised proportionality:

It needs to be right sized for our organisation to not burden ourselves with administrative overhead, but at the same time finding the right level of protection.

Participants thus perceived equilibrium as a dynamic tension: governing AI with enough caution to ensure safety without undermining innovation or efficiency.

4.2.2.4. Awareness

Participants identified awareness creation as a key objective of AI policies. Respondents viewed it as essential to ensure that employees, stakeholders, and the wider community understand both the opportunities and risks of AI adoption. It aims to cultivate informed engagement, reduce resistance, and embed responsible use across all levels of the organisation.

Interviewee#5 highlighted that awareness-building is integral to governance itself:

Getting people who are prepared, understanding what governance looks like, and getting them to be part of the process to help move the city forward.

Similarly, Interviewee#7 emphasised education as the foundation of responsible adoption:

I insisted to my mayor that we need education on AI because people don't know the tools or their potential usefulness.

These statements indicate that awareness-oriented policies are designed to make AI governance participatory and proactive. Rather than assuming familiarity with emerging technologies, municipalities deliberately integrate education, training, and communication strategies into their policy objectives.

4.2.2.5. Enablement

Participants also perceived AI policies as instruments of enablement; policies that not only restrict but also empower municipalities to innovate responsibly. Rather than viewing governance as a limitation, participants described it as a means of advancing the digital transformation process and improving service delivery. As Interviewee#13 noted:

The prevailing policy is sufficient for us to explore AI to enhance our work operational efficiency… it still gives us a lot of room to implement and develop AI solutions.

Similarly, Interviewee#11 stated:

AI policies are essential for promoting responsible and ethical use… they aim to foster innovation, ensure data privacy and security, and enhance public trust.

These perceptions frame enablement as an active policy objective, one that positions AI as a tool for efficiency, innovation, and societal benefit under ethical guidance.

Together, abovementioned objectives reveal a comprehensive municipal approach to responsible AI: (a) Accountability establishes human responsibility; (b) Guardrails define ethical and procedural limits; (c) Equilibrium balances innovation with governance; (d) Awareness builds organisational capacity and preparedness; (e) Enablement drives efficiency and innovation. These objectives collectively illustrate how municipalities move beyond compliance to embed responsible AI principles into everyday governance practice.

4.2.3. Policy implementation

The analysis revealed that the implementation of municipal AI policies occurs through five interrelated approaches: communication, transparency, compliance, adaptability, and training. Together, they form a coherent model of implementation that balances procedural control with learning and responsiveness.

4.2.3.1. Communication

Effective communication was repeatedly identified as the foundation of successful policy implementation. Respondents emphasised structured, multi-level communication processes that ensured consistent understanding of AI policy intentions across organisational hierarchies. As Interviewee#6 explained:

We've done [this] by communicating through management, both upper city management executives as well as department division management, about the policy and about the timelines and roadmaps for the tools.

Such communication extended beyond the dissemination of policy documents; it involved continuous dialogue across departments to align priorities, manage expectations, and adapt to shifting technological timelines. As Interviewee#3 elaborated:

We communicated regularly through management across departments and divisions about timelines for AI tool releases.

These communication practices were instrumental in coordinating the adoption of AI tools such as Microsoft Copilot and ensuring departments were aware of cybersecurity and certification requirements prior to deployment. This structured, iterative communication process functioned as a policy transmission mechanism, transforming formal policy language into operational understanding. It also reflected a managerial approach in which AI policy implementation was not a static act of compliance, but a continuous exchange between departments, technology officers, and executives to maintain organisational coherence.

4.2.3.2. Transparency

Transparency emerged as a central normative value guiding the implementation of municipal AI policy. Participants consistently emphasised the principle of being "open by default," making data,

documentation, and policy decisions publicly accessible unless clear legal or ethical reasons prevented disclosure. As Interviewee#5 asserted passionately:

We are open by default… There's zero reason to have that behind a firewall. If we have it and there's a potential for public interest, we publish it public facing—that is the hill I am willing to die on.

This commitment to openness reflected an ethical stance rather than merely an administrative procedure. By defaulting to openness, municipalities sought to build public trust, enable civic learning, and encourage collaboration across jurisdictions.

Beyond its normative role, transparency also functioned as an operational mechanism in policy implementation. The public disclosure of AI projects, datasets, and governance processes enabled feedback, peer benchmarking, and cross-jurisdictional learning. Interviewee#5 noted that transparency allowed municipalities to "*learn from others' adaptations*, *an iterative exchange of knowledge that reinforced collective improvement*". In this sense, transparency was conceptualised not only as a value underpinning responsible AI governance, but also as a practical mechanism that facilitated distributed innovation and continuous policy learning.

4.2.3.3. Compliance

A defining feature of municipal AI policy implementation was the institutionalisation of compliance through systematic checkpoints. These mechanisms were designed to ensure that AI use across departments adhered to established policies and governance requirements.

Interviewee#4 detailed a comprehensive compliance framework embedded within procurement, finance, and technology assessment processes:

There's a question that's part of our RFP (request for proposal) process that asks if there's AI in the software… it's baked into the system. Procurement is aware, finance flags AI-related charges, and we have a tracking tool where I'm asking people to register their use of AI.

Compliance was operationalised through *layered institutional controls*: vendor questionnaires, procurement filters, and finance oversight, creating procedural visibility over AI acquisitions and deployments.

Saudi municipalities extended this compliance focus even further. For example, Interviewee#9 stated that *"dedicated teams responsible for monitoring compliance and assessing AI initiatives against policy goals,"* while Interviewee#11 reported the use of "*regular audits and transparency initiatives"* to ensure adherence to both national and local governance standards.

Together, these practices illustrate how compliance serves as an organisational safeguard, ensuring accountability, preventing unauthorised AI adoption, and embedding responsible use into everyday administrative workflows.

4.2.3.4. Adaptability

In this study, adaptability functioned as a key operational dimension of the broader adaptive governance strategy, representing the organisational and procedural capacity through which adaptive governance was enacted in practice. Given the rapid evolution of AI technologies, adaptability emerged as a critical condition for sustaining effective implementation. Municipalities recognised that static policies quickly become outdated as standards and technologies evolve. As Interviewee#1 described:

The industry is moving so quickly at the moment that we constantly have to review what our guidelines say… we're really relying on the federal government to bring all of that together into an Australian-focused policy.

Similarly, Interviewee#9 emphasised *"continuous review and adaptation"* through structured processes to ensure alignment with national standards and international best practices.

This adaptability was not reactive but institutionalised as a policy routine. A recognition that maintaining responsible AI governance requires continuous calibration. Municipalities framed adaptability as both a technical and organisational competency: the capacity to integrate new frameworks, update internal guidelines, and anticipate emerging risks.

4.2.3.5. Training and capacity building

The final dimension of policy implementation was ongoing training and professional development. Across cases, municipalities described systematic efforts to build staff capability, raise awareness of ethical risks, and cultivate responsible AI practices.

Interviewee#9, for instance, outlined a *"regular training and workshop"* program to enhance employees' understanding of AI regulations and compliance expectations. Similarly, Interviewee#3 described the establishment of a digital learning initiative:

We're launching an AI community of practice to teach people the basics and help them use it responsibly.

