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Awareness and Application of Artificial Intelligence in Urban Governance in Ghana: Insights from the Wa Municipality

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Abstract

The breakthroughs in artificial intelligence (AI) continue to (re)shape possibilities in urban governance. These breakthroughs have prompted a renewed investigation of AI awareness and AI application as a functional capacity. However, the awareness-application relationship is not a given. This paper sheds light on urban governance actors' awareness and application of AI based on the technology acceptance model (TAM). The study used a mixed-methods approach to survey 27 respondents and 14 key informants to understand the awareness and application of governance actors in Wa Municipality, Ghana. The paper found that AI awareness is generally moderate, and the main governance activity leveraging it was urban planning/decision-making. It also revealed that, while 46% of the changes in AI application could not be explained by AI acceptance, 80.8% and 82.8% of the changes in AI acceptance and AI application were defined by AI awareness. For sustainable AI in urban governance, policies should focus on adopting AI technologies, and the choice of a particular AI technology should align with existing digital infrastructure, digital talent, and governance structures.

Keywords: Artificial Intelligence, Urban Governance, AI Awareness, AI Application, Ghana

INTRODUCTION

Urban governance is facing unprecedented challenges in the 21st century, including environmental degradation, rapid urbanisation, frequent flooding, and climate change. In tackling these challenges, artificial intelligence (AI) – understood as a technology that enables machines to imitate various complex human skills (Sheikh et al., 2023) – has emerged as an indispensable toolset for urban government actors (Koseki et al., 2022; Zhu, 2021). A notable reason is that the traditional urban governance models are becoming less capable of keeping pace with contemporary urban dynamics and/or challenges (Liang & Zhou, 2025). Research has shown that urban governance benefits significantly from integrating AI-enabled technologies in addressing urban problems. Some notable benefits include cost-effectiveness, data-driven law enforcement, a proactive urban service delivery system, people's capacity to act as agents of change, and accountable governance (OECD, 2024; Samsurijan et al., 2024; Schoemaker, 2024). In fact, AI is increasingly deployed in several sectors of society, including transportation, housing, healthcare, education, policing, and employment (Taylor et al., 2025). Additionally, AI's transformative effects are profound across various aspects of urban society, including job creation, smart agriculture, well-being, and governance (Wall et al., 2021; Anderson & Rainie, 2023; United Nations, 2024).

Moreover, there is growing interest in AI, and many government agencies are utilising AI-based technologies to implement public policies that promote efficiency (Yigitcanlar et al., 2021). Indeed, the effective integration of AI and other digital tools, such as the Global Positioning System (GPS), is transforming citizens' experiences and enabling new forms of data collection and analysis for urban governance. The consequential effects of such integration include enhancing urban quality of life, government performance, and the ability to integrate data from networked physical infrastructure (Yang & Rong, 2024; Goldsmith & Yang, 2025). At the same time, a robust governance structure for AI is recognised as critical. The convergence of AI and urban governance presents unique opportunities, underscoring the importance of adopting and integrating AI technologies in city governance. However, despite its potential opportunities/benefits, AI-augmented governance may be taking place amidst gaps in AI awareness and application, particularly in the Global South. As noted by Srivastava (2023) and Cazzaniga et al. (2024), the AI or digital awareness gap is pronounced in the Global South. Within this same context, the gap is particularly prevalent among the

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elderly, low-income individuals, and less educated members of society (Anderson & Rainie, 2023). This gap will worsen, particularly in Africa, unless concerted efforts are made to enhance awareness and utilisation of AI-driven technologies in urban governance.

In Africa, the critical role of digital technologies in (re)defining governance and society has been recognised. Two major initiatives of the AU in support of this recognition are the African Digital Transformation Strategy (DTS) and the African Union Communication and Advocacy Strategy (CAS) (Sedola et al., 2021). Studies have shown that the adoption of the AU-AI Continental strategy has influenced national AI strategies and policies, which signals a growing awareness of the need for harmonised AI development on the governance front (CIPIT, 2025). In fact, many African governments, including Kenya, Ghana, and South Africa, are making notable strides to create an enabling environment for AI innovation and adoption. Unfortunately, despite this progress, disproportionate structural inequalities, scarcity of AI-ready workers, and uneven implementation of digital strategies persist (Gwagwa et al., 2020; Butcher et al., 2021; Jaldi, 2023; CIPIT, 2025). Similarly, though Ghana is positioning itself as a regional leader in inclusive AI development, notably in agriculture, education, property address systems, energy, financial services, e-government initiatives, and climate resilience (Mensah et al., 2023; Addy, 2023; Ministry of Communication and Digitisation (MCD), 2024), there is low awareness concerning opportunities and the value of AI adoption. This can undermine the attainment of the Sustainable Development Goals (SDGs), particularly Goal 11.

Against this backdrop, this paper aims to investigate the extent to which urban governance actors are aware of and applying AI technologies in governance within the Wa municipality of Ghana, using the Technology Acceptance Model (TAM). It argues that the ability of urban governance actors to deploy AI-driven technologies in governance depends, in part, on their awareness of these technologies. In other words, awareness of AI technologies is a fundamental determinant of their application (Andrulienė et al., 2023). To unpack this, the paper addresses two interrelated questions: To what extent are urban governance actors aware of the use of AI in governance? And what is the relationship between awareness and the application of AI in urban governance? This paper makes two contributions to the debates on the AI-urban governance interface. First, by examining these questions, this research will prompt all

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urban governance actors, including local government workers, private sector operators, civil society organisations, traditional leaders, and international agencies, to develop greater awareness that can bolster their preparedness and readiness to integrate AI technologies into the decision-making process and the management of municipal services. Second, by seeking to refocus the AI question in contemporary socio-technological and governance debate and scholarship, the paper will illuminate how AI awareness, and the mediating role it plays in AI application, shape, create, and develop possibilities in urban governance. The better the level of awareness is understood, the more likely it is that application challenges can be addressed, leading to decision-relevant delivery of urban services in the study municipality and beyond.

