

The Antecedents of Recycling Management to Green Environment: A Case of North Eastern of Thailand

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Abstract : The objective of this study is to examine the role of recycling management in green environment. The relationship between recycling management, pollution, air quality, environmental quality and green environment was examined. Population of the study is the waste management companies in north eastern Thailand. Employees of waste management companies were selected as the respondents of this study. A survey was carried out among the waste management companies to collect the data. 290 questionnaires were used for data analysis. Results of the study found that; recycling management has major role to enhance green environment.

Keywords. Recycling management, pollution, air quality, environmental quality and green environment.

1. Introduction

Waste management is the most interesting topic which has significant relationship with the environmental performance. The activities of waste management are increasing worldwide due to the increase in environmental pollution. With the increase in industrialization, the waste is also increasing which has negative effect on the environment. Increase in waste increases the intention of waste management companies to manage the waste. It is important to handle waste because it has major effect to increase the pollution. As the waste has crucial role to promote pollution in the environment (H. Liu et al., 2008; Ma, Cai, & Tan, 2020). However, the waste management has the ability to decrease the effect of waste to increase the pollution.

To handle waste, the role of recycling is most important. Recycling is the major sources of waste management which is adopted by several waste management companies. Increase in the recycling of waste lead to the lower effect of waste on environment which ultimately increases the green environment. Thus, recycling management is most important to decrease the effect of waste. As given in previous studies that recycling is important for waste management (Ko, Kim, Shin, & Shin, 2020; Satayavibul & Ratanatamskul, 2020). Therefore, it is important for the waste management companies to adopt various strategies related to the recycling for waste management. Figure 1 shows that recycling is one of the major parts of waste management activity. Therefore, recycling management is one of the process which used to recycle the waste, leading to the green environment.



Figure 1. Waste Management Process

Recycling management has the ability to foster green environment by decreasing pollution. Decrease in the pollution automatically lead to the higher green environment performance as pollution is one of the major issues in the world (Cárdenas-Barrón, González-Velarde, Treviño-Garza, & Garza-Núñez, 2019; Chu, Fan, Wang, & Huang, 2019). Therefore, to decrease the effect of pollution, recycling management has important contribution. Several previous studies also show that recycling management and green environment has major relationship which lead to the higher green environmental performance. Furthermore, air quality also has key contribution to the environment. The most important part of environment is air and green environment always require higher quality of air to maintain environmental quality and higher performance. Air quality has important relationship with human health. Better air quality is required for humans to survive with good health, however, the lower air quality lead to the negative effect on the health. Therefore, air quality has vital importance in the environment having major importance to maintain better environment (Omokungbe et al., 2020; Puškár et al., 2019) and waste from various factories, construction and homes has major effect to increase the negative effect on environment by decreasing the overall quality of air. Furthermore, environmental quality also has important relationship with the green environment. To maintain a green environment, the environmental quality maintenance is most important. In this way, recycling management is most important to handle air quality. Further, better air quality lead to the green environment. Hence, recycling management has significant role to handle pollution, air quality and environmental quality which further lead to the green environment.

Several previous studies have examined the role of waste management through recycling (Gu, Zhang, Guo, & Hall, 2019; Sajid et al., 2019), however, these studies have not considered the pollution, air quality and environmental quality in the North of Thailand. North of Thailand is also facing several issues of environmental performance. Various strategies are required in this area to handle environmental issues. In rare case any study documented the role of recycling management in green environment in relation to the pollution, air quality and environmental quality in North of Thailand. Therefore, the objective of this study is to examine the role of recycling management in green environment.

