Local Administration Journal 13(2) • April - June 2020 • 103 - 136
Received: January 1, 2020 • Accepted: March 31, 2020
RESEARCH ARTICLE

Collaborative Capacities for Successful Collaboration: The Case of Thai Local Administrative Organizations' Waste Management

Sirinbhattra Sathabhornwong
Lecturer at Faculty of Political Science
Ubon Ratchathani University, Thailand

Abstract
Thailand has faced a continuous increase in municipal waste, only a small amount of which has been managed by proper disposal techniques. To respond to this problem, the government has implemented public policies that encourage collaboration between local administrative organizations (LAOs) and other sectors in the management of waste. This article aims to increase the understanding of collaborative capacities, a theory developed by Lodge and Wegerich (2014) and Thomson and Perry (2006), consisting of administrative capacity and social capacity. The article draws upon data from three case studies of best practices in LAOs' waste management collaboration. The data led to identification of two new sub-types of collaborative capacities: policy capacity, which is a new sub-type of administrative capacity; and innovation capacity, which is a new sub-type of social capacity.

Keywords
solid waste, Thailand, waste management

Introduction

The increase in municipal waste caused by population growth and economic development has become a serious problem in Thailand. Only a small fraction of the waste has been managed using proper disposal techniques. The government of Thailand has been concerned about this problem, so they have had public policies on solid and hazardous waste management since 2014. Local administrative organizations (LAOs) throughout the country have been assigned by the government the responsibility for developing and implementing these

CORRESPONDING AUTHOR
Sirinbhattra Sathabhornwong, Faculty of Political Science, Ubon Ratchathani University
85 Sathonlamark Road. Warin Chamrap, Ubon Ratchathani, 34190, Thailand.
Email: sirinbhattra.s@ubu.ac.th

policies, including the collection, treatment, and disposal of waste within their administrative zones (Jutidamrongphan, 2018).

However, most Thai LAOs have faced problems in the provision of waste management service. First, they do not have enough available land to construct waste disposal sites to cover the waste generated in their areas. Furthermore, there has been resistance from local citizens against these waste disposal sites because they do not want their households to be affected by the dirt and air pollution from these sites. As a result, many LAOs have disposed of their waste in landfills or burning in open areas to avoid the dirt and air pollution problems, but these methods do not meet sanitary standards and they cause environmental problems (Department of Pollution Control, 2016b, p. 3).

The new public policies are based on the principles of reducing, reusing, and recycling waste. Most of the waste is separated at the source for reuse and recycling while the rest will be disposed of to reduce or prevent environmental impacts. Energy production from the waste is considered to be a desirable by-product of LAOs' waste disposal, and the government supports the private sector to invest in waste-to-energy businesses (Department of Pollution Control, 2016b, pp. 3-4). These policies have encouraged LAOs to collaborate among themselves and to collaborate with other participants, for instance, local people, schools, and the private sector, in resolving LAOs' waste management problems.

Purpose and Organization of Study

This article aims to identify the collaborative capacities of LAOs that may be considered as best practices and are important in achieving successful waste management collaboration. This will enable the author to establish whether any changes need to be made to the typology developed by Lodge and Wegerich (2014) and Thomson and Perry (2006), which present two types of collaborative capacities: administrative capacity and social capacity.

Concepts and Theoretical Framework

Collaborative Capacity

collaborative capacity in various ways. Most of these are based on authors' ideas rather than empirical research, for example, how actors think about the capacities that are important to them or their organizations when developing or managing collaboration. Nevertheless, the research in this article has started with the concepts of administrative capacity and social capacity made by Thomson and Perry (2006).

As Thomson and Perry (2006) stated: "the key to getting things done in a collaborative setting rests in finding the right combination of administrative capacity (through coordination and elements of hierarchy) and social capacity to build relationships". They do not explain their

distinction in any more detail, and it has been left to other authors to define the elements of administrative capacity and social capacity.

Administrative Capacity

Lodge and Wegerich (2014) discuss the concept of administrative capacity in the public sector that is relevant to problem-solving and innovation. Administrative capacity is defined as a set of skills and competencies which are expected of public bureaucracies to facilitate and contribute to problem-solving. They cover both structural and procedural provisions that enable bureaucracies to perform functions and embrace capable and skilful individuals within bureaucracies, to meet the expectations of their chiefs and the public. From their work, administrative capacity has four subtypes as follows:

(1) Delivery Capacity

Delivery capacity deals with the frontline of policy. It is defined as a capacity to make things happen concerning the use of available resources and to ensure that citizens will receive the public services they need. Moreover, the delivery activities include both service provision and more coercive activities such as policing and tax collection. It is also related to the power of the government to make public services available, especially when the private sector fails to do so.

(2) Regulatory Capacity

Regulatory capacity addresses the enforcement and oversight of public activities. It is an enforcement capacity and is often related to an oversight function. It entails the presence of regimes combining statements on what is to be achieved, with an apparatus detecting and enforcing compliance. It can be a challenge for boundary-spanning collaborations, where there are different regulatory bodies involved.

(3) Coordination Capacity

Coordination capacity applies to the areas where collaborative governance is supposed to take place. It is about bringing together and aligning organizations from different backgrounds for their collective purposes. It relies on competencies of individuals about both the ability to hierarchically impose ways of working together and a non-hierarchical facilitating role or orchestrating role. It is also about an ability to deal with difficulties that arise in mediating agreements between organizations, for example, the 'boundary spanning' competency.

(4) Analytical Capacity

Analytical capacity is defined as how the government is informed about current developments and future projections. It addresses demands on forecast and intelligence that facilitate policymaking under uncertain conditions. It is relevant to how the government ensures transparency and legitimacy of the application of knowledge, how it deals with alternative sources of information, and how the information is being accessed and disseminated.

Although the concept of administrative capacity is not directly proposed for public organizations to use in collaboration, there is literature that discusses how public organizations employ this concept in their collaborations. For example, Grotenbreg and Buuren (2016) studied how public organizations, including national and local authorities, employed their administrative capacities to succeed in public-private collaborations, such as integrated energy and waterworks. There are considerations with each type of administrative capacity. The delivery capacity could be employed in the form of financial contributions and in allowing external actors to use public infrastructure. The analytical capacity might be used in the form of sharing governmental data with private organizations. The coordination capacity might be engaged in the roles of network manager and boundary spanner that are performed by public authorities. Finally, the regulatory capacity could be performed by adjusting public authorities' existing rules and drawing up new ones.

Social Capacity

Lichterman (2009) states that social capacity is an ability to act as a mutually responsible citizen in organizing public relationships, rather than leaving those relationships entirely under the direction of either impersonal market mechanisms or administrative fiats of the state. Also, its defining feature is the ability to talk and act reflectively, to coordinate and engage in problem-solving that may involve state or market actors and civic actors, including a variety of socially diverse groups and individuals.

How the Concept of Collaborative Capacity Informs the Research Design

There are many aspects of administrative capacity and social capacity in which empirical research could be undertaken. This study concentrated on certain aspects because of the resources available to the researcher and the context in which the empirical research was undertaken. How collaborative capacities are defined and operationalized follow from these decisions and form the research focus. Two aspects of collaborative capacity were selected for detailed empirical research and shaped the methods employed.

This article focuses on understanding more about how actors in collaboration think about the capacities that have helped develop and manage their collaboration and in achieving positive outcomes. A case study design was used in this research. Case study interviews use a topic

guide, and so the questions are open-ended. In other words, a literature-based set of definitions of collaborative capacity were not imposed on the respondents. As a result, the analysis of the case study data concerning collaborative capacities is more inductive, with the researcher trying to identify these from the interviews, documents, and other sources. The analysis, however, keeps the overall distinction between administrative and social sides of collaborative capacity to provide a broad structure within which to identify actor-based definitions.

Research Methodology

Sampling Frame

The sampling frame of my case studies is the list of five individual LAOs that are outstanding in waste management and collaborating with local citizens and other organizations or groups in their waste management. This list was derived from the discussions with a group of Thai experts in waste management and Thai local government. This group is composed of seven people. Three of them are governmental officials who have worked for governmental organizations that created public policies on waste management and have collected data about waste management of LAOs throughout Thailand officially. Three are university lecturers who have completed research about the Thai local government and have supervised Thai LAOs, and one of them is a think tank researcher who has done research on waste management and the Thai local government. The list is composed of Bangkok Metropolitan Administration (BMA), Khon Kaen City Municipality, Phang Khon Sub-District Municipality, Phitsanulok City Municipality, and Sikhio Sub-District Municipality.

