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Environmental Values as a Predictor of Recycling Behaviour in Urban Areas: A Comparative Study

Saripah Abdul Latif^{a*}, Mohd Shukri Omar^a, Yeop Hussin Bidin^a & Zainudin
Awang^b

^a*Faculty of Business Management, Universiti Teknologi MARA Kelantan Campus, 18500 Machang, Kelantan, Malaysia*

^b*Faculty of Mathematics and Computer, Universiti Teknologi MARA Kelantan Campus, 18500 Machang, Kelantan, Malaysia*

Abstract

The objective of the study is to compare the causal relationships between environmental values and recycling behaviour of consumers in two urban areas. A survey was carried out on 300 respondents. Structural equation modeling (SEM) was used in obtaining measurement models and structural models. The outcomes show differences in the recycling behaviour of the two samples. Environmental value is found to be a significant predictor for recycling behaviour in both urban areas but with greater effect in Kuala Lumpur as compared to Kota Kinabalu. The study should facilitate the local governments in overcoming urban waste management problem.

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Keywords: Environmental values; recycling behaviour; intention to recycle; comparative study

1. Introduction

The deterioration of the environment is an issue that has grown strongly over the past several decades and that has far-reaching consequences for both human well-being and nature (Diaz, Fargione, Chapin & Tilman, 2006 in Boeve-de Pauw & Van Petegem, 2011). Habitat destruction and fragmentation, introduction of invasive exotic species, biodiversity loss, overexploitation, for instances have become a prominent issue. Malaysia, which is at an intermediary stage of development, is facing tremendous

* Corresponding author. Tel.: +6-012-929-4669; fax: +6-009-741-7741
E-mail address: saripah@kelantan.uitm.edu.my

challenge in ensuring sustainable development. The national statistics showed that the condition for some of the Malaysian environment is rather stressful. Urban air quality, river water quality, deforestation, household wastes and hazardous wastes are some of the examples of environmental issues faced by the nation. The air quality index particularly in the urban areas has deteriorated and fallen under moderate levels with air pollution index (API) of slightly above 50. Since 1995, the number of clean rivers has dropped from 48 to 34 rivers but the number of much polluted rivers has decreased slightly in the same period from 14 to 12 (Department of Statistics Malaysia, 2001).

Solid domestic waste is one of the major environmental problems faced by most municipalities in Malaysia, particularly in urban areas. The generation rate of waste is 1.0 kg/day per person and 80 percent of the 230 landfills in Malaysia have only two years of lifespan left. Despite rigorous campaigns of recycling, the attainment of recycling rate has increased from 1-2 percent in 1997 to merely 5 percent in 2001 (Aini & Roslina, 2002). Accordingly, various policies and strategies are currently being developed and implemented by the government in order to ensure sustainable development of the nation. Environmental degradation is a global concern for its effects are borderless and the quality of life of the present and of future generation depends on the protection and preservation of ecosystems.

This study is focussed on the recycling behaviour of consumers, where recycling is argued to be a better solution to the problem of waste management. The objectives of the study are to compare the causal relationships between environmental values and recycling behaviour of consumers in both cities and in furtherance, it is to determine the mediating effect of the intention to recycle between environmental values and recycling behaviour of consumers in Kuala Lumpur and Kota Kinabalu, two urban areas in Malaysia.

2. Literature review and hypotheses

Environmental values do play a role in influencing recycling behaviour. Studies have revealed positive correlation between values and action in environmental behaviour. Those who have strong moral norms are more likely to act on environmental knowledge (Barr et al., 2005; Fishbein & Manfredo, 1992; Olofsson & Ohman, 2006). As early as 1992, Stern identified a view that assumes environmental concern is a function of some deeper cause of concern which shapes consumers' values, such as a moral obligation to act appropriately towards the environment stemming from a religious belief (Fransson & Garling, 1999). Recent studies have suggested that general beliefs are a strong predictor of environmental behaviour (Olofsson & Ohman, 2006).

