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DIGITAL TECHNOLOGY POLICY INITIATION OF LOCAL ADMINISTRATIVE ORGANIZATIONS: THE LESSONS OF SMART CITY DEVELOPMENT IN THAILAND

Phanompatt SMITANANDA[1] and Noppon AKAHAT[1*]

1 Sukhothai Thammathirat Open University, Thailand; phanompatt.smi@stou.ac.th (P. S.); noppon.aka@stou.ac.th (N. A.) (Corresponding Author)

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Abstract

This study aims to 1) study the context of smart city (SC) development, 2) analyze the key success factors of applying digital technology to develop a SC, and 3) sum up the lessons from being a SC to formulate strategies and guidelines for digital technology development of local administrative organizations (LAOs). A qualitative method was used to study in the case studies of three LAOs in Thailand. The findings reveal that 1) although each local administrative organization has its own context in driving digital technology into SC development but in every organization, there are a process to develop a stable technology system in urban administration and management under the executive policy, knowledgeable and skilled personnels with practical potential, and guidelines for urban administration and management by integrating various public services with digital technology, 2) the key success factors of applying digital technology to develop a SC are included of (1) having an obvious digital strategy and vision, (2) digitalization and creating digital work culture, (3) digital transformation and management, and (4) conditions of using digital technology to completely transform the organization, and 3) the lessons from being a SC to formulate strategies and guidelines for digital technology development of LAOs such as policy formulation that aims to enhance urban administration and management with digital technology, database usage, making decisions on urban development in accordance with the problems and needs of the people, networks of public sectors collaborating with local agencies in designing and developing digital technology system, having sufficient human resources and materials, integrations of plans and projects and activities to upgrade local development to a SC, etc.

Keywords: Smart City, Digital Technology Policy, Local Administrative Organization

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Introduction

The government recognized the exigency to use digital technology as a key tool to transform Thailand toward stability, prosperity and sustainability. On September 30, 2015, the cabinet resolved to assign the Ministry of Information and Communication Technology (currently renamed Ministry of Digital Economy and Society) to collaborate with the Ministry of Science and Technology (now renamed to the Ministry of Higher Education, Science, Research and Innovation) to set up Thailand Digital Economy and Society Development Plan to provide a framework to implement digital economy and society policy which will enable modern and diverse digital technologies to change the ways of doing business, ways of life and the government operation which will result in economic stability with competitiveness on the world stage and social stability. Later on, on April 5, 2016, the cabinet approved the Digital Economic and Social Development Plan as an important mechanism for driving sustainable national development using digital technology. Ministry of Digital Economy and Society was assigned to be the main agency to drive the plan as well as preparing an action plan to drive the development of strategies and/or agendas with relevant agencies, which will serve as a guideline for government agencies of all ministries, departments, state enterprises and local administrative organizations (LAOs) to prepare their digital action plans and budget request for information technology (Department of Local Administration, 2016).

Department of Local Administration, on behalf of a department that oversees local administrations, has implemented a Digital Economic and Social Development Plan and the digital government strategic action plan as a guideline for its digital action plan to proceed in accordance with the government policy in driving the digital economy policy by the public, private and public sectors in the same direction. It is also an efficient guideline for allocating personnels and financial resources, reducing the redundancy, and aiming for the utmost benefit of the technology use in organizational management and the provision of public services of the department and LAOs as the agencies under the supervision of the department, which later can be found in the strategic plan of Department of Local Administration 2017-2026. In the second strategy, local promotion and development is determined to drive the development of Thailand 4.0 to a developed country from local bases which leads to a goal and an indicator related to digital technology, that is to turn Department of Local Administration and local administrations to digital organizations in all administrative missions, the use of modern and efficient information technology in providing public services in order to push Thailand towards Smart Thailand (Department of Local Administration, 2016).

The concept of smart city (SC) is one of local development concepts that occurred in the 21st century, at that time European and American countries were facing very high economic and social inequality problems. In addition, only few people had the opportunity to access the infrastructure and public utilities. European and American governments finally found a solution, to lead national development by local development methods. One of the popular local development methods is called “Smart City” (Calderoni et al., 2012, Kourtit et al., 2012).