Sampling

There are five individual LAOs in my case studies sampling frame. Due to the limited resources available for conducting fieldwork, I was unable to study all these five individual LAOs. Thus, l selected three individual LAOs from the case studies sampling frame through two steps, as follows:

First, the Bangkok Metropolitan Administration (BMA) was selected because there are two major types of LAOs in Thailand, consisting of special LAOs and general LAOs. Bangkok Metropolitan Administration (BMA) is the only special LAO in the case studies sampling frame. For this reason, it was selected to represent special LAOs.

Next were two LAOs from the remaining four LAOs that are general LAOs. These LAOs were selected by virtue of having received a King Prajadhipok's Institute award or a Golden King Prajadhipok's Institute award for LAOs on networking with the public sector, the private sector, and the civil society. King Prajadhipok's Institute is a juristic entity under the supervision of the President of the National Assembly of Thailand and works as a democratic development

institution. King Prajadhipok's Institute has realized the importance of local government development. Therefore, it has sponsored the King Prajadhipok's Institute awards every year since 2001. These awards are presented to LAOs that maintain the best practices in three categories: transparency and promotion of people's participation; strengthening peace and harmony; and networking with the public sector, the private sector and the civil society (King Prajadhipok's Institute, 2019a).

The objective of the King Prajadhipok's Institute awards is to encourage LAOs to collaborate with networks from the public sector, the private sector, and the civil society in their responsible areas to achieve the collaborative goal of sustainable development. 'Network' in this context means groups or organizations that exchange data and information with each other and operate in collaborative activities. Each of these groups and organizations has the autonomy to operate to accomplish their missions (King Prajadhipok's Institute, 2019b).

LAOs who have been awarded the King Prajadhipok's Institute awards have been evaluated to have the best practices through five categories of indicators as follows (King Prajadhipok's Institute, 2019b):

1. Basic Indicators

These indicators evaluate LAOs from their compulsory missions or their activities that are required to operate by authority, laws, and regulations.

2. Organizational Management for Networking with the Public Sector, the Private Sector and the Civil Society Indicators

These indicators evaluate LAOs' leadership, priority, and preparation for achieving the missions on networking with other groups or organizations in terms of staff, budgets, and working mechanisms.

3. Provision of Projects and Public Services Responding to New Challenges Indicators

These indicators evaluate LAOs' proactive works responding to new challenges that affect local citizens; and imply the management that emphasizes qualities of public services, and creative solutions to problems of local citizens in their responsible areas.

4. Capacity Building and Empowerment of Local Citizens Indicators

These indicators are indicators to evaluate LAOs' activities on capacity building and empowerment of local citizens such as general learning support, specialized capacity building, public consciousness building, collective value creation, and local citizen empowerment.

5. Implementation of Collaborative Projects between the Public Sector, the Private Sector and the Civil Society Networks Indicators

These indicators are indicators to evaluate outstanding projects or activities of LAOs on networking with the public sector, the private sector, and the civil society as concrete examples of their project management and implementation for selecting the best practices from participating LAOs.

The Golden King Prajadhipok's Institute awards were initiated in 2006 and are awarded every two years as a motivation for LAOs to continuously develop their work to meet local citizens' needs and create innovations on local administration. The LAOs that have received these awards will be role models for other LAOs in Thailand (King Prajadhipok's Institute, 2019a).

The Golden King Prajadhipok's Institute awards have two criteria to evaluate LAOs performance: a basic criterion and an innovation criterion. The basic criterion is composed of two categories of indicators (King Prajadhipok's Institute, 2019c):

1. Anti-Corruption Indicators

LAOs must not have had a corruption case or a corruption lawsuit against them, and their executives are not being considered to have their rights removed to run for political offices. They are evaluated through information from the Department of Local Administration, the State Audit Office of the Kingdom of Thailand, the Office of the National Anti-Corruption (ONACC), the Office of Public Sector Anti-Corruption Commission (PACC), and the Office of the Election Commission of Thailand.

2. Implementation of Duties Indicators

LAOs must implement their duties by authority, laws, and regulations such as providing rooms that have information services to local citizens with updated information and that are user friendly; creating reports about results of the implementation of their duties and revenue and expense records, publishing these reports and records to local citizens; publishing their procurement operations on their promotional boards or official internet websites to local citizens, and other duties by law.

The innovation criterion is composed of seven indicators (King Prajadhipok's Institute, 2019c):

1. The numbers of an LAO's outstanding networks or network activities must be significant. These networks and network activities must show how LAOs network with the public sector, the private sector, and the civil society.

2. LAOs' outstanding networks or network activities must show continuity, not contemporary or ad hoc.

3. LAOs' outstanding networks or network activities must show creativity or innovation. If these networks or network activities resemble those belonging to entities, LAOs must be able to explain how they differ from others and what their unique characteristics are.

4. LAOs' outstanding networks or network activities must be initiated by the LAOs, themselves.

5. LAOs' outstanding networks or network activities must show concrete evidence of operations.

6. LAOs' outstanding networks or network activities must show their partnership or clear collaboration, not being driven by only one organization.

7. LAOs' outstanding networks or network activities must be different from those that have been evaluated when LAOs received the King Prajadhipok's Institute awards in terms of being new networks or network activities or having been developed from previous ones.

Both the King Prajadhipok's Institute awards and the Golden King Prajadhipok's Institute awards for LAOs are highly regarded on a national level in Thailand. For this reason, individual LAOs who have received these awards are considered to have been successful in their collaboration with other groups, organizations, or sectors. As a result, I have selected two individual LAOs from the case studies sampling frame as my case studies. First is the Phitsanulok City Municipality, which received the King Prajadhipok's Institute in 2013 (King Prajadhipok's Institute, 2019b). Second is Khon Kaen City Municipality, which received the King Prajadhipok's Institute award in 2011 and 2014 (King Prajadhipok's Institute, 2019c), as well as the Golden King Prajadhipok's Institute awards in 2016 (King Prajadhipok's Institute, 2019d).

The selection of the case study sampling frame and the sample itself are both dependent on expert peer assessment of individual LAOs. Although this method may be subject to bias on the part of the experts, there are at least explicit criteria for the two awards. Also, it is the most robust method available in the absence of any other data on LAOs' waste management collaboration.

Research Methods

Three research methods are employed in this research: document study, semi-structured interview, and direct observation.

Research Instrument

Semi-structured interviews of individual LAOs that are successful in waste management collaboration use a topic guide or an interview guideline.

Topic Guide

In order to identify the level of collaborative administrative capacity, the topic guide draws on the four sub-types of administrative capacity proposed by Lodge and Wegerich (2014): delivery, regulatory, coordination, and analytical capacity.

First, there is a group of questions that relate to day-to-day organizational collaborative capacities:

- knowledge and skills of staff (delivery capacity)
- appropriate workloads of staff (delivery capacity)
- policies and plans for collaboration (regulatory capacity)
- regulations and rules to control collaboration (regulatory capacity)
- publications of information about collaboration (analytical capacity)
- frequency of communications with collaborating organizations (coordination capacity).

Additionally, there are questions that relate to more strategic collaborative capacities concerned with the development and success of the collaboration based on the framework of Sullivan, Barnes, and Matka (2002). Four types of strategic collaborative strategies are queried in the topic guide of this study:

- strategies for obstacles of collaboration (regulatory capacity)
- strategies for informing responsibilities of collaborating organizations (coordination capacity)
- strategies for emergencies (delivery capacity)
- strategies for creating new ways to make collaboration efficient (analytical capacity).

Data Analysis

The case studies data were analyzed using two techniques: thematic analysis and cross-case analysis.

Case Analysis (Thematic Analysis)

Three cases of best practices in waste management collaboration have been analyzed in 3 major themes: waste management problems, collaborative organizations, and collaborative capacities.

Bangkok Metropolitan Administration (BMA) 's Waste Management Collaboration

(1) Overview of the Bangkok Metropolitan Administration (BMA)

The BMA is an LAO that covers all areas of Bangkok, which has been the capital city of Thailand since 1782. It covers an area of 1,568.7 square kilometers (BMA Data Center, 2019). As of 2019, the population of Bangkok was 5,701,394 (BMA Data Center, 2019). In 2014 the BMA generated 2,853.58 metric tons of waste per day, 11,510 metric tons of waste per day in 2015, and 11,530 metric tons of waste per day in 2016 (Department of Pollution Control, 2015; Department of Pollution Control, 2016a; Department of Pollution Control, 2017).

