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Parallel Session: Moving towards sustainable consumption: a study of reduce, reuse and recycle (3Rs) adoption among malaysians

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Moving Towards Sustainable Consumption: A Study of Reduce, Reuse and Recycle (3Rs) Adoption among Malaysians

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Abstract: *Over the last decade, rapid globalization, industrial development, economic growth and technological advancement has resulted in population growth and unprecedented changes to the social and cultural lifestyle in Malaysia. One of the dramatic increase was witnessed in the consumption of goods and services due to the rising household income and progressive consumption-oriented lifestyles. On one hand, it helps to stimulate economic activities, but on the other hand, it poses threat to the diversity and stability of the natural environment in various ways. Hence, the key purpose of this study is to identify the factors that affects Reduce, Reuse and Recycle (3Rs) adoption among Malaysians by proposing a model for the prediction of 3Rs adoption, deriving upon Value-Belief-Norm Model with the inclusion of perceived behavioral control from Theory of Planned Behavior. The study includes a total of 407 qualified respondents from all over Malaysia who are the actual adopters of 3Rs. The results demonstrate a profile, behavior and experience of consumers towards 3Rs adoption. The regression analysis was utilized to test the hypothesized relationships among the constructs. All the six-hypothesized relationships were supported. The new ecological paradigm acts as a mediating variable to altruistic value, biospheric value and egoistic value and directly affects the adoption. The findings also indicates several key theoretical and managerial contributions. It was proven that new ecological paradigm is the key determinant of 3Rs adoption decisions, and then followed by perceived behavioral control. Also, biospheric value is the key influence on new ecological paradigm, followed by altruistic value and egoistic value. The study also reveals that recycling behavior is different from waste reduction and reusing behavior. Overall, there are more Malaysians performing recycling behavior as compared to reducing and reusing waste.*

Keywords: *Green Marketing, Sustainable Consumption, Consumer Adoption of Reduce, Reuse and Recycle*

1. Introduction

Over the last decade, rapid globalization, industrial development, economic growth and technological advancement has resulted in population growth and unprecedented changes to the social and cultural lifestyle in Malaysia. The growing local and global concerns about significant environment issues, such as pollution, climate change, global warming and sustainability of natural resources has posed a great challenge to mankind (Steg & Vlek, 2009). These problems are at least partly rooted in human behavior and actions which have caused research to flourish in environmental values and concern with a multitude of publications on the determinants of pro-environmental behavior and on the adoption of waste management (Best & Mayerl, 2013; Trudel & Argo, 2013). One of the dramatic increase was witnessed in the consumption of goods and services due to the rising household income and progressive consumption-oriented lifestylesOn one hand, helps to stimulate economic activities, but on the other hand, poses threat to the diversity and stability of the natural environment in various ways (Haron et al., 2005; Mukherji & Mukherji, 2012; Moh & Manaf, 2014). Thus, environmental issues are becoming

a crucial concern in today's world and is detrimental to human health when there is a lack of access to clean water and air (Nameghi & Shadi, 2013; Pakpour et al., 2014).

Recent studies also found that consumers' adoption of sustainable consumption is very much affected by the individual's values, beliefs, principles and orientations (Aguilar-Luzón et al., 2012; Best & Mayerl, 2013; Izagirre-Olaizola, Fernández-Sainz & Vicente-Molina, 2015). Therefore, this study sets out to close the gaps by examining the factors that influences Malaysian on their sustainable consumption behavior towards Reduce, Reuse and Recycle (3Rs) adoption.

1.1. Sustainable Consumption

Generally, 'sustainable consumption' can be expressed as the intentional behavior or actual behavior to use products and services to satisfy certain basic needs; enhancing the quality of life while minimizing irreplaceable natural resources usage and detrimental consequences that has resulted from production and development activities, such as toxic materials, emission of waste and environmental pollution as derived within an individual's consideration set of values, beliefs, norms and related actions so that the actual behavior or outcome of the present generation needs does not jeopardize the capability of future generation consumption needs (Dolan, 2002; Jones et al., 2009; Mukherji & Mukherji; 2012; Park & Ha, 2014).

Nevertheless, Demarque et al. (2015) and Van Dam and Fischer (2015) viewed sustainable consumption as a social dilemma, indicating a trade-off between immediate personal benefits and delayed collective gains, where individual rational choices may lead to collective undesirable outcomes. Nonetheless, the concept of sustainable development and consumption were initially presented by the Brundtland Report approximately 25 years ago, entitled "Our Common Future" as pointed out by Peattie and Peattie (2009) and Lee (2014). The Brundtland report clearly showed the existing patterns of development, consumption and production were unsustainable in nature, leading to the debate and criticism by the environmental activists and campaigners prior to the report publication. These environmentalists argued that the marketing discipline's role of promoting global consumption growth by offering solutions to consumers to target more sales and consumption levels does not contribute to the macro marketing context of sustainable consumption (Dolan, 2002; Peattie & Peattie, 2009; Gifford & Nilsson, 2014; Lee, 2014; Pakpour et al., 2014). Additionally, sustainable consumption can be regarded as a strategic move of focusing on new ways to meet consumer needs by emphasizing on society and environmental well-being, as well as economic benefits (Haron et al., 2005).

Berger and Corbin (1992) pointed out that it is critical for institutions, marketers, policymakers and the government to implement sustainable remedial ways to overcome these environmental issues in order to mitigate ecological harms on animals, plants and non-renewable natural resources that might result in global warming, air and water pollution, ozone layer depletion, increase of species loss and farmland degradation (Tanner & Kast, 2003; Haron et al., 2005; Mukherji & Mukherji, 2012; Cecere, Mancinelli & Mazzanti, 2014). Paco, Alves and Shiel (2013) added that the satisfaction of human needs should be met with minimal damages to the ecology and natural environment. Thus, effective measures and approaches should be undertaken to resolve this problem for the long run. Urgent remedy is also required to encourage consumers to believe that their behavior to purchase, consume and dispose sustainably can significantly affect the environment and ecological well-being, while emphasizing on developing cleaner and efficient technologies to accommodate the consumption scale growth (Tanner & Kast, 2003).

1.2. Reduce, Reuse and Recycle (3Rs) Adoption

Caring for the environment is no longer promoted by environmental activists or campaigners as a marginal theme, but it has now become a mainstream issue which has captured the attention of the public (Culiberg, 2014), which results in the surge in adoption of 'Reduce, Reuse and Recycle', or also known as '3Rs'. By far, 3Rs adoption is an effective means for reducing landfills, saving on raw materials and preserving the environment against solid waste disposals (Moh & Manaf, 2014; Park &

Ha, 2014). Reducing, reusing and recycling glass, paper, plastic, oils, metals, energy and other waste materials can be a cost-effective way to ultimately converse natural resources, protect the biosphere and diminish landfill problems (Hopper & Nielsen, 1991; Zen, Noor & Yusuf, 2014).

Numerous studies on pro-environmental behaviors, green consumption and ethical beliefs discusses about the increasing importance of 3Rs adoption, indicating that individuals who engage in these practices would usually act for the long term societal benefit instead of temporal advantage (Zhu et al., 2013; Culiberg, 2014; Lorek & Spangenberg, 2014). It is assumed that 3Rs adoption is closely linked to the values orientation, beliefs, norms, culture, economic and socio-demographic factors (Thomas & Sharp, 2013; Izagirre-Olaizola, Fernández-Sainz & Vicente-Molina, 2015) that has encouraged more involvement and willingness from consumers to adopt 3Rs.

