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Mechanism of environmental concern on intention to pay more for renewable energy: Application to a developing country

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ABSTRACT

Concerns regarding the development of renewable energy have increased because of dwindling conventional energy resources and increasing cost of pollution prevention. Despite mounting evidence supporting the advantages of using renewable energy, knowledge of how consumers in a developing country, such as Kazakhstan, perceive this environmental but considerably expensive energy source remains insufficient. This study explores this issue and applies the Bang's model, which is based on theory of reason action, to investigate the consumer knowledge mechanism on the intention to pay more for renewable energy. A partial least squares structural equation modeling (PLS-SEM) technique is employed for data analysis. Consistent PLS results show that consumers' concerns regarding renewable energy have a positive effect on their attitudes, thereby enhancing their environmental beliefs and increasing their willingness to pay more for renewable energy. Moreover, demographics determine the levels of concern for the environment and willingness to pay more for renewable energy. Implications for public policymakers and electric power company managers are provided in this study.

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1. Introduction

Conventional energy resources are dwindling; thus, people are resorting to various energy sources, particularly renewable energy resources, to sustain economic growth. Renewable or green energy is produced from solar, hydro (water), biomass, wind, and geothermal energy sources. Non-renewable or conventional energy is often fossil- or nuclear-based energy. Given contemporary technology limitations, non-renewable power generation remains more inexpensive than renewable energy because the former has considerable advantages in terms of economies of scale, thereby resulting in substantially low production cost at least in the initial stage (Midilli, Dincer, & Ay, 2006). However, non-renewable energy is responsible for the worsening pollution and accelerated global warming (Rowlands, Parker, & Scott, 2002). Even worse, uranium- or nuclear-based energy production could generate potential mass

devastation. In light of the nuclear crisis in Fukushima, Japan in 2011, striking a balance between human safety and standard of living that is highly related to energy consumption has become a growing concern (Park & Ohm, 2014). Thus, academic and public initiatives to enhance consumer willingness to accept the safe and clean but considerably expensive renewable energy are increasing.

Enhancing consumers' concern for the environment has been recognized in consumer psychology and marketing studies as a critical characteristic that influences their green consumption decisions (e.g., Bang, Ellinger, Hadjimarcou, & Traichal, 2000; Hartmann & Apaolaza-Ibáñez, 2012; Polonsky, Vocino, Grau, Garma, & Ferdous, 2012; Pagiaslis & Kroutalis, 2014; Tilikidou, 2007; Warren & O'Dowd, 2005). Environmental concern should be positively related to their pro-environmental behaviors (i.e., the intention to use renewable energy). Warren and O'Dowd (2005) revealed that people in southwest Ireland were almost in universal support for renewable energy; 92% support the development of wind energy in Ireland. The reasons provided for these results are primarily environmental in nature. Approximately 81% expressed their concern for the environment (Warren & O'Dowd, 2005). Environmental concern involves what people know regarding the environment and the key relationships leading to environmental

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impacts. Hence, environmental concern must be present for environmentally responsible consumer behaviors to occur (Polonsky et al., 2012).

Environmental concern may play a more critical role in developing countries than in developed ones. People in developing countries often lack environmental knowledge and belief in their responsibility to protect the environment (Chan, 2001). Several people and non-governmental organizations only begin to realize the magnitude of the problem when environmental conditions have worsened; thus, they turn to the government to enact various anti-pollution laws and implement strict legal measures against environmental offenses (Chan, 2001). However, comprehensive environmental laws and policies need citizens to support and exhibit environmental behaviors.

Most previous studies on renewable energy consumption were conducted in developed regions, such as the U.S. (e.g., Bang et al., 2000; Polonsky et al., 2012), Canada (e.g., Laroche, Bergeron, & Barbaro-Forleo, 2001; Rowlands et al., 2002), South Korea (Kim & Choi, 2005), Hong Kong (e.g., Wong & Wan, 2011), and European Union (e.g., Abeliotis, Koniari, & Sardanou, 2010; Egea & Frutos, 2013; Gerpott & Mahmudova, 2010; Hansla, Gamble, Juliusson, & Gärling, 2008; Tilikidou, 2001, 2007). Only a few studies were conducted in developing countries such as China (Chan, 2001), Malaysia (Tan, 2011), and South Africa (Petzer & Berndt, 2011). The opening of energy markets for competition for energy firms and governments in developed countries has generated immense challenges for both established and new suppliers of electricity services (Gerpott & Mahmudova, 2010). These suppliers needed to offer renewable energy resources to satisfy environmentally conscious consumers. Moreover, these firms knew how to educate consumers to encourage the use of renewable power that is substantially beneficial in terms of reducing environmental harm and ensuring energy production safety.