BMA has initiated waste management collaboration using the concept of CBM (community-based solid waste management) for LAOs. After that, it has set prototypes of CBM communities for communities both in the BMA and other LAOs. Furthermore, the implementation of the BMA's waste management collaboration has an impact on policymaking on waste management at a national level. The Ministry of Interior has adopted a policy of waste management collaboration of the BMA and applied it to create a public policy for waste management collaboration for all LAOs in Thailand.

Table 1. General Information about the Bangkok Metropolitan Administration (BMA)

Number	Type of Information	Details
1	Area	1,568.7 km2
2	Population	5,701,394
3	Waste Generation Rates of the Last Three Years	2014: 2,853.58 tons per day 2015: 11,510 tons per day 2016: 11,530 tons per day

Source: Sathabhornwong (2019)

(2) Waste Management Problems in the Bangkok Metropolitan Administration (BMA)

Like most capital cities in the world, the BMA population has been increasing. The demands on resources of the BMA have also increased, which has led to the problem of increasing amounts of waste. The increasing amounts of waste, together with improper waste disposal, have caused an increase in spending on waste disposal. For example, data show that there were 3,636, 595.33 metric tons of waste generated by the population of the BMA in 2013, and the BMA spent approximately 10 million baht per day on waste disposal (Jitasa Foundation, 2016). An officer of the Department of Environment (2015) of the BMA explained that, before the

BMA created collaboration for waste management, the BMA disposed of waste by the landfill method, which is not sustainable.

Since the waste of the BMA has been increasing continuously, the BMA has tried to find more landfill sites. However, there is little more space left for creating landfill sites in Bangkok because all areas have become urban areas and located near the communities. The bad smells of landfill sites are not acceptable to the surrounding population. If the BMA constructed a landfill site in Bangkok, people nearby would object to this. Therefore, the BMA needed to transfer waste for disposal in other provinces. At present, there are only transfer stations in Bangkok. BMA has signed contracts with private companies to send their trucks to collect waste from those transfer sites to their landfill sites in other provinces within 24 hours. However, the amount of waste generated in the BMA area is still increasing (a BMA official, personal communication, May 23, 2017).

Moreover, the BMA has received transients and commuters from other areas who are attracted to the city. It is likely that most people in this group lack awareness and knowledge of environmental maintenance (Jitasa Foundation, 2016, p. 2-4), which waste management is part of. Thus, the lack of awareness and knowledge about waste management can cause additional problems. A representative of a private company that is collaborating with the BMA in waste management also mentioned a waste management problem caused by people who lack awareness of waste management problems:

"Since around two years ago, there has been a problem that people dropped their waste on the roadside until the waste covered approximately 1 kilometer of the road. Many people came to drop their waste on the road because they saw that others did. Consequently, our organization was negatively affected by this waste because of the bad smell of the waste" (a representative of a private company, personal communication, July 27, 2017).

Furthermore, the BMA has waste management problems in canal-side areas because the residents are not aware of the waste management problems they are causing. For example, a community leader of a prototype community which is collaborating in waste management with the BMA stated that:

"In the past, waste management problems always happened because of our community located in canal-side areas. We had 170 households in total, with 150 households located in canal-side areas. There was a problem with those people dumping their waste into the canal" (a community leader, personal communication, May 25, 2017).

(3) Collaborative Organizations

Collaboration for waste management of the BMA can be divided into two periods. In the first period (2008 - 2012), the BMA collaborated with the Thai Packaging Center,

three universities (Kasetsart, Chulalongkorn, and Mahidol), and shopping malls in the BMA area. In the second period (2013 - the present), the BMA collaborated with Coca-Cola Thailand, the BMA district offices, and communities. Other community organizations, such as local schools and other academic institutes, markets, shopping malls, hotels, high-rise buildings and condominiums, also cooperated (a BMA official, personal communication, May 23, 2017).

Moreover, most key collaborative organizations have participated in the waste management collaboration of the BMA since the beginning of the project in 2013. However, there were some organizations, for instance, one district office and one community, which claim that they have participated in a project since 2010 (a district official, personal communication, May 25, 2017; a community leader, personal communication, May 25, 2017). That was still in the first period of collaboration. This was possible because, according to a BMA official, the waste separation project which had been implemented since 2008, was still continuing (a BMA official, personal communication, May 23, 2017).

(4) Collaborative Capacities

There were nine types of collaborative capacities of collaboration for waste management of the BMA identified in my case study research. The first was financial capacity. There were three major organizations that provided budgets for collaboration in waste management of the BMA. Firstly, the waste management collaboration used the BMA's budget as its major source of income; for instance, budgets for the provision of garbage trucks and their fuel, waste burning ovens, and landfill provision. The second organization that provided money for the BMA waste management collaboration was Coca-Cola Thailand, which gave 20 million baht. The last financial supporter was Fukuoka City, which offered scholarships covering all payments (e.g., air tickets, food, accommodation) for BMA staff to learn about waste management in Fukuoka City, Japan.

The BMA had developed the capacity of its staff at every level by providing waste management workshops and site visits both within the country and to foreign countries. However, there was not enough staff in some departments, and there was a scarcity of specialists in waste management due to the problem of paying for these specialists (Department of Environment, 2015, p. 14). Moreover, a BMA official stated that the "BMA supported new generation staff to learn and absorb knowledge about waste management as much as possible, and old generation staff could learn from reports of those new generation staff" (a BMA official, personal communication, May 23, 2017).

The third capacity was knowledge. Apart from the BMA staff's knowledge of waste management, there was also knowledge from other collaborative staff, such as a private company. For instance, a representative of a private company that participated in the BMA waste management collaboration said about his company's knowledge that "we supported the project

in the form of personnel, and knowledge on waste separation because we had had this knowledge from the experience of the implementation of ISO (International Organization for Standardization) 14,000 standard. We brought our knowledge to educate the community" (a representative of a private company, personal communication, July 27, 2017).

The information-sharing capacity was the fourth collaborative capacity that was mentioned by the interviewees. It was said that the BMA always published information about all projects on the website in order to inform the public. This meant that the BMA had the capacity to share information about its waste management collaboration with the public as well. However, in order to share information with other collaborative organizations, the BMA frequently chose to have meetings with other organizations.

The fifth capacity mentioned in interviews was emergency management. When there was an emergency case that could impact waste management collaboration, such as a flood, a joint committee would have a meeting to discuss solutions. In addition to this, BMA had the capacity to deal with possible emergencies based on past experiences. For example, a BMA official stated that the "BMA had a lesson about waste management collaboration learned from the flood that emerged in the past. Thus, when it was flooding, we would ask local people to do not to dump their waste on the public roads and encourage them to keep their waste at home until the flooding had stopped. In the case of their food waste, we would encourage them to process food waste into bio-fermented water. Furthermore, BMA had staff that had knowledge about dealing with emergencies, for example, the head of each unit of the organization" (a BMA official, personal communication, May 23, 2017).

The innovation capacity was also discussed. The BMA always provided opportunities to think together and talk together for proposing new ideas for waste management collaboration. Moreover, some of the other collaborative organizations also had the capacity to be innovative. For example, a representative of a private company that participated in the BMA waste management collaboration stated that "our organization encouraged staff to talk when they wanted to talk, not because the organization wanted them to present their ideas. It was because our organization wanted them to present what they really need to see in the future. This might make the project more successful" (a representative of a private company, personal communication, July 27, 2017).

The sixth capacity was the boundary-spanning capacity. This was about encouraging other people or organizations to collaborate with the BMA. For example, the following quote from a district official reflected the capacity to encourage people to participate in the collaboration:

"We did some tactics to make local people realize their waste management problems that need to be resolved by collaboration with the BMA through a district office. That

was a district official who went to inform local people in a public hearing speaking with them directly because local people would not understand the too complicated messages. Making local people realized that they were the key actor to solve waste management problems in their areas since the district officials could help by just collecting waste, and the district officials could not collect waste for them every day. If they wanted to solve their waste management problems sustainably, they needed to do by themselves" (a district official, personal communication, May 23, 2017).

