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From Traditional to Digital: Transforming Local Administrative Organization Workflows in Thailand Through Social Listening Tools

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Abstract: Digital transformation offers transformative potential for public service delivery, yet many local administrative organizations (LAOs) in Thailand struggle with integrating digital tools effectively into their workflows. This study investigates the integration of social listening tools (SLTs) to enhance the efficiency and responsiveness of public service delivery in Thailand's LAOs. The primary goal is to redesign traditional, manual workflows through the development of a digital-by-design framework, addressing inefficiencies in public engagement and service provision. Employing a mixed-method approach, this research combines interviews and focus groups with municipal staff from four municipalities in Northeast Thailand to identify challenges and co-create solutions. The redesigned workflow integrates digital practices into existing organizational structures and achieves a significant 282% improvement in efficiency, measured in transactions per manpower-hour. Additionally, the new process enhances operational speed, responsiveness, and public engagement. To ensure sustainability, this study recommends a phased implementation strategy and consistent staff training. This research contributes to the public administration literature by providing a practical, scalable framework for digital transformation in local governance. It underscores the potential of SLTs to modernize public sector workflows, enabling more dynamic, responsive, and citizen-centric interactions between LAOs and the communities they serve.

Keywords: digital transformation; social listening tools; process evaluation; local administrative organizations; efficiency

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1. Introduction

In the era of digital transformation, the concept of "social listening" has emerged as a pivotal tool for organizations, particularly in public administration and health communication. Social listening is defined as the process of monitoring and analyzing conversations across various digital platforms to inform and tailor communication strategies to be culturally relevant and appropriate for diverse subpopulations. This methodology goes beyond mere data gathering; it involves understanding the community's pulse, identifying their needs, concerns, and sentiments, thereby enabling institutions to respond with precision and empathy (Lohiniva et al. 2022).

The integration of social listening tools (SLTs) within local governments signifies the government's innovation and responsiveness. These tools, which meticulously track and analyze information across social media platforms, are invaluable in deciphering user-generated content, revealing trends, topics, and sentiments pertinent to specific target audiences (Setthasuravich et al. 2024a). Their application extends beyond mere observation,

empowering local governments to craft and refine content strategies that resonate deeply with their communities, ensuring communication is not only heard but also meaningful and impactful (Hove and Cilliers 2023). SLTs play a critical role in monitoring public awareness and sentiment regarding social issues, exemplified by their use in tracking discussions around such topics. This capability allows local governments to gauge the volume and tone of discourse around specific topics, providing insights into public perception and the effectiveness of information dissemination efforts. Understanding the sentiment of the content shared within their communities and the impact of this information on social media users enables local governments to navigate the challenges posed by infodemics, characterized by an overwhelming flood of information, often leaving the public struggling to identify credible and useful content amidst harmful misinformation (Sommariva et al. 2021; Lohiniva et al. 2022).

The absence of SLTs in local government operations can lead to significant challenges, including the unchecked spread of misinformation during crises, leading to public confusion and undermining health initiatives (Burzyńska et al. 2020; Schuetz et al. 2021). Without insights from social listening, communication strategies may fail to resonate with the public, reducing the effectiveness of crucial messages and engagement efforts (Jeppson and Stapley 2021). This gap also signifies missed opportunities for meaningful engagement, creating a disconnect between local officials and their constituents, potentially eroding trust in local governance. Additionally, the absence of social listening hampers proactive crisis management, making local governments reactive rather than preventative. It becomes challenging to gauge public sentiments and awareness accurately, leading to decisions that may not align with community expectations. Ultimately, not leveraging SLTs make local governments appear out of touch or indifferent to public concerns, significantly impacting their ability to maintain public trust and ensure effective governance in the digital age (Evans et al. 2018; Setthasuravich et al. 2024a).

Traditionally, the workflow of Thailand's local governments, officially called local administrative organizations (LAOs), while effective, is not fully efficient, especially in the modern digital context. To illustrate, the process relies heavily on physical documents that must be transmitted through official correspondence to various departments. This necessitates the involvement of numerous administrative staff, such as clerical officers or secretaries, to manage the reception and dispatch of these documents. Implementing a digital document management system for online exchanges eliminates the need for physical document transfers, as digital documents can be sent directly to the recipients' accounts. Consequently, the role of administrative staff in document handling becomes unnecessary, since these personnel can be given tasks that create more value and better align with the organization's strategic objectives instead. Overall, digital transformation is not merely about adopting new tools but rethinking and redesigning processes to maximize efficiency, cost savings, and service delivery. This is what experts refer to as "digital-by-design" (Müller 2020; OECD 2020; Sebastian et al. 2020).

This study highlights the problem regarding the lack of a suitable process for digital transformation within the context of LAOs, particularly in terms of the application of SLTs. Since the traditional workflow has been entrenched since the establishment of LAOs in B.E. 2540, this long-standing reliance on conventional methods can significantly impair effective governance and public service delivery. The lack of effective workflow for these technologies can lead to outdated communication strategies and failure to engage the community with regard to their preferred digital platforms. This reluctance may cause officials to miss the opportunity to gain access to the public's sentiments, which may result in the spread of rumors, misinformation, and delayed responses to public concerns. Furthermore, skepticism towards social listening hampers opportunities for civic engagement and feedback, which are essential for fostering public trust and participatory governance. Operational inefficiencies could also arise, with governments missing the chance to streamline services and leverage data for informed decision making (Obregon et al. 2020). Despite their critical role in service delivery, LAOs in Thailand rely heavily

on manual processes and physical documentation. These traditional workflows are slow to respond to citizens' needs, often resulting in delayed service delivery and diminished public trust. The lack of efficient mechanisms for gathering and analyzing public feedback may hinder LAOs' ability to adapt to the evolving expectations of digital-savvy citizens.

The Northeast region of Thailand, known as Isan, is the country's largest area and is characterized by unique socio-cultural features, including linguistic diversity and distinct cultural practices. However, it faces challenges due to its rural and economically disadvantaged status compared to other regions (Setthasuravich and Kato 2022; Setthasuravich et al. 2024b). These factors create a unique context for the integration of digital technologies aimed at improving local governance. The lack of technology acceptance among local government officials has further hindered effective communication and public service delivery, making it crucial to understand the region's specific dynamics.