1.3. Research Gaps

Although numerous literatures have investigated on recycling behavior (Hopper & Nielsen, 1991; Derksen & Gartrell, 1993; Biswas, 2000; Best & Mayerl, 2013; Thomas & Sharp, 2013; Trudel & Argo, 2013; Bernstad, 2014; Moh & Manaf, 2014; Park & Ha, 2014), however, to-date, limited investigation has been conducted in terms of examining the adoption of Reduce, Reuse and Recycle (3Rs) whereby it is crucial to investigate these three behaviors together to understand how the country's holistic waste problem can be resolved sustainably (Barr, Gilg & Ford, 2001). Further,

Stern et al. (1999) and Stern (2000) derived the Value-Belief-Norm (VBN) Model and Ajzen (1991) developed the Theory of Planned Behavior (TPB) to describe the extent of these constructs affecting the pro-environmental consumption behavior, and to examine the distinction between each behavior of Reduce, Reuse and Recycle (3Rs).

From the quantitative research drawn from previous studies (e.g. De Groot & Steg, 2007; Aguilar-Luzón et al., 2012; Best & Mayerl, 2013; Izagirre-Olaizola, Fernández-Sainz & Vicente-Molina, 2015), the constructs of altruistic value, biospheric value and egoistic value have significantly affected the adoption of 3Rs. Altruistic value (AV) orientation involves the beliefs and principles that guide individuals' ethical concern and consideration towards the social welfare, including the environment and animals. Meanwhile, individuals with biospheric value (BV) orientation are guided by principles that causes them to show concern for non-human species and the biosphere (Stern, 2000; Aguilar-Luzón et al., 2012). On the other hand, egoistic value (EV) orientation is defined as those guiding principles in an individual's life that represents their concern for oneself (Stern, 2000; Aguilar-Luzón et al., 2012). Besides, the new ecological paradigm (NEP) was also tested in this research as a mediating variable that directly affects adoption and indirectly affected by altruistic value, biospheric value and egoistic value. Furthermore, perceived behavioral control (PBC) has been added into the conceptual model to assess the direct relationship towards adoption.

Therefore, to close the gaps, this study aims to expand existing knowledge by investigating the factors of 3Rs adoption which are drawn from the VBN and TPB model while examining the proposed antecedents of this model (e.g. new ecological paradigm and perceived behavioral control) with its value orientations (e.g. altruistic value, biospheric value, egoistic value) that determines the overall adoption of 3Rs among Malaysians.

1.4. Research Questions

Therefore, this study attempts to identify and examine the factors that affect the adoption of Reduce, Reuse and Recycle (3Rs) among Malaysians. As such, the following are the research questions that will be investigated in this study:

a. Does altruistic value of reduce, reuse and recycle (3Rs) adoption affect new ecological paradigm?

b. Does biospheric value of reduce, reuse and recycle (3Rs) adoption affect new ecological paradigm?
c. Does egoistic value of reduce, reuse and recycle (3Rs) adoption affect new ecological paradigm?
d. Is there a relationship between new ecological paradigm and the adoption of reduce, reuse and recycle (3Rs)?
e. Is there a relationship between perceived behavioral control and the adoption of reduce, reuse and recycle (3Rs)?

1.5. Research Objectives

The main objective of this study is to investigate the factors of Reduce, Reuse and Recycle (3Rs) adoption among Malaysians, based on the two theories of Value-Belief-Norm (VBN) Model and Theory of Planned Behavior (TPB). The research model proposed in this study aims to enhance the existing understanding of 3Rs adoption factors, and predict the possibility and extent of the adoption among Malaysians based on the value orientations, beliefs and perceived control. The following objectives are intended to be achieved from this research:

a. To investigate the factors of altruistic, biospheric and egoistic values affecting the new ecological paradigm.
b. To investigate the factors of perceived behavioral control and new ecological paradigm affecting the adoption of reduce, reuse and recycle (3Rs) consumption behavior among Malaysians.
c. To propose a research model of reduce, reuse and recycle (3Rs) consumption behavior among Malaysians.

1.6. Research Significance

Considering that the rise in ecological footprint would affect the depletion of natural resources, at the same time, impose harm towards the biosphere and environment, hence this research intends to contribute to marketers by making distinctive contributions towards advancing sustainable consumption with a consumer focus. Although Malaysians are increasingly becoming more aware and concern about environmental issues, however their willingness to act on those concerns might not translate into actual behavior or sustainable patterns of consumption. It is vital to understand pro-environmental behavior among Malaysians to identify ways that could promote higher adoption of 3Rs behavior.

As waste generation problem is also recognized as a community-wide public policy and institutional issue (Biswas et al., 2000; Bernstad, 2014; Culiberg, 2014), it is hoped that the findings of this study would further enlighten the understanding of 3Rs behavior among Malaysians, and provide meaningful implications to social marketers and public policymakers who strive to develop effective strategies to promote, motivate and encourage sustainable consumption through increasing 3Rs holistic behavior. Hence, the findings from this study would benefit both consumers and marketers to better apprehend the key factors that leads to 3Rs adoption among Malaysians.

2. Literature Review

Numerous studies on pro-environmental behaviors, green consumption and ethical beliefs discusses about the increasing importance of 3Rs adoption, indicating that individuals who engage in these practices would usually act for the long term societal benefit instead of temporal advantage (Culiberg, 2014; Lorek & Spangenberg, 2014). Thus, expressing concern for the natural environment would translate into pro-environment behaviors (Derksen & Gartrell, 1993; Gifford & Nilsson, 2014), such as in the context of Reduce, Reuse and Recycle (3Rs) adoption.

2.1. Sustainable Consumption

Every consumers' consumption intention and behavior can become powerful signals to the direction of marketers, manufacturers and retailers. It has the potential to contribute to a greater or lesser sustainable consumption practices, bringing certain effects to the society and environment at large, such as to the resources, energy and wastes, while altering the dynamic structures of the ecosystem and biosphere (Stern, 2000; Corbett, 2003; Spaargaren, 2003; Young et al., 2010; Tanner & Kast, 2013). Indeed, the significance of sustainable consumption has flourished over the years, attracting scholars' attention from various disciplines worldwide to research extensively on this area, contributing to the rapid expansion of research volume and diversity (Schrader & Thogersen, 2011; Best & Mayerl, 2013).

Leary et al. (2013) and Sahakian and Wilhite (2014) added that since the early 1990s, previous literatures had acknowledged that the current global consumption patterns are unsustainable. As a result of the explosion of human desire, modern culture and social complexities, consumers themselves are partly responsible for the environmental consequences from their private consumption choices and decisions (Dolan, 2002; Schrader & Thogersen, 2011; Greaves, Zibarras & Stride, 2013) This statement is relatively relevant, as De Groot and Steg (2007) further emphasizes that majority of the issues relating to the environment and ecosystem are founded in human values. Culiberg (2014) further emphasizes that sustainable consumption involves the environmental behavior of consumers to consider beyond their individual desire, but also towards long term social goals, ideas and ideologies. Hence, several researchers (Stern, 2000; Spaargaren, 2003; Prothero et al., 2011; Greaves, Zibarras & Stride, 2013) stresses that it is critical to adopt an intention-behavior-oriented study on consumer's attitudes, beliefs, values and motives that can help develop and enhance sustainable consumption in this rapid moving and globalized world. As proposed by Dolan (2002), marketers should view and understand consumption behavior within a changing social context instead of looking at it as a static fact.

2.2. Environmental Values and Concerns

In this relatively new area of research in sustainable consumerism, there are lacking in some findings and discussions pertaining to the values and concerns towards the environment (Gilg, Barr & Ford, 2005). Steel (1996) reported that higher levels of environmental activism tends to contribute to stronger linkages of environmental values and concerns. As such, Aoyagi-Usui, Vinken and Kuribayashi (2003) pointed out that environmental values vary between countries and culture. This is particularly true as pro-environmental values, behavior and practices differ among households geographically due to the diverse emphasis, acceptance, and engagement activities.

