From Readiness to Public Value: Modelling AI Adoption in Sweden's Decentralised Municipal System

Lavanya Kadarla, Gideon Mekonnen Jonathan* and Erik Perjons

Department of Computer and Systems Sciences (DSV), Stockholm University, Borgarfjordsgatan 12, SE-16455 Kista, Sweden

Abstract

Sweden's decentralised municipal structure creates a complex setting for digital transformation. Despite national strategies promoting artificial intelligence (AI), adoption remains uneven across municipalities due to regulatory uncertainty, budget limitations, and ethical concerns. This study investigates how technological, organisational, and contextual factors influence AI adoption and how municipalities manage trust and transparency. Drawing on the Technology–Organisation–Environment (TOE) framework and Public Value Management (PVM) theory, data were collected through a survey of municipal officials and analysed using descriptive statistics, regression modelling, and thematic analysis. Findings show leadership support as the strongest enabler, while inadequate infrastructure, unclear legal frameworks, and low public trust hinder progress. Limited budgets further restrict implementation, though collaboration and shared learning present underused opportunities. The study highlights the importance of strategic leadership, transparent governance, and inter-municipal cooperation to promote trustworthy and sustainable AI adoption in local government.

Keywords

Artificial Intelligence, public value, public value management (PVM), decentralised governance, Technology–Organisation–Environment (TOE) framework, technology adoption, Sweden.

1. Introduction

1.1. Background

Artificial Intelligence (AI) is increasingly transforming the way public services are designed, delivered, and governed. Within public administration, AI technologies such as chatbots, predictive analytics, and process automation are being leveraged to improve efficiency, enhance responsiveness, and personalise citizen services [1, 2]. Through data-driven insights, AI has the potential to support evidence based decision-making, streamline administrative tasks, and enable more transparent and accountable governance. As governments worldwide strive toward digital transformation, AI stands out not merely as a technological innovation but as a catalyst for organisational and cultural change in the public sector.

In Sweden, municipalities play a particularly central role in this digital transformation. The Swedish governance system is highly decentralised, granting municipalities substantial autonomy in managing essential public services, including education, social welfare, healthcare, and local infrastructure. This decentralised structure enables municipalities to tailor service delivery to local needs, but it also means that technological adoption, including AI, heavily depends on local priorities, capabilities, and resources. While decentralisation fosters flexibility and innovation, it also generates disparities in technological readiness and implementation capacity across municipalities.

At the European level, regulatory developments have also shaped the landscape for AI governance. The recent EU Artificial Intelligence Act [3] seeks to harmonise AI regulation across member states, ensuring that AI systems are safe, transparent, and aligned with fundamental rights. However, while the AI Act provides a unified legal framework, its local-level implications remain uncertain, particularly for municipalities tasked with implementing AI systems under limited resources and evolving legal

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*Corresponding author.

lavanya.lovs@gmail.com (L. Kadarla); gideon@dsv.su.se (G. M. Jonathan); perjons@dsv.su.se (E. Perjons)

0000-0001-6360-7641 (G. M. Jonathan); 0000-0001-9044-5836 (E. Perjons)

interpretations. Questions around liability, data protection, and algorithmic accountability continue to pose challenges for local administrations.

Several national initiatives have aimed to strengthen AI capabilities and foster digital innovation in Sweden. AI Sweden, a national initiative supported by agencies such as Vinnova, has provided training, infrastructure, and collaboration platforms for public organisations. These initiatives have accelerated AI awareness and capacity building across municipalities. According to [4], over 90% of Swedish municipalities have engaged in some form of AI-related activity since 2022, ranging from pilot projects to small-scale automation efforts. However, many municipalities remain in the early stages of adoption, with limited strategic integration, uneven technical infrastructure, and weak mechanisms for trust-building and citizen engagement. Despite the country's reputation as a digital frontrunner, the uneven pace of AI implementation across municipalities raises concerns about fairness, transparency, and accountability. Public trust, long regarded as a cornerstone of Sweden's welfare model, has become a crucial factor influencing how AI is perceived and accepted in local governance. As municipalities increasingly adopt AI systems that affect citizens directly, such as in welfare services, education, or predictive maintenance, ensuring transparency, fairness, and explainability becomes essential. Instances like the failure of the Skolplattformen system in Stockholm illustrate how technical shortcomings and communication gaps can undermine public confidence in digital government initiatives. Thus, while AI promises efficiency, its successful deployment in the public sector depends equally on maintaining public trust and legitimacy.

This study, therefore, situates municipal AI adoption within the dual frameworks of technological readiness and public value creation. It adopts the Technology–organisation–Environment (TOE) framework [5] to assess the technological, organisational, and contextual factors that shape adoption, and Public Value Management (PVM) theory [6] to explore how AI supports democratic values such as equity, accountability, and citizen participation. Together, these perspectives provide a holistic lens for examining how Swedish municipalities navigate the complex interplay between innovation, governance, and public trust in the digital era.

