

Utilization and Effectiveness of Artificial Intelligence Chatbots in Municipal Legislative Processes in Pangasinan, Philippines

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ABSTRACT

Objective: This study aims to assess the level of utilization and perceived effectiveness of Artificial Intelligence (AI) chatbots in enhancing the legislative functions of Sangguniang Bayan (SB) Members in the 2nd Congressional District of Pangasinan, Philippines, and to examine their relationship with the legislators' profile variables. **Method:** Using a descriptive survey method, data were collected to evaluate familiarity, usage patterns, and challenges associated with AI chatbot integration among local legislators. **Results:** Findings reveal that while most SB Members are aware of free AI chatbot models and use them for work-related functions such as research, engagement, and continuing education, overall utilization remains minimal. The tools are viewed as only moderately effective in supporting legislative processes. Key challenges include concerns over privacy and security, insufficient knowledge and skills, and legal and ethical considerations. **Novelty:** This study provides empirical insights into the cautious adoption of AI chatbots in local legislative contexts and underscores the critical need for comprehensive training programs to facilitate informed decision-making and promote innovative governance at the grassroots level.

INTRODUCTION

Emerging technologies are changing the dynamic landscape of contemporary governance and public administration [1]. The integration of these new and emerging technologies plays a pivotal role in shaping efficiency and effectiveness in service delivery and policy formulation of governmental institutions [2]. It has allowed the fulfillment of making better decisions, forecasting situations, creation of strategic documents and legislation, bridging communication and relations between the government and the people, and even the creation of personalized public services [3], [4].

One technology that has gained increasing attention is Artificial Intelligence (AI), which simulates human reasoning [5], [6]. An improvement of AI is the Chatbot, which is a computerized program that provides human-like responses through interactive queries based on machine learning, neural networks, and natural language processing. They are categorized into three types: menu-button-based chatbots, keyword recognition-based chatbots, and the most technologically advanced type, the contextual chatbots [7]. Differentiated by their user-interfaces, algorithms and underlying technologies, these chatbots are beneficial in the areas of knowledge management, conversational agents, predictive analysis, communication and assignment of resources, among others [3], [6]. They have become multidisciplinary and have enabled innovations in organizational operations, significantly reducing administrative burden and disruptive traditional tasks [8].

Despite the promising benefits of AI in organizational operations and public administration, hesitations loom as it may fail to consider interacting factors. AI in government threatens to overlook societal needs by being too internally focused and overly technocratic [5]. Further, drawbacks related to user comprehension and capabilities, issues of accountability and transparency, regulatory compliance, and data protection affect the overall exploration and implementation of AI and other new technologies in the government. The evolving nature and complexity of AI leads to a lack of understanding and control by the users of the said technology. No one wants to be held responsible for things beyond their control and influence hence, taking full responsibility to the effects of using AI in government has been very difficult [9]. The distinction between AI capability to develop and AI capability to implement changes highlights the lack of confidence and training for most government personnel who adopt AI technologies such as chatbots. Intervention measures are necessary to ensure the translation of technological opportunities to concrete public value [3], [10].

One of the three branches of the Philippine government is the legislative department. At the local level, it is composed of the eight Sangguniang Bayan (SB) members of any municipality, along with two ex-officio officers: the president of the Pederasyon ng Liga nga mga Barangay, and the president of the Sangguniang Kabataan Federation [11]. The Vice Mayor serves as the head and presiding officer of the legislative council. One of their functions as local legislators is to craft ordinances and resolutions for the benefit of their constituents (Local Government Code of 1991). They are also tasked to draft and approve the budget of a local government unit every fiscal year. With the related study of Wang in 2023 which found that artificial intelligence can effectively improve the efficiency of local legislation by handling repetitive paperwork and achieving very high text recognition rates in legislative opinions, it is essential to determine the insights of legislators in their utilization and perceived effectiveness of AI, especially contextual chatbot types. It will be instrumental in understanding the practical implications of AI integration in resolution and ordinance-making, including its impact on legislative processes, resource allocation, and the overall legislative workflow.