To address these challenges, this study develops a digital-by-design framework for integrating SLTs into the workflows of LAOs. Employing a mixed-method approach, this study gathers insights from interviews and focus groups with municipal staff in four cities across Northeast Thailand, enabling the redesign of existing processes. While these cities provide valuable insights due to their diverse challenges and population characteristics, the findings may be limited in their generalizability to regions with differing socio-economic profiles or levels of digital readiness. This research aims to contribute to the literature on digital transformation in public administration by providing a practical framework that illustrates the efficiency gains achieved through digital integration. It offers empirical evidence of how SLTs can enhance public engagement and responsiveness, aligning with broader trends in digital governance. This study is guided by the following research question:

> RQ: How would traditional workflows that utilize SLTs in LAOs be transformed if redesigned using the digital-by-design concept, and how would their efficiency compare to the original processes?

Following this Introduction, Section 2 reviews the relevant literature. Section 3 details the mixed-method approach and data collection procedures used in this study. Section 4 presents the findings, including a comparison between traditional and redesigned workflows and their impact on efficiency and public engagement. This paper concludes with Section 5, discussing the implications of these findings for digital governance practices and offering recommendations for policymakers and practitioners.

2. Literature Review

2.1. Social Listening Tools

During the early stages of social media, the SLTs were used to improve the quality of public services (Paris and Wan 2011). Preliminary analyses were presented on the nature of work and the information needs of users monitoring social media to enhance government services. In a subsequent study, a prototype SLT called Vizie was used to improve government services (Wan and Paris 2014). This tool's unified search interface allowed queries to be sent to various social media platforms, and consolidated results were displayed. User logs from nearly 200 registered users across 17 government agencies were analyzed. This illustrates that Vizie can enhance data exploration and assess the relevance of online conversations, thereby facilitating increased engagement with the online community.

Meanwhile, other pertinent research show that SLTs are not only limited to government services use. In Schuurman and Bont (2022), SLTs were used to assess public awareness about respiratory viruses, thus showing significant potential for future research. Such tools have also been used in Thailand's tourism sector. Thai-language text data from tourists were collected, and sentiment analysis was performed to help those responsible for tourist sites understand visitor satisfaction. This information was used to improve and enhance services (Markdee 2020).

Remarkably, the UC Berkeley Labor Center has examined the use of technology within the public sector, revealing a lag in transparency and accountability compared to

technological advancements that emerged during the COVID-19 pandemic. The findings of the study suggest that public sector organizations must adopt a more proactive approach in utilizing technology. Specifically, they should consider incorporating SLTs to enhance citizen engagement (Hinkley 2023).

A comparison of the use of SLTs between the public and private sectors indicates a de facto monopoly within public organizations, resulting in less competition and, consequently, a lower incentive for innovation with new tools and techniques than in the private sector. This represents a valuable opportunity for governments and public organizations to begin employing innovative tools, such as social listening, to significantly improve citizens' quality of life.

Globally, SLTs have been widely adopted in various government sectors to monitor public sentiment, manage crises, and inform policymaking. Tools such as Brandwatch, Hootsuite, Sprinklr, and Talkwalker are popular across public and private sectors for analyzing social media conversations and detecting trends (Brandwatch 2024). Talkwalker, for instance, is particularly effective in crisis management, enabling the real-time tracking of public discourse during emergencies (Talkwalker 2024). Additionally, specialized government tools like Google Public Sector Analytics and WHO Europe's EARS (Early AI-powered Response with Social Listening) are tailored for public health monitoring and combating misinformation (McGowan 2022). In Australia, the Vizie platform, developed by CSIRO, exemplifies how SLTs can be customized for public sector needs, integrating data from multiple platforms to enhance government responsiveness (Rance 2015). Furthermore, advancements in natural language processing (NLP) tools, such as IBM Watson Analytics and Google Cloud NLP, provide sophisticated sentiment analysis capabilities that can be integrated with SLTs to deliver deeper insights into public discourse (IBM 2022; Google Cloud 2024).

In Thailand, SLTs are predominantly utilized in the private sector, where they play a crucial role in customer engagement, market analysis, and brand management. Their adoption in government, particularly among LAOs, remains limited by comparison. This disparity reflects the private sector's stronger emphasis on leveraging digital tools for competitive advantage. However, in the Thai context, several locally developed SLTs have emerged, including Zocial Eye by WISESIGHT, SocialEnable, and Mandala Analytics. These tools are uniquely tailored to the linguistic and cultural nuances of Thailand, enabling them to address the specific needs of local governance effectively. For example, their ability to analyze Thai-language social media data and adapt to regional communication styles makes them valuable resources for enhancing public engagement and responsiveness in government operations (Setthasuravich et al. 2024a).

2.2. Digital Transformation in Local Governance

Digital transformation is more than just a technological upgrade; it represents a fundamental shift in how organizations operate, integrating digital technologies into every aspect of their processes to enhance efficiency, adaptability, and service delivery. This transformation is driven by three core elements: people, processes, and technology (Mahmood et al. 2019; Moreira and Ferreira 2023). The challenge for any organization, particularly in the public sector, is not only selecting the appropriate technology but also ensuring its alignment with human skills, creativity, and broader organizational objectives. A thoughtful integration of technology is required to simplify workflows and foster innovation.

Digital transformation initiatives can generally be categorized into two primary approaches, i.e., enhancing existing processes and integration through process reengineering. The enhancement approach involves adding digital tools to current workflows with minimal changes to the underlying processes. This method is relatively straightforward and can yield quick, incremental improvements. However, because it does not fundamentally alter the way an organization operates, it often fails to fully leverage the potential of digital

technologies, resulting in only marginal gains in efficiency (Fernández et al. 2023; Eyieyien et al. 2024).