Sweden's strong national commitment to digital transformation and artificial intelligence (AI) has not translated into uniform municipal adoption. Despite national initiatives such as AI Sweden and Kraftsamlingen promoting collaboration and capacity building, local implementation remains uneven. Some municipalities have advanced AI applications in areas such as social care and urban planning, whereas others remain at exploratory stages, limited by resources, infrastructure, and expertise. This fragmentation highlights the persistent challenge of aligning national AI ambitions with local governance realities.

While prior studies emphasise technological readiness, leadership, and innovation culture as key enablers of public sector AI adoption [7, 8], two critical dimensions remain underexplored in the Swedish context: organisational readiness and public trust. Organisational readiness—encompassing leadership commitment, staff competence, and institutional learning—determines the capacity to move beyond pilot projects toward sustainable integration. Public trust, conversely, shapes the legitimacy and societal acceptance of AI-enabled public services. Although Sweden enjoys relatively high institutional trust, concerns about fairness, privacy, and accountability have intensified, particularly in welfare and healthcare domains [9, 10]. The interaction between organisational preparedness and citizen trust thus remains insufficiently understood. Thus, the gap in the literature is the lack of empirical, local-level evidence connecting AI adoption to public value creation in Swedish municipalities. We argue that addressing this gap is vital to understanding not only whether AI is adopted, but how it advances democratic values such as transparency, accountability, and citizen engagement in local governance.

1.2. Aim, Research Questions, and Contribution

The aim of this study is to explore how technological, organisational, and contextual factors influence the adoption of artificial intelligence (AI) in Swedish municipalities and how such adoption contributes to the creation of public value. The following research questions guide our study: 1) *How do technological readiness and organisational support influence AI adoption?* (2) *How do contextual factors such as trust,*

regulation, and collaboration shape adoption? and (3) *How does AI adoption contribute to perceived public value?*

2. Related Work and Theoretical Framework

2.1. AI Adoption in Public organisations

Governments worldwide are increasingly deploying AI to enhance service delivery, mostly through administrative automation. Yet, overall adoption of the technology remains constrained by limited technical capacity, budgetary pressures, regulatory uncertainty, and ethical concerns regarding fairness, transparency, and accountability [13].

Nordic experiences offer instructive comparisons. In Denmark, a study [8] demonstrates that strong local leadership is pivotal to AI uptake, particularly in welfare services where human oversight and accountability mechanisms sustain public trust. In Finland and Estonia, evidence [2] suggests that fragmented legal frameworks and uneven technical expertise have become key impediments, underscoring that governance culture and organisational capacity are as critical as technological readiness. These findings affirm that AI adoption is not merely a technical endeavour but a socio-institutional process shaped by ethical and organisational dynamics.

Across the Nordic region, leadership commitment, inter-organisational collaboration, and knowledge-sharing networks have emerged as principal enablers of adoption, helping municipalities mitigate resource and expertise gaps. However, barriers persist—especially in citizen-facing services where transparency, equity, and trust are essential. Scholars, for instance [13], contend that centralised, top-down governance models often fail to capture these local nuances, whereas approaches grounded in organisational readiness and local autonomy offer more explanatory power. In Sweden, these insights are particularly salient. Its decentralised municipal system grants local governments significant discretion over AI use, fostering both innovation and variability in implementation. Drawing from the wider Nordic context, it becomes clear that successful municipal AI adoption depends on the alignment of technological, organisational, and ethical considerations to promote efficiency while safeguarding democratic values and public trust.

2.2. Technology–organisation–Environment (TOE) Framework

The Technology–Organisation–Environment (TOE) framework [5] provides a comprehensive model for analysing the factors that influence technology adoption within organisations. It emphasises the interdependence of three domains—technological, organisational, and environmental—which together shape how innovations are evaluated, adopted, and implemented.

Technological factors concern the perceived complexity, compatibility, and relative advantage of a new technology. In municipal contexts, this involves assessing whether AI systems integrate effectively with existing digital infrastructure, support administrative and operational needs, and deliver clear benefits compared with manual or legacy processes. These perceptions often determine the perceived value and feasibility of AI deployment in local government settings.

Organisational factors relate to internal capabilities such as leadership commitment, staff competence, and readiness for innovation. In Sweden, municipalities exhibit a wide variation in technical expertise, resource allocation, and strategic priorities, all of which significantly impact their capacity to adopt and scale AI solutions. Strong digital leadership and an innovation-oriented culture have been shown to accelerate the adoption of AI, while resource limitations or fragmented strategies can hinder progress.

Environmental factors encompass external conditions that shape organisational decisions, including regulatory frameworks, vendor ecosystems, and stakeholder expectations. In the Swedish context, the environmental dimension is characterised by robust societal norms of transparency and accountability, as well as high public expectations regarding ethical governance. These norms make public trust a particularly salient contextual variable influencing AI adoption and legitimacy.

The TOE framework underpins this study's analytical design and survey instrument, enabling an empirical examination of how municipalities balance technological opportunities with institutional constraints. It also illuminates how external pressures—such as national policy directives, inter-municipal collaboration, and civil society expectations—can drive or delay AI implementation in local governance.

