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The Participatory Behavior of Stakeholders toward Solid Waste Management: A Case Study in Thailand

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The purpose of this study was to examine a relationship model between the variables of problem perception of solid waste management, public mind, servant leadership, happiness and well-being that affect the participatory behavior of the stakeholders regarding the solid waste management in Ratchaburi, a province of Thailand.The study sample included community enterprise members, tourism entrepreneurs, community leaders, staff of the local administrative organization and officers from related government agencies in the Ratchaburi province. In this study, 400 participants completed the questionnaires and 40 participants were interviewed. Validity, reliability and discrimination were assessed to measure the quality of the research instrument. Path analysis was used to test the proposed relationship model and content analysis was used to analyze the data from the interviews. The results showed that the most important factors affecting the participatory behavior of the stakeholders toward solid waste management were public mind, followed by problem perception of solid waste management, servant leadership, well-being and happiness. These variables accounted for 19 percent of the variance of participatory behavior of the stakeholders toward solid waste management. Happiness, well-being, public mind and servant leadership accounted for 43 percent of the variance of problem perception of solid waste management. The findings from this study suggest a psychological relationship model in order to promote participatory behavior toward solid waste management. Behavioral and socio-economic interventions for solid waste management are discussed.

Keywords: problem perception of solid waste management, public mind, servant leadership, happiness, well-being

One of the major issues regarding Thailand's environmental situation is about solid waste, which has been increasing dramatically, and is having a massive effect on society. The solid waste problem is caused by the increasing population growth resulting in mass production and mass consumption, and ever greater quantities of solid waste leading to a continuous environmental problem. According to Pollution Control Department (2009), Thailand has problems with the amount of accumulated solid waste and solid waste management. In 2013, solid waste in Thailand reached 26.77 million tons but only 7.2 million tons was properly managed. It was also reported that Thailand had 2,490 disposal solid waste sites but only 416 sites or 19% were correctly operated. The other 81% were incorrectly operated using open dumping, public burning and misplaced waste (ThaiPublica, 2013) and only 5.1 million tons were able to be recycled or reused (Silapasuwan, 2014). The Thai government declared a National Agenda to solve the problem under Thailand's roadmap on solid waste management and hazardous waste on August 26, 2014 (Chaihan, 2015) which aimed to eliminate accumulated solid waste in critical areas (old solid waste), to create proper solid and hazardous waste management (new solid waste), to set policy on solid waste management and hazardous waste and to create citizen discipline toward sustainability.

Based on ThaiPublica survey in 2013, Ratchaburi province in Thailand is one of the major provinces where economic size, industry and tourism are growing and causing a solid

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waste issue. The Pollution Control Department also reported that Ratchaburi province was ranked sixth highest in the critical provinces regarding solid waste management and seventh highest of all provinces with accumulated solid waste (ThaiPublica, 2013). Information and Communication Department of Ratchaburi Provincial Authority (2015) reported that Ratchaburi province had 600–700 tons per day or 220,000 tons per year of waste.

Solid waste management guidelines were proposed by government authorities such as requiring pre-solid waste to be disposed of suitably, reducing the quantity of solid waste, recycling and reusing, organizing disposal sites and undertaking waste separation (Pollution Control Department, 2009) and also promoting a waste-free community to share knowledge and to be a community model. The effective solid waste solution was to get the stakeholders involved and to reduce solid waste generation which would reduce the cost and quantity of solid waste from origin.

However, the roadmap on solid waste management and hazardous waste did not address how to enhance participatory behavior toward solid waste management. A previous study of participatory behavior revealed that it is one of the many factors which affects solid waste disposal behavior and the perception of solid waste management and solid waste problems. Furthermore, the study identified that the perception of solid waste management, solid waste news and solid waste disposal knowledge affect the solid waste disposal behavior (Sirikhun et al., 2010).

