Essential Competencies for Digital Workforce of Provincial Office in Thailand Using Delphi Technique

Rujira Rikharom iD
Department of Information Science, Faculty of Humanities and Social Sciences, Khon Kaen University, Khon Kaen, Thailand
E-mail: rujira.ri@kkumail.com

Wirapong Chansanam* iD
Department of Information Science, Faculty of Humanities and Social Sciences, Khon Kaen University, Khon Kaen, Thailand
E-mail: wirach@kku.ac.th

ABSTRACT

This study aimed to study its required performance requirements and proposes a competency framework necessary for the digital workforce of the Provincial Offices in Thailand. The specific primary informants were determined as 17 people. The collecting process was performed using the Delphi technique and the electronic Delphi technique in two phases, totaling four rounds. In the first time, a structured interview was used to conduct online interviews for 15 people. Content validation was performed to determine issues of the competency framework essential for the digital workforce with 7-level scaled questionnaires, and then online reviews were collected between 10-15 people (2nd to 4th times). A consensus was found and confirmed four times with descriptive statistics, namely frequency, mean, standard deviation, mode, median, and the absolute value of the difference between mode and median, interquartile range, and application of the conceptual framework. The research findings revealed that the essential competency requirements for the digital workforce were covered in digital literacy (six aspects), digital skills (four aspects), and digital characteristics (four aspects). Consensus was confirmed for 84 issues. Therefore, it was concluded that 61 points for building an essential competency framework for the digital workforce made them effective in using digital technology as a labor-saving instrument, as well as for expanding the breadth of development of digital expertise to include members of the organization's digital practitioner network. This development will benefit government agencies and the private sector, both national and international, in the future.

Keywords: Delphi technique, essential digital competency, digital workforce, government organization, provincial office in Thailand

1. INTRODUCTION

The innovation system is a critical factor in the overall competitiveness of regional and national economies (Samara et al., 2023). Therefore, digital technology has become an issue of public policy according to policy information publication and geographic restriction (Setthasuravich & Kato, 2022), which is a basic factor leading to digital government in the future. For example, the Canadian government proposed to develop a framework and integrated format according to characteristics and agencies that were expected to create the communication, sharing, publication, and information access caused by using digital equipment and various resources for transportation and record keeping (Kupfer, 2022; Taher, 2015). The Singapore government outlined a plan to transform its economy, government, and society through a digital economy framework called the 'Digital Government Blueprint,' which set goals for success to achieve digital transformation of public services by 2023. For Thailand, the goal was to increase the potential of the digital workforce and to increase awareness and digital skills by driving programs that promote the creation of talent and professionals in digital technology and innovation, to enhance digital skills for the general public toward a dynamic digital economy based on a scholarly society, workforce, and digital innovation (Digital Economy Promotion Agency, 2018).

Therefore, the adoption of digital technologies and the replacement of non-digital processes with digital ones have led to organization-wide transformation and the emergence of new business models (Radziwon et al., 2022; Verhoef et al., 2021) or modifying existing ones, focusing on the technological aspect, such as optimizing operational processes within the organization (Dąbrowska et al., 2019; Vial, 2021). As a result, there has been an ever-increasing demand for digital competencies worldwide (New Zealand Digital Skills Forum, 2017). Siddoo et al. (2019) showed that the talent of a digital workforce in the digital age strongly influences the nature of digital technology jobs and the demand for a digital workforce. But there still remains a gap in the top five competency requirements: lifelong learning, personal attitude, teamwork, credibility, and digital fundamentals. Additionally, a review of 70 empirical papers between 2010 and 2022 identified essential characteristics of labor change: (1) the digital capabilities of a person, (2) digital culture, (3) digital workspace, (4) empowerment, participation, and motivation, (5) presenting and expressing a shared vision, and (6) transformational leadership and governance (Alrasheedi et al., 2022).

To achieve workforce transformation, essential skills were also promoted, such as communication, openness, positive attitude, critical thinking, empathy, and potential training through face-to-face role play (Konstantinidis et al., 2022). The conclusion was that a diverse workforce of gender, age, color, and digital capabilities requires flexibility and balance between life, family, work, education, and digital society (Wong et al., 2020). Therefore, the model organization should respond to its work in the integrated environment of the workforce, which is necessary to receive skills and new potential from personnel, to balance the arrangement of different workplaces with the process of integrating the digital workplace in the digital age, especially those digital workforces in organizations that need to develop their digital capabilities. This was consistent with provincial and national strategic plans. According to the insights of Weritz (2022), it was found that responsible digital thinking, digital literacy, change skills, personal development skills, communication skills, community management skills, data analysis skills, and web development skills are critical in the digital workplace. This considers employees as the top priority for digital transformation, and highlights employee-level innovation in the workplace (Ahmed et al., 2022).

Under the provincial office in Thailand, there is a group called the Strategy and Information Technology Development Division, which employs computer technicians who are considered essential digital human resources. They are responsible for carrying out digital tasks related to the mission and responsibilities of information technology in order to drive organizational development in accordance with the country's digital technology plans and policies (Office of the Council of State, 1991). Therefore, it is important to establish a digital infrastructure foundation to benefit from digital technology in maintaining digital security, supporting public culture with technology, and preparing a suitable working environment for collaborative technology use, including the safe use of data related to digital technology. They possess wisdom and responsibility for continuous learning (Smart Nation Singapore, 2018). The scope of digital capabilities includes data, communication, content creation, security, and problem-solving abilities (Ragnedda & Kreitem, 2018). This aims to create an efficient digital workforce that can integrate and utilize technology (Basilotta-Gómez-Pablos et al., 2022) to generate new jobs that develop alongside technological advancements (Pesch, 2021), leading to two research objectives: firstly, to define the necessary competencies and propose an essential competencies framework for digital

personnel in the regional offices of Thailand and, secondly, for planning digital workforce development that aligns with management platforms and supports digital changes according to the digital economic and social development plan of Thailand from 2018-2037, enabling digital integration and keeping pace with continuous global digital transformations.

2. RELATED LITERATURE

2.1. Digital Workforce Concept

The concept of a digital workforce in this research was a human-centered approach that was part of skilled human capital and provides them with sustainable, suitable employment opportunities. As organizations transform into the digital workplace, it becomes a real challenge to manage the digital talent of employees (Cooke et al., 2022). The definition of the digital workforce is employee transition from traditional/semi-traditional production to fully automated systems (Cooke et al., 2022), which encounters outdated skills in some workforces. This meant that some of the roles and skills need to be recovered. It was estimated that 30% of the workforce is forced to do different jobs, low-skilled and high-skilled, and inevitably needs to change careers and occupations and their skill levels. The result has been the creation of millions of new jobs requiring new skills (World Economic Forum, 2020) based on the flexibility of qualifications and defined digital competency targets (Chaerunisa et al., 2022). Therefore, it is necessary to develop all-new abilities. The same applies to the digital workforce working in computer academic positions; according to the workforce structure and division of labor within the provincial government under the Ministry of Interior, Thailand, it is necessary to have roles, features, and capabilities in digital operations.

2.2. Knowledge and Skill of Digital Workforce of the Provincial Offices in Thailand

In this research, conceptual approaches related to digital workforce competency involve using and supporting basic information technology skills and using computers to retrieve, evaluate, store, produce, present, and exchange information (European Union, 2006). The role of digital literacy in the workplace was to transition towards a management style oriented around digital technology (Dery et al., 2017; Hanelt et al., 2021a), as well as pointing out that it is necessary to recognize and support an organization's digital innovation efforts (Hanelt et al., 2021b; Kohli & Melville, 2019; Wrede et al., 2020). Moreover, digital

competencies are required for general management or leadership in the digital age (Furr et al., 2012; Volberda et al., 2021). These fulfill the requirements appropriately and are flexible enough to adapt to different digital situations. Moreover, protection against rapidly obsolete structures is required (Bartolomé et al., 2022); for example, skills to transform digital literacy could be classified into five aspects: (1) data and information literacy, (2) communication and collaboration, (3) digital content creation, (4) security, and (5) problem-solving. This describes capabilities in general terms and is technologically neutral. A deep understanding of the technology capable of analyzing data and creating scenarios, simulations, and insights is also needed (Wu, 2022). Thereby, the knowledge dimension is the acquisition and retention of specific information, specific contexts, or rules for exchange. The skill dimension is communication or showing different behaviors of people. This results in successful discussions (Sue, 1998; Sue et al., 1992).