2.3. Public Value Management (PVM)

Public Value Management (PVM) [6] emphasises how public organisations create societal value that extends beyond operational efficiency, focusing instead on democratic legitimacy, citizen trust, and ethical governance. Within this perspective, public managers are responsible for ensuring transparency, fairness, and civic engagement—principles that collectively define the public value delivered through government action.

In the context of AI governance, PVM is particularly pertinent because AI systems increasingly underpin citizen-facing services where legitimacy depends on trust and perceived fairness. The framework provides a lens through which to assess whether AI adoption enhances ethical standards, transparency, and citizen participation, ensuring that technological innovation remains aligned with societal expectations and democratic norms. We argue that PVM complements the TOE framework by extending the analysis from readiness to outcomes. While the TOE framework identifies the technological, organisational, and environmental factors that shape the capacity to adopt AI, PVM evaluates whether such adoption generates public value through equity, accountability, and trust. Together, they offer a holistic understanding of both the determinants and consequences of AI implementation in local governance. The findings of an empirical study [14] reinforce this connection, showing that public service motivation is closely linked to values of transparency, accountability, and equity. Public employees are therefore more likely to embrace technological innovation, including AI, when it resonates with their normative commitment to democratic governance and the pursuit of public value.

2.4. Conceptual Model

This study integrates the TOE framework with PVM to examine the determinants and implications of AI adoption in Swedish municipalities. The conceptual model posits that technological, organisational, and environmental factors jointly shape the extent and nature of AI implementation, while the resulting adoption influences public value outcomes.

Technological readiness encompasses the compatibility of digital infrastructure, system complexity, and perceived relative advantages of AI tools. Organisational readiness reflects leadership commitment, staff competence, and institutional capacity for innovation. Environmental factors capture the influence of regulatory clarity, inter-organisational collaboration, citizen expectations, and societal norms of transparency and trust.

Leadership plays a mediating role between organisational and technological readiness and AI adoption by articulating strategic vision, mobilising resources, and fostering a culture of learning and experimentation. The model further assumes that effective AI adoption contributes to public value outcomes—notably greater efficiency, enhanced transparency, and strengthened citizen trust.

By linking TOE's explanatory dimensions with PVM's normative focus on democratic legitimacy and accountability, the model captures both the drivers and the societal implications of AI adoption. This integrated framework informs the study's survey design and analytical approach, offering a comprehensive basis for assessing how readiness conditions translate into public value creation within local governance.

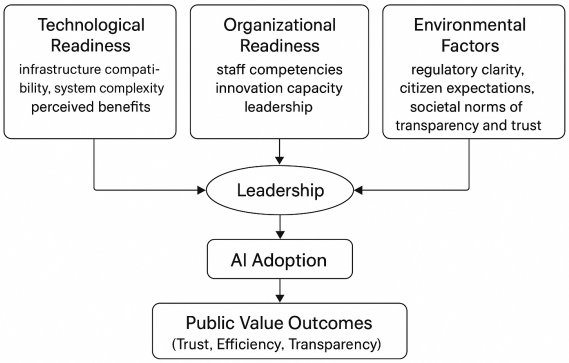

Figure 1: Conceptual Model

3. Methodology

3.1. Research Strategy

This study employs a survey-based mixed-methods design combining quantitative and qualitative approaches. This design suits Sweden's decentralised municipal system, where digital maturity and organisational capacity vary widely. Quantitative data enable systematic assessment of leadership, trust, infrastructure, and budgets, identifying trends and relationships across municipalities, while qualitative responses provide contextual insight into institutional barriers, organisational challenges, and trust dynamics. Besides, the mixed-methods approach supports the study's aim of exploring factors influencing AI adoption and perceived public value. Surveys of municipal officials allow cross-municipal comparison and generalisation beyond individual cases [15]. The approach also aligns with the study's theoretical foundations: the TOE framework requires data on technological readiness, organisational capacity, and environmental context, while PVM focuses on legitimacy and trust.

3.2. Data Collection and Sampling

Data were collected through a structured, cross-sectional survey administered between February and March 2025. The survey targeted 30 Swedish municipalities representing diverse sizes, geographical contexts, and levels of AI maturity [17]. Respondents included municipal officials responsible for AI-related decision-making, digital transformation, or innovation—such as IT managers, department heads, digital strategists, and policy advisers—whose roles provided informed perspectives on technological readiness, organisational capacity, trust, and public value outcomes. This approach aligns with prior European studies examining municipal digital transformation through comparable survey designs [18].

A combination of purposive and snowball sampling was used [19]. Purposive sampling identified officials with direct experience in AI implementation, while snowball sampling leveraged referrals to reach additional participants, particularly in smaller municipalities with less formal role definitions. Initial contacts were made via municipal directories, service centres, and the Swedish Association of Local Authorities and Regions (SKR). Inclusion criteria required participants to be employed by a Swedish municipality and hold a position linked to digital transformation or innovation, with authority or insight into AI readiness and governance. National agencies, private vendors, and staff without relevant responsibilities were excluded. This targeted sampling ensured that data reflected the institutional realities and operational capacities shaping municipal AI adoption. The list of respondents (i.e., their roles and corresponding municipalities) and the survey questionnaire can be accessed here.