In addition to problem perception of solid waste management, the public mind is one of the major factors affecting solid waste management participatory behavior. The public mind is a process to educate a person to have self and social responsibility where virtue and morality are internal; therefore, personal sacrifice and commitment are shown in order to promote a social benefit and to reduce social problems. Public mind is an ownership feeling for public facilities as well as the right and duty to maintain facilities together regarding environmental issues and waste problems (Thanasangaun, n.d.). Therefore, public mind might be the most important factor affecting participatory behavior toward solid waste management which confirms that public mind could eliminate the solid waste problem (Wattanachan, 2011).

Leadership is a trait, behavior, ability or process which interacts with people or influences others to collaborate or to be satisfied with performance, and to implement activities in lieu of a specified plan and goal (Chongvisal, 2016). Much research on leadership has shown that leadership can influence group and organizational effectiveness and also society, especially where the community leader or society leader is the key person in organizing the activities inside the community. A leader who has strong leadership skills can influence and motivate the community to collaborate with each other or to solve effectively the community problems and strengthen the community through sustainability (Vajarodaya Poboon, & Chompunth, 2014) . The most popular research based on leadership theories currently is servant leadership, which involves personal behavior that wants to serve others' needs and to assist others to achieve their objectives at both a personal and work level (Lussier and Achua, 2007) . Yukl (2010) also stated that servant leadership is a person' s behavior in assisting others to achieve their aims by serving them and giving power to promote their well-being. It is personal ability in giving priority, pleasing and paying attention to others in order to enhance their knowledge, wisdom and freedom (Beerel, 2009) . The servant leader is able to understand the people' s mind and treat them equally based on their needs (Laub, 2003).

One of the personal factors which causes positive behavior is happiness. It is a positive emotion including enthusiasm, self-support, positive thinking, time management ability, self-attraction and good memory (Synder and Lopez, 2007; Phoomchan, 2015). Well-being is a positive emotion and satisfaction is integrated to enhance positive emotions and reduce negative ones. It is an emotional response and a satisfaction level to economic, social, family, hygiene, culture or belief factors (Phoomchan, 2015). When people are happy and enjoy a sense of well-being; they will help each other, get involved in work and create beneficial activities for the community. Therefore, it is expected that this factor will also affect participatory behavior.

This research aimed to study factors affecting participatory behavior toward solid waste management which are the problem perception of solid waste management, public mind, leadership, happiness and well-being of the stakeholders who are represented by community enterprises, tourist entrepreneurs, community leaders, local administrative staff personnel and governmental officers in Ratchaburi province in order to create a relationship model for participatory behavior of the stakeholders in guidelines toward solid waste management with the idea that a good solution starts from the origin. The stakeholders' network could work effectively together in solid waste management and with the suggested involved authorities to enforce the policy and plan on solid waste management to comply with governmental policy and the national strategy.

Objectives

The main purpose of this research was to identify the antecedents of the participatory behavior of stakeholders towards solid waste management in Rachaburi province in Thailand through the embedded mix methods design (Creswell, 2014). With this design, the author began by collecting the quantitative data, embedding it with the qualitative data as to support the quantitative findings as follows:

(1) the quantitative study was aimed to examine the relationship model among problem perception of solid waste management, public mind, servant leadership, happiness and well-being affecting the participatory behavior of the stakeholders toward solid waste management in Ratchaburi province.

(2) the qualitative study was aimed to study other factors and the approach to promote the participatory behavior of stakeholders toward solid waste management in Ratchaburi province using structured interview.

Method

Population

The population in this research were the stakeholders of community enterprise members, tourism entrepreneurs, community leaders, staff of local administrative organization and officers from related government agencies in Ratchaburi province.

Sample

Through a purposive sampling method, 440 participants were selected, who included community enterprise members, tourism entrepreneurs, community leaders, staff of local administrative organization and officers from the related government agency in Ratchaburi

province. Out of the 440 participants, 400 were involved in the quantitative part of the research and 40 participants participated in the qualitative part.

