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A moral extension of the theory of planned behavior to predict consumers' purchase intention for energy-efficient household appliances in Malaysia

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ABSTRACT

Electricity consumption throughout the world has been rapidly increasing in past decades. However, the current investment trend is showing signs of power supply inadequacy. Hence, many countries have embraced energy efficiency as a partial solution to looming energy problems. In reality, many people are not replacing their household appliances with energy-efficient ones. The use of energy efficient products in Malaysia is still at unsatisfactory level. Hence, this study aims at closing the gap by applying the moral extension of the theory of planned behavior (TPB) to examine the determinants of consumers' purchase intention for energy-efficient household appliances. A survey using self-administered questionnaires was administered to 210 consumers in Penang, Malaysia, and Partial Least Square (PLS) regression was used to test the hypotheses. The findings show that consumer' more-favorable attitudes toward energy-efficient household appliances and perceived behavioral control significantly influence consumers' purchase intention for such products. This study also proved the extension of moral norm in the classic theory of planned behavior to be a significant predictor for consumers' purchase intention. Policy implications like creating awareness for Energy Star Labelling, enhancing Minimum Energy Performance Standard (MEPS) and the role of education in nurturing younger generations are addressed.

1. Introduction

A concern for environmental conservation has recurred in diverse forms, in different parts of the world, throughout history. The idea of 'the environment' as an explicit concept has changed over time as detailed issues have developed (Griseri and Seppala, 2010). Recently, environmentalism has changed to address new issues such as climate change, overpopulation and genetic engineering. Climate change is one of the main environmental issues widely discussed in international dialogues and conferences. One of the key initiatives to reduce climate change is through the reduction of energy usage. According to Ek and Soderholm (2010), environmental policy-makers increasingly emphasize individual consumers' responsibility for the environmental side effects of their actions, and many environmental requirements are expressed in terms of household-related activities. These include, for instance, recycling, purchase of green-labeled products and activities that decrease household electricity use. Improving energy efficiency via faster diffusion of energy-efficient appliances is considered a key option for achieving energy efficiency and climate policy targets; likewise, higher energy efficiency typically translates into lower fossil fuel use and lower carbon emissions (Mills and Schleich, 2013). Particularly in this context, energy-efficient appliances can and are playing a role in reducing energy consumption in homes.

1.1. Background

Energy is an important element in nation building because it acts as the foundation that supports the socio-economic development of a country. Over the past few decades, there has been a rapid increase in electricity consumption, with the strongest growth in the service and residential sectors. The main cause of this rise is increased ownership and usage of electrical appliances (Taylor et al., 2010; Gaspar and Autunes, 2011). Global primary energy demand is expected to rise by approximately one-third from now until 2035, with the majority of that demand coming primarily from China, India, ASEAN countries and the Middle East (International Energy Agency, 2014). It has been projected that more than a $40 trillion investment in the energy supply over the period from 2014 to 2035, together with $8 trillion to improve end-use energy efficiency, will be required to keep up with booming electricity demand (International Energy Agency, 2014). However, the reality is that, in view of the current investment trend, there are indeed warning signs of power supply inadequacy. Worldwide, households account for

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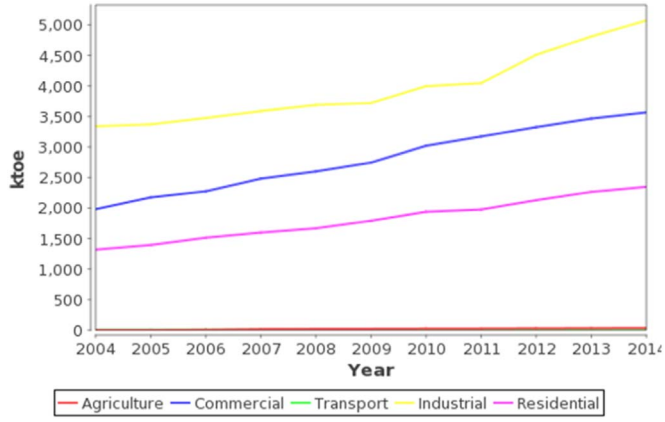

Fig. 1. Electricity Consumption in Malaysia from 2004 to 2014.
Source: Malaysia Energy Information Hub, Energy Commission (2017).

approximately 31% of total energy consumption, with Saudi Arabia at 50%, the UK 31%, the USA 25% and Finland 16% (Saidur et al., 2007). Faced with increasing populations, increasing per-capita electricity consumption, rising fuel costs, and aging facilities, a number of countries have embraced energy efficiency as a partial solution to looming energy problems (Reynolds et al., 2012). Governments around the globe are increasingly aware of the urgency and importance of wiser and better use of energy resources. Energy efficiency, one of the key focuses to mitigate climate change was the main agenda in Malaysia National Energy Efficiency Master Plan (NEEMP) (2011–2020).

1.1.1. Overall trend in electricity consumption in Malaysia

Fig. 1 demonstrates the overall trend of electricity consumption in Malaysia from year 2004 to 2014. Industrial sector accounted for the highest electricity consumption (ktoe) follows by commercial sector, residential sector, and agriculture sector and lastly is transport sector. It is apparent that all major sectors are showing an increasing trend in electricity consumption. For example, the residential sector showed an increase growth rate of household electricity consumption from 2004 to 2014. Hence, residential consumers played an important role contributing towards the high electricity consumption based on their usage of household energy appliances. This can be explained in Fig. 2.

