



Toward effective multi-sector partnership: A case of municipal solid waste management service provision in Bangkok, Thailand



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ABSTRACT

An increasing amount of municipal solid waste needs an effective waste management system to provide reliable service, but in reality this has failed to respond to the demand. Partnership is considered as a potential solution that can increase waste management service performance. A public-private-community partnership was studied as a potential way to alleviate the impacts of ineffective waste management. Based on the tripartite service concept, the roles and relationships between service providers and service recipients were identified by incorporating analyzed results obtained from questionnaires, interviews, and site visits. Bangkok was selected as a representative urban city in a developing country that has experienced problems caused by ineffective waste management. The results showed that 87.2 percent of respondents thought that everyone should be responsible for and be part of waste management. A public-private-community partnership was a vital factor in a successful waste management system and also had high possibility to be implemented. In the partnership, essential roles were identified for each stakeholder sector including service recipients, intermediaries, and service providers. Based on the tripartite service concept, a modified conceptual model was proposed.

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Introduction

The increasing generation of municipal solid waste (MSW) is one of the serious problems particularly for urban areas in developing countries. It has become problematic as its level of seriousness is driven by the high growth of population, urbanization, and economic development (Afroz, 2011). The effectiveness of providing a municipal

solid waste management (MSWM) service is an essential factor making cities sustainably livable and far removed from the consequences of MSW problems (UN-HABITAT, 2010). MSWM is a basic service that should be effectively provided to everyone to reach quality of life (Ahmed & Ali, 2004). Like other urban cities, Bangkok—the most populous and also capital city of Thailand—was selected as a case study representing problems caused by the ineffective provision of MSWM service.

MSWM is dynamic along its process and involves multi-sector stakeholders in the system. This study adopted the tripartite service concept by emphasizing the collaboration

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of service providers and service recipients to improve the values of the ecosystem (Shirahada & Fisk, 2011). The study incorporated the concept of tripartite collaboration in a form of partnership to improve the ineffective situation of Bangkok MSWM.

The public-private partnership has increasingly been applied in MSWM service provision in urban areas to improve ineffective situations. This study involved related stakeholders from both the private and public sectors. Therefore, the objectives of this study were: 1) to show how a public-private-community partnership (PPCP) can improve ineffective MSWM and 2) to identify the roles and relationships of stakeholders who are essential in making MSWM effective.

Literature Review

Overview of MSWM

Provision of MSWM service does not go at the same pace as the increasing amount of waste generated. Many cities in the developing world cannot meet the need of MSWM although investing a large proportion of their budget on MSWM. The World Bank (2011) reports that urban cities in the developing world spend more than half of their allocated budget on MSWM; yet still the service coverage is less than 50 percent of total area. As a result of ineffective MSWM, risks to public health, societal well-being, and adverse impacts on the environment are likely increasing in these urban cities. It is, therefore, imperative to find a potential MSWM service provision regime that keeps cities livable and increases the quality of life of the residents.

Context of Bangkok MSWM

In Thailand, MSW includes waste generated from community activities, from residential households, commercial and business establishments, fresh markets, institutional facilities, and construction and demolition activities, but excludes industrial waste. Bangkok has the largest amount of waste in Thailand, in terms of population quantity and density; there are more than 300,000 t of MSW generated monthly (DOE, 2014). The Bangkok Metropolitan Administration (BMA) and 50 district offices are responsible for city management and the well-being of residents. A kerbside collection service is provided by collecting waste from receptacles in front of houses, buildings, or designated public locations on specific dates and at designated times. The collected waste is transferred to three waste transfer stations located on Bangkok's provincial border. Then, it is transported to two landfill sites in two nearby provinces (BMA, 2014).