Instruments

To measure the quality of the instrument used in the quantitative study, the content validity was assessed by experts. The reliability of the instrument was evaluated using the coefficient alpha (α-coefficient) and the item-total correlation was used to determine the discrimination power. The 8 questionnaires used to collect quantitative data were tested. 1) The perception of problems and solid waste management questionnaire contains 11 questions and all items were scored on a six-point rating scale. 2) The public mind questionnaire which was developed from the questionnaire of Kuha and Naraong-ard (2011). This questionnaire consists of 22 items and all items were scored on a five-point rating scale. 3) Servant leadership questionnaire which was developed from the concept of Yukl (2010). This instrument consists of 29 items and all items were scored on a five-point rating scale. 4) The happiness questionnaire used in this study was that developed by Phoomchan (2010) as translated from the Oxford Happiness Questionnaire, consists of 29 items and all items were scored on a six-point rating scale. 5) The well-being questionnaire of Phoomchan (2010), consists of 6 items and all items were scored on a six-point rating scale. 8) The participatory behavior toward solid waste management questionnaire which developed by the researcher constructed based on the concept of Cohen and Uphoff (1997), consists of 4 items and all items were scored on a five-point rating scale.

Data Collection

The data were collected using the questionnaires and structured interviews.

Data Analysis

The following were applied for analyis: data descriptive analysis, Pearson's Product Moment Correlation, path analysis using LISREL and content analysis.

Results

The results are reported in terms of qualitative and quantitative studies**.** There were two parts as follows**.**

The Quantitative Results

The quantitative results revealed that majority of the stakeholders in Ratchaburi province were female, (238 participants, 59**.**5%), 120 (30%) participants were 31 to 40 years old, 98 (24**.**5%) participants were government officers, 188 (47%) participants graduated with Bachelor**'**s degree and 195 (48**.**7***%)*** participants had sufficient income with no savings**.** In addition, 335 (83**.**8%) participants lived in a house**.** There were 345 (86**.**3%) participants who reported that they had no problem with solid waste management whereas 55 (13**.**7%) participants reported that they did have a problem with solid waste management**.** Stakeholders**'** behaviors toward solid waste management were studied**.** The results demonstrated that the three most common behaviors were putting the waste in designated area **(**280 participants, 70%), separating waste for recycle (211 participations, 52**.**8%) and reducing

and reusing waste (196 participants, 49%). Table 1 shows that the studied variables had positive correlations ranging between .21 to .85, all which were significant at the level of .01.

Table 1

Mean, standard deviation and correlation coefficient of variables

Variable	M	SD	1	2	3	4	5	6
1. Problem perception of solid waste management	3.71	.69	(.93)					
2. Public mind	3.91	.56	.63**	(.95)				
3. Servant leadership	3.91	.53	.62**	.85**	(.95)			
4. Happiness	4.67	.66	.45**	.54**	.56**	(.96)		
5. Well-being	3.52	.70	.41**	.43**	.49**	.61**	(.83)	
6. Participatory behavior toward solid waste management	2.84	1.10	.37**	.36**	.29**	.24**	.21**	(.96)

Note: Cronbach's Alphas are shown in parentheses. **Significance level of 0.01

The results from the path analysis and model evaluation showed that the model had a good fit to the empirical data and every index met the criteria. For example, the value of chi-square was equal to 6.28 with 4 degrees of freedom (p = 0.18). The Goodness of Fit Index (GFI) was 0.99. The Root Mean Square of Error (RMSEA) was equal to .038 and the Comparative Fit Index (CFI) was equal to 1.00.