Training was conceptualised as a mechanism of cultural embedding; ensuring that AI policy principles were not confined to formal documents but translated into shared norms and everyday behaviour. Through structured learning initiatives and internal communication platforms, municipalities cultivated institutional literacy around responsible AI use, reducing operational risk and fostering long-term organisational capacity.

While the five approaches above formed the operational structure of implementation, participants emphasised that their effectiveness depended on strong leadership support. As Interviewee#5 reflected:

If I didn't have city manager support… it would make my job very hard, if not impossible. There has to be leadership buy-in that governance is important.

Leadership was thus identified as a cross-cutting enabler: providing strategic direction, resource legitimacy, and moral authority to sustain governance efforts across departments. Without visible leadership endorsement, even the most well-designed compliance or transparency mechanisms risked remaining symbolic rather than transformative.

These five interdependent approaches reflect how municipalities translate responsible AI principles into tangible administrative processes. Collectively, they illustrate that the effective implementation of AI policy in local government requires not only regulatory precision but also organisational learning, cultural alignment, and iterative reflexivity.

4.2.4. Policy challenges

The analysis identified five interrelated challenges that municipalities encounter: innovation trade-offs, administrative complexity, resource limitations, stakeholder unawareness, and digital lag. While each category represents a distinct dimension of difficulty, together they underscore that responsible AI policy implementation is constrained not only by technical readiness but also by organisational learning, governance maturity, and socioeconomic context.

4.2.4.1. Innovation trade-offs

A central challenge expressed across multiple cases was the tension between risk protection and technological innovation. Municipalities recognised the necessity of safeguarding citizen privacy, data integrity, and ethical compliance, but also feared that excessive caution could suppress the benefits of AI adoption. As Interviewee#6 clarified:

We wanted to put in place policy that balanced the protection of the residents and their data while at the same time not stifling innovation and allowing the use within the guidelines… the chief challenge is balancing those different factors.

This statement captures a core dilemma in responsible AI governance, how to regulate without paralysing experimentation. Officials described the need to craft policies that were robust enough to protect public interest yet flexible enough to accommodate technological evolution.

Similarly, Interviewee#2 cautioned against what they termed an *“abundance of caution,”* warning that over-regulation could inadvertently ‘watch out for all of these potential concerns’ at the cost of losing capability. Such trade-offs highlight an emerging governance paradox: local governments must operate as ethical regulators and digital innovators simultaneously, often without established models for balancing these dual roles.

4.2.4.2. Administrative complexity

The second category of challenge involved the procedural and structural complexity of implementing AI governance across diverse departments. Municipal AI policy development required input from legal, IT,

data, cybersecurity, and management divisions, leading to intricate coordination requirements. Interviewee#6 described this multidimensional process:

The governance group that got together and crafted the policy consisted of people from public outreach, our city attorneys, our data team, our cybersecurity team, and city management and IT… a wide range of factors that they had to look at and balance to make that policy work well.

Similarly, Interviewee#5 referred to the challenge as *"building the plane in flight,"* emphasising that the governance mechanisms were being designed simultaneously with AI adoption. Administrative complexity was compounded by documentation demands such as Standard Operating Procedures (SOPs) and compliance reviews, which required each department to formalise its AI use.

These procedural requirements, while necessary for accountability, imposed substantial administrative burdens on municipal teams that were already operating with limited capacity. The analysis indicates that the difficulty lies not in the absence of governance will, but in the bureaucratic friction of translating broad AI principles into daily operational routines.

4.2.4.3. Resource limitations

A recurrent challenge across all jurisdictions was the shortage of qualified personnel and insufficient financial resources to sustain AI policy initiatives. Interviewee#9 was most explicit in describing this constraint:

"The primary challenges our local government faces include a shortage of qualified personnel in the field of AI and insufficient funding to support the necessary initiatives and infrastructure."

Similar concerns were echoed by Interviewee#8, where resource limitations were tied to demographic scale and budget capacity:

Madrid and Barcelona have a lot bigger budgets… many more experts that work for them internally… it's difficult for us to actually come up to speed within the developments.

These accounts demonstrate a capacity divide in municipal AI readiness. Smaller cities and municipalities often depend on external or national support networks. In the absence of sustained investment, AI policies risk remaining aspirational rather than operational. Even in developed contexts such as Australia, resource scarcity manifested as staff allocation issues, as stated by Interviewee#1:

We haven't committed dedicated resources to this yet… it's all just pulling people from their normal BAU jobs and trying to bring it together.

This highlights that AI governance competes with routine workloads, revealing structural funding gaps that undermine long-term policy execution.

4.2.4.4. Stakeholder knowledge gaps

Another key challenge was the limited awareness of AI policies among both staff and the broader community. Interviewee#10 observed that *"a lack of awareness about AI policies among stakeholders and limitations imposed by the current organisational structure"* hindered effective adoption.

Similarly, Interviewee#1 admitted that even internal education remained incomplete:

We've already talked about educating the public… we haven't even started that journey. That's something we should look to do, but we're just having difficulty trying to educate our own internal staff for now.

This indicates a dual-layered awareness gap: internal (staff understanding of AI ethics and procedures) and external (public comprehension of AI policy goals). Local governments face challenges in ensuring that AI governance is not only technically sound but socially legitimate through informed participation.

4.2.4.5. Digital lag

The final category identified was digital lag, referring to disparities in technological infrastructure, adoption pace, and readiness across municipalities. Interviewee#5 who worked in the city of Tempe municipality near a large public research university compared their rapid AI adoption with slower-moving neighbouring cities such as Scottsdale in Arizona in the US, stated that:

They just don't have all the AI coming into their cities and all these tools the same that we are seeing now… some of my counterparts at surrounding cities are taking longer to put the governance in place.

Similarly, Interviewee#8 described the difficulty of keeping pace with larger metropolitan areas: *"It's difficult for us to actually come up to speed within the developments."*

This digital lag reflects asymmetries in innovation ecosystems, where cities with greater economic and educational resources, population density, or technological infrastructure advance more quickly in adopting responsible AI practices. Conversely, smaller, aging or resource-constrained municipalities remain at risk of falling behind in capability and governance maturity, perpetuating a cycle of digital inequality. Hence, digital lag emerges as both a technical and policy challenge, constraining equitable implementation of AI policy across local government tiers.

Collectively, these five categories reveal that policy challenges are not merely administrative barriers but systemic constraints that define the limits of responsible AI governance. They reflect the dynamic tensions between innovation and regulation, structure and flexibility, ambition and capacity. While local governments are increasingly aware of the ethical and procedural demands of AI, their ability to act is mediated by resource scarcity, bureaucratic inertia, and uneven digital maturity. These findings suggest that future policy frameworks must embed mechanisms for capacity building, inter-municipal collaboration, and adaptive learning to address these enduring structural challenges.

4.2.5. Policy requirements

The analysis revealed that municipal AI policy effectiveness depends on multiple interrelated requirements that enable successful adoption, oversight, and integration of AI technologies. From the grounded analysis of interviews, five primary categories of policy requirements were identified: resource provision, ethical accountability, technical frameworks, stakeholder engagement, and institutional coordination. Together, these requirements form a cohesive foundation for responsible AI governance.