3.3. Measures and Instruments

The survey instrument was designed to capture key constructs related to AI adoption and public value creation. Quantitative measures assessed leadership support, public trust, infrastructure readiness, budget allocation, legal uncertainty, and collaboration—variables derived from the TOE and PVM frameworks and prior research on public sector digital transformation. Likert-scale items enabled standardised quantitative analysis, while open-ended questions elicited qualitative insights into local challenges, opportunities, and contextual influences on AI implementation.

A pilot study with municipal professionals ensured clarity, contextual relevance, and content validity [20]. Feedback informed the refinement of question wording and response options, minimising ambiguity and enhancing reliability. To triangulate survey data and strengthen interpretive validity, municipal strategy documents, policy reports, and national datasets were also reviewed. This mixed evidence base provided essential contextual grounding and supported a nuanced understanding of how Swedish municipalities approach AI adoption and governance.

3.4. Data Analysis

Data analysis combined quantitative and qualitative approaches to provide a comprehensive understanding of AI adoption patterns across Swedish municipalities. Descriptive statistics summarised respondents' perceptions of leadership support, public trust, infrastructure readiness, and budget allocation, while Pearson correlations examined relationships between technological, organisational, and environmental factors and outcomes such as AI adoption and perceived public value. Multiple regression analysis was then used to assess the predictive influence of leadership, trust, and budget on AI adoption. All analyses were conducted using IBM SPSS Statistics (version 29), with minimal missing data (<5%) handled through listwise deletion and mean substitution.

Qualitative analysis followed the six-phase thematic approach of [21]. Open-ended responses were coded inductively and grouped into key themes—leadership, collaboration, trust, resource constraints, and legal uncertainty—then mapped to the TOE and PVM frameworks for conceptual alignment. Triangulation integrated quantitative results with qualitative insights, validating observed relationships and providing contextual depth. This mixed-method approach strengthened analytical robustness and offered a nuanced understanding of how organisational, technological, and environmental factors shape AI adoption and public value creation.

4. Results

The empirical findings of the study are presented under the six thematic areas derived from the qualitative analysis. Quantitative survey results are integrated with qualitative insights to provide a comprehensive understanding of the factors influencing AI adoption in Swedish municipalities. The interpretation and theoretical implications of the results are elaborated in the subsequent discussion.

4.1. Leadership and Strategic Support

Leadership emerged as the most significant enabler of AI adoption across Swedish municipalities. Respondents rated their municipal leadership's support for AI on a five-point Likert scale, with 1 representing very low and 5 representing very high support. The mean score was 3.57 (SD = 1.165), indicating moderate to high overall leadership engagement. The frequency distribution revealed that 33.3% of respondents rated leadership as 4, and 23.3% as 5, showing that over half of municipalities perceive their leadership as actively supportive. Only 16.7% reported low or very low support.

Pearson correlation analysis confirmed a strong positive relationship between leadership support and the prioritisation of AI initiatives ($r = 0.672$, $p < 0.01$)(figure 3), and a moderate correlation with staff AI skill levels ($r = 0.373$, $p < 0.05$). Multiple regression analysis identified leadership as the only statistically significant predictor of AI adoption ($p = 0.043$)(Figure 8), emphasising its central role

Leadership and Management Support
How supportive is the leadership in your municipality for adopting AI technology?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	6.7	6.7	6.7
	2	3	10.0	10.0	16.7
	3	8	26.7	26.7	43.3
	4	10	33.3	33.3	76.7
	5	7	23.3	23.3	100.0
	Total	30	100.0	100.0	

Figure 2: Leadership Support Frequency Distribution.

		Leadership and Management Support How supportive is the leadership in your municipality for adopting AI technology?	Perceived Impact: Perceived Value: How would you rate the impact of AI adoption on improving municipal services?	How would you rate the current level of AI-related skills among municipal staff?	how would you rate the priority of AI adoption compared to other technological initiatives in your municipality?
Leadership and Management Support How supportive is the leadership in your municipality for adopting AI technology?	Pearson Correlation	1	0,222	.373*	.672**
	Sig. (2-tailed)		0,239	0,042	0,000
	N	30	30	30	30
Perceived Impact: Perceived Value: How would you rate the impact of AI adoption on improving municipal services?	Pearson Correlation	0,222	1	-0,065	0,211
	Sig. (2-tailed)	0,239		0,733	0,262
	N	30	30	30	30
How would you rate the current level of AI-related skills among municipal staff?	Pearson Correlation	.373*	-0,065	1	0,184
	Sig. (2-tailed)	0,042	0,733		0,331
	N	30	30	30	30
how would you rate the priority of AI adoption compared to other technological initiatives in your municipality?	Pearson Correlation	.672**	0,211	0,184	1
	Sig. (2-tailed)	0,000	0,262	0,331	
	N	30	30	30	30

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 3: Correlations between variables

in driving implementation decisions. Neither public trust nor budget allocation showed significant predictive power in this model.

