# Assessing Essential Needs for Developing AI Competencies Among Local Administrative Personnel Toward Smart Local Communities in Maha Sarakham Province

Ntapat Worapongpat
Eastern Institute of Technology Suvarnabhumi (EIT)
*Corresponding Author E-mail: dr.thiwat@gmail.com

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**Abstract**

This research consists purposes were 1. to examine the level of artificial intelligence (AI) competencies among personnel in local administrative organizations in Maha Sarakham Province 2. to identify the essential needs for AI competency development among such personnel and 3.to propose strategies for enhancing AI competencies to advance local administration toward the concrete realization of smart localities. Methods A questionnaire (30 items; knowledge, skills, attitudes; five-point scale) underwent expert review (IOC 0.80–1.00) and reliability testing (Cronbach's alpha [confirm value]). Respondents were LAO personnel selected via probability sampling (sample size: AUTHOR CONFIRM – 82 or 360). Data were analyzed using descriptive statistics and the Modified Priority Needs Index (PNI_modified). Results: Current competencies were at a moderate level across dimensions, while desired levels were at the highest level. The greatest need concerned practical AI skills (PNI_modified = 0.43), followed by knowledge (0.40) and attitudes (0.32). Conclusions: Practical skill development should be prioritized alongside foundational AI knowledge and attitude-building to support the realization of smart local communities.

**Keywords:** Needs Assessment, AI Competencies, Local Administration

## Introduction

Over the past decade, the transition into the digital era particularly with the advent of artificial intelligence (AI) has profoundly influenced every sector of society and public administration (Worapongpat, Dookarn, Boonmee, Thavisin, & Chanphong, 2025, pp. 97–109). This transformation is especially critical at the local level, where rapid adaptation is necessary to respond effectively to the demands of sustainable development and the expectations of twenty-first-century citizens (Campion, Gasco-Hernandez, Jankin Mikhaylov, & Esteve, 2022, pp. 462–477).

According to the Office of the National Digital Economy and Society Commission of Thailand, a national framework for Smart Cities has been established, encompassing the concept of Smart Localities, in which digital technologies serve as pivotal instruments for enhancing quality of life and improving the operational efficiency of local administrative organizations (Chompotjananan & Vichit-Vadakan, 2022, p. 5). This vision aligns with contemporary studies emphasizing the crucial role of innovation and digital transformation in strengthening local governance and improving public service delivery (Worapongpat, Thavisin, & Viphoouparakhot, 2024, pp. 230–242).

Nevertheless, despite supportive national policies, existing evidence suggests that public-sector personnel continue to face significant limitations in AI competencies particularly in terms of knowledge, practical skills, and attitudes (Worapongpat, 2025h, pp. 1–12; Worapongpat, 2025i, pp. 1–11). These competency gaps hinder the effective advancement of digital innovation at the local administrative level (Worapongpat, 2025g, pp. 51–68). Furthermore, the Office of the Public Sector Development Commission, together with Gqamane and Taylor (2013, pp. 824–842), reported that most local agencies lack strategic plans for AI development, and that personnel are not yet capable of effectively applying AI in citizen service delivery (Worapongpat, 2025f, pp.55–71).

AI competency development among personnel in local administrative organizations remains limited (Worapongpat, 2025e, pp. 232–241). Recent scholarship highlights this gap, particularly within the Northeastern region of Thailand, which continues to face substantial developmental challenges (Worapongpat, 2025d, pp. 147–158). Addressing these challenges through evidence-based competency development is therefore crucial to advancing smart local community initiatives in Maha Sarakham Province (Johnson, Coggburn, & Llorens, 2022, pp. 538–562).

This study provides empirical evidence regarding existing AI competencies, developmental needs, and policy recommendations intended to strengthen the effective integration of AI in local governance. Ultimately, this research promotes the advancement of 'smart localities' that are responsive to technological transformations and citizen needs in the twenty-first century. The findings carry significant implications for scholarship, policymaking, and public sector development.

**The purposes**

1. To examine the level of artificial intelligence (AI) competencies among personnel in local administrative organizations in Maha Sarakham Province.

2. To identify the essential needs for AI competency development among such personnel.

3 . To propose strategies for enhancing AI competencies to advance local administration toward the concrete realization of smart localities.