4.2.5.1. Resource provision

Adequate resources were consistently highlighted as essential for operationalising AI policies. Municipalities emphasised the need for skilled personnel, specialised tools, and dedicated funding to manage both technical and administrative dimensions of AI adoption. As Interviewee#10 explained:

"To make AI policies work effectively, the local government needs support in the form of AI experts, specialised tools, and funding to manage implementation costs. These resources are essential to advance AI initiatives and ensure proper adherence to policies."

Interviewee#11 further elaborated on this requirement, stressing the need for structured capacity-building initiatives:

To effectively implement AI policies, local governments need technical expertise, funding, training programs, and collaboration with national authorities, academic institutions, and the private sector to share knowledge and best practices.

Similarly, Interviewee#1 highlighted long-term planning and budget prioritisation to create sustainable structures for AI initiatives:

We're planning to stand up a project to get all of this up and going properly… there's some further budgets ask that's going to be put into next year's budget to trim and stand up more formal processes behind it.

These statements demonstrate that resource provision is a foundational requirement. Without appropriately skilled personnel, specialised tools, and financial support, AI policies cannot be effectively implemented or sustained.

4.2.5.2. Ethical accountability

Ethical considerations emerged as a central requirement, particularly transparency with the public and responsible handling of citizen data. Municipalities framed ethical accountability as a mechanism for trust-building and legitimacy. Interviewee#3 emphasised:

We need to encourage a level of trust in our activities that we are being responsible with [public] information… transparency, keeping you in the loop around high-impact activities.

This ethical accountability reflects both a procedural and moral dimension: AI policies must not only comply with legal requirements but actively demonstrate fairness, openness, and accountability. This ensures that AI initiatives are socially acceptable and resilient to public scrutiny, reinforcing public confidence in municipal governance.

4.2.5.3. Technical frameworks

Another category identified was the necessity of technical frameworks, standards, and thresholds for risk oversight. Municipalities acknowledged that not all AI applications carry equal impact, and governance processes must differentiate accordingly. Interviewee#3 underlined that:

A lot of our procedure is baked around high-impact AI technology that warrants risk mitigation, controls, and oversight… what is the threshold where risk mitigation is warranted?

Technical frameworks include structured SOPs, risk assessment protocols, and clear operational boundaries for technology use. They provide clarity, guide decision-making, and ensure that AI deployment aligns with both municipal objectives and public expectations. These frameworks are critical for operational reliability and regulatory compliance.

4.2.5.4. Stakeholder engagement

Effective AI policies require active engagement with internal and external stakeholders, including employees, citizens, national authorities, and academic institutions. Interviewee#11 emphasised:

Collaboration with national authorities, academic institutions, and the private sector is necessary to share knowledge and best practices.

Interviewee#1 highlighted the importance of cross-functional collaboration:

Within our strategy, we're planning a centre of excellence to bring in members of the organisation from legal, risk, IT, and other departments… all to work together on AI use case adoption and prioritisation.

Stakeholder engagement ensures policies are informed, contextually relevant, and supported by those responsible for implementation, fostering both innovation and compliance.

These requirements collectively highlight that successful AI policy implementation demands a combination of material resources, ethical grounding, structured governance, and participatory engagement. They form the essential conditions for responsible and sustainable adoption of AI technologies in local government.

5. Findings and discussion

Through GT methodology, employing iterative coding, constant comparison, and memo development, five interrelated categories emerged that collectively explain how local government practitioners understand, interpret, and practice municipal AI policies. This grounded theory extends existing accounts

of AI governance by showing how local practitioners navigate policy complexity through a cyclical interplay of structural anchors (policy governance), interpretive devices (policy objectives), and practice-based mechanisms (implementation, challenges, and requirements). This clusters encapsulates the ongoing and adaptive work practitioners do as they navigate the intersection of external governance frameworks, local operational constraints, and ethical imperatives. Rather than simply following predetermined rules, practitioners actively balance conflicting regulatory demands, organisational capacities, and normative values, such as transparency, equity, and accountability to achieve responsible and contextually appropriate AI adoption within their municipalities. This highlights that ethical AI governance is not solely a matter of regulation, but also fostering institutional cultures capable of reflexive judgment, continuous learning, and civic responsibility.

Studies confirm that effective AI governance depends not only on technology but on organisational structures and bureaucratic networks surrounding algorithmic transparency, which create foundations for responsible adaptation (Zaidan & Ibrahim, 2024; Jørgensen & Grace, 2025). As Katzenbach & Ulbricht (2019) argues, algorithmic governance increases administrative efficiency only if institutional design enables transparent coordination and participatory oversight, directly echoing the structural anchors identified in this study.

Analysis revealed that this navigation process is cyclical and relational, rather than linear or sequential (Fig. 4). The process begins with the policy governance structure, which establishes the institutional context and shapes how local governments interpret policy intent. The policy governance structure frames the way objectives are defined and implemented, while also giving rise to the challenges that are encountered in practice. In turn, these challenges prompt the identification of policy requirements, that feed back into and sustain implementation efforts. This iterative movement between structure and adaptation reflects how practitioners actively negotiate between top-down policy frameworks and local operational realities.

5.1. Policy governance: the structural anchor

Policy governance emerged as the institutional anchor shaping the entire AI policy process at the municipal level. Practitioners' accounts indicated that governance frameworks shape how municipalities interpret AI policies, organise implementation responsibilities, establish accountability mechanisms, and mobilise resources. Whether nationally coordinated, contractually guided, hybrid, or predominantly locally developed, these arrangements influence municipal action in systematic and enduring ways. In this sense, policy governance functions as an institutional framework that defines the conditions under which local governments engage with AI technologies.

In nationally coordinated systems, municipal AI governance was strongly shaped by centralised direction and regulatory alignment. As Interviewee #11 put forward, "*Local governments follow AI policies set by national authorities such as Saudi Data and Artificial Intelligence Authority … and implement them effectively under the guidance and support of these national authorities*." This pattern aligns with Saudi

Arabia's nationally coordinated governance structure for data and AI, in which municipal authorities operate within a centrally steered policy framework. Within this context, policy objectives are interpreted with a strong emphasis on regulatory alignment and compliance (AlGosaibi et al., 2020; Aljabri, 2024).

By contrast, municipalities operating under hybrid governance arrangements described greater interpretive flexibility. These settings combined adherence to overarching national strategies with scope for local adaptation. As Interviewee #14 noted in the Hong Kong context, it was necessary to *"observe national strategies… but for some cases like openness… having our own policy embraced by the Hong Kong policies led by the digital policy office."* Hybrid governance frameworks enabled municipalities to align national objectives with local priorities, supporting context-sensitive practices such as tailored communication strategies and transparency norms. For example, Interviewee #5 stated, *"We are open by default if we do it and it's a public interest and there's no reason for us not to make it public facing."*

Importantly, local or bottom-up governance approaches placed even greater demands on municipal capacity. In such context, municipalities were required to develop their own AI expertise, policies, and operational procedures. While such arrangements allowed for responsiveness and experimentation (OECD, 2023), they were also significantly more resource- and expertise-intensive (David et al., 2023). As Interviewee #8 observed in the Spanish context, *"First and foremost, budget… Madrid and Barcelona have a lot more inhabitants… bigger budget… more experts than us."* Similar dynamics were evident in US interviews, where cities operating with limited national guidance faced acute challenges related not only to funding, but also to technical expertise and organisational capacity. These constraints could limit the ability to scale pilot initiatives or sustain long-term AI governance capabilities (Andersson et al., 2024).