The MSWM service is provided to most areas of the city. However, the effectiveness of the provided service levels is unequal. An inefficient management process has caused a large amount of incurred costs. Consequently, the BMA has to use budget allocated for other development projects for MSWM (DOE, 2014). Inefficient MSWM is caused by many reasons along the management process chain. For example, the time taken in the MSW transportation process is longer

than planned because of traffic congestion. In some cases, waste collection staff spend time segregating and gathering recyclable or valuable waste for sale as another source of income.

To provide an effective MSWM service for sustainable MSWM, strong collaboration of the stakeholders is imperative. Emphasizing the potential of a public-private partnership, the community has become more important in terms of its potential performance in MSWM.

Public-Private-Community Partnership (PPCP) and Tripartite Service Concept

Partnership has become a potential MSWM alternative to the traditional service provision made by the government. The private and public sectors are partnered to develop a plan, co-create value, and share responsibility in providing the MSWM service. Developing countries in Asia and Africa have successfully applied a partnership model in MSWM service provision (Massoud, Fadel, & Malak, 2003; Rathi, 2006; The World Bank, 2011).

PPCP is a collaboration of the related stakeholders in the MSWM processes ranging from MSW generation at source, collection, transportation, treatment and disposal, and also monitoring and mitigation. Those stakeholders are residents, communities, NGOs, private organizations, and government authorities. In other words, entities from public, private, and community sectors contribute to the efficiency and effectiveness of MSWM. In this study, participation encourages residents to participate in goal and policy setting and also to be active in MSWM activities, such as proper source separation and waste disposal. In other words, residents are stimulated to contribute in a PPCP principally by practical means.

The tripartite service concept consists of three inseparable elements: service providers, service recipients, and the ecosystem. The concept aims to enhance collaboration by engaging providers and recipients in mutual value creation without decreasing the quality of future generations' values. For the last element, service providers collaborate with recipients to improve the values of the ecosystem by creating a "voice for nature" in the service process. The ecosystem in this context means resource integrators among participants, who are service providers and recipients. In the value co-creation service process, the ecosystem joins the process through interactions between human and natural capital (Shirahada & Fisk, 2011, 2014).

Methodology

Data Collection

Primary data were acquired from three groups of people 1) questionnaire to residents; 2) conducting expert interviews; and 3) conducting site visits to frontline MSWM staff, scavengers, and local people at one landfill site and three waste transfer stations. The study site was in the Jatujak district of Bangkok. The study site selection was based on a number of criteria, including waste generation quantity, the population, number of households, and total land area (Bangkok Statistics Report, 2013).

The 422 questionnaire surveys were distributed between December 2013 and January 2014 and this sample size was calculated with a 95% confidence level. The population frame of the samples was people aged over 15 years. A random sampling method was used in the survey. Moreover, to identify the associations of potential roles of imperative stakeholders for PPCP, Pearson's chi-square model fit tests were implemented. Two-by-two test screening of variables was determined, which finally produced the results on the roles and relationships needed in the partnership. In addition, 12 expert interviews of various stakeholders from government institutions; educational institutions; private companies; NGOs, and community-based management projects leaders were implemented. Site visits were conducted at three waste transfer stations and one landfill site throughout March 2014 in order to extract undocumented information. During the visits, 39 discussions were held with frontline staff, scavengers, and local people. The discussions were conducted to develop the partnership potential implications and to obtain comprehensive comment from involved people in MSWM.

Measurements

The questionnaire consisted of 66 queries involving 23 questions which were grouped into 4 parts: 1) general demographic information, 2) MSW sorting habit and disposal behavior, 3) MSWM situation and attitudes on MSWM, and 4) attitudes on having PPCP. Based on their knowledge, respondents were required to answer whether collaboration among involved stakeholders was important; what roles each sector should have to make MSWM service effective, and finally what the results or differences created by having a PPCP among related stakeholders were.

The experts were asked questions about the current MSWM service, influential factors and impacts on the effectiveness of MSWM, the level of collaboration of multi-stakeholders regarding MSWM, their opinions on the performance of MSWM service, and the possibility of having PPCP and stakeholders' roles. The authors had discussions with frontline staff, scavengers, and local people on topics related to general MSWM, their daily life or work conditions, such as work satisfaction, quality of life, and MSWM service problems.