The rest of the paper is organised as follows. The second section presents the discussion of the theoretical framework adopted and the conceptual explanation of the key terms used in the study. The third section provides a brief description of the study municipality and the methods deployed to collect and analyse empirical data. In the fourth section, the paper presents and discusses the results within the context of existing literature. The fifth and final section concludes with policy recommendations for promoting awareness and the application of AI for inclusive urban governance.

Theoretical Framework

The Technology Acceptance Model (TAM), introduced by Fred Davis (1986, 1989), serves as the underpinning theoretical framework for studying urban governance actors' awareness and application of AI in governance within the Wa Municipality. This model is based on the premise that when users are presented with a new technology, two major factors are determinants of users' decisions about when and how to use it (Fathema et al., 2015). The model suggests that these factors, perceived usefulness (PU) and perceived ease of use (PEoU), are of primary relevance for computer acceptance behaviours. The former (PU) "is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organisational context". The latter (PEoU) "refers to the degree to which the prospective user expects the target system to be free of effort" (Davis, 1989: 985). In the context of the current research, this means that urban governance actors' intention to accept and adopt particular AI technologies is based on the perceived ease of use and usefulness of such technologies or AI tools.

The technology acceptance literature suggests that TAM components, particularly PEoU and PU, mediate the relationships among awareness, acceptance, and the utilisation/application of technology and/or AI (Shahzad et al., 2023; Shahzad et al., 2024). That is, urban actors' awareness and acceptance of AI may influence its adoption in urban governance. Shahzad et al. (2024) in particular stressed that awareness, mediated by PEoU and PU, is a critical precursor to technology adoption. In other words, before adopting a technology, users must be aware of its existence, functionality, and potential benefits. Hence, creating awareness is the first step in any technology application process. As noted by Nwodu (2025), the ability to explore digital resources, such as AI, depends on awareness and access to digital technologies. On the contrary, a lack of awareness will result in a lack of use and a lack of skill to use AI technologies. Awareness "is the capacity to be conscious of a new trend, such as a new technology or system" (Alordiah et al., 2023: 4). For Dinev & Hu (2007), awareness is defined as the extent to which a target population is conscious of an innovation and formulates a general perception of what it entails. In Endsley's (1995: 36) terms, awareness means "knowing what is going on". The concept of awareness in this study refers to whether urban governance actors in the Wa Municipality have recognised the existence and use of AI-driven technologies for governance.

The term utilisation/application refers to the ability to explore, evaluate, and put a given technology to service (Kaur, 2006). Similarly, Rahman & Ramzy (2004) also perceived utilisation as the ability of an individual or a group of persons to learn and apply knowledge to service. From an AI perspective, an application refers to the integration of AI technology into a computer application, including human–computer interaction and data interaction (Wirtz et al., 2019). However, it is possible to cultivate the notion of AI awareness even without direct exposure to AI technology or applications. That said, the ability to integrate, adopt, and/or apply AI to any activity depends on its acceptability among citizens and the availability of a robust information technology infrastructure (IT infrastructure) (Pellegrin et al., 2021). This concept – IT infrastructure – is defined as the bedrock of information technology capabilities that enable the development of information technology applications across both the private and public sectors (Tabesh et al., 2019). However, Sheikh et al. (2023) argued that, irrespective of the state of IT infrastructure, AI applications can be described as "semi-finished products" partly because they are constantly evolving.

Artificial Intelligence – Urban Governance Nexus

This section discusses the key issues around the relationship between AI and urban governance. Research indicates that cities continue to grow, with Africa and Asia at the forefront. It is estimated that by 2050, 68% of the global population will be in urban areas (Leal Filho et al., 2024; UNDESA, 2019). Taking advantage of rapid urbanisation and addressing its associated challenges, such as high resource consumption, rising greenhouse gas emissions, and increased pollution, requires cutting-edge technologies. AI offers transformative potential in this context by influencing urban life, administrative structures, the way governments operate, and the entire urban socioeconomic fabric (Sepehr, 2025) and is also associated with the smart city concept (Pellegrin et al., 2021). Indeed, the integration of digital tools, including AI, into the urban environment is (re)shaping urban planning and decision-making as well as enhancing new modes of data collection and analysis for urban governance. As noted by Schoemaker (2023, 2024), [urban] governance is not just at the service of digital technologies; the latter are also changing the way resources are allocated, goods and services are delivered, and the shape of the public sphere is transformed.