In contrast, the integration approach involves a comprehensive reengineering of processes to fully embed digital tools at the core of organizational operations. This method typically leads to significantly better outcomes, including higher efficiency, greater flexibility, and improved service delivery, as demonstrated in various international case studies (Álvarez et al. 2019; Wang et al. 2024). Processes are redesigned to eliminate inefficiencies and streamline operations, ensuring that the implemented technologies are fully utilized to their potential (Affonso et al. 2020; Ratte et al. 2022; Ivanišević et al. 2023). For LAOs, this approach aims not only to meet citizens' needs more effectively but also to enhance their overall quality of life and well-being.

Despite the clear advantages of the integration approach, its adoption within Thailand's LAOs has been limited. It has been observed that most digital transformation efforts within the country's LAOs have focused on enhancing existing processes rather than undertaking the more comprehensive reengineering needed to fully harness digital tools (Lowatcharin et al. 2024). Hence, the limited adoption of process reengineering highlights a significant shortfall in Thailand's public sector digital transformation efforts. This suggests that the full potential of implemented technologies may not be realized. Meanwhile, the decision to adopt digital tools within local administrative organizations is primarily driven by the expectation of increased efficiency that the technology is anticipated to bring (Pansorn and Prachumrasee 2024). These gaps present a valuable opportunity to revise current processes using a digital-by-design approach, setting a new benchmark for public sector innovation. Aligning technology investments more closely with organizational goals can significantly enhance public service delivery and improve the quality of life and the overall well-being of citizens. Highlighting the crucial role of comprehensive digital integration in Thai local governance could enhance both efficiency and effectiveness. (Herasymiuk et al. 2024; Tano 2024).

The digital-by-design framework analyzed in this study focuses on reengineering traditional workflows by embedding digital tools at the core of operations to fully harness their capabilities (Rijcken 2023; Satwekar et al. 2024). In traditional workflows, digital tools were often underutilized, serving as supplementary aids rather than integral components (Russell et al. 2009). This framework adopts a transformative approach by strategically integrating digital tools to optimize their use and maximize their impact. Key steps of the framework include the following: (a) leveraging SLTs to effectively collect and analyze public feedback from digital platforms, (b) redesigning workflows to minimize inefficiencies such as bottlenecks and excessive personnel involvement, and (c) utilizing tools like a LINE Group Chat for real-time communication and decision making. Rather than merely adopting digital tools, this framework focuses on optimizing their use to streamline tasks, enhance responsiveness, and align operations with digital capabilities. The transition from traditional to digital-by-design workflows demonstrates how maximizing the potential of digital tools can significantly improve workflow efficiency, responsiveness, and overall service delivery (Ozkaynak et al. 2020; Schmailzl et al. 2023).

2.3. Challenges in Traditional Governance Workflows

Traditional workflows in Thai LAOs are characterized by manual processes and fragmented communication systems. Services such as citizen complaint management, tax collection, and permit approvals often rely on physical documentation and in-person interactions, leading to delays and inefficiencies. Additionally, these workflows lack transparency and responsiveness, limiting citizen satisfaction and trust in local governance (Boonyarat et al. 2014; Chongthammakun and Pal 2012; Lowatcharin et al. 2024).

Traditional service delivery in LAOs faces significant inefficiencies due to outdated workflows. For instance, the reliance on manual systems for complaint management leads to delays in resolving issues and increased personnel workload (Maroye et al. 2017; Norgren

et al. 2023). This lack of responsiveness undermines public trust and highlights the need for streamlined digital solutions.

The integration of SLTs has the potential to significantly improve overall service delivery in Thai LAOs. By automating complaint management and introducing real-time feedback mechanisms, SLTs may address inefficiencies in traditional workflows, enhance transparency, and build citizen trust. Furthermore, they create opportunities to optimize resource allocation and develop more responsive and citizen-centric public services (Gunawong 2015; Nokkaew et al. 2024; Sommariva et al. 2023).

2.4. Process Efficiency Evaluations

Evaluating process efficiency is crucial for the success of digital transformation (İnel 2019). Hence, to ensure that the newly designed workflow has been improved in accordance with the country's objectives and goals on operational efficiency (National Strategy Secretariat Office, Thailand 2019), it is necessary to evaluate the efficiency of the process. This evaluation allows organizations to identify areas where resources may be underutilized or wasted and to assess the overall effectiveness of process performance.

Efficiency is simply defined by the Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee as the transformation of inputs into results (OECD 2021a). As noted by Palenberg (2011), various methods have been employed to assess these efficiencies in public service processes. However, measuring process efficiency using the output–input ratio is a simple and widely adopted approach in the public sector, providing a clear indication of the amount of output generated per unit of input (Kao 2017; Blank 2018). The simplicity and ease of calculation of the output–input ratio offer a straightforward method for assessing the efficiency of a process or organization (Danaher and Mattsson 1998; Mihaiu et al. 2010).

According to Griffin (2012), in the context of public service processes, the inputs typically include material resources, human resources, and financial resources, while the outputs consist of the services delivered or the information produced. The evaluation of efficiency in public services within LAOs was demonstrated by Prachumrasee (2022, 2024). In this evaluation, resources such as the time spent in the workflow and the number of personnel involved are defined as inputs, while the delivered service represents the outputs.

Therefore, the manpower and time spent are determined as the inputs, while the output is defined as the public feedback obtained through the use of SLTs in a single operational cycle in this work. This approach ensures that the efficiency of the workflow is systematically evaluated, allowing for the identification of potential areas for improvement and ensuring alignment with the overarching goals of efficiency and effectiveness in public service delivery, as illustrated in Figure 1.

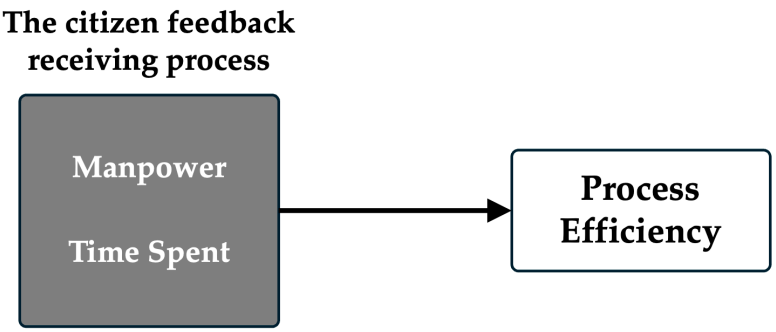


Figure 1. A conceptual framework for efficiency evaluation.

