




# Municipal employee perceptions on the use of artificial intelligence to perform their work



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**Background:** Over the past 30 years of democracy, South Africa has undergone a significant technological transformation, with an increasing integration of artificial intelligence (AI) in government operations. Local governments remain reliant on manual systems, resulting in inadequate service delivery, community protests, and corruption.

**Aim:** This study assessed municipal employees' perceptions of using AI in their work, highlighting a research gap in reliance on manual systems that contribute to poor service delivery, community unrest, and corruption. The findings underscore the need for electronic management systems and a deeper understanding of employee perceptions of AI.

**Setting:** The study was conducted in the Buffalo City Metropolitan Municipality (BCMM) in the Eastern Cape Province of South Africa.

**Method:** A quantitative, hypothetical-deductive study employed structured questionnaires to assess the perceptions of 255 employees in BCMM's corporate services and finance divisions, utilising a cross-sectional, purposive sampling design.

**Results:** Employees generally view AI positively, recognising its advantages. Structural Equation Modelling results indicate that a low perceived ease of use hinders performance, while positive attitudes and perceived usefulness enhance it, highlighting the challenges in experience and capacity-building for effective AI use.

**Conclusion:** Municipalities can enhance employee performance and service delivery by implementing user-friendly systems and cultivating a positive attitude towards AI. Furthermore, strategic investment in employee retention and institutional capacity building is crucial for the effective and efficient adoption of AI.

**Contribution:** This study contributes to the limited literature on electronic management systems and provides insights to improve employee perceptions and adoption of AI within municipal contexts.

**Keywords:** perceived usefulness; ease of use; attitudes; financial management; artificial intelligence; Buffalo City Metropolitan Municipality.

## Introduction

South Africa has undergone a significant technological transformation over the past 30 years, since the establishment of democracy, particularly within local government. The rise of artificial intelligence (AI) has notably influenced daily life. Artificial intelligence enhances productivity and creativity across the manufacturing, healthcare, finance, retail, energy and agriculture industries. In finance, AI streamlines decision-making, while in healthcare, it improves diagnostic accuracy and treatment strategies (Usman 2024). Artificial intelligence applications have improved safety in urban areas, increased cleanliness, and reduced corruption and fraud through automated systems.

Several factors impact South African municipalities' adoption of technology. While employees see its potential to improve service delivery, obstacles such as Information Technology (IT) expertise, inadequate training, and low awareness of information and communication technology (ICT) hinder progress (Nkgapele & Mokgolobotho 2024). The digital divide remains a significant barrier.

The Auditor-General's 2023 report identified issues such as poor governance, financial mismanagement and reliance on outdated manual systems, leading to substandard service

delivery and corruption (Auditor-General South Africa [AGSA] 2023; Ndasana & Umejesi 2022). The National Treasury Report (2022) also noted a worsening financial situation because of weak leadership, with 64.4% of municipalities in an economic crisis.

Employee reactions to AI have been mixed, with some optimistic about its efficiency benefits while others fear job displacement (Ahn & Chen 2022).

Despite these concerns, local government employees are generally willing to embrace AI, expecting collaboration between technology and human workers (Criado & Zarate-Alcarazo 2022). Integrating AI in public service and administrative processes is crucial for improving fraud detection, regulatory decisions and civic engagement (Ahn & Chen 2022). By understanding these perceptions in local government, this study aims to provide insights on how to enhance the integration of AI to improve employee performance and overall service delivery.

The main objective of this study is to assess municipal employees' perceptions of using AI to perform their work. These research objectives guide this study:

- To determine municipal employees' ease of using AI to perform their work.
- To assess the attitude of employees towards AI to perform their work.

To achieve these objectives, the Technology Acceptance Model (TAM) was deemed the most appropriate theoretical lens. The TAM's empirically robust constructs of perceived usefulness and perceived ease of use aid the study with the framework to interrogate the cognitive and attitudinal dimensions underpinning the adoption of AI in local government. In addition, its proven applicability in organisational settings ensures conceptual alignment with the study's focus on municipal employees' perception with AI. Lastly, this study is focused on understanding perceptions as determinants of technology acceptance. Therefore, TAM provides a much more targeted approach as opposed to adoption of models that may diffuse attention from the core variables of interest to this study.

## The problem

Over the past three decades, the South African government has made significant progress in AI technologies such as machine learning and natural language processing (Kimari et al. 2023). Artificial intelligence helps institutions establish standards, enhance accessibility and improve safety research. It also fosters collaboration and decision-making in local governments (Dei 2024). Despite these advancements, local governments struggle with manual systems and procurement law non-compliance, with the Auditor-General noting a lack of fair contract awarding evidence (AGSA 2022). Inefficient record management can lead to

community protests and erode public trust (Dikotla & Mokgolo 2023).

While some municipalities adopt AI platforms like financial management and e-procurement systems, they face instability and compliance challenges (AGSA 2023). Trust issues and the digital divide further complicate e-governance implementation, making it crucial to understand municipal workers' perceptions of AI for successful adoption (Nel-Sanders & Malomane 2022). This study explores how AI is adopted in municipalities, seeking to address employee experiences in integrating AI into their day-to-day activities.

## Literature review

A traditional municipality relies on a centralised culture, using paper and pen for public services. Manual systems lead to a lack of auto-control, poor service delivery, low customer satisfaction and minimal technology use (Nel-Sanders & Malomane 2022). This dependence on manual processes leaves municipal employees unprepared for digital systems. Makgahlela (2020) found that South African municipalities face inefficiencies in record management because of the extensive storage needed for paper records. Paper-based records hinder information flow and complicate the creation of comprehensive records. They are limited in security; if destroyed or lost, all information is lost.

This study focuses on AI applications at the local government level in South Africa, primarily in urban municipalities and smart cities using open data platforms, such as the eThekweni and Cape Town Metropolitan municipalities (Wilson & Guya 2020). The focus on Category A municipalities arises from factors like a lack of legislative direction, affordability, a skills gap and limited infrastructure in rural areas. This discussion underscores the potential of AI technology to enhance governance and service delivery in South African municipalities.