Through a comprehensive examination of the AI integration landscape, this research aims to contribute to the ongoing discourse on the modernization of local governance. The findings from this study will not only benefit municipal legislators and policymakers in the 2nd Congressional District of Pangasinan, Philippines, but will also serve as a valuable reference for other regions considering or currently implementing AI technologies in their legislative processes.

Ultimately, this research strives to pave the way for informed decision-making, fostering a culture of innovation and adaptability within local governance structures. By understanding the nuances of AI integration in crafting municipal resolutions and ordinances, communities can harness the potential of technology to promote more efficient, transparent, and responsive governance [12].

Objectives of the study

This research explored the extent of utilization and perceived effectiveness of generative AI chatbots by local legislative officials in the 2nd Congressional District of Pangasinan, Philippines. The profile of the municipal legislators was collected, and its relationship with their utilization, and perceived effectiveness of generative AI chatbots were tested. Primary problems in integrating AI into their legislative processes were also determined.

RESEARCH METHOD

Employing the descriptive survey method, the researchers utilized a set of questionnaires to collect data from the respondents.

The respondents of the study were elected legislators called Sangguniang Bayan (SB) Members from the different municipalities in the 2nd Congressional District of Pangasinan, Philippines. The 2nd Congressional District is comprised of 8 municipalities located in central Pangasinan, namely Aguilar, Basista, Binmaley, Bugallon, Labrador, Lingayen, Mangatarem, and Urbiztondo. Each municipality have 10 SB members who are composed of the Municipal Vice Mayor, 8 Sangguniang Bayan members, and two ex officio members: the president of the municipal chapter of Barangay Chairman (village leader) and the president of the municipal Sangguniang Kabataan Federation (youth leader). From the total population of 88 legislators, using the Slovin's formula with a margin of error of 0.05, the computed sample size for the study is 74.

The study employed different statistical methods to process the collected data. Frequency and percentage distribution were used to analyze the demographic profile of the respondents. To determine the level of utilization of Artificial Intelligence (AI) chatbots and its perceived effectiveness in the legislative processes, Likert scales were used, allowing respondents to indicate their perceived usage and effectiveness.

This approach provided a nuanced understanding of their perceptions. The weighted mean was calculated to provide an overall measure of the respondents' attitudes and responses to various aspects of AI utilization and effectiveness.

To identify significant relationships between the respondents' profile variables and the level of Artificial Intelligence (AI) chatbots utilization and effectiveness, the Pearson chi-square test was applied. This statistical method helped uncover correlations and patterns within the data.

Finally, frequency and ranking were used to determine and analyze the problems in integrating Artificial Intelligence into legislative processes. This method facilitated a clear identification of key issues and their relative importance, providing valuable insight for addressing challenges and improving the integration of Artificial Intelligence in local policy making.

RESULTS AND DISCUSSION

Results

This part of the study presents the results based on the data collected from the 74 sample legislators from the eight municipalities in the 2nd Congressional District of Pangasinan, Philippines.

Table 1. Profile of the respondent local legislators

Profile variables	Frequency	Percentage
Sex		
Male	59	79.70
Female	15	20.30
Age		
18 – 24 years old	6	8.10
24 – 54 years old	44	59.50
55 – 59 years old	12	16.20
60 and above	12	16.20
Highest Educational Attainment		
High School Graduate	3	4.10
Vocational	2	2.70
College Undergraduate	5	6.80
College Graduate	55	74.30
Masters Degree (Units)	2	2.70
Masters Degree	6	8.10
Doctorate Degree	1	1.40
Number of Terms		
1 st Term	32	43.20
2 nd Term	18	24.30
3 rd Term	24	32.40
Years in Government Service		
1 – 5 years	22	29.70
6 – 10 years	23	31.10
11 – 15 years	14	18.90
16 – 20 years	6	14.00
More than 20 years	9	6.00
Number of Ordinances or Resolutions Prepared in the Year 2023		
None	42	56.80
1 – 3 ordinances and/or resolutions	7	9.50
4 – 6 ordinances and/or resolutions	8	10.80
7 – 9 ordinances and/or resolutions	2	2.70
10 or more ordinances and/or resolutions	15	20.30