2.3. Characteristics and Functional Roles of Digital Workforce of the Provincial Offices in Thailand

General knowledge, mental ability, behavior and attitude, emotional management, personal relationships, and goals (Cunningham et al., 2022) are prerequisites for a digital workforce looking to manage learning and digital technologies. Therefore, stimulating the integration of that behavior is necessary. Furthermore, the hierarchical structure in the team division, in particular, is a contextual factor resulting from the influential role of senior management (Firk et al., 2022). Furthermore, interdependence, enhanced by networks, facilitates collaboration and innovation, manages complex social issues, augments governance, and collectively steers the development and implementation of policies (Gray & Purdy, 2018; Larsson, 2020). This transformation encompasses shifting towards more open, egalitarian interpersonal relationships while diminishing hierarchical structures. It primarily entails improvements in several key areas, namely: (1) work-life balance, (2) flexibility, (3) versatility, (4) alignment of values, and (5) the enhancement of work meaningfulness (Hofmann et al., 2019), all of these focusing on inspection, acceptance, utilization, and the significant advancement of digital technology (Beliaeva et al., 2020; Nambisan et al., 2018; Olsson & Bernhard, 2021; Srinivasan & Venkatraman, 2018). Therefore, achieving a balanced and accurate digital career path discovery should be prioritized, starting with strategic digital business model support, digitalizing the process of strategic digital platform sup-

port, and building a digital ecosystem (Bartolomé et al., 2022), as well as stimulating the inclusion of behaviors under specific traits of digital innovation with the behavioral integration of digital knowledge (Buyl et al., 2011; Georgakakis et al., 2017) and emphasis on skill level enhancing coordination roles (Firk et al., 2021; Kunisch et al., 2022; Singh et al., 2020). These objectives were linked to the need for success theory. This reflects a sense of accomplishment by striving to achieve one's career goals (McClelland, 1961). Positive intercultural relationships, and values embedded in the environment, preferences, and awareness of importance, are the deepest part of the culture in that environment (Bukowski & Rudnicki, 2019; Gao et al., 2020; Okada et al., 2021). Individuals with aspirations for high achievement proactively engage in significant endeavors motivated by a deep-seated desire for success. They consistently pursue success, driven not only by goal orientation but also by a lasting aspiration for the psychological satisfaction that results from achieving desired outcomes (Furnham, 2021).

Therefore, the above information could be considered as concepts and principles of digital competency, which had many issues. The researcher asked the research questions, "What are the competency requirements required for the digital workforce of the Provincial Offices in Thailand?", and "What should be the ideal competency framework for an effective digital workforce in these offices?" The summaries were synthesized to form a conceptual framework for the study, shown in Fig. 1.

3. METHODOLOGY

The Delphi technique is a method of collecting and organizing the results of expert group opinions and decision-making regarding consensus answers. This involves gathering answers in a series of interviews and using systematic consensus checks on specific issues through the design of questionnaires to collect feedback and summarize opinions as a consensus in each successive round (Balasubramanian & Agarwal, 2012). Following the feedback-response process for decision-making (Novakowski & Wellar, 2008), this is a method for validating potential conclusions based on the highest possible level of expertise (Glass et al., 2022), covering diversity in the researcher's focus group, regardless of the conversation, including reflections on individuality, identity, and sensitive contexts (Milani & Borba, 2022). The approach was receptive to creativity, innovation, and discovery, fostering a sense of responsibility (Jarzabkowski et al., 2021), and more practical application of new ideas, processes, and design procedures (Lê & Schmid, 2022). Personalization and linguistic diversity (Daft & Lengel, 1986), together with the integrated Delphi technique between the Delphi technique and Delphi electronics technique (von der Gracht, 2012), achieved flexibility and suitability in the current context. This allowed the researcher to uncover

Digital literacy
- Using digital
- Digital insights
- Digital applied creativity
- Digitally using problem-solving tools
- Adaptation to digital transformation
- Digital organization management

Digital skills
- Digital technology
- Calculation of digital work systems
- Innovation in digital work services
- Programming in digital work

Competency of digital workforce

Digital characteristics
- Personal image in digital work
- Digital job roles
- Digital performance
- Practice ethics in digital work

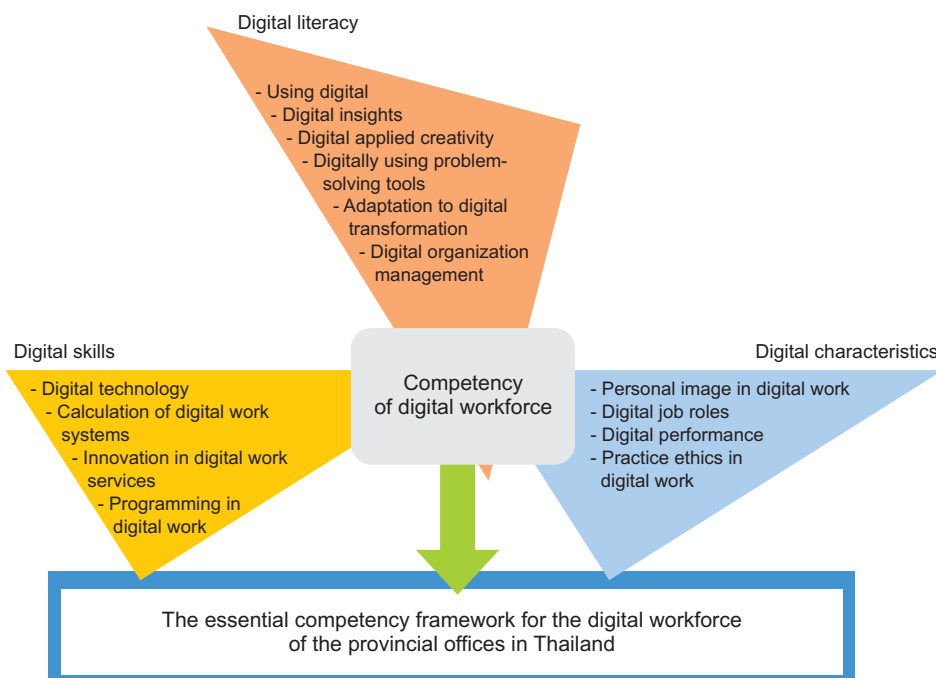The essential competency framework for the digital workforce of the provincial offices in Thailand

Fig. 1. Conceptual framework for studying the competencies needed for digital workforce in Thailand.

new insights from exploring specific social contexts by utilizing channel interviews to simultaneously send and receive verbal and non-verbal messages. Furthermore, the process could personalize and prevent multilingualism. A distinguishing feature of Delphi research was that a group of experts was free to provide answers but could not know the answers or details of the experts who were primary informants. This study was approved by the Human Research Ethics Committee, Khon Kaen University, number HE643217, certified on 24 November 2021.

The population studied in this research consists of individuals who work and are involved with the digital workforce in Thailand. Since the actual population size is unknown, a targeted selection method was used to select primary data sources. This includes individuals working or responsible for digital technology under provincial offices, experts working or responsible for digital technology in public and private sectors, those involved in the digital workforce, and experts from educational institutions who contribute to teaching and research in producing digital technology personnel. They represent the research study as representatives for the research objectives. The discrepancy was between 0.02-0.50 (Macmillan, 1971), totaling 17 people, divided into groups of organizational personnel (12 people, including six executives and six digital workforces), and a group of digital technology experts (5 people, including two digital workforce development experts and three digital workforce production experts). However, if the leading informant group needed help providing information, each region's provinces would be selected instead according to the population. The three criteria for the exclusion of informants from the research were defined as follows: (1) they do not meet the qualifications specified in each group, (2) they fail to provide consent and complete cooperation in providing information by the completion of the data collection process, and (3) consent to participate and cooperate by providing information was incomplete; participants reserved the right to withdraw prior to the completion of the data collection process.

Conducting research using the Delphi technique was an efficient and fast data collection process, starting with brainstorming. This was followed by assessment and screening to ensure a unanimous consensus (Nayahangan et al., 2019), generated as an electronic survey with anonymous and confidential responses. This provided independent feedback and limited the risk of bias affecting the outcome (Karstensen et al., 2018; Nayahangan et al., 2018; 2019). An approach to concept and framework development (Rowe & Wright, 2011), especially in research

on professional learning with an iterative process, avoids groups' dynamic bias (Harteis, 2022). Data collection and knowledge had to be built on informed opinions, subjective expert judgments, and experiential interpretations (Winkler & Moser, 2016). Obtaining group opinions from individual primary informants (Landeta & Barrutia, 2011) allowed input from large and geographically dispersed cohorts. There were always multiple rounds to include around the generation of ideas. The first round needed to be more structured. This gave each primary informant an independent scope to identify and elaborate on issues they deemed necessary (Hartland-Rowe & Wright, 1975). In this research, work was divided into two phases according to the 2-step Delphi technique (Judd, 1971) as follows:

Step 1: The determination of the topics studied, leading to structural and operational policy formulation.

The first phase focused on the study of competency requirements for the digital workforce of the Provincial Offices in Thailand (1st time). The steps involved in Phases 1 and 2 are included in Fig. 2.