A study by Ash, Galletta and Giommoni (2020) indicates that municipalities can use machine learning to address issues like nepotism and corruption, a finding supported by Blasio, D'Ignazio and Letta (2022), who noted that over 70% of municipalities might experience corruption. This capability enhances anti-corruption initiatives and promotes transparency in governance. In South Africa, municipalities struggle with maintenance issues. Emily and Muyengwa (2021) found that in Limpopo, residents face water access problems because of inadequate supply and poor infrastructure maintenance. Madyibi (2022) reported that the Intsika Yethu Local Municipality does not maintain its roads regularly because of insufficient funding and resources. Overall, these studies suggest that AI can improve decision-making in service delivery, thereby boosting municipal employee performance (Kimari et al. 2023).

Introducing AI in municipal practices can greatly enhance efficiency and service delivery, but it requires significant

investment (Karatueva 2023). In Africa, AI adoption challenges include government policies, inadequate infrastructure, ethical concerns and skills development (Ade-Ibijola & Okonkwo 2023). Afolabi (2024) identifies data privacy, algorithm transparency and ethical decision-making as key barriers in South Africa, while Arakpogun et al. (2021) highlight that infrastructure constraints and knowledge gaps further impede AI use across the continent.

This study applied the TAM developed by Davis (1989) to explore employee perceptions of AI when performing their work. The TAM is a well-researched framework that predicts user adoption of various technologies (Davis & Granic 2024). Studies on user acceptability of applications have shown the model's adaptability and efficacy in various technological contexts, using customised TAM frameworks to examine variables like usability perception, convenience of use, usage attitude and actual use (Triwibowo et al. 2024).

The TAM was central to this study as it addresses key variables that influence employee AI adoption, such as the perceived usefulness (U), perceived ease of use (E), attitude towards using (A), behavioural intention to use (BI) and actual system use (Andrés-Sánchez et al. 2024; Mejía-Mancilla & Mejía-Trejo 2024). Technology Acceptance Model can be utilised to explain individual behaviour related to adopting new technology. As a result, this model was helpful for our research.

This study explores how municipal employees perceive AI and how these perceptions influence their willingness to adopt AI when performing their tasks. By examining employees' perceptions and attitudes towards AI, this study intends to develop effective strategies to improve employee perceptions towards using artificial intelligence in municipalities.

### Research questions and hypothesis development using the technology acceptance model

The research questions served as the foundation for the development of the study's hypotheses. Each question was carefully aligned with the constructs of the TAM to ensure theoretical consistency. By doing so, every research question directly informed the formulation of one or more hypotheses aimed at providing empirical answers. This structured alignment strengthened the logical flow from inquiry to testing. As such, the hypotheses were purposefully designed to address the specific dimensions outlined in the research questions:

- *What are the municipal employees' perceptions on the use of AI to perform their work?*
- *What is the ease of using AI for municipal employees performing their work?*
- *What is the attitude of employees towards using AI to perform their work?*

As a result, key variables of TAM were applied to explore employee perceptions of AI and their experiences when

using AI to perform their work. It examines how factors like the usefulness of AI, perceived ease of use, and attitudes towards AI affect their acceptance and adoption of AI. Based on the framework, the following hypotheses were formulated, focusing on their influence on perceived usefulness, perceived ease of use and attitudes:

- H1a:** Municipal employees' attitudes towards AI significantly and positively influence the perceived usefulness of AI in improving employee perception when performing their work.
- H2a:** Municipal employees' attitudes towards AI significantly and positively influence the employee ease of using AI to perform their work.
- H4b:** Municipal attitudes towards AI significantly and positively influence employees in performing their work.

Hypotheses 1a, 2a, and 4b investigate how employee attitudes influence their perception of AI's usefulness and ease of use in the workplace. Hypothesis 1a asserts that positive employee attitudes towards AI enhance their belief in its benefits. Yigitcanlar, Beeramoole and Paz (2023) found that municipal employees with favourable views of AI are more likely to believe it can improve their performance, leading to greater job satisfaction.

Hypothesis 2a suggests that when employees view AI positively, they find integrating these tools into their work easier, which can boost productivity. Lastly, Hypothesis 4b indicates that favourable attitudes towards AI increase municipal employees' readiness to adopt AI technologies, enhancing their productivity (Chandra 2022). This underscores the need to cultivate positive attitudes towards AI to improve public service delivery:

- H2b:** Employee ease of using AI to perform their work significantly and positively influences employee attitude towards AI in improving employee perception on performing their work.
- H3a:** Employee ease of using AI to perform their work significantly and positively influences the perceived usefulness of AI in improving employee perception on performing their work.
- H4c:** Ease of using AI significantly and positively influences employees to perform their work.

This hypothesis examines how the ease of using AI affects employee attitudes towards AI, its perceived usefulness and overall performance. It suggests that when employees find a system user-friendly, they are more likely to view it positively and engage with it. Omar et al. (2019) highlight that a user-friendly system encourages better task execution. This hypothesis aims to determine how ease of use can enhance employee perceptions and boost productivity:

- H4a:** Perceived usefulness of AI significantly and positively influences the ability of employees to perform their work.

This hypothesis examines the role of the perceived usefulness of AI in improving employees' ability to perform their work

using AI. It highlights that when employees perceive a system as beneficial, they become more engaged and satisfied, which enhances productivity. This is supported by Wahyuni, Hidayatullah and Sisharini (2023), who discovered that perceived usefulness mediates the relationship between user satisfaction and information system quality, influencing employee performance. As a result, the study proposes a hypothetical framework on employee perceptions of the use of AI, as demonstrated in Figure 1.

## Artificial intelligence adoption in developing public service of the south

Globally, municipal financial management is undergoing a digital transformation, with AI playing a critical role in enhancing efficiency, decision-making and service delivery (Amentes 2023; Karatueva 2023; Petrogradskaya, Korobova & Barchukov 2021). Artificial intelligence applications in this domain address challenges such as manual data collection, limited automation and inefficiencies in project quality, while also improving financial accountability, risk management and strategic planning (Chen 2023; Liu, Wang & Zou 2022; Madhi et al. 2022; Mothupi, Musvoto & Lekunze 2022; Zhu 2020).