Table 2

Total effect (TE), Indirect effects (IE) and direct effects (DE) of variables

Dependent variable	Servant leadership			Problem perception of solid waste management			Participatory behavior toward solid waste management		
Independent variable	TE	IE	DE	TE	IE	DE	TE	IE	DE
Happiness	.11	-	.11	.02	.02	-	-	-	-
Well-being	.11	-	.11	.13	.02	.11	.03	.03	-
Public Mind	.73	-	.73	.57	.16	.41	.38	.14	.24
Servant leadership	-	-	-	.21	-	.21	.05	.05	-
Problem perception of solid waste management				-	-	-	.25	-	.25
R^2	.74			.43			.19		

Note: Every path coefficient was significant at the level of 0.01

Table 2 indicates that the most dominant factor affecting participatory behavior toward solid waste management was public mind whose path coefficient was 0.38 followed by problem perception of solid waste management with path coefficients of .25. Participatory

behavior was directly affected by public mind and problem perception of solid waste management with path coefficients of .25 and .24 respectively.

The most dominant factor affecting problem perception was public mind with a path coefficient of .57, followed by servant leadership and well-being with path coefficients of .21 and .13, respectively. Problem perception was affected directly by public mind, servant leadership and well-being with path coefficients of .41, .21 and .11, respectively.

Servant leadership was most affected by public mind with a path coefficient of .73, followed by happiness and well-being, which both had the same path coefficient value of .11. Servant leadership was affected directly by public mind, happiness and well-being with path coefficients of .73, .11 and .11, respectively.

In addition, the results also indicated that happiness, well-being and public mind were able to explain 74% of the variance of servant leadership. Happiness, well-being, public mind and servant leadership were able to explain 43% of the variance of problem perception of solid waste management. Happiness, well-being, public mind, servant leadership and problem perception of solid waste management were able to explain 19% of the variance of participatory behavior toward solid waste management.

The adjusted path analysis model of factors affecting stakeholder's participatory behavior toward solid waste management is illustrated in Figure 1.