3. Methodology

The strengths of embedded mixed methods (Creswell and Clark 2017) and participatory action research (PAR) were combined in this study to provide a robust and comprehensive approach to investigating the digital transformation of LAOs. The embedded

mixed-method approach integrated qualitative and quantitative data, enabling a nuanced understanding of the impact of SLTs on LAO workflows and enhancing the validity of findings through data triangulation. Meanwhile, PAR was used to actively engage LAO staff, facilitating collaboration in identifying challenges and co-developing solutions for SLT integration. This iterative, participatory approach ensured that the redesigned digital-by-design framework was both theoretically robust and practically relevant, addressing the specific needs of municipal staff. To ensure the successful integration of digital tools, LAO staff members were trained on the use of the selected SLTs. The training equipped the staff with the necessary skills and knowledge to effectively utilize these tools within their existing workflows. Afterwards, the LAO staff were tasked with using the SLTs within their traditional workflows.

Reflection sessions and brainstorming workshops were organized with representatives from various municipalities across different provinces. These sessions were held with the LAO staff for the purpose of discussing their experiences after the SLTs had been implemented. During the workshops, a cross-functional diagram, also known as a swimlane diagram, was introduced. This type of diagram was used because it visually separates the different roles and responsibilities of LAOs, making it easier to identify inefficiencies and streamline processes (Rummler and Brache 2012). The focus was on collaboratively redesigning the workflow to better integrate digital tools, resulting in a digital-by-design workflow (OECD 2021b; Satwekar et al. 2023). The goal of this redesigned workflow was to enhance efficiency, reduce bottlenecks, and improve responsiveness compared to traditional workflows while ensuring that the digital tools were utilized to their fullest potential.

3.1. Site Area Selection

The research areas selected for this study are the municipalities of four major cities in the Northeastern region of Thailand: Khon Kaen, Nakhon Ratchasima, Udon Thani, and Ubon Ratchathani, as illustrated in Figure 2. These municipalities were chosen based on their status as large urban centers with significant populations and relatively high levels of internet penetration, which reflect their advanced technological readiness. Such characteristics make them ideal case studies for evaluating the feasibility and potential impact of implementing SLTs in LAOs.

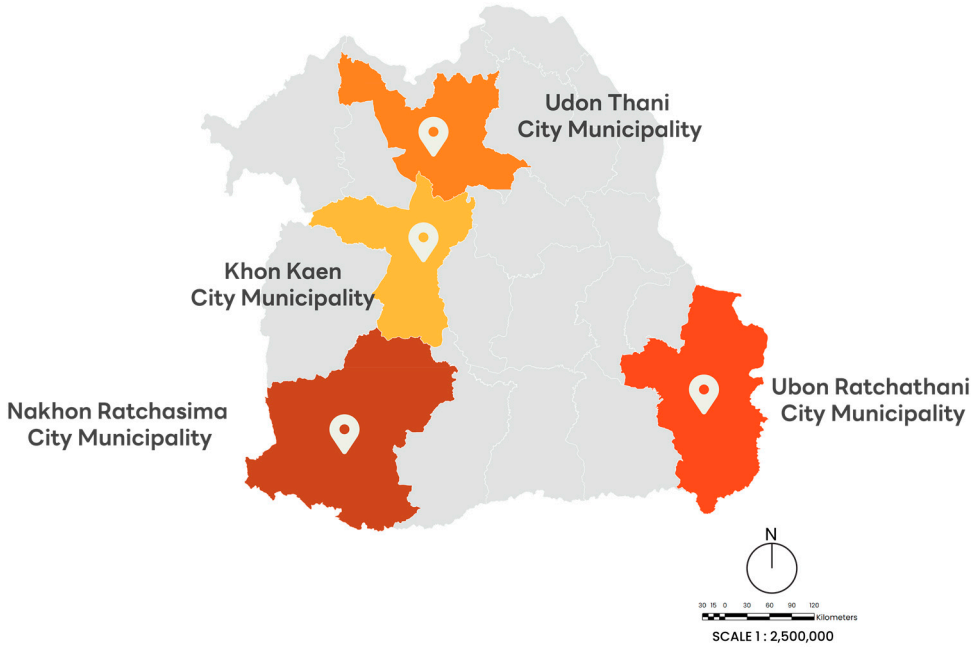


Figure 2. Thailand's Northeastern region and the four selected cities.

To objectively support their selection, these cities were assessed using statistical indicators such as population size and internet penetration rates. Khon Kaen, with a population of approximately 1.59 million and an internet penetration rate of 92.2%, demonstrates strong digital infrastructure alongside its administrative importance. Nakhon Ratchasima, the largest city in the region, has a population of about 2.33 million and an internet penetration rate of 86%, further highlighting its suitability as a regional hub for testing digital innovations. Similarly, Udon Thani and Ubon Ratchathani, with populations of around 1.16 million and 1.61 million, respectively, and internet penetration rates of 89.2% and 82.9%, represent diverse administrative settings with varying degrees of technological readiness (National Statistical Office, Thailand 2024). These figures underscore the cities' capacity to support digital transformation initiatives while offering a representative sample of urban LAOs in Thailand's Northeastern region.

In addition to their technological advantages, these municipalities face a wide range of public service challenges, including resource allocation inefficiencies, delayed citizen engagement processes, and complex administrative demands. This diversity ensures the collection of varied data and facilitates a thorough analysis of the digital-by-design framework's adaptability and scalability. By focusing on cities with both robust digital infrastructures and diverse operational contexts, this study seeks to provide a comprehensive evaluation of SLT integration in local governance.