The governments connected information technology with the Internet and local transportation networks to facilitate the people, create economic growth for small businesses and improve the quality of life of the local people at the same time. For Thailand, SC development policy is still mainly driven by the government sector in the central government, as a result, there is very little movement of SC development policy from the central government down to local areas. In principle, LAOs should be the main agencies for city management and development at the local level but the LAOs are unable to implement SC policies in line with government policies. Because it encountered limitations in many ways such as unclearness of SC development policy, lack of integration of government agencies, problems with limited local budgets, problem of personnel lacking skills. These are all very important obstacles in driving the SC development policy in Thailand to success (King Prajadhipok's Institute, 2020).

For this reason, the concept of SC has been so popular that it has become one of the solutions of local problems nowadays. SC development is about changing the new urban development paradigm from the original focus on local development in physical terms to local development that must take the needs of the people into account comprehensively, in terms of society, economy, infrastructure, public health, education, environment, etc. Besides, SC development also focuses on local visioning, strategic planning, and direction to move forward by relying on urban design paradigm with public participation from all sectors and using technology as a tool for local governance according to the existing context as well (King Prajadhipok's Institute, 2020).

In the past fiscal year 2022, Office of the Decentralization to the Local Government Organization Committee, Office of the Permanent Secretary, the Prime Minister's Office (2022) assessed the award for LAOs with good governance. As a result, there were 3 LAOs at the municipal level that had presented local innovation projects regarding digital, namely (1) Pakkret Municipality, Pakkret district, Nonthaburi province won the first prize in general category of a large municipality group (city municipality and town municipality), displayed a project concerning security improvement in Pakkret municipality by enhancing Geographic Information System (GIS) to collect, manage and analyze geographic data with the position obtained from the closed-circuit television system (2) Yala Municipality, Mueang Yala district, Yala province won the first prize in the outstanding category of a large local administrative organization group (city municipality, town municipality and provincial administrative organizations) that showed the SMART Governance project, using digital technology to make a closer connection between the state and people and (3) Nakhon Sawan Municipality, Mueang Nakhon Sawan district, Nakhon Sawan province was the first runner-up in the outstanding category of a large local administrative organization group (city municipality, town municipality and provincial administrative organizations) presented the Nakhon Sawan Smart City Network Project (Super Node). As it can be seen, these three municipalities have played vital roles in using digital technology to administrate and manage their cities, to facilitate the public, to increase an economic growth for small business and to improve the quality of life of the people at the same time, which is one of the factors to consider the characteristics of a SC.

As mentioned above, the researcher is interested in studying the context of applying digital technology to develop a SC as well as analyzing the key success factors of applying digital technology to develop a SC and summarizing the lessons taken from being smart cities of Pakkret Municipality, Yala Municipality and Nakhon Sawan Municipality. To be more accurate, area-based and policy proposals from the empirical operations of local administrative administration will be demonstrated and used to formulate strategies and guidelines for digital technology development of LAOs, which will lead to a further development of SC that is in line with the appropriate development area.

Literature Review

Digital Transformation Concept

It was found that there are various key success factors regarding the concepts of using digital technology to change or develop the organization management which can be summarized as follows (Evans, 2017; Boonyarataphan, 2019).

1) A clear digital strategy and vision: Since the changes in the use of digital technology to enhance the efficiency of government organization management are considered to be a big deal, therefore, the organizations need to define a clear vision that will result in long-term outcomes and key goals which are: (1) Having a digital strategy: the organization has to identify the vision or the expected outcome in respect of digital as well as to determine the strategies which will drive the visions to be more visibly (2) Digital focus: the focus must be on customers or service recipients by taking a perspective of those service recipients as a main point and

responding to their changing needs and expectations and (3) Investment: digital-enabled organizational change management requires significant investment in order to achieve large-scale organizational change.

2) Digital worker and digital work culture: The adoption of digital transformation will have an impact on the overall transformation of the organization. Hence, in order to successfully manage the digital transformation of the organization, the following key elements are required: (1) Digital skills: Transforming to a digital organization requires an increasing number of digitally skilled people across the organization to work under a new digital workflow (2) Leadership: since digital technology will change the paradigm, work system, management system as well as work styles, it is necessary to rely on leaders who play an important role in driving the organization towards this dramatic change and (3) Organizational culture: since digital technology will challenge both thinking and design process. New systems and work processes will replace the old ones, thus creating a new organizational culture that emphasizes culture and work that is shared on digital processes. Therefore, it is necessary for the organization to create a modern organizational culture that is consistent with the digital working style.

