



An analysis of household acceptance of curbside recycling scheme in Kuala Lumpur, Malaysia



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ABSTRACT

This study explored and analyzed household acceptance of the curbside recycling scheme (CRS) in selected residential areas in Kuala Lumpur, Federal Territory (KLFT), Malaysia where the number of drop-off recycling facilities are limited. The analysis identified the socio-economic factors that affect the respondents' willingness to pay (WTP) for CRS. A survey using standardized questionnaires of the contingent valuation method (CVM) was administered to 460 households. The proposed scheme received a positive response with high willingness of residents to separate (90%) but low WTP (34%) for the scheme charges. Despite the average of WTP curbside recycling charges of MYR88.80 added to household annual tax has translated into MYR7.40 per month (USD 2.50), the study revealed various issues to improve existing recycling facilities with the solid waste management (SWM) and recycling practices. The analysis further revealed that CRS gained support from the Chinese who practice recycling and also from older age groups with the involvement of other family members such as a father/husband and adult and household who has the right attitude towards recycling. It showed the demand for more convenient recycling services which is an improvement from drop-off recycling facilities or a public recycling facilities to a private recycling services at the household level. Finally, CRS has potential application in the middle-high income residential areas of Bangsar and Wangsa Maju.

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Introduction

Household recycling activity in Malaysia is still sporadic and concentrated mainly in the urban and sub-urban areas. It is supported by public recycling facilities as part of the Second National Recycling Campaign that was launched in 2000 by the Ministry of Housing and Local Government. At the same time, solid waste management (SWM) underwent a privatization process in 1999 which involved private concessionaire in recycling campaign.

As an effort to encourage household recycling practice, government provided the public with recycling facilities. Statistical records showed that 62 and 1000 recycle bins were distributed respectively in Kuala Lumpur Federal Territory (KLFT) and in the other 13 states of Malaysia as part of the recycling campaign (Annual Statistical Year Book, 2004). The 120-L recycle bins were located at public spaces such as shopping malls, petrol stations,

post offices, institutions, etc. with scheduled collection carried out by the Alam Flora Sdn Bhd (AFSB). The company is a private consortium of solid waste management covering three states, KLFT, Selangor and Perak States. The ratio of recycle bins to population in KLFT is 1:22,247 per inhabitant (Zen, 2006). The number of recycle bins for KLFT were increased to 100 for KLFT and 2,470 for the other parts of the country in 2011 (SWM and Public Cleansing Corporation 2011) (www.sisa.my2012).

The inadequacy of the recycle bins has been reported in several studies (Chenayah, Agamuthu, & Takeda, 2007; Ibrahim, Aliagha, & Khoo, 2000; Octania, 2005; Zen, 2006). The method known as drop-off recycling is the least convenient recycling method (Lund, 1992) that largely depends on household participation (Sidique, Lupi, & Joshi, 2010). Nevertheless, recycling activity requires individual investment of time, space, money and effort beside their knowledge and attitude towards recycling. Personal barriers in performing recycling activity include 'not enough time', 'lack of space to store the recyclables' or external factors such as 'too few drop-off sites' and 'inconvenient recycling locations' have been identified in several studies (Chenayah et al., 2007; Ibrahim et al., 2000; Octania, 2005; Zen, 2006; Zen, Noor, & Yusof, 2014).

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Complementing the drop-off recycling facilities, the nationwide campaign provides recycling centres (RC) or buy back centers (BBC) with monetary incentives for recyclable items. The RC/BBC are mostly located at selected densely populated and middle-high income residential areas in urban areas. Previously, there were thirteen (13) RC/BBC that consisted of six permanent RC/BBC and seven mobile RC/BBC under the AFSB concession area (Alam Flora, 2009). Some of the mobile RC/BBC had served the recycling activity by community-based organizations (CBO's), schools, institutions and non-government organizations (NGO's) as an additional source of income to fund their social activities (Zen, 2006, 2007). Presently, there are 599 communities RC/BBC for the whole states (www.sisa.my2012).

Though various recycling facilities are provided, household's response to the various stimuli of pre-environmental behavioral change is complex. Some research has reported the role of incentives to induce environmentally responsible behavior (Stern, 1999; Wyposal, 1989). In contrast, other research claims that incentive-based approach creates the challenge of forming intrinsic motives of pro-environmental behaviors such as recycling behavior (Frey & Oberholzer-Gee, 1996). This study covers the influence of attitude on CRS in order to gain a better understanding of the acceptance or otherwise of the new proposed household recycling facilities.

Recycling is one of the important methods of diverting the increasing amounts of municipal solid waste (MSW) that cannot be fully deposited in the available landfills. In Malaysia, from a total 291 landfill sites in April 2007 (Yahaya, 2008), about 80% of them reached their maximum capacity by 2010 (Alam Flora, 2008) and 112 (38.5%) were not in operation with only 10 sanitary landfills being in operation (Yahaya, 2008). To achieve a developed country status by 2020, recycling target of Malaysia was set at 22% (Malaysia, 2006). However, the recycling rate recorded in KLFT is only 1% (UNEP 2004) and 5% at the national level (Agamuthu, Fauziah, & Kahlil, 2009; Agamuthu, Fauziah, & Khidzir, 2009; Malaysia, 2006). However, this figure did not capture recycling works being actively conducted by the informal sector. This activity creates a challenge in profiling the country's SWM.