Qualitative insights reinforced these findings, revealing that effective leadership extends beyond general endorsement to encompass strategic vision, political commitment, and active prioritisation. As one municipal official noted, *"Leadership determines whether AI is taken seriously and whether pilots are scaled up. Without clear direction, projects stall despite technical readiness."* (Vadstena kommun).

Similarly, another observed that *"Municipal leaders who invest in staff training and inter-departmental coordination accelerate adoption."* (Sollentuna kommun).

The evidence indicates that leadership shapes several dimensions of AI readiness, including organisational coordination, staff competence, and openness to experimentation. Municipalities demonstrating strong leadership were more likely to implement AI initiatives systematically, whereas those lacking strategic direction tended to experience slower progress, stalled pilots, or isolated experimentation. Leadership thus emerges as both a motivational and operational enabler—establishing the foundation upon which resources, infrastructure, and trust can effectively support AI-driven transformation.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Leadership and Management Support How supportive is the leadership in your municipality for adopting AI technology?	30	1	5	3.57	1.165
Public Trust and Citizen Engagement: How would you assess the level of public trust in AI technologies used for public services in your municipality?	30	1	4	3.00	.743
Valid N (listwise)	30				

Figure 4: Descriptive Statistics

4.2. Public Trust and Legitimacy

Public trust was measured on a five-point Likert scale, yielding a mean score of 3.00 (SD = 0.743), indicating a generally neutral perception across municipalities. Over half of respondents (56.7%) selected the midpoint score of three, suggesting cautious or undecided attitudes toward municipal AI adoption, while only a minority expressed high (scores 4–5) or low trust (scores 1–2).

Although public trust was not statistically significant in the regression analysis ($p = 0.477$), qualitative findings underscored its importance for legitimacy and long-term sustainability. Several officials emphasised transparency, citizen engagement, and fairness as prerequisites for building confidence in AI initiatives. As one respondent explained, *"Citizen engagement and understanding are essential. AI will improve the quality of public services, but trust must be built through clear communication and accountability."* (Vara kommun)

Respondents noted that trust-related concerns were more evident in qualitative narratives than in quantitative indicators, reflecting the early stage of AI adoption in many municipalities. Trust emerged as a particularly critical issue in sensitive domains such as welfare, education, and healthcare, where perceptions of fairness and transparency directly shape public acceptance. While trust does not yet predict AI implementation statistically, it remains a latent enabler of sustainable and socially legitimate AI adoption in local governance.

4.3. Technical and Infrastructure Readiness

Survey data indicated that most municipalities perceive themselves as relatively well-prepared in terms of technical infrastructure. Approximately 70% of respondents rated infrastructure readiness as "good" (46.7%) or "very good" (23.3%), while only a minority provided "moderate" or lower ratings (Figure 6).

Public Trust and Citizen Engagement:
How would you assess the level of public trust in AI technologies used for public services in your municipality?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	3.3	3.3	3.3
	2	5	16.7	16.7	20.0
	3	17	56.7	56.7	76.7
	4	7	23.3	23.3	100.0
	Total	30	100.0	100.0	

Figure 5: Public Trust Levels Among Municipalities.

At first glance, this suggests that digital foundations—such as hardware, broadband coverage, and basic IT systems—are generally sufficient to support AI initiatives.

Infrastructure Readiness
How would you assess your municipality's current digital infrastructure?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fair	7	23.3	23.3	23.3
	Good	14	46.7	46.7	70.0
	Poor	2	6.7	6.7	76.7
	Very Good	7	23.3	23.3	100.0
	Total	30	100.0	100.0	

Figure 6: Infrastructure Readiness Assessment.

However, qualitative insights revealed deeper operational challenges not captured by the survey's categorical measures. Respondents highlighted persistent issues with legacy IT systems, fragmented or inaccessible data, and limited interoperability between departmental platforms. Smaller municipalities in particular reported difficulties integrating AI tools due to outdated infrastructure, minimal automation, and reliance on manual workflows. As one official explained, *"Knowledge gap about what value AI can create… data locked in systems."* (Umeå kommun). Another added, *"Unmature data analytics capability… regulations and legislations are barriers too."* (Umeå kommun).

These findings distinguish surface-level readiness from operational maturity. While hardware and network capacity may appear adequate, fragmented systems and weak data integration undermine effective AI implementation. This underscores the importance of assessing organisational and technical maturity beyond visible infrastructure when evaluating AI readiness.