3) Process and governance: The organization must be apparent in applying digital innovation to the organization and adjust the management process to facilitate digital work that must contain the following key elements: (1) Digital innovation: Having a clear policy on the use of digital innovation to drive a digital organization will be a catalyst for change by adopting more digital technology to work more integrated across the departments (2) Change management: Using digital technology will have a far-reaching impact and a profound shift of paradigm. Consequently, having a clear change management plan will enable the organization to have a contingency that could lead to a concrete practice and (3) Governance: Digital technology will move away from individual towards integrated management across the departments with rapid accordance on digital workflows.

4) Technology and capabilities: The organization must completely adopt digital technology for transforming, designing a digital working platform, and creating a new prototype of integrated digital service provision while focusing on the highest value for customers or service recipients. The key elements are required as follows (1) Disruptive Technologies Enables: The organization has to integrate various digital technologies such as Cloud, connectivity technology, also cybersecurity to secure digital work, etc. in order to create a new value for service recipients (2) Platform Architectures and Business Models: The organization will change the working style from its traditional ones which each departments worked separately into a way of sharing the same online platform and (3) Digital service mastery: It is insufficient to use only digital technology to drive the change. The organization must design a prototype or a new working model, developing details, transforming into practice as well as continuously modernizing the digital management process.

Smart City Concept

The main point of transforming locals to a SC lies in the paradigm shift from focusing on physical development to considering the needs of people more comprehensively in terms of social, economic, infrastructure, public health, education, environment, etc. Besides, this concept also emphasizes visions, strategies and directions of the cities to move forward through the participatory design process of people from all sectors and the use of technology as a tool in city management (Batty et al., 2012; Alkandari et al., 2012; Nam, 2012). It can be concluded that the development of a SC requires an analysis of the problems and needs of the people in the city. Then, planning and designing the city in accordance with those problems and needs (Area-based Development) by using information technology. Although digital technology is an indispensable part of a SC, design and development of the city's administrative mechanisms are also needed to enhance the quality of life and the standard of well-being. Joseph Pelton and

Indu Singh suggest that a good SC must contain of the following characteristics: (1) meet the needs of both public and business sectors, (2) create a sustainable environment and a circular economy 3) create more jobs and competitiveness (4) enable public participation in planning (5) improve infrastructure and resources (6) own good technology and artificial intelligence, and (7) must be more secure (Pelton & Singh, 2019).

SC development is often described in various dimensions because each city is very complex with several systems such as education system, healthcare system, Infrastructure, transportation system, etc. Literature generally mentions the following six dimensions of development: (1) smart economy refers to an economy system that digital technology is used to efficiently allocate resources, create added value, and enhance regional and global competitiveness, promote entrepreneurs and innovation and upgrade the productivity of the city (2) smart mobility refers to transportation system that uses digital technology to increase efficiency, connectivity, accessibility, diversity and safety of urban transportation system and urban mobility (3) smart environment refers to the application of digital technology to preserve the environment and to manage natural resources efficiently and sustainably, the example of a smart environment (4) smart people is about to upgrade urban human capital by using digital technology to develop knowledge, skills, and environment to enable a lifelong learning (5) smart living is to improve the well-being of urban citizens using digital technology to encourage a good quality of life, safety and easy access to the public services and (6) smart governance refers to urban public administration system that uses digital technology to develop democracy, provide public services, raise the level of transparency, boost participation and facilitate people and stakeholders (Lowatcharin, 2021).

Conceptual Framework

The literature review has led to the development of a conceptual framework used in this study as shown in the figure below.