**Literary review**

**1. Competency-Based Theory**

Competency-Based Theory emphasizes that effective job performance depends on a set of underlying personal characteristics such as knowledge, skills, attitudes, and behaviors that distinguish outstanding performers from average ones (Khaenamkhaew, Onjun, Damrongwattana, & Prathum, 2023, p. 2229172).

According to competencies represent the integration of cognitive abilities, emotional intelligence, and behavioral patterns that lead to superior performance.

In this study, the theory is applied to define AI Competencies required for personnel in local administrative organizations, which may include:

AI competency encompasses three core dimensions: knowledge, skills, and attitudes. Knowledge refers to an understanding of AI principles, data management, and digital governance; skills involve the ability to apply AI tools and systems to enhance administrative efficiency and service delivery; and attitudes reflect openness, adaptability, and motivation to engage with AI technologies (Kinder, Stenvall, Koskimies, Webb, & Janenova, 2023, p. 101865).

This theoretical foundation provides a basis for identifying the competency dimensions and performance indicators relevant to AI literacy and digital transformation within the local government context (Worapongpat, 2025c, pp.1–32).

**2. Technology Acceptance Model (TAM)**

The Technology Acceptance Model (TAM) explains the process through which individuals accept and use new technologies. proposed that technology adoption is primarily determined by two key beliefs:Perceived Usefulness (PU) – the degree to which an individual believes that using a technology will enhance job performance;Perceived Ease of Use (PEOU) – the degree to which an individual believes that using a technology will be free of effort. (Murire, 2024, p. 316).

In this research, TAM is used to explain the attitudes and readiness of local government personnel toward adopting and utilizing AI systems in public administration. The model provides a lens to understand how perceived usefulness and ease of use influence employees' willingness to engage in AI-related learning and application, which is crucial for building AI competency and digital literacy. (Nua-amnat, Brahmakappa, Pumturian, & Soonthondachar, 2021, pp. 559–573).

**3. Needs Assessment Theory**

Needs Assessment Theory posits that an organizational need arises from a gap between the current state and the desired state of performance or capability. emphasized that systematic needs assessment enables decision-makers to prioritize development efforts that yield the greatest impact.

further suggested the use of quantitative techniques—such as the Priority Needs Index (PNI Modified) to determine and rank the magnitude of each developmental need. (Parycek, Schmid, & Novak, 2024, pp. 8390–8415).

In this study, the theory underpins the process of identifying and prioritizing the essential needs for AI competency development among local administrative personnel. It supports the assessment of current competency levels versus the desired competencies necessary for achieving smart governance and digital transformation. (Worapongpat, 2025b, pp. 96–108).

**4. Smart Community Development Theory**

The concept of a Smart Community is rooted in the integration of digital technologies and data-driven governance to improve the quality of life, economic development, and environmental sustainability of local communities. (Sirisawat & Chaiya, 2025, pp. 137–178).

This theory typically comprises six core dimensions:Smart Governance,Smart People,Smart Economy,Smart Environment,Smart Living,Smart Mobility (Worapongpat, 2025a, pp. 47–69).

In this research, Smart Community Development Theory serves as the outcome framework, linking the enhancement of AI competencies among local administrative personnel with the broader goal of realizing a Smart Local Community in Maha Sarakham Province. This approach reflects how human resource development in AI contributes to the readiness and sustainability of local digital transformation.

## Methodology

This study was designed to investigate the essential needs for developing artificial intelligence (AI) competencies among personnel in local administrative organizations in Maha Sarakham Province, in support of the concrete realization of “Smart Local Government.” The scope of the research is delineated as follows:

**1. Content Scope**

AI competency was defined as encompassing three core dimensions:Knowledge – fundamental understanding of AI concepts.Skills – the ability to apply AI in work processes.Attitude – openness and readiness to adopt AI technologies.

**2. Population and Sample**

The population for this study was personnel, working in local administrative organizations (LAOs) across Maha Sarakham Province, Thailand.

The sample group was LAO personnel directly responsible for providing public services.

The sample size was determined using Yamane’with a confidence level of 95% and a margin of error of 5%, resulting in a total of 360 participants. A simple random sampling technique was employed to ensure representativeness.

**3. Time Frame**

Data collection was conducted during the second quarter of the fiscal year 2025.