Furthermore, from Schwartz's (1992) study on the social values structure in various nations, he highlighted two essential social value dimensions: 'altruistic – egoistic' and 'conservative – openness to change'. In fact, several researchers have argued that environmentalists and people who engage in pro-environmental activities generally demonstrates 'altruistic' and 'openness to change' values (Schwartz, 1992; Stern, Dietz and Guagnano, 1995; Dietz, Stern & Guagnano, 1998; Stern et al., 1999; Corraliza & Berenguer, 2000). Subsequently, Gifford and Nilsson (2014) emphasizes that people must perceive to be in control of their own actions or personal characteristics for values to be expressed in pro-environmental behavior. Chan (2001) noted that consumers who are heavily engaged in sustainable consumption are more likely to hold altruistic and biospheric values. Moreover, individuals who are concerned about the environment demonstrates higher likelihood to engage in non-material values and set priorities beyond their immediate social circle (Karp, 1996; Stern, 2000; Gifford and Nilsson, 2014). Nevertheless, Barr, Gilg and Ford (2001) pointed out that the underlying attitudes, values and beliefs towards environmental values are closely linked to 3Rs behavior.

2.3. Consumer Socio-demography and Psychology

The impact of socio-demographic variables provides a general support to the view of an environmentalist, such as age, gender, race, income and education level (Stern, 2000). These variables may become vital indicators for explaining the pro-environmental or sustainable consumption behaviors (Dietz, Stern & Guagnano, 1998; Chen et al., 2011; Zen, Noor & Yusuf, 2014). Gilg, Barr and Ford

(2005) highlighted that consumers who adopt sustainable consumption are largely female, well-educated and have high income. Chen et al. (2011) also emphasized that females and highly educated consumers are more likely to engage in sustainable behavior as they are aware of the causal effect of environmental harm due to greater exposure of information related to this matter. In addition, numerous studies (Sidique, Joshi & Lupi, 2010; Thomas & Sharp, 2013; Bernstad, 2014; Zen, Noor & Yusuf, 2014) further pointed out that socio-demographic factors have a significant influence on recycling behavior.

However, Stern et al. (1999) discovered that socio-demographic variables were held constant and had no significant relationship with consumer behavior towards sustainable consumption. Similarly, Derksen and Gartrell (1993) also argued that there was little association between socio-demographic factors and recycling behavior. Despite the ongoing debates that surrounds the socio-demographic variable, this variable still does provide a good starting point to understanding the environmentally significant behaviors among consumers (Stern, 2000). Nonetheless, understanding socio-demographic factors may enlighten us in certain sections of our analysis.

Other than values and beliefs, the various psychological factors held by consumers, such as attitudes and habits, perceived consumer effectiveness, self-efficacy or perceived behavioral control, social responsibility, price, quality and brand loyalty could influence and affect their behavior towards sustainable consumption (Gilg, Barr & Ford, 2005). Sidique, Joshi and Lupi (2010) indicates that other psychological variables, for instance social norms and moral obligations also plays an important in influencing recycling practices among households.

Nordlund and Garvill (2002) and Thomas and Sharp (2013) further states that it is vital to understand the psychological factors that influences consumers' willingness to carry out pro-environmental behavior. Additionally, moral norms and beliefs about consumer responsibility and environmental conditions are also central elements in predicting sustainable consumption behavior (Turaga, Howarth & Borsuk, 2010; Gifford & Nilsson, 2014). As recommended by Aguilar-Luzón et al. (2012), it is evident that specific psychographic factors are necessary when assessing certain environmental behavior which may explain the characteristics of 3Rs adoption from a cognitive and behavioral level.

3. Conceptual Framework

Although several theories such as the Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Norm Activation Model (NAM) and Value-Belief-Norm (VBN) Model focuses on different factors to explain consumers' behavior towards 3Rs adoption, however these theories do share some commonalities. The TRA and TPB demonstrates the attitude-intention-behavior relationship, where the beliefs form an attitude and influences behavioral intention and actual behavior. The NAM and VBN model, on the other hand, links the different value orientations that usually co-exist in the same individual and may influence the behavior. Thus, the individual's action may be dependent on his or her belief or value set that associates to personal norms, behaviors or actions.

This study focuses on TPB and VBN as both places extensive importance on the values, attitudes and beliefs in making decisions to adopt 3Rs practices. The TPB indicates a causal relationship between intended behaviors, such as attitudes, subjective norms and perceived behavioral control. On the other hand, the VBN takes into consideration of environmental values such as altruism, biospheric and egoistic which directly influences the new ecological paradigm, and in turn affecting the actual behavior of consumers. Although, it appears that the Malaysians show signs of undergoing a transition, resulting in pro-environmental intentions, there are very limited published work undertaken in Malaysia to elaborate the ecological paradigm and behavior.

Based on Stern et al.'s (1999) research, the VBN theory seems to be the best predictor for environmental movement public support. Public support is known as one of the most important resources for social movements to overcome cultural inertia by understanding the changes in attitudes and behavior through social psychological theory towards environmentalism. The criticism offered by Heberlein (1981) argued that most theories on environmental attitudes and behavior does not build into a cumulative understanding as too little attention has been given to systematic theoretical models. Thus, the VBN theory is most suitable to use in this study as it links three elements of norm activation theory, the theory of personal values and the new ecological paradigm hypothesis to test the actual explanatory value of environmental behavior instead of other theories which only measures the specific problem or consequences (Stern et al., 1999).

Therefore, this study intends to close the gap by integrating the TPB with the VBN into a research model to fit the research on 3Rs adoption among Malaysians as there was no prior research conducted using this conceptual model in the Malaysian context. The research model includes Altruistic Value, Biospheric Value, Egoistic Value and New Ecological Paradigm from VBN and Perceived Behavioral Control from TPB to explain the 3Rs adoption, which have received validation from numerous studies on this behavior (Taylor & Todd, 1995; Corraliza & Berenguer, 2000; Nigbur, Lyons & Uzzell, 2000; Nordlund & Garvill, 2002; Aoyagi-Usui, Vinken & Kuribayashi, 2003; Schultz et al., 2005; Oreg & Katz-Gerro, 2006; De Groot & Steg, 2007; Turaga, Howarth & Borsuk, 2010; Davies, Foxall & Pallister, 2012; Largo-Wight, Hui & Lange, 2012; Park & Ha, 2014).

From a practical point of view, this research also enables the investigation of the relative influence of each construct and to develop effective strategies for marketers to increase the adoption of 3Rs among Malaysians. Thus, the research model presented in this subsequent section would be able to assist the development of an integral model to describe 3Rs adoption behavior.

Altruistic value orientation is adopted from the original VBN model. AV is defined as the beliefs and principles that guide individuals' ethical concern and consideration towards the social welfare, including the environment and animals (Stern, 2000; Aguilar-Luzón et al., 2012). Individuals with altruistic value will base their decision on the perceived costs and benefits for society to behave pro-environmentally or the opposite (De Groot & Steg, 2007). According to Oreg and Katz-Gerro (2006), environmental beliefs are anteceded by individuals' personal values, such as altruistic value. Prior studies have also confirmed that altruistic value significantly influence pro-environmental behaviors. Individuals with more altruistic value are expected to have higher new ecological paradigm belief by engaging in pro-environmental behaviors, and vice versa (Park & Ha, 2014; Izagirre-Olaizola, Fernández-Sainz & Vicente-Molina, 2015). Thus, the hypothesis is:

H1: Altruistic value has a significant effect on Malaysians' new ecological paradigm

Biospheric value orientation is defined as individuals with guiding principles that causes them to show concern for non-human species and the biosphere (Stern, 2000; Aguilar-Luzón et al., 2012). Numerous researchers (Stern et al., 1999; Stern, 2000; De Groot & Steg, 2007) have pointed out that individuals with a biospheric value orientation will mostly base their decision to act pro-environmentally or not depending on the perceived costs and benefits for the ecosystem and biosphere. Biospheric values, as noted by Izagirre-Olaizola, Fernández-Sainz and Vicente-Molina (2015) illustrates the concern of individuals for the planet. In addition, Best and Mayerl (2013) clearly relates biospheric values to the environment, emphasizing that biospheric values correlates closely and positively with the new ecological paradigm. Thus, the hypothesis is:

H2: Biospheric value has a significant effect on Malaysians' new ecological paradigm