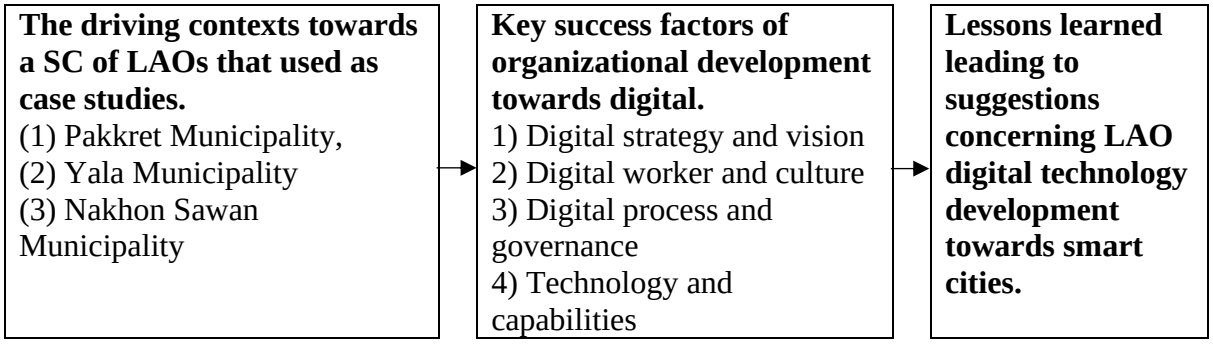

Figure 1 Conceptual Framework

Research Methodology

Research Design

A qualitative research methodology is used by selecting case studies which are responding to the research topic and have similar administrative contexts namely, Pakkret Municipality, Pakkret district, Nonthaburi province, Yala Municipality, Mueang Yala district, Yala province and Nakhon Sawan Municipality, Mueang Nakhon Sawan district, Nakhon Sawan province.

Participants

Purposive sampling is applied by considering from 24 people whose roles and responsibilities involved in development operation and affected by local innovation project in digital technology of the selected LAOs consisting of (1) a mayor of deputy mayors for 3 people (2) municipal clerk or deputy municipal clerk for 3 people (3) municipal employees for 6 people (4) government agencies and business sector representatives in the area for 6 people, and (5) community and public sector representatives in the area for 6 people.

Data Collection and Analysis

There are 2 sets of tools which are 1) a secondary data survey, a form containing general information of LAOs aiming at content analysis. It is to analyze documents or any evidence to describe the phenomena and 2) in-depth interview with a group of key informants/representatives as addressed in target population section to acquire information. Analytic induction is used for analyzing data from each phenomenon and figuring out the common conclusion.

Research Result

The context of applying digital technology to develop a SC of the studied LAOs.

1) Nakhon Sawan Municipality, Mueang Nakhon Sawan district, Nakhon Sawan province is a large local administrative organization located in central Thailand, 237 kilometers away from Bangkok with a service area of approximately 27.87 square kilometers. Topographic characteristic is a river basin. It is the confluence point of the Nan and Ping rivers, originating as the Chao Phraya River at Pak Nam Pho in the area of Nakhon Sawan Municipality. In addition, some small mountains have also become tourist attractions. In respect of government, there are 71 urban communities covering the entire area of Pak Nam Pho subdistrict, some parts of Tok Nakhon Sawan, Ok Nakhon Sawan, Wat-Sai and Khwae Yai subdistrict. The population in the municipality is about 80,533 people, the latent population is 120,000 people, 18,959 households, and the median income per capita is 92,156.56 THB. (Nakhon Sawan Municipality, 2019).

Nakhon Sawan Municipality is a large community considered as an important commercial area located at the source of Chao Phraya River, which is the confluence point of two main rivers namely, Ping and Nan. Therefore, it is a transportation hub that vital in both economic and industrial sectors. It is a densely populated together with latent population. It's also where a government complex located, including of central government agencies, provincial government agencies, state enterprises, universities and civil society. It is the main city of the upper central region. Nakhon Sawan Municipality by municipal executives consequently initiated a policy to gradually adopt digital technology to develop smart politics by taking municipal networks and network technology. Even they were used in similar formats but since they were created for different purposes, so it was unable to collaborate these existing networks or add any other formats. This caused complicated problems of a network system and difficulty in maintenance. As a result, "Nakhon Sawan Smart City Network (Super Node)" has finally been emerged to integrate all projects and create a large communication network that covers the whole municipal area by enabling communication cable system from the existing network systems to work together. Without investing the entire new network system, costs for future development and operation are reduced. People can access services such as Free WiFi as well as conveniently receiving information and updates. The network system is connected to closed-circuit television (CCTV) throughout the city along with a backup route to support during the unavailability of the main route. Hence, this is a stable system that provides safety of life and property more efficiently.