Research Instruments

The primary instrument was a questionnaire, designed to capture respondents' perceptions of the current and expected states of AI competency.

The instrument employed Likert- five rating scale which consisted of 30 items, covering three dimensions:AI Knowledge (e.g., fundamental AI concepts, machine learning, public sector applications)

– 10 items. AI Skills (e.g., use of ChatGPT, data management systems, big data analytics)

– 12 items. Attitude/Openness toward AI Technologies – 8 items. Instrument Validation:

The questionnaire was reviewed for content validity, yielding an index of item–objective congruence (IOC) ranging from 0.80 to 1.00. Reliability testing produced a Cronbach's alpha coefficient of 0.88, indicating high internal consistency.

**4. Data Collection Procedures**

Data were collected through both online and paper-based questionnaires, distributed with the cooperation of local administrative organizations, including municipalities, subdistrict administrative organizations (SAOs), and provincial administrative organizations (PAOs). The purpose of the study and the procedure for completing the questionnaire were explained to respondents prior to participation.

**5. Data Analysis**

Descriptive Statistics: Frequency, percentage, mean, and standard deviation were employed to describe the respondents' AI competency levels. Needs Assessment: The Modified Priority Needs Index (PNImodified) was calculated to determine the gap between the expected and current states of AI competency, thereby prioritizing the areas requiring development.

**Results**

**Table 1** Needs Assessment of AI Knowledge Competencies

| No. | Knowledge Competency in AI | Current State (Mean) | SD | Interpretation | Expected State (Mean) | SD | Interpretation |
|---|---|---|---|---|---|---|---|
| 1 | Understanding the meaning and definition of AI | 3.10 | 0.52 | Moderate | 4.85 | 0.55 | Highest |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2 | Awareness of benefits and applications of AI in public administration | 3.05 | 0.48 | Moderate | 4.88 | 0.50 | Highest |
| 3 | Understanding principles of AI systems and data analytics | 2.85 | 0.47 | Moderate | 4.80 | 0.53 | Highest |
| 4 | Familiarity with AI tools and technologies used in local governance | 2.75 | 0.49 | Moderate | 4.82 | 0.52 | Highest |
| 5 | Comprehension of strategies for smart locality development using AI | 2.90 | 0.50 | Moderate | 4.90 | 0.49 | Highest |

**Table 2** Needs Assessment of AI Skill Competencies

| No. | Skill Competency in AI | Current State (Mean) | SD | Interpretation | Expected State (Mean) | SD | Interpretation |
|---|---|---|---|---|---|---|---|
| 1 | Ability to use AI programs or tools for data analysis | 2.80 | 0.45 | Moderate | 4.80 | 0.48 | Highest |
| 2 | Ability to design and develop AI-related projects | 2.60 | 0.42 | Moderate | 4.75 | 0.50 | Highest |
| 3 | Ability to evaluate and select AI solutions appropriate for organizational tasks | 2.70 | 0.44 | Moderate | 4.78 | 0.52 | Highest |

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|---|---|---|---|---|---|---|---|
| 4 | Ability to troubleshoot and improve AI systems in practice | 2.65 | 0.46 | Moderate | 4.82 | 0.49 | Highest |
| 5 | Ability to communicate and present AI-generated data effectively | 2.85 | 0.47 | Moderate | 4.85 | 0.47 | Highest |

**Table 3** Needs Assessment of AI Attitudinal Competencies

| No. | Attitudinal Competency toward AI | Current State (Mean) | SD | Interpretation | Expected State (Mean) | SD | Interpretation |
|---|---|---|---|---|---|---|---|
| 1 | Interest and openness to learning about AI | 3.40 | 0.55 | Moderate | 4.70 | 0.50 | Highest |
| 2 | Confidence in AI as a tool for organizational and local development | 3.30 | 0.52 | Moderate | 4.75 | 0.48 | Highest |
| 3 | Enthusiasm in applying AI in professional practice | 3.20 | 0.50 | Moderate | 4.78 | 0.45 | Highest |
| 4 | Commitment to continuous self-improvement for AI utilization | 3.15 | 0.48 | Moderate | 4.80 | 0.47 | Highest |
| 5 | Willingness to listen to feedback and suggestions on AI development | 3.10 | 0.49 | Moderate | 4.82 | 0.50 | Highest |