### Asia

In Southeast Asia, AI supports sustainable and inclusive city initiatives through cross-industry collaboration, advanced IT infrastructure and government-backed research (Chong et al. 2023). Bangladesh applies AI in libraries, public services and workplace systems, despite infrastructure and privacy challenges (Mahmud 2024; Mazumder & Hossain 2024). India's Digital India programme incorporates tools like MyGov, the AgriMarket app and accessibility-focused platforms to promote citizen participation and inclusivity (UN 2022).

### South America

Ecuador's 2021–2025 plan integrates AI and digital transformation to reduce inequality, supported by expanded 4G coverage for rural institutions (UN 2022). Guyana aims for a fully digital government by 2030, leveraging AI in social protection and rural connectivity projects. Peru advances AI-driven governance via the Building the Europe Link with Latin America (BELLA) initiative, the Better than Cash

Alliance and a National Digital Talent Platform training thousands in digital transformation (UN 2022).

### Africa

Rwanda leads African AI adoption in governance, offering 98 online services, real-time analytics for performance monitoring and data-driven policy alignment (UN 2022). Its SMART Rwanda Master Plan and ICT for Governance Strategy promote universal internet access, digital inclusion for 250 000 households and ICT-enabled public empowerment, aiming to achieve Sustainable Development Goal (SDG) 9 by 2024.

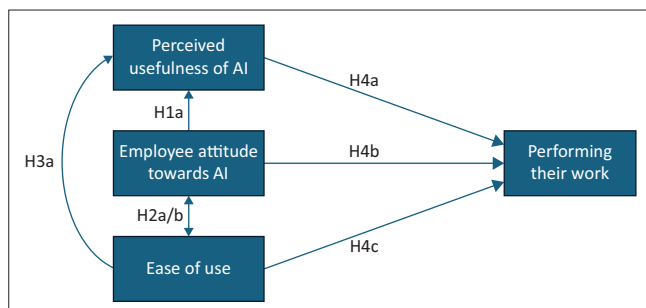
AI's integration into municipal financial management across these regions reveals its potential to reshape governance, enhance inclusivity and improve fiscal accountability, while also highlighting infrastructure gaps, capacity-building needs and contextual policy challenges that must be addressed for sustained impact.

## Methods

This study employed a quantitative research method through a hypothetical deductive research approach, which verifies the accuracy of hypotheses and is more objective and repeatable (Patel & Patel 2019). The application of the positivist philosophy necessitated the use and application of cross-sectional design to collect numerical data to understand how factors like perceived usefulness, perceived ease of use and attitudes affect how employees at the Buffalo City Metropolitan Municipality (BCMM) view AI in doing their work. This methodological alignment was critical in reinforcing the theoretical grounding of the study within the TAM, ensuring that each construct was empirically tested while maintaining its conceptual integrity. Furthermore, it strengthened the practical relevance of the study by providing evidence-based insights that can guide AI adoption strategies in local government. The correlation design was suitable for future research, which can influence decisions about the application of AI in municipal workplaces. A non-probability purposive sampling method was used to select participants.

## Population and sampling

The study focused on the BCMM, which has 5522 employees (BCMM IDP 2024). It focused on the Finance and Corporate Services directorates because of the complicated financial rules (Stoilova 2023) and the potential for AI to improve human resources (HR) decision-making (El-Menawy 2022). South Africa's local government faces difficulties in enforcing rigorous financial restrictions, prompting reforms targeted at enhancing monitoring and crisis management (Maone & Lekhanya 2023; Mlambo & Mphurpi 2023). Manual processes have resulted in financial problems and corruption, causing the National Treasury to require electronic systems. Artificial intelligence has been shown to improve financial reporting, compliance and resource



AI, artificial intelligence.

**FIGURE 1:** Hypothetical framework on employee perceptions of the use of artificial intelligence to perform their work.

management (Leitner-Hanetseder & Lehner 2022), as well as HR performance appraisals and incentives. The study investigated employee perceptions of AI use at BCMM. For this study, employees are populated by their two directorates, as shown in Table 1.

### Sampling technique

Purposive also known as judgemental sampling was used to choose participants from the BCMM to better match the sample with the study's aims and objectives, improving reliability and robustness (Campbell et al. 2020). Purposive sampling finds people who have qualities that are relevant to the study, particularly when few people in the community have these qualities (Rahman 2023). According to Bhargava, Bester and Bolton (2021), purposive sampling is a non-probability technique for choosing participants to respond to certain study questions. Participants with extensive expertise and experience in the two directorates, who might have differing opinions on the application of AI in their work, were chosen using this method. The approach is supported by the idea that certain people have important and divergent views on the ideas and problems being studied, which makes it necessary to include them in the sample (Campbell et al. 2020).

In essence, purposive sampling allows for targeted selection of knowledgeable participants; it introduces potential biases because the sample is not randomly selected. Selection bias may occur if the chosen participants are more likely to have favourable or unfavourable views on AI, which may not reflect the entire population. To mitigate this, the study ensured diversity by including participants from both financial and corporate services directorates, representing different roles, experiences and perspectives. In addition, clear inclusion criteria were established to select participants with relevant knowledge, while maintaining confidentiality to encourage honest responses.

### Sample size

According to Saunders, Lewis and Thornhill (2019), the Rao Soft calculator is appropriate to establish the sample size for surveys and research; hence, this study also used it to promote validity and accuracy of this investigation's findings. The established margin of error was 5%, with the confidence level being 95% (Dube & Gonhovi 2022). The set margin of error is because the study used a large population. Therefore, the set margin of error is appropriate for a large target population. The specified target number of the study was 810 employees from two directorates or departments and units of the BCMM. These included directorates of financial services ( $n = 619$ ) and corporate services ( $n = 193$ ). The calculations from the Rao Soft calculator confirmed the sample size of 261. In essence, in pursuing a good research study, a 60% return rate was therefore imperative. After collecting and analysing the data from the distributed questionnaires, 255 completed surveys were returned, yielding a 97.7% return rate.