2. Literature Review

Northern Thailand, bordering Laos as well as Myanmar (Burma), is famous for its thickly woodland mountains inhabited by numerous hill tribes, each with its own language along with unique culture. In the provincial capital, Chiang Mai, the old city has noteworthy Buddhist temples dating to the Lanna Kingdom, including 14th-century Wat Chedi Luang. The sacred, gilded Doi Suthep Temple overlooks the city from nearby Mt. Suthep. This is one of the important parts of Thailand has significant geographical importance. The availability of forests in this area also has several advantages. It also has economic importance for the Thailand because this area contributed to the economic development of Thailand. This area also has several mountains which is the attractive part of Thailand and increasing the beauty. This area continues from the Shan Hills in neighboring Myanmar to Laos and also include rivers which also increase the attractiveness of this area. Therefore, this area has vital contribution to the Thai economic development through various ways. For instance, this area is also famous for the tourism activities. Due to the beauty of this area, it remains the intention of the tourists for whole year (Sawatsuk, Darmawijaya, Ratchusanti, & Phaokrueng, 2018; Watanabe & Patitad, 2020) which generate significant amount of revenue for Thailand. As the tourist activities generate lot of revenue and also enhance the income generating activities which contribute significantly to welfare of people and increases the strength of economy in Thailand. Hence, North of Thailand has significant importance for Thailand (Sithithaworn, Pipitgool, Srisawangwong, Elkins, & Haswell-Elkins, 1997).

However, to promote North Thailand and make it more attractive, the role of green environment is most crucial. Environment is always remaining the major concern of the countries (W. Wu, An, Wu, Tsai, & Yang, 2020) because it has major influence on the human beings. In the recent decade, green environment is the major need of this world because the pollution is increasing day by day with the increase in development among all areas and with the increase in technology. Therefore, in this condition, to maintain a green environment is most crucial and it is one of the major challenges. A healthy environment is the guaranty of good health of human; however, the maintenance of healthy environment is not easy in the current era due to increase in industrialization. Industry is increasing in the world which is decreasing the quality of the environment. Quality of environment is most crucial issue among the countries including Thailand. Thailand is also suffering from several issues related to the environmental quality. Environmental quality is decreasing day by day which is showing the negative effect. Therefore, performance of environment is decreasing which has many negative effects on the society and require the intention of practitioners. In North Thailand, the forest is covering most of the part of this area which is also

one of the key strengths to maintain the better quality, however, still the strategies are required to improve the quality of environment by promoting green environment. Due to the increase in the importance of environment, various previous studies also highlighting the great need of green environment (Chuang & Huang, 2018; Srivastava et al., 2020) and recommended that green environment is one of the ways to increase the quality of environment by decreasing the negative effect of pollution.

Green environment in North Thailand can be promoted through different ways. For instance, waste management is one of the most important part of green environment. Waste management has the ability to promote green environment by decreasing the level of pollution. Therefore, waste management and green environment has important relationship with each other's (Fu, Zhong, Chen, & Liu, 2020; Lu, Chi, Bao, & Zetkunic, 2019; Srivastava et al., 2020). Therefore, it is important for the management of North Thailand to promote waste management activities. In this direction, the role of recycling management is most important. Recycling has positive role to promote the decrease in pollution which lead to the green environment. Along with this, recycling also leads to the air quality which further increases the green environment. Finally, recycling also has positive influence on environmental quality and better environmental quality has positive effect on green environment. Therefore, recycling management activities increases the green environment by decreasing the pollution and increasing the air quality and environmental quality. Therefore, the relationship between recycling management, pollution, air quality, environmental quality and green environment is highlighted in Figure 2.