**Table 4** Summary of Priority Needs Index (PNI Modified) and Ranking

| Competency Dimension | Current Situation (D) | Expected Situation (I) | PNI Modified (I – D)/I | Priority Ranking |
|---|---|---|---|---|
| Knowledge of AI | 2.91 | 4.85 | 0.40 | 3 |
| Practical AI Skills | 2.72 | 4.80 | 0.43 | 1 |
| Attitude toward AI | 3.23 | 4.75 | 0.32 | 2 |

*Note:*

Mean scores range from 1–5 (1 = lowest, 5 = highest).

Interpretation criteria:

1.00–2.33 = Low

2.34–3.66 = Moderate

3.67–5.00 = High

## Conclusion and Discussion

1 Objective 1 To examine the current and expected levels of AI-related knowledge, skills, and attitudes among personnel.The results show that personnel generally had moderate to high levels of knowledge and positive attitudes toward AI. However, their practical skills in using AI were only at a moderate level.Average scores (on a 1–5 scale):AI Knowledge: Current level – moderate (mean 2.75–3.10); expected level – very high (mean 4.80–4.90).AI Skills: Current level – moderate (mean 2.60–2.85); expected level – very high (mean 4.75–4.85).Attitudes toward AI: Current level – moderate (mean 3.10–3.40); expected level – very high (mean 4.70–4.82).In summary, while (Budhwar, Malik, De Silva, & Thevisuthan, 2022, pp. 1065–1097). most personnel understand AI concepts and have a positive attitude toward its use, they still need more hands-on experience and practical training to achieve the desired competency level.

Objective 2 To analyze the essential needs for AI competency development.The analysis found that the highest priority need is the improvement of practical AI skills including the ability to use AI tools, design AI-related projects, and troubleshoot AI systems.In addition, both knowledge and attitudes toward AI require further development to strengthen personnel's understanding, confidence, and readiness to apply AI in local administrative work.Priority Needs Index (PNI_Modified):Practical AI Skills: 0.43 Rank 1.AI Knowledge: 0.40 Rank 2.Attitudes toward AI: 0.32 Rank 3.These results indicate that while (Butt, 2023, pp. 7–25).personnel already possess basic knowledge and positive attitudes toward AI, the greatest improvement is needed in practical, hands-on skills.

Objective 3 To propose strategic approaches for enhancing AI competency.The study recommends several key strategies for developing AI competencies among local administrative personnel:Organize practical

workshops and training that focus on real-world AI applications in local governance.Develop online learning and support systems to promote continuous skill improvement.Foster an innovation-oriented organizational culture that encourages experimentation with emerging technologies and supports the transition toward a smart local government.In summary, personnel currently demonstrate moderate to high levels of knowledge and positive attitudes toward AI. (Butsara Phon Phuangpanya, 2024, pp. 30–43).However, their practical skills remain limited, making hands-on training and continuous learning the most urgent priorities.An effective competency development plan should therefore integrate practical training, online learning opportunities, and a supportive organizational culture that values innovation.

**Discoveries or new knowledge**

The findings indicate that the AI competencies of personnel are currently at a moderate level, despite exhibiting high developmental needs in all aspects—knowledge, skills, and attitudes. Among these, AI application skills represent the most critical area for improvement. Furthermore, the study reveals the existing gaps and pressing needs for strategic personnel development planning aimed at enhancing AI competencies in alignment with the goals of smart local community development within the specific context of Maha Sarakham Province.

From the study titled “Assessment of the Essential Needs for Developing Artificial Intelligence Competencies among Personnel in Local Administrative Organizations toward the Realization of a Smart Local Community in Maha Sarakham Province,” new knowledge has been generated and can be summarized conceptually as follows