The research instrument was a structured interview with in-depth information about the questionnaire (Crabtree et al., 1993), generated from a synthetic review of secondary data. This was a set of two open-ended questions. It consisted of an interview form for corporate personnel and digital technology experts. The quality of the tools was examined by five experts knowledgeable in digital technology, competency, and social science research statistics, with rates of +1 (consistent), 0 (unsure), and -1 (inconsistent). The Index of Item Objective Congruence method was used to analyze the results. It was found that the consistency of the question items was between 0.80-1.00, indicating that both interview forms had content validity (Rovinelli & Hambleton, 1976).

The initial data collection was conducted by developing an interview form using Google Forms, a method employed to gather empirical data pertinent to qualitative and quantitative research (David et al., 2023). This approach enabled experts to freely provide information and respond to inquiries (von der Gracht, 2012). The form was disseminated via online channels, including Line, Facebook, and Email, to facilitate accessibility and participation. When the primary informant had to participate in the interview in person or via online platforms such as Line, Facebook, or Zoom, they chose individual interviews. Maintaining the anonymity of responses is a key aspect of the Delphi technique. Iterative surveys used di-
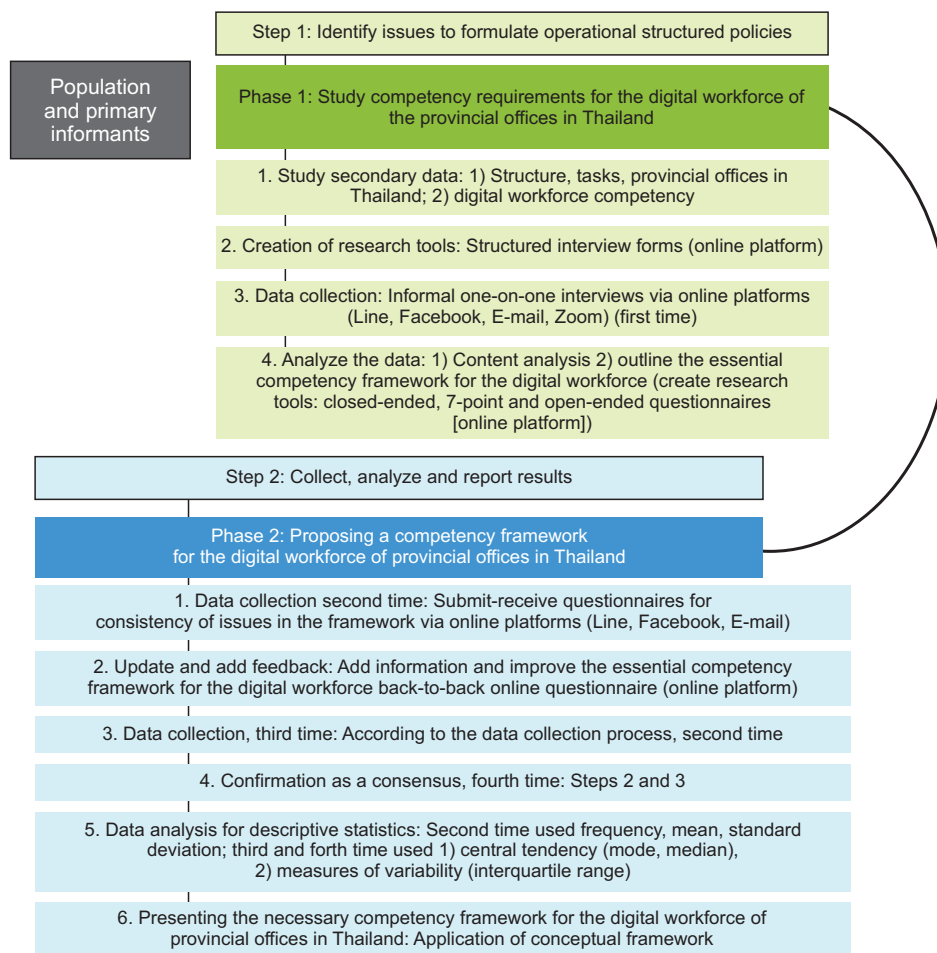
Population and primary informants	Step 1: Identify issues to formulate operational structured policies
	Phase 1: Study competency requirements for the digital workforce of the provincial offices in Thailand
	1. Study secondary data: 1) Structure, tasks, provincial offices in Thailand; 2) digital workforce competency
	2. Creation of research tools: Structured interview forms (online platform)
	3. Data collection: Informal one-on-one interviews via online platforms (Line, Facebook, E-mail, Zoom) (first time)
	4. Analyze the data: 1) Content analysis 2) outline the essential competency framework for the digital workforce (create research tools: closed-ended, 7-point and open-ended questionnaires [online platform])

Step 2: Collect, analyze and report results

Phase 2: Proposing a competency framework for the digital workforce of provincial offices in Thailand

1. Data collection second time: Submit-receive questionnaires for consistency of issues in the framework via online platforms (Line, Facebook, E-mail)

2. Update and add feedback: Add information and improve the essential competency framework for the digital workforce back-to-back online questionnaire (online platform)

3. Data collection, third time: According to the data collection process, second time

4. Confirmation as a consensus, fourth time: Steps 2 and 3

5. Data analysis for descriptive statistics: Second time used frequency, mean, standard deviation; third and forth time used 1) central tendency (mode, median), 2) measures of variability (interquartile range)

6. Presenting the necessary competency framework for the digital workforce of provincial offices in Thailand: Application of conceptual framework

Fig. 2. Implementation of research data collection using Delphi techniques and Delphi electronic techniques.

verse groups and solving differences to achieve the goal of maximum consensus (Gupta & Clarke, 1996; Guzys et al., 2015), with a total of 15 people, representing 88.23%, consisting of 10 corporate personnel (66.67%) and a group of five digital technology experts (33.33%). This was consistent with the observations of Creswell and Creswell (2017) that guidelines determine the appropriate sample size in qualitative studies. Depending on the research design and saturation, there could be 1-30 participants.

Data analysis uses the method of analyzing the content region, connection, and relationships (Steiner et al., 2007) by using short or long statements with latent content analysis on the fundamental aspects of the phenomenon under consideration (Boyatzis, 1998; Vears & Gillam, 2022) that were relevant to the question. The research was used to outline the competency required for the digital workforce of the Provincial Offices in Thailand through a closed-ended questionnaire. A 7-level assessment scale (Chan & Idris, 2017; Vagias, 2006) allowed for assessing different levels of importance, agreement, or even quality

(Claveria, 2018) and appropriateness before being used to collect data in Phase 2.

Step 2: Collection, analysis, and reporting of study results (2nd, 3rd, and 4th, unanimous confirmation of concordance).

The second phase of the project proposed the necessary competency framework for the digital workforce of provincial offices in Thailand. Data collection was created as a closed-ended questionnaire in an online form using Google Forms delivered via online channels (same as Phase 1, Time 1) with the primary informants as follows: for Time 2, a total of 15 people (there was a synthesis of each issue); for Time 3, a total of 10 people (reviewing issues and adding feedback); and for the 4th time, 10 participants were able to confirm their consensus to determine the importance of each case and reach agreement in the end (Gupta & Clarke, 1996; Guzys et al., 2015).

Descriptive statistical methods were employed to ana-

lyze the data, facilitating an understanding of key metrics such as the maximum and minimum values and the overall data distribution (Sudarto et al., 2020). Initially, this involved calculating the frequency, mean (M), and standard deviation (SD). Subsequently, measures of distribution, including the quartile range, were examined. The interpretation of the calculated median was conducted by Best (1970)'s criterion. According to this criterion, a median value of 3.50 or higher was deemed necessary to indicate consistency in the data. Subsequently, the standard for interpreting the interquartile range was defined by the methodology proposed by Glass and Hopkins (1996). This involved calculating the difference between the first and third quartiles. A resultant value not exceeding 1.50 was indicative of consistency in the opinions of the expert group regarding each question in the report. Finally, the criteria for interpreting the mode results were established based on Flanders (1988)' guideline, which stipulates that the absolute difference between the Mode and Median should not exceed 1. This criterion was adopted to ascertain the uniformity of opinions within the expert group.

For presenting the necessary competency framework for the digital workforce of provincial offices in Thailand with the application of the conceptual framework, the researcher visualized the understanding of concepts, sub-concepts, and relationships between concepts in a mind map (Kwon & Cifuentes, 2009). The relationship between concepts in the mind map consisted of open-ended ideas, connecting lines, phrases, and concept map structures linked. The researcher chose terms for ideas similar to the respondent's knowledge to characterize overall coverage and associations between categories (Cañas et al., 2013; Ruiz-Primo, 2000; Ruiz-Primo et al., 2001; Watson et al., 2016). The researcher synthesized the results derived from consensus-building exercises to construct a competency framework essential for the digital workforce in Thailand's Provincial Offices.

4. RESULTS

4.1. Competency Requirements Needed for the Digital Workforce of the Provincial Offices in Thailand

4.1.1. Summary of Competencies for Digital Labor in Thai Provincial Government Offices

This initial phase of data collection, utilizing the Delphi technique with a primary informant group, encompasses findings presented in Tables 1-3, detailing essential skills for digital tasks in provincial government settings in Thailand.