2) Pakkret Municipality, Pakkret district, Nonthaburi province is a large local administrative organization located around 10 kilometers to the north of Nonthaburi Provincial Hall, adjacent to Bangkok in the east having Prapa canal as a border line. The service area is approximately 36.04 square kilometers. There are 66 administrative communities covering 5 subdistricts 34 villages of Pakkret district which are Pakkret, Bang Phut, Ban Mai, Bang Talat, and Klong Kluea. At the present, Pakkret Municipality has a total population of 189,356 people, divided into 87,574 males and 101,782 females. The average population density per area is 5,254 people per square kilometer. (Pakkret Municipality, 2022). Pakkret is a large residential community and an expanding area for trade and investment as well as a location of government

agencies. It is an important transportation hub because it has Chaengwattana and Tiwanon Road cut through, so it is crucial in terms of economy and industry. It is a densely populated together with latent population. In addition, the community is settled along the Chao Phraya River with many small canals connecting within the area, including Khlong Bang Phut, Khlong Kluea, and Khlong Bang Talat. Chao Phraya River flows through the west of the city. Sometimes, there is heavy rain together with water from the north in rainy season. These may cause flooding.

These general characteristics of Pakkret Municipality led to the need of safety in life and property which is actually a basic need of human being. Pakkret district, Nonthaburi province has a statistic of accidents and crime problems that are among the top of the same category of cities that affect safety such as crimes, electric light, and accidents. To successfully solve the problems, it requires a wide range of information to support decision-making in urban management planning. The missions of Pakkret Municipality are to maintain public order as well as providing public services in various fields has firstly operated CCTV project in municipality area since 2019, gradually increased in the following fiscal year with an aim to achieve a complete SC in the future. A number of projects and integrations concerning safety in life and property have initiated as appeared in local development plan. Geographic Information Systems (GIS) has been applied to collect, manage and analyze geographic data with the location obtained from CCTVs in order to manage sets of data support for analysis and systematically forwarding. These are to remove any problems caused from a large volume of dataset and overlapping responsibilities of departments, resulted in effective integration and participation of sectors through the establishment of a central security data center.

Executives, practitioners, and the public receive clear and useful information that can be put into practice, make a decision in order to prepare and deal with various problems. Clarity of information apparently builds confidence.

3) Yala Municipality, Mueang Yala district, Yala province is a large local administrative organization in the lower southern region of Thailand. It is about 1,395 kilometers south of Bangkok, with a service area of approximately 19.4 square kilometers. The topography is characterized by Sai Buri River plain and intermountain plains. There is a well-planned urban system within the municipality area. Yala Municipality is known as one of the well-planned and beautiful cities of Thailand. The municipality has more than 400 streets intersected in a cobweb style with 3 overlapping roundabouts, similar to Paris, France. All roads gather at Lak Muang roundabout, clearly dividing the areas for use, such as educational institutions, government offices, business districts, residential houses and parks, etc. In respect of administration, it is divided into 43 urban communities covering the area of Sateng subdistrict, Muang Yala district, Yala province, with a population of approximately 61,000 people in the municipality, 20,000 latent population, 25,983 households, with a median income per capita of 107,023 THB (Yala Municipality, 2022).

Yala Municipality is considered as an important commercial area and a large community of Yala province. It's also the center of government and administration of Yala province with a dense population together with latent population. Unfortunately, the unrest situation in the area has inevitably affected lives and security of the locals as well as the overall economy. There has chronically been a gap in the relationship between government agencies and people, coupled with the work context of the municipality that clearly divided into separate sections, causing information scattered, redundant and error. These are all obstacles in data management and integration. In addition, access to government information in the past has been limited in many aspects. People are not able to contact the municipality during night time or public holidays. This causes delays and inability to receive public services promptly, causing gaps in access to services and information. Yala Municipality has therefore introduced an innovative digital platform that integrates technology between the basic internet service Free Wifi and

communication technology on the Line Official Account system: Line OA by applying the Rich Manu feature on Line OA and collecting data on various platforms for data analytics in order to design efficient public service delivery under the SMART Governance project, using digital to connect the state to people.