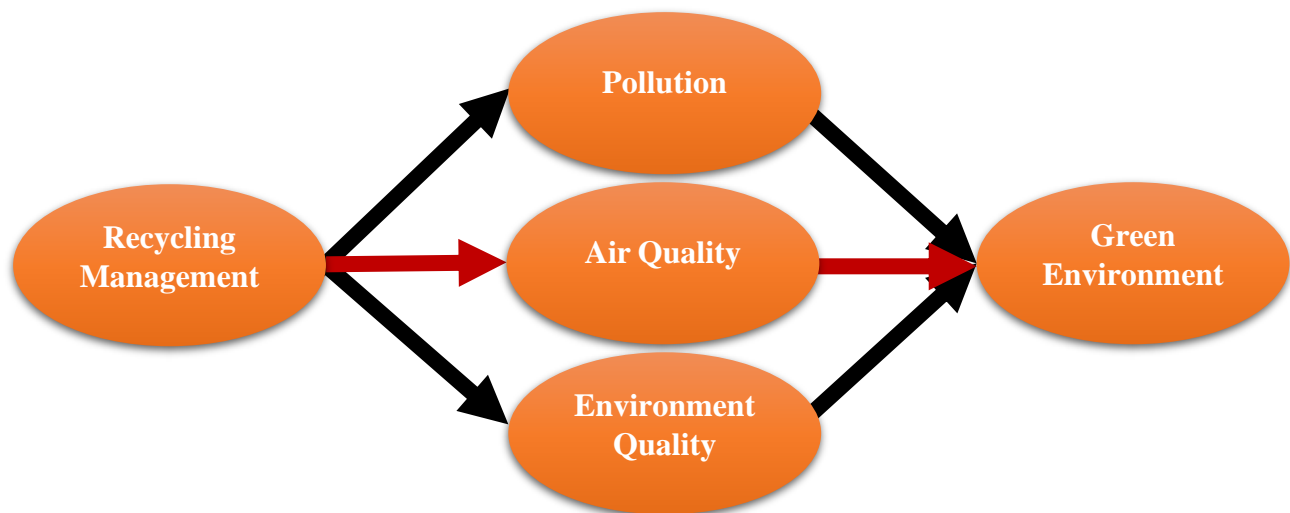


Figure 2. Framework of the study showing the relationship between recycling management, pollution, air quality, environmental quality and green environment

2.1 Hypotheses Development

Waste management comprises the activities mandatory to manage waste from its inception to its final disposal. This contains the collection, transport, treatment as well as disposal of waste, together with monitoring and regulation of the waste management process. Waste always remain in huge quantity which is required to manage efficiently to enhance the environmental performance. Household waste also remain in huge quantity which shows negative role in environment and required to settle. Along with the waste from the houses, factories also produce lot of waste which increase the level of pollution in the environment. Therefore, waste from factories also required to decrease through various strategies. In this direction, waste management decreases negative effect on the environment and increases the environmental quality. Therefore, waste management has positive effect on environment (Kedzierski, Frère, Le Maguer, & Bruzaud, 2020) through different ways.

To promote waste management, the role of recycling is most important. Recycling is one of the most important ways to enhance waste management. To settle the waste is not easy without promoting waste management. Therefore, management of recycling is most crucial for waste management. Recycling is a process in which recycling the waste for further use. Recycling is the procedure of collecting as well as processing materials that would otherwise be thrown away as trash and turning them into new products. Recycling can advantage the community as well as the environment. Recycling waste is already addressed in the literature and shows the major role in the environment (Meng et al., 2018; Ranjan et al., 2016). Waste from homes as well as factories can be recycled for further use which can decrease the negative effect of waste, in this direction various waste management companies have major role for recycling waste (Kang, Kang, Ilankoon, & Chong, 2020). Hence, recycling is one of the most important strategy which is following by the waste management companies to promote waste management and decrease the negative effect on environment.

Recycling management is most important to decrease the pollution. In the recent era of industrialization, the role of pollution is increasing because the industrialization is also increasing which shows negative effect by increasing the level of pollution in the environment. Recently, pollution is big challenges for all the nations, and it is damaging the environment. There are several factors which increases the pollution in the environment. However, it can be decreased with the help of recycling waste. The pollution can be decreased by increasing the recycling management activities. Therefore, pollution has negative effect on the environment (Bai et al., 2020; de Bont et al., 2020; Titov, Soshnikov, & Drobyazko, 2020).