Egoistic value orientation is defined as those guiding principles in an individual's life that represents their concern for oneself (Stern, 2000; Aguilar-Luzón et al., 2012). De Groot and Steg (2007) explains

that individuals with an egoistic value orientation will weigh the costs and benefits of performing environmental behavior for them personally; when the perceived benefits is exceeding the perceived costs, these individuals will demonstrate an environmentally friendly behavior, and vice versa. Egoistic value is one of the important factors for predicting and determining pro-environmental behavior among individuals, whereby if individuals bases their decision process highly on egoistic motivations, they will be less likely to engage in pro-environmental behavior, resulting in an inverse relationship with new ecological paradigm (Izagirre-Olaizola, Fernández-Sainz & Vicente-Molina, 2015). Thus, the hypothesis is:

H3: Egoistic value has a significant effect on Malaysians' new ecological paradigm

Due to the rise in environmental movement, Stern et al. (1999) and Stern (2000) incorporated the new ecological paradigm (NEP) into the VBN model, measuring the broad values and beliefs that the fragile biosphere can significantly experience adverse effect from the actions of human. The NEP has gained considerable popularity and acceptance among the academic and intellectual circles, however Dunlap and Van Liere (1978) highlighted that there is relatively little awareness relating to the degree of NEP acceptance among the public and the validity of the NEP measurement scale. According to Stern, Dietz and Guagnano (1995), the NEP describes the primitive beliefs about the nature of the earth and humanity's relationship with it. The term 'paradigm' represents a revolutionary new perspective towards a coherent worldview, whereby environmentalism itself is a new paradigm (Stern, Dietz & Guagnano, 1995). These new perspectives and worldviews as argued by Stern, Dietz and Guagnano (1995) aims to incorporate attitudes towards material growth, technology, governance, and other related matters, including the biosphere, environment and animals. Thus, individuals with greater beliefs towards the NEP would engage in more responsible ecological behavior (Corraliza & Berenguer, 2000). Thus, the hypothesis is:

H4: New ecological paradigm has a significant effect on Malaysians' adoption of reduce, reuse and recycle (3Rs) behavior.

Perceived Behavioral Control (PBC) is the third original construct in the TPB as extended by the TRA, measuring the perception of individuals' ability and capability to perform certain behavior (Ajzen, 1991; Tonglet, Phillips & Read, 2004; Largo-Wight, Hui & Lange, 2012; Park & Ha, 2014). It is appropriate to apply this construct in the research model to investigate consumers' 3Rs adoption by their perceived ability to engage in the behavior. The previous findings on TPB validates the positive relationship between PBC and behavior in which PBC is found to have direct influence on behavioral intention and actual behavior (Derksen & Gartrell, 1993; Oreg & Katz-Gerro, 2006; Culiberg, 2014). According to Mahmud and Osman's (2010) study, PBC was discovered as the strongest predictor of behavior, thus when PBC increases, behavioral intention and actual behavior towards 3Rs would increase. In contrary, if consumers have the perception that performing 3Rs related practices are too difficult for them or out of their control, they will less likely to engage in the behavior and adopt 3Rs practices. Thus, the hypothesis is:

H5: Perceived behavioral control has a significant effect on Malaysians' adoption of reduce, reuse and recycle (3Rs) behavior.

3.1. Research Model and Hypotheses

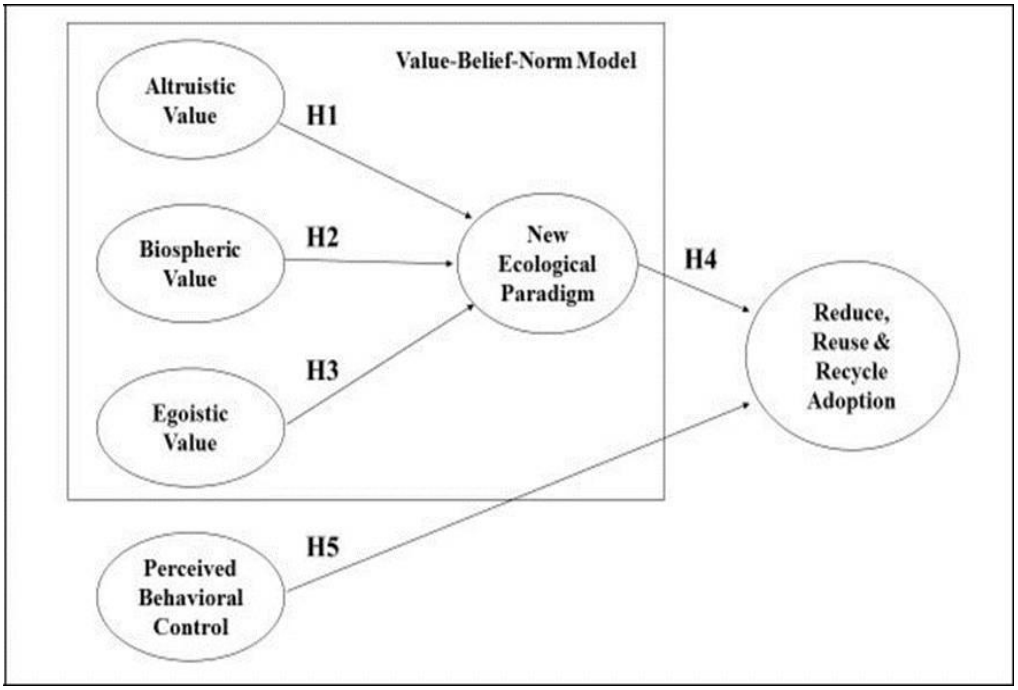

FIGURE 1: 3Rs Adoption Model and Hypotheses (Source: This study)

4. Research Methodology

The initial stage of this research carried out exploratory research by gathering secondary data from the Internet and University Malaya Library journal publications. Subsequently, primary data collection is initiated with quantitative data collection through questionnaires, which were conducted in a structured manner. In this study, the web-based surveys are designed to have similar features and format layout as the paper-based questionnaires.

4.1. Data Collection and Sampling Techniques

Since this research is using both data collection methods of printed questionnaires and web-based surveys, non-probability sampling is more practical to deploy. Thus, the most appropriate sampling technique adopted in this research is snowball sampling using simple random sampling frame to identify initial cases, and these cases further identify members of the population and who then identify further members (Saunders, Lewis & Thornhill, 2015). Meanwhile, the main objective of this research is to investigate the factors of Reuse, Reduce and Recycle (3Rs) adoption amongst Malaysians, therefore the population for this study should be individuals, households and the public who are residing in Malaysia. To be precise, the target population for this research includes all Malaysians who conduct and adopt Reuse, Reduce and Recycle (3Rs) related practice or behavior.

The paper-based questionnaire was personally distributed amongst Malaysians, including students, housewives and working adults in Malaysia. Likewise, the web-based surveys were also distributed to the similar group of respondents through email database, Facebook database and mobile application (WhatsApp) which includes the survey link using Google Docs embedded in the survey invitation. Respondents are not required or forced to answer all the questions before submitting the survey. In this case, they are able to skip questions which are irrelevant or sensitive to them. In addition, respondents who voluntarily assisted to snowball the web-based survey invitation link to their peers are pre-

instructed to inform the researcher on the number of samples that have been sent in order to keep track of the online response rate of the study.

All the questions are presented in a clear and user friendly format for both the multiple choice and Likert scale questions. One of the main differentiator is the hardcopy version instructs respondents to 'tick' the multiple choice or Likert scale column, whereas for the electronic version, respondents are requested to 'click' on the respective buttons to select their appropriate answers.

The web-based surveys were developed in Google Forms to support multiple web browsers and mobile platforms, prevent multiple submissions, and appreciating respondents by including a "thank you" sentence upon completion of the survey. Google Forms provide standard web buttons such as 'Back', 'Next' and 'Submit' for respondents to review and change, proceed to the next page and finally submit the survey form.