The profile indicates that most of the respondents were male, accounting for 59 individuals (79.70%), while 15 respondents (20.30%) were female. Most of the local legislators were between 24 and 54 years old, with a frequency of 44 (59.50%). This group was followed by those aged 55 to 59 and those 60 years and older, each with a frequency of 12 (16.20%). Lastly, respondents aged 18 to 24 years had a frequency of 6 (8.10%).

The profile also shows that most of the respondents were college graduates, with a frequency of 55 (74.30%). It was followed by master's degree holders with a frequency of 6 (8.10%), high school graduates with a frequency of 3 (4.10%), vocational graduates and those with units in a master's program, each with a frequency of 2 (2.70%), and doctorate degree holders with a frequency of 1 (2.30%).

Most respondents were either in their first term comprising 3 years of government service, with a frequency of 32 (43.20%), followed by those in their third term (9 years), with a frequency of 24 (32.40%), and those in their second term, with a frequency of 18 (24.30%). Most of the respondents had 6–10 years of government service, with a frequency of 23 (31.10%), followed by those with 1–5 years, at 22 (29.70%). Respondents with 11–15 years of service had a frequency of 14 (18.90%), those with more than 20 years had a frequency of 9 (12.20%), and those with 16–20 years had a frequency of 6 (8.10%).

Regarding legislative activity, most of the respondents did not author any resolutions or ordinances in the past year, with a frequency of 42 (56.80%). It was followed by those who authored 10 or more ordinances, with a frequency of 15 (20.30%), 4–6 ordinances with a frequency of 8 (10.80%), those who authored 1–3 ordinances with a frequency of 7 (9.50%), and 7–9 ordinances with a frequency of 2 (2.70%).

The demographic profile of the respondents reveals a predominance of males, suggesting a lack of gender diversity that could limit the range of perspectives in decision-making. Most of the legislators are middle-aged, and most hold college degrees, indicating that they are well-educated and capable of making informed decisions. The mix of legislators across different terms and lengths of service brings a blend of new ideas and stability, which can positively impact governance effectiveness. However, the data also shows that many local legislators are not fulfilling their primary function of authoring resolutions and ordinances for their constituents, highlighting potential inefficiencies in their roles.