Pollution is the availability of injurious materials into the environment. These damaging materials are called pollutants. These pollutants can be natural, such as volcanic ash. They can also be created due to various human activities, such as trash or runoff shaped by factories. Pollutants harm the quality of environmental air, water, as well as land. However, recycling has the ability to increase the management of waste. As facilitates handling of waste of household as well as factories which has major importance to enhance the environmental performance. Therefore, increase in the recycling management increases the performance of green environment. Recycling management has positive effect to decrease the pollution which further lead to the better quality of environment by promoting green environment. Therefore, North of Thailand should promote green environment by decreasing the pollution through introducing various strategies of recycling management which has several benefits in terms of environment. Hence, following hypotheses are proposed;

- H1.** Recycling management has negative effect on pollution.
- H2.** Pollution has negative effect on green environment.

Air is one of the major parts of green environment. Air must have sufficient quality to support green management. Low quality of air cannot maintain a green environment. Because air quality determines the environmental performance. The air quality has major relationship with environment as shown in previous studies (Kalimeri et al., 2016; Tsay et al., 2016). Recycling management also has important relation with air quality. Better air quality is always required to support green environment. As the North Thailand is full of forests, therefore, it has positive effect on air quality. It has positive role to increase air quality. Therefore, in North Thailand, green environment can be promoted with the help of recycling management. As recycling management has positive role to promote air quality and further air quality has positive effect to promote environmental performance by increasing green environment. Therefore, following hypotheses are proposed;

- H3.** Recycling management has positive effect on air quality.
- H4.** Air quality has positive effect on green environment.

Furthermore, environment quality also leads to the green environment. Number of previous studies in the literature addressed that environmental quality has major relationship with the green environment performance. To increase the green environment, the role of environmental quality has major effect. There is a direct relationship between environmental quality and green environment. As highlighted in the previous studies that environmental quality has major relationship with the green environment (Geng, Ji, Wang, Lin, & Zhu, 2019; P. Liu, Gao, & Ma, 2019; H. Wu, Cheng, Chen, & Hong, 2018). To promote environmental quality, the role of recycling management is most important. The waste management companies should promote recycling management to enhance the quality of environment which further lead to the higher green environment performance. Therefore, following hypotheses are proposed;

- H5.** Recycling management has positive effect on environmental quality.
- H6.** Environmental quality has positive effect on green environment.
- H7.** Pollution mediates the relationship between recycling management and green environment.
- H8.** Air quality mediates the relationship between recycling management and green environment.
- H9.** Environmental quality mediates the relationship between recycling management and green environment.

Research Methodology

Research work proceed systematically, hence it requires a defined method by following the method research work for a specified reason is accomplished. Researchers initially select a research method which is relevant to the nature of the research study under consideration. Hence, selection of a research method is crucial for a study. The present study opted quantitative research method that is just relevant to the nature of the study. Besides, quantitative research method, qualitative research approach and mixed method are also very commonly used research methods among the researchers. But it was found that quantitative research method is perfectly suitable for the present research study.

After the selection of the research method, a questionnaire was composed encompassing all the questions which were to ask from the population of the present study. However, for the better understanding and engaging purposes, the questionnaire was categories as per the nature of the questions present in it. There were three different types of the questions such as questions about the personal information of the respondents, questions related with the key variables of the present study, and the 25 questions based on 5-point Likert scale ranging from 1 as “Strongly Agree” to 5 as “Strongly Disagree”.

Area cluster sampling was preferred because respondents of the present study were from the different areas of the North of Thailand which is a wide area. Area cluster sampling is the best option when population of under consideration study is from a wide area. Hence, the present study opted area cluster sampling approach. Moreover, sample size of the present study was a 500, because a 500-sample size is considered a very good sample size.

As it is a survey-based study, hence, various offices of recycling waste material companies were personally visited for the selection of the respondents of the present study, form the various effective employees. Hence, a list containing the basic contact information of the selected employees as per the samples size, was created. Moreover, it was also ensured that all these employees have significant role for their corresponding companies.