3.2. Interviewees

This study involved 52 officers from the municipalities of Khon Kaen, Nakhon Ratchasima, Udon Thani, and Ubon Ratchathani (see Table 1). The interviewees were categorized into two main groups: executives and staff. These participants were selected using purposive sampling to ensure the inclusion of individuals directly involved in workflows relevant to the integration of SLTs. The selection process considered variations in organizational size, staffing levels, and personnel availability across the municipalities. Despite these differences, every effort was made to ensure diverse representation from both groups, providing a comprehensive understanding of traditional workflows and the proposed digital-by-design framework.

Table 1. Number of interviewees.

Type	Municipality				Total
	Khon Kaen	Nakhon Ratchasima	Udon Thani	Ubon Ratchathani	
Executive	2	1	2	1	6
Staff	23	10	7	6	46
Total	25	11	9	7	52

Executives, representing senior decision-makers, contributed strategic insights into governance processes, policy formulation, and regulatory considerations. Their input emphasized the importance of aligning SLT integration with existing regulations and ensuring the long-term sustainability of digital transformation initiatives. Meanwhile, staff members, responsible for executing day-to-day operations, provided practical feedback on workflow inefficiencies, resource allocation challenges, and the feasibility of implementing SLTs. Their perspectives highlighted the need for user-friendly tools, targeted training, and enhanced interdepartmental communication. This combination of strategic and operational insights allowed for a holistic analysis of the challenges and opportunities associated with SLT integration.

3.3. Data Collection and Analysis

Data collection involved interviews and focus group discussions with officers engaged in policy formulation, strategic planning, and handling public feedback. The qualitative data centered on exploring the processes involved in gathering citizen feedback and the

roles of various stakeholders. Quantitative data in this study focused on metrics such as time spent and manpower required at each workflow stage to evaluate process efficiency. These data were primarily collected from official workflow records and administrative documents provided by the participating LAOs. Where official records were unavailable, supplementary self-reported information was gathered from respondents during interviews and focus group discussions. Respondents provided estimates for specific tasks, including time requirements and personnel involved. To enhance reliability, all self-reported data were cross-referenced with official operational logs and administrative records whenever possible.

To further mitigate potential biases associated with self-reported data, several measures were implemented. First, official administrative records were prioritized as the primary source of quantitative data to ensure objectivity. Second, participant anonymity was ensured during interviews and focus groups, encouraging honest and uninfluenced responses. Lastly, triangulation methods were employed by comparing self-reported data with workflow documentation and metrics collected through observational methods. This rigorous approach strengthened the validity of the findings by corroborating qualitative insights with quantitative evidence, ensuring that the data accurately reflected workflow processes and efficiency.

The qualitative data analysis techniques employed in this study were content analysis and thematic analysis. Content analysis was used to systematically examine the qualitative data from interviews and focus groups, identifying patterns, themes, and categories. Thematic analysis was used to further explore and interpret the qualitative data, extracting key themes and insights related to the use of SLTs and their impact on workflows. Meanwhile, the quantitative data were analyzed using descriptive statistics, particularly frequency and percentage, to provide objective measures of workflow efficiency and related metrics. Comparative analysis was also conducted to assess improvements in efficiency by comparing the performance of traditional workflows with digital-by-design workflows using the collected quantitative data.

The evaluation of workflow efficiency using an input–output ratio is recognized as a practical approach, particularly in the context of local administrative organizations. This method offers a clear insight into how resources or inputs are utilized to produce the desired outcomes or outputs (Prachumrasee 2024). The input involves human resources, specifically the time spent and the number of personnel involved in the process. Conversely, the output is defined as a complete transaction, which includes collecting citizen feedback, processing the information, and providing a response with an outcome or resolution through the SLTs. Since there are multiple factors of the input, the multi-factor productivity concept was employed to determine the overall efficiency (Coelli et al. 2005; Fitzsimmons and Fitzsimmons 2011; Grönroos and Ojasalo 2004; Hulten 2001; Slack et al. 2010). Therefore, the workflow efficiency can be calculated by using the following equation:

$$\text{Workflow Efficiency} = \frac{Output}{(Tmin \times N)} \quad (1)$$

where $Tmin$ represents the shortest amount of time required to complete the entire process, while N refers to the total number of officials involved in the process.

4. Results and Discussion

4.1. Integrating Social Listening Tools into Traditional Workflows in LAOs

To evaluate the efficiency of the process, it is essential to understand the status quo of the citizen feedback mechanisms. The operational status of the citizen feedback mechanisms in the four municipalities before the implementation of SLTs included both offline and online channels, as evidenced by the following interview excerpts:

> *"...We listen to citizens' feedback through two main channels: one is through field visits, and the other is through social media. There are various methods we use, but what we do*

most frequently is field visits. The Mayor and the team visit communities regularly to meet and listen to the issues and reflections from the citizens. . ." (KI1)

"*. . .We have multiple channels for receiving complaints from citizens, both online and offline. One example of an online channel is Line@. Offline channels include receiving complaints through community leaders. . ., and we also have a dedicated office where citizens can come to file their complaints directly at the municipal office. . .*" (KI2)

The common channels for receiving citizen feedback in all municipalities include passive complaint reception at the municipal office. Proactive problem identification, suggestions, and complaints were gathered through field visits by administrators, who meet and converse with community leaders and residents periodically. This is an indispensable duty of municipal administrators, as illustrated by the following interview excerpt:

"*. . .Complaints are heard through the community chairman, where the people will complain or communicate through the community chairman in their own community, and then the community chairman will continue to complain to the municipality, which is mostly about public utilities that are necessary for daily life in general, showing complaints or communicating with the municipality using the community mechanism, and we have a permanent room at the office for people to complain about problems at the municipal office. . .*" (KI3)

"*We organize community meetings, which can be held within the communities or, for larger gatherings, at the municipal office conference room, attended by approximately 400–500 people. These meetings focus on large-scale project planning and gathering public opinions. After discussions, representatives are invited to express their views formally, which are recorded in meeting minutes and forwarded to the relevant departments for resolution. This process involves both large-scale meetings and localized community engagements. . .*" (KI4)

"*. . .In terms of offline methods, the Mayor has also opened additional service centers within the municipality. Since our municipality is mainly an urban area with a large size of nearly 30 square kilometers, four smaller service centers have been set up around the city. These centers match the four electoral districts, and municipal staff are stationed there to help citizens with travel challenges. This initiative, which has been in place for about 3–4 months, has worked well as an additional way for people to file complaints.*" (KI3)

For those who cannot attend community meetings or prefer not to meet with large groups, there was an option to file complaints in person at the municipal office.