The rationale behind this sample size was to achieve a balance between feasibility and statistical power, ensuring sufficient representation to detect meaningful relationships in the data. Using a 95% confidence level and a 5% margin of error allowed the study to maintain a high level of reliability. While the non-probability nature of purposive sampling limits the generalisability of findings to the entire BCMM population, the high response rate of 97.7% enhances the robustness of the results, indicating strong engagement from the selected participants.

### Measuring instrument

Printed hardcopy structured questionnaires were distributed at BCMM by the researcher as the instrument to collect data from employees. The questionnaire specifically addressed factors such as perceived usefulness, perceived ease of use, attitudes and actual usage derived from the TAM framework. Through the application of TAM, the key item constructs of perceived usefulness, ease of use and employee attitudes were restructured to align with the objectives of this study.

The researcher obtained permission through a formal letter addressed to the BCMM to serve as a gatekeeper of the study. The gatekeeper permitted the researcher to access the municipality where the study was conducted. Participants were invited to partake in the study, and in the invitation letter, the researcher introduced herself as an honours degree student undertaking the academic research. The purpose and the objective of the study were explained. The informed consent documentation was also distributed to participants before commencing with research so that they could read it and give their consent to participate in the study. To be specific, 261 questionnaires were distributed, strict ethical standards were observed and all acquired information was kept strictly confidential.

### Statistical analysis

Data analysis for this study was conducted through STATA 14 software, following an initial cleaning process in Excel to ensure data reliability (Bhardwaj & Kaushik 2024). Variables were appropriately labelled, and text responses were converted into numerical formats where needed. The dataset was refined for quality, with any missing or incorrect responses flagged for review. Structural Equation Modelling (SEM) was employed to explore the relationships among three key variables: Perceived usefulness of AI, ease of using AI and attitudes towards AI, as well as their effects on employees' work performance. Path analysis within SEM quantified direct and indirect effects, yielding valuable insights into these relationships.

**TABLE 1:** Presentation of the number of employees populated by their two directorates.

Directorate	Number of employees
Finance	619
Corporate services	193
<b>Total</b>	<b>810</b>

## Ethical considerations

Ethical clearance to conduct this study was obtained from University of Fort Hare and University of Fort Hare Research Ethics Committee on 31 July 2024 (No. REC-270710-028-RA Level 01).

## Results

This section presents the findings of the study using tables to indicate key components of the results of the study. Table 2 presents the demographic features of participants. Table 3 presents the descriptive statistics. Table 4 presents the pairwise correlations. Lastly, Table 5 presents SEM results.

### Demographic profile of the participants

A 97.7% response rate was attained at BCMM, where 255 of the 261 disseminated surveys were correctly completed. Out of the total responders, 41.4% were men and 58.6% were women. The 31–50-years-old made up the largest age group (67.8%), followed by 21–30-years-old (23%) and 51–60-years-old (9.2%). Furthermore, 53.3% of respondents have a bachelor's degree, 35.2% have a master's degree, 5.7% have a diploma and 5.7% have a PhD, according to the study. Supervisors, managers, senior managers and general managers were less represented in the sample than line personnel, which made up 41.8%. The finance directorate employed roughly 46% of the staff, while corporate services employed 54%. The respondents' availability at the time of data collection had an impact on this distribution.

**TABLE 2:** Demographic features of participants ( $N = 255$ ).

Demographic feature	<i>n</i>	%
<b>Level of education</b>		
Diploma	15	5.7
Degree	136	53.3
Masters	89	35.2
PhD	15	5.7
<b>Job position</b>		
Line officer	107	41.8
Supervisor	45	17.6
Manager	45	17.6
Senior manager	29	11.5
General manager	29	11.5
<b>Marital status</b>		
Single	164	64.4
Married	91	35.6
<b>Department or Directorate</b>		
Finance	117	46.0
Corporate services	138	54.0
<b>Age groups (years)</b>		
Youth (21–30)	59	23.0
Adult (31–50)	173	67.8
Old (51–60)	23	9.2
<b>Gender distribution</b>		
Female	149	58.6
Male	106	41.4

PhD, Doctor of Philosophy.

## Descriptive statistics

This section summarises the external measurements, including mean, standard deviation (SD), and minimum and maximum values, and describes the descriptive statistics of the significant variables used in this study, as seen in Table 3. Employee attitudes towards AI (att\_index), perceived ease of use (ease\_index), perceived usefulness (use\_index) and employees' ability to perform their work (per\_index) are all shown by these statistics.

### Ability of employees to perform using artificial intelligence

A mean of 0.285 and a standard deviation of 0.452 are displayed in the statistical results. According to these findings, employees' proficiency with AI is at its lowest, indicating that utilising AI does not improve their output or performance. This low score suggests that workers may lack the necessary abilities or self-assurance to use AI tools, which could impede creative work practices and general job performance (Chen et al. 2024).

### Perceived usefulness of artificial intelligence

This variable's mean value is 0.227, with a standard deviation of 0.42. The moderate mean indicates that the BCMM employees believe AI can help them to be more productive. The moderate perceived utility of AI significantly improves municipal employees' performance and job satisfaction.

### Employee attitudes towards artificial intelligence

The moderate mean score of 0.231 for employee attitudes indicates that employees have expressed a favourable opinion of adopting AI to complete their tasks. This

**TABLE 3:** Descriptive statistics.

Variable	Obs	Mean	SD	Min	Max
<b>Per index</b>					
Least	260	0.28	0.45	0	1
Low	260	0.11	0.32	0	1
Medium	260	0.23	0.42	0	1
High	260	0.25	0.44	0	1
Highest	260	0.12	0.32	0	1
<b>Use index</b>					
Least	255	0.20	0.40	0	1
Low	255	0.20	0.40	0	1
Medium	255	0.23	0.42	0	1
High	255	0.18	0.39	0	1
Highest	255	0.18	0.39	0	1
<b>Att index</b>					
Least	255	0.21	0.41	0	1
Low	255	0.20	0.40	0	1
Medium	255	0.23	0.42	0	1
High	255	0.18	0.38	0	1
Highest	255	0.18	0.38	0	1
<b>Ease index</b>					
Least	261	0.24	0.43	0	1
Low	261	0.17	0.38	0	1
Medium	261	0.23	0.42	0	1
High	261	0.18	0.38	0	1
Highest	261	0.18	0.38	0	1

SD, standard deviation; Obs, observations; Min, minimum; Max, maximum.