4.1.2. Delphi Study Findings on Essential Competencies for Digital Labor in Thailand

Identifying essential competencies for digital labor in Thailand was derived from the insights of a primary cohort of 15 data contributors, utilizing the Delphi technique in its second round and second iteration. The findings were as follows: 1) In digital literacy, scores ranged from high (5) to high (6). The highest score (6) was attributed to digital usage and adaptation to digital transformation, as indicated by 13 respondents. Following this, digital applied creativity was noted by 12 respondents.

Table 1. Summary of competency requirements required for digital workforce digital knowledge dimension

Dimension	Requirement
Digital literacy	Knowledgeable, spacious, clean, modern, and timely digital innovation is designed and developed with the old technology to the new one with expertise for continuous use
1. Digital use	Using computers, the Internet, management program presentation programs, computer security applications for daily career, and self-development
2. Digital understanding	Thinking, searching, filtering, discriminating, analyzing, synthesizing, and using digital tools to create, modify, communicate, disseminate, share, monitor, and supervise digitally
3. Digital applied creativity	Inventing, innovating, and processing together with digital technology concepts in the form of digital creation for managing and providing digital services
4. Digitally using problem-solving tools	Use equipment, technology, knowledge, programs, processes, and formats to solve problems arising from digital operations and services
5. Digital transformation adapting	Changing habits and behavior to improve, correct, develop, and reform operations, operations, and digital services
6. Digital organization management	Selection and recruiting digital technology increases productivity and adds value to the work process and digital workforce management according to plans and projects

Table 2. Summary of essential competency requirements for digital workforce; digital skills

Dimension	Requirement
Digital skill	Specific skills were amalgamated with knowledge, predicated on the requisite digital technology, to foster a novel digital work ecosystem, thereby augmenting professional competency in alignment with the demands of digital labor
1. Digital technology	Bringing modern scientific knowledge to apply digital work to achieve operational results and deliver digital services
2. Digital systematic calculation	The results were systematically deduced through computational science, leveraging knowledge of digital technology. This involved the integration of complexity characteristics into a coherent sequence, guided by specific digital technical logic, for developing a system encompassing information and technology
3. Digital service innovation	Finding ways to create new digital innovations and different digital work services, with principles, processes, steps and concepts, technical theories, and specific digital techniques to benefit the organization, colleagues, and service users
4. Digital programming	Writing a list of commands, a set of instructions written in a computer language to work with information systems and digital programs according to established procedures

Table 3. Summary of essential competency requirements for digital workforce; digital characteristics

Dimension	Requirement
Digital characteristics	A digital work environment, as measured by roles and performance, is achieved accurately, reasonably, and transparently to all parties
1. Digital personal image	Showing gestures and behaviors requiring communication about facilitation, service delivery, and digital performance to society
2. Digital function role	The requisite status for conducting digital activities and operations must be underpinned by a conscientious awareness of responsibility and a commitment to ethical practice
3. Digital performance result	Ability to perform tasks effectively following the organization's digital objectives and goals
4. Digital ethical practice	Acting and proceeding following guidelines for conduct based on moral principles rationally, distinguishing what is right and what should and should not be done, not selfishly encroaching on one another, and following the rules, conventions, laws, and regulations related to digital work

Nine respondents acknowledged using digital tools for problem-solving and digital organizational management, while eight respondents ranked digital understanding last. 2) For digital skill dimensions, the scores varied from moderate (4) to high (6). The highest score (6) in this category was for digital service innovation, as reported by 14 respondents. This was followed by digital technology and digital systematic calculation, noted by 12 and 6 respondents, respectively, with digital programming being the least mentioned by four respondents. 3) Regarding digital characteristics, the scores again ranged from high (5) to high (6). The top position, with a score of (6), was for the role of digital function, as identified by 12 respondents. There were three areas with equal scores: digital personal image, digital performance result, and digital ethical practice, each cited by ten respondents. These results are detailed in Table 4.

4.1.3. Ranking and Analysis of Competency Dimensions for Digital Personnel in Thailand's Provincial Offices

The computation of the mean and standard deviation for the competency requirements essential for digital personnel in Thailand's provincial office sector was conducted based on the inputs from a primary group of 15 data contributors, employing the Delphi technique in its second round and iteration. The results indicated a high level of competency across all dimensions (M=5.62, SD=0.03). The dimensions were ranked in descending order of importance as follows: (1) The Digital Literacy dimension exhibited the highest mean (M=5.69, SD=0.09), with Digital Applied Creativity leading within this category (M=5.90, SD=0.40). (2) The Digital Characteristics dimension followed closely (M=5.68, SD=0.09), with the Digital Function Role being the most prominent aspect (M=5.79, SD=0.31). (3) Lastly, the Digital Skills dimen-

Table 4. Summary of the frequency of the competency requirements required for the digital workforce of the provincial offices in Thailand (n=15)

Dimension	Number (issue)	Frequency (n)						
		Not have (1)	Little (2)	Quite a bit (3)	Moderate (4)	Quite a lot (5)	A lot (6)	The most (7)
Digital literacy	56							
1. Digital use	12	-	-	-	-	2	13	-
2. Digital understanding	10	-	-	-	-	7	8	-
3. Digital applied creativity	6	-	-	-	-	2	12	1
4. Digitally using problem-solving tools	7	-	-	-	-	5	9	1
5. Digital transformation adapting	9	-	-	-	-	2	13	-
6. Digital organization management	12	-	-	-	-	6	9	-
Digital skill	33							
1. Digital technology	8	-	-	-	-	3	12	-
2. Digital systematic calculation	9	-	-	-	-	9	6	-
3. Digital service innovation	9	-	-	-	-	1	14	-
4. Digital programming	7	-	-	-	3	8	4	-
Digital characteristics	50							
1. Digital personal image	11	-	-	-	-	5	10	-
2. Digital function role	10	-	-	-	-	3	12	-
3. Digital performance result	15	-	-	-	-	5	10	-
4. Digital ethical practice	14	-	-	-	-	5	10	-
Total	139	-	-	-	-	-	-	-

sion (M=5.49, SD=0.14) was identified, where Digital Service Innovation was ranked highest (M=5.73, SD=0.17). These findings are comprehensively detailed in Table 5.

4.2. Presenting the Necessary Competency Framework for the Digital Workforce of the Provincial Offices in Thailand

This discovery confirms a consensus on various issues within the framework of competencies necessary for digital personnel in the regional office sector of Thailand. The data were obtained from a questionnaire survey con-

ducted with a main group of 10 data providers, using the Delphi technique, round 2, iteration 3, and were further confirmed as a consensus in round 4. It was found that there was a consensus level of consensus on all dimensions (3 dimensions), all aspects (14 aspects), and all issues (84 issues). The interquartile range (IQR) was not over 1.50, and the median (Mdn) was between 5.00-6.00, indicating the most consistent, and the absolute value of the difference between the mode and the median was between 0.00-0.50. When classifying as a digital knowledge dimension (6 aspects, 28 issues), it was found that the IQR was

Table 5. Mean and standard deviation of competency requirements required for digital workforce in Thailand (n=15)

Dimension	Number (issue)	M	SD	Meaning	Rank
Digital literacy	56	5.69	0.09	A lot	1
1. Digital use	12	5.76	0.34	A lot	4
2. Digital understanding	10	5.43	0.30	A lot	6
3. Digital applied creativity	6	5.90	0.40	A lot	1
4. Digitally using problem-solving tools	7	5.80	0.51	A lot	2
5. Digital transformation adapting	9	5.78	0.27	A lot	3
6. Digital organization management	12	5.47	0.30	A lot	5
Digital skill	33	5.49	0.14	A lot	3
1. Digital technology	8	5.63	0.23	A lot	2
2. Digital systematic calculation	9	5.45	0.24	A lot	3
3. Digital service innovation	9	5.73	0.17	A lot	1
4. Digital programming	7	5.16	0.49	A lot	4
Digital characteristics	50	5.68	0.09	A lot	2
1. Digital personal image	11	5.64	0.42	A lot	3
2. Digital function role	10	5.79	0.31	A lot	1
3. Digital performance result	15	5.62	0.39	A lot	4
4. Digital ethical practice	14	5.68	0.52	A lot	2
Total/average total	139	5.62	0.03	A lot	-

M, mean; SD, standard deviation.

not more than 1.50, and the Mdn was between 5.50-6.00, indicating that it was the most consistent, and the absolute value of the difference between the mode and the median was between 0.00-0.50. The digital skills dimension (4 aspects, 20 issues) found that the IQR was not more than 1.50, and the Mdn was between 5.00-6.00, indicating that it was the most consistent, and the absolute value of the difference between the mode and the median was between -0.25-0.00. The digital feature dimension (4 dimensions, 36 issues) found that the IQR was not more than 1.50, and the Mdn was between 6.00-6.00, indicating that it was the most consistent, and the absolute value of the difference between the mode and the median was between 0.00-0.00, as shown in Table 6.

