

Using Risks-, Attitudes-, Norms-, Abilities-, and Self-regulation (RANAS) approach to identify behavioural drivers of recyclables separation

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Introduction

The waste management challenge is particularly severe in low- and middle-income countries like Vietnam, where a rapid pace of urbanisation, industrialization, and overpopulation has led to an alarming increase in waste generation. Vietnamese government recently enacted a new Law on Environmental Protection, which aims to urgently improve waste management practices and services, in particular, to implement circular solutions that promote waste recovery and recycling. Enabling and ensuring reliable and regular waste segregation behaviour by all citizens. To initiate and sustain such a modified behaviour consistently and effectively is difficult and resources require a profound understanding of people's mindsets and the related psycho-social drivers that influence these mind-sets. In Vietnam, the initiative to test, promote and implement waste segregation at the household level is not new. However, published studies that provide scientific evidence on what drives behaviour specifically with regard to waste separation at the point of generation are only very limited (Tong et al., 2021). In this study, our systematic approach was based on the Risks-, Attitudes-, Norms-, Abilities-, and Self-regulation (RANAS) approach (Mosler, 2012) as a theoretical background and to identify psycho-social factors related to recyclables separation. This study is the first study that uses the RANAS approach to identify behavioural and contextual factors underlying recyclables separation and develop an evidence-based strategy targeting recyclables separation in Vietnam for future intervention.

Methods

The present study is cross-sectional and employs either qualitative or quantitative methods designed to assess recyclables separation behaviour, habit and intention, and behavioural determinants underlying recyclables separation. The questionnaire was developed and then pre-tested in the field. The study participants were individuals responsible for waste management within the household. Face-to-face interviews were conducted in December 2022, in the city of Tuy Hoa, Vietnam. A total of 465 people from 13 residential groups in ward 5 and ward 7 were interviewed, of which 15 were dropped due to external influence during the interview. The quantitative questionnaire was based on the RANAS model (Mosler, 2012). The questionnaire comprised questions that covered demographics, social and physical contexts, behaviour towards waste segregation (frequency, type of recyclables separated, and collection), habit, intention and psychosocial factors underlying recyclables segregation. Data was analysed using SPSS Version 28.

Results and discussion

From a total of 450 study participants, 93.6% were female and 6.4% male. Study participants were on average 57.05 years old. Household size ranged from 1 to 11 people while only 15.78% had children under 5 years of age. The major portion of interviewees (69.78%) belonged to one or more social groups with the Women's Union and the Elderly Union being most represented in the sample. Of the interviewees, 32.67% owned a garden and 87.96% had a dedicated place on their property to store recyclables. Collection occurred through the informal sector, with 91.5% of households either selling or giving their recyclables to itinerant waste buyers, on occasions they did segregate. Households showed a high preference for town council meetings, television and social networks as a way to receive information, which therefore points to an important future communication channels that can be used during an intervention.

The analysis showed that study participants separate recyclables 'much' as a matter of habit ($M=4.10$ ($SD=1.26$), $N=433$) and intended to separate recyclables 'much' also in the future ($M=4.37$ ($SD=.97$), $N=449$). Self-

reported behavioural frequency shows to be very high, in average respondents reported that they separate recyclables '(almost) always' ($M=4.79$ ($SD=.67$), $N=432$). Furthermore, the Spearman nonparametric correlation analysis revealed that having a dedicated space for storage of recyclables (yes/no) and level of education were significantly associated with behavioural frequency ($r=.161^{***}$, $r=-.148^{**}$, respectively), but not with habitual practices and intention related to recyclables separation. Additionally, 'giving' recyclables to informal sector (but not 'selling' them) was significantly associated with intention ($r=.099^*$) related to recyclables separation in the future, while interacting directly with scrap yards instead of the informal waste collectors was significantly associated with behavioural frequency ($r=-.118^{**}$ when 'giving' to scrap yards, $r=-.141^{**}$ when 'selling'). Being a retiree correlated significantly with intention to always separate recyclables ($r=.154^{**}$).

Significant differences between doers and non-doers were found in perceived severity, factual knowledge, belief – time consuming, several feelings (disgust, shameful, proud, satisfying, care), personal importance (obligation and guilt), how-to-do knowledge, confidence in performance, maintenance, and recovery, action control, barrier planning, remembering, and commitment. Lack of knowledge on waste segregation found in our findings was also well supported by literature (Otoma et al., 2013). Contextual factors, such as having a dedicated space for storage of recyclables and level of education were associated with behavioural frequency, however we could not find an association with habitual practices and intention related to recyclables separation. This is, again, in line with our findings about the relevance of factual knowledge, and education level seems to be an important factor in behaviour change. The aspect regarding storage of recyclables is consistent with previous studies that have found that the availability of storage space positively correlates with a recycling behaviour of households (Afroz et al., 2010) and that lack of storage space is a barrier to recycling as reported by interviewees (Martin et al., 2006; Mee et al., 2004).

Our findings revealed that behaviour change interventions should target feelings (satisfying, care), the personally felt obligation and guilt, the action knowledge (how to do), the confidence in performance, maintenance, and recovery, action control, remembering and the felt commitment, because these factors showed medium and large effect size. The high proportion of Women's Union members in the sample helps with communication as this social group can act as very effective dissemination pathway as well as a potential intervention and implementation partner.

Conclusion

This is the first study that aimed to identify the behavioural determinants of recyclables segregation at source and develop evidence-based behaviour change strategy in Vietnam. Our findings suggest that factual knowledge is a critical component of promoting recyclables segregation behaviour. We also found that feelings of satisfaction and personal norm are important factors in shaping recyclables segregation behaviour. Contextual factors, such as the availability of storage space and education level, were found to be associated with recyclables segregation behaviour. It is hoped that this research will inspire further efforts to promote sustainable waste management practices worldwide.

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