4.4. Resource Constraints and Budget Allocation

Financial resources dedicated to AI initiatives were consistently limited across municipalities. Survey data showed that only 10–20% of IT budgets were allocated to AI-related projects. Regression analysis confirmed that budget allocation was not a statistically significant predictor of AI adoption ($p = 0.422$) (Figure 7), suggesting that at this exploratory stage, financial inputs alone do not drive measurable adoption outcomes. Nevertheless, qualitative data indicated that limited resources remain a practical barrier, particularly for smaller or rural municipalities. Respondents cited short-term budgeting cycles, the absence of dedicated AI funding, and the difficulty of recruiting specialised staff. As one official observed, *"Budget constraints mean AI projects are often deprioritised in favour of immediate administrative*

needs." (Huddinge kommun).

Collaboration emerged as a key compensatory mechanism for addressing these constraints. Municipalities partnering with universities, technology providers, or peer organisations were able to pool expertise, share costs, and participate in pilot projects, thereby mitigating financial limitations. One respondent explained, *"Joint initiatives with other municipalities allow us to experiment with AI while spreading risk and cost."* (Botkyrka kommun).

These findings suggest that although AI funding remains modest, strategic partnerships and intermunicipal collaboration can partially offset resource barriers, supporting continued experimentation and adoption of AI technologies in local government.

4.5. Legal and Regulatory Uncertainty

Legal and regulatory frameworks, including the GDPR and the forthcoming EU AI Act, were frequently cited as external constraints affecting municipal AI adoption. Survey results revealed no statistically significant relationship between perceived regulatory clarity and adoption outcomes. However, qualitative evidence highlighted that ambiguity in national guidance and complex interpretations of data protection law fostered risk aversion and delayed implementation. As one respondent observed, *"Regulations and legislations are barriers too."* (Umeå kommun). Another elaborated, *"Legal uncertainties make the process complex and difficult to navigate, particularly for sensitive data-driven services."* (Umeå kommun).

Officials described difficulties reconciling compliance obligations with innovation objectives. The absence of AI-specific national guidelines left municipalities to interpret legislation independently, resulting in inconsistent practices and heightened caution. Although regulatory uncertainty did not emerge as a direct quantitative predictor, it clearly functions as an indirect barrier—shaping decision-making, constraining experimentation, and limiting the scope of AI initiatives, particularly in domains involving citizen data or automated decision-making.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.985	.789		1.247	.223		
	Leadership and Management Support How supportive is the leadership in your municipality for adopting AI technology?	.207	.097	.384	2.131	.043	.936	1.069
	Public Trust and Citizen Engagement: How would you assess the level of public trust in AI technologies used for public services in your municipality?	.115	.160	.136	.721	.477	.853	1.172
	Budget Allocation: What percentage of your municipality's technology budget is allocated to AI-related initiatives?	.224	.275	.154	.816	.422	.859	1.164

a. Dependent Variable: AI Adoption Status: Is your municipality currently using AI-driven solutions?

Figure 7: Regression Results for AI Adoption Status

4.6. Collaboration and Learning

Collaboration with external partners—such as universities, national agencies, and technology providers—emerged as a key enabler supporting municipalities in addressing AI adoption challenges. While this factor was underrepresented in quantitative measures, qualitative data underscored its significance in strengthening technical competence, organisational capacity, and confidence. As one official

explained, *"General AI presentation in cooperation with universities and internally in the municipality."* (Botkyrka kommun). Another noted, *"Collaboration between municipalities, regions, and state authorities strengthens knowledge and capacity."* (Sollentuna kommun).

Through collaboration, municipalities shared best practices, pooled resources, and accessed external expertise unavailable internally. Smaller municipalities particularly benefited from such partnerships, compensating for limited staff skills, budgets, and experience. Respondents also emphasised the need for stronger national coordination to systematise knowledge sharing and collective learning, though such mechanisms remain underdeveloped.

Collaboration was consistently described as a long-term enabler rather than an immediate driver of AI adoption. Its value lies in capacity-building, knowledge exchange, and fostering institutional confidence, suggesting that sustained cooperative practices could be instrumental for scaling AI adoption across Sweden's decentralised municipal landscape.

5. Discussion

This study investigated the factors influencing AI adoption in Swedish municipalities through the lenses of the TOE framework [5] and the PVM theory [6], addressing our three research questions. We present our discussion in relation to these research questions.

5.1. Technological Readiness and Organisational Support

Leadership emerged as the single most decisive factor influencing AI adoption. It was the only significant predictor in the regression analysis ($p = 0.043$) and was consistently reinforced by qualitative data. Respondents highlighted leadership as central to providing strategic vision, mobilising resources, and ensuring cross-departmental coordination. These findings affirm the TOE framework's emphasis on organisational readiness [5] and align with national reports [25] and studies such as [26], which underscore the critical role of digital leadership, including Chief Digital Officers, in driving transformation. Leadership also correlated strongly with an innovation-oriented culture ($r = 0.672$, $p < 0.01$).

Leadership in this context extended beyond rhetorical endorsement. It entailed strategic coherence, resource alignment, and the capacity to foster collaboration internally and externally. Municipalities with proactive leaders were more likely to establish partnerships, promote experimentation, and create structures for institutional learning. Conversely, those lacking clear leadership vision often experience stalled projects, fragmented planning, and limited competence development. Leadership thus functions as both a catalyst and an integrator, linking technological capability with organisational intent.