In addition to this, the BMA created public awareness to encourage people to participate in the collaboration. Overall, the BMA created public awareness of the importance of participating in waste management collaboration through the media such as radio, television, billboards, and pamphlets, which all promoted waste management collaboration projects. Intermediary staff from district offices made local people aware that waste management problems were their own problems, and they were the people who caused those problems. Therefore, they needed to understand that they were in the best position to solve those problems. Moreover, children within local communities were informed about collaboration for waste management.

Furthermore, the capacity to provide equipment for the collaboration was mentioned as well. It was said that the BMA offered collaborative organizations the necessary equipment for waste management collaboration. For example, a community leader of a community that collaborated with the BMA for waste management stated that "our communities had always received vehicles, garbage bins, waste fermentation bins, and fermentation substance and staff from a district office (a community leader, personal communication, May 25, 2017)."

The last collaborative capacity the interviewees mentioned was communication. The BMA already had a free hotline service for local people. They could use this to communicate with the BMA about waste management collaboration. Moreover, intermediary staff from district offices always opened opportunities for communities to recommend their ideas. This point was supported by an intermediary member of staff that people in a community knew intermediary staff, and they would tell the staff when they had any problems with the waste management project. Sometimes they would tell the community leader or the community committee. The community leader or committee would then inform the intermediary staff. Moreover, sometimes intermediary staff participated in committee meetings, if that meeting was related to issues about waste management, to give information or to listen to problems and comments from the community.

Phitsanulok City Municipality's Waste Management Collaboration

(1) Overview of the Phitsanulok City Municipality

Phitsanulok City Municipality covers an area of 18.26 square kilometers (The Project for Promoting Sustainability in Future Cities of Thailand, 2015). The current population of the Phitsanulok City Municipality is 68,086 (Official Statistics Registration Systems, 2017). It generated 134.81 metric tons of waste per day in 2014, 133.95 metric tons of waste per day in 2015, and 132.99 metric tons of waste per day in 2016 (Department of Pollution Control, 2015; Department of Pollution Control, 2016a; Department of Pollution Control, 2017). The Phitsanulok City Municipality received the 2013 King Prajadhipok's Institute award for networking with the public sector, the private sector, and civil society. Moreover, it is the first LAO prototype in Thailand to use Community-Based Solid Waste Management (CBM).

Table 2. General Information about the Phitsanulok City Municipality

Number	Type of Information	Details
1	Size of Area	18.26 km2
2	Size of Population	68,086
3	Waste Generation Rates of the Last Three Years According to National Records	2014: 134.81 tons per day 2015: 133.95 tons per day 2016: 132.99 tons per day

Source: Sathabhornwong (2019, p. 292)

(2) Waste Management Problems of the Phitsanulok City Municipality

The Phitsanulok City Municipality's waste management problems can be traced back to 1995–1997, the period when the municipality first used landfill sites. Firstly, the municipality disposed of waste at the Wang Tong landfill site. After the municipality had disposed of a lot of waste in this site, there was opposition from local people in that area. For example, the garbage trucks of the municipality that needed to enter the area were destroyed. There were problems due to flies and bad smells from the landfill site. Consequently, the municipality had to close it. However, the municipality understood that local people could not live with the bad conditions caused by the landfill site; for instance, they had to use a mosquito net to protect themselves from flies (a Phitsanulok City Municipality official, personal communication, July 3, 2017).

In 1998 the municipality experienced problems due to rapidly increasing waste. The amount of waste generated by the municipality was 142 metric tons per day. This is a big increase when compared to the 49 metric tons per day in 1993. Furthermore, at that time, the

municipality disposed of waste by burning it, which caused air pollution. Moreover, local people suffered from insects and bad smells from the piles of waste that were awaiting disposal. This made local people opposed to the waste management of the. For this reason, the municipality created a waste management project in 1998 that had three major strategies, consisting of encouraging public participation in waste management, improving the waste management systems of the municipality, and collaborating with nearby LAOs (Department of Environmental Quality Promotion (DEQP), 2008).

In addition, there was the problem of the 'commuter adjusted population'. Phitsanulok City was a city where many people came to study because it had many academic institutions such as Naresuan University, Phitsanulok Rajabhat University, Rajamangala University of Technology Lanna and vocational colleges. These people produced waste which had to be disposed of in the city. In Phitsanulok, there is the hospital that is the center of public health provision in the northern region of Thailand and private hospitals. People who came to receive services generated a large amount of waste.

There were also big businesses that had a lot of workers, hotels that had a lot of guests, events that had a lot of visitors; these people would generate a lot of waste when the capacity to deal with waste was limited. This burden was the responsibility of the municipality (a Phitsanulok City Municipality official, personal communication, July 3, 2017).

Moreover, there was no prototype of an effective LAO waste management system. Therefore, the executive body of the municipality, led by the mayor, sought assistance from foreign countries. As a result, they received academic assistance from the Deutsche Gesellschaft für Internationale Zusammenarbeit (GTZ) in Germany to study waste management and solutions for the waste management problems of the municipality. GTZ helped the municipality study waste management problems, manage the data, and educate all sectors which were related to the municipality's waste management problems about how to solve those problems (Poboon, 2008). Additionally, waste generated by the municipality had been disposed of by the landfill method. It would be put into the municipality's landfill site in Bang Rakam District. However, this landfill site would be full in a short time due to the continuously increasing amount of waste, and due to inappropriate waste treatment. In addition, it led to other environmental problems. For this reason, the municipality used the results of the GTZ study to find an appropriate waste treatment for the municipality. As a result, the municipality agreed to apply mechanical-biological waste treatment (MBT) to its waste management (Environmental Research Center, 2006).

Lastly, the municipality had a problem with a lack of public awareness of waste management problems, and there was a lack of collaboration between LAOs and related central government agencies (Phitsanulok City Municipality, 2012). For example, a Phitsanulok City

Municipality official found that some local people avoided paying the fees for municipal waste collection: "Some people did not pay their waste collection fees. They claimed that they never disposed of their waste at the points provided by the municipality. The fact was that, although they did not dispose of their waste at the municipality's waste collection points, they disposed their waste at markets, department stores or other public spaces where were also under the responsibility of the municipality in collecting waste and transporting waste from those places for the disposal. They did not realize this fact" (a Phitsanulok City Municipality official, personal communication, July 3, 2017).

(3) Collaborative Organizations

The Phitsanulok City Municipality waste management collaboration can be divided into two periods. The first period was when the municipality collaborated with an international organization to study waste management problems and found some solutions to those problems in terms of technology to dispose of waste. In this period, the collaborative organization was the Deutsche Gesellschaft für Internationale Zusammenarbeit (GTZ), who gave academic assistance to the municipality by sending their specialists to work with the municipality. The second period was when the municipality used mechanical-biological waste treatment (MBT), which was the result of the academic collaboration between the GTZ and the municipality to dispose of the waste generated by people within the municipality.

This period was also when the municipality tried to reduce the amount of waste by dealing with the source of waste. Therefore, the municipality applied the CBM concept to encourage public participation in waste separation in communities. There were five major organizations or groups that collaborated with the municipality. The first group was the 'network of environmental protection volunteers.' They were developed from the 'village health volunteers' under the Ministry of Public Health. This network was created in 1999-2000. It was composed of volunteers who encouraged communities within the areas of the municipality to separate waste to reduce the overall amount of waste. Therefore, the second collaborative group was the group of all communities in the municipality, which would be the main actor in reducing the amount of waste by implementing waste separation at source in accordance with the CBM principle. They would separate saleable waste and organic waste from the total waste. The saleable waste would be sold to private companies, organic waste would be composted into bio-fertilizers, and the remaining waste would be disposed of with NBT technology by the private company.

The third collaborative group was a group of private organizations that were waste buyers; for instance, the Wongpanit Company. They would come to buy waste from the communities. The next collaborative group was a group of local schools under the municipality,

from kindergarten to primary school levels. These schools used the waste management curriculum produced by the municipality to educate students about waste management and encouraged children to take part in waste separation both at school and at home (a Phitsanulok City Municipality official, personal communication, July 3, 2017).

The final collaborative group was the group of other organizations that voluntarily participated in waste management collaboration in the municipality; for instance, hotels that applied the CBM principle. An owner of a collaborative hotel explained how his hotel participated in the collaboration:

"There was an incident that I saw municipal employees collecting waste which had dirty leachate. It made me realize that we should help by managing our waste properly. I believed that if everyone collaborated, our environment would be better" (a hotel owner, personal communication, July 4, 2017).