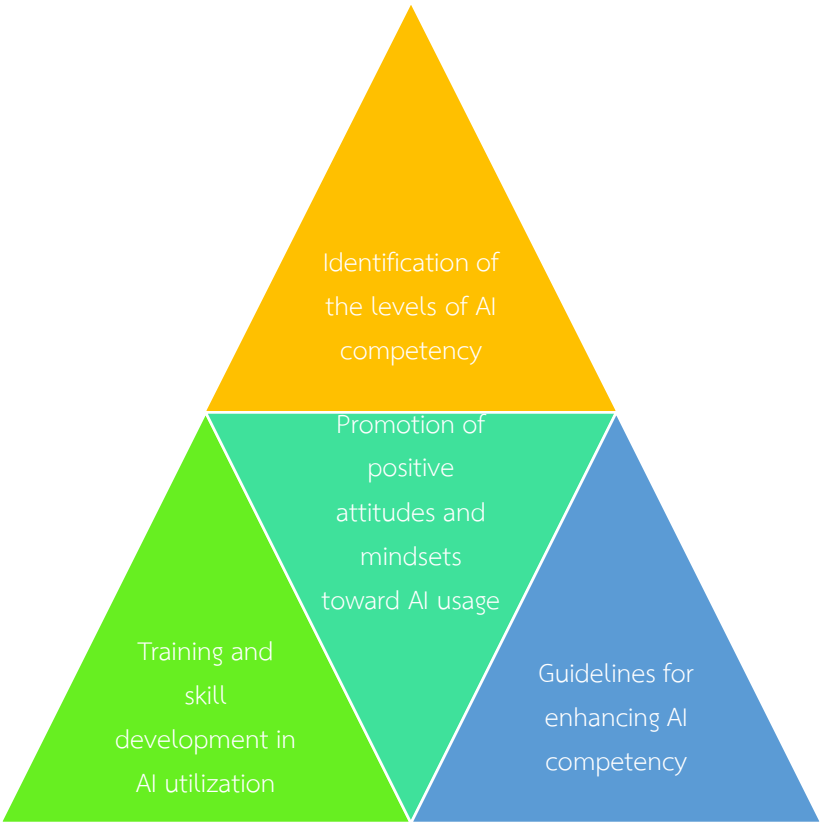


**Figure 2 illustrates the essential needs and competency gaps in the development of artificial intelligence (AI) among personnel in local administrative organizations in Maha Sarakham Province.**

The figure demonstrates that this study has contributed new knowledge regarding the needs and gaps in AI competency development among local administrative personnel, particularly in the following areas:Identification of AI Competency Levels:The current AI competency level of personnel was found to be at a moderate level, while the need for further development was high across all dimensions—especially in AI technology application skills, which serve as a crucial factor for achieving smart local community development. Clear Needs Assessment:The study highlights an evident need for training and skill development in AI utilization, enabling personnel to effectively apply AI technologies in administrative management and public service delivery.Promotion of Attitudes and Mindsets toward AI:Enhancing positive attitudes and organizational mindsets toward AI adoption is identified as a key factor that supports sustainable technology acceptance and utilization.Guidelines for Promoting AI Competency:Strategies for competency enhancement should comprehensively address knowledge, skills, and attitudes, emphasizing practical, hands-on learning and organizational culture building that encourages the integration of new technologies.These new insights can be applied as a framework for strategic planning and policy formulation in the development of smart local

communities in Maha Sarakham Province and can be further adapted to other local administrative contexts effectively and appropriately.

**Suggestion**

**1. Recommendations for Practical Application**

1.1 Based on the findings of Objective 1, personnel in local administrative organizations possess AI competencies at a moderate level. Therefore, relevant agencies should formulate systematic personnel development plans that continuously and appropriately enhance both knowledge and skills in AI.

1.2 In line with the findings of Objective 2, the most critical developmental need concerns practical AI skills. Accordingly, agencies should prioritize training programs and hands-on activities that emphasize the application of AI technologies in real-world organizational contexts, supported by the necessary resources and infrastructure.

1.3 Consistent with the findings of Objective 3, fostering positive attitudes toward AI adoption is essential. Thus, agencies should cultivate an organizational culture that embraces innovation and technological change, while also promoting knowledge-sharing and collaborative learning within the organization.

**2. Recommendations for Future Research**

This study identifies AI skill development as a crucial factor in enhancing the efficiency of local administrative management and in advancing the realization of smart local governance. The findings may also be adapted to other similar contexts with appropriate modifications. Future research should explore the determinants influencing AI acceptance and utilization within local administrative organizations, as well as the barriers and solutions related to practical AI adoption. Such investigations would further support scaling efforts and enhance the efficiency of public sector management on a broader scale.

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