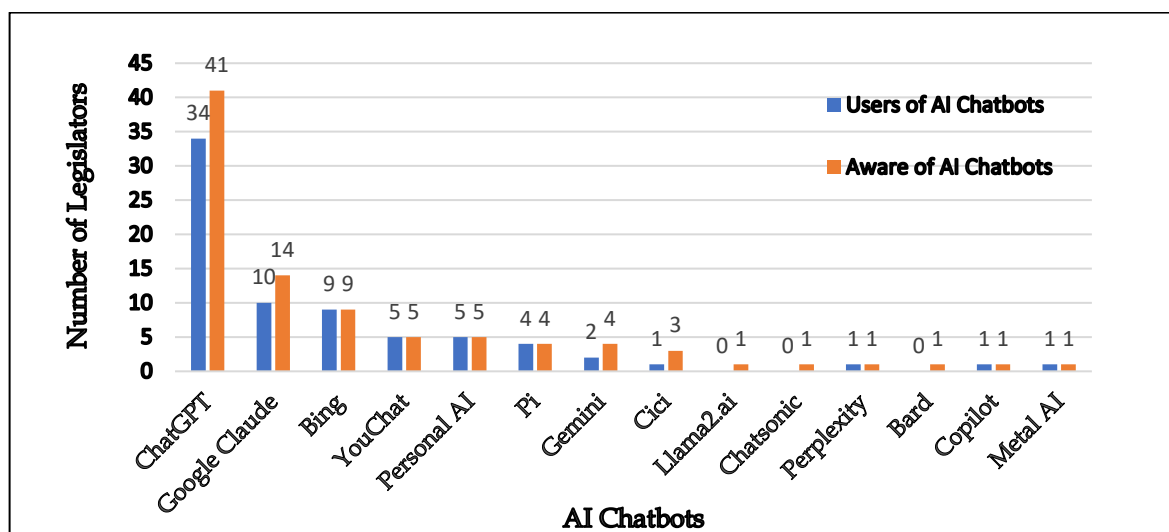


Figure 1. Number of legislators who are aware and use AI chatbots

In terms of awareness and utilization of artificial intelligence chatbot models, the majority of the respondents were familiar with ChatGPT. It was the most recognized AI chatbot model among the respondents, with a frequency of 41, ranking first in the list of AI models they were aware of. Regarding utilization, 34 respondents reported using ChatGPT, making it the top-ranked AI chatbot model that respondents had tried or were using.

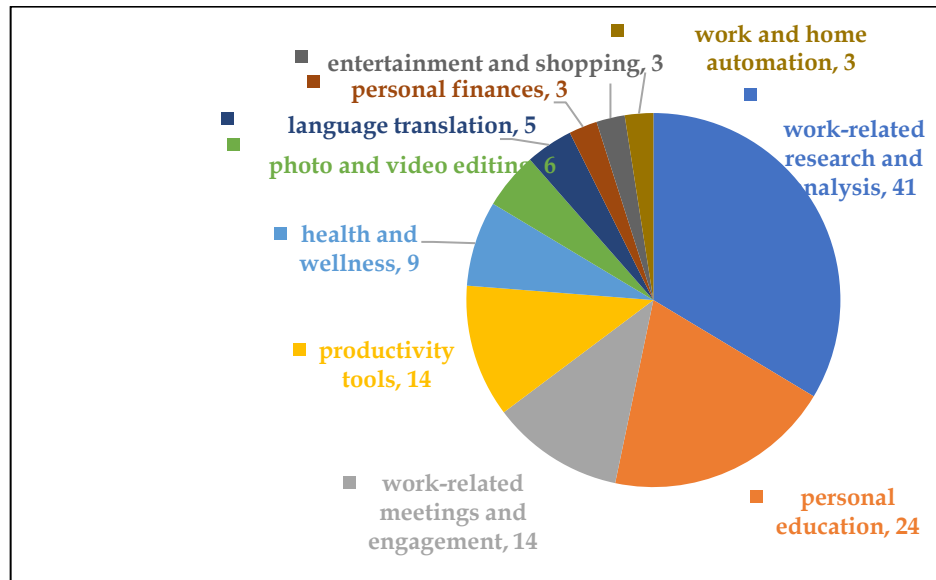


Figure 2. Purpose in using Artificial Intelligence (AI) chatbot models

The figure above indicates that municipal legislators primarily use artificial intelligence chatbots for work-related research and analysis, ranking this application first and being mentioned by 41 respondents. This suggests that AI tools are significantly enhancing their productivity and efficiency, particularly in tasks requiring data analysis and information gathering. The frequency of this usage underscores the value that municipal legislators place on AI tools for improving the accuracy and speed of their research activities, enabling them to make more informed decisions and achieve better outcomes in their legislative work.