Fig. 2 depicts an overview of Residential Energy Consumption in Malaysia in year 2011. Referring to Fig. 2, residential sector consumed a total of 7.8 Mtoe of electricity. This energy consumption was mainly contributes by usage on others categories (31%); refrigerator (18%); cooking gas (15%); cooking equipment (13%); air conditioner (10%);

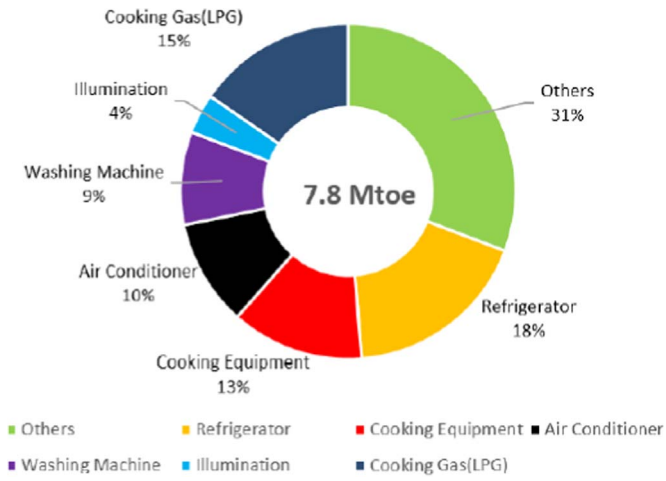

Fig. 2. Residential Energy Consumption in Malaysia in 2011.
Source: Adopted from Chong et al. (2015)

washing machine (9%) and lastly is the usage for illumination (4%). It is apparent that these categories are the most popular electrical appliances among the residential consumers in 2011. Hence, in view of the rapid increase in the electricity consumption, promoting the purchase intention on energy efficient appliances become crucial to reduce the high electricity consumption and provide economic benefits to consumers.

1.1.2. Malaysia energy-saving effort and purchase of energy-efficient appliances

During the 1970s oil crisis, Malaysia touted renewable energy and energy efficiency (EE) as Malaysia's fifth fuel; however, the discovery of great amounts of oil and natural gas in the 1980s rapidly masked EE issues (Choong, 2011). Some regulations on EE were drafted in the 1990s by the Electricity and Gas Supply Department (EGSD) and the Ministry of Energy (now the Ministry of Energy, Green Technology and Water, i.e., KeTTHA) but were not implemented due to “legal issues” (Choong, 2011).

Recommendations on energy efficiency, including labelling requirements, became a key focus; soon, the National Energy Efficiency Master Plan was developed. However, many implementation aspects of energy efficiency for both businesses and domestic consumers have been overlooked as reported by Association of Water and Energy Research Malaysia (AWER, 2012) in 2012. In 2006, the Energy Commission with cooperation from the Standards and Industrial Research Institute of Malaysia (SIRIM) established the energy label for refrigerators (Energy Commission, 2013). Energy Efficient Labelling Program for Household Appliances in Malaysia has been enacted for freezers, air-conditioners, domestic fans and televisions. Household appliances are labeled with an Energy Commission label with 1-Star to 5-Stars; a 1-Star label indicates the least energy-efficient appliance, whereas a 5-Star Label indicates the most energy-efficient appliance.

Driven by strong demand from commercial and domestic sectors in line with its Gross Domestic Product (GDP) growth, the growth of electricity demand in Malaysia as forecasted by the Economic Planning Unit (EPU) showed an increase of 3.52% in 2012 compared with 3.48% in 2011 (Tan et al., 2013). Statistics from Energy Commission showed that Malaysian households consumed approximately 20.2% of total electricity usage in 2011, an increase of nearly 2% from 18.3% in 2007. The steady growth of electricity consumption in Malaysia has actually raised the concern of the Malaysian government because increasing energy consumption is directly linked to CO2 emission. In Malaysia, energy efficiency drives at the national level first began in the Seventh Malaysia Plan 1996–2000), which gave birth to the Malaysia Energy Center (PTM). Next, in the Ninth Malaysia Plan 2006–2010) and Tenth Malaysia Plan 2011–2015), energy efficiency is once again clearly being addressed. The Malaysian government has noticed the importance of reducing household electricity usage through the adoption of energy-efficient appliances.

SAVE, or Sustainability Achieved via Energy Efficiency, is a program spearheaded by the Ministry of Energy, Green Technology and Water to improve energy efficiency in Malaysia. From July 2011 to the end of 2012, 100,000 rebate vouchers for 5-Star-rated refrigerators and 65,000 vouchers for 5-Star-rated air conditioners have been allocated to household consumers across Malaysia. The effort is in line with the utilization objective of Malaysian Energy Policy, which is to promote the efficient utilization of energy and discourage wasteful and non-productive patterns of energy consumption. This first of its type of incentive in Malaysia may not be sufficient to decrease energy usage, but it marked an important milestone in the Malaysian local context in promoting the adoption of energy-efficient appliances.

In reality, many people do not replace their household appliances with energy-efficient ones. As reported by the president of the Association of Water and Energy Research Malaysia (AWER), the use of energy efficient products in Malaysia is still at unsatisfactory level