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MODELLING PUBLIC INTENTION TO REDUCE NON-REVENUE WATER: AN EXPANDED VERSION OF THE THEORY OF PLANNED BEHAVIOUR

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Abstract

The study seeks to determine the public's Non-Revenue Water (NRW) reduction behavioural intention in Malaysia. It endeavours to expand the social-psychological behavioural model which is the theory of planned behaviour (TPB) by adding the determinants of environmental knowledge (EK), environmental concern (EC), and the respondents' socio-demographic variables to predict the public's behavioural intention to engage in NRW reduction practices. A self-structured questionnaire with face-to-face interview was employed to gather responses from 800 citizens who are currently living in the state of Selangor, the Federal Territory of Kuala Lumpur, Pahang, and Johor. Following the subsequent hierarchical linear regression models, the final model has explained 51.3% of the variance in behavioural intention to take part in NRW reduction practices. The study's findings identify that the factors of attitude (ATT), subjective norm (SN), perceived behavioural control (PBC), EK, EC, and gender significantly influence the NRW reduction intention. Moreover, the study reveals that ethnicity and education differences have significant influences on the expanded TPB in terms of NRW reduction. This study furthers to the present theory and experience by offering advantageous perception about the application of EK and EC on the public's NRW reduction intention.

Research Highlights

A high level of NRW indicates that the water utility is not performing well and negatively impacted due to lack of governance, investment, and technical and managerial skills to ensure sustainable water management (Kingdom, Liemberger, & Marin, 2006). NRW can be described as the water loss change between the capacity of water insert into the water distribution system and the amount of water charged towards consumers through authorised metered and illegal water consumption (Chan, 2009). Malaysia's NRW matter is not merely a technological issue, nevertheless, it also correlates with the water utility's poor management and governance (Teo, 2014). By increasing the awareness of water-related issues among the public, the citizens may be more receptive to reduce water consumption, enhance water conservation and perform NRW reduction actions by reporting any water loss issues to the water utility and engaging in NRW reduction programmes.

Research Objectives

This study aims to achieve the subsequent research goals:

1. To determine whether the factors; ATT, SN, PBC, EK, EC and the public's socio-demographic variables (which are gender, age group, ethnicity, marital status and education level) are associated with the NRW reduction behavioural intention among Malaysia consumers.

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2. To examine gender, age group, ethnicity, marital status and education level differences in examining the factors of expanded Theory of Planned Behaviour (TPB) (which are ATT, SN, PBC, EK and EC) towards Malaysia consumers NRW reduction behavioural intention.

Understanding the determinants that impact the public's NRW reduction behaviour may help the water-related stakeholders to encourage pro-environmental actions to reduce the NRW level, lessen water consumption, and support water conservation among those living in Malaysia.

Methodology

This study targeted the public (aged 21 and over) who are currently living in the states of Selangor, the Federal Territory of Kuala Lumpur, Pahang, and Johor, Malaysia. In sum, 800 copies of questionnaires were collected via the face-to-face interview method with structured questionnaires at the time duration of September to October 2018. The questionnaire design was constructed from several environment studies by implementing the TPB concept (Ajzen, 2011; Taylor & Todd, 1995). It also added the factors of EK (Bang, Ellinger, Hadjimarcou, & Traichal, 2000; Mostafa, 2006), EC (Aman, Harun, & Hussein, 2012; Dunlap & Van Liere, 2008), and the respondents' socio-demographic variables. The gathered study data were examined through the Statistical Package for the Social Sciences version 23. In addition, descriptive analysis, the Pearson correlation coefficient, hierarchical linear regression analysis, the F-test, reliability, and one-way analysis of variance (ANOVA) were used to analyse the research data.

Results

All three models were significant predictors of intentions to engage in NRW reduction behavioural intention. The findings of the hierarchical linear regression revealed that each block added had improved the overall model significantly. As a whole, Model 1 had interpreted a 47.7% variation in NRW reduction behavioural intention with the three main determinants of TPB (consisting of ATT, SN and PBC). Model 2 had increased R^2 by 0.030, which revealed that when TPB determinants were controlled, EK and EC explained 3.0% of the variation in NRW reduction behavioural intention. Model 2 had interpreted a 50.7% variation in NRW reduction behavioural intention with the five determinants of TPB (that consisted of ATT, SN, PBC, EK, and EC). Model 3 had increased R^2 by 0.006, which revealed that when TPB determinants were controlled, the respondents' demographic profile explained 0.06% of the variation in NRW reduction behavioural intention. The final model (Model 3) with all the variables had an $R^2 = 0.513$, affirming that the overall model interpreted 51.3% of the variance

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in behavioural intentions to engage in NRW reduction actions. However, the only significant determinant of respondents' demographic profile was gender ($p \leq 0.05$).

Findings

First, the results reveal that there are positive and significant associations of ATT, SN, PBC, EK, EC and respondents' gender in explaining the NRW reduction behavioural intention. Second, the additional of EK, EC and demographic constructs have significantly predicted the NRW reduction behavioural intention when controlling the TPB, which is the addition of 3.0% (EK and EC) and 0.6% (demographic characteristics) variation respectively towards the behavioural intention. Third, the exploration of the differences of demographic factors and their effects on NRW reduction behavioural intention, concludes that ethnicity and education differences significantly influence NRW reduction behavioural intention only.

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