"*. . .When citizens come to the municipal office to file complaints, there is a dedicated complaint center at the front counter. This center is specifically for handling issues from the public. The process is still traditional—people come in person and give their information to the staff. The municipality has a system where, once the information is collected, the team enters it into the system and creates a record of the complaint. The issue is then quickly sent to the relevant departments, which are expected to fix the problem within seven days and respond to the citizen.*" (KI1)

When the four municipalities implemented the SLTs to gather citizen feedback, the response process exhibited similarities. The process involved nine key persons: Online Admin, Mayor, Municipal Clerk, Head of the Municipal Clerk's Office, Bureau Director, Division Director, Subdivision Chief, Section Chief, and Operational Officer. The entire sequence of activities, from the initial receipt of citizen feedback to the final resolution and reporting, is illustrated in a swimlane diagram in Figure 3.

The process starts with an online administrator in the Complaint Reception Center setting a keyword using SLTs. After gathering citizen feedback from social media, the data were analyzed and reported to the Head of the Municipal Clerk's Office. The Head of the Municipal Clerk's Office acknowledges and reports the findings to the Municipal Clerk and the Mayor, following the hierarchical chain of command.

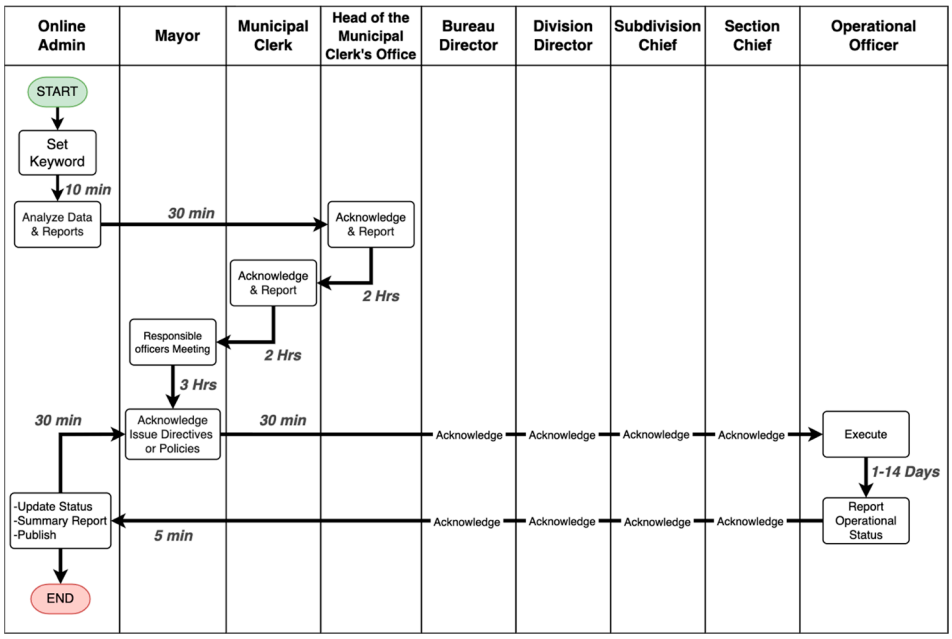


Figure 3. A current state process.

At this stage, the Mayor calls for a meeting with responsible officers to brainstorm and formulate policies or directives to address the issues raised by the citizens. The directives are then communicated to the Operational Officer through a LINE Group Chat, an instant messaging application that is commonly used by the four municipalities as an informal communication platform. Subsequently, formal directive documents are sent via the established protocol.

Members of the LINE Group Chat include the Bureau Director, Division Director, Subdivision Chief, and Section Chief. Consequently, when the Mayor issues directives to the operational officers, these four officials are also informed. The next step involves the Operational Officer executing the tasks assigned by the Mayor. During the execution phase, the status of task completion is communicated to the Online Admin. If the tasks are completed, the Online Admin closes the job and provides feedback to the complainant via the complaint system platform. However, if the tasks are not completed, the Online Admin follows up with the relevant departments. Additionally, the Online Admin prepares a summary report of the operations, which is forwarded to the Mayor for further decision making and policy formulation.

To evaluate the process efficiency, the workflow is analyzed in detail, considering the time spent at each step and the number of personnel involved. The current workflow requires nine personnel and takes a minimum of 1965 min, or approximately 32.75 h, to complete. The efficiency of this process, calculated using Equation (1), is 0.00339 transactions per manpower-hour. In other words, each hour of manpower, with one person working for one hour, results in 0.00339 completed transactions of the entire process. This includes every procedure from collecting citizen feedback to providing a response. To put it more clearly, it takes about 295 manpower-hours, which is equivalent to nine people working for 32.75 h, to complete one full transaction. This value is used as a baseline for comparison with a digital-by-design workflow.

4.2. Collaborative Brainstorming Sessions with Municipalities for Redesigning a Digital-by-Design Workflow

To improve the efficiency of the current process, it is necessary to identify bottlenecks, or the points where delays occur, if resources are constrained, or if there is an excessive wait time (Goldratt and Cox 2004). During a brainstorming session, the LAO staff unanimously agreed that the steps involving reporting from the Online Admin to the Head of the

Municipal Clerk's Office and, subsequently, to the Mayor's call for a meeting, are the most time-consuming part of the workflow. These steps take approximately 450 min. The execution step by the Operational Officer can be excluded from this analysis, as the time required depends on the complexity of the issues raised from citizen feedback.

To eliminate this bottleneck, the current process was redesigned under the digital-by-design concept. This approach involves strategically integrating digital technology from the outset, ensuring that digital solutions are foundational to the workflow. The redesigned process aims to streamline operations, reduce steps, minimize time, and decrease the number of personnel involved. Synthesized from interviewee inputs, this new model process is illustrated in Figure 4.