**TABLE 4:** Pairwise correlations.

Variables	(1)		(2)		(3)		(4)	
	Correlation coef.	p-value	Correlation coef.	p-value	Correlation coef.	p-value	Correlation coef.	p-value
(1) per_index	1.000	-	-	-	-	-	-	-
(2) use_index	0.818*	0.000	1.000	-	-	-	-	-
(3) att_index	0.875*	0.000	0.883*	0.000	1.000	-	-	-
(4) ease_index	0.575*	0.000	0.641*	0.000	0.771*	0.000	1.000	-

Note: \*\*\*, p-value, signifying the significance level, any variable with \*\*\*, statistically significant at 1%; \*\*, statistically significant at 5%; and \*, statistically significant at 10%.  
 \*, p < 0.1; \*\*, p < 0.05; \*\*\*, p < 0.01.  
 Coef., coefficient.

**TABLE 5:** Structural equation modelling results.

Variable	OIM				95% Conf. interval
	Coef.	SE	z	P > z	
<b>Structural:</b>					
use_index <-					
att_index	0.956	0.046	20.910	0.000	0.867 to 1.046
ease_index	-0.088	0.045	-1.960	0.050	-0.176 to 0.000
_cons	0.379	0.099	3.820	0.000	0.185 to 0.574
per_index <-					
use_index	0.176	0.061	2.900	0.004	0.057 to 0.295
att_index	0.905	0.073	12.360	0.000	0.762 to 1.049
ease_index	-0.231	0.044	-5.260	0.000	-0.317 to -0.145
_cons	0.312	0.098	3.200	0.001	0.121 to 0.503
att_index <-					
ease_index	0.483	344.275	0.000	0.999	-674.284 to 675.249
_cons	1.529	989.296	0.000	0.999	-1937.456 to 1940.514
ease_index <-					
att_index	0.464	372.085	0.000	0.999	-728.808 to 729.737
_cons	1.520	1085.086	0.000	0.999	-2125.21 to 2128.249
var (e.use_index)	0.418	0.037	-	-	0.351 to 0.498
var (e.per_index)	0.394	0.035	-	-	0.332 to 0.469
var(e.att_index)	0.930	383.276	-	-	-
var (e.ease_index)	1.005	465.487	-	-	-

OIM, observed information matrix; SE, standard error; Coef., coefficient.

modest mean value for employees’ attitudes towards AI points to a cautious but maybe optimistic view of BCMM’s AI integration. Given that favourable opinions of AI are associated with improved task and contextual performance, this mindset can significantly impact how sound employees perform on the job (Sezgin 2024).

**Ease of using artificial intelligence**

This variable has a mean of 0.241 and a standard deviation of 0.429. This suggests that the BCMM employees indicated that they do not find AI user-friendly. System accuracy and transparency are critical for building user trust and pleasure in AI-driven decision-making, underscoring user-centric design’s need to improve experiences (Aldossari 2024).

**Structural equation modelling analysis**

Structural equation modelling was used to test hypotheses relating to the relationships between the perceived usefulness of AI, ease of using AI, attitudes towards AI and employees’ ability to perform their tasks with AI. As seen in Table 5, the SEM analysis demonstrated significant relationships among various constructs under investigation, indicating a good fit

for the path model and confirming that the hypothesised model aligned well with the observed data.

**Covariance between variables**

The strength of the correlations between variable pairs is shown by the covariance given. The links between the perceived usefulness of AI (use\_index), attitude towards AI (att\_index) and ease of using AI (ease\_index) constructs and their combined impact on the ability of employees to perform their work using AI (per\_index) are depicted by the covariance values. The positive correlation and reciprocal relevance of perceived usefulness of AI (use\_index) and attitude towards AI (att\_index) in influencing the ability of employees to perform using AI (per\_index) are further supported by the covariance of 1.713, which indicates that these variables tend to rise together. As employees find AI more useful and adopt a favourable attitude, their performance utilising AI also increases, increasing total productivity, pointing to the covariance, which reveals a strong positive association between perceived utility and attitude towards AI (Indrasari & Pamuji 2023). Both perceived utility (use\_index) and ease of use (ease\_index) are important factors in determining user attitudes towards AI, which in turn influence their behavioural intents and performance levels, as reported by Dhingra and Mudgal (2019) and Junejo et al. (2024).

Employee performance in the public sector, for example, is positively correlated with these impressions, indicating that when workers believe AI to be practical and user-friendly, their performance improves (Omar et al. 2019). To further improve performance outcomes, attitudes also mediate the relationship between perceived usefulness (use\_index) and ease of use (ease\_index) (Natasha, Fahrudi & Darmawan 2024). These elements’ significance in promoting successful AI adoption and use, which eventually results in enhanced employee performance, is highlighted by their incorporation into frameworks such as the TAM (Anaam et al. 2023).

Likewise, the positive correlation of 1.279 between ease of using AI (ease\_index) and perceived usefulness of AI (use\_index) suggests that while ease of using AI (ease\_index) has a direct negative impact on the ability of employees to perform their work using AI (per\_index), rises in perceived usefulness of AI (use\_index) are linked to increases in ease of using AI (ease\_index). This duality highlights a complicated interaction in which direct effects and positive correlations may not always coincide. Users’ perceptions of the

technology's utility are influenced by perceived ease of use; a system that is easy to use increases trust and decreases scepticism, which in turn promotes acceptance (Gao et al. 2023; Ismatullaev & Kim 2022).