Taken together, these findings demonstrate that policy governance operates as a persistent institutional framework shaping municipal AI governance. It conditions what objectives are prioritised, how implementation unfolds, and where tensions between autonomy and compliance, innovation and control, or flexibility and capacity are most likely to emerge. Rather than serving merely as a starting point, policy governance constitutes an enduring structuring force that defines the possibilities and limits of local government responses to AI complexity.

5.2. Policy objectives: balancing innovation and control

Within the grounded theory model, policy objectives were described by practitioners as practical guides that translate broad policy governance into actionable implementation. Participants emphasised how objectives clarify operational purpose, provide justification for decisions, and reduce uncertainty in day-to-day implementation. Rather than simply reproducing national directives or reflecting local preferences, objectives were used to mediate between them, making policy intent workable within municipal contexts.

In national policy–driven contexts, participants characterised objectives as functioning primarily as guardrails, clarifying permitted actions, procedural requirements, and risk management. They also legitimised efforts to use AI to improve efficiency and service delivery. This framing aligns with findings

from Roberts et al. (2021), who highlight that national AI strategies often emphasise establishing regulatory guardrails that protect public interests and ensure ethical AI adoption at scale. In contrast, those working within locally developed or hybrid approaches described objectives that balanced constraint and possibility through more community-facing logics, prioritising accountability, ethical responsibility, and managing tensions between innovation and caution. This aligns with the study by Hsu et al. (2022), which underscores how local and regional AI policies tend to focus more on the practical integration of AI within community contexts and building governance capacities responsive to local needs. Across all governance settings, practitioners highlighted awareness-building as a central objective, emphasising staff preparation, governance clarity, and organisational readiness for responsible AI integration. These distinctions are consistent with patterns identified by Saheb & Saheb (2024) and Papagiannidis et al. (2025), who note that policy objectives vary depending on governance level, technological maturity, and socio-political context.

What emerges from the analysis is not a dichotomy between national and local approaches, but a shared functional role: policy objectives operate as stabilising mechanisms within conditions of ambiguity. Across contexts, objectives delineate what should be prioritised, the risks that must be managed, and the boundaries within which experimentation is permissible. In this sense, objectives function as an organising device that connects the structural orientation of the policy governance with the practical demands of implementation. They shape not only what local actors aim to achieve but also how they legitimise decisions and navigate persistent tensions between innovation and control.

5.3. Policy implementation: translating objectives into practice

Interview findings reveal that policy implementation is closely influenced by both the overarching policy governance adopted by the local government and the specific objectives underpinning each policy. For instance, municipalities with their own policies tend to emphasise systematic compliance mechanisms, including formal procurement checks, vendor questionnaires, and structured reporting systems, to ensure adherence to established standards. As one interviewee noted, these mechanisms involve asking whether *“a Standard operating procedure exists”* and whether it is being followed, highlighting the role of systematic checkpoints in governance (Interviewee#4). Another participant stated, *“Governance! I think the governance group is important and just making sure we have guardrails in place… there is no way for someone to purchase a software application…without going through procurement or having to fill out a request for technology…That's where we catch them on the firewall”* (Interviewee#5). This indicates how the policy governance is reflected in the implementation process, shaping the operational procedures and governance structures through which AI tools are adopted and monitored.

The connection between policy objectives and implementation strategies is also evident. Where the policy objective emphasises responsible and ethical use of AI, the implementation often involves comprehensive training programs, workshops, and knowledge dissemination to city staff, ensuring that personnel understand both the capabilities and limitations of AI tools (Interviewee#2, Interviewee#3 and

Interviewee#9). Similarly, when the objective includes fostering public trust and transparency, municipalities implement open data initiatives, publish guidelines, and maintain public-facing documentation to make AI practices visible to stakeholders (Interviewee#4, Interviewee#5. and Interviewee#6). These examples underscore how the goals set out in policy documents directly inform the operational mechanisms through which AI is deployed and managed.

While implementation operationalises objectives, it also generates policy challenges. Communication efforts, for instance, can create administrative complexity, requiring repeated messaging, coordination across departments, and leadership oversight. Stakeholder engagement may reveal awareness gaps or divergent expectations, necessitating iterative adjustments to policy practices. Interviewee#5 reflected on this tension: *"It's just going to be a ton of repetition and messaging…reminding the directors to remind people that they're supposed to be doing this"*. Similarly, procedural compliance can strain municipal resources, particularly in smaller municipalities where technical and staff capacity is limited. These challenges underscore that policy implementation as an interpretive and adaptive process, shaped by both the objectives it seeks to fulfill and the structural constraints of the policy governance.

Implementation is increasingly understood in the literature as an active engine of practice, not passive execution (Matland, 1995; Hill & Hupe, 2002). In urban AI research shows that operational routines generate new challenges and learning opportunities, confirming these findings on the generativity of friction and constraint (Kitchin, 2016; Mergel et al., 2019).

Overall, the findings highlight a causal and cyclical relationship: the policy governance frames the permissible and prioritised modes of action, policy objectives determine the mechanisms through which implementation occurs, and the implementation process itself generates challenges that must be managed to maintain effective governance. Policy implementation is therefore both a translation of intention into action and a source of emergent complexity, emphasising the need for structured support, ongoing evaluation, and adaptive learning within municipal AI governance (Liebig et al., 2022; Heinisuo et al., 2025).

5.4. Policy challenges: tensions and constraints in practice

Although technical complexity is often identified as a central challenge in AI governance (Taeihagh, 2021; Zaenal & Astuti, 2025), this study finds that local government policy challenges arise critically from the policy governance adopted and the mechanisms through which policies are implemented. These two dimensions jointly shape the tensions practitioners encounter as they translate policy expectations into operational reality. In other words, policy challenges are produced by the governance architecture itself, not simply by the nature of AI technologies.

First, the policy governance, whether grounded in national guidelines, local frameworks, or hybrid models, creates distinct forms of pressure. Nationally driven approaches emphasising strict compliance generated challenges related to procedural rigidity, increased documentation, and alignment with external regulatory requirements. Interviewee#6 described the difficulty of ensuring that AI use protects

resident data *"without stifling the use of AI,"* highlighting the tightrope created by compliance-heavy frameworks. Conversely, locally developed approaches, which prioritise community responsiveness and ethical alignment, produced challenges related to ambiguity and uneven departmental interpretation. Decisions often required repeated discussion and consultation because, as Interviewee#3 noted, *'everyone wants to have a say when it comes to AI,'* highlighting the deliberative nature and interpretive flexibility of locally developed policy governance structures.