Important features of the AI-urban governance interface to bear in mind are the notions of governance of AI, governance with AI, and governance by AI (Digital Future Society, 2021; Pellegrin et al., 2021). The first feature – governance "of AI" – argues that introducing AI into the public sector must not override existing governance mechanisms and institutions. Also, issues of perceived value, long-term investments, capacities, and sustainability are central to AI. At the same time, governments need to develop a better understanding of the regulatory implications and governance mechanisms that are altering the way public and private organisations operate, as well as the consequential impacts on citizens' rights (Digital Future Society, 2021). The second feature – governance with AI – means that man should remain in the classical situation of applying and controlling digital technologies that reinforce capacity through supervision. For this to work, actors must be made aware of the potential benefits and risks of using AI in the public sector (Desouza et al., 2020; Digital Future Society, 2021). The third feature – "governance by AI"-asserts that human decision-makers should surrender to the "superhuman capacities" of AI. This is a more sophisticated level of AI application that relies less on human intervention; a position vehemently opposed by Zhu (2021) and Fernandez (2023), who argued that it is

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unacceptable for AI technologies to ignore human agency and human oversight. In general, a system of governance "with and of" AI, rather than "by" AI, should be the central focus for building a formidable AI-urban governance interface (Digital Future Society, 2021). To ensure that AI is not seen as an end in itself and does not supplant the human factor, city governance should use (governance "with" AI) and draw benefits from AI while recognising and addressing risks (governance "of" AI).

Typically, the AI-urban governance interface manifests a kind of symbiotic relationship. In that, while AI provides new ideas and means of city governance (Yao, 2024; Cugurullo et al., 2024), it also requires effective digital governance to ensure it serves the public interest and attains its full potential (Schoemaker, 2023). In this sense, AI should be seen as an active stakeholder in governmental decision-making, shaping urban governance (Cugurullo et al., 2024) and accompanied by an innovative and clear governance framework (Sanchez et al., 2024). In the concluding remarks of a study by He et al. (2025), the symbiotic relationship between AI and urban governance was reiterated. For these scholars, taking advantage of AI's full potential requires more than just adopting digital technologies; it calls for a nuanced understanding of how AI can be incorporated into governance and data-driven decision-making. Empirical literature, particularly that of Caprotti et al. (2024), has traced how AI technologies interface with urban governance and has recognised that technical systems that predate AI have served as test beds for integrating AI-driven technologies into an already technicized urban environment. Therefore, AI-driven digital technologies and tools have become integral to urban governance, prompting consideration of how to balance their development with various urban governance processes and activities.

STUDY CONTEXT AND METHODS

Study Context

The study was conducted in Wa, the municipal and regional capital of Wa Municipality and the Upper West Region, respectively. Wa Municipality was chosen for this study not only because it has the potential to open the governance process to AI technologies, but also because it could become the hub of AI in the Upper West Region. The absolute location of the municipality is the intersection of latitudes 9º32'N to 10º20'N and longitudes 1º40'W to 2º45'W (UNDP, 2011). The relative location shows the districts that border the Wa Municipality. These are the Nadowli District to the north, the Wa East

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and Wa West Districts to the east and west, respectively, and the Sawla-Tuna-Kalba District in the Savannah Region to the south (see Figure 1). The Municipality has a total landmass of approximately 579.86 square kilometres, representing 6.4% of the total regional landmass, and a total population of 200,672 (UNDP, 2011; Ghana Statistical Service, 2021). Regarding spatial extent, the municipality's built-up area increased from 3.7 to 29.2 square kilometres between 1986 and 2016 (Ahmed et al., 2020).