The key success factors of applying digital technology system to develop smart cities of the studied LAOs.

From the data analysis, the issues and success factors in the application of digital technology systems in the development of smart cities of the studied local government organizations can be summarized as follows.

1) Having an obvious digital strategy and vision: It was found that the executives of the three LAOs have set a clear vision and policy for digital city development and have a local digital development plan that will be used to drive the development of their own digital technology that is in line with the goals of SC development. There are differences in sub-issues and details of SC development with different dimensions, in other words, Pakkret Municipality focuses on providing public services to satisfy people in the area to be happy and secured. Since it is a residential area, security is the key of municipal administration under the vision that "Pakkret City, the City of Happiness for Residents and Visitors". While Yala Municipality has set a vision that "Yala City, the city of multiculturalism, Create innovation, To a good quality of life". Under the administration of the Mayor of Yala Municipality, modern technology has been used as management tools to receive citizen information by applying a platform that integrated technologies together while providing basic internet services; Free Wi-Fi, communication technology on the Line official Account system and other platforms in order to determine urban administration and management policy in various aspects, improve work efficiency, link public service information, reduce costs and resources and create a competitive advantage so that the public can access public services quickly and thoroughly to meet the target group. It is also an opportunity for all sectors to express their opinions on the design of city management. It creates a sense of ownership and participation in the development of the city, leading to a sustainable improvement in the quality of life. Besides, the vision of Nakhon Sawan Municipality is "A livable city alongside Chao Phraya, develop innovation, create a healthy society". The municipal administrators have a clear policy concerning information technology development, aiming to develop Nakhon Sawan into a SC, thus creating an integration of operations through various projects of Nakhon Sawan Municipality, led to Nakhon Sawan Smart City Network Innovation (Super Node) which achieved goals of local administrators.

It can be seen that a clear executive policy will be supported by government officials in planning, designing and negotiating for mutual understanding with those who involved. In addition, the executives themselves have a clear policy on the use of information technology to develop their city into a SC, resulted in the integration of operations through various projects in public services regarding safety in life and property according to the local development plan until it finally resulted in the application of digital technology in managing an organization that achieved the goals of local administrators.

2) Digitalization and creating digital work culture: These three LAOs are equipped with digital technology personnel. A digital organizational work culture has also been created by the Nakhon Sawan Municipality and Pakkret Municipality where municipal employees specialize in computers and digital technology in Information Technology, Strategy and Budget Division. This group of personnel has initiated and planned to enhance the existing technological resources of the municipality and integrated them to work together efficiently and comprehensively. Big data thus created and used to decide a protection and security plan causing maximum benefit to the government. The role of municipalities in maintaining peace and order has also strengthened by using information from CCTV and locational information stored in Geographic Information Systems (GIS) which supports both current and future usage.

In addition, this operation has received adequate and continuous budget support. Both municipalities have also established CCTV Control Centers at the municipal offices that are open for service through various channels 24 hours a day, with skilled staffs at the centers in providing services efficiently. Yala Municipality has developed its work system for officials so that each person is equipped with data-driven, data security, data privacy, as well as data linkage from all channels, bringing important information to be processed into Dashboard so that their executives are able to make decisions in the short term, long term, or in times of crisis, leading to policy making based on public participation and using data to make operations more transparent, efficient and effective, etc.

3) Digital transformation and management: These three LAOs have a process of transforming their organization management to digital through a process of participation along with support from public sectors and network partners in their area. Each local administrative organization has relied on participation and integration among government agencies, private sectors, public sectors, and local communities in form of a network, open for the public to participate by holding a meeting to share opinions, needs and design a suitable platform for a universal use that may varies in some details for instance, Yala Municipality focused on Smart Governance that designed for improving the system of public service provision to facilitate stakeholders in accessing government information, focusing on transparency and participation. It has continuously improved through the application of service innovation by adding public service platforms to maximize the opportunity for citizens to access information and services as much as possible, including websites, Facebook, Line Official Account and Mobile Application, as well as Yala Market system, which is an e-commerce system that helps people to access products and services online during COVID-19 situation. Nakhon Sawan Municipality has received support for the development from its network in installing CCTV system. All along, there have been requests for connection to access the systems of agencies that are responsible for security for the public, including the police and the security department. They asked for assistance in installing a special CCTV system for both security and safety in traditional events and for dealing with critical problems such as drugs. Also, requests for other services in an emergency, which is connected CCTV to the police in the area in order to facilitate officers in processing their operation and offering rapid rescues.