Second, the mechanisms used to implement policy generated their own complexities. Even when governance structures were clearly defined, implementation created administrative burdens and coordination challenges. Interviewee#4 described *"building the plane in flight,"* working to articulate SOPs while simultaneously responding to rapid internal demand for AI tools. Others noted the difficulty of managing new review processes, such as explaining why certain tools were blocked and guiding departments toward approved alternatives. These mechanisms also exposed capability gaps: several practitioners emphasised shortages of skilled personnel, limited funding, competing workloads, and the difficulty of *"educating our own internal staff before we even start educating the public."* Such constraints directly hinder the rollout of responsible AI practices.

Taken together, these findings highlight that policy challenges originate from policy governance and policy implementation. Policy governance establishes governance expectations, while implementation mechanisms reveal organisational friction points, including privacy concerns, cybersecurity requirements, resource shortages, and internal communication gaps (Diro et al., 2025; Ilcic et al., 2025). This interplay shapes how staff interpret expectations, manage risks, and negotiate the boundaries of responsible AI use. Ultimately, the constraints faced by local governments are not simply technological but structural, organisational, and institutional, reinforcing the need for AI policies that are both principled and feasible within municipal realities.

5.5. Policy requirements: enabling sustainable implementation

Analysis of practitioner narratives shows that policy requirements emerge as the adaptive response to the challenges generated by both the policy governance structure and the mechanisms used to implement it. That is, once practitioners confront misalignments, resource gaps, or governance friction, they begin identifying what is necessary to sustain responsible AI in practice. These requirements are not merely technical add-ons; they represent the conditions under which AI policies become workable, sustainable, and ethically aligned within local government.

Local governments consistently emphasised several foundational requirements needed to make AI policies workable in practice. A primary requirement was technical expertise, with participants stressing that effective policy implementation depends on *"skilled professionals to develop and manage AI systems"* (Interviewee#11) and continuous training to keep pace with technological change. Without this specialist capacity, councils risked over-reliance on vendors or misinterpreting policy obligations (Reed, 2018; Slattery et al., 2024). This need for expertise was closely tied to financial capacity, which

interviewees repeatedly described as a structural prerequisite for responsible AI. As Interviewee#10 explained, *"local government needs support in the form of AI experts, specialised tools, and funding to manage implementation costs."* Similarly, Interviewee#7 emphasised that AI adoption must *"optimise the resources… optimise the money"* because they are accountable for the responsible use of citizen funds, underscoring that financial constraints directly shape the speed and quality of AI implementation (OECD, 2025).

Participants also outlined the importance of stakeholder engagement to coordinate governance functions and strengthening institutional capacity for decision making. As Interviewee#1 described plans to *"stand up a centre of excellence for AI… bringing together legal people, risk, people from IT… right across the business, supported by dedicated budgeting and a formalised framework for evaluating and prioritising AI use cases"*. These accounts highlight that institutional architecture is needed to reduce fragmentation, consolidate expertise, and support consistent decision-making (Domorenok et al., 2021). In addition to structural factors, interviewees emphasised the importance of ethical accountability, highlighting transparency, public trust, and clearly defined ethical boundaries. As Interviewee#2 explained, councils must be *"transparent with the community," "encourage a level of trust," and "keep you in the loop around stuff that's high impact and going to impact you as a community"*. These comments show that policy requirements extend beyond technical and financial needs: they include embedding ethical commitments into governance processes and ensuring that AI strategies reflect public values rather than purely administrative imperatives.

Taken together, these findings suggest that the policy requirements identified in this study operate as feedback mechanism that directly informs future policy implementation mechanism. This aligns with contemporary theoretical arguments that responsible AI in cities requires 'continuous learning environments', 'reflexive accountability', and adaptive governance structures capable of evolving alongside technology (Yigitcanlar et al., 2021; Ilcic et al., 2025).

The challenges practitioners encountered, whether related to expertise, funding, institutional coordination, or public trust, clarify the conditions that must be in place for AI governance to function sustainably. Recognising these requirements enables policymakers to anticipate and integrate the necessary supports when implementing or revising AI policies in the future. In this way, policy requirements do not simply respond to existing gaps; they actively shape more realistic, better resourced, and more trustworthy implementation processes in subsequent iterations.

This integrated model, illustrated in Fig. 4, extends understanding of municipal AI policy enactment by framing it as a response to the inherent complexity of local government AI governance, rather than as linear implementation. The findings demonstrate that policy complexity arises from the interplay of structural frameworks, diverse objectives, operational constraints, and ethical considerations. Within this context, practitioners exercise interpretive agency, actively mediating between policy intention and practice while identifying structural, technical, and ethical enablers that sustain responsible AI. Ultimately, responsible AI adoption in municipal contexts emerges not from static compliance but from

this adaptive, learning-oriented cycle of navigating complexity, addressing challenges, and refining implementation. Policy requirements identified in practice actively feedback to enhance subsequent policy enactment, providing actionable insights for future governance.

6. Implications and recommendations

The findings of this study offer a set of recommendations that may assist policymakers and researchers in strengthening the design, implementation, and scholarly understanding of municipal AI governance.

6.1. Recommendations for policymakers

6.1.1. Design AI policies as adaptive frameworks

There may be value in moving beyond static, compliance-only models toward more flexible governance frameworks that accommodate local operational diversity. The findings indicate that overly rigid national frameworks can create administrative burden and constrain innovation, while the absence of shared or recommended frameworks can increase ambiguity and fragmentation, particularly for smaller municipalities with limited technical expertise and institutional capacity. Balancing these forces through adaptive guidance, iterative review mechanisms, and contextual flexibility could support more effective AI policy design.

6.1.2. Embed resource equalisation mechanisms to address municipal disparities

Smaller municipalities face significant skill, funding, and infrastructure deficits that limit their ability to enact responsible AI practices. National and state-level authorities could establish targeted funding streams, shared service models, and regional centres of expertise to prevent widening AI capacity inequalities across municipalities. Such approaches could help prevent widening disparities in AI capacity and promote more equitable adoption of responsible AI practices.

6.1.3. Mandate organisational coordination mechanisms within AI policy frameworks

The study suggests that fragmented governance: siloed decisions, inconsistent SOPs, and uneven policy interpretation, can undermine responsible AI implementation. Incorporating coordination structures such as AI oversight committees, cross-departmental review processes, or standardised procurement checkpoints may help support consistent interpretation, risk reduction, and alignment with ethical and legal expectations.

6.1.4. Integrate transparency and community-facing requirements as core policy components

The findings show that public trust, ethical clarity, and openness are not optional, practitioners see them as essential conditions for responsible AI. Policymakers could incorporate internal governance structures such as AI oversight committees, cross-departmental review processes, and standardised procurement checkpoints. These enable consistent interpretation, reduce risk, and ensure AI use aligns with ethical and legal expectations.

6.1.5. Develop policy feedback loops informed by practitioner experience

As practitioners actively shape how policy operates in practice, policymakers may benefit from formalising channels for capturing practitioner insights. Regular consultation cycles, structured learning reviews, or shared national-local policy forums could support policies that are responsive to real-world implementation challenges rather than idealised assumptions.

6.2. Recommendations for researchers

6.2.1. Advance research on the interpretive role of practitioners in AI policy enactment

This study demonstrates that practitioners are not passive implementers but active interpreters of AI governance. Future research should investigate how this interpretive agency shapes policy outcomes, including comparative work across governance models, political systems, and municipal scales. Understanding practitioner sense-making is essential for bridging the persistent gap between policy design and operational reality.