Given that minimal effort will be required to complete the duties, municipal employees are more likely to perceive an AI-based tool or system as beneficial for increasing their productivity when they perceive it to be simple to use and accessible. Therefore, people will perceive AI-related systems as more beneficial and usable if the municipality makes them easier to use.

Although their impacts on the ability of employees to perform using AI (*per\_index*) differ, attitude towards AI (*att\_index*) has a positive influence on the ability of employees to perform their work using AI (*per\_index*). This outcome is consistent with the findings of a study conducted by Taşgit et al. (2023), which indicated that employees' positive attitudes towards AI have a positive impact on both task and contextual performance. A related study emphasises that demographics, views of AI effectiveness, ethical considerations, transparency and empowerment are the main determinants of employee attitudes towards AI (Datta & Narayanamma 2024).

This implies that when employees believe AI is good at what they do and there is a good exchange of knowledge among them, their attitudes will improve. The study emphasises that these elements have a major impact on general attitudes and satisfaction levels, which in turn influence their propensity to embrace AI or keep utilising AI-related solutions. According to this, the municipality should make sure that there are unambiguous ethical concerns, transparency in the exchange of information, and the ability for staff members to use AI efficiently to enhance their performance while simultaneously carrying out their constitutional duties.

The correlation of 1.523 between ease of AI (*ease\_index*) and attitudes towards AI (*att\_index*) indicates a substantial positive association, meaning that employees' attitudes towards AI improve as they believe it to be simpler to use. This association is crucial because it supports research by Panagoulas et al. (2023) and Osman et al. (2023) that highlights the significance of perceived utility and simplicity of use in the adoption of technology, especially in industries like healthcare and education. Enhancing ease of use may result in improved academic achievement, as evidenced by the significant correlation between students' positive attitudes towards AI and their learning outcomes in educational contexts (Bation & Pudan 2024).

These results correspond with the study's findings the study's findings, which suggest that making AI easier to use could improve worker performance, especially in the corporate services and financial sectors, which are the study's

primary emphasis areas. Furthermore, by comprehending this covariance, measures to enhance municipalities' AI integration can be improved, ultimately creating a more receptive environment for AI technology (Park & Woo 2024). Therefore, improving usability could increase AI adoption and use generally in the public sector, particularly at the local level. The stability of these correlations is confirmed by the statistical significance of these covariances, which have a *p*-value of 0.000 and a 95% confidence interval from 1.221 upward.

## Discussion

### Hypothesis 1 (H1a)

Municipal employees' attitude towards AI significantly and positively influences the perceived usefulness of AI in improving employee perception of performing their work. The SEM results demonstrate that perceived usefulness (*use\_index*) is strongly and favourably influenced by attitude towards AI (*att\_index*), with a coefficient of 0.956. This implies that users' attitudes significantly influence how beneficial they view AI to be. In the study by Yigitcanlar et al. (2023), municipal employees who have positive attitudes towards AI are more likely to believe that AI can improve their work performance, which in turn improves employee perceptions and job satisfaction in local government services.

Perceived usefulness has a significant impact on municipal senior managers' attitudes towards AI adoption. This suggests that when municipal employees realise AI can improve their work performance, their attitude towards adopting such technologies improves. The results highlight the necessity of focused actions to mould favourable perceptions of AI among municipal employees. Municipalities can create forums, training sessions and awareness campaigns to educate staff members on the advantages and applicability of AI, creating a favourable impression that will enhance their output.

### Hypothesis 4 (H4b)

Municipal attitudes towards AI significantly and positively influence employees in performing their work. Employee attitudes and performance were shown to have a correlation of 0.905. This suggests that attitude towards AI (*att\_index*) has a significant positive impact on the ability of employees to perform their work using AI (*per\_index*), demonstrating a very strong positive and statistically significant direct effect. This hypothesis is corroborated by Chandra (2022), who shows that favourable municipal perceptions of AI greatly increase government workers' readiness to use AI technologies, which in turn improves their productivity.

As reported by Campued et al. (2023), a study that examined the opportunities and challenges of implementing AI found that respondents had a generally positive attitude towards

AI integration. This suggests that positive municipal attitudes towards AI can significantly increase employees' willingness to adopt new technologies and improve their work performance through proactive skill development and troubleshooting.

Essentially, employees are more inclined to participate in activities that improve their proficiency with AI technologies when they have a positive opinion of the technology. Their performance, as well as the general efficacy of AI integration in the municipality, can be further improved by this proactive strategy. This optimistic outlook can be fostered by training initiatives, transparent explanations of AI's advantages and clearing up any misunderstandings or worries. This is essential to ensuring that workers are inspired to use AI technology, which will enhance productivity and job performance.

### Hypothesis 2 (H2a)

Municipal employees' attitude towards AI significantly and positively influences the employees' ease of using AI to perform their work. On the other hand, the significant moderate positive effect is reflected in the coefficient of 0.464 between attitude towards AI (att\_index) and ease of using AI (ease\_index). This implies that when employees have positive opinions about AI, they are more likely to find it simple to incorporate and utilise AI tools into their work, which can facilitate adoption and increase productivity. The results are similar to those of Gesk and Leyer (2022), who demonstrated that favourable perceptions of AI promote increased acceptance and usability, which improves the integration of AI technologies in public sector jobs. Furthermore, Geddani, Nethravathi and Hussain (2024) point out that a favourable attitude towards AI can increase usability as well as general efficacy and efficiency in public administration. They recommend that municipal organisations give priority to fostering a positive attitude towards AI among staff members to promote its adoption and raise the standard of public service delivery.

### Hypothesis 2 (H2b)

Employee ease of using AI to perform employees' work significantly and positively influences employee attitude towards AI in improving employee perception of performing their work. Ease of use also has a favourable effect on attitude, with a coefficient of 0.483, indicating that when people think AI is user-friendly, their attitudes towards technology significantly improve. This highlights the need for user-friendly design since simpler AI technologies promote positive user attitudes, which in turn affect perceptions of utility. The decision to use an information system, in this case AI-based systems, can be influenced by attitudes and beliefs regarding perceived ease of use, as highlighted by Prastiawan, Aisjah and Rofiaty (2021).