Copies of the questionnaire were sent to each respondent separately via their corresponding WhatsApp number, after making a phone call purposed with a brief introduction about the objectives of the present study. Moreover, the respondents were asked to provide their feedback within the next 45 days. Hence, after the 45 days, there were 310 responses received from the respondents. After a brief investigation of the collected data from the respondents, it was found that 20 responses are partially filled, thus, after removing the 20 partially filled responses, the rest 290 responses were considered as the primary data for the present study. Furthermore, with help of PLS this primary data was tested and analyzed to achieve the results of the present study. All the scales and measures were opted from previous studies.

4. Findings

Initially, data screening was carried out in this study before data analysis. In data screening, various expected errors were removed such as missing value (Yang et al., 2020) as well as outlier. Table 1 shows the data screening results.

Table 1. Data Statistics

	N o.	Missi ng	Me an	Medi an	Mi n	M ax	SD	Kurto sis	Skewn ess
							1.3		
RM1	1	0	3.51	4	1	5	23	-0.747	-0.598
			3.53				1.2		
RM2	2	0	4	4	1	5	59	-0.855	-1.491
			3.47				1.2		
RM3	3	0	6	4	1	5	86	-0.918	-0.425
			3.51				1.1		
RM4	4	0	4	4	1	5	77	-0.608	-1.481
							0.8		
RM5	5	0	3.5	4	2	5	55	-0.618	0
POL			3.41				0.7		
L1	6	0	8	3	2	5	92	-0.433	0.038
POL			3.42				0.9		
L2	7	0	8	3	1	5	53	-0.045	-1.346
POL			3.46				1.7		
L3	8	0	2	4	2	5	39	-0.331	-0.19
							0.7		
AQ1	9	0	3.51	4	2	5	4	-0.274	-0.284
	1		3.46				0.8		
AQ2	0	0	6	4	2	5	2	-0.53	-0.102
	1		3.50				1.8		
AQ3	1	0	5	4	2	5	15	-0.491	-0.096
	1		3.51				0.7		
EQ1	2	0	4	4	2	5	96	-0.427	-0.163
	1		3.72				0.8		
EQ2	3	0	1	4	2	5	77	-0.621	-0.243
	1						0.8		
EQ3	4	0	3.75	4	2	5	85	-0.722	-0.199
	1		3.72				0.8		
EQ4	5	0	1	4	2	5	14	-0.505	-0.145
	1		3.75				1.8		
EQ5	6	0	5	4	2	5	84	-0.705	-0.213
	1		3.70				0.8		
EQ6	7	0	2	4	2	5	65	-0.663	-0.145
	1		3.54				0.8		
GE1	8	0	3	4	2	5	76	-0.691	-0.003
	1		3.50				0.8		
GE2	9	0	5	3	2	5	49	-0.602	0.056
	2		3.48				0.9		
GE3	0	0	6	4	1	5	9	-0.19	-0.319
	2		3.55				0.8		
GE4	1	0	8	4	2	5	42	-0.551	-0.134
	2		3.59				0.9		
GE5	2	0	1	4	2	5	1	-0.829	0.015
	2		3.61				0.8		
GE6	3	0	1	4	2	5	92	-0.755	-0.051
	2		3.79				0.9		
GE7	4	0	8	4	2	5	08	-0.742	-0.287

Structural Equation Modeling (SEM) was applied which is recommended in previous studies (F. Hair Jr, Sarstedt, Hopkins, & G. Kuppelwieser, 2014; J. Hair, Hollingsworth, Randolph, & Chong, 2017; J. F. Hair, 2010; J. F. Hair, Ringle, & Sarstedt, 2013; J. F. Hair, Sarstedt, Pieper, & Ringle, 2012). In the first part of data analysis, factor loadings were examined in this study. Recycling management was examined by using five scale items. Pollution was measured by using three scale items. Air quality was measured by using three scale items. Environmental quality was measured by using six scale items. Green environment was measured by using six scale items. It is found that; recycling management, pollution, air quality, environmental quality and green environment have factor loadings above 0.4.