Table 2. Level of Utilization of Artificial Intelligence (AI) Chatbots in the Legislative Process

Factors for utilization	Mean	Descriptive equivalent
AI tools are used extensively in drafting legislative proposals.	2.50	Minimal utilization
AI is employed in analyzing public opinion data related to proposed legislation.	2.49	Minimal utilization
AI is used in predicting the potential impacts of proposed policies or legislation.	2.51	Minimal utilization
AI is used in identification of relevant case law or legal precedents during the legislative process.	2.55	Minimal utilization

Factors for utilization	Mean	Descriptive equivalent
AI contributes to the efficiency of legislative research tasks, such as gathering data and synthesizing information.	2.72	Moderate utilization
AI is used in assisting in proofreading and editing legislative documents for accuracy and coherence.	2.65	Moderate utilization
AI was used to automatically generate sections or parts of resolutions or ordinances based on predefined parameters or input data.	2.41	Minimal utilization
AI provides suggestions and improvements for sentence structure, grammar, and syntax in legislative drafts.	2.72	Moderate utilization
AI technologies were aiding in the alignment of legislative language with constitutional principles, legal precedents, and regulatory requirements.	2.55	Minimal utilization
AI tools are assisting in translating of ordinances and resolutions into local languages so it could be understood easier by the constituents.	2.47	Minimal utilization
Grand mean	2.56	Minimal utilization

Likert scale for the level of utilization of AI chatbots among legislators

Level description

- 5 Fully integrated utilization
- 4 Significant utilization
- 3 Moderate utilization
- 2 Minimal utilization
- 1 Not at all utilized

The table indicates the overall utilization of artificial intelligence (AI) chatbots in legislative processes, with a grand mean of 2.56, categorizing it as Minimal Utilization. The factors of utilization, particularly “AI usage in legislative research tasks, such as gathering data and synthesizing information” and “providing suggestions for sentence structure, grammar and syntax,” both achieved the highest mean scores of 2.72, meaning Moderate Utilization of AI chatbots. Conversely, “the use of AI to generate sections or parts of resolutions or ordinances based on predefined parameters or input data” received the lowest mean score of 2.41, classified as Minimal Utilization. This disparity suggests that while AI is moderately integrated into research and information synthesis tasks within legislative processes, its application in predictive analytics and foresight remains limited.

Table 3. Level of effectiveness of Artificial Intelligence (AI) chatbots in the legislative process

Factors for effective AI	Mean	Descriptive equivalent
AI tools significantly enhance the accuracy and completeness of legislative research and data analysis.	2.76	Moderately effective
Integration of AI tools effectively identifies potential legal issues or conflicts within legislative proposals.	2.66	Moderately effective
AI tools analyze public feedback and sentiment regarding proposed legislation.	2.64	Moderately effective
AI tools enhance the speed and efficiency of drafting legislative proposals.	2.64	Moderately effective
AI tools contribute to the accuracy and coherence of legislative language and formatting.	2.64	Moderately effective
AI tools assist in proofreading and editing legislative documents for accuracy and clarity.	2.70	Moderately effective
AI tools suggest alternative wording or phrasing to address ambiguities or inconsistencies in legislative drafts.	2.70	Moderately effective
AI tools facilitate collaboration among legislative drafting teams by enabling real-time document sharing, version tracking, and simultaneous editing.	2.69	Moderately effective
AI tools assist in generating summaries or explanations of complex legal concepts or provisions to accompany legislative texts.	2.61	Moderately effective
AI tools are used in translating ordinances and resolutions into local languages to make them easier for constituents to understand.	2.61	Moderately effective
Grand mean	2.66	Moderately effective

Likert scale for the level of effectiveness of AI chatbots among legislators

Level description

- 5 Extremely effective
- 4 Highly effective
- 3 Moderately effective
- 2 Somewhat effective
- 1 Not effective

The table above shows the level of effectiveness of using artificial intelligence (AI) chatbots in the legislative process as per the legislators in the different municipalities in Pangasinan, with an overall grand mean of 2.66, indicating that AI chatbots are widely

perceived to be only moderately effective. The factor “AI significantly enhances the accuracy and completeness of legislative research and data analysis,” achieved the highest mean of 2.76, also categorized as Moderately Effective. On the other hand, “the use of AI to assist in generating summaries or explanations of complex legal concepts or provisions,” as well as “translating ordinances and resolutions into local languages to make them more accessible for constituents,” both had the lowest mean of 2.61, described as Somewhat Effective. It demonstrates AI's capability to improve the quality and reliability of legislative research, aiding legislators in making more informed decisions.

