Structural equation modelling of residential energy-saving behaviour based on theory of planned behaviour: Evidence from Changchun, China

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Overview

Energy-saving behaviour has a large potential of reducing residential energy consumption, which is influenced by various determinants. In this study, we classify the residential energy-saving behaviours into three categories: investment behaviours, control behaviours and careful use behaviours, and further investigate the careful use behaviours in the framework of the theory of planned behaviour based on the survey data in Changchun in China. Structural equation modelling is used to analyse the careful use energy-saving behaviour, we find that in the case of residents in Changchun, energy-saving intention is the most important effect on energy-saving behaviour, which is influenced by three driving factors including attitude, subjective norm and perceived behaviour control. Among subjective norm is the most important effect on energy-saving intention followed by attitude and perceived behaviour control. We emphasize the effect of subjective norm on careful use behaviour and further interpret the importance of subjective norm to careful use behaviour. We give policy implementation on improving energy-saving behaviour from the perspective of subjective norm throng a widely energy knowledge diffusion and energy information publicity, and establishing a pro-environmental attitude by education and reducing the resistance of energy-saving behaviour implement.

Methods

In this study, we intend to investigate the careful use energy-saving behaviour, which is not sensitive to the economics factors such as income, price relative to the other two types of energy-saving behaviours (Feng et al., 2010). However, owing to the behaviour is driven by cognitive psychological factors (Grob, 1995; Thogersen and Gronhoj, 2010), we will investigate the careful use energy-saving behaviours in the framework of cognitive psychology based on the Theory of Planned Behaviour.

A representative sample is randomly selected from the residents in Changchun, China, and an online survey on energy-saving behaviours in households is conducted. We use structural equation modelling to test the proposed model. With the help of the program of AMOS 17 we tested the measurement of each construct and significance of the structural parts of the model and further gave the results.

Results

According to the statistical results of each construct, the means of the three items for energy-saving behaviours are respectively 3.89, 4.29 and 3.85, which indicate that respondents like to conduct energy-saving behaviour. The mean of the two items for energy-saving intention are also bigger than 3 indicating a relatively strong energy-saving intention which is the main determinant for energy-saving behaviour. In addition, the relatively big mean of the items for attitude, subjective norm and perceived behavioural control show that most respondents in this study realized the importance of saving energy or protecting the environment, felt social pressure for saving energy or protecting the environment and felt little resistance to behave for saving energy.

In line with the assumption of Theory of Planned Behaviour, energy-saving intention has the strongest direct effect on energy-saving behaviour (β=0.28), and followed by the construct perceived behaviour control, which has second strongest direct effect on energy-saving behaviour (β=0.15). 74% of the variance of energy-saving intention could be explained by the three antecedents, among the construct subjective norm is the strongest effect on energy-saving intention (β=0.77), and energy-saving toward the construct attitude is the second strongest effect (β=0.17) on energy-saving intention. Whereas, the construct perceived behaviour control in the smallest effect which influenced energy-saving intention (β=0.12) even though it is one of the influencing effects on energy-saving behaviour directly.

Conclusions

First, we have given another evident of Theory of Planned Behaviour in the case of careful use energy-saving behaviours in Changchun in China. In line with this theory, careful use energy-saving behaviours are determined by energy-saving intention and perceived behaviour control directly, among which energy-saving intention is the most important determinant of the behaviour. Energy-saving intention is further determined by three effects including attitude, subjective norm and perceived behaviour control. Second, we emphasized the effect of subjective norm on careful use behaviours, differing from previous studies on investment behaviours or control behaviours that attribute the determinants of energy-saving behaviours to attitudes or perceived behaviour control. Third, we further discussed the results of the empirical model, and pointed out the importance of knowledge and information by improving careful use energy-saving behaviours.

References

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