4.2. Sample Size

According to Hair et al. (1998), it is more appropriate to obtain a sample size with the ratio of 10 respondents per factor. Therefore, it is recognized that larger samples are always preferable over smaller ones. It also serves an important factor in determining the extent of reliability of the research model. Since there are 38 factors (items) in this study, the target sample size for this study is 380. Thus, 518 surveys were distributed, received 443 replies and only 417 are usable. In this study, we intend to focus on respondents who have adopted 3Rs to investigate whether environmental values, beliefs and controls are predictors of their actual behavior. From the 417 usable cases, 10 respondents stated that they have never engaged in 3Rs behavior at all.

4.3. Measurement and Scaling

The printed questionnaire and web-based survey requires respondent to express and rate their level of importance, agreement and frequency respectively using a five-point Likert scale, ranging from (1) Not Important to (5) Very Important, (1) Strongly Disagree to (5) Strongly Agree and (1) Never to (5) Always. In addition, the measures used for this research are adapted from well-established scales, theories and previous studies to ensure the validity and reliability for each construct measurement. Table 1 provides a summary of the constructs, measurement, items and references.

Table 1: The Constructs, Measurements, Items and References

Constructs	Measures	Abbr.	Items	References
Altruistic Value	Five – point Likert Scale: (1) Not Important to(5) Very important	AV1	Helpful, working for the welfare of others.	Stern et al. (1999)
		AV2	Equality, equal opportunity for all.	
		AV3	A world of peace, free of war and conflict.	
		AV4	Social justice, correcting injustice, care for the weak.	
Biospheric Value	Five – point Likert Scale: (1) Not Important to(5) Very important	BV1	Preventing pollution, conserving natural resources.	Stern et al. (1999)
		BV2	Respecting the earth, harmony with other species.	
		BV3	Unity with nature, fitting into nature	
		BV4	Protecting the environment, preserving nature.	
Egoistic Value	Five – point Likert Scale: (1) Not Important to (5) Very Important	EV1	Social power, control over others, dominance.	Stern et al. (1999)
		EV2	Influential, having an impact on people and events.	
		EV3	Wealth, material possessions, money.	
		EV4	Authority, the right to lead or command.	
Perceived Behavioral Control	Five – point Likert Scale: (1) Strongly Disagree to (5)	PBC1	It is habitual for me to help protect the	Oreg & Katz-Gerro (2006)
			environment by performing reduce, reuse and recycle	
			(3Rs) activities.	
		PBC2	I believe I have the ability to perform reduce, reuse and	

	Strongly Agree		recycle (3Rs) activities.	
		PBC3	The decision to perform reduce, reuse and	
			recycle (3Rs) activities is within my control.	
		PBC4	If it were entirely up to me, I am confident that	
			I would be able to perform reduce, reuse and	
			recycle (3Rs) activities.	
		PBC5	There is value in performing reduce, reuse and	
			recycle (3Rs) activities whether others are	
			doing it or not.	
		PBC6	It is likely that I will continue to perform	
			reduce, reuse and recycle (3Rs) activities in the	
			near future.	
New Ecological Paradigm	Five – point Likert Scale: (1) Strongly Disagree to (5) Strongly Agree	NEP1	We are approaching the limit of the number of	Stern et al. (1999)
			people the earth can support.	
		NEP2	The earth is like a spaceship with very limited	
			room and resources.	
		NEP3	Plants and animals have as much right as	
			humans to exist.	
		NEP4	Despite our special abilities humans are still	
			subject to the laws of nature.	
		NEP5	Humans will eventually learn enough about	
			how nature works to be able to control it.	
		NEP6	The earth has plenty of natural resources if we	
			just learn how to develop them.	
		NEP7	When humans interfere with nature, it often	
			produces disastrous consequences.	
		NEP8	If things continue on their present course, we	
			will soon experience a major ecological	
			catastrophe.	
Reduce, Reuse and Recycle Adoption Behavior (AB)	Five – point Likert Scale: (1) Never to (5) Always	RD1	Use less plastic bags	Barr, Gilg & Ford (2001)
		RD2	Try to reduce leftover food	
		RD3	Turn off the lights when you do not need them	
			Switch off or use less of appliances and	
		RD4	electronic items	
		RU1	Reuse papers	
		RU2	Reuse bottles	
		RU3	Reuse boxes or containers	
		RU4	Try to repair items instead of throwing them	
			Away	
		RC1	Recycle plastic bottles	
		RC2	Recycle papers	
		RC3	Recycle drinks cans	
		RC4	Donate recyclable goods to charity	

5. Results

5.1. Respondents' Profile

From the 407 surveys collected from Malaysians who are 3Rs adopters, majority of the respondents were aged from 25 to 34 years old (43.2%), and followed by 35 to 44 years old (25.8%). This demonstrates that more than half (69%) of 3Rs adopters are amongst the young and middle age group (between 25 and 44 years old). Most the sample was Chinese (46.4%), followed by Malay (34.2%) and Indian (16.2%). Based on the non-probability sampling methodology employed, it has resulted in ethnic group biases whereby snowball sampling represents respondent driven sampling or chain referral that

is not fully controllable by the researcher. From the survey, most of the respondents are single (44.7%) and married with children (36.9%). Besides, almost half of the respondents have obtained Bachelor Degree (45.7%) in terms of education level. With regards to the type of employment, respondents are mostly employed (63.1%), followed by unemployed (25.6%) and then self-employed (9.8%). This shows the about 73% of the respondents are actively working. This result is aligned with the well-educated respondents as they would have higher awareness towards pro-environmental ehavior due to more exposure of information and knowledge relating to the environment and nature.

In terms of the job roles, majority of the respondents fall into the Sales or Marketing role (24.1%). As for the position held, the result was distributed normally with most of the respondents holding Team Leader/ Senior Executive (13.8%) position, followed by Senior Manager (11.5%) and Assistant Manager (11.3%), and then home maker/ housewife (13.0%), and finally student (10.1%). This indicates that there are three main categories of respondents that are those who hold high positions in an organization, home makers and students (Table 2).

Table 2: Respondent Demographics

Gender	Frequency (n=407)	%
Male	166	40.8
Female	241	59.2
Age		
< 18 years old	6	1.5
18 to 24 years old	32	7.9
25 to 34 years old	176	43.2
35 to 44 years old	105	25.8
45 to 54 years old	40	9.6
55 to 64 years old	45	11.1
> 64 years old	3	0.7
Ethnic Group		
Malay	139	34.2
Chinese	189	46.4
Indian	66	16.2
Others	13	3.2
Marital Status		
Single	182	44.7
Married without children	73	17.9
Married with children	150	36.9
Separated/Widowed/Divorced	2	0.5
Education Level		
Primary Education	10	2.5
Secondary Education	25	6.1
Certificate	19	4.7
Diploma Qualification	57	14
Bachelor Degree	186	45.7
Master Degree	98	24.1
Doctorate/PhD	12	2.9
Employment Type		
Employed	257	63.1
Self-employed	40	9.8
Unemployed	104	25.6
Others	6	1.5
Job Role		
Top Management	15	3.7

Sales/Marketing	98	24.1
Operations/Supply Chain/Logistics	11	2.7
Product/Branding/Innovation	15	3.7
Information Technology	26	6.4
Finance/Accounting	31	7.6
Human Resource	20	4.9
Administration	30	7.4
Creative Arts/Designer/Artist	4	1
Journalist/Reporter/Copywriter	4	1
Professor/Lecturer/Teacher	33	8.1
Not Applicable	95	23.3
Others	25	6.1
Position		
Top Management	15	3.7
Director	14	3.4
General Manager	3	0.7
Head of Department	19	4.7
Senior Manager	47	11.5
Manager	27	6.6
Assistant Manager	46	11.3
Team Leader/Senior Executive	56	13.8
Executive	39	9.6
Assistant/Officer/Clerical	15	3.7
Student	41	10.1
Home maker/Housewife	53	13
Not Applicable	22	5.4
Others	10	2.5
Monthly Income		
< RM2,000 a month	38	9.3
RM2,000 - RM3,999 a month	62	15.2
RM4,000 - RM5,999 a month	96	23.6
RM6,000 - RM7,999 a month	24	5.9
RM8,000 - RM9,999 a month	38	9.3
> RM10,000 a month	52	12.8
Not Applicable	80	19.7
Reluctant to Reveal	17	4.2