Table 4. Relationship between the level of utilization of AI chatbot models in the legislative process and the profile of the respondents

Profile variables	Chi-Square Value	Significance	Description
Sex	20.113 ^a	.826	Not significant
Age	81.349 ^a	.468	Not significant
Highest Educational Attainment	142.428 ^a	.864	Not significant
No. of Terms	63.040 ^a	.187	Not significant
Years in Government Service	94.258 ^a	.824	Not significant
Number of Ordinances/ Resolutions	110.214 ^a	.423	Not significant

The table shows that there is no significant relationship between the level of utilization of Artificial Intelligence chatbots in the legislative process and the various profile variables of the respondents. It indicates that variations in respondents' demographic characteristics, such as age, sex, educational attainment, and years of service, do not significantly influence how they use Artificial Intelligence tools in their legislative duties.

Table 5. Relationship between the Level of Effectiveness of AI chatbot models in the legislative process and the profile of the respondents

Profile variable	Chi-Square Value	Significance	Description
Sex	17.996 ^a	.649	Not significant
Age	56.844 ^a	.694	Not significant
Highest Educational Attainment	89.123 ^a	.995	Not significant
No. of Terms	41.397 ^a	.497	Not significant
Years in Government Service	89.153 ^a	.330	Not significant
Number of Ordinances/ Resolutions	110.705 ^a	.027	Significant

Table 5 indicates that among the profile variables of the legislators in Pangasinan, the number of ordinances or resolutions has a significant relationship with their perception of the effectiveness of AI chatbots. Given the data on the percentage

distribution of respondents according to the number of ordinances and resolutions they passed in the previous year, along with the grand mean for the level of effectiveness, it can be interpreted that those who have authored more ordinances or resolutions rate AI chatbots as slightly more effective. While those who have passed none or only a few ordinances are likely to view it as less effective. There is no significant relationship between the other demographic factors such as age, sex, educational attainment, number of terms, and years of service of the municipal legislators in Pangasinan, and their perceived level of effectiveness of using AI chatbots in the legislative processes.

Table 6. Problems encountered by legislators in integrating the use of AI chatbots in the legislative process

Problems	Frequency	Rank
AI systems may require access to sensitive data, raising concerns about privacy and security, particularly if the data is mishandled or compromised.	40	1
Lack of comprehensive understanding of AI technology and its implications hinders its effective integration into the legislative process.	38	2.5
AI cannot effectively replicate human judgment and legal expertise in resolving ambiguities in legislative language.	38	2.5
Automating certain legislative tasks through AI may lead to concerns about job displacement or the devaluation of human labor among legislative staff and professionals.	37	4
AI systems struggle to address the unique needs and priorities of diverse communities, requiring careful consideration and cultural sensitivity.	36	5
AI faces challenges in addressing ethical considerations such as fairness, equality, and transparency in generating draft of resolutions or ordinances.	35	6.5
Determining responsibility for AI-generated decisions can be challenging, as it may not always be clear who is accountable for errors or unintended consequences.	35	6.5
AI has limited capabilities in incorporating input from different constituents or interested parties when drafting ordinances or resolutions.	34	8.5
Ensuring the long-term sustainability of AI systems in local legislation requires ongoing maintenance, updates, and adaptation to evolving needs and technologies that are not available or sufficient in our LGU jurisdiction.	34	8.5
AI systems may lack the contextual awareness crucial for crafting resolutions and ordinances, such as understanding local regulations, community needs, and historical background.	33	11
Legislation drafted by AI may diminish the human connection and empathy that are essential in	33	11

understanding and addressing the needs and concerns of constituents.		
Using AI in local legislation requires a large budget allocation.	33	11
AI struggles to accurately interpret legal language and its nuances, potentially leading to errors or inconsistencies in the drafting of ordinances or resolutions.	32	13
AI-generated recommendations or decisions may lack interpretability, making it difficult for legislators and the public to understand the rationale behind them.	31	14

Table 6 highlights the challenges legislators face in integrating artificial intelligence (AI) into legislative processes. According to the table, the primary issue identified by respondents, with a frequency of 40, is that "AI systems may require access to sensitive data, raising concerns about privacy and security, particularly if the data is mishandled or compromised." AI systems often require access to extensive datasets, which may include personal, confidential, or governmental information, posing inherent risks to data privacy and security. Next in line are concerns about the inadequate understanding of AI technologies and how these tools lack human judgment and legal expertise.