6.2.2. Investigate structural inequities in municipal AI capacity and their governance implications

The findings highlight disparities in expertise, funding, and institutional maturity across municipalities. Scholars might examine how these inequalities influence the distribution of AI benefits and risks, including research on regional support models, shared infrastructures, and collaborative governance mechanisms.

6.2.3. Study AI governance as a dynamic and cyclical system rather than a linear process

The study provides empirical evidence for a cyclical model driven by iterative feedback between policy governance, objectives, implementation, challenges, and requirements. Researchers can further theorise and test this model across jurisdictions to deepen understanding of how complex public-sector technologies evolve in practice.

6.2.4. Explore new models of participatory and community-centred AI governance

As municipal use of AI expands, future research should examine how citizens perceive and engage with local AI governance in practice. This study highlights the importance of communication, transparency, and trust-building, suggesting that participation often occurs through existing civic channels rather than formal mechanisms. Future work could explore how citizens engage local media, public communication platforms, and interactions with elected officials and municipal staff to influence or co-shape AI policy, offering more grounded insights into participatory municipal AI governance.

7. Conclusion

This study offers a GT model illuminating how local government practitioners navigate the complex terrain of municipal AI policy enactment across diverse governance contexts. By synthesising practitioner perspectives from multiple countries and institutional settings, the research extends understanding beyond formal policy design to reveal how policies are interpreted, implemented, and adapted in everyday municipal operations. The model highlights five interrelated categories (policy governance, objectives, implementation mechanisms, emerging challenges, and enabling requirements) that interact cyclically, framing AI governance as an ongoing, adaptive process rather than a static, linear endeavour.

This study advances understanding of municipal AI governance by extending adaptive governance theory into a technology-focused context. It operationalises adaptive governance as a meta-strategy enacted through policy governance as the structural anchor, continuous adaptability via policy calibration, and policy requirements as feedback mechanisms that sustain iterative refinement. The research reframes policy implementation as a generative process, where challenges and procedural friction create learning opportunities that feed back into governance practices, building adaptive capacity. Additionally, the study provides a comparative perspective on governance structures, showing how nationally coordinated, hybrid, and local approaches shape municipal AI practices differently balancing compliance, interpretive flexibility, and experimentation. Collectively, these insights provide a GT of policy complexity for responsible AI, demonstrating how practitioners co-produce governance through structural, interpretive, and reflexive mechanisms.

Key contributions include demonstrating that policy governance serves as a structural anchor shaping local discretion, resource allocation, and governance practices, while policy objectives mediate between national directives and community-specific priorities. Implementation is shown to translate these objectives into organisational actions, simultaneously generating new challenges that practitioners must manage to sustain responsible AI adoption. This study advances theory by integrating structural, normative, and operational dimensions into a cohesive framework grounded in empirical practitioner insights. This study also provides valuable insights for policymakers by highlighting the experiences of municipal practitioners navigating AI policy implementation across different governance systems. It suggests that enhancing AI governance effectiveness requires attention to key levers identified by practitioners, including tailored training programs to build staff capacity, robust communication strategies to facilitate coordination and transparency, and clear compliance mechanisms to ensure

accountability. Understanding how practitioners experience policy implementation helps policymakers recognise the complexities involved on the ground and design more responsive and context-sensitive AI governance frameworks that align with local capacities and challenges.

At the same time, this research acknowledges limitations that open avenues for future inquiry. First, the cases represent a limited range of countries and governance styles and may not capture the full diversity of municipal contexts globally, such as rural or low-income settings. Second, while the study draws on data from multiple municipalities, its primary aim is theory-building rather than systematic cross-case comparison; as such, it does not engage in deeper comparative analysis across the five sites, which limits the specificity of comparative conclusions. Third, the focus on municipal practitioners, while providing rich experiential knowledge, excludes perspectives from elected officials, civil society, and affected communities, which could deepen understanding of participatory AI governance. Fourth, the cross-sectional design captures a moment in a rapidly evolving AI policy landscape, warranting longitudinal studies to observe how governance complexity and practitioner strategies evolve over time. Finally, while the findings are not intended to be statistically generalisable, the GT model offers analytical generalisability by identifying recurring governance dynamics that are likely to be relevant across municipal contexts facing similar institutional, technological, and capacity constraints.

Ultimately, the study underscores that responsible AI governance in local governments is not achieved through policy directives alone, but through the everyday interpretive work of practitioners operating within complex and uneven institutional landscapes. Ensuring that AI genuinely serves the public interest therefore requires governance arrangements that respect local realities while upholding shared ethical commitments. Policymakers and municipal leaders must therefore view AI governance not as a fixed endpoint, but as a continuous, participatory effort to align technological innovation with democratic values and social equity. By revealing how practitioners navigate these tensions in practice, this research offers a grounded foundation for designing AI policies that are both contextually realistic and normatively robust. The insights generated here emphasise that advancing responsible AI is an ongoing endeavour; one that depends on institutional willingness to learn, adapt, and support those charged with translating policy into meaningful public value.

Author Statements:

Ethics Approval:

This study was conducted in accordance with the ethical standards of the approving institutional review body. Ethical clearance was obtained from the relevant university Human Research Ethics Committee prior to data collection. All participants were informed about the purpose of the study, and informed consent was obtained prior to their participation. Data were collected and managed in a manner that ensured confidentiality, anonymity, and compliance with institutional and national research ethics guidelines.

Declarations

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Conflicts of Interest:

The authors declare no conflict of interest.

Author Contribution

AD: Data curation; Formal analysis; Writing - original draft. TY: Conceptualisation; Supervision; Funding acquisition; Writing - review & editing. PC, KM, RL, RM, JC Writing - review & editing. All authors have read and agreed to the final version of the manuscript.

Data Availability

Data will be made available upon request from the corresponding author.