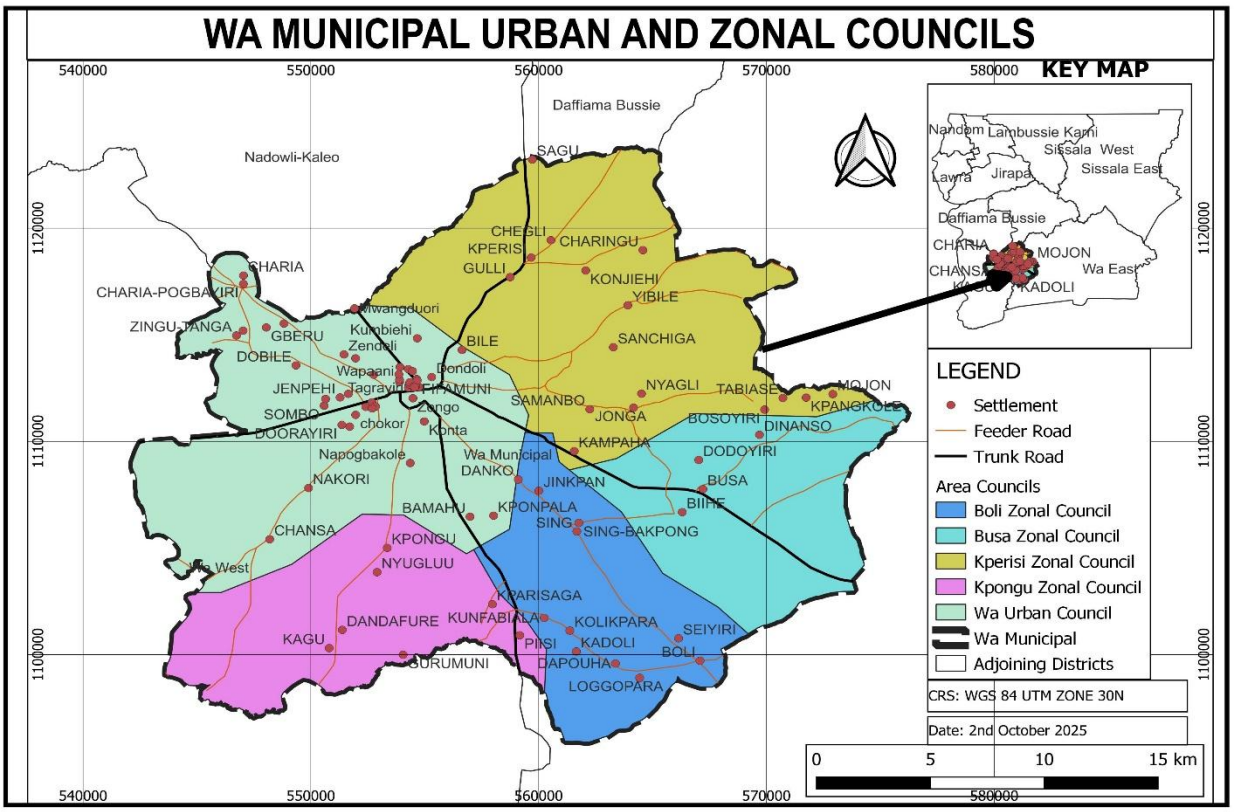

Figure 1: Contextual map of Wa Municipality showing the Urban and Zonal Councils

As with any other district/municipal/metropolitan assembly in Ghana, the prevailing governance practices in the Wa Municipality have legal backing under the 1992 Constitution and the Local Governance Act of 2016 (Act 936). In terms of governance, the municipality has a three-tier local governance structure consisting of the Municipal Assembly, five Urban/Zonal Councils (Wa, Busa, Kperisi, Kpongu, and Boli) (see Figure 1 for their location), and 73 Unit Committees (or electoral areas). The Municipality is currently composed of 44 Assembly members (40 males and 4 females),

two-thirds of whom are elected and the remaining one-third appointed by the president in consultation with the municipality's opinion leaders (Dokuwie, 2017; Wa Municipal Assembly, 2022). Other actors of governance in the municipality include private sector operators (Ghana Private Road Transport Union (GPRTU), Private Road Transport Owners Association (PROTOA), civil societies, traditional leaders (the paramount chief, divisional chiefs, and customary landowners), and international/local agencies (JICA, UNICEF, GIZ, SNV, SEND Ghana, and CARO Ghana) (see Table 1 for more details). This choice was based on the thinking that AI-driven governance should see the definition of urban issues as being constructed through interactions between government, civil society, the private sector, and citizens (Jiang, 2020).

Table 1: Actors of Urban Governance in Wa and their Constituents

Actors	Constituents
Government	Regional Coordinating Council, Municipal Assembly, Zonal Councils, Assembly Persons, Unit Committees, Physical Planning Department, Development Planning Department, Urban Roads, Land Commission, and Land Use & Spatial Planning Authority (LUSPA)
Private Sector	Ghana Private Road Transport Union (GPRTU), Private Road Transport Owners Association (PROTOA), and Association of sachet water producers
Civil Societies	CARO Ghana
Traditional Leaders	Paramount Chief, Divisional Chiefs, Community Leaders, and Customary Landowners
International Agencies	GIZ, UNICEF, JICA, and SNV

Source: Constructed by authors based on Adade (2020)

Methods

The study used a convergent mixed-methods research design to collect both quantitative and qualitative data. This research design requires the collection and analysis of both data sequentially, starting first with the quantitative phase and followed by the qualitative phase (Ivankova et al., 2006). A cross-sectional approach was used to collect data, which allows researchers to study the attitudes or opinions of a

population at a point in time by focusing on a subset of that population (Creswell & Creswell, 2017). The cross-sectional survey was conducted using a Google online data collection tool (Google Form) and face-to-face questionnaire administration to collect quantitative data. The sample size for the quantitative phase was mainly based on the Urban/Zonal Councils, Assembly persons, and the Unit Committees. The total membership of the actors was 142 – 25 for Zonal Councils (i.e., the 5 members who are ordinary residents), 44 Assembly persons, and 73 Unit Committee members. The decision to limit the quantitative phase to the above category of actors was mainly informed by the inability to obtain the sample frames for the other governance actors. Using a confidence level of 97%, an associated margin of error of 3%, and an estimated number of Urban/Zonal Councils, Assembly, and Unit Committee members of 142, the sample size was calculated using Slovin's (Stephanie, 2020) formula:

$$n = \frac{N}{1 + Ne^2}$$

Where: 'n' is the sample size, 'N' (142) is the total membership of the Urban/Zonal Councils, Assembly persons, and Unit Committees, and 'e' (0.03) is the level of precision. After obtaining the sample size (27), the number of questionnaires administered was based on the proportional representation method using the following formula:

$$s = \frac{CA}{\Sigma CA} * \mathbf{S}$$

Where: 's' is the sample size for the particular category of actors, 'CA' is the number of members in a given category of actors, 'ΣCA' is the sum of the numbers for all categories of actors, and 'S' is the sample size for all categories of actors. The proportional sample sizes of the three categories of actors were five (5), eight (8), and fourteen (14) for Urban/Zonal Council, Assembly persons, and Unit Committees, respectively.

Respondents were selected using a two-stage procedure. The first stage involved listing all members of the Urban/Zonal Councils, Assembly, and Unit Committees in the municipality to generate a sample frame from which respondents would be selected for interviews. After generating the list, the second stage then deployed a simple random sampling method to select the specific respondents for data collection.

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The target population for the qualitative phase of the study was all other urban governance actors in the municipality (see Table 1), except members of the Urban/Zonal Assembly and Unit Committee. A purposive sampling approach was used to identify and select respondents. Purposively, 14 key informants (respondents) were selected from among various categories of urban governance actors in the municipality. This includes one (1) respondent each from the Regional Coordinating Council, Physical Planning Department, Development Planning Department, Department of Urban Roads, Land Commission, Ghana Private Road Transport Union, Private Road Transport Owners Association, Divisional Chief, Customary Landowner, GIZ, JICA, SNV, UNICEF, and CARO Ghana (Centre for Advancing Rural Opportunities). The interviews were conducted using semi-structured interview guides. All interviews were conducted in person by the authors over the survey period (i.e., June to August 2025).