Discussion

The profile of the respondents of the study is similar to the results of Guinid's research in 2019 in which the majority of the local legislators in Region 1 Philippines, where Pangasinan is a part, are predominantly male in their prime years of age, who are professionals as degree holders and have just recently joined the government in their first term, sponsoring less than 10 ordinances and resolutions. Guinid's study also concluded that though these local legislators possess adequate competence in effectively performing their legislative functions, they still need to improve their proficiency through appropriate capability training. Hence, given the results of this study, it is suggested that capability enhancement training topics should include AI use.

Although a significant number of legislators are familiar with AI chatbot models, particularly ChatGPT, there is minimal utilization of AI tools among them. Greater use of AI tools is directly correlated to ease of use; hence, legislators in the 2nd Congressional District of Pangasinan may be experiencing difficulty using AI tools, which affects their ability to take advantage of its benefits.

Among the legislators who have been using AI chatbots, they aim to utilize them for work-related research, engagement activities and personal education, suggesting their helpful nature, particularly in tasks requiring data analysis and information gathering. The legislators found AI chatbots to be moderately effective tools in completing research and ensuring accurate data analysis - tasks that are relevant to their function as policymakers. The familiarity with and use of AI tools by some government officials may contribute to improving the accuracy and speed of their research activities, enabling them to make more informed decisions and achieve better outcomes in their

legislative work. Given the results of this study, it can be interpreted that those who have authored more ordinances or resolutions rate AI chatbots as slightly more effective. Those who have passed none or only a few ordinances are likely to view it as less effective.

Significant benefits of AI use include Wang's study, which concluded that AI streamlines legislative processes, specifically in preparing policy documents and simplifying or automating administrative functions related to legislation [13], [14]. As the use of AI technology increases effectiveness and relevance in work performance, the commitment to its potential results in improving lives interests government officials [15], [16].

There is, however, hesitation among government employees and other users regarding AI tools, such as chatbots. Legislators are particularly concerned about the potential for AI systems to compromise individual privacy. If these systems mishandle sensitive data, it could lead to unauthorized access or misuse of personal information, infringing on privacy rights and resulting in significant legal and ethical ramifications. Artificial intelligence threatens privacy as it collects and processes personal data [17]. Additionally, AI technologies pose significant risks to fundamental rights and can profoundly undermine efforts to safeguard privacy. Moreover, interventions to bridge competency gaps are recommended to ensure full advantage and manifestations of technological improvements. A comprehensive understanding of AI technology should be promoted, to encourage greater accountability among legislators, allowing them to take control of and influence AI systems' behavior. AI becomes easier to use, more focused supervision is needed [18].

CONCLUSION

Fundamental Finding : This study reveals that while a considerable number of Sangguniang Bayan Members in the 2nd Congressional District of Pangasinan are aware of free AI chatbot models, their actual utilization remains limited, primarily due to conservative perceptions of their effectiveness and concerns regarding privacy, security, and legal implications. **Implication :** Addressing these barriers through targeted training could enhance the legislators' decision-making capabilities, legislative productivity, and foster more innovative practices in local governance. **Limitation :** However, the study is constrained by its focus on a specific geographic and political context, limiting the generalizability of the findings to broader legislative populations or other government sectors. **Future Research :** Further studies should explore comparative analyses across different districts and include longitudinal assessments to determine how sustained training and exposure to AI tools influence legislative outputs and governance innovation over time.

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