However, most people in developing countries still prefer conventional energy over renewable energy; hence, only a few empirical studies have assessed consumer perceptions on renewable energy in developing countries. Kazakhstan is a developing country situated in Central Asia. This country is rich in oil, natural gas, and coal; these three resources are commonly used to generate electricity for Kazakhstan's energy market. Increasing power consumption in Kazakhstan has been observed in the last few years because of economic growth. The Global Environment Facility reported that new power generation capacity is required in Kazakhstan because many of the existing facilities are obsolete and worn out. Many existing energy-generation stations are also aging and should be replaced (UNDP-GEF, 2015). Therefore, the issue of enhancing Kazakhstan consumers' willingness to pay more for renewable energy has become an important discussion.

Despite the widespread support to develop renewable energy among developed countries, renewable energy has not been extensively applied in developing energy markets primarily because the cost of this type of energy remains higher than that of conventional energy. However, present understanding of consumers' ecological behaviors is inconsistent and mainly based on studies on either European or American consumers. An integrated theoretical approach that includes additional mediating variables is essential to significantly understand the correlation between consumer knowledge and attitude toward renewable energy in a developing country (i.e., Kazakhstan).

This paper is organized as follows. First, a brief review of existing research findings is presented and research gaps are analyzed. Second, an integrated framework is proposed using theory of reasoned action (TRA) as theoretical framework to investigate the effect of Kazakhstan consumers' environmental concerns on renewable energy on their willingness to pay more for it by

enhancing their knowledge and beliefs. Finally, the specific managerial implications of this study are discussed, and several suggestions are proposed for future research.

2. Literature review

2.1. Overview of the related literature

Table 1 summarizes previous research results of pro-environmental purchasing behaviors across demographics and psychologies. Previous research results based on demographics consistently indicate that age and education are positive antecedents of green purchase behaviors. However, gender and income level provide contradictory results. Previous studies suggest that high-income consumers tend to exhibit pro-environmental behavior (e.g., Arcury, 1990; Scott & Willits, 1994; Tilikidou, 2001, 2007), whereas other studies determine a negative or unrelated correlation between income level and green purchasing behavior (e.g., Roberts, 1996; Petzer & Berndt, 2011). Similarly, a few studies determine that women have lower levels of environmental behavior than men (e.g., Roberts, 1996; Egea & Frutos, 2013), whereas other studies have opposite findings (e.g., Arcury, 1990; Scott & Willits, 1994).

Previous research results based on psychographics are similar to one another except in the areas of consumer knowledge and environmental concern. Certain previous studies suggest that consumer knowledge is unrelated to pro-environmental behaviors (e.g., Pickett, Kangun, & Grove, 1993; Laroche et al., 2001; Tilikidou, 2001; Gerpott & Mahmudova, 2010), whereas others determine a positive correlation between consumer knowledge and green purchasing behavior (e.g., Arcury, 1990; Tilikidou, 2007; Bang et al., 2000; Egea & Frutos, 2013; Pagiaslis & Krontalis, 2014; Polonsky et al., 2012). Similarly, most previous research consistently determines a positive correlation between environmental concern and pro-environmental behaviors (e.g., Scott & Willits, 1994; Roberts, 1996; Bang et al., 2000; Kim & Choi, 2005; Tilikidou, 2007; Hansla et al., 2008; Hartmann & Apaolaza-Ibáñez, 2012; Pagiaslis & Krontalis, 2014). Abeliotis et al. (2010) determined that although 80% of Greek consumers acknowledge concern for the environment as pivotal and are willing to pay more for environment-friendly products; merely 20% of them are willing to change their consumer behavior to attenuate the negative environmental impact of their daily activities (Abeliotis et al., 2010).

A possible explanation for the aforementioned inconsistent findings is that previous studies may have excluded critical mediators between consumer knowledge and pro-environmental behavior. Kim and Choi (2005) learned that individuals' belief that they can effectively contribute to pollution abatement has a direct effect only on energy saving. Therefore, including additional mediating variables (i.e., environmental beliefs and attitudes toward renewable energy) that may have a mediating effect on consumers' purchase decisions is necessary.

2.2. TRA and model development

This study applies TRA, which was proposed by Fishbein and Ajzen. TRA suggests that consumers may consider the consequences of alternative behaviors before engaging in them and tend to exhibit behaviors they associate with desirable outcomes (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). Thus, consumer behavioral intentions (e.g., purchase intentions) are mainly derived from consumers' attitude toward purchase behavior, and consumer attitude is particularly derived from consumers' beliefs and concerns toward the purchase behavior. TRA is a well-organized research model that has been proven successful in predicting and

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