4.3. Results of the Proposed Framework for the Essential Digital Workforce for the Provincial Offices in Thailand

Results were derived from the analysis of the key points from the consensus confirmation of conformity (Table 6), consisting of the overall components, the total amount of 3 dimensions, 14 aspects, and 61 issues, as shown in Fig. 3.

4.4. Additional Recommendations and Guidelines

4.4.1. Promoting Digital Work Management according to the Policy Plan

Suggestions of driving digital management according to the policies and operational plans of the Provincial Offices in Thailand in the future include: (1) increased or sufficient personnel support for digital workloads, (2) establishing a digital skills development framework for personnel, (3) promoting sufficient digital technical competency along with modern digital tools, and (4) raising awareness of adapting and paying attention to competency dimensions according to different contexts of personnel and organizations, as in the interview examples here:

...It is necessary to establish a framework for developing digital skills that will promote and support the use of digital technology in operations and the development of government work, and support the transformation of the public sector into a digital government…. (D001, interview, 18 March 2022)

Table 6. Summary of the consensus of the essential competency framework required for the digital workforce of provincial offices in Thailand

Dimension	Number (issue)	Consensus					
		Mod.	Mdn	Mod.-Mdn	Q3	Q1	IQR
Digital literacy	28	6.00	5.88	0.13	6.25	4.84	1.41
1. Digital use	5	6.00	5.50	0.50	6.25	5.00	1.25
2. Digital understanding	3	6.00	6.00	0.00	6.25	5.00	1.25
3. Digitally applied creativity	4	6.00	5.75	0.25	6.25	5.00	1.25
4. Digitally using problem-solving tools	3	6.00	5.50	0.50	6.25	4.75	1.50
5. Digital transformation adapting	5	6.00	6.00	0.00	6.13	4.88	1.25
6. Digital organization management	8	6.00	6.00	0.00	6.25	5.00	1.25
Digital skill	20	6.00	5.63	0.38	6.25	4.83	1.42
1. Digital technology	5	6.00	6.00	0.00	6.25	5.00	1.25
2. Digital systematic calculation	4	5.00	5.25	-0.25	6.00	4.81	1.19
3. Digital service innovation	5	5.00	5.00	0.00	6.25	4.88	1.38
4. Digital programming	6	6.00	6.00	0.00	6.25	5.00	1.25
Digital characteristics	36	6.00	6.00	0.00	6.25	4.81	1.44
1. Digital personal image	9	6.00	6.00	0.00	6.25	4.75	1.50
2. Digital function role	9	6.00	6.00	0.00	6.13	5.00	1.13
3. Digital performance result	9	6.00	6.00	0.00	6.25	5.00	1.25
4. Digital ethical practice	9	6.00	6.00	0.00	6.25	5.00	1.25

Mod., mode; Mdn, median; Q, quartile; IQR, interquartile range.

...The 3D performance framework, regarding knowledge skills (abilities) and attributes, is still suitable for driving. The weights of the 14 sub-components may differ depending on the context of each organization... (C001, interview, 8 March 2022)

4.4.2. Guidelines for Promoting the Essential Competencies in the Future

As illustrated in Fig. 3, guidelines for driving the critical digital competencies of the workforce through the development of digital-specific technically assisted artificial intelligence for public sector organizations may include: (1) guidelines for establishing a framework for developing essential digital competencies that could promote and support the use of digital technology in work for all workforce levels equally, (2) guidelines for policy framework comprehensive digital implementation plans to support digital government transformation development platforms, (3) guidelines for driving the digital networking policy to develop the digital competencies needed to manage the digital workforce for the dynamic organization,

and (4) guidelines for a systematic approach to developing essential competencies using the digital knowledge, skills, and feature dimensions for people development planning, technology, and digital management.

5. DISCUSSION

The results of the essential competency requirements for the digital workforce of the Provincial Offices in Thailand are as follows:

The findings provide a comprehensive overview of the competencies needed for digital literacy, emphasizing the necessity for clear, current, and timely knowledge. These competencies are crucial for responding innovatively to evolving technological demands and effectively understanding and managing complex digital data sets. This could be analyzed, adapted, and planned to be utilized dynamically and collaboratively in response to missions with expertise (Alaimo, 2022), which require finding the most appropriate model by taking advantage of skills and re-

Fig. 3. Essential competencies for the digital workforce for the Provincial Offices in Thailand.

sources of organizations through data generated by data-driven digital technologies (Björkdahl, 2020) focused on auditing optimization. The Provincial Offices in Thailand have responded by approaching an organizational model that exploits coherence and interdependence (Cennamo et al., 2020). This is an opportunity to innovate change in structure, process, and management models that enable organizations to adapt quickly and continuously (Cennamo et al., 2020; Hanelt et al., 2020; Lanzolla et al., 2020). Schallmo and Lohse (2020), along with Verhoef et al. (2021), posit that the application of digital technologies in the analysis and collection of data encompasses

the generation of actionable information for assessment, decision-making, and the development of innovative digital business models. This process aids organizations in creating value and enhancing performance, encapsulating the concept of "Organization+Technology+Information." This concept is characterized by model innovation, value creation, and the emergence of new economic paradigms. Parallel to this, the professional development of librarians, as discussed by Ezeani et al. (2015), has facilitated their ability to design novel information resource formats for communities, thereby contributing to the advancement and stability of the librarianship career (Khan & Du, 2017;

Sivankalai, 2021; Venturella & Breland, 2019). An example of this evolution is the creation of e-learning communities, where an operating system, leveraging online knowledge resources, functions as an e-learning server. This system allows users to engage with libraries via the Internet, as illustrated by Cooke (2012), thereby expanding the scope and accessibility of library services.

It is imperative to possess competencies in specific professional skills, which involve integrating knowledge acquired from digital transformation to transition into the new digital paradigm that is both in demand and congruent with digital work. The Intellectual Property Rights Allocation Regime and Geopolitical Strategy have emerged as critical conditions for utilizing technology and digital information (Brem & Nylund, 2021; Lee, 2018; Petricevic & Teece, 2019). Producing and portable accumulation of big data for worldwide policymakers requires better infrastructure, interfaces, and storage (Otto & Jarke, 2019), along with a robust infrastructure to enable governance to create more value and distribute more widely (Jones & Tonetti, 2020). While having more accessible access to many platforms as a member leads to more creativity, it might encourage opportunistic behavior (Karhu & Ritala, 2021). Consequently, pursuing creative digital organizational innovations is essential (Cennamo & Santaló, 2019). The study by Popoola and Adedokun (2023) revealed that collective intelligence skills markedly influence the utilization of electronic library resources. Furthermore, librarians' attitudes towards technology underscore the importance of skills such as computational thinking in technology development, coding proficiency, and using technology as a tool tailored to local needs. Additionally, the necessity for technical language skills and the capability to bridge users with technology necessitates a comprehensive understanding of both domains (Cox, 2023).

As for the digital attributes dimension, there is a need for digital collaboration capabilities within the context of accuracy, fairness, and transparency in the digital ecosystem environment and within the digital workforce. The human involvement of behavioral needs, expectations, creativity in design, and the use of digital technology to solve problems and perform other tasks, might be at risk of being used as a customization tool according to the needs of the organization (Kellogg et al., 2020; Nørskov, 2022). Therefore, determining how to design digital technology that facilitates including a model of sustainable cultural use is an important management task. It has to be ensured that those technologies could enhance moral, social, and emotional skills to bring about valuable

changes in practices and norms in the workplace (Ulhøi & Nørskov, 2021), while individual competencies depend on digitally promoting learning, engagement, and problem-solving (Belpaeme et al., 2018; Ford, 2015; Tennent et al., 2019; Traeger et al., 2020). Organizations must maintain equilibrium among structures, formats, and ecosystems shaped by design principles and processes stemming from digital technology. This balance is crucial to effectively harness the organization's existing knowledge, capabilities, and potential (Lanzolla et al., 2020; Maijanen & Virta, 2017). Such an approach fosters an awareness of the varying priorities that exist at different levels: personal (emotional), organizational (strategic), and geographic (regulatory). This awareness acknowledges the distinctiveness and significance of each level in the broader organizational context (Aarikka-Stenroos et al., 2021; Nylund et al., 2021). At the same time, library and related fields are beginning to show interest and study the services, changes, and application of technology in the metaverse era (Njoku et al., 2023). The metaverse is a newly created space built on various technologies, such as virtual reality, cloud computing, blockchain, and 5G (Kesselman & Esquivel, 2022). To develop smart libraries and provide intelligent and convenient public services (Sanji et al., 2022), it is generally recognized that smart librarians are the driving force behind the development of libraries and are representatives of the main components of smart libraries (Duncan, 2021).