The first portion of the survey asked participants to describe their behavior and experience according to their length of 3Rs engagement, their perceived importance towards performing 3Rs activities, and their influence to engage in 3Rs. The results show that about half (56%) of the respondents claimed that they have been engaged in 3Rs practices between 1 and 3 years (29%) and 4 to 6 years (27%). In total, the study found that a relatively large number of respondents (>80%) are apparently regular adopters of 3Rs with at least one-year engagement of 3Rs practices. Next, when asked about the importance for adopting 3Rs, majority of the respondents expressed their willingness to adopt 3Rs to help reduce pollution and able to protect the environment (54%), followed by the respondents adopting 3Rs to save

the natural resources (31%). Besides, respondents reported that the top three selection of influence towards adopting 3Rs were due to parents or family influence (22%), followed by a similar percentage for self-awareness (20%) and media/ advertisements (17%). However, a relatively small number of them indicated that they had adopted 3Rs due to the influence from teachers, lecturers or professors (10%).

5.2. Data Quality and Normality Testing

Before assessing the measurement model, data were screened and cleaned to avoid any violation of the assumptions. Normality test was conducted to ensure that the assumptions are not violated and could be used for further validation of statistical hypothesis testing. All the variables tested in the normality test have achieved non-significant results, $p>0.05$ on Shapiro-Wilk statistics, indicating that the distribution of data and scores are normal. Thus, the null hypothesis is rejected and we conclude that the data and scores in this study are normally distributed.

Before moving on to measure the validity and reliability of the data, outlier analysis is performed to identify and detect any possible outliers within the data distribution. After conducting the outlier analysis on the mean of each construct, it is discovered that two constructs have outliers identified. From the boxplot analysis performed, 5 samples from new ecological paradigm and perceived behavioral control are omitted from the subsequent validity and reliability analysis. Hence, this reduces the sample size from 407 to 402 cases.

5.3. Independent Samples T-Test

It is vital to conduct a two-tailed test to examine whether the responses for the two groups are significantly different or the same to limit or reduce nonresponse bias among offline and online data collection (Armstrong and Overton, 1977). Based on the results, all the variables showed a Sig. value above $p>0.05$ for the Levene's Test for Equality of Variances, indicating that the data does not violate the assumption of equal variance. To assess whether there are differences between the groups, the Sig. (2-tailed) values for the t-test for Equality of Means fall between 0.32 and 0.922, which is larger than $p>0.05$, demonstrating that the variance of scores for the two groups (offline and online respondents) are the significantly the same. Therefore, there is not a statistically significant difference in the mean scores for online and offline respondents.

5.4. Reliability and Validity of Measurement

Upon confirming that the offline and online respondents are statistically the same, we proceed to assess the validity and reliability of the data. The reliability analysis shows that the Cronbach alphas of each construct are above 0.70, showing a high degree of internal consistency as recommended by Nunnally (1978). The recycle adoption scale demonstrates the highest alpha value at 0.843, while reduce adoption scale indicates the lowest alpha at 0.729. Since all the Cronbach alpha values were above 0.7, item deletion process was not required to be performed in this study. Therefore, the results generally denote a Cronbach alpha between 0.729 and 0.843, indicating that all the items used for each measurement scale has achieved the recommended reliability and good internal consistency (Table 3).

Table 3: Reliability Analysis of Scaled Variables

Variables	Cronbach Alpha
Altruistic Value	0.757
Biospheric Value	0.764
Egoistic Value	0.835
Perceived Behavioral Control Scale	0.789
New Ecological Paradigm	0.821
Reduce Adoption	0.729
Reuse Adoption	0.785
Recycle Adoption	0.843

The assessment of construct validity can be derived from conducting Exploratory Factor Analysis (EFA). The EFA will be conducted for two loading groups. The first group consist of Altruistic Value, Biospheric Value, Egoistic Value, New Ecological Paradigm and Perceived Behavioral Control; and following by the second group of Reduce Adoption, Reuse Adoption and Recycle Adoption. For the first group, a total of 26 items was factor analyzed by performing Principal Component Analysis utilizing Varimax with Kaiser Normalization. The EFA results indicates that the pool of items captured five distinct factors, excluding the dependent variable. The result indicates that all constructs exceeded the minimum requirement for convergent validity, except for two items, which were deleted (e.g. NEP2 and NEP4) and no longer considered for subsequent analyses as these items either had high cross loadings (above 0.40) or indicated low factor loadings (below 0.40). Although the VBN model constructs of Altruistic Value, Biospheric Value, Egoistic Value and New Ecological Paradigm are based on values, however the result shows that each construct in the VBN model differs from the other constructs and are not overlapping with each other. In other words, each construct is unique from one to another, demonstrating discriminant validity among the constructs assessed.

For the second group, a total of 12 items was factor analyzed by performing Principal Component Analysis utilizing Varimax with Kaiser Normalization. The EFA results shows that the pool of items captured three distinct factors. The MSA test results of 0.711, it demonstrates a middling level of prediction. The BTS is significant at $p < 0.05$, supporting the appropriate factorability of the correlation matrix. Subsequently, the three factors extracted from this study can be explained by a percentage of variance criterion approach to validity the analysis. It is shown that only the first three factors recorded eigenvalues above 1 (3.115, 1.770, and 1.091). The results for the first factor accounts for a moderate percentage of 25.962 percent of the total variance, and the three factors extracted account for 60.857 percent of the total variance, which is estimated as satisfactory. To conclude, the test results for the three factors could be used for subsequent investigation of the research questions. A total of 1 item is deleted (e.g. RD2) and no longer considered for subsequent analyses as this item had indicated low factor loading of below 0.40. Hence, the 3-factor solution accounted for 60.86% of the total variance.

5.5. Regression Analysis

The regression analysis is performed after fulfilling the preliminary regression assumptions. All four models have achieved statistical significance ($p = 0.000$) in the regression analysis. The variances explained (R Square) by each model are, following an ascending order of, 10.4 percent (Model B, Reduce Adoption), 17.5 percent (Model C, Reuse Adoption), 39.9 percent (Model D, Recycle Adoption) and 57.4 percent (Model A, 3Rs Adoption). It is shown in Figure 2 that 57.4 percent of the variance in dependent variable “3Rs Adoption” is explained by the independent variables (AV, BV, EV, NEP and PBC) and the significance value is for the entire model is 0.000 ($p < 0.001$). Besides, AV, BV, EV, NEP and PBC are significant contributors to the dependent variable with each of the variables having significance value of $p < 0.05$. NEP makes the largest contribution (Beta = 0.461), followed by PBC (Beta = 0.314), BV (Beta = 0.305), AV (Beta = 0.283) and finally EV (Beta = -0.151) with the least significant contribution.

From these results, all the hypotheses are supported by the data collected. It seems that new ecological paradigm has demonstrated the greatest effect on 3Rs adoption (Beta = 0.461), whereas egoistic value has exhibited the least effect on new ecological paradigm of 3Rs adoption (Beta = - 0.151). Generally, we can consider all the variables as factors of the adoption of 3Rs (Table 4).