Data Analysis

Descriptive statistics were used to organize and present the demographic profile of respondents, and their MSWM habits and behavior. The roles of stakeholders were grouped into service recipients, intermediaries, and service providers; which were quantitatively analyzed using chi-square tests. To organize experts' opinions and ideas on the MSWM system and their attitudes on PPCP, the authors analyzed the qualitative data using the tripartite value co-creation concept. In addition, a tripartite service concept model was proposed. The model represents the intertwined relationships and roles of the three elements of the tripartite concept under the three aspects of sustainability.

Results

General Information, MSWM Situation, and Attitudes on MSWM Service

The results of the surveys showed that there were 217 female and 205 male respondents. The majority had an average monthly income of THB 10,001 to 20,000 (USD 300 to 600). The average household size was three persons. About half the respondents (216 respondents, 51.2%) did waste sorting at their houses. In terms of household MSWM methods, nearly all (96.7%) of the respondents either placed waste in front of their houses or in public waste bins. The MSW generation rate per household was 1–3 kg per day. Only 48.1 percent of the respondents paid a waste collection fee, which was THB 20 (USD 0.60) on a monthly basis.

In terms of MSWM service, 55.9 percent thought that the effectiveness of the delivered service was at the moderate level. Urgent problems caused by ineffective service were: odor from waste (68.5%), uncollected waste (51.2%), waste not collected on time (39.1%), scattered waste during transportation (31.8%), and no service coverage (7.6%). The experts' opinions on waste collection fee indicated that they thought the current service fee was affordable for Bangkokians. The results showed a lack of participation in MSWM from the people as less than half of the respondents paid a MSW collection fee.

Attitudes on a PPCP

When asked about responsible stakeholders for MSWM, 368 (87.2%) respondents thought that everyone should be responsible; 31 (7.3%) respondents thought that the government should handle all the MSWM processes; 15 (3.6%) respondents thought that residents who were the main waste generators should be responsible for managing waste, while 6 (1.4%) and 2 (0.5%) respondents thought that private companies and NGOs, respectively, should be the primary sector to manage waste. Moreover, 395 (93.6%) respondents thought that collaboration among communities, government, private companies, and NGOs was important for effective service provision and sustainable MSWM. In terms of willingness to join the collaborative system, 332 (78.7%) residents would like to join.

These results matched with the opinions given by the experts who considered that to have sustainable and successful MSWM system, not only the government or private companies had to manage all waste appropriately but also everyone related to waste needed to be involved. Residents and experts thought that a PPCP was vital for MSWM in Bangkok and they would like to be part of the sustainable management system. Therefore, a PPCP had a high possibility of being implemented as the MSWM mechanism.

Table 1 shows results from the chi-square association tests indicating the roles and relationships for each stakeholder on the basis of significant sense.

Table 1 demonstrates a preliminary screening of essential roles of each sector is important for an effective and sustainable MSWM at the .01 level of significance. For the roles of service recipients, respondents thought that

Table 1
Results of chi-square tests of associations with roles of stakeholder for MSWM

(n = 422)					
Roles for service recipients (Residents/communities)	Sort waste	Dispose waste correctly	Minimize waste	Work with government to promote sustainable MSWM	Pay waste collection fee
Count	307	297	244	213	182
Pearson Chi-Square	299.735	271.809	156.815	112.596	86.752
Contingency co-efficiency	0.644*	0.626*	0.521*	0.459*	0.413*
Roles for intermediary (NGOs)	Promote sustainable MSWM	Be an intermediary	Check effectiveness of MSWM system		
Count	248	238	216		
Pearson Chi-Square	163.049	143.600	119.951		
Contingency co-efficiency	0.528*	0.504*	0.470*		
Roles for service providers (Govt/private companies)	Employ appropriate technologies	Provide effective service	Service oriented system	Traceable management process	
Count	283	282	229	226	
Pearson Chi-Square	227.717	230.429	135.736	127.726	
Contingency co-efficiency	0.592*	0.594*	0.493*	0.482*	