Although most municipalities rated their infrastructure as "good" or "very good," qualitative data exposed a gap between perceived readiness and operational maturity. Respondents described challenges such as legacy IT systems, data silos, and poor interoperability, particularly in smaller municipalities. This finding resonates with [4], who observe that while Swedish municipalities possess basic digital infrastructure, many lack the data governance and integration capacity required for scalable AI deployment. Hence, surface-level infrastructure readiness does not necessarily translate into effective AI implementation without corresponding organisational and data maturity.

5.2. Contextual Factors—Trust, Regulation, and Collaboration

Public trust emerged as a latent but vital factor shaping the legitimacy of AI adoption. Although not statistically significant ($p = 0.477$), qualitative findings revealed its foundational role in sustaining long-term acceptance. The mean trust score of 3.0 (neutral) suggests cautious citizen attitudes, yet respondents repeatedly emphasised that "citizen engagement and understanding are essential" for successful implementation. This aligns with the PVM perspective [6], which highlights transparency, fairness, and accountability as central to public innovation. Trust-related concerns—such as algorithmic bias, explainability, and perceived fairness—may not yet influence early adoption but are likely to become critical determinants of legitimacy as AI applications expand. Municipalities such as Helsingborg and

Malmö have already integrated child-centred AI principles to promote transparency and inclusivity [27]. Trust, therefore, acts as a latent enabler: not immediately predictive, but essential to ensuring AI enhances, rather than undermines, public value.

Legal and regulatory uncertainty, particularly concerning GDPR compliance and the EU AI Act, was also identified as a major contextual barrier. Respondents frequently described the legal environment as restrictive or unclear, with some referring to "regulations and legislations as barriers" (Umeå kommun). The absence of national AI-specific guidelines has left municipalities to interpret regulations independently, leading to inconsistent practices and heightened caution. Although not statistically significant, regulation acts as an indirect constraint—shaping decision-making and discouraging experimentation in sensitive domains such as welfare and healthcare. These findings echo [2], who note that Nordic municipalities often struggle to balance innovation with compliance obligations.

Collaboration and knowledge-sharing emerged as critical enablers, particularly for smaller or resource-constrained municipalities. While underrepresented in quantitative data, qualitative accounts underscored collaboration's value in enhancing competence, confidence, and capacity. Partnerships with universities, research institutes, and other municipalities facilitated access to technical expertise and shared learning opportunities. For instance, officials from Botkyrka and Sollentuna described joint initiatives with universities and state authorities as instrumental in building awareness and practical understanding. These findings align with national initiatives led by [28], which promote cross-sector collaboration as a driver of equitable digital transformation. Collaboration therefore functions as a long-term enabler—cultivating institutional learning, reducing risk, and fostering innovation across Sweden's decentralised governance landscape.

5.3. AI Adoption and Public Value Creation

Although the study's quantitative results did not directly measure public value outcomes, qualitative evidence suggests that AI adoption can enhance efficiency, transparency, and accountability when implemented under strong leadership and ethical oversight. Respondents highlighted that the perceived legitimacy of AI initiatives depends on how well they align with democratic values and societal expectations. This reflects the core premise of PVM [6], which posits that public managers are accountable not only for efficiency but for creating value that strengthens trust and citizen engagement.

However, our findings also point to the risk of uneven value creation. Variations in leadership capability, resource allocation, and regulatory interpretation may lead to disparities in how AI supports transparency and inclusion across municipalities. The findings thus reinforce the need for strategic leadership grounded in ethical governance—balancing innovation with accountability—to ensure that AI contributes meaningfully to public value creation.

In sum, the findings illustrate a multidimensional model of AI adoption in local government. Technological readiness provides the infrastructure; leadership converts potential into action; trust and regulation establish legitimacy; and collaboration sustains learning and diffusion. In Sweden's decentralised governance context, these factors are interdependent. Leadership drives adoption and organisational readiness, while trust influences legitimacy and citizen acceptance. Regulation and collaboration, in turn, shape the institutional environment that either enables or constrains innovation. Effective AI governance, therefore, requires the co-evolution of leadership, legitimacy, and learning—where technological progress advances within a framework of democratic accountability and shared public value.

5.4. Theoretical Implications

The findings contribute to the application of both the TOE framework and the PVM theory by extending their adaptation to local public sector AI adoption.

From the TOE perspective, this study reaffirms that organisational readiness—particularly effective leadership—is the most decisive predictor of adoption. It also identifies trust and collaboration as critical contextual variables that the traditional TOE model does not fully capture. Integrating these elements

broadens the "environmental" dimension of TOE to encompass governance and legitimacy concerns specific to public-sector innovation. In doing so, the study refines the framework for democratic administrative contexts, where environmental factors extend beyond market and regulatory pressures to include citizen expectations, ethical accountability, and public trust.