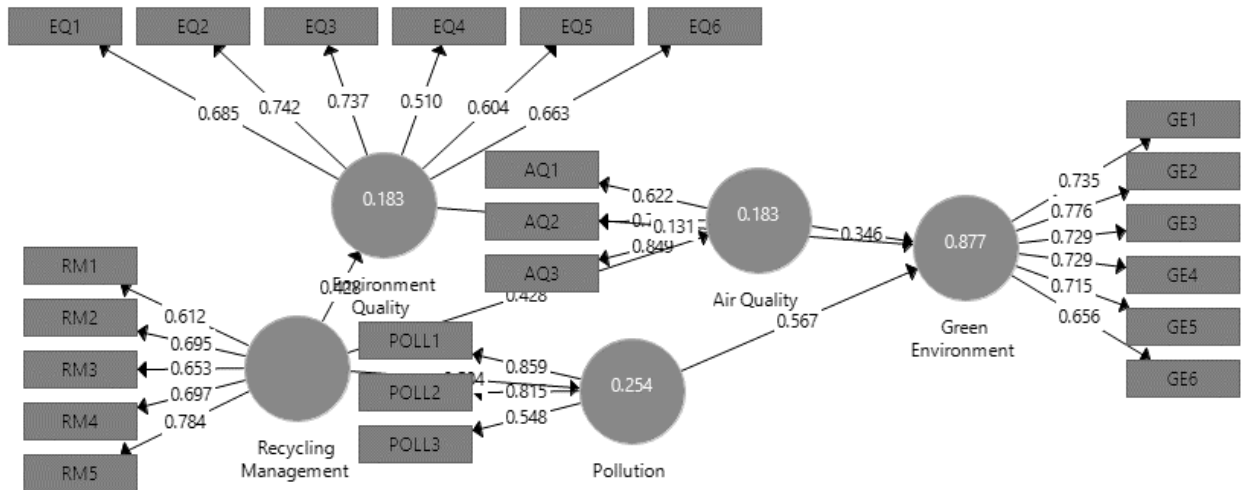


Figure 3. Measurement Model

Table 2. Factor Loadings

	Air Quality	Environment Quality	Green Environment	Pollution	Recycling Management
AQ1	0.622				
AQ2	0.798				
AQ3	0.849				
EQ1		0.685			
EQ2		0.742			
EQ3		0.737			
EQ4		0.51			
EQ5		0.604			
EQ6		0.663			
GE1			0.735		
GE2			0.776		
GE3			0.729		
GE4			0.729		
GE5			0.715		
GE6			0.656		
POLL1				0.859	
POLL2				0.815	
POLL3				0.548	
RM1					0.612
RM2					0.695
RM3					0.653
RM4					0.697
RM5					0.784

Table 3. Reliability and Convergent Validity

	Alpha	rho_A	CR	(AVE)
Air Quality	0.75	0.799	0.804	0.582
Environment Quality	0.778	0.84	0.822	0.538
Green Environment	0.818	0.823	0.868	0.524
Pollution	0.729	0.702	0.792	0.567
Recycling Management	0.824	0.765	0.819	0.577

Table 4. AVE Square Root

	Air Quality	Environment Quality	Green Environment	Pollution	Recycling Management
Air Quality	0.583				
Environment Quality	0.067	0.604			
Green Environment	0.055	0.578	0.657		
Pollution	0.319	0.336	0.424	0.394	
Recycling Management					

SEM was used to examine the relationship between recycling management, pollution, air quality, environmental quality and green environment. The direct effect of recycling management was examined on pollution. The direct effect of recycling management was examined on air quality. The direct effect of recycling management was examined on environmental quality. Furthermore, the direct effect of pollution was examined on green environment. The direct effect of air quality was examined on green environment. The direct effect of environmental quality was examined on green environment. SEM is most famous technique to analyze the data (Fattah & Setyadi, 2019; Hair Jr, Hult, Ringle, & Sarstedt, 2016; Hameed, Nisar, & Wu, 2020; Henseler & Chin, 2010; Henseler et al., 2014). Results of the study shows that recycling management has positive effect on air quality. It also has positive effect on environmental quality; however, it has negative effect on pollution. Increase in recycling management increases the air quality, environmental quality and decreases the pollution. Pollution has negative effect on green environment. Air quality and environmental quality has positive effect on green environment. These results are given in Table 5. Table 6 also shows the indirect effect. Total three indirect effect are given in Table 6 and all the indirect effect of pollution; air quality and environmental quality has significant role.