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Figures

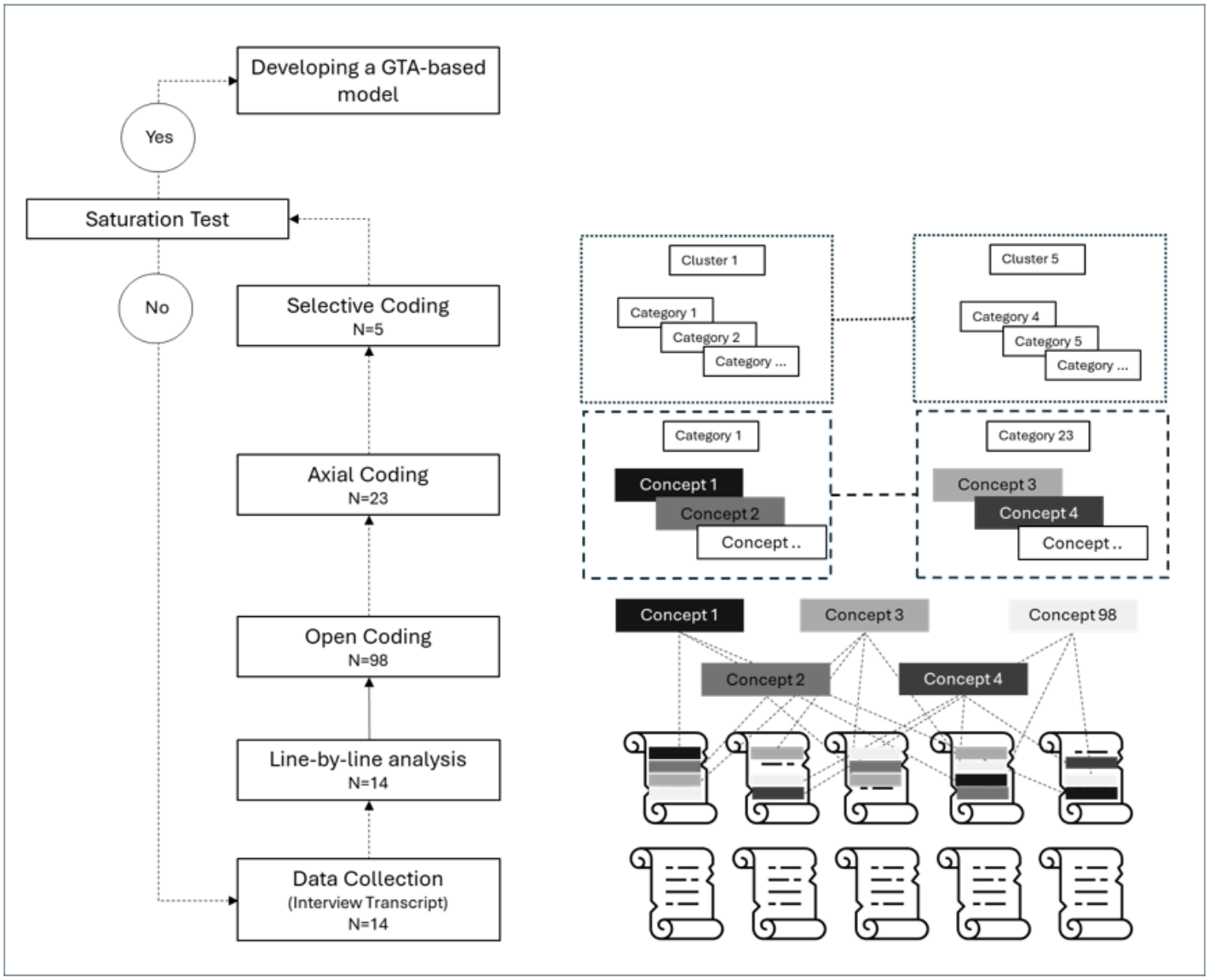


Figure 1

Methodology of the research adopting the GT approach

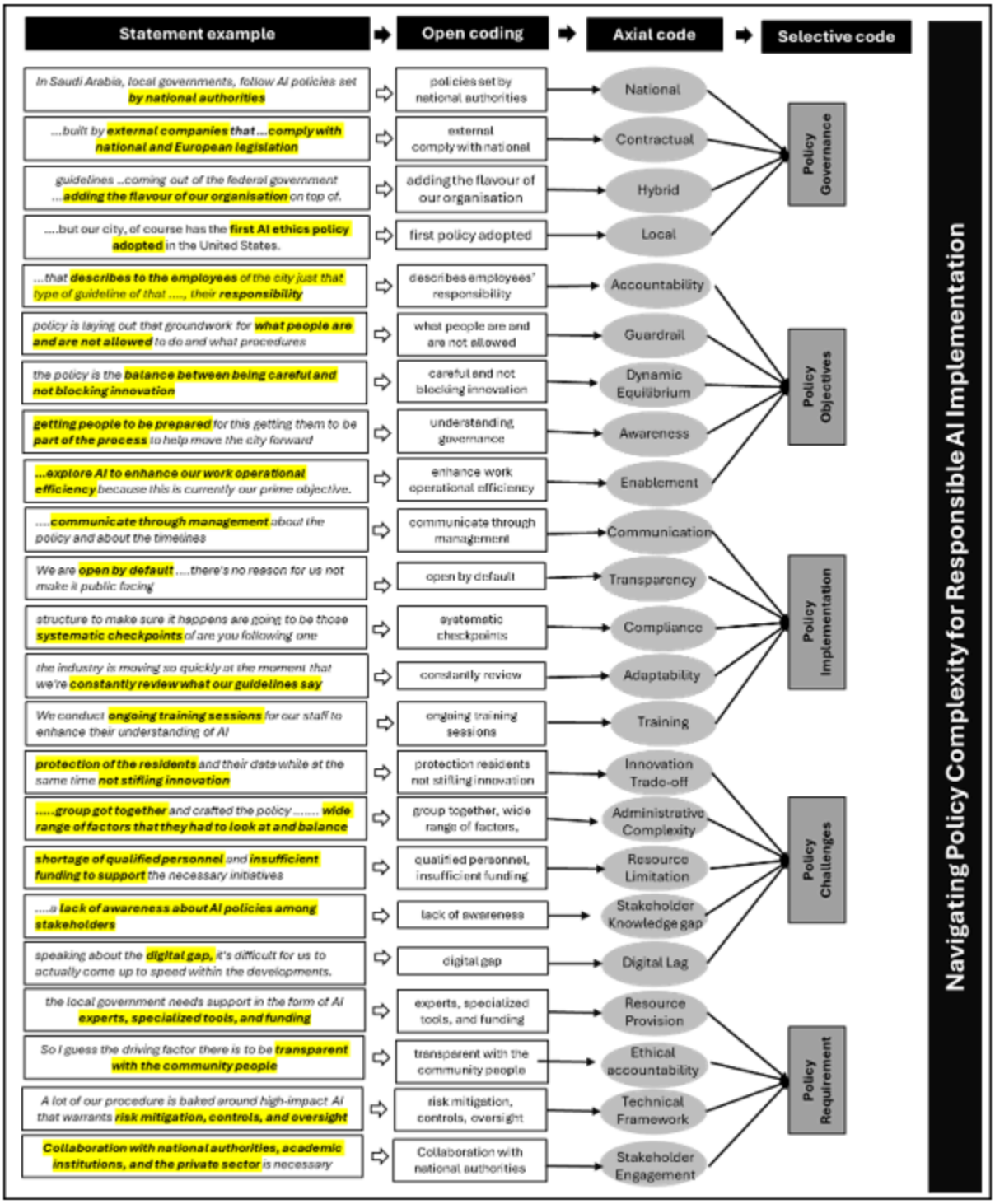


Figure 2

An example structured presentation of codes from GT analysis