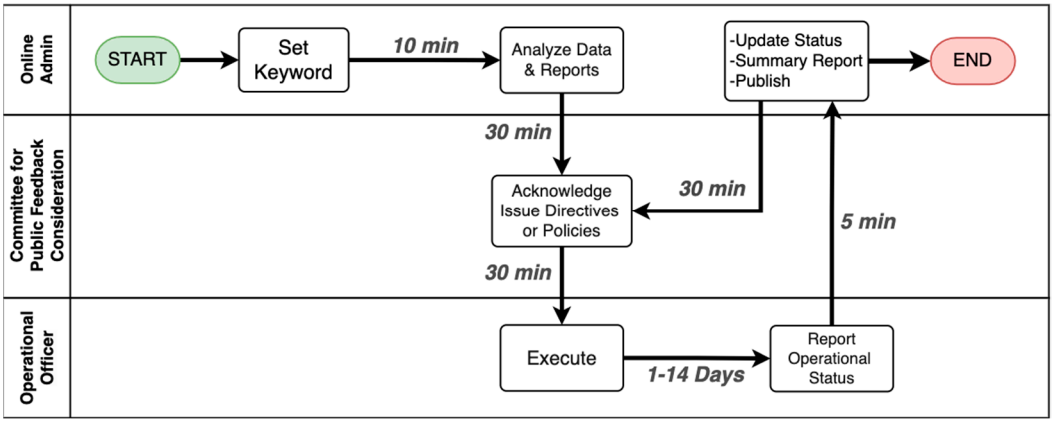


Figure 4. A digital-by-design process.

The digital-by-design process involves only three main key persons, namely: (a) the Online Admin, (b) the Committee for Public Feedback Consideration, and (c) the Operational Officer. It begins with the keyword being set by the Online Admin in the Complaint Reception Center using SLTs. Following this, data collected from social media are analyzed and reported to the Committee for Public Feedback Consideration. The Head of the Municipal Clerk's Office acknowledges and reports the findings to the Municipal Clerk and the Mayor.

The Committee for Public Feedback Consideration consists of the Mayor, the Municipal Clerk, and the Head of various departments. In this step, the Committee member can discuss and meet via an online channel. The analyzed data are then acknowledged, and appropriate directives or policies are formulated to address the identified issues. This step is overseen by the Committee for Public Feedback Consideration. The formulated directives are then communicated to the Operational Officer for execution. Practical actions to resolve the issues are carried out.

Once the tasks are executed, the operational status is reported back to the Online Admin. Finally, the status of the task is updated, a summary report is prepared, and the results are published. The job is closed if completed successfully, and the complainant is provided with feedback via the complaint system platform. If the tasks are incomplete, follow-up actions are initiated to ensure the issues are resolved.

Table 2 presents the results of a comparative analysis of workflow efficiency metrics. The redesigned workflow reduces both the time required, from 32.75 h to 25.75 h, and the number of personnel needed, from 9 to 3. The efficiency of the newly redesigned process has significantly improved, reaching 0.01294 transactions per manpower-hour. In comparison, the traditional process operates at 0.00339 transactions per manpower-hour. This means the redesigned process is about 3.82 times more efficient, representing a 282% increase in efficiency. In simpler terms, the new process allows the same tasks to be completed faster and with fewer people. This not only saves time and resources but also enhances the ability to respond more quickly, which is crucial in public administration. Citizens

can expect faster responses and better service, as the streamlined process improves overall service delivery.

Table 2. Comparative analysis of workflow efficiency metrics.

Metric	Traditional	Digital-by-Design	% Change
Time (hours)	32.75	25.75	–21.4%
Personnel involved	9	3	–66.7%
Efficiency (trans/mph) *	0.00339	0.01294	+282%

Note: * transactions per manpower-hour.

To provide a clearer understanding of the potential impact of the digital-by-design framework, consider a citizen complaint management system as an illustrative example. In the traditional workflow, complaints are submitted manually at municipal offices, categorized by hand, and processed through multiple departments. This process often results in significant delays due to inefficient communication and coordination. Under the proposed digital-by-design framework, SLTs would enable real-time complaint collection from social media platforms, automate the categorization of issues using keyword analysis, and prioritize tasks for immediate attention. This redesign not only reduces response times and minimizes personnel workload but also enhances citizen satisfaction and public trust in local government services. By demonstrating how SLTs streamline a commonly managed service, this example highlights the framework's potential to transform LAOs in Thailand.

In practice, public sector personnel may hesitate to implement new methods due to concerns about potential conflicts with existing regulations or the absence of established guidelines to support innovative practices. However, Thailand has enacted a robust legal and regulatory framework, as outlined in Table 3, that supports the concept of the digital-by-design workflow. The regulations listed in Table 3 collectively provide a solid foundation for promoting the use of digital technologies in LAOs. By streamlining workflows—reducing the number of personnel and operational steps—and adopting electronic methods for transactions, meetings, and service delivery, LAOs can significantly enhance their efficiency, responsiveness, and transparency. Furthermore, the alignment of these regulations with the national reform plan ensures that the digital-by-design approach is not only innovative but also compliant with existing legal standards, ultimately improving public service delivery.

For example, the Electronic Government Operations Act B.E. 2565 facilitates the adoption of electronic methods for delivering public services and citizen welfare. Under this law, several municipalities have transitioned to e-service portals for tax payments and permit applications. These portals allow citizens to complete transactions online, eliminating the need for physical visits to government offices. This shift not only streamlines processes but also reduces administrative burdens, increases transparency, and enhances citizen satisfaction. Similarly, the Digital Government Administration and Services Act B.E. 2562 has enabled municipalities like Khon Kaen and Nakhon Ratchasima to implement digital platforms for citizen complaint management. These platforms allow citizens to submit and track complaints electronically, significantly reducing response times and fostering trust between citizens and local governments.

