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著者(和文)	DilixiatiDilinazi
Author(English)	Dilinazi Dilixiati
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報告番号 For administrative use only	乙 第 号	氏 名 Name	DILIXIATI Dilinazi
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( 要 旨 )

(Summary)

This thesis aims to quantify the unwillingness toward PET bottle recycling actions by a new contingent valuation method based on pairwise comparison and analyze the correlation between unwillingness and actual PET bottle sorting conditions. In addition, according to the characteristics of the current recycling system and the result of the present study, put forwards the improvement strategies for PET bottle recycling.

Chapter 1 briefly introduced the worldwide trends in municipal solid waste (MSW) management and the MSW management in Japan. In addition, the significance of social psychology and theory of behavior study as well as web questionnaire survey in environmental-related research was given. Finally, the research object of this thesis and the related papers published by the author were mentioned.

In Chapter 2, A new method was suggested to evaluate the unwillingness people perceive when they perform actions for PET bottle recycling. The new method was applied to the eight single and multiple actions. The new method consists of two stages; quantification of unwillingness by pairwise comparison method and monetary transformation of unwillingness based on outsourcing costs (market prices to outsource reference actions). In the unwillingness calculation of single actions, "Cap removal" receives the weakest unwillingness. In contrast, the strongest unwillingness toward "disposal in the supermarket" explains the consistently high-quality PET bottles collected in the supermarket. Strong unwillingness might allow only recycle-conscious people to bring PET bottles to supermarkets. Unwillingness toward multiple actions indicated that unwillingness shows higher to recycling actions when they include situational factors such as distance, time consumption, or complexity. The difference in performances of participants in a recycling system might be explained by the Theory of Planned Behavior (TPB). For some participants, the possibility of overcoming strong unwillingness to complete the recycling activities as requested is higher.

Moreover, the result of quantified unwillingness using the new method was compared to the willingness-to-pay (WTP) method. Good agreement was found for actions like "bottle washing" between the new and WTP methods. On the other hand, for some actions higher than the WTP method. It suggests that the new method might quantify both recognizable and unrecognizable unwillingness. Furthermore since, in the new method, the respondent did not go through a process of

directly converting actions into amounts, which reduced the biased results caused by the characteristics of the questionnaire.

In Chapter 3, the actual PET bottle sorting conditions in six targeted cities in Japan by on-site investigations. No significant difference in the completion rate of the overall PET bottle sorting actions (except F city). Besides, the impact of sociodemographic factors was not significant. It might be determined by the relatively advanced waste sorting and recycling system in Japan. However, there were some differences found caused by differences in local classification rules or provided information. If the information is officially provided by the local authority, people might follow it without doubt, even if it is incomplete. Being misled by such information might affect the quality of classification.

In Chapter 4, the unwillingness toward PET bottle recycling actions, and the actual completion rate of PET bottle sorting were compared, and a correlation was found. It was assumed that the more unwillingness, the lower the completion rate. However, the finding of this Chapter was unexpectedly interesting. The valuated unwillingness of “cap removal” (1.8 JPY) divides respondents into eco-conscious and non-eco-conscious. For eco-conscious respondents, their completion rate of recycling actions is increased with the unwillingness, while for non-eco-conscious respondents, the completion rate is decreased with the increase of unwillingness. According to the multi-ANOVA analysis of the Web questionnaire survey, significant correlations were found between “cap removal” and other pro-environmental activities. If a recycling system could comprehensively consider different types of users and combine the proper psychological barrier with psychological stimulation, the recycling efficiency might be further improved. Strategies for the improvement of the current recycling system were suggested accordingly in chapter 5.

Chapter 5 suggests several suggestions for improving the PET bottle collection system by “participants screening.” Based on the result of previous chapters, the participants of this study can be divided into eco-conscious and non-eco-conscious groups; it is called a “participants screening” approach. According to the current situation of the PET bottle recycling system in Japan and the conclusion of previous chapters, this study suggested a strategy that combined the improvement in information, feedback, incentives, and environmental alternations. It might be a combination of supervision, convenience, and psychological incentives for non-eco-conscious users.

In conclusion, this study suggested a new contingent valuation method to quantify the unwillingness toward the PET bottle disposal process. In addition, the participants of this study were screened and further analyzed. Moreover, the improvement strategies were put forward accordingly to different types of participants. It is suggested that, if a recycling system enables to use of rules to limit while implementing encouragement, it might achieve the ultimate goal of everyone-correct-recycling.

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