(4) Collaborative Capacities

The first capacity was the financial capacity. The municipality focused on environmental management, so it allocated a lot of money to support its environmental management projects. For example, the municipality allocated 25 percent of its annual budget to support environmental management problems (Poboon, 2008). Moreover, the municipality received 1.1 million baht for a project to reduce the release of short-lived air pollutants. This project also covered the implementation of waste separation at source and utilization of separated waste, such as organic waste (Phitsanulok Hotnews, 2016), which was related to waste management collaboration between the municipality and communities. At the present time, the major source of funds for waste management collaboration was from the annual budget of the municipality. The municipality spent more than 30 million baht per year. Waste collection and waste transportations required money to pay for energy and staff wages. The municipality had a four-year plan to manage this project. This plan was fixed and did not vary much year by year.

The staff capacity was the second collaborative capacity of the municipality. The waste management collaboration was the responsibility of the Department of Public Health of the municipality. Most staff in this department had the knowledge and experience appropriate for their tasks. Only a small number of staff did not have direct knowledge of environmental management, but they were motivated by the municipality to be responsible for the tasks. Furthermore, staff always received training, had opportunities to visit other organizations to learn from them, exchanged knowledge and experience with other organizations, and systematically managed knowledge within the municipality (Poboon, 2008). In terms of the readiness of the staff, the municipality had a big working team (15 people) and the sub-teams by the mission to work for the collaboration, although it was work in addition to their routine duties.

Next, the municipality did not have a direct ordinance for waste management collaboration. However, the municipality had the policy capacity to collaborate since it had environmental management policies in three major areas: increasing green spaces and public parks, increasing efficiency of waste disposal; and encouraging public participation in waste management (Poboon, 2008). The last two major policies supported waste management collaboration between the municipality, communities, and other sectors.

The municipality had the capacity to provide training and workshops for communities about waste management, such as creating a community waste bank and composting fertilizers from organic waste. The municipality also provided annual training for environmental protection volunteers. These training events were organized by municipal staff who had knowledge and experience of waste management. In addition, the municipality had the capacity to take community representatives to visit and learn from communities in other LAOs (Poboon, 2008).

Additionally, the municipality used incentives to help increase public participation in all municipal projects, not just waste management collaboration projects. However, the municipality used those incentives carefully and rationally, according to the former vice-mayor of the municipality. He explained that the rationale that the municipality used was to help people understand the municipal projects, not just to please them without any reason (Poboon, 2008).

The sixth capacity was the communication capacity. The municipality often had meetings with collaborating communities. In the first period of the projects, they had two meetings per week. After the projects had been implemented effectively, the number of meetings was reduced to one per month. In some projects, they had one meeting every two months to follow up on the projects such as the community waste bank project. These meetings were for having conversations between the municipality and the communities. They also gave opportunities to the communities to discuss problems they were experiencing with the municipality (Poboon, 2008).

The next capacity was the capacity to report problems. Local people could report problems to the municipality through community leaders. The community leaders would then report the problems received from people in their communities at the meetings with the municipality. In general, there were meetings between communities and the municipality every month. Moreover, local people could report problems through the customer service center of the municipality (Poboon, 2008). Additionally, local people and other collaborative organizations were able to report their problems to the municipality via the internet, such as through the official internet website of the municipality or through the mayor's Facebook page. They could also report the problems via the municipality hotline.

The capacity to encourage participation from other organizations was also important. The municipality encouraged local people to participate in waste management collaboration by creating public awareness of the collaboration. The municipality created a network of environmental protection volunteers. The method that these volunteers used was knocking on doors to talk with local people on behalf of the municipality. This was based on the idea that to make a community understand, the volunteers that the municipality used to inform local people should be people within that community because outsiders might make local people doubt their sincerity. The volunteers approached people in the evening or at weekends because people are usually not at home in the afternoon. The result was that local people collaborated well with the municipality in implementing household waste separation, garbage bin-free roads, and community waste banks (a Phitsanulok City Municipality official, personal communication, July 3, 2017).

The ninth capacity was the capacity to share information. The municipality promoted its projects to the public through various media, such as community radio broadcasting, publishing books and pamphlets, and through its official internet website (Poboon, 2008). Using Facebook, the municipality also promoted environmental protection projects, mobile waste management units, information about communities winning waste management awards, and other related information. Lastly, the municipality had a municipal journal to promote related projects.

Furthermore, the municipality had the capacity to find solutions to problems. When collaboration experienced any problems, the municipal executives needed to know the problems and to discuss solutions. In addition, each community had a community leader. The municipality had meetings with community leaders from all 14 communities every month. Furthermore, the communities had meetings with their networks of communities and other organizations every year.

The last capacity was the capacity to be innovative. For instance, in community learning centers, collaborative organizations could hold brainstorming sessions with their members to create new products made of waste. A Phitsanulok City Municipality official stated that, "The municipality offered the opportunity to grow up to participating communities. For example, learning centers of successful communities could generate incomes from visitors, such as collecting fees from the visitors and selling products made of saleable or recyclable waste. The municipality would help those communities to create and promote their learning centers and other projects so that other people and organizations would be interested and then visit the communities" (a Phitsanulok City Municipality official, personal communication, July 3, 2017).

Khon Kaen City Municipality's Waste Management Collaboration

(1) Overview of the Khon Kaen City Municipality

The Khon Kaen City Municipality covers an area of 46 square kilometers (Khon Kaen City Municipality, 2018a). The current population of Khon Kaen City Municipality is 118,262. It generated 212.5 metric tons of waste per day in 2014, 219.1 metric tons of waste per day in 2015, and 269.42 metric tons of waste per day in 2016 (Department of Pollution Control, 2015; Department of Pollution Control, 2016a; Department of Pollution Control, 2017). The Khon Kaen City Municipality received the King Prajadhipok's Institute awards for networking with the public sector, the private sector and the civil society in 2011 and 2014; and the golden King Prajadhipok's Institute awards for LAOs for networking with the public sector, the private sector and civil society in 2016. In addition, it has received the zero-waste community award in 2014 (Khon Kaen City Municipality, 2018b).

Table 3. General Information about the Khon Kaen City Municipality

Number	Type of Information	Details
1	Size of Area	46 km2
2	Size of Population	118,262
3	Waste Generation Rates of the Last Three Years According to National Records	2014: 212.5 tons per day 2015: 219.1 tons per day 2016: 269.42 tons per day

Source: Sathabhornwong (2019, p. 323)

(2) Waste Management Problems in the Khon Kaen City Municipality

Khon Kaen Province is known as a famous university town. Consequently, its growing population of both locals and incoming students resulted in an increase in waste, especially in the areas of the municipality. It was predicted that the waste volume would be 182 to 256 metric tons per day by 2025 (Team Group, 2018). Turning to the waste management problems of Khon Kaen City Municipality, it was claimed that the major waste management problem of the municipality was the limited landfill site for the continuously increasing waste of the municipality (Asian Urban Information Centre of Kobe, 2008). The municipality's landfill site has been used since 1968 (a 10th Regional Environmental Office officer, personal communication, June 13, 2017).

The municipality started to experience problems with full landfill sites in 1996 (More than 800,000 metric tons of waste accumulated over the past five decades at the 16-hectare landfill site at Ban Kham Bon, Muang District, Noen Thon Sub-District of Khon Kaen City. However, residents who had been living around this landfill site believed that the actual amount

of waste could exceed 1 million metric tons when the waste beneath the ground was included. These residents had been negatively affected by the foul smell of the waste, the wastewater that leaked and polluted rice fields and water sources, and occasional fires within the landfill site that produced a lot of smoke. The residents protested and filed their complaints about these problems many times over the years. The municipality made efforts to tackle the negative impact of the landfill site on the residents and to manage the amount of waste in order not to reach the maximum capacity of the site. Nevertheless, the amount of waste was continuously increasing because the area of the city was expanding and the population was growing (Janphrom, 2015).

(3) Collaborative Organizations

The Khon Kaen City Municipality collaborated with three sectors, consisting of local people, a private company, and Khon Kaen Province. A 10th Regional Environmental Office officer explained that:

"Province in this context covered all organizations under the provincial administration of the provincial governor. For example, the Khon Kaen Provincial Office for Local Administration was responsible for law-related issues; the Khon Kaen Provincial Treasury's Office was responsible for budget disbursement issues, and the Khon Kaen Office of Natural Resources and Environment was responsible for environment-related issues and requesting central government's budgets for the municipality through the Ministry of Natural Resources and Environment" (a 10th Regional Environmental Office officer, personal communication, June 13, 2017).