The quantitative data were analysed using statistical tools, such as frequency tables and percentages, to describe the socio-demographic characteristics of the respondents. Additionally, to address the research question that examined the relationship between urban governance actors' awareness of AI in governance and its application, a correlation analysis was conducted. The qualitative data were also analysed using thematic analysis proposed by Braun and Clarke (2013). After the recorded interviews were transcribed, the authors searched for relevant themes. We then defined the themes by identifying what each is about and developed the analysis by extracting data that illustrate different facets of each theme, as well as providing narratives around those themes.

RESULTS AND DISCUSSION

To place the findings in context, we begin this section with background information on the study's respondents. The background information on the 27 survey participants' age, gender, level of education, and occupation is presented in Table 2. This information is used to put into perspective the socio-demographic and AI-awareness situation of urban governance actors, which has the potential to influence their acceptance and application of AI-driven technologies in city governance. The results revealed that the majority (70.4%) of respondents were male, and more than half (51.9%) were in the 25–34 age bracket. Furthermore, only 14.8% of respondents had a level of education below tertiary. This may be attributed to the fact that, as urban governance actors, the

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respondents are required to possess certain basic qualifications and to communicate and/or write in English during the governance process. In terms of occupation, the majority (74.1%) were either public servants or private-sector employees.

Table 2: Background characteristics of respondents

Category	Frequency	Percent	Cumulative Percent
Age of Respondents			
18 – 24	2	7.4	7.4
25 – 34	14	51.9	59.3
35 – 44	8	29.6	88.9
45 PLUS	3	11.1	100.0
Gender of Respondents			
Male	19	70.4	70.4
Female	8	29.6	100.0
Level of Education			
JHS	1	3.7	3.7
SHS	1	3.7	7.4
Tertiary	23	85.2	92.6
Others	2	7.4	100.0
Main Occupation			
Public Servant	10	37.0	37.0
Private Sector Employee	10	37.0	74.1
Self-Employed	2	7.4	81.5
Student	2	7.4	88.9
Unemployed	2	7.4	96.3
Others	1	3.7	100.0

Source: Authors' Construct, 2025

Urban Governance Actors' Awareness of AI in Governance

Advancing understanding of knowledge- and awareness-related AI in city governance is critical to understanding its application. In other words, the ability to explore AI

technologies depends on urban governance actors' awareness of and access to them. Figure 2 illustrates respondents' knowledge about, or awareness of, AI in the governance of Wa Municipality. Their responses are categorised into high, moderate, and low, indicating the extent to which respondents (or urban governance actors) were aware of AI's presence in governance. The study revealed that the majority (66.67%, n = 18) of the respondents rated their AI awareness at a moderate level. While about a quarter (25.93%, n = 7) of participants reported a high level of awareness, a smaller proportion (7.41%, n = 2) reported a low level of awareness. Those who had low or moderate awareness may only possess "knowledge awareness", the first stage of Rogers' (2003) five stages of diffusion of innovation. While AI has entered public awareness in the European context (OECD, 2023), the current findings do not provide sufficient evidence of widespread awareness. In general, these results demonstrate that, while urban governance actors report a moderate level of awareness, relatively few consider their awareness to be high, underscoring a clear need to raise AI awareness in municipal governance.