However, developing measurable benchmarks should be considered role norms seeking the link between participatory processes, trust, and firm performance (Roy, 2022). Dynamic analysis, guidelines, rules, and interactions are necessary as organizations increasingly rely on technology. Therefore, there is a need to balance productivity and human well-being (Nørskov & Nørskov, 2020). As one clear example, AI is an extension of personal abilities and a potential replacement for human cognition, including increasing the creativity of individuals and teams (Amabile, 2019; Wang & Siau, 2019). Therefore, it affects employees' well-being and performance in digital work environments (Marsh et al., 2022). At the same time, the results confirm conformity as a unanimous consensus. This is an evaluation of data choices per the decision by a group of 10 primary informants who cooperated in identifying data according to reduced items. Consequently, the issues encapsulated within the essential competency framework for digital workforces were rendered more specific and lucidly delineated. This clarification aligns with the argument presented by Belton et al. (2021), who qualitatively exam-

ined data feedback issues. They raised concerns regarding whether pre-judgmental or selectively curated information poses an intellectual challenge, noting that the clarity of this challenge was previously ambiguous. The extent of this challenge depends on the interaction between many factors, including the amount of data (number and length of reasons and overall word count), complexity (variety of viewpoints, explanations, arguments, and types proposed), and the participants' expertise. The researcher often had to read other primary informants' responses and written rationale before reviewing them to make informed decisions with extreme accuracy (United Nations Educational, Scientific and Cultural Organization (UNESCO), 2019).

6. CONCLUSION

This research explored the essential competency framework for the digital workforce in Thailand's Provincial Offices. Utilizing a Delphi study, a rigorous consensus confirmation process was employed to achieve consensus on key issues. This process facilitated the prioritization of appropriateness in digital literacy across six aspects, digital skills encompassing four aspects, and digital characteristics also spanning four aspects. Consensus was established for 84 issues, concluding that 61 points are critical for constructing an effective competency framework for the digital workforce, enhancing their efficiency in utilizing digital technology as a labor-saving tool. Consequently, the findings of this study can inform the development of more thoughtful and practical program strategies. Furthermore, the identified essential competency framework for the digital workforce in this research can be adapted for broader coverage and policy adjustments as needed. This adaptability extends to planning, decision-making, implementation, evaluation, and future research endeavors. However, the group of primary informants in this study was relatively small. Suppose there are future studies with larger sample sizes. In that case, the findings of the performance outcomes required for the digital workforce can be most prominently demonstrated in a volatile technology environment, quickly and continuously in the digital world, and to make research more in-depth and different. Furthermore, this will result in guidelines to promote, develop and train specific digital techniques. It is essential to focus on applying the necessary competency frameworks for digital manpower to improve the curriculum of relevant digital-related courses, including digital technology, computer science, information science, and library science. These are professional fields that require the

continuous development of digital competencies to create valuable and sustainable potential.

The combination of a digital workforce and the Delphi technique can be highly beneficial to libraries and library professionals in several ways. The following is an overview of how these two elements can contribute to their effectiveness:

6.1. Digital Workforce in Libraries

Automation: Libraries can leverage digital technologies to automate repetitive and mundane tasks, such as cataloging, inventory management, and circulation processes. This allows library professionals to focus on more strategic and value-added activities.

Enhanced access: Digital platforms and online catalogs enable libraries to provide greater accessibility to their collections, resources, and services. Users can search, request, and access materials remotely, expanding the reach of the library beyond physical boundaries.

Personalization: Digital tools can enable libraries to personalize user experiences by offering recommendations based on users' preferences and interests. This can enhance engagement and satisfaction among library patrons.

Data analysis: With a digital workforce, libraries can collect and analyze data on user behavior, resource utilization, and preferences. These insights can help librarians make informed decisions regarding collection development, resource allocation, and service improvements.

6.2. Delphi Technique for Decision Making

Expert consensus: The Delphi technique involves gathering input from a panel of experts through a structured and iterative process. Libraries can employ this technique to tap into the collective wisdom and knowledge of library professionals, researchers, and scholars for decision-making purposes.

Strategic planning: Libraries can use the Delphi technique to identify emerging trends, anticipate future challenges, and develop long-term strategic plans. The iterative nature of the technique allows for refining and validating ideas over multiple rounds, resulting in well-informed decisions.

Resource allocation: The Delphi technique can aid libraries in determining resource priorities and allocations. By engaging a diverse group of experts, libraries can assess the relative importance of different projects, initiatives, or services, leading to more efficient and effective use of available resources.

Policy development: Libraries often face complex issues and dilemmas requiring careful policy development. The Delphi technique facilitates structured discussions, helping library professionals reach consensus on policies and guidelines that align with user needs and organizational objectives.

Combining a digital workforce with the Delphi technique empowers libraries and library professionals to harness technology for automation, improved decision-making, enhanced user experiences, and optimized resource utilization. By leveraging these approaches, libraries can adapt to the evolving needs of their patrons and remain relevant in the digital age.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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APPENDIX

Interview Terminology Set 1 and Set 2 (Phase 1)

A digital workforce refers to individuals who work in computer-related positions within their respective career paths and have additional responsibilities as assigned by provincial offices in Thailand.

Digital technology refers to the tools and systemic environment of a new working format that serves as a central axis to drive collective potential through digital networks, without being restricted by location and time, for the purpose of sharing and leveraging mutual benefits.

The context of provincial offices refers to the current situation of provincial offices in Thailand, which includes the organizational structure, duties, and internal division of tasks within the government agencies under the decentralized administrative structure of the Ministry of Interior. It also encompasses the working environment, readiness, and adequacy of information and digital technology.

An internal organizational management platform refers to the comprehensive process of managing everything within an organization to support the transition to a digital format as outlined in the national digital development plan for the economy and society for the years 2018-2037. This platform includes the Back Office by Digital Default system, smart service systems, inter-service systems, the seamless integration of government agencies as a single organization, beneficial data disclosure systems, and learning systems within an open framework for the general public.

Necessary competencies refer to essential behavioral characteristics in the performance of digital workforce, resulting from learning, expertise, proficiency, and other personal attributes. These competencies contribute to outstanding job performance, creating value and benefits for both the organization and society. They include:

A. Digital competency dimensions, consisting of three aspects, including:
1) Digital Knowledge Dimension, consisting of 6 aspects:
(1) Digital Usage, which refers to technical proficiency in digital technologies and the ability to leverage expertise from devices and knowledge sources for maximum benefit.
(2) Digital Understanding, which entails comprehending content, roles, being aware, and responsible for intellectual property and effectively managing information using critical thinking for digital media assessment.
(3) Digital Creative Application, which involves the ability to use digital technologies as tools for content creation and efficiently adapt various communication methods.
(4) Digital Problem-Solving Tool Utilization, which involves evaluating products through diverse digital media and assessing the accuracy of information to successfully employ digital technologies in problem-solving.
(5) Digital Adaptation, which encompasses managing knowledge, attitudes, and skills necessary to identify information needs, digital technologies, and digital media of an organization.
(6) Digital Organizational Management, which involves managing knowledge, attitudes, and skills to connect digital technologies for communication, collaboration with others, networks, and online communities.

B. Digital Skills Dimension, comprising 4 aspects:
(1) Digital Technology Skills, which encompass the knowledge and utilization of digital technologies to facilitate digital work transformation aligned with the structure, context, and digital operations of an organization.
(2) Systematic Thinking, which involves a comprehensive understanding that connects theoretical concepts related to digital technologies and technical practices in the digital field. It leverages creative thinking to develop systematic software programs for the organization, based on academic expertise and systematic skills of digital workforce within the organization.
(3) Service Innovation, which entails creating content derived from new knowledge sources through diverse technologies and digital media. It enables widespread recognition and dissemination of content through online social platforms.
(4) Programming Skills, which refers to the ability of digital workforce in understanding the principles of programming that support the platform for internal organizational management. This leads to the implementation of online systems that benefit the overall organization in all sectors with efficiency and effectiveness.

C. Digital Competency Dimensions, consisting of 4 aspects:

(1) Personal Image, which refers to competencies that exist within an individual and are challenging to observe and access. It arises from motivations, distinctive characteristics, and self-perception, and is visible through knowledge and skills that drive behaviors demonstrated in digital technology work.

(2) Roles and Responsibilities, which encompass the ability to work with various digital technologies and media securely, accurately, and efficiently.

(3) Work Performance, which involves communication of knowledge, attitudes, and skills through ethical online sharing tools, with an awareness of privacy and security.

(4) Ethical Work Practices, which entail an awareness of the positive and negative consequences in terms of knowledge, opinions, and necessary expertise regarding transparency, ethics, and laws related to digital technologies and diverse media.

Digital Technology Policies and Plans, according to the National Policy and Plan for Digital Development for Economy and Society, B.E. 2561-2580, consist of 2 aspects:

1. Current Platform Management Objectives: This involves setting goals for managing the existing platforms within an organization and establishing management objectives for all 6 platforms to align with the digital development plan for the economy and society, B.E. 2561-2580.