Owing to the study, a person's intention to use a platform is directly impacted by perceived ease of use and is impacted by perceived usefulness based on thoughts of the advantages he will obtain. Attitude towards use is influenced by perceived ease of use. This demonstrates how municipal employees' attitudes regarding the use of AI can be influenced by how easy they perceive it to be. Employees are more likely to adopt a favourable attitude towards AI when they find the technologies straightforward to use. This implies that to reduce the apparent complexity of these systems and promote favourable attitudes towards them, the municipality should give top priority to making AI tools simple and easy to use. To increase their efficiency in carrying out their responsibilities, personnel will transition from manual systems to automated AI technologies based on how simple it is to learn about AI.

### Hypothesis 3 (H3a)

Employee ease of using AI to perform employees' work significantly and positively influences the perceived usefulness of AI in improving employee perception of performing their work. With a coefficient of  $-0.088$ , the negative relationship between perceived utility and ease of use indicates that, even while employees are aware of the advantages of AI, the perceived complexity of using the technology may exceed these benefits. This surprising discovery might be the result of BCMM staff members realising the promise of AI apps but finding them difficult or inconvenient to use. Notwithstanding the advantages of the technology, the effort needed to understand and operate AI systems may cause annoyance or discontent and reduce the sense of utility. This is consistent with the findings of Omar et al. (2019), who discovered that perceived utility was not always influenced by ease of use. This suggests that if AI is viewed as being too complicated or challenging to use, its perceived value may be compromised. In this instance, employees' impression that the advantages of AI outweigh the work necessary to adopt it may be impacted by the cognitive load, time commitment and annoyance that come with utilising it.

### Hypothesis 4 (H4c)

Ease of using AI significantly and positively influences employees to perform their work. The relationship between ease of use and employee performance is  $-0.231$ . Although not as much as usefulness or attitude, this modest correlation implies that perceived performance is influenced by ease of use. The coefficient of  $-0.231$  indicates that, assuming all other factors stay the same, there is a  $-0.231$ -unit drop in employees' performance using AI (per\_index) for every unit rise in ease of using AI (ease\_index). With a value of  $-0.231$ , the negative correlation between employee performance and ease of use may be explained by several contextual factors. Even if AI tools are thought to be simple to use, employees may not be able to use them effectively because of a lack of experience or proper training. This is brought to light by

Nguyen et al. (2023), who speculated that insufficient training or experience with AI use can result in poor performance in sociotechnical systems, mismatches between human trust and AI capabilities, and impede efficient interaction, all of which complicate usability and task fulfilment.

Resistance to technological change may also be the cause of this impact, especially in cases where workers are used to manual or traditional methods. This could impede the adoption of AI and result in poorer performance. In the words of Katke (2021), employees who are used to old ways may be resistant to technological change, which might make it difficult for them to accept new tools and impede the adoption of AI. In the end, this resistance results in poorer performance as workers find it difficult to adjust to the rapidly changing technological environment. Additionally, this adverse effect can be linked to technical infrastructure, such as shaky internet connection or inadequate hardware, which could hinder usability and performance. As noted by Martinez et al. (2022), issues with technology infrastructure, such as erratic internet or inadequate hardware, can seriously impair the functionality of cloud services. These problems eventually impact the entire user experience and application availability by causing service interruptions, higher latency and decreased fault tolerance.

Finally, the extra cognitive load and stress caused by the new technology may overwhelm personnel, significantly impairing their performance. These considerations imply that to maximise AI adoption and enhance employee performance, governments must address infrastructure, organisational support and training in addition to ease of use. However, for further research to understand this finding, mixed-method research can be applied. This would include conducting interviews to get an in-depth view of the employees as to why the ease of use decreases their performance. As a result, hypothesis *H4c* is not supported.

#### Hypothesis 4 (H4a)

Perceived usefulness of AI significantly and positively influences the ability of employees to perform their work. The model also shows that perceived usefulness (*use\_index*) has a moderate effect on performance (*per\_index*), with a coefficient of 0.176. This implies that AI technologies enhance genuine task performance and workers' capacity to complete tasks when they are viewed as advantageous. Thus, it has been demonstrated that workers' perceptions of AI's value significantly and favourably impact their capacity to perform their jobs. This lends credence to the notion that how workers view AI's potential is essential to increasing output. These results are consistent with the study by Arora and Mittal (2024), which shows that workers' performance is positively impacted by their perception of AI's revolutionary potential, especially in HR-related tasks. It is relevant to this study because it aims to enhance both financial and employee performance.

Further proving that positive views of AI's utility can result in more productive and engaged employees, the study by

Luhana, Memon and Khan (2023) supports the idea that AI's perceived usefulness not only improves performance but also raises employee job engagement. As a result, the municipality should concentrate on informing staff members about the useful advantages of AI, as this may greatly enhance their performance results and promote more seamless AI implementation. *H4a* is therefore supported.

#### Practical implications

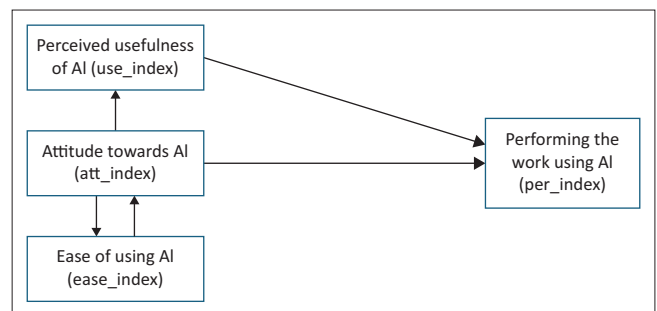
The present study underscores the practical significance of comprehending the perceptions and lived experiences of municipal employees on the use of AI to perform their work. This study contributed to the framework for measuring employee perceptions of the use of AI (Figure 2). The framework postulates that with regard to the ease of using AI, important are the employee attitudes towards AI.