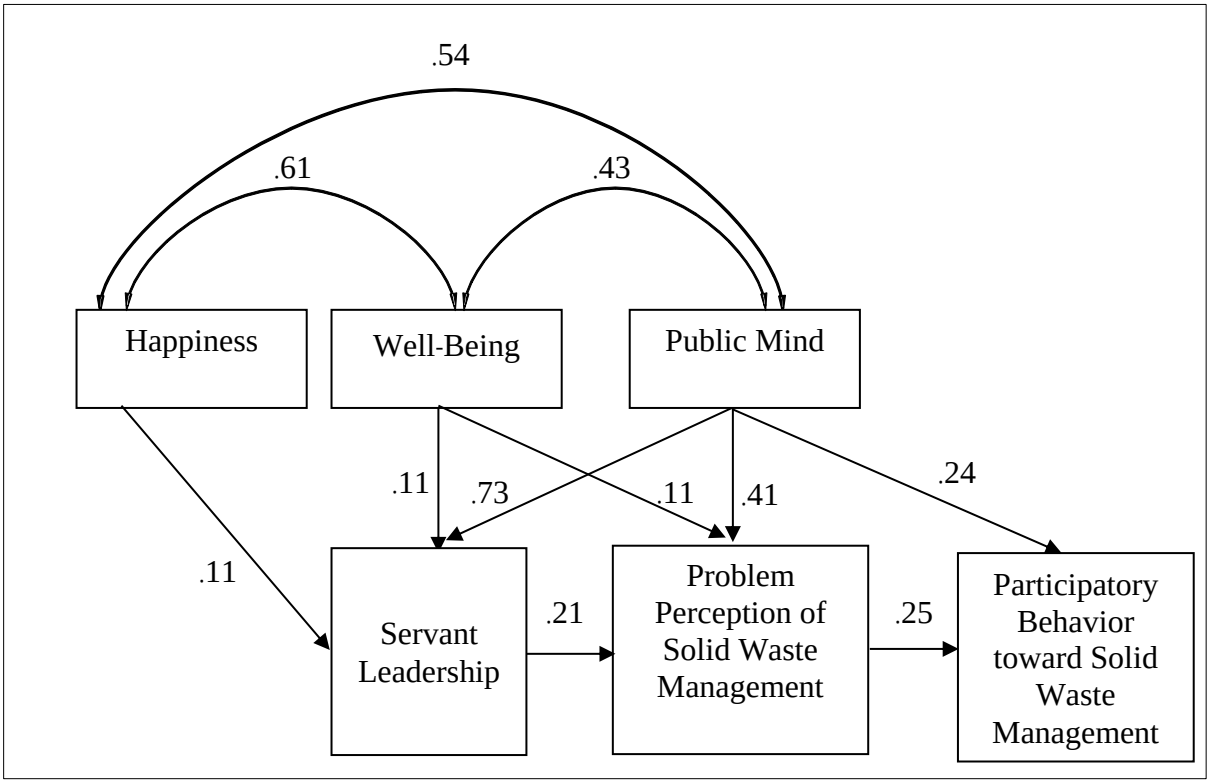

Figure 1. Relationship model of participatory behavior of the stakeholders toward solid waste management.

The Qualitative Results

The results of the structured interviews with 40 participants demonstrated that there were also other factors that had an effect on participatory behavior of the stakeholders toward solid waste management as follows.

The findings from qualitative data reveal the significant factor related to behavior according to the solid waste management is the problem perception of solid waste management**:** 1) Most of the participants recognized the problem and current waste situation**.** Eight participants informed that the waste situation was a big problem in Ratchaburi province**.** Seven participants informed that there were the problems with the waste destruction area, waste bins and insufficient garbage trucks**.** 2) Seven participants informed that there was a problem with the government policy and the governmental and provincial solid waste management procedures were not appropriate**.**

The main problems and obstacles in solid waste management were**:** 1) Equipment for waste management**:** for example, inadequate waste bins and unsuitable waste area**.** No drop-off area for waste (8 participants)**.** No colored bins for sorting waste (4 participants)**.** Do not want the waste area or disposal area to be located near their community (2 participants)**.** 2) Personal behavior**:** for example, waste misplacement (11 participants), no waste sorting (9 participants)**.** 3) Personal knowledge, feeling, opinion and practice toward solid waste management**:** for example, people think that waste management is not their duty but rather that of the officials (4 participants)**.** People lack awareness or participation at the household level (2 participants)**.** People lack correct knowledge in solid waste management and recycling (1 participant)**.** 4) Community leaders and executives**:** for example, leaders have neither group nor social responsibility and do not do their job (2 participants)**.** 5) Related officer and related organization**:** for example, related organization does not follow the policy (4 participants)**.** 6) Population and characteristics of the area**:** for example, an increase in population (4 participants), expansion of community with an increase in villages (2 participants) and also expansion of the shopping center (2 participants)**.**

Participants from the interviews suggested several approaches to promote the participatory behavior toward solid waste management, as listed**:**

1) Educating people about solid waste by introducing solid waste management problems and its impacts, appropriate procedures for solid waste management and waste reduction (15 participants)**.**

2) Encouraging people**'**s participation by promoting the right habits, for example, using refilled product, reducing the use of plastic bags and using reusable/cloth bags and sorting waste (3 participants)**.**

3) Promoting youth participation**:** for example, motivating public mind since childhood (2 participants), creating waste management activities in schools (2 participants) and creating awareness at the family level (2 participants)**.**

4) Promoting a positive attitude toward solid waste management**:** for example, correct attitude toward waste management (2 participants) and developing public mind of people in the society (4 participants)**.**

5) Promoting individual correct practice in waste management**:** for example, waste sorting, selling waste to earn money (3 participants), having landfill site at home (1 participant) and producing enzyme ionic plasma from waste (1 participant)**.**

6) Community leaders and participatory behavior toward solid waste management**:** for example, the leader has to realize the importance (1 participant), be a good example (1 participant) and the leader has to have a clear policy (1 participant)**.**

7) Municipal government officer and related organization**:** for example, related organizations should cooperate with each other and build up a network (2 participants)

8) Setting up activities to promote participatory behavior toward solid waste management**:** for example, waste sorting projects (2 participants), plastic bag recycling project (1 participant) and to love the community starting from ourselves project (1 participant)