Table 4: Regressions Analysis Results

Model	Dependent Variable	Independent & Mediating Variables	Beta	t-value	Sig.	Model Summary
A	3Rs Adoption t = 9.993 p = 0.000	Altruistic Value	0.283	3.854	0.000	F = 16.967 p = 0.000
		Biospheric Value	0.305	8.632	0.000	
		Egoistic Value	-0.151	2.443	0.017	R = 0.788
		New Ecological Paradigm	0.461	2.364	0.010	R^2 = 0.574
		Perceived Behavioral Control	0.314	5.733	0.000	Adj. R^2 = 0.569
	Reduce Adoption t = 10.959 p = 0.000	Altruistic Value	0.196	4.025	0.000	F = 11.529 p = 0.000
		Biospheric Value	0.334	5.938	0.000	
		Egoistic Value	-0.136	2.175	0.011	R = 0.323
		New Ecological Paradigm	0.478	7.992	0.000	R^2 = 0.104
		Perceived Behavioral Control	0.378	3.153	0.002	Adj. R^2 = 0.093
	Reuse Adoption t = 5.784 p = 0.000	Altruistic Value	0.174	1.902	0.013	F = 6.442 p = 0.000
		Biospheric Value	0.229	5.503	0.000	
		Egoistic Value	-0.164	3.409	0.001	R = 0.373
		New Ecological Paradigm	0.342	4.765	0.000	R^2 = 0.175
		Perceived Behavioral Control	0.280	3.128	0.002	Adj. R^2 = 0.163
	Recycle Adoption t = 4.456 p = 0.000	Altruistic Value	0.124	2.693	0.007	F = 19.118 p = 0.000
		Biospheric Value	0.150	2.829	0.005	
		Egoistic Value	-0.093	2.081	0.038	R = 0.546
		New Ecological Paradigm	0.320	6.397	0.000	R^2 = 0.399
		Perceived Behavioral Control	0.302	5.654	0.000	Adj. R^2 = 0.389

Based on the regression results presented in Table 5, all three variables (AV, BV and EV) had significant effect towards NEP. Therefore, the relationship between AV, BV and EV, with NEP as a mediator is tested using the Sobel test. Based on the Sobel test results, all three independent variables (AV, BV and EV) has yielded p-value of less than 0.05, showing that the mediating effect is statistically significant. Thus, the new ecological paradigm is a significant mediating variable between altruistic value, biospheric value and egoistic value, and with 3Rs adoption.

Table 5: Regression and Hypotheses Test Results

	Hypotheses and Hypothesized Paths		Beta	Sig.	Results
H1	Altruistic Value	→ New Ecological Paradigm	0.283	0.000	Supported
H2	Biospheric Value	→ New Ecological Paradigm	0.305	0.000	Supported
H3	Egoistic Value	→ New Ecological Paradigm	-0.151	0.017	Supported
H4	New Ecological Paradigm	→ 3Rs Adoption	0.461	0.010	Supported
H5	Perceived Behavioral Control	→ 3Rs Adoption	0.314	0.000	Supported

6. Discussion and Implications

This study provides some practical implications and suggestions for marketers, policymakers and public sectors to understand the factors affecting 3Rs adoption among Malaysians. It is vital to examine these

factors to build effective communications and strategies for encouraging greater 3Rs adoption among Malaysians. Additionally, it is important to establish pro-environmental values and beliefs towards 3Rs adoption by emphasizing on the causal effect between consumers' action and the consequences of their actions.

Fundamentally, by understanding the profile of 3Rs adopters, who consist of young to middle-aged females with well-educated background and middle class income group, marketers would be able to design effective marketing and communication strategies that influence households to change their behavior of consuming sustainably. Since parents and family plays the highest role in influencing 3Rs adoption, strategies implemented should continuously inspire pro-environmental household behavior by shifting habits and routines towards waste reduction, reusing waste materials and recycling behavior. When children witness their parents adopting 3Rs behavior, they would learn to build pro-environmental self-awareness and carry on this culture in their lives. It is encouraging to note that 97.6% of the respondents who participated in this study are 3Rs adopters.

In addition, this study also emphasizes on the influencing factors of three value orientation, new ecological paradigm and perceived behavioral control on 3Rs adoption. Consumers who gave higher priority to altruistic value and biospheric value were perceived to hold stronger moral obligations to protect the environment as compared to individuals who gave priority to egoistic values. Purely self-interested consumers would be less likely to adopt 3Rs if the perceived costs is greater than the benefits (Turaga, Howarth & Borsuk, 2010). These findings are in accordance with Nordlund and Garvill's (2002) research in relation to the social dilemmas on value orientations. Nonetheless, these social dilemmas could be resolved by imposing structural solutions (e.g. laws, fines, incentive-based policies or subsidies) or changing behavior through education (e.g. community projects and awareness campaign). As a result, it may pose a challenge to social marketers that aims to develop promotional strategies to increase waste reduction, reusing waste materials and recycling behavior among consumers. This can be argued as such behavior does not usually provide immediate personal benefits to individuals, but rather promotes long term benefits to the society as a whole (Biswas et al., 2000).

According to Turaga, Howarth and Borsuk (2010), corporations should carefully create pro-environmental value structures that promotes sustainable consumption and achieve appropriate relationships between sustainable consumption and economic systems.

Communication messages should also be aimed at motivating consumers' willingness to adoption of 3Rs practices by enhancing their altruistic value and biospheric value, and lowering their egoistic value to achieve greater new ecological paradigm, which are the beliefs leading to bridge the gap between human, nature and the environment. Campaign messages should also consider of how the behavior of one can significantly affect the well-being of others (Culiberg, 2014). As such, Oreg and Katz-Gerro (2006) further stressed that environmental education and programs should involve the basis of nurturing sustainable values, knowledge and problem-solving orientations towards pro-environmental behavior.

Generally, the study's findings are consistent with Barr, Gilg and Ford's (2001) study, indicating that recycling behavior is not the same as reduce and reuse behavior. This implies that when consumers have responsibility, good knowledge and access to recycling facility, it tends to increase the recycling behavior. However, waste reduction is only enhanced when consumers have knowledge about policy instruments, while reuse of waste is increased by the feeling that it is easy and convenient to reuse, and believing that reusing waste materials will make a difference. Thus, if consumers can understand their role and responsibility towards preserving the environment, their behavior to reduce, reuse and recycle will be higher (Culiberg, 2014).

It is argued here that although the respondents in this study demonstrated pro-environmental values and beliefs towards the environment, the holistic framework illustrates that each behavior is diverse from

another, as seen from the exploratory factor analysis, reliability test, Pearson correlation and hierarchical multiple regression analysis. Therefore, as proposed by Barr,

Gilg and Ford's (2001), policies and strategies aimed at encouraging waste reduction, reuse of waste materials and recycling should be tailored specifically towards addressing different characteristics, behaviors and predictors among consumers to achieve effectiveness in promoting 3Rs adoption.

7. Research Contributions

The research contributions are divided into two parts, which addresses the contributions to both theoretical and managerial.

7.1. Theoretical Contributions

First and foremost, the conceptual model developed in this study makes an important contribution to the past literatures on pro-environmental behavior among consumers by integrating the well-known Theory of Planned Behavior (TPB) into a widely accepted Value-Belief-Norm (VBN) model and subsequently applying them to the context of 3Rs. This study incorporates perceived behavioral control, which was drawn from the Theory of Planned Behavior into the VBN model that was never tested before by past literatures as majority of the research have examined both the models separately. Consequently, the proposed conceptual model highlights the influence of altruistic value, biospheric value, egoistic value, new ecological paradigm and perceived behavioral control on the adoption of 3Rs behavior. In this study, '3Rs adoption' refers to the actual behavior and not merely intentional behavior.

A second contribution is that the research objectives examines the actual objectives of 3Rs adoption and its relationship without speculating its relationship with the actual behavior, whereas previous literatures on 3Rs has either indicated acceptance from respondents' intentions or relating their positive intentions to self-reported behaviors. This is an important implication to demonstrate and measure the actual relationship strength of the behavior so that the various social or marketing campaigns can be properly targeted to address environmental advantages and intensify pro-environmental values and beliefs that are closely linked to behavior. Thus, the present study supports the proposition that 3Rs behavioral intentions do not actually represent the actual adoption behavior (Best & Mayerl, 2013; Park & Ha, 2014).