The systems of VoIP telephony and internet are linked to the municipal authorities so they can use free of charge, similar to Pakkret Municipality that has an integrated network between government agencies and citizens. Consequently, they can use both statistical and geographic information to report the results obtained from data collected in a geographic information system (GIS) as key information for decision-making and analysis in order to improve, resolve, and prevent crimes in the community efficiently, instantly, and accurately.

4) Conditions of using digital technology to completely transform the organization: All three LAOs have fully applied digital technology to transform their organizations. Each has a different operational approach as follows:

4.1) Nakhon Sawan Municipality has initiated the development of a network from existing equipment that is redundant and difficult to manage. The municipality has developed the system by creating Nakhon Sawan Smart City Network (Super Node), which is a city communication network that covers a large area of the city by installing network linkage equipment along the route of the original network system to reconnect new signals using the structure of the existing communication networks for example, the former office network, Free Wi-Fi service network, and digital telephone network system, communication network of CCTV system that has been gradually installed and not interconnected. Other systems are connected together to improve their communication to be faster and more efficient in the form of network nodes. It can be reused effectively, reduce system redundancy, serve services in various fields, and stable enough to be the main infrastructure in SC development.

4.2) Pakkret Municipality has implemented the innovative project to enhance security in Pakkret Municipality by developing a Geographic Information System (GIS) to collect, manage and analyze geographic data with the location obtained from CCTV system. Existing resources have been integrated to work together, extend, improve, and link operations until Big Data is created. Subsequently, Big Data will be used for management and decision-making in planning prevention and security in the city, created maximum benefit to the government. It also strengthens the role of the municipality in maintaining order for safety officers to successfully monitor and close cases that occurred in their area caused from crimes, accidents, etc. by using information from CCTV and geographic data obtained from Geographic Information System (GIS) storage.

4.3) Yala Municipality has enhanced SMART Governance system to benefit from Big Data to make decisions and determine the direction since this crucial information affected and maximized the development, digital capabilities, operational efficiency, public service information linkage, cost reduction, resource saving and competitive advantages so that the target group can access public services thoroughly and instantly. It has also provided an opportunity for all sectors to participate in expressing their opinions in designing city management. There is a sense of ownership and participation in city development, leading to a sustainable improvement of the quality of life. Yala Municipality has also further developed its database management system that can retrieve service usage data from various Rich Manu features and from other municipal services, such as garbage collection services that are equipped with GPS and cameras on the front of every vehicle. People are able to check the route and service period of the garbage truck. School Bright, an educational platform that can transform schools into digital schools, strengthening parent participation. Such information will be stored as a large database for further development in various areas such as the development of vaccine service points, COVID screening service points, Complaint and Suggestion Center, News and information notification specifically to a target group, such as warning of flood risk areas, promoting the strength of entrepreneurs who participate in Yala Market project through Money Expo, the event that allows entrepreneurs to access funding sources, develop knowledge, add product value, etc.

The lessons learned from being a SC of the studied LAOs in order to determine appropriate strategies and guidelines for digital technology development of local government organizations.

From the analysis of data obtained from various data collection, the lessons learned from being a SC of the studied LAOs to be used to determine appropriate strategies and guidelines for digital technology development of LAOs can be summarized as follows:

1) Nakhon Sawan Municipality: The push for Nakhon Sawan Smart City Network can be concluded that in respect of digital technology development, the existing network has been reinvented. The key of SC development in this case is not to depend on only one kind of technology while taking unlimited benefit from it. It doesn't require a high budget for one large investment so the local administrative organization whose limited fund can apply the technology according to their potential to achieve maximum efficiency. LAOs must pay attention to the development of their own digital technology personnels. They should be promoted, supported, motivated and encouraged. As a result, their intuitiveness and ability to solve problems, improve, change, develop the organization are created, leading to success. That is, the administration that aims to provide happiness to people by setting them the first priority in order to response to their needs and develop their quality of life according to better governance guidelines.