Discussion and Conclusion

The main results of this study showed that the public mind was the most dominant factor affecting participatory behavior toward solid waste management with path coefficient of **.**38, followed by problem perception and waste management variable with path coefficient of **.**25**.** This was similar to the conclusion of Wattanachan (2011) that public mind could eliminate the solid waste problem**.** Sirikhun et al**.** (2010) suggested that solid waste disposal knowledge, perception of solid waste management and solid waste news were correlated to solid waste disposal behavior**.** Moreover, servant leadership had significant indirect effect on participatory behavior toward solid waste management (path coefficient = **.**05)**.** This was similar to Vajarodaya, Poboon, and Chompunth (2014) study that a leader who had strong leadership skills could influence and motivate the community to collaborate with each other or to solve effectively the community problems and strengthen the community through sustainability**.** In addition, the result also indicated that well-being and happiness had significant indirect effect on participatory behavior toward solid waste management with path coefficient of **.**03 and **.**01, respectively**.** This result was in conformity with the concept of happiness and well-being with stated that when persons are happy and enjoy well-being, they will help each other, get involved in work and create beneficial activities including participatory behavior for the community**.**

The results of this study suggested that public mind, problem perception of solid waste management, servant leadership, well-being and happiness of stakeholders should be promoted and developed as a suitable approach to improve participatory behavior toward solid waste management in the province**.**

Research Recommendations

The results of the analysis of the qualitative and quantitative data in this study suggested a model to promote participatory behavior toward solid waste management into behavioral interventions and socio-economic interventions as follows**.**

The behavioral interventions. These include -

1**.** Promote and encourage the public mind of stakeholders and other groups in the community**.** For example, 1**.**1) encourage people in the community to have common attitudes, understanding and goals by helping them to realize the waste problem and its impacts; 1**.**2) encourage people to realize the importance of their own participation and their ability to solve this problem**.** Establish and increase the group of people who would like to solve this problem by strengthening love, care and unity within the group; 1**.**3) create a common learning process or activity with continuity; and 1**.**4) establish a network and communication channels to exchange knowledge and to learn how to solve waste problems**.**

2**.** Use economic and social motivation approaches by asking the stakeholders and other groups in the community for suggestions by**:** 2**.**1) contacting the recycling waste buyer company; 2**.**2) setting up a waste bank (the procedure for setting up can be found in related research) by raising funds or recruiting members**.** There should be benefits such as a dividend, healthcare allowance, life insurance, accident insurance, low interest loans and an annual celebration; and 2**.**3) setting up a waste exchange activity and promoting social motivation**.**

3**.** Related organizations should promote and develop leadership skills among related people such as community leaders, community enterprise members, tourism entrepreneurs, staff of local administrative organizations, and the executives and officers from related government agencies**.** This can be carried out by setting up various activities such as servant leadership development training and also organizing activity to implement servant leadership skills in the community**'**s working procedures**.**

The socio-economic interventions. These include -

1**.** Promote problem perception of solid waste management by educating people, especially those who are not aware of the problem about the current situation and developing understanding toward solid waste problems such as the daily increase in waste quantity, daily solid waste quantity and waste management problem in Ratchaburi province**.**

2**.** Create a network for waste management among related stakeholders such as community enterprise members, tourism entrepreneurs, community leaders and officers from related government agencies**.**All these people should promote knowledge, understanding and participatory behavior toward solid waste management**.**

3**.** Encourage the stakeholders to find appropriate procedures for waste management in their own community and to act as a community prototype for proper waste management with support from municipal and related government organizations and to encourage its implementation in other communities**.**

4. Create solid waste management guideline for officers and related organizations**.** For example, the municipal administrative organization should routinely report to the stakeholders on solid waste management performance and the problems of the community. The monitoring and evaluation should be conducted and the results circulated to related organizations**.** There should be a policy to promote activity such as waste sorting and a waste bank should be in place and there should be sufficient budget for waste management activity such as waste collection and waste containers**.**

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