As a final point, there are several new findings of 3Rs adoption that contributes to theories. Firstly, the positive relationship between altruistic value and biospheric value suggests a positive belief towards new ecological paradigm which positively affects adoption. This finding deserves attention for the development of pro-environmental values and beliefs to increase the adoption of 3Rs. Secondly, lower egoistic value will increase the new ecological paradigm and influences positive behavior, indicating that marketing campaigns should increase the perceived benefits of adopting 3Rs so that this can encourage more involvement for consumers with high egoistic value. As recommended for further research by De Groot and Steg (2007), the three value orientations in this study were able to significantly provide a distinct basis for explaining pro-environmental beliefs and behavior. Thirdly, the positive relationship of perceived behavioral control has directly affected the actual behavior of consumers towards 3Rs adoption. This relationship suggests that behavior depends on the individuals' control towards taking pro-environmental action. Lastly, new ecological paradigm acts as an indirect antecedent to adoption through altruistic value, biospheric value and egoistic value. This finding points out the significant role of new ecological paradigm in 3Rs adoption decisions.

7.2. Managerial Contributions

Firstly, the adoption findings contribute and extends the understanding of 3Rs behavior by investigating and examining the diverse type of waste materials that can consumers can reduce, reuse and recycle, which was recommended by Largo-Wight, Hui and Lange (2012) and Park and Ha (2014). Generally,

the findings in this study showed that most of the Malaysians have the greatest 3Rs behavior of turning off the lights to reduce energy wastage, and reusing and recycling papers instead of throwing them away. Therefore, marketing campaigns can be tailored specifically on increasing varied 3Rs behaviors individually.

Secondly, this contribution is related to the overall consumer behavior. This study confirmed that all the constructs were found to have significant impact on the adoption of 3Rs. One of the prominent reasons that caused individuals to adopt 3Rs is due to the belief that these pro-environmental behaviors can help to reduce pollution and protects the overall environment. This study also validates that marketers and policymakers are beginning to engage into pro-environmental consumption among consumers that goes beyond "green" or "ethical" language, and towards "sustainable" as this incorporates activities or actions that do not necessarily have green or ethical credentials, but they do leave behind long term benefit towards sustaining the biosphere and nature (Gilg, Barr & Ford, 2005).

Further, this study also contributes by providing recommendations that are readily to be applied by institutions that are seeking to encourage greater levels of 3Rs adoption to focus their attention on influencing consumers on psychological issues, such as promoting altruistic and biospheric motivations, and trying to increase perceived behavioral control through continuous education and knowledge. This contribution is vital as it relates directly to 3Rs behavior and adoption decisions.

8. Limitations and Future Research

There are several shortcomings or limitations in this study that are necessary to be highlighted and reflected here. Nevertheless, possible remedial actions have been taken to minimize or reduce the limitation effect on the results.

8.1 Generalization of Research Data Set

First, as there are always the issues relating to the generalizability in consumer behavior studies, the present study is no exception as well. As this study was conducted on Malaysians whose pro-environmental behavior and experience might be influenced by their family culture, lifestyle, education and socio-economic status, the generalizability of the research findings to other countries may have some restrictions. Perhaps if the study had been conducted in developed or less developed countries, the adoption behavior and acceptance of 3Rs findings may differ from this study. Thus, future research should address these generalizability issues by using different samples and conducting cross-cultural studies on 3Rs adoption.

8.2. Lack of Sample Representation

Second, due to the sampling technique employed, which was snowball technique, the respondent profile shows that majority of the participants are Chinese (46.4%). Compared to the overall population in Malaysia, the Malay and Indian population was under represented in the sample. Although all three major ethnic group (Malay, Chinese and Indian) are noted as "Malaysians", their culture, background and social class might differ from one another with regards to 3Rs adoption. Besides, this study did not take into account of the geographic locations of the respondents as different states might have different policies towards reducing, reusing and recycling waste materials.

The study also concentrated on a single country population. Additionally, the sample in this study tended to have a higher level of education. This calls for future research to include equal participants from all three races with mixed backgrounds and from various locations in order to examine a holistic data that can represent Malaysians. It is also vital to validate the study for Malaysians with a lower educational level and less affluent population. Future studies should try to include more countries as this would allow for cross-cultural comparison of 3Rs adoption.

8.3. Utilizing only Quantitative Data Collection Method

Third, in this research, only quantitative data collection method was carried out which caused some lacking in the richness and in-depth exploration that could be gathered from mixed-mode data comprising of quantitative and qualitative. Consequently, the findings and conclusions were only made based on quantitative data. In contrast, previous studies conducted on 3Rs adoption (e.g. Hopper & Nielsen, 1991; Derksen & Gartrell, 1993) that employed both quantitative and qualitative analysis were able to report additional in-depth insights and new explorations towards the drivers of 3Rs adoption, acceptance and behavior. Therefore, qualitative analysis, such as interviews, focus groups and experimental studies are strongly proposed for future research.

8.4. Limited Constructs Considered

Fourth, since only a limited number of constructs were included in the model, it may have caused the study to suffer from a narrow focus and slightly under-represented as compared to other studies. Other constructs (e.g. motivations, degree of willingness, moral obligations, environmental knowledge, perceived consumer effectiveness, situational characteristics, education and gender) which are unrelated to psychological factors (values and beliefs) have been left out of this study. However, past studies have claimed that universalism values are more strongly related to social and environmental behaviors and provides the best social-psychological account of environmentalism support (Stern et al., 1999; Aoyagi-Usui, Vinken & Kuribayashi, 2003; De Groot & Steg, 2007; Aguilar-Luzón et al., 2012; Izagirre-Olaizola, Fernández-Sainz & Vicente-Molina, 2015). Nevertheless, future studies should adopt a more inductive approach by including new factors that could emerge from other theories and examine their effects. A more comprehensive model could be developed from the extended VBN model used in this research. Additionally, the role of ascription of responsibility, awareness of consequences and personal norm, which are factors of VBN was explored in this study. Future studies should include an in-depth investigation into how these factors works in union with this model.

8.5. Cross-Sectional Restrictions

Due to the cross-sectional research design used, hence it does not allow for a continuous measure of 3Rs behavior to be obtained. Therefore, future research, using a longitudinal approach, may be able to assess and trace the model in association with 3Rs behavior to complement the findings of this study. Although conducting a longitudinal research design may result in higher cost and more time consuming, nonetheless it could provide stronger causality results and enhance the understanding of sustainable consumption process. Therefore, it is suggested that future research should adopt the longitudinal research design.

8.6. Emotional Dimension of the Theories

Finally, the research also lacked the adoption measurement of emotional dimension to the TRA, TPB and VBN theories. Since the measurement of ‘behavior’ or ‘adoption’ construct are related to feelings or emotions, it would be potentially worthwhile for future research to extend the current findings by including the emotional elements in the study.

9. Conclusion

The results of this study highlighted that the VBN and TPB model can serve as a fundamental conceptual model to predict 3Rs adoption among Malaysians. Despite several past research have adopted both theories to study on the antecedents of 3Rs adoption, however, this research integrated the key constructs from both theories to explain the actual behavior of consumers towards adopting 3Rs. Moreover, the research model is one of the first studies to incorporate TPB construct of perceived behavioral control with VBN model. Apart from that, the study has also built on current knowledge about consumers’ adoption patterns, behavior and experience, which provides a more comprehensive and holistic understanding of 3Rs adoption.

The research model also helped to explain the values and beliefs factors that determine and drive the pro-environmental behavior. In addition, this study suggests that various related constructs may be integrated into one research model, so that the understanding and prediction of 3Rs adoption is far more comprehensively grounded rather than by using only one theory. Furthermore, the individual components of reduce, reuse and recycle which has been outlined in this present study can also greatly assist marketers, institutions, policymakers and public sectors to tailor effective strategies and promotions towards increasing 3Rs adoption. To conclude, the research model presented in this study provides an integrated foundation based on existing research and demonstrates a holistic view of waste reduction, reusing waste material and recycling behavior. It also acts as an integral groundwork for future systematic research in the area of sustainable consumption and pro-environmental behavior.

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