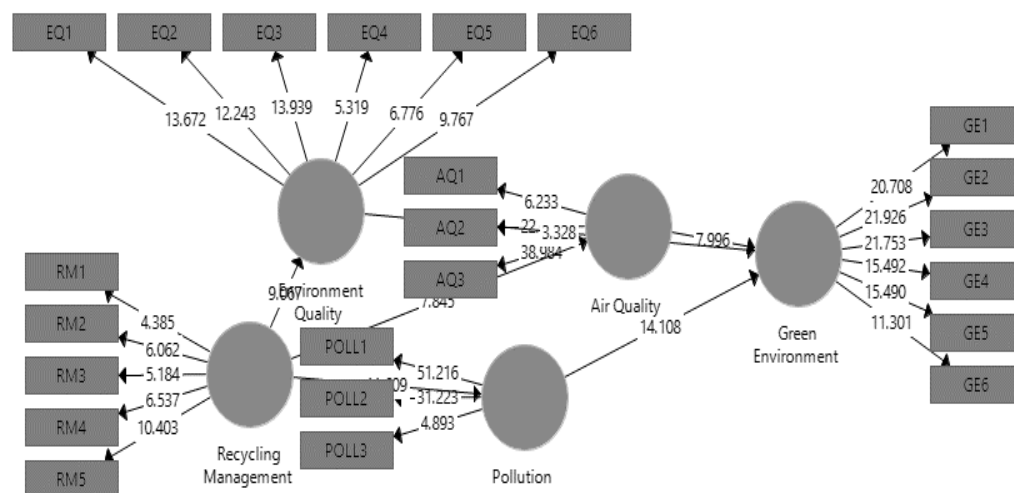


Figure 4. Structural Model

Table 5. Direct Effect Results

	(O)	(M)	SD	T Statistics	P Values
Air Quality -> Green Environment	0.346	0.345	0.043	7.996	0

Environment Quality -> Green Environment	0.131	0.135	0.039	3.328	0.001
Pollution -> Green Environment	0.567	0.566	0.04	14.108	0
Recycling Management -> Air Quality	0.428	0.437	0.054	7.845	0
Recycling Management -> Environment Quality	0.428	0.441	0.047	9.067	0
Recycling Management -> Pollution	0.504	0.512	0.043	11.609	0

Table 6. Indirect Effect Results

	(O)	(M)	SD	T Statistics	P Values
Recycling Management -> Air Quality -> Green Environment	0.148	0.151	0.026	5.586	0
Recycling Management -> Environment Quality -> Green Environment	0.056	0.06	0.019	2.93	0.004
Recycling Management -> Pollution -> Green Environment	0.286	-0.29	0.033	8.561	0

5. Conclusion

After the completion of all the significant parts of the study it is concluded that recycling management plays a very crucial role in the accretion of green environment. According to the present study it is found out that air quality, environment quality and pollution are the major factors which directly influence the green environment. Recycling management is responsible to control the elements which causes for air contamination. Hence, the role of recycling management is significant in the acquisition of green environment. Moreover, it is concluded that recycling management have direct effect on air quality, pollution, environment quality and green environment. At the same time, pollution mediates between the relationship of recycling management and green environment, air quality mediates between the relationship of green environment and recycling management, and environment quality also mediates between the relationship of green environment and recycling management. Practically the present study provides significant improvements to the practitioners trying to acquire green environment. Moreover, the present study is also very helpful for the recycling management to understand and maintain effective steps which are crucial for the acquisition of a green environment.

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