The Solid Waste Management and Public Cleansing Act 2007 (Act 672) came into force in 2012 and stated the requirement of source separation by households (Yahaya, 2012). Even though waste separation is not yet enforced, the main intention of increasing household recycling participation becomes urgent due to the annual increase in waste generation. It was estimated that solid waste generation in Malaysia is more than 25,800 tonnes/day and it will reach 30,000 tonnes/day by 2020 (Yusuf, 2013). In 2005, solid waste generation in KLFT was 3478 tonnes/day and is expected to rise to 3200 tonnes/day in 2017 (Agamuthu, Fauziah, Khidzir, & Aiza, 2007). The per capita solid waste generation in KLFT alone is about 1.62 kg/capita/day, with the national average being 0.8–0.9 kg/capita/day (Osman Saeed, Nasir Hassan, & Mujeebu, 2009).

The composition data of recyclable items collected shows the following: 55% by scavengers in landfills, 30% recycling by communities and 15% by educational institutions (Alam Flora, 2004). Though the data indirectly portrays a low quality of recyclable items from the landfill, it indicates domination of the informal sector in Malaysia recycling scenario. The informal sector recycling practices in Malaysia are from door-to-door itinerant recycling buyers, waste collection workers doing segregation during their works and scavenging activity in landfills (Siwar, 2008).

Informal sector recycling is common in many developing countries and play an important role in their waste management scenario (Medina, 2000; Ojeda-Benitez et al., 2002). A study of Zen (2007) in KLFT found out that 31% of households have favorable

attitudes towards door-to-door itinerant buyers compared to 23% favoring drop-off recycling provided by the government. It could be said that informal recycling helps in initiating the development of household recycling practice and creates recycling norms in the society. The preference towards itinerant recycling buyers was probably due to monetary incentives received and convenience as one of the factors affecting recycling behavior from various studies (Medina, 2000; Ojeda-Benitez et al., 2002; Stern, 1999; Wysopal 1989).

Other studies on household recycling conducted in KLFT identified 19% of households separating recyclable items into separate plastic bags aside their garbage bins on voluntary basis (Zen, 2007). Another study showed the need of recycling facilities at the household level in order to encourage them to participate in recycling and minimize their time (Kuo & Perrings, 2010). Interestingly, the door-to-door itinerant buyers that mainly focused on the sales of recycled items have the capacity to provide the convenience household recycling facility.

Curbside recycling has been known as one of the effective ways to reduce household cost of recycling by reducing inconvenience in recycling and it consumes less time (Aadland & Caplan, 1999; Jenkins, Salvador, Martinez, Palmer, & Podolsky, 2000). Compared to drop-off recycling, accessibility to curbside recycling has significant and substantial positive effect on the percentage of recyclables collected (Bardos et al., 1990; Jenkins et al., 2000). A combination of several recycling methods or facilities such as curbside recycling, economic incentives and drop-off recycling has a positive effect on household recycling participation (Hong & Adams, 1993; Jenkins et al., 2000; Tiller, Jakus, & Park, 1997). Considering the various recycling facilities and practices in this study area, the proposed CRS conducted will explore the adaptation of CRS into the existing solid waste management system.

The identification of household's support and acceptance towards the CRS is important (Aadland & Caplan, 2003). It is an effort to reduce misjudgments that led to poor facilities/scheme design and performance (Altaf & Hughes, 1994) with the additional high operational cost (Jenkins, Martinez, Plamer, & Podolsky, 2003). CRS design varies in terms of frequencies of collection, mandatory versus voluntary separation, whether it is part of the waste collection system, type of collection containers of recycle bin and type of recycled material collected (Bouman, Goodwin, Jones, & Weaver, 1998). CRS also varies on the community level due to differences in the socioeconomic demography background (Guagnano et al., 1995; Mattsson, Berk, & Clarkson, 2003). Preference of CRS is found in landed or single house building compared to high rise housing areas (McQuaid & Murdoch, 1996).

The contingent valuation (CV) method was applied to capture the passive use values of CRS as an essential aspect in the conceptual framework of CRS. The passive use values of CRS involved the environmental values embedded in the goods offered (Carson, 2012). The approach that has direct elicitation of consumer preference and willingness to pay (WTP) has emerged as one of the approaches to address this shortcoming (Carson, 2012; Mitchell & Carson, 1989). Several studies on the WTP of CRS (Aadland & Caplan, 1999, 2003; Blaine, Lichtkoppler, Jones, & Zondag, 2005; Huhtala, 1996; Jenkins et al., 2000; Lake, Bateman, & Parfitt, 1996) identified socioeconomic characteristics, awareness and attitudes of households as contributors to the WTP. Other studies recognized the elderly person's willingness to pay for curbside recycling (Boyer, 2006).

CV studies conducted on solid waste and recycling services are limited in Malaysia. Previous studies (Afroz & Masud, 2011; Jamal, 2000; Mourato, 1999) were inconclusive with regards to solid waste and recycling services. A study by Jamal (2000) on the acceptance of recycling facilities in Kajang area, Selangor State

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