Recent studies continue to explore the factors that differentiate recyclers from non-recyclers with the hope of using these factors to increase recycling behaviours. A study on the relationship between value orientation and recycling behaviour suggested that inconvenience was the key factor for predicting the recycling behaviour of people who were more individualistic or had a lower economic status. For people who had collectivistic value orientation whereby sharing, duties, and obligations were strongly valued, or for people who had more internal locus of control, beliefs about the importance of recycling were positively related to the tendency to recycle (McCarty & Shrum, 2001). The past few decades have been undoubtedly characterized by rapid globalization and increased concerns about environmental problems. Laroche, Tomiuk, Bergeron and Barbaro-Forleo (2002) investigate the influence of culture on pro-environmental knowledge, attitudes, and behaviours of Canadian consumers.

Results indicate that French-Canadians, as opposed to their English counterparts, (a) are more knowledgeable and concerned about ecological issues, (b) perceive that it is important to behave in an environmentally friendly fashion, (c) believe that most corporations are acting responsibly toward the environment, and (d) consider environmental issues to a greater extent when making a purchase. However, English-Canadians are more likely to recycle and are more willing to pay a premium price for

ecologically compatible products. Additionally, Laroche et al. (2002) defines ecological behaviours as the act of doing something to protect the environment at a personal expense, a sacrifice in their personal lifestyle. They found that French-Canadians are more willing to pay higher prices products that they really want. The question that arises is if other groups of people may act the same way or how much this behaviour differs across cultures and countries. Midori Aoyagi-Usui et al. (2003) found that the structure of environmental values in Asian countries differs from those in western countries. Social and environmental values have been linked to environmental action, such as recycling behaviour, with varying success. Researchers such as Dunlap and Van Liere (1978), Dunlap *et al.* (2000) and Stern *et al.* (1995) have all argued that individuals with pro-environmental values are more likely to be engaged in environmental action. Indeed, Coraliza and Berenguer (2000) have argued that ‘universal’ social values are also significant in predicting who is more likely to help the environment, with those holding more altruistic values and being ‘open to change’ as the most environmentally active.

Environmental values have been studied extensively and a multitude of terms are used interchangeably. They include subject matter such as (1) environmental worldviews, (2) ecological values, (3) environmental concern, (4) environmental beliefs, (5) general environmental attitudes and (6) global environmental attitudes (Boeve-de Pauw & Van Petegem, 2011). These values attempt to describe what primitive belief is in social psychology. It is a belief about the earth and the natural environment and humanity’s relationship with it (Stern, Dietz & Guagnano, 1995). These primitive beliefs form the inner core of an individual’s belief system, and this is referred to as environmental values. In summary, it can be said that people who have positive environmental values are supportive and agreeable to pro-environmental efforts such as recycling, minimizing energy use and pollution avoidance. They are motivated to participate in environmental friendly activities and regard themselves as environmental protector. They believe that their pro-environment activities will help improve the environment quality. Since environmental values are regarded as crucial precursors of environmental behaviour (Stern, 2000), thus the importance of carrying out this study. Culture is shared by all, or almost all, members of a social group and shapes one’s attitudes and behaviour. Hence it is expected that environmental values tend to differ across cultures. Johnson, Bowker and Cordell (2004) found that environmental values vary by ethnicity, while Leung and Rice (2002) found that Anglo-Australians showed more pro-environmental values than Chinese-Australians. The aim of the current study is to compare the environmental values and recycling behaviour of consumers across two cultures: Kuala Lumpur and Kota Kinabalu. Ajzen (1991) stated that the more favourable the attitude with respect to behaviour, the stronger is the individual’s intention to perform the behaviour under consideration. Additionally, the effect of intentions in the attitude-behaviour relation has been found varied along the level of effort needed to perform the behaviour (Bagozzi & Yi, 1989; Bagozzi, 1992; Schultz & Oskamp, 1996). Thus, the intention to recycle will be more likely to form as the end result of the evaluation of the behaviour. Theoretically, the dependent construct (endogenous variable) is recycling behaviour and the independent construct (exogenous variable) is environmental values. The respondents’ intention to recycle is the mediating construct in the study. These constructs are selected in light of prior researches on the determinants of engagement in recycling. The study intends to test the following three hypotheses:

- H₁: Environmental value has significant and direct effects on recycling behaviour
- H₂: Environmental value has significant and direct effects on intention to recycle
- H₃: Intention to recycle has significant and direct effects on recycling behaviour