2. Digital Technology Implementation Plans: This includes incorporating the current platform management objectives and the management objectives for all 6 platforms into the digital development plan for the economy and society, B.E. 2561-2580, to create a short-term 4-year operational plan for digital technology work within the organization.

Interview for Research, Set 1 (Phase 1)

Essential Competencies for Digital Workforce of Provincial Office in Thailand: Using Delphi Technique
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Instructions: This interview is conducted to collect data from the first round of personnel in Phase 1. The objective is to study the digital competency needs of provincial offices in Thailand. The collected data will be used as a guideline to create the necessary competency framework for digital workforce in provincial offices in Thailand, as follows:

1. Opinions on the necessary competencies for performing digital technology-related tasks within the organization.

2. Other suggestions that support the development of necessary competencies for the digital workforce within the organization.

The researcher kindly requests your cooperation in providing truthful responses to all interview questions and sharing your opinions along with any additional suggestions based on your genuine knowledge. This will greatly contribute to the completeness and academic relevance of the study for future benefits.

Researcher

Opinions on the necessary competencies for performing digital technology-related tasks within the organization.
Instructions: Please provide your opinion on the competencies that are most essential for performing digital technology-related work within your organization, based on the most realistic assessment.

1. Competencies necessary for digital workforce.

1.1. What competencies do you think are necessary for digital workforce to perform in the following digital technology-related areas? Please provide reasoning to support your response. and list specific sub-competencies.

1) Digital Literacy: (1) Digital Use, (2) Digital Understanding, (3) Digital Applied Creativity, (4) Digitally Using Problem-solving Tools, (5) Digital Transformation Adapting, and (6) Digital Organization Management

2) Digital Skill: (1) Digital Technology, (2) Digital Systematic Calculation, (3) Digital Service Innovation, and (4)

Digital Programming

3) Digital Characteristics: (1) Digital Personal Image, (2) Digital Function Role, (3) Digital Performance Result, and (4) Digital Ethical Practice

1.2. What do you think are the essential competencies for individuals working in the digital technology field, specifically as digital assets in your organization? Which aspect do you consider the most important and why? Additionally, what specific qualities should they possess? (You can choose more than one aspect or all aspects, along with providing reasons and recommendations for those specific qualities.)

1) Digital Literacy

2) Digital Skills

3) Digital Characteristics

Other recommendations that support the development of essential competencies for digital workforce practitioners in the organization

Instructions: Please provide recommendations on the requirements needed to support the development of essential competencies for the digital workforce in your organization based on the most realistic needs.

The desired competencies for the digital workforce in an organization with the potential to drive and manage digital operations according to policies, action plans, or future development strategies are as follows. What are they and why are they important?

Research Interview Questionnaire Set 2 (Phase 1)

Essential Competencies for Digital Workforce of Provincial Office in Thailand: Using Delphi Technique

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Instructions: This interview questionnaire aims to gather information from a group of digital technology experts in Phase 1, with the objective of studying the necessary digital competencies for provincial offices in Thailand. The data collected will be used as a guideline for developing the essential competency framework for digital workforce in provincial offices across Thailand.

1. Opinion on the necessary competencies required for digital workforce performance on an internal management platform within an organization.

2. Recommendations and essential comments on the competencies of the digital workforce.

The researchers kindly request your input and interview responses to each question based on your truthful knowledge and opinions. Please provide additional suggestions with factual completeness for the benefit of academic purposes appropriately.

Researcher

Opinion on the necessary competencies required for digital workforce performance in digital work.

Instruction: Please provide your feedback on the necessary competencies required for actual and appropriate digital workforce for digital operation.

1. What do you think are the essential competencies required for the digital workforce to perform digital work and manage the following platforms? What specific important characteristics should they possess?

1) Back Office by Digital Default System

2) Smart Service System

3) Peer to Peer System

4) One Government System

5) Open Data System

6) Massive Open Online Courses System (mooc)

7) In cases where there is no management based on the aforementioned six platform formats, but there is management related to digital technology within the organization, what specific characteristics are necessary?

Recommendations and essential feedback for digital workforce competency.

Instructions: Please provide recommendations and feedback regarding the necessary competencies for the digital workforce. This will serve as guidance in establishing the framework for developing essential competencies required for the digital workforce to be relevant in the future.

Do you wish to understand the competencies of a digital workforce within an organization, particularly those with the potential for driving and managing digital operations in line with policies and operational plans? Alternatively, are you interested in exploring strategies for fostering these necessary competencies in the future?

Sample Issues in Questionnaire Set 3 (Phase 2)

An assessment form on compliance and conformity represents my individual standpoint on the essential competencies related to the digital transformation of provincial government offices in Thailand.

Instructions: This assessment form is designed to collect data from both the personnel group and the group of digital technology experts in the second phase of the second interval. The objective is to study the level of agreement and conformity to the unique perspective of the issues within the necessary competency framework for the digital workforce of provincial offices in Thailand. The data will be used as a guideline for the development and improvement of the necessary competency framework for the digital workforce of provincial offices in Thailand, with the aim of effectively applying it towards the intended goals. It is divided into two sections as follows:

Section 1: Opinions on the conformity and alignment to the unique perspective of the issues within the necessary competency framework for the digital workforce of provincial offices in Thailand.

Section 2: Recommendations and feedback for the necessary competency framework for the digital workforce of provincial offices in Thailand.

The researchers kindly request that you, the information provider, mark the symbol "✓" in the square symbol "□" for true statements. Please provide additional recommendations based on the truth to make them more complete for academic purposes and future benefits.

Researcher

Section 1: Opinions on the conformity and alignment to the unique perspective of the issues within the necessary competency framework for the digital workforce of provincial offices in Thailand.

The scoring criteria for each dimension/aspect/issue are as follows:

7 points=Very high, 6 points=High, 5 points=Moderately high, 4 points=Moderate, 3 points=Moderately low, 2 points=Low, 1 point=Very low.

Dimension/aspect/issue	Level of opinion						
	7	6	5	4	3	2	1
Digital Literacy							
1. Digital Use							
- Utilize digital tools to enhance productivity and solve problems.							
- Utilize digital technologies diversely and efficiently.							
- Apply digital technologies in work processes.							
- Utilize basic digital tools or applications for work purposes.							
- Utilize digital technology for communication and information sharing.							
- Apply, select, and utilize modern digital technologies to transform work processes and service delivery.							
- Utilize digital technology as formulas or functions for data calculation and prediction.							
- Utilize digital technology to support education, exploration, and research in work practices.							
- Utilize digital technology to integrate and adhere to digital work standards.							
- Utilize digital technology to design efficient and effective processes.							
- Utilize digital technology for planning, managing, and delivering diverse and appropriate services.							
- Utilize digital technology as network systems and software for work purposes.							
2. Digital Understanding							
- Understand digital comprehensively and holistically to drive organizational transformation in all aspects.							
- Understand laws, policies, and digital management standards.							
- Understand, control, and monitor compliance with policies and standards in digital management.							
- Understand the design and define the direction for organizational digital development.							
- Understand the management and administration of digital security in the use and provision of digital services.							
- Understand openness and embrace new digital advancements.							
- Understand search, analyze data, and assess the reliability of technology and digital data.							
- Understand responsibility and be aware of intellectual property when using digital media content.							
- Understand, adapt, and keep up with digital changes.							
- Understand digital literacy and apply it to problem-solving in working with technology.							
3. Digital Applied Creativity							
- Creatively utilize digital tools to solve encountered work problems.							
- Utilize various digital media with innovative technology applications according to the intended purposes of use.							
- Initiate and innovate the use of technology to support, plan, and transform digital strategies and projects within the organization.							
- Apply the integration of new media, online social media, and traditional communication technologies.							
- Creatively utilize digital data for decision-making based on situational and cultural contexts.							
- Apply digital technology to create a variety of efficient tools and work methods.							
4. Digitally Using Problem-solving Tools							
- Using limited digital tools to handle problem-solving in encountered tasks.							