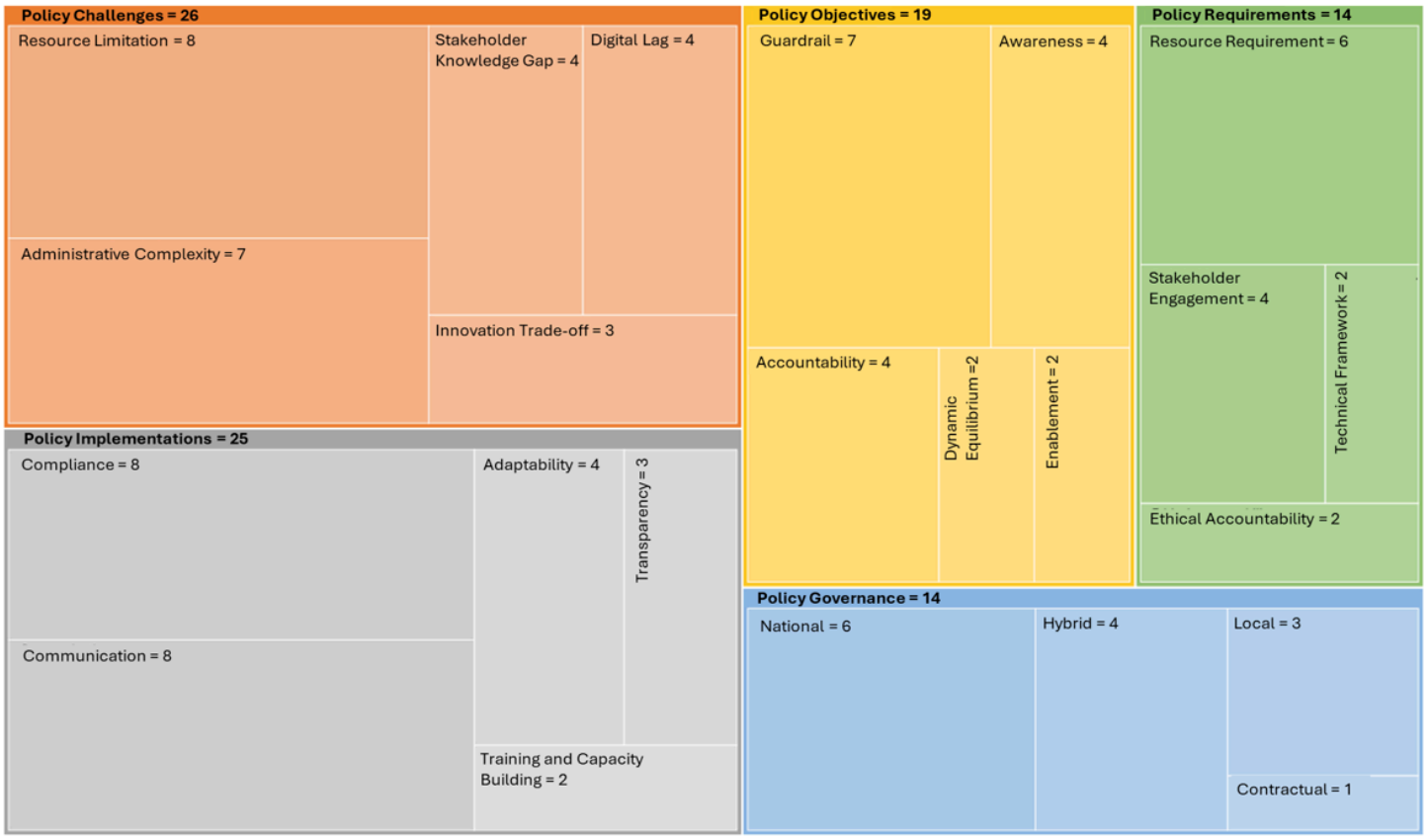


Figure 3

Hierarchy of axial and selective codes

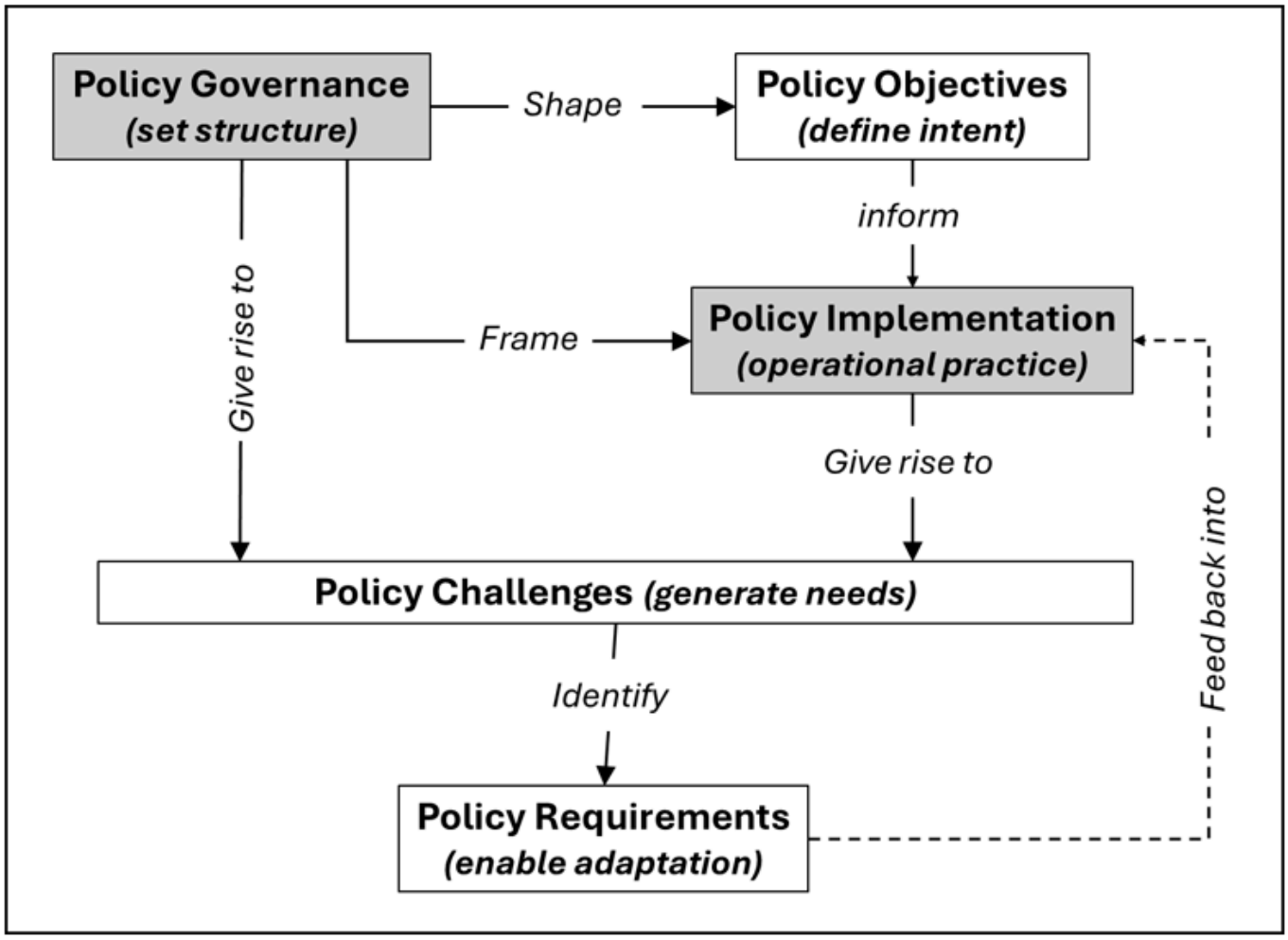


Figure 4

Conceptual framework of policy complexity for responsible AI in local government