* Significant at .01 level

waste sorting, correct waste disposal, and reducing waste generation were top priorities. NGOs, were considered to be critical to gaining better performance from the MSWM; NGOs should help promote sustainable MSWM, be an intermediary between service providers and service recipients, and be a party that monitors and assesses the effectiveness of MSWM processes and performance of the service provided. From the service providers' standpoint, the government authorities and private companies should employ appropriate technologies, provide effective and reliable service, and be more service oriented.

PPCP Based on the Tripartite Concept

This section explains the integrated expert interview results as if there were a PPCP in MSWM in Bangkok. Figure 1 shows a modified tripartite service model representing the balanced importance of the three elements of sustainability, which are the environment, society, and economy. Within these three aspects, collaboration of service providers, service recipients, and resources supported by the ecosystem, leads to the co-creation of values.

In the model, value-in-use refers to expertise and strengths of the providers and recipients that will be integrated and used in improving the waste management system. In a community, actors from the public, private, and community sectors mutually co-create values by integrating all resources that each sector has for a better and more effective MSWM. In other words, sustainable MSWM is a factor that enhances societal well-being with, for example, better health, more happiness, and less disparity.

Perspectives on how the experts think toward each stakeholder and the different roles and responsibilities in MSWM are demonstrated in Figure 2. The results showed that the major problems of the current MSWM system were no collaboration among sectors, lack of involvement, and an unpractical policy; whereas effective MSWM service could be achieved by having a practical policy, providing MSWM knowledge, and most importantly, more involvement and collaboration within the same and different

sectors. MSWM policies are different from place to place. The practicality of MSWM policies is measured on how effective they can be used in management processes.

Another perspective is PPCP attitudes to the tripartite concept. To provide sustainably effective service, human-to-human and human-to-nature interactions should be logically integrated. To become a voice for nature, service providers and recipients should ensure the good condition of the environment (Shirahada & Fisk, 2014). The gray area in Figure 2 covers all interactions of all sectors for both the provider and recipient sides.

Discussion

Social Implications

Increasing economic inequality has strongly affected human well-being, especially for those who are unemployed or have low literacy skills. A large number of low to no income people have moved into or worked in waste station or landfill areas. They are inevitably influenced by adverse impacts, including bad odors, pathogens, or toxic waste. Frontline staff and scavengers have been subjected to an increasing health risk as they are directly exposed to MSW. Working in this environment prevents frontline staff and scavengers from achieving full citizenship.

Scavengers have gradually created complex forms of organization. They recover a large quantity of recyclable materials, which has a great positive impact on the environment (Buenrostro, 2001). Taking this group of people into consideration in the partnership provides a strong influence to achieve better performance of the MSWM. Forming a labor union and legitimizing both regulations and practices for these people are two potential ways to lessen problems in terms of the disorganized waste management process, health risk, and quality of life.

In a real-life situation, working in an environment that has many sectors can cause conflicts of interest. To avoid such conflicts and overlapping difficulties or any problematic consequences, all sectors need to ensure that they