Dimension/aspect/issue	Level of opinion						
	7	6	5	4	3	2	1
- Wisely deciding to use digital tools that are suitable for the objectives and requirements.							
- Using digital tools to support collaborative work and fulfill roles and responsibilities.							
- Consistently review the correct and appropriate use of digital tools in the work.							
- Familiarize oneself with various digital tools and utilize them in tasks and problem-solving.							
- Utilize modern digital tools to effectively design and implement appropriate work process problem-solving.							
- Curiously explore and seek knowledge about new technology and cutting-edge digital tools to apply in work.							
5. Digital Transformation Adapting							
- Eagerly learn new things, show interest, and stay informed about digital advancements.							
- Adapt and survive in both the current and future digital world.							
- Creatively generate innovative breakthroughs that yield benefits ahead of time and sustainably develop them independently.							
- Be flexible and adapt to the diverse social, economic, and cultural changes in the digital world.							
- Select appropriate digital technologies to develop organizational management platforms and provide digital services.							
- Embrace change and listen to feedback from others in applying new digital technologies and resolving work-related issues.							
- Control and adhere to digital management standards to leverage enterprise-level digital technologies.							
- Understand, possess the mindset, and adhere to digital management standards with a responsible and ethical approach to embrace changes effectively in work.							
- Be ready to learn new digital technologies and apply them to work.							
6. Digital Organization Management							
- Drive digital transformation and have strategies to address challenges arising from the use of digital technologies in the organization.							
- Set proactive guidelines and leverage digital technologies to address problems promptly in both current and future circumstances.							
- Review and evaluate problem-solving efforts by utilizing digital technologies to track and monitor events.							
- Respond to feedback and anticipate potential future situations or digital-related work issues.							
- Digital technology techniques supporting role-based work execution, collaboration, and interagency service delivery in the public sector.							
- Search for reliable digital information, understand how to reference the data used for analysis, and make informed decisions.							
- Establish digital policies and directions in collaboration with the organization.							
- Understanding the principles of knowledge management, mindset, and methods of interacting with others through digital technology.							
- Knowledge management and talent development in organizations utilize technology in their work processes.							
- Motivating or leading individuals within the organization to accept and manage knowledge and the use of digital technology towards digital transformation.							

Dimension/aspect/issue	Level of opinion						
	7	6	5	4	3	2	1
- Striving to learn about digital organizational management and applying it in the form of digital work practices.							
- Generating new knowledge in the field of digital innovation and using it creatively to adapt to the changes in the digital world.							

Digital Skills

1. Digital Technology

- Introducing new-age technology to replace outdated technology.

- Inventing innovations and applying them to existing or limited technologies.

- Proposing new digital concepts for transforming into a digital organization.

- Learning, analyzing, and presenting ideas by comparing existing digital concepts to newer and superior digital concepts.

- Utilizing digital technology as a key component in collectively transforming the organization into a digital entity.

- Transmitting and applying digital technology to generate positive outcomes or achieve organizational objectives.

- Choosing from a diverse range of digital technologies that are flexible and suitable for digital work tasks.

- Aligning digital work tasks with the structure, context, and digital operations of the organization.

2. Digital Systematic Calculation

- Anticipating positive outcomes and the impacts of digital utilization.

- Analyzing and reporting issues encountered in digital usage.

- Engaging in logical and computational analysis, and applying it extensively to address and solve problems, thereby benefiting the advancement of new digital knowledge.

- Designing and calculating the system, structure, and workflow of digital aspects to be in the form of digital processes.

- Developing systematic and efficient processes for analyzing, problem-solving, and decision-making in digital work.

- Designing algorithms to solve problems in digital work.

- Performing calculations and systematically designing digital work components with clear and comprehensive structures and well-defined steps.

- Creating, developing, and applying digital programs in a systematic and proficient manner, aligned with expertise and mastery.

- Utilizing a variety of digital programs, integrating and collaborating in work tasks, while applying them according to the organizational needs.

3. Digital Service Innovation

- Creating digital innovations that encompass convenience for service providers and recipients, reduce time constraints, and allow for seeking new knowledge.

- Utilizing digital business processes in conjunction with digital knowledge management and communication to create ethically-driven digital service innovations.

- Designing a process for generating new digital propositions and creating value in digital service delivery.

- Designing a new digital service model that places the user at the center of the digital experience.

Dimension/aspect/issue	Level of opinion						
	7	6	5	4	3	2	1
- Creating and integrating diverse content with digital technologies to make it accessible, verifiable, and transparent.							
- Creating and fostering digital innovation to generate comprehensive and impactful digital service innovations, both directly and indirectly.							
- Designing and creatively developing new digital services that are suitable for the job and provide services in terms of both time and location.							
- Creating new digitally integrated content formats for managing digital knowledge and applying them through various digital media channels.							
- Utilizing new digital platforms to develop digital service innovations and disseminate them through online channels.							
4. Digital Programming							
- Understanding the logic and workflow of coding commands and programs.							
- Writing steps and programs for developers to create new work or improve existing work in a new system.							
- Using computer language to define data structures and specify the step-by-step procedures used to solve problems according to the designed requirements accurately and appropriately.							
- Write and understand the fundamentals of programming.							
- Design and develop programs using modern computer languages that are suitable for digital tools.							
- Develop programs that can be applied according to the objectives of the work and expand the capabilities of using digital technology to operate according to the designed processes.							
- Develop programs that support organizational management platforms, leading to efficient online dissemination for overall effectiveness.							
Digital Characteristics							
1. Digital Personal Image							
- Provide assistance, support, and encouragement to personnel in addressing digital challenges.							
- Assist, promote, and support collaborative problem-solving in the digital realm.							
- Polite, well-mannered, with good interpersonal skills, capable of communicating effectively with individuals both within and outside the organization.							
- Listen to others' opinions from all perspectives and be open to information from all dimensions.							
- Differentiate, select relevant data sets, and analyze the data.							
- Learn, create, and take responsibility for digital technology.							
- Recognize the importance of digital technology and understand the concept of being a digital organization.							
- Work with purpose and achieve success using digital technology.							
- Conduct activities as routine tasks using digital technology.							
- Balance life in the digital era by utilizing modern technologies.							
- Reliability in providing digital services.							
2. Digital Function Role							
- Conducting digital work that aligns clearly with digital-specific skills.							
- Clearly delineating roles and responsibilities in digital work.							
- Supervising, monitoring, and overseeing the usage of digital work for managers, colleagues, and system users.							

Dimension/aspect/issue	Level of opinion						
	7	6	5	4	3	2	1
- Gathering up-to-date and fresh data to regularly formulate and maintain policies.							
- Thinking, analyzing, and considering the appropriate and up-to-date implementation of digital work policy.							
- Continuously improve and develop digital work policies to keep up with ever-changing technologies.							
- Learn, innovate, and utilize digital and media technologies securely, accurately, and efficiently.							
- Take responsibility for actions and activities that contribute to achieving one's own role and objectives.							
- Understand and apply knowledge to perform digital-related activities in accordance with assigned responsibilities.							
- Manage data of modern technologies and communicate in digital formats that facilitate outcome-driven service delivery.							
3. Digital Performance Result							
- Perform tasks and solve digital-related issues proficiently.							
- Execute digital tasks swiftly, minimize errors, and gain confidence in the work.							
- Resolve digital work issues promptly and efficiently.							
- Identify options and make effective decisions in digital work.							
- Manage digital work and time effectively.							
- Create a balance in life and digital work.							
- Understand the process of work and service in the digital field.							
- Utilize technology and efficiently search for information on using modern technologies.							
- Evaluate risks and plan for unexpected occurrences in digital work.							
- Communicate knowledge and attitudes through online technology sharing effectively.							
- Be aware of privacy and security in performing digital tasks efficiently and responsibly.							
- Create positive outcomes in digital work that contribute positively to the goals or plans of the organization.							
- Working in digital field according to necessary roles and responsibilities, must achieve results that align or promote the achievement of organization's goals or plans.							
- A positive attitude towards using digital technology in work, having knowledge of the selected technology, and selecting digital technology that is appropriate for the job characteristics.							
- Performing tasks by applying technology and digital management to achieve the set goals.							
4. Digital Ethical Practice							
- Accepting mistakes and embracing digital changes.							
- Being trusted and relied upon by digital service customers.							
- Utilizing high-value digital skills to maximize efficiency in digital work.							
- Applying standards, criteria, best practices, digital laws, and relevant laws to solve problems arising from technology use.							
- Disclosing information and not concealing errors in reporting digital work data according to the facts that have occurred.							
- Utilize risk management plans to assess the digital situation within the organization to prevent reporting data in a manner that does not align with the analysis results.							

Dimension/aspect/issue	Level of opinion						
	7	6	5	4	3	2	1
- Evaluate digital work risks in conjunction with ethics and morality.							
- Be aware of the positive and negative impacts of using their own digital knowledge and skills.							
- Express opinions in accordance with ethical and legal standards in digital technology, consistent with digital governance principles and best practices.							
- Understand and be able to work in accordance with the digital ethics and overall organization's guidelines in the digital field.							
- Using digital technology while considering the impact that may arise from the operation, correctly and appropriately.							
- Choose to use digital technology wisely, appropriately, and for the benefit of oneself, the organization, and society with ethics.							
- Differentiate ethical and legal issues related to new or digital technology.							
- Perform digital work transparently without risking unethical or illegal actions.							

Section 2: Recommendations and feedback for the necessary competency framework for the digital workforce of provincial offices in Thailand.

Instructions: Please provide suggestions and comments on the necessary competencies for digital workforce as a guideline for developing appropriate competency frameworks for digital workforce in the future.