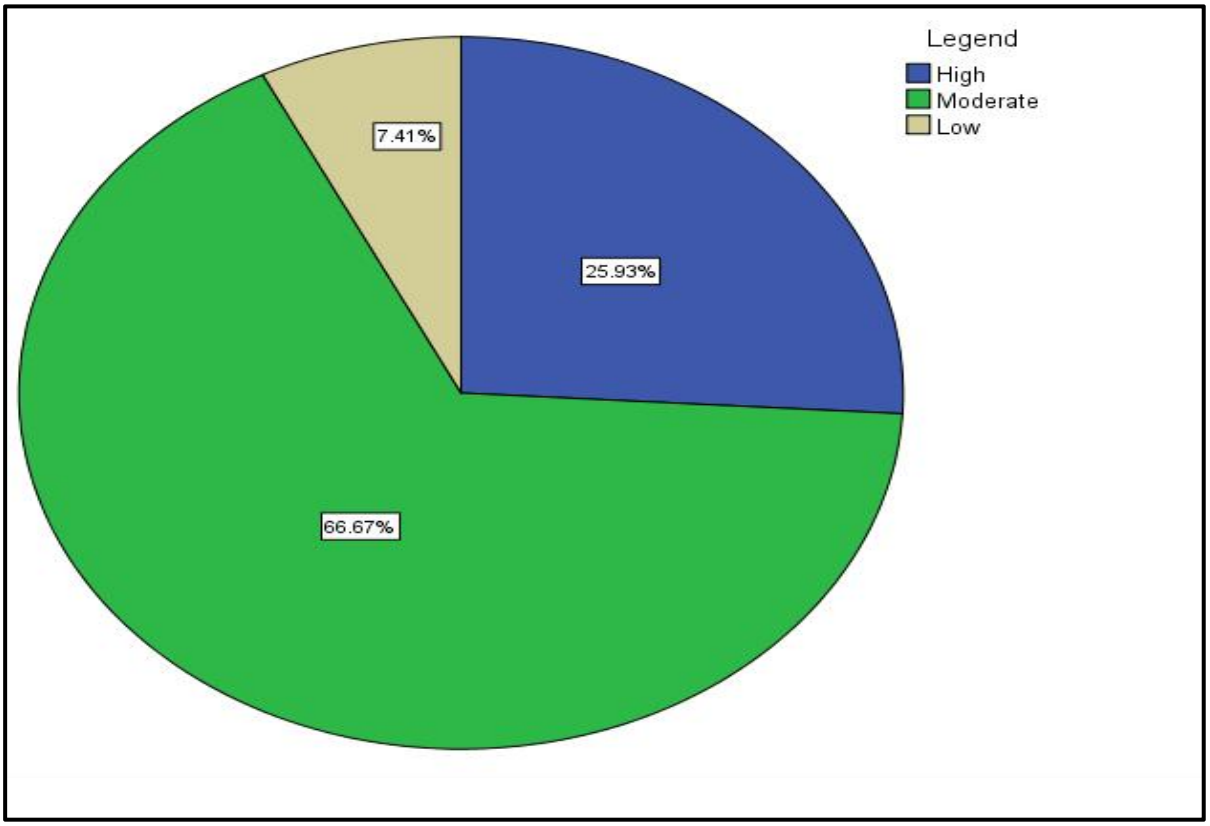

Figure 2: Artificial Intelligence in Governance by Degree of Awareness
Source: Authors' Construct, 2025

Probing further on the question of AI awareness in the study municipality, a respondent from the private sector has this to share:

"AI awareness of actors in the governance space is central to effective governance and delivery of municipal services. But this involves two actors: the government (i.e., the Wa Municipal Authority) and individuals with a stake in local governance. The former's ability to create appropriate AI platforms is an antecedent to the latter actors' awareness of it, if urban governance is the intended purpose. I'm tempted to reason this way because, before individual actors can develop functional awareness of AI-driven technologies, their consciousness and interest must be raised. It is only rational to assume that before people can form a positive belief about any technology, they must first be made aware of it. […] if individual actors are just aware that AI-technologies exist out there, or elsewhere, without having the benefit of accessing/knowing how they need such technologies in modern-day governance, then we have unfinished business at hand" (A private sector operator, August 2025).

Support for the above claims can be found in the existing literature on awareness, which holds that awareness is more than exposure to information – awareness creation or knowledge awareness – of new technology (Rogers, 1995). It is also about whether individuals have a need that can be addressed by new technologies, including AI, which should not be perceived as a passive activity. Therefore, actors' greater AI awareness is rooted in having knowledge awareness, a need that can be addressed by AI technologies, and an understanding of how such technologies function. The results also support Dinev & Hu's (2007) assertion that awareness may appropriately be described as the initial stage of the digital transformation or innovation process. What is not clear at this point is the extent to which knowledge awareness of AI is tailored to address urban governance issues. In line with this, the following section further interrogates how AI awareness has built the momentum for AI-driven technologies in governance issues of the Wa Municipality.

Centrality of AI Awareness in AI Usage in Urban Governance Activities

To better understand how AI awareness serves as a springboard for performing governance work, respondents were asked to identify urban governance activities conducted through AI-driven technologies in the case municipality. Table 3 presents the main urban governance activities and the corresponding AI awareness categories as perceived by the respondents. This is crucial for assessing how AI awareness is an antecedent of AI application in urban work and can promote a positive opinion of the need for greater interest in focal governance issues. The survey revealed that 44.4% (n = 12) of those who believed the level of AI awareness was moderate believed that AI awareness influences urban governance actors in their decision-making processes or urban planning work. While the same proportion (7.41%) of respondents who reported low AI awareness also believed that awareness is an antecedent for urban governance decisions, only 3.7% of those with high-level AI awareness (25.9%) agreed that it is a predictor of decision-making. However, 11.1% of the urban governance actors who were highly or moderately aware of AI believed that energy management in the municipality would benefit more from such awareness. These findings indicate that AI awareness levels do not necessarily guarantee equal deployment of AI across all governance activities.

Table 3: Crosstabulation of AI Awareness and Domain of Urban Governance

			Category of AI Awareness			Total
			High	Moderate	Low	
Urban Governance Activity	Public engagement	Count	1	1	0	2
		% of Total	3.7%	3.7%	0.0%	7.4%
	Health promotion	Count	1	0	0	1
		% of Total	3.7%	0.0%	0.0%	3.7%
	Public transportation	Count	0	1	0	1
		% of Total	0.0%	3.7%	0.0%	3.7%
	Energy management	Count	3	3	0	6
		% of Total	11.1%	11.1%	0.0%	22.2%
	Urban	Count	1	12	2	15

	planning/Decision making	% of Total	3.7%	44.4%	7.4%	55.6%
	Public safety	Count	1	1	0	2
		% of Total	3.7%	3.7%	0.0%	7.4%
Total		Count	7	18	2	27
		% of Total	25.9%	66.7%	7.4%	100.0%

Source: Authors' Construct, 2025

However, some of the respondents of the qualitative interviews shared different views as to the urban governance activities that are direct beneficiaries of AI awareness, as shown in the quotes:

"It is true that AI is shaping the way we govern our cities, and it is also true that AI awareness is central to whatever use we may like to put it to. But for me, AI readiness, or whatever, in governance is more than being aware of its existence; it has everything to do with digital skills, digital infrastructure development, and institutional capacities. These are the launchpads for harnessing AI for effective governance rather than just its awareness. For example, 21st-century teacher educator GPT in Dagaare was made possible by the availability of a customised GenAI tool" (A staff of GIZ, Wa, July 2025).