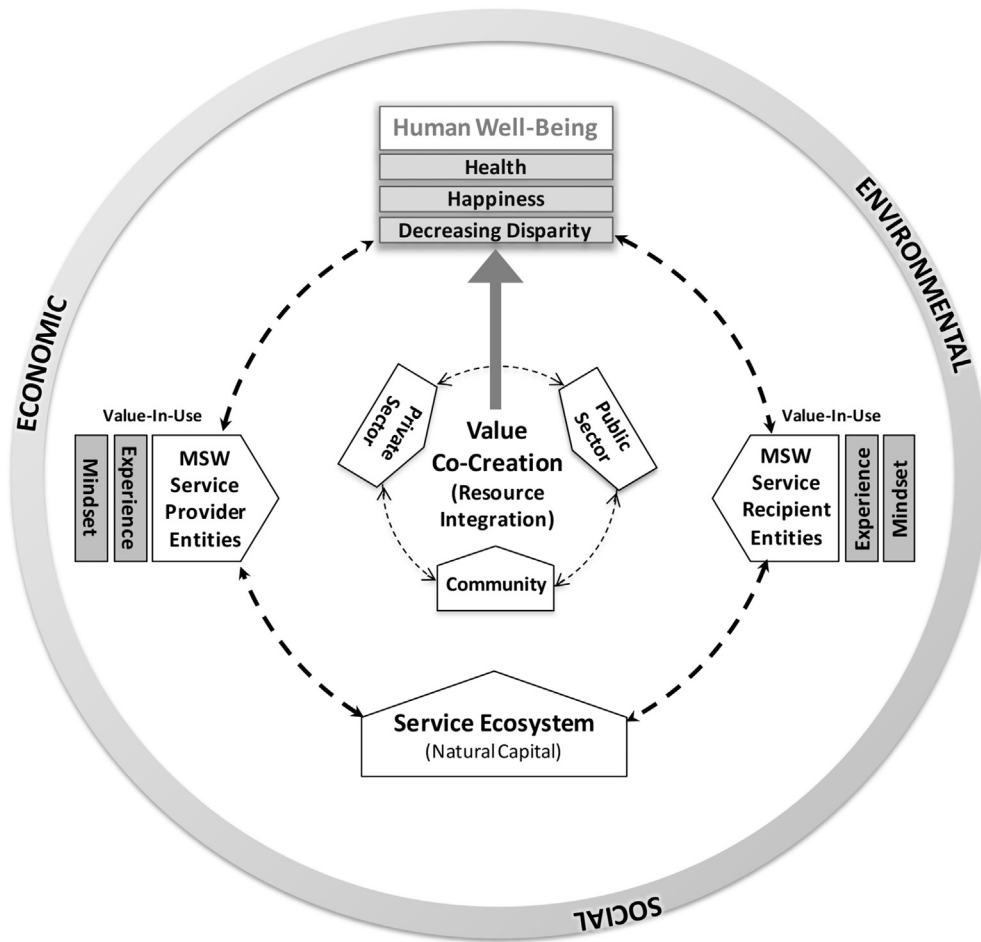


Figure 1 Tripartite service concept model
 Source: Modified from Sukholthaman, Shirahada, and Fisk (2014)

are operating their businesses or performing their roles according to the mutually set plan. To ensure transparency, there should be a monitoring and mitigating system to scrutinize the performance of each sector in the PPCP.

Economic Implications

The BMA spends a large amount of its budget on MSWM service provisions. Likewise, the need for infrastructure concerning collection and transportation of waste seems overwhelmed by the increasing demand for public sanitation and societal well-being. Therefore, allowing more private investment, more participation by the people, and the involvement of the related sectors through a PPCP is an option. The government can attract the private sector to invest more in MSWM by offering incentives, such as tax relief, funding, or low interest loans (OECD, 2012).

In a successful partnership, growing levels of trust between service providers and recipients occurs. The built-up trust can reduce the risk of uncertainty and conflict of interest. In a PPCP, relationships extend over time and each sector gradually becomes familiar with the roles and

practices of the other sectors. This leads each sector in the PPCP to achieve greater co-created benefits.

Environmental Implications

In the MSWM chain, governments, private waste management companies, NGOs, residents, and manufacturers are stakeholders that all have high contributions to the amount of waste being generated (Brum & Hippert, 2014). At the same rate of consumption, if manufacturers use fewer resources for packaging goods and use environmentally friendly materials in production processes, waste generation will be reduced. More effective and environmentally friendly MSWM service is provided. Interviewees agreed that monetary incentives can draw attention to such action; however, it is not a sustainable way. On the contrary, interviewees suggested that a PPCP should provide information, such as the types of waste, waste separation techniques, or the process of MSWM, and highlight the importance of having effectively sustainable MSWM in the society for the sake of the environment and the well-being of all.