3. Methodology

This study was done in two urban areas, namely Kuala Lumpur in Peninsular Malaysia and Kota Kinabalu in East Malaysia. The nation Malaysia was formed in 1963 when Sabah (Kota Kinabalu is the

capital of Sabah) and Sarawak joined the Peninsular Malaysia. After so many years, the cultural difference between Peninsular and East Malaysia still remains. It should be noted that the population in Kota Kinabalu is a very diverse composition of ethnic groups. Apart from Malay, Chinese and Indian that form the biggest portion of the population as in Kuala Lumpur, the descriptive study of Kota Kinabalu sample also comprises of ethnic Dusun (3.1 percent), Kadazan (2.3 percent), Bajau (2.3 percent) and Iban (0.8 percent). This multi-ethnicity condition and the physical barrier by the South China Sea contribute to the difference in culture. These two urban areas are chosen based on the availability of recycling facilities. Each of the two cities receives services from two different providers. Kuala Lumpur is served by Alam Flora Sdn Bhd and Kota Kinabalu is served by Kota Kinabalu Town Council itself. By employing cluster sampling, a total of 260 respondents were selected randomly from the two urban areas (130 respondents for each city). It should be noted that the focus of this study is those areas in Kuala Lumpur and Kota Kinabalu where there are recycling bins provided. Those parts of the cities without the provision of recycling bins were excluded in the study. A self-administered survey was employed to collect the data in both urban areas. The structured questionnaire was designed to measure all constructs involved in the study, which are recycling behaviour, intention to recycle, environmental values and demographic variables. Since this is a comparative study, the analysis for each sample is carried out separately. Each analysis consists of two parts; namely measurement model and structural model. The measurement model for each construct is analyzed for its validity and reliability prior to modeling the structural model. Before data analyses are carried out, data mining and descriptive analysis for demographic variables are done. This is followed by factor analysis, determining the normality of the data, and finally hypotheses are tested. Data is analyzed using structural equation modeling (SEM). The statistical package Analysis of Moment Structures (AMOS) is used to analyze for model fit (Goodness of fit index), predictive power (regression) and significance of paths for the specified model proposed. The standardized regression coefficients (β coefficients) for the structural models for both samples are calculated as a comparative measure.

4. Results and discussion

This paper intended to ascertain the effects of respondents' environmental values toward recycling of solid waste. At the same time, the study was also interested to assess the influence of respondents' intention to recycle in mediating the antecedent with actual recycling practice. The aim of the analyses is twofold. First, it is to check the influence of environmental values on the intention to recycle and recycling behaviour. Additionally, it is to check the mediator role of intention to recycle linking between environmental values and recycling behaviour. Descriptive analysis for demographic variables shows that the respondents are almost equally represented between male and female. On average the respondents are young single or married, with or without children, and living in medium-cost houses.

The outcomes (refer Table 1) show there are significant differences in demographic variables especially in terms of the education levels, living area and number of rooms in the house for Kota Kinabalu sample. For Kuala Lumpur sample, only employment status has significant difference. Generally, Kuala Lumpur sample is better educated as compared to Kota Kinabalu sample. Only 43 percent of the respondents in Kota Kinabalu have post-secondary school education (higher education), while 64.6 percent of Kuala Lumpur sample has higher education. More than seventy percent of the respondents in Kuala Lumpur sample live in medium-cost and high-cost housing areas, as compared to Kota Kinabalu sample which is only fifty percent. However, there is no significant difference in the ethnic groups for both samples. In the data mining process, all skewness values lie between -1.0 and 1.0. Data is considered normally distributed and acceptable to proceed with the parametric analysis procedure. For both Kuala Lumpur and Kota Kinabalu samples, the Kaiser-Meyer-Olkin (KMO) measure of

sampling adequacy for environmental values, intention to recycle and recycling behaviour are close to 1.0, which exceed the recommended value of 0.6 (Kaiser, 1974). Furthermore, the Bartlett's test significance value is close to 0. Therefore, it is appropriate to proceed with data reduction procedure or a factor analysis procedure. The analysis also shows that Cronbach's alpha values of 0.6 or higher for all components. This is a reflection that the measuring items provide reliable measure of internal consistency (Zainudin, 2010). After removing the items with factor loading less than 0.6, there are four items usable to measure recycling behaviour, four items to measure intention to recycle and seven usable items for environmental values. See Fig. 1. and Fig. 2.