"The biggest AI awareness is the growing regulatory awareness, and the number one area of city management of this transformation is AI-assisted diagnosis to improve medical decision-making. I will give the second to the fintech companies that are integrating machine learning into fraud detection, identity verification, and improving credit services. The third area is the application of AI for real-time wind energy forecasting and the utilisation of smart meters in Wa, both within the energy sector. Also, critical governance tasks like rule-making, citizen engagement, and internal personnel management should be given serious attention" (A staff of LUSPA, Wa, August 2025).

As evident from the above, exposure to AI information in the absence of digital skills and infrastructure, and institutional capacity is less transformative. This does not suggest that AI awareness lacks transformative potential for urban governance, but

rather that it is also crucial to recognise how AI-driven technologies are being embedded in complex urban issues and are intricately linked to the promotion of an enabling digital environment. This aligns with the extant literature, which finds that though AI awareness can be leveraged for governmental decision-making (Cugurullo et al., 2024; Dinev & Hu, 2007), there are no blueprints for the sequential application of municipal services and activities (He et al., 2025). Thus, there is no consensus on whether AI awareness served as a catalyst or on which governance tasks rely more heavily on it in the municipality. This highlights that we cannot continue to treat AI awareness as the only groundwork for effective AI-driven urban governance takeoff; it is time also to recognise that the "awareness-core governance functions" interface depends on the governance business at stake. It can also be inferred that using AI awareness as a precursor to its deployment in particular governance tasks involves the amalgamation of technology and human agency, a view termed "governance with AI" by the Digital Future Society (2021).

Relationship between Awareness and Application of AI in Governance

To better understand the application of AI in urban governance, we need to explore further the complex relationships among AI awareness, acceptance, and application. Particularly because awareness, acceptance, and application of AI in urban governance stand as indispensable cornerstones, playing essential functions in AI-driven transformation of governance. Though the existing literature stresses the importance of each of these elements, their interconnectedness and/or symbiotic relationships require analysing them together. The Pearson correlation coefficient in Table 4 predicts that AI awareness and AI acceptance, and AI awareness and AI application have a strong positive correlation coefficient of 0.899** and 0.910**, respectively. This implies that urban governance actors who are aware of AI and accept its usefulness are generally willing to apply it. In contrast, urban governance actors who are unaware of AI will not accept and/or apply it in governance. The respective coefficient of determination (80.8% and 82.8%) suggests that about 80.8% and 82.8% of changes in AI acceptance and AI application can be explained by changes in AI awareness. However, AI acceptance and AI application displayed a moderate correlation coefficient of 0.735** and a coefficient determination of 54%. This implies that, since around 46% of changes in AI applications

could not be explained by AI acceptance, there must be one or more other relevant factors related to AI acceptance.

Table 4: Correlations between AI Awareness, Acceptance and Application

		AI Awareness	**AI Acceptance**	**AI Application**
AI Awareness	Pearson Correlation	1	0.899**	0.910**
	Sig. (2-tailed)		0.000	0.000
	N	27	27	27
AI Acceptance	Pearson Correlation	0.899**	1	0.735**
	Sig. (2-tailed)	0.000		0.000
	N	27	27	27
AI Application	Pearson Correlation	0.910**	0.735**	1
	Sig. (2-tailed)	0.000	0.000	
	N	27	27	27

Source: Authors' Construct, 2025; **. Correlation is significant at the 0.01 level (2-tailed).

These findings echoed the thinking of Andruliene et al. (2023) and Nwodu (2025) that awareness of AI technologies is a precursor to their application. On the other hand, they counter Shahzad et al. (2023) and Shahzad et al's (2024) findings, which highlighted how the TAM components (i.e., PEoU and PU) can effectively facilitate technology awareness, acceptance, and application/utilisation. This suggests that the urban governance actors' AI awareness and application in the Wa Municipality may be occurring with limited AI acceptance, creating ambiguity and doubt about the real-time manifestation of the TAM. To clarify this, the interview participants were asked to further identify the factors that make urban governance more receptive to AI applications. During the interviews, the chairman of GPRTU and the chief of Kperisi have this to say:

"There are several factors that can influence one to use AI, but personally, two of them are fundamental. What I considered first was how AI could be harnessed in my work as a decision-maker or stakeholder in governance. Next, my personality cannot be discounted; I mean, my socio-economic attributes, such as my social class/income, education, and age. But honestly, my age did not favour me. In all this, I would love to see that whatever AI tools we deploy for managing the city should be human-centred and of central importance for solving some of the biggest governance issues in this city (referring to Wa)" (The Chief of Kperisi, August 2025).

"It is not so simple that when individuals become conscious of the existence of AI, the next thing is its adoption or application. No! […] between AI awareness and AI application lies regulatory awareness, a flexible governance structure that can swiftly respond to the changing digital landscape and how much time, effort, and other resources one has to spend to develop the necessary skills and know-how when it comes to planning and managing affairs of the municipality. If these things are taken seriously or provided, then we will be raising the foundation for a more inclusive AI regime" (The Regional Chairman of GPRTU, Wa, August 2025).

The above narration suggests that a positive relationship exists between perceived usefulness (PU) and perceived ease of use (PEoU), as well as AI awareness-knowledge and AI application-knowledge. In addition, it can be argued that socio-economic characteristics and responsive/effective governance arrangements are key determinants of AI application. The findings further suggest that an AI application is not an end in itself but a means to promoting human-centred and inclusive AI. This draws parallels with Claudy et al. (2010) and Nwodu's (2025) studies, which emphasised that the acceptance and application of new technology depend on individual factors; hence, AI application is not automatic upon exposure to AI information. It therefore appears that using AI to address critical governance issues requires the proper consideration of urban dynamics rather than focusing on isolated factors. This advises us against policies that are narrowly focused on AI awareness as a panacea for transformative AI application in governance.