Therefore, favourable attitudes and perceptions towards AI could increase productivity and municipal revenue. Thus, favourable attitudes and perceptions are critical to performing the work using AI. Municipalities can enhance employee performance and optimise service delivery by concentrating on user-friendly AI systems and fostering positive attitudes.

#### Limitations and recommendations

This study focuses on employee perceptions of using AI to perform their work at BCMM. Its results on the use of AI are limited to the public sector context and not the private sector. The study recommends that municipal managers should concentrate on programmes that promote favourable attitudes towards AI, like training and resolving concerns, to increase productivity and the efficacy of integrating AI into financial management. Given the SEM results showing moderate means for attitudes (*att\_index* = 0.231), perceived usefulness (*use\_index* = 0.227) and ease of use (*ease\_index* = 0.241). The targeted interventions are essential to convert cautious optimism into actual performance improvements. As a result, municipalities should foster favourable views of AI to make workers feel at ease with new technologies and boost municipal revenue.

In addition, municipalities must facilitate the adoption of AI technology and handle contextual elements in financial management to improve employee performance.



AI, artificial intelligence.

**FIGURE 2:** Framework for measuring employee perceptions on the use of artificial intelligence to perform their work.

Municipalities should concentrate on creating tools that are easy to use and offering thorough training to boost staff confidence to promote a good attitude towards AI. The low ability of employees to perform using AI ( $pex\_index = 0.285$ ) underscores the need for hands-on skill development programmes, mentorship and departmental workshops to translate positive attitudes into measurable performance gains. Senior directorate managers must promote training, intuitive user interfaces and robust technical support to increase the perceived value of AI and eventually boost employee performance. It is recommended that municipalities develop AI adoption strategies that emphasize the benefits of fostering acceptance and strengthening public sector financial management.

The study's findings reaffirm the predictive strength of the TAM in explaining municipal employees' adoption of AI, particularly, through the interplay between perceived usefulness, ease of use, and attitudes, as indicated by the significant SEM covariances ( $att\_index-use\_index = 1.713$ ;  $ease\_index-att\_index = 1.523$ ;  $ease\_index-use\_index = 1.279$ ). The strong and significant relationships observed highlight that positive perceptions are pivotal to successful integration. However, organisational barriers such as training gaps, infrastructure limitations and resistance to change remain critical challenges. Hence, the negative direct effects observed between ease of use and performance ( $ease\_index \rightarrow per\_index = -0.231$ ) suggest that infrastructure and experiential factors must be addressed to ensure that user-friendly tools translate into actual productivity improvements. Therefore, future research could extend these insights by applying comparative case study and longitudinal designs to assess whether these relationships persist over time, vary across municipalities, or are influenced by broader organisational cultures. Incorporating capacity-building interventions as a mediating factor in future studies may reveal strategies to strengthen the link between perceived ease of use, perceived usefulness and employee performance. It is argued in this study that such work would not only strengthen TAM's theoretical relevance in the public sector but also enhance its practical application for AI policy and implementation strategies in local government.

## Conclusion

This study shed insights into municipal employees' perceptions of AI within South African municipalities. Structural Equation Modelling findings indicate that employee attitudes towards AI ( $att\_index$ ) have a strong positive correlation with perceived usefulness of AI ( $use\_index$ ), with a covariance of 1.713, highlighting that favourable attitudes enhance the perception of AI's benefits and directly improve employee performance ( $per\_index$ ). Similarly, ease of using AI ( $ease\_index$ ) is positively correlated with attitudes (1.523) and perceived usefulness (1.279), indicating that user-friendly systems foster positive perceptions and engagement, although direct performance effects may vary across departments. In the public sector,

enhancing employee performance can lead to better financial management and service delivery.

A strong positive correlation exists between attitudes towards AI and its perceived usefulness, creating a feedback loop that enhances productivity. Moderate mean values for  $use\_index$  (0.227),  $att\_index$  (0.231) and  $ease\_index$  (0.241) reveal cautious optimism among employees; interventions should target increasing both AI proficiency and confidence through structured training programmes; municipalities should highlight the practical advantages of AI tools to cultivate positive attitudes and improve overall performance.

Furthermore, employees' low ability to perform using AI ( $pex\_index$  mean = 0.285) suggests the need for targeted skill development, mentorship programmes and hands-on AI workshops to convert positive perceptions into tangible performance improvements. User-friendly AI systems are often viewed as more beneficial, making it crucial to prioritise accessibility while demonstrating the advantages of these technologies. Positive attitudes also mediate the relationship between perceived usefulness, ease of use and performance. Municipalities should prioritise user-friendly AI tools, transparent system interfaces and continuous demonstrations of AI's practical advantages to strengthen employee attitudes and perceived usefulness. Regular feedback sessions, ethical guidelines and clear communication channels are recommended to enhance trust and adoption, addressing concerns highlighted in the SEM covariance results. Improving perceptions of AI is essential for its successful adoption and can be achieved through open communication, attention to ethical considerations and effective training. Initiatives improving attitudes, such as recognition for AI-enabled efficiency or departmental AI champions, can amplify performance gains. Municipalities can enhance employee performance and optimise service delivery by concentrating on user-friendly systems and fostering positive attitudes.

Future research might consider capacity building as a mediating variable, exploring how structured AI training, on-the-job support and cross-departmental knowledge sharing can strengthen the links between ease of use, perceived usefulness and performance outcomes. This is carried out to determine whether capacity building would favourably impact the relationship between performance and ease of use. A mixed-methods strategy, which blends quantitative and qualitative techniques, may be used in future studies. With this method, researchers could get detailed information about how employees feel and perceive AI. This would also make it easier to pinpoint the experiences that might have contributed to the perceived ease of use with performance and usefulness.

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## Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

## Authors' contributions

L.B. was responsible for developing the study topic, designing the research tools, collecting the data in the field, performing the data analysis, interpreting the findings, and writing the full first draft of the manuscript. The study is part of L.B.'s Honours study. S.L. and Q.M. were the study supervisors and assisted with writing and editing the manuscript before submission to the journal.

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## Data availability

The data that support the findings of this study are available from the corresponding author, S.L., upon reasonable request.

## Disclaimer

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