Table 1. Descriptive analysis summary

Demographics	Kuala Lumpur	Kota Kinabalu
	F-test	F-test
Age	0.057	0.012
Educational level	0.103	0.001
Employment status	0.030	0.015
Income	0.284	0.043
Living area	0.197	0.001
Number of rooms	0.720	0.001

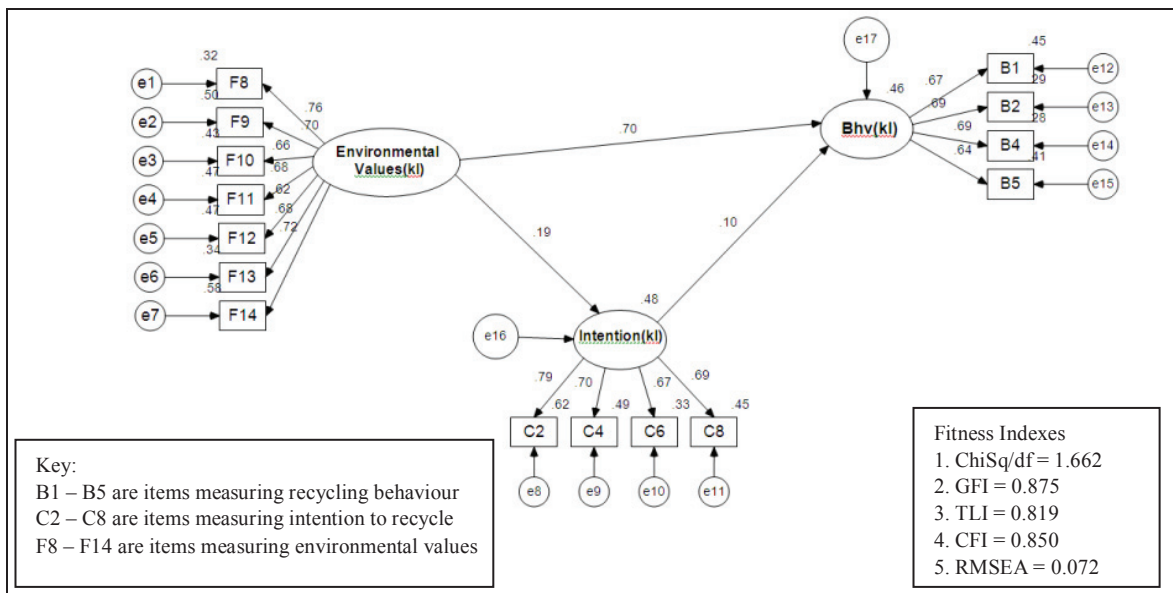


Fig. 1. Standardized model for Kuala Lumpur

The values for the level of acceptance for fitness indexes assessment in Table 1 below show that $RMSEA < 0.08$, GFI approaching 1, CFI approaching 1, and $Cmin/df < 3$, which are under the acceptable level. Therefore, both Kuala Lumpur Standardized Model (Fig. 1.) and Kota Kinabalu Standardized Model (Fig. 2.) are considered as appropriate and have good fit. The path analysis summary shows that the regression coefficient of environmental values on recycling behaviour are significant for both

samples, where p-value for Kuala Lumpur is 0.00, and p-value for Kota Kinabalu is also 0.00. (p-value is the probability of committing Type I error). Meaning that, environmental value is a significant predictor for recycling behaviour in both urban areas. This finding conforms to the studies done by Olofsson and Ohman (2006), Barr et al. (2005) and McCarty and Shrum (2001). The regression coefficients of environmental value on intention to recycle ($p\text{-value}_{KL} = 0.02$, $p\text{-value}_{KK} = 0.021$) are also significant for both samples. Therefore, environmental value is also a significant predictor of intention to recycle.