Ecosystem (Natural Capital)							
<ul style="list-style-type: none"> - Providing natural resources to produce and provide goods, services, and land spaces - Receiving pollution caused by high amount of waste generated and ineffective MSWM service - Enhancing its value by collaboration of service providers and recipients through establishing voice for nature in PPCP through MSWM practices - Combining innovative co-created values from collaborative PPCP actions of service providers and recipients to benefit the environment and society through social entrepreneurship 							
Service Provider							
Service Recipient	Public (Government)	Public (Government)	<ul style="list-style-type: none"> - Old system and policy - No collaboration 	Private (Private companies, NGOs)	<ul style="list-style-type: none"> - No collaboration - Traditional mechanism (managed by government) 	Community (Residents, communities)	<ul style="list-style-type: none"> - Ineffective management and service - Lack of involvement - Break the laws
		Future	<ul style="list-style-type: none"> - Sustainable and practical policy - More participation and involvement - No overlapped work - Sharing MSWM knowledge - Transparent management process 	<ul style="list-style-type: none"> - More involvement and work together - Practical method and policy - Working together based on mutually set plan - Transparent management process 	<ul style="list-style-type: none"> - More participation and involvement - Building awareness on MSW impacts and the environment - Preventing and minimizing MSW impacts - Providing knowledge and information - Transparent management process - Providing effective service 		
	Private (Private companies, NGOs)	Current		<ul style="list-style-type: none"> - No collaboration - Profit oriented 		<ul style="list-style-type: none"> - No formal MSWM business activities but act as recyclable waste buyers, lack of social concern 	
		Future		<ul style="list-style-type: none"> - Association for MSWM companies - Being part of MSWM system to minimize waste - Preventive plans for efficient service - System and service effectiveness evaluation - Providing effective service 	<ul style="list-style-type: none"> - Promoting MSWM method - Increasing CSR activities - Launching program to increase participation 		
	Community (Residents, communities)	Current				<ul style="list-style-type: none"> - No formal collaboration - Lack of good attitude on public benefits - Lack of awareness on MSW impacts 	
		Future				<ul style="list-style-type: none"> - Participated in MSWM activities - Work together to minimize waste based on knowledge provided - Concern more on MSW situation and MSWM in community 	

Figure 2 Relationships and roles of each stakeholder in PPCP based on the tripartite concept perspective

Conclusions

This study reported interdisciplinary research on the analysis of human aspects toward having a partnership for sustainably effective MSWM. The results of stakeholders' relationships and roles that can be used as potential solutions to increase the effectiveness of MSWM service were identified. From the service providers' point of view, this study identified the hidden problems that actually happen to service recipients. With respect to a PPCP, the respondents and experts agreed that the active collaboration of all stakeholders is imperative to improve the MSWM system.

The relationships and roles of each stakeholder were thoroughly explained on the basis of an effective partnership from the internal and external perspectives. Incorporating the tripartite service concept to waste management is a new research area. Notwithstanding, analyzing data using this concept provides clearer results of the roles of service providers and recipients.

With regard to Bangkok, a practical partnership is imperative to reaching effective MSWM service provision goals. The most likely way to start improving MSWM service provision would be by the BMA launching a long-term MSWM policy to attract all related stakeholders to harmoniously work toward sustainable MSWM. Then, the

stakeholders could collectively work to develop plans, roles, and responsibilities by utilizing their strengths to increase the effectiveness of the MSWM system as a whole. Pilot projects involving a PPCP should be implemented to see how those plans and roles work in practice, to identify the potential for implementation on a large scale, and to see what can be improved. There is no single solution that is suitable for all circumstances.

Conflict of Interest

There is no conflict of interest.

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