2) Pakkret Municipality: Safety innovation project in Pakkret Municipality has been driven by developing Geographic Information System (GIS) in collect, manage and analyze geographic data with the locations from CCTV system. Existing resources are taken to integrate,

collaborate, improve, link the operations and finally create Big Data that will be used for determining defense and security plan. Although its data management has not been in form of Big Data yet but Pakkret Municipality itself can determine the its direction and goals from now on by emphasizing the design and data usage. Once there are enough correlation, clear conditions and automatic tools to manage data, Pakkret Municipality will eventually be an organization that completely uses Big Data.

3) Yala Municipality: SMART Governance project has been developed by using digital to connect the state closer to the people, leading to the development of a city digital platform that integrates information and services that are scattered together. It can be summarized a lesson learned in terms of the development of digital technology that to keep up with changes, the LAOs must adapt themselves, prepare for the analytical era and realize that Big Data is an important mechanism for determining the direction of operations and decision making. Since Big Data is crucial information that affected and maximized the development, digital capabilities, operational efficiency, public service information linkage, cost reduction, resource saving and competitive advantages so that the target group can access public services thoroughly and instantly. It has also provided an opportunity for all sectors to participate in expressing their opinions in designing city management. There is a sense of ownership and participation in city development, leading to a sustainable development of the quality of life.

Conclusion and Discussion

The finding has revealed that the drive of digital technology policy to SC development of each local administrative organization showed different contexts of digital technology application in developing smart cities but all of them have stable technology process in urban administration and management, obvious policies from the executives, skilled personnels, and creative and determined local administrators who intend to perform digital urban administration and management and integrate public services that are suitable for the urban context. This is consistent with the concept of SC development as proposed by Pelton & Singh (2019), a SC would not be emerged by the application of digital technology alone. It requires planning, design along with the development of administrative mechanisms so that the city upgrades the quality of life and standard of living. As for the key success factors of applying digital technology to develop a SC, the three studied LAOs presented similar factors, according to the study of Evans (2017) and Boonyarataphan (2019) who found various factors for success in developing the digital organization of government agencies as follows: 1) Having an obvious digital strategy and vision 2) Digitalization and creating digital work culture 3) Digital transformation and management and 4) Conditions of using digital technology to completely transform the organization. Regarding the issues of lessons learned from being a SC of three LAOs to be used to formulate strategies and guidelines for digital technology development of LAOs to develop into a SC that is appropriate to the development area, it involves setting up urban development policies that aim to elevate urban management with digital technology for using decision making database in urban development to respond the problems and needs of the area and people, assistance from public sector network and local agencies in designing and developing digital technology system together, having a foundation in terms of resources, especially human resources in the organization and sufficient materials and equipment along with promoting the use of existing resources in the integration of plans, projects, activities in order to drive local development towards a SC development, the finding corresponds to the characteristics of SC development by Pelton & Singh (2019), who proposes that a SC development must have the following characteristics; (1) meet the needs of citizens and businesses (2) create a sustainable environment and circular economy (3) create jobs and competitiveness (4) enable citizens to participate in planning (5) must improve infrastructure

and resources, (6) must have good technology and artificial intelligence, and (7) must be more secure.

Suggestion

1) Government, by Ministry of Digital Economy and Society and Department of Local Administration on behalf of the department that oversees LAOs, should establish a clear central digital technology development plan for LAOs, ready to support budget, knowledge and materials for applying digital technology system in managing and providing public services with constant direction and goals in order to raise the development level of smart cities in various aspects according to the context of each local development, including setting up a system to support cyber security that may occur.

2) LAOs that are used as case studies should clearly evaluate the results and impacts that arise from driving the development of digital technology systems to develop smart cities, compare the results before and after implementation to provide important information for planning the development of digital technology of LAOs to develop into a SC with an obvious goal, leading to the revision of regulations and policies to support the local government in towards becoming a SC in every aspect.

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