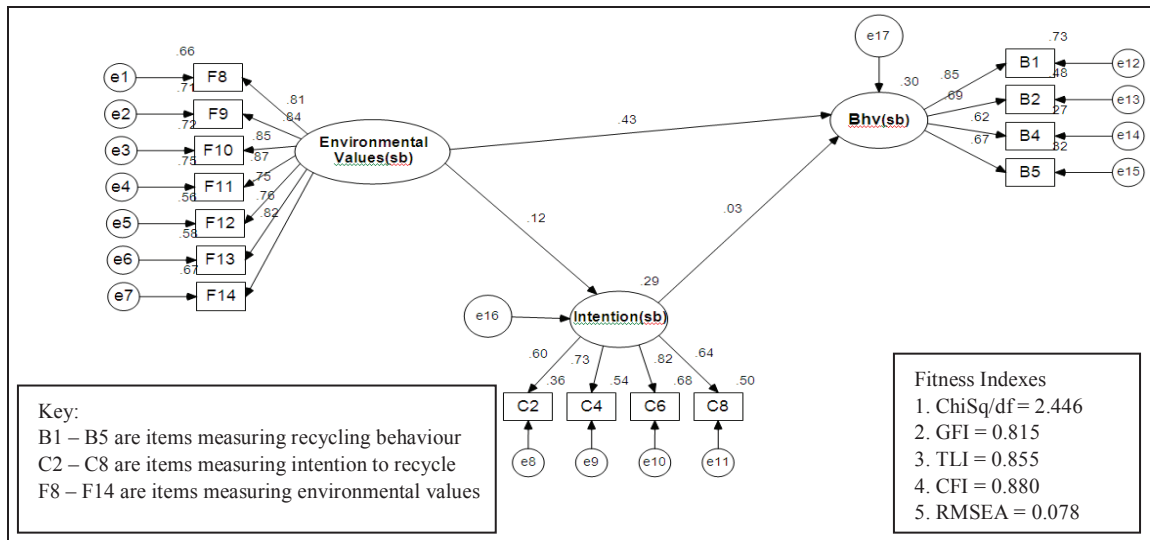


Fig.2. Standardized model for Kota Kinabalu

However, the regression coefficients of intention to recycle on recycling behaviour ($p\text{-value}_{KL} = 0.53$, $p\text{-value}_{KK} = 0.87$) are not significant for both urban areas. Therefore, construct intention to recycle is a non-mediator in linking environmental values to recycling behaviour. This finding does not conform to the classic Theory of Reasoned Action by Fishbein and Ajzen (1975). It should be highlighted that some other researchers have shown that intention is not a sufficient impetus for action (Bagozzi, 1992), and the degree of intention formulation moderates the way in which attitudinal related characteristics influence behaviour (Bagozzi & Yi, 1989). The standardized regression coefficient for Kuala Lumpur sample is 0.70, which is higher than Kota Kinabalu sample (0.43), and this shows that environmental values have greater effect on recycling behaviour in Kuala Lumpur as compared to Kota Kinabalu.

Table 1. The Fitness Indexes for Structural Models

Index category	Index	Index value Kuala Lumpur	Index value Kota Kinabalu
Absolute fit index	RMSEA	0.072	0.078
	GFI	0.875	0.815
Incremental fit index	CFI	0.850	0.880
	TLI	0.819	0.855
Parsimonious fit index	Cmin/df	1.662	2.446

5. Conclusion and recommendation

In conclusion, our study shows that environmental values have significant influence on recycling behaviour. It is also highlighted that environmental values do have significant influence on the consumers' intention to recycle. Thus, it can be said that consumers who have better environmental values, or who are more pro-environment, would have higher participation in recycling. Nevertheless, the hypothesized theory of intention to recycle as the mediator for environmental values and recycling behaviour was not supported for both Kuala Lumpur and Kota Kinabalu samples.

This empirical study also shows greater effect of environmental values on recycling behaviour in Kuala Lumpur as compared to Kota Kinabalu. Cultural differences, especially in terms of education level may affect the environmental values of the consumers, which consequently affect the way consumers act or behave.

It is hoped that the outcomes of the study would help facilitate the local governments in overcoming the persistent problem of waste management. The practice of benchmarking by the authorities is a good effort to find a solution to a problem. However, caution should be taken when cultural differences factor is taken into consideration. What works in one culture, may not work in another.

Since intention to recycle is a non-mediator in this study, it is suggested that further research should be carried out by considering some moderating variables such as effort, or degree of intention formulation in the local context.

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