From the PVM perspective, the research bridges public value creation with AI governance. While PVM emphasises legitimacy and socially valued outcomes, this study demonstrates how AI readiness frameworks can operationalise these principles in practice. Trust, transparency, and leadership emerge as both ethical imperatives and practical enablers of sustainable digital transformation. The integration of TOE and PVM thus produces a composite model of democratic AI readiness, underscoring the dual necessity of technological capability and institutional legitimacy in achieving responsible AI adoption.

5.5. Practical Implications

The findings offer several actionable insights for Swedish municipalities and national policymakers seeking to advance responsible and sustainable AI adoption.

For municipal leaders, the results emphasise the need for explicit AI strategies supported by strong executive commitment. Municipalities with clearly articulated strategic visions and active leadership demonstrated higher levels of adoption. Leadership training in digital transformation should therefore be prioritised to ensure coherence between ambition and implementation. Inter-municipal collaboration also emerged as a powerful mechanism for reducing costs and sharing expertise, particularly among smaller municipalities. Establishing regional AI centres, shared data platforms, and joint procurement models can help build collective capacity and resilience.

Building public trust is equally essential. Transparent communication about how AI systems are used, opportunities for citizen participation, and clear ethical safeguards can enhance legitimacy and acceptance. Capacity-building initiatives—such as training civil servants in data management, digital ethics, and AI fundamentals—are also vital to bridging the gap between conceptual ambition and operational capability.

For national agencies such as DIGG, Vinnova, and SKR, the study underscores the importance of providing coherent national guidance. Unified interpretations of GDPR and the EU AI Act would help reduce legal ambiguity and risk aversion at the local level. Funding inter-municipal pilot projects could facilitate the testing of scalable and ethical AI models. The establishment of audit frameworks and ethical standards would support transparency and fairness in automated decision-making.

6. Concluding Remarks

This study explored the factors shaping AI adoption in Swedish municipalities through the integrated lenses of the TOE framework [5] and PVM theory [6]. By combining quantitative and qualitative data from municipal officials, the research examined how technological readiness, organisational capacity, and contextual conditions influence the implementation of AI and the creation of public value.

The findings reveal that leadership is the most decisive enabler of AI adoption, functioning as both a strategic driver and an organisational integrator. Municipalities with proactive leadership demonstrated stronger coordination, higher staff competence, and greater openness to experimentation. Technological readiness, while important, often reflected surface-level capability; many municipalities possessed basic infrastructure but lacked the interoperability, data governance, and analytical maturity required for sustained AI use.

Public trust, regulation, and collaboration emerged as critical contextual factors shaping legitimacy and long-term adoption. Although trust and regulation were not statistically significant predictors, qualitative evidence showed that they profoundly influence citizens' acceptance and municipal risk behaviour. Collaboration—particularly between municipalities, universities, and national agencies—was found to enhance competence and confidence, offsetting resource constraints and fostering shared learning. Collectively, these findings underscore that AI adoption in the public sector is contingent not

only on technological capacity but also on effective governance mechanisms that ensure transparency, accountability, and trust.

The study refines the TOE framework by extending its environmental dimension to include governance, ethical accountability, and citizen expectations, while linking it with PVM's normative focus on public value. This integration generates a composite model of *democratic AI readiness*, emphasising the dual necessity of technological capability and institutional legitimacy. For practice, the study underscores the importance of leadership training, inter-municipal collaboration, and citizen engagement as prerequisites for sustainable and responsible AI implementation.

While the study provides valuable empirical insight into local AI adoption in Sweden, we also recognise the following limitations. First, the sample size was relatively small, covering 30 municipalities, which limits the generalisability of the quantitative findings across all 290 Swedish local authorities. Although the sample was selected to ensure diversity in size and digital maturity, it may not fully capture the heterogeneity of municipal experiences nationwide. Second, the cross-sectional design provides only a snapshot of AI adoption at a specific moment in time. As municipal strategies, technologies, and regulations evolve rapidly, longitudinal data would be needed to assess how adoption trajectories and public attitudes change over time. Finally, while qualitative data enriched interpretation, the study did not include citizen perspectives, which limits understanding of how residents perceive and experience AI-enabled services.

Future research should build on these findings by adopting longitudinal and comparative designs. Tracking municipalities over time would reveal how leadership continuity, regulatory evolution, and public engagement shape AI implementation outcomes. Comparative studies across other Nordic or European countries with decentralised governance models could also enhance understanding of how institutional contexts mediate the relationship between technological readiness and public value creation. Further investigation into citizen perspectives is also important. We recognise that exploring public perceptions of fairness, transparency, and accountability in AI-driven services would provide critical insight into the legitimacy dimension of digital transformation. Finally, future studies should also examine the operationalisation of ethical AI governance mechanisms, including algorithmic auditability, human oversight, and participatory design. Such research would contribute to developing actionable frameworks that ensure AI adoption in public administration remains both technically robust and effective in contributing to public value creation.

Declaration on Generative AI

Generative AI tools were applied to assist in language editing, grammar correction, and improving the overall readability of this manuscript. The authors remain fully responsible for the accuracy of all scientific content and conclusions.

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