Implications of the Findings

The policy interventions should focus on raising AI awareness, creating an enabling environment for the adoption/application of AI, and building the necessary digital

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skills, primarily for functional digital urban governance. The findings point to a generally moderate level of AI awareness and a strong perception that greater awareness cannot be decoupled from establishing the need for, or having access to, particular AI technologies in the municipality. Therefore, so long as AI awareness remains moderate, inadequate access and utilisation may continue to confront urban governance actors in the municipality. In other words, a moderate AI awareness is unsustainable if the relevance and access to AI are low among the actors.

To sustain AI awareness and improve access beyond awareness, some effort could be deployed. In the municipality, investment in awareness-raising and public engagement will be important to ensure that citizens are not only encouraged to use AI but also understand it, access it, and shape its design/development. Therefore, an intervention that provides funding for community-driven dialogues to promote and intensify public awareness will help urban governance actors in the municipality become AI-ready and AI-assertive. Even though sophisticated AI-driven platforms do not exist in the municipality, smartphones could be used to connect and share information among all actors, at least to promote and solidify AI awareness. Moreover, appropriate measures should be put in place to promote inclusive access so that AI can be leveraged to bridge the "awareness-access" gap and also ensure that no governance actor is left behind. This is especially vital for the realisation of a transformative AI system that facilitates knowledge sharing across urban governance institutions and promotes a digital regime responsive to the needs of governance actors in the municipality. It also aligns with the inclusive notion of cities, as outlined in Goal 11 of the Sustainable Development Goals. Essentially, target 11.3 inclusive and sustainable urbanisation implies that by 2030, enhance inclusive and sustainable urbanisation and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.

The findings again indicate that AI awareness extends beyond exposure to AI information. Thus, awareness without the necessary digital skills, infrastructure and institutional capacity will hinder its application. To fully participate in the digital governance landscape, the municipal authority must prioritise digital skills development to ultimately improve the digital literacy of all governance actors. In addition, policies that focus on the provision and expansion of robust digital infrastructure and building institutional operational capacity should be promoted. In the case of the latter, the focus should be on the Unit Committees, Urban/Zonal

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Councils, and Municipal Assembly, which are the primary local-level institutions of governance. In search of improved digital skills, digital infrastructure, and institutional capacity development, inclusive by-laws should also be put in place to integrate awareness of local capacity needs and local values and languages. It also requires that the application align with good governance principles and be anchored in the municipality's development priorities.

The study's findings further indicate a positive relationship between AI awareness and AI application in the municipality. However, even if urban governance actors are aware of AI technologies, they may remain uncertain/unable to evaluate their full potential for governance work, thereby hindering their wider application. Also, the relationship between AI awareness knowledge and AI application knowledge is not a given, since some potential users who are aware of AI may not be motivated to apply it in real time. One way to leverage a positive "awareness-application" interface and stimulate sustained AI application in the municipality is to put in place incentive policies or mechanisms. First, this can be achieved by reducing uncertainty about the costs and benefits of using AI in governance. Second, subsidies should be provided to key institutions and individual actors to develop and deploy appropriate AI tools through a public-private partnership. Third, instead of formulating generic proposals for AI applications, the municipal authority should embark on targeted interventions that reflect actors' level of AI/digital competence. For example, through targeted interventions, actors with standard competence could be further incentivised by offering them self-guided [online] training programmes, while those with low competence are introduced to a specialised basic AI applications training programme.

Conclusion

This study provides empirical evidence that AI awareness in the Wa Municipality of Ghana is generally moderate (except for a third of respondents who reported high awareness). Theoretical implications also strengthen the significance of the Technology Acceptance Model (TAM) in AI-driven governance. Arguably, the municipality stands at the threshold of leveraging AI awareness for transformative digital urban governance. However, this research indicates that the true test of progress depends not only on awareness but also on how urban governance actors harness their AI awareness to apply AI technologies effectively to support viable decision-making and urban management. The paper also recognised the role of AI awareness and the kind of

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governance activities that leverage AI technologies. However, except for urban planning/decision-making, there was no evidence that AI awareness is a precursor of its application across the spectrum of urban governance activities in the municipality. As the precursory role of AI awareness is limited to a few urban governance activities, it is proposed that municipal authorities put in place appropriate structures/mechanisms to build actors' interest in AI applications across various governance activities. An attempt should be made to sustain actors' awareness, interests, and application of AI, as well as ensure knowledge sharing to foster shared skill development and synergies. Specifically, in line with activity 17 of Ghana's National Artificial Intelligence Strategy of 2022, the municipal authority should promote collaboration and a coordinated AI community, both online and in person.

In addition to AI awareness, the paper also highlights some core enablers of AI application: socio-economic characteristics of actors, improved digital skills, robust digital infrastructure, inclusive and adaptable policy frameworks, and effective governance systems. That is, a robust AI application should be marked by the ability to translate awareness-knowledge into actionable results and/or integrate awareness-knowledge with relevance to municipal needs, institutional support, governance, and capacity building. For long-term success, policymakers should focus not only on adopting emerging AI technologies in governance but also on ensuring that the chosen technologies align with the municipality's digital infrastructure, governance structure, and digital talent base. This will help improve the equitable delivery of AI-induced benefits to actors and communities.

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