Working alongside related provincial (and also regional) government organizations was an outstanding characteristic of the Khon Kaen City Municipality waste management collaboration. The 10th Regional Environmental Office was one example of a regional government organization that collaborated with the Khon Kaen City Municipality. An officer of the 10th Regional Environmental Office explained the overall role of the 10th Regional Environmental Office:

"In the whole picture, when an LAO received the budget from the central government, the Regional Environmental Office had a role as a commissioner to consider the projects in terms of the techniques; for instance, we considered like "Was the technology they used appropriately?" and "Was it worth the cost to do this project?" Before this stage, the project had been filtered by provincial organizations such as a provincial environmental office" (a 10th Regional Environmental Office officer, personal communication, June 13, 2017).

(4) Collaborative Capacities

This research identified six collaborative capacities that Khon Kaen City Municipality used to make their waste management collaboration successful. The first collaborative capacity that Khon Kaen City Municipality had was the financial capacity. The major

sources of finance were the municipality itself and private companies that invested in waste-to-energy projects.

The second collaborative capacity was training. The Division of Environment of the Khon Kaen City Municipality hosted community educational workshops on the '3Rs (reduce, reuse and recycle)' principle for waste management and supported training on composting waste into fertilizers in 15 communities within the municipality for the waste management collaboration initiative. Another collaborative capacity was equipment. The Division of Environment of the municipality provided 25 recycle bins around the city of Khon Kaen for the waste management collaboration initiative (Swartz & Powers, 2016).

The fourth collaborative capacity was the staff. Municipal staff was educated and had a good vision statement. In terms of education, a 10th Regional Environmental Office officer explained that:

"The statement that says, "LAO staff is foolish." should be ignored because, from my experience, officers of the municipality have high academic degrees in related fields and have been well trained from well-known institutes, particularly those who are directors of the Division of Public Health and Division of Public Works, so we do not need to question their levels of intelligence. We respect each other's potentiality. They are intelligent, flexible, and can get along with local people very well" (a 10th Regional Environmental Office officer, personal communication, June 13, 2017).

A 10th Regional Environmental Office officer also explained the vision statement of municipal staff:

"They have a good vision statement. You might have heard that there is much LAO staff that corrupts, but this LAO staff has a good vision statement and apply their vision statement to develop their responsible areas. They think about using appropriate techniques for productive works in the long run. Not just on waste management but on every municipal policy; for instance, developing Khon Kaen City to be a smart city well" (a 10th Regional Environmental Office officer, personal communication, June 13, 2017).

The fifth collaborative capacity was innovation. Innovations came from consulting and exchanging ideas on the space within waste management collaboration. A 10th Regional Environmental Office officer explained the stages in this context that, "They were the stages provided by the governmental committees for related sectors." One innovation from these stages was a policy to make a provincial administrative organization (PAO) be the core organization in hazardous waste management. This public policy was initiated in Khon Kaen Province. It came from related organizations exchanging ideas during collaboration. In the past, the Khon Kaen municipality had been responsible for hazardous waste management, but the

current Director of the regional environmental office raised the issue about letting the PAO manage hazardous waste at a provincial level.

The last collaborative capacity was communication. Within the waste management collaboration, an online chat application was used for communication both within the organization and across the organizations. For example, a 10th Regional Environmental Office officer stated that "the chief of each department of governmental organizations commanded the officers through the Line application." Moreover, he mentioned that the Maintenance of the Cleanliness and Orderliness of the Country Act, B.E. 2560 assigned the Ministry of Interior to be the core organization in driving the policy to make LAOs have a 'committee on solid waste management.' This committee would invite related sectors in waste management to have meetings together. The committee would hold a meeting, send invitation letters to related organizations (e.g., central government organizations, LAOs, and local communities), assign the roles of president and commissioners, and count the attendants. It was a formal channel for communication among collaborative organizations that enabled many organizations to communicate together at the same time in the meeting (a 10th Regional Environmental Office officer, personal communication, June 13, 2017).

Cross-Case Analysis

Table 4. Cross-Case Analysis

	Case Study 1	Case Study 2	Case Study 3
Waste Management Problems	increasing waste due to increasing population, improper waste disposal, lack of public awareness and knowledge on waste management among the citizens	environmental problems due to waste, reckless commuters, no prototype of effective waste management, lack of public awareness on waste management problems, lack of collaboration between the local administrative organization and other government organizations	increasing waste due to increasing population, limited landfill sites, environmental problems as a result of waste

Table 4. Cross-Case Analysis (Cont.)

	Case Study 1	Case Study 2	Case Study 3
Creation of Waste Management Collaboration	The waste disposal method could not eliminate the continuously increasing waste, and a lack of public awareness and knowledge on waste management stimulated the local administrative organization to initiate collaboration with a state enterprise and universities to create a waste separation project engaging public participation.	The inability of the current waste disposal infrastructure to meet the demands stimulated the local administrative organization to initiate collaboration with a German development agency to study municipal waste problems and propose solutions to those problems.	1.) The vision of being a green city stimulated the province to create collaboration between local citizens, academic institutions, private companies, and government organizations. 2.) The inability of the current waste disposal infrastructure to meet the demands stimulated the local administrative organization to initiate collaboration with the private sector in creating a waste-to-energy plant.
Collaborative Organizations	non-profit state enterprises, universities, private companies, district offices, local schools, communities, markets and shopping malls, hotels, and private accommodations	international/foreign organizations, private companies, communities and hotels	the province, other government organizations, local citizens and private companies

Table 4. Cross-Case Analysis (Cont.)

		Case Study 1	Case Study 2	Case Study 3
Collaborative Capacities	Administrative Capacities	1.) financial capacity 2.) staff capacity 3.) equipment capacity 4.) knowledge capacity 5.) emergency-management capacity	1.) financial capacity 2.) staff capacity 3.) training capacity 4.) policy capacity 5.) problem-reporting capacity 6.) solution-finding capacity	1.) financial capacity 2.) staff capacity 3.) equipment capacity 4.) training capacity
	Social Capacities	1.) communication capacity 2.) information-sharing capacity 3.) boundary-spanning capacity 4.) innovation capacity	1.) communication capacity 2.) information-sharing capacity 3.) incentive capacity 4.) public-participation encouragement capacity 5.) innovation capacity	1.) communication capacity 2.) innovation capacity

Source: Sathabhornwong (2019, pp. 358 – 361)

The cross-case analysis has been made in 4 major themes: waste management problems, creation of waste management collaboration, collaborative organizations, and collaborative capacities as follows:

Waste Management Problems

The case studies show that the major waste management problems were increased waste due to the population change (e.g., increasing population and commuters), lack of public

awareness on waste management, and environmental problems caused by the method of waste disposal. Although migration to urban areas took place across Thailand, the migration to the cities of these case studies was significantly higher. The city where the first case study took place is the capital city, which is also the main port and the center of jobs in the government sector, commerce, construction, manufacturing, and various other services (BMA Data Center, 2019). The city of the second case study is the center of education, public health providers, and tourist attractions of Northern Thailand (a Phitsanulok City Municipality, personal communication, July 3, 2017). The city where the final case study took place is one of the major tourist cities of Thailand, the national export center for trade throughout the Indo-China Region, and the center of commerce, politics, and education of North-Eastern Thailand (a10th Regional Environmental Office Officer, personal communication, June 13, 2017).

In these cities, there was a lack of public awareness of waste management in two out of three cities. For example, some citizens in the first city threw rubbish on roadsides or dropped litter on waterways, whereas some of those in the second city avoided paying the municipal waste collection fee. Moreover, all of them had experienced environmental problems caused by their waste disposal. The main problem was a foul smell of waste generated from the landfill sites that existed in all case studies. The second problem was an insect nuisance that impacted the citizens who stayed near the landfill sites of the first and the second case studies. Besides, the third case study showed the problems of polluted agricultural fields and water sources because wastewater leaked from the landfill site, and a lot of smoke blew over from occasional fires inside the landfill.

Creation of Waste Management Collaboration

Although the creation of collaboration for waste management was initiated by the LAOs in all cases, this was due to different reasons. The LAO of the second and the third case studies initiated their collaboration because of the ineptitude of their waste disposal infrastructure. The landfill site of the second case study generated so many insects and released such a bad odor that local citizens could not stay in that area anymore. Thus, the LAO had to close the site. The LAO of the third case study experienced the problem that their landfill site was full, and they could not construct a new landfill site because the local citizens protested the project.