Despite these advances, the implementation of these laws remains inconsistent across LAOs. Urban municipalities have made significant progress in integrating digital workflows, while rural areas with limited technological infrastructure face challenges in fully leveraging these regulations (Setthasuravich et al. 2024b). Issues such as staff digital literacy, funding constraints, and infrastructural deficiencies hinder the uniform adoption of digital-by-design workflows. Nevertheless, the implementation of these regulations has already demonstrated tangible benefits for LAOs, including improved operational efficiency and citizen engagement. These advancements illustrate the transformative potential of the digital-by-design framework when supported by an enabling legislative environment.

Table 3. Regulations and laws supporting digital-by-design workflow in LAOs.

Category	Regulations/Laws	Relevance
Formation of Committees	The Royal Decree on Good Governance B.E. 2546	LAOs can reduce operational procedures to enhance convenience and efficiency in service delivery and responsiveness to the needs of citizens. This improvement can be achieved through the strategic use of information technology.
	The Municipal Act B.E. 2496 and its amendments	The duties of the municipality are intended to ensure the well-being of the citizens, in alignment with the good governance framework.
Implementation of Digital Technologies	The Electronic Transactions Act B.E. 2544 and its amendments	Any transactions with government agencies can be conducted electronically, which will have legal effect under the framework of government electronic transactions.
	The Digital Government Administration and Services Act B.E. 2562	Government agencies can leverage digital technology to enhance efficiency and facilitate public services. By creating and developing processes, they can achieve efficient, rapid, and transparent public service delivery.
	The Royal Act on Electronic Meetings B.E. 2563	Meetings conducted through electronic media under this Royal Decree are considered legally valid.
	The Electronic Government Operations Act B.E. 2565	This law facilitates the use of electronic methods in providing services and welfare to citizens. It promotes the adoption of electronic methods as the primary means of government operations and service delivery, in alignment with Thailand's administrative reform plan.

5. Conclusions

This study explored the integration and efficacy of SLTs within LAOs in Thailand, focusing on evaluating the current state process vis à vis its redesign under the digital-by-design concept. The initial evaluation of the current process, which has already integrated SLTs, provided a baseline efficiency measure. It revealed several inefficiencies of the current state process, particularly in the communication and execution phases, which often involve multiple personnel and complex manual processes. These inefficiencies lead to unnecessary delays and reduced responsiveness, hindering LAOs' ability to effectively meet the citizen needs.

The workflow was redesigned based on the digital-by-design concept through collaborative brainstorming sessions with municipal stakeholders. It is aimed at streamlining operations by diminishing downtime and reducing the number of personnel involved. A comparison between the baseline and the redesigned workflow demonstrated a substantial improvement in efficiency, with the redesigned process showing a 282% increase. We have shown that this improvement was achieved through the adoption of digital methods for transactions, meetings, and service delivery, as well as alignment with national policies and legal frameworks that support digital transformation.

The importance of adopting a digital-by-design approach in LAOs to enhance public service efficiency and responsiveness has been emphasized by the findings of this study. By leveraging digital technologies and reengineering workflows, the needs of citizens can be better met, and contributions to the overall well-being of society can be made.

The new workflow has been thoroughly developed and tested, demonstrating its readiness to effectively handle citizen feedback via SLTs. Evidently, LAOs can already consider replacing the old workflow. However, it is recommended that the transition phase be executed with a clear, phased approach to ensure minimal disruption to existing operations. The transition process should be initiated through a pilot testing in a specific department before its full implementation across all relevant areas. Furthermore, ongoing training and support should be provided to the staff to ensure that they are fully equipped to operate the new system. With the new workflow in place, improvements in efficiency,

response times, and accuracy in handling citizen feedback can be expected, ultimately leading to enhanced public service delivery.

This study has several limitations that should be acknowledged. First, this study relied heavily on self-reported data from municipal staff, which may be subject to social desirability bias and recall inaccuracies. For instance, respondents may have provided overly favorable accounts of their experiences with social listening tools to align with perceived organizational expectations. Additionally, recall errors could have influenced the accuracy of reported workflow timelines and bottlenecks. Future research could enhance reliability by integrating automated data collection tools or observational studies to validate self-reported findings. Such methods would provide a more nuanced understanding of the impact of digital workflows on public administration efficiency. Second, this study focused on four municipalities in Northeast Thailand, limiting the generalizability of the findings to other regions with different socio-economic contexts or levels of digital readiness. Further studies are needed to explore the applicability of the digital-by-design framework in municipalities with different levels of economic development, digital infrastructure, and administrative structures. Third, this study focuses primarily on evaluating the redesigned workflow through the lens of time efficiency, a critical but narrow metric that does not fully capture the broader implications of digital transformation. Important aspects such as quality of service, citizen satisfaction, and the long-term sustainability of the digital-by-design approach were not explicitly measured. As a result, while the findings are valuable, they may not comprehensively reflect the multifaceted benefits of e-government solutions. Future research should adopt a more holistic approach by incorporating a diverse set of metrics to evaluate the impact of digital transformation. Examples include the citizen satisfaction, accuracy, and reliability of service delivery, staff adaptability to new digital systems, and the long-term sustainability of digital workflows. These indicators would offer a more nuanced and complete understanding of the effectiveness and overall value of digital transformation in local governance. Fourth, the proposed digital-by-design framework provides a robust foundation for enhancing workflow efficiency in LAOs. However, as it has not yet been implemented, future studies should focus on pilot testing the framework in specific services, such as public health monitoring or resource allocation, to validate its effectiveness and scalability in real-world contexts. Fifth, this study focused on cities with a relatively well-developed information technology infrastructure, which may not fully reflect the challenges faced by less technologically advanced regions. Future research could address this gap by examining the implementation of SLTs in areas with lower levels of digital readiness to explore the framework's adaptability and identify additional barriers to implementation. Sixth, the digital-by-design framework's effectiveness may vary across municipalities with different technological infrastructures or organizational cultures. Furthermore, while the mixed-method approach provided a comprehensive understanding of the integration process, it did not account for potential long-term impacts of the redesigned workflows on staff adaptation and community engagement. Future research should be conducted to explore the long-term impacts of digital-by-design workflows on municipal performance and citizen satisfaction. Additionally, studies should investigate how different municipalities with varying resource levels and organizational cultures adapt to and benefit from this approach, providing valuable insights into the overall effectiveness of these policies.

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