There was no problem with the landfill site of the first case study because the LAO used landfill sites that were in other provinces. However, the LAO realized that the landfill method was not the appropriate waste disposal method in the long run, because they could not construct a new landfill site in their province. The local citizens would be opposed to the LAO since they were affected by insects and bad odor from the site. In addition, the LAO found that there was a lack of public awareness and knowledge on how to manage waste. Therefore, these LAOs initiated a

collaboration with other sectors in order to operate better waste disposal methods in their governed areas.

Collaborative Organizations

The three-case study LAOs are outliers in the overall population of Thai LAOs because they are part of the small percentage that collaborates with private organizations (Sathabhornwong, 2019, p. 347). However, like many local governments, they involve local citizens. Local citizens of all cases were involved in the waste separation process. In the first case study, local citizens collaborated with LAOs in implementing the community-based waste separation project. Similarly, local citizens in the second case study collaborated with the LAO in implementing waste separation at the source in accordance with the concept of the Community-Based Solid Waste Management (CBM). That was, the citizens separated recyclable waste and organic waste from the main waste. After that, the recyclable waste was sold to private companies, the organic waste was composted to make bio-fertilizers, and the rest was disposed of at the Mechanical Biological Waste Treatment (MBT) (a Phitsanulok City Municipality official, personal communication, July 3, 2017). The third case study showed that the local citizens were encouraged by the LAO to separate waste at its source, to reuse usable materials, and to compost organic waste that was separated from the main waste to make bio-fertilizers. For example, the LAO runs the 'Pig Feeding' project that encouraged the citizens to separate food waste for composting into liquid fertilizers (Asian Urban Information Centre of Kobe, 2008)

In terms of the involvement of private companies, they played different major roles in different case studies. In the first case study, private companies were 'implementers' since they implemented the waste separation similar to the local citizens (a BMA official, personal communication, May 23, 2017). The private companies in the second case study were the 'waste buyers' who bought recyclable waste from local citizens (a Phitsanulok City Municipality official, personal communication, July 3, 2017) whereas those in the third case study were the 'investors' in a waste-to-energy project (Janphrom, 2015).

Collaborative Capacities

The cross-case analysis of this theme starts by considering the collaborative capacities that the three case studies had in common: financial, communication, and innovation creation capacities. The first common collaborative capacity was the 'financial capacity.' The major source of financing, which was a key collaborative capacity, was from an LAO; for instance, the supporting budgets from municipal waste collection fees collected by the LAOs. Moreover, the LAOs were able to receive the allocation of national funding through the Office of Natural Resources and Environmental Policy and Planning, the Ministry of Natural Resources and Environment, the Department of Local Administration, and the Ministry of Interior. This shows how the central

public financed the development of collaboration on waste management of the local governments (Sathabhornwong, 2019, p. 352). This central public financing is a form of administrative capacity that comes within the sub-concept of 'delivery capacity' discussed by Lodge and Wegerich (2014).

The second common capacity was 'communication capacity.' This collaborative capacity is partly about the administrative capacity (the capacity to set up administrative procedures for communication) and partly about the social capacity (the way in which these communication networks can improve the interaction between organizations). All cases perceived this capacity as the 'channel' for other collaborative organizations to get in touch with the LAOs. For example, the first case had two channels: the hotline service and communicating through the intermediary staff. The second case had only one channel, which was through frequent meetings between the LAO and the communities, and the third case had two channels: an on-line chat application and the meetings between the LAO and all collaborative organizations in the form of the 'committee on solid waste management.'

The final collaborative capacity that all cases shared was the 'innovation capacity'. The first case perceived it as an 'opportunity' for the collaborative organizations to think together and talk together to find out new ideas for a waste management collaboration where the second and the third case established a particular space for creating innovations. For example, the second case had a community learning center to brainstorm with their collaborative organizations to create innovations, and the third case had set up an official stage for consulting and exchanging ideas among their collaborative organizations.

Some collaborative capacities were identified in only one or two of the three cases. The first case study analysis identified 'knowledge capacity,' which was an administrative capacity. It is similar to the idea of 'analytical capacity' discussed by Lodge and Wegerich (2014). This knowledge was the knowledge about waste management technologies that each collaborative organization had. For example, the knowledge of ISO technologies that a collaborating private organization had, was used to educate the local citizens. The first case study also identified the 'emergency management capacity,' which was a 'policy capacity'. Policy capacity is a new sub-type of administrative capacity which has not been discussed in the literature. I have identified it as a result of the case studies. It is a type of administrative capacity because the creation and implementation of policy require administrative processes. This policy capacity is important for successful collaboration because it is necessary for making the 'regulatory capacity' mentioned by Lodge and Wegerich (2014) effective. For example, when there was an emergency that could affect a waste management collaboration (e.g., a flood disaster), a joint committee would have a meeting in order to find out ways to deal with that situation as soon as possible.

The second case study identified the 'incentive capacity,' which was a social capacity. The LAO incentivized individuals or organizations to increase public participation in their collaborative projects. It also identified the 'problem report capacity,' which was an administrative capacity. It relates to Lodge and Wegerich's (2014) 'delivery capacity' because the problem report capacity will make public organizations improve the public services that they deliver to citizens. For example, the second case showed that local citizens could report any problems they experienced within the waste management collaboration through their communities' leaders when other collaborative organizations and also the local citizens could report problems through the website or the hotline service of the LAO.

Finally, it identified the 'solution finding capacity,' which was also an administrative capacity and relates to Lodge and Wegerich's (2014) 'delivery capacity' because it helps public organizations find the best way to improve their public services before delivering them to their citizens. For example, the second case showed that when the waste management collaboration experienced any problems, they would set up meetings both within the LAO and between the local administrative organization and other collaborative organizations to find solutions.

There were six collaborative capacities that the case studies had, that were particularly important in assisting them to achieve their collaboration with communities. For example, in the first case study, the respondents mentioned six capacities that assisted them. First, the 'financial capacity,' which was the capacity that the intermediary staff of the LAO needed in order to work with the communities. The staff even used their own personal finances in cases where they could not receive financial support from the LAO. In addition, other collaborative organizations also needed this capacity to work with the communities. For example, a private company provided financial support to its staff in the form of food, drinks, and tools in exchange for collaborating in waste management with the communities.

The second capacity was 'staff capacity.' The LAOs organized training for their intermediary staff on how to approach the communities, and how to encourage people in the communities to participate in waste management collaboration. Thus, the staff capacity in this context means that the staff is well trained for collaborating with the communities. Furthermore, the staff is expected to have good time management skills because working with the communities is additional to their normal job. According to the district office official, the intermediary staff needed to have good time management skills since they had to undertake their core work at the local administrative organization as well as their work with the communities.

The next capacity was 'knowledge capacity.' For example, the staff of a collaborative private company used their own knowledge of waste management to educate the communities. The 'capacity to deal with emergencies' was the fourth capacity that was mentioned by the

respondents. For example, the LAO's staff encouraged people in the communities not to bring their waste to the collection points but to store it within their houses at times of flooding.

The fifth was the 'boundary-spanning capacity' that was defined as a capacity to encourage individuals or organizations to collaborate with the LAO. For example, the intermediary staff made people in the communities perceive waste management problems as their own problems, not the LAO's problems. Moreover, they were the best people to resolve waste management problems since they caused those problems. This made the communities publicly aware of waste management.

The last capacity was the 'equipment capacity.' Because the communities voluntarily collaborated with the waste separation project, they needed the relevant equipment to achieve their goals. For example, they required waste transportation vehicles, garbage bins, and composting chemicals. This equipment was provided by the LAO.

Conclusion

The origin of waste management collaboration of Thai LAOs is due to two major reasons. The first is the ineptitude of their old waste disposal methods and/or facilities, and the second is the executive policy that supports LAOs to collaborate with other organizations for more efficient waste management. Second, the inductive results from the case studies allow me to identify a new sub-type of administrative capacity, policy capacity, and new sub-type of social capacity, innovation capacity. Both are important in explaining the ability of Thai LAOs to collaborate on waste management. Although Sullivan, Barnes, and Matka (2002) recognize that 'innovation strategy' is something collaboration should aim for. Therefore, the innovation capacity is a type of collaborative capacity I am adding to the literature. Although Lodge and Wegerich (2014) have a related concept of 'delivery capacity', their concept suggests a static view of what collaboration can achieve. In contrast, the innovation capacity is about the potential of collaboration to achieve improvements in delivery and outcomes.

Limitations of the Study

The major limitation of this study is that it cannot be applied to all LAOs because it studied only best practices. However, the case studies data would give more information about the collaborative capacities of Thai LAOs in real-life situations, and more insights from the officials who worked for waste management collaboration.

Recommendations for Future Research

LAOs that are not in a group of best practices or successful waste management collaboration is recommended to be a case study design. These case studies are aimed to present

collaborative capacities and other relevant issues of these LAOs. Because my case studies were only based on those who were in a successful group, these findings can be compared to my case studies' findings in terms of comparative analyses. Furthermore, my research emphasized the collaborative capacities of LAOs in waste management. The collaborative capacities – i.e., the capacities to collaborate or create collaboration, are the issues that are important for understanding the early stages of collaboration. There are also other stages of collaboration that could be studied in the future.

References

Asian Urban Information Center of Kobe (AUICK). (2008). AUICK first 2008 workshop: City report and action plan of Khon Kaen. *AUICK Newsletter* 51. Retrieved from http://www.kicc.jp/auick/database/apc/apc051/apc05102_08.html

BMA Data Center. (2019). Bangkok at present. Retrieved from http://203.155.220.230/m.info/nowbma/

Department of Environment. (2015). *Bangkok solid waste management plan B.E. 2558-2562*. Bangkok: Bangkok Metropolitan Administration (BMA). Retrieved from http://www.oic.go.th/FILEWEB/CABINFOCENTER9/DRAWER021/GENERAL/DATA0000/00000579.PDF

Department of Environmental Quality Promotion (DEQP). (2008). In Collaboration with Regional Environment Offices, Ministry of Natural Resources and Environment. (2008). *Phitsanulok City Municipality*. Retrieved from http://local.environment.in.th/formal_data2.php?id=870

Department of Pollution Control. (2015). *Thailand's community solid-waste situation annual report B.E. 2557.* Retrieved from http://infofile.pcd.go.th/waste/wst_annual57.pdf?CFID=1900759&CFTOKEN=30257372&fbclid=IwAR2RNDvZ9F18PwxjmOKSBfl6qWj6G4_dlF3zv1g_nCNKTcSR9XYkucIVRlk

Department of Pollution Control. (2016a). *Thailand's community solid-waste situation annual report B.E. 2558*. Retrieved from http://infofile.pcd.go.th/waste/wst_annual58.pdf?CFID=1900759&CFTOKEN=30257372&fbclid=IwAR0ceT1je_b-O1oPzgzspRW3mzZrc7IUXrCFlNuEvwmc9sbCbs7coLrS6rc

Department of Pollution Control. (2016b). *The master plan of the national action plan on waste management B.E. 2559 – 2564*. Bangkok: Waste and Hazardous Substances Management Bureau, Department of Pollution Control, Ministry of Natural Resources and Environment.

Department of Pollution Control. (2017). *Thailand's community solid-waste situation annual report B.E. 2559*. Retrieved from http://infofile.pcd.go.th/waste/wsthaz_annual59.pdf?fbclid=IwAR1u_e_oXkTCw_ljiKRN0Pftg36EySK5913UMGGXSApmuD9x1_CTviH9 NAk

Environmental Research Center. (2006). *The analysis of the Phitsanulok City Municipality's waste characteristics after received the Mechanical Biological Waste Treatment (MBT) project*. Retrieved from http://www.erc.nu.ac.th/Project-12-5.asp

Grotenbreg, S. & Buuren, A. V. (2016). Realizing innovative public waterworks: aligning administrative capacities in collaborative innovation processes. *Journal of Cleaner Production*, 171(2018), S45-S55. doi: 10.1016/j./jclepro.2016.08.128.

Janphrom, J. (2015, November 29). Tackling Khon Kaen's mountain of garbage. *The Nation*, Retrieved from http://www.nationmultimedia.com/national/Tackling-KhonKaens-mountain-of-garbage-30273912.html

Jitasa Foundation. (2016). *Summary report (draft) of the second period of the waste and recyclable materials management (Recycle 360°: love the world every day, recycle waste) project*. Bangkok: Jitasa Foundation.

Jutidamrongphan, W. (2018). Sustainable waste management and waste to energy recovery in Thailand. In M. Nageswara-Rao (Ed.), *Advances in Biofuels and Bioenergy* (pp. 217-238). doi: 10.5772/intechopen.70022.

Khon Kaen City Municipality. (2018a). *General information of Khon Kaen City Municipality*. Retrieved from http://www.kkmuni.go.th/basic-data/basic-data/history.pdf

Khon Kaen City Municipality. (2018b). Awards and honors of Khon Kaen City Municipality. Retrieved from http://www.kkmuni.go.th/2017/pages/52

King Prajadhipok's Institute. (2019a). *King Prajadhipok's Institute awards*. Retrieved from http://kpi3.uds.co.th/award/

King Prajadhipok's Institute. (2019b). *Local administrative organizations who have received the King Prajadhipok's Institute awards in Phitsanulok Province*. Retrieved from http://kpi3.uds.co.th/award/search-award?year=&province=135&categories=1

King Prajadhipok's Institute. (2019c). *Local administrative organizations who have received the King Prajadhipok's Institute awards in Khon Kaen Province*. Retrieved from http://kpi3.uds.co.th/award/search-award?year=&province=106&categories=1

King Prajadhipok's Institute. (2019d). *Local administrative organizations who have received the Golden King Prajadhipok's Institute awards in Khon Kaen Province*. Retrieved from http://kpi3.uds.co.th/award/search-award?year=&province=106&categories=2

Lichterman, P. (2009). Social capacity and the styles of group life. *American Behavioral Scientist*, *52*(6), 846-866.

Lodge, D. & Wegerich, K. (2014). Administrative capacity. In Hertie School of Governance (Ed.), *The governance report 2014* (pp. 151-170). Oxford: Oxford University Press.

Official Statistics Registration Systems. (2017). Statistical reports on population and homes: Phitsanulok City Municipality. Retrieved from http://stat.bora.dopa.go.th/stat/statnew/statTDD/views/showZoneData.php?rcode=6599&statType=1&year=60

Phitsanulok City Municipality. (2012). *Phitsanulok City Municipality model: solid waste management*. Retrieved from https://hls-esc.org/documents/3hlsesc/06_T1A_Phitsanulok%20City%20Muncipality%20Model%20Solid%20Waste%20Management_Sinpaisansomboo n.pdf

Phitsanulok Hotnews. (2016). *Phitsanulok City Municipality launched the reduction of air pollutant releases project*. Retrieved from https://www.PhitsanulokHotnews.com/2016/03/11/82617

Poboon, C. (2008). LAO and good environmental management: The case study of the Phitsanulok City Municipality. *Romphruek Journal*, *26*(3), 2-39.

Sathabhornwong, S. (2019). *The relationship between Thai local administrative organisations' collaborative capacities and outcomes: The case of waste management*. Doctor of Philosophy Thesis, *Institute of Local Government Studies School of Government and Society College of Social Sciences*, University of Birmingham, Birmingham, United Kingdom.

Sullivan, H., Barnes, M. & Matka, E. (2002). Building collaborative capacity through 'theories of changes': early lessons from the evaluation of health action zones in England. *Evaluation*, 8(2), 205-226.

Swartz, Z. & Powers, M. (2016, June 5). Khon Kaen's monument to consumerism – the landfill, the scavenger, and the conundrum of ethical disposal. *The ISAAN Record*. Retrieved from https://isaanrecord.com/2016/06/05/khon-kaens-monument-to-consumerism-the-landfill-the-scavenger-and-the-conundrum-of-ethical-disposal/

Team Group. (2018). Solid waste disposal center in Khon Kaen Municipality. Retrieved from http://www.teamgroup.co.th/index.php/en/credentials/projects/environmentalengineering/418-solid-waste-disposal-center-in-khon-kaen-municipality. html

The Project for Promoting Sustainability in Future Cities of Thailand. (2015). Phitsanulok city municipality: project for promoting sustainability in future cities of Thailand. Retrieved from http://www.nesdb.go.th/download/document/Brochure%20of%20Phitsanulok%20City%20Municipality.pdf

Thomson, A. M. & Perry, J. L. (2006). Collaboration processes: inside the black box. *Public Administration Review*, December 2006 (Special Issue), 20-32.