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RESPONSIBLE CONSUMPTION BEHAVIOUR: A FRAMEWORK FOR THE ACQUISITION, USE & DISPOSAL OF COMPUTERS

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Abstract

Green IT has been identified as a contributing factor in maintaining a green environment. However, past studies have focused mainly on Green IT practised by IT vendors or organizations rather than by individual consumers. Malaysia is a developing nation with high computer penetration. Almost every citizen is owns several computers, from desktops, tablet PCs, laptops, notebooks to smartphones. This contributes to unsustainable computer production, consumption, and disposal patterns. Greenhouse gas (GHG) emission resulting from computer life cycles can be reduced if individuals acquire, use, and dispose computers in a responsible manner. Hence, this study investigates the antecedents of individuals' responsible consumption behaviour. A research framework was developed through integrating several theories, i.e. Theory of Planned Behaviour, Value-Belief-Norm, and Theory of Interpersonal Behaviour. This study contributes to existing knowledge in the fields of information systems, consumer research, and sustainability, through the development of a theoretical framework that identifies the key factors that influence responsible consumption behaviour. The findings will enable policy makers to design programmes that could influence behavioural change and stimulate responsible consumption behavior, in order to prevent further degradation of the natural environment.

Keywords: sustainability, responsible consumption, computers, green acquisition, green use, green disposal, behaviour, theory of planned behaviour, value norm beliefs.

1 INTRODUCTION

Global warming stems from the growing accumulation of greenhouse gases (GHG), which contribute to multiple threatening environmental problems such as the depletion of the ozone layer, acid rain, drought, and floods(IPCC, 2007; Mida, 2009). Human activity is said to be the main source of accelerating carbon dioxide (CO2) emission. The Climate Group's findings show that computers emit 35 million tonnes of CO_2 (The Economist, 2009). According to Murugesan (2008), computers are responsible for increased CO_2 emissions, direct or indirectly, over their lifespan, i.e. from the time of production to usage and disposal. Research indicates that in the manufacturing of a desktop computer, which requires around 1.4kg of electronics, 410kg CO_{2eq} will be emitted (i.e. approximately 293kgCO_{2eq}/kg electronic) (Andrae & Andersen, 2010). Using a desktop computer will generate about a ton of CO_2 per year and will increase the total electrical energy consumption of servers, computers, monitors, data communications equipment and cooling systems for data centers. Additionally, disposing of obsolete computers in landfills after 2 to 3 years of usage will result in the pollution of the earth and in the contamination of water sources (Murugesan, 2008).

Statistics in 2011 showed that Malaysian private households, to access the internet, own different devices - comprising 77% desktop computer, 79% notebook/laptop/netbook, 77% internet-capable mobile phone and 18% tablet computer (E-market, 2012). The high rates of computer ownership and their usage, along with their frequent replacements (Murugesan, 2008), are driving manufacturers to cater to seemingly unlimited demand in a marketplace with scarce resources, thus contributing to higher CO_2 emissions. Green IT has been identified as a vital factor contributing towards the preservation of a green environment. According to Murugesan (2008), green IT refers to "the study and practice of designing, manufacturing, using and disposing of computers, servers, and associated subsystems - such as monitors, printers, storage devices, and networking and communications systems - with minimal or no impact on the environment".

The goals of green IT can be achieved if concerned individuals were to practise green acquisition, use, and disposal of computers. Hickman (2011) reported, "Consumers who practised green acquisition purchased computers based on Electronic Product Environmental Assessment Tools (EPEAT) in 2009 helped to prevent the disposal of 72,000 metric tons of hazardous waste and saved over 10 billion kWh of electricity, which is enough to power 900,000 homes in the U.S. for a year". Additionally, individuals who practised green usage, such as turning off computers not in use for 40 hours per week, saved up to 561.6 kilowatt-hours of electricity. More importantly, consumers who practise green disposal via reusing, refurbishing, and recycling, will help reduce electronic wastes, which contain toxic materials like lead, chromium, and mercury, all of which pose grave threats to the environment.

The amount of wastes generated by unsustainable over-consumption that leads to poor environmental quality reflects the irresponsible consumption practices of Malaysians. This is supported by Norazlina's (n.d) findings which reveal that Malaysia is experiencing an uptrend in e-waste disposal. The amount of e-waste was 52,718.20 metric tonnes in 2007, 102,808.50 metric tonnes in 2008, and 134,035.70 metric tonnes in 2009. Tan and Lau (2009) observed that the level of responsible consumption behaviour among young Malaysian consumers is mediocre. Malaysians can help the environment if responsible consumption behaviour is promoted and practised. This study aims to (1) examine the extent of responsible consumption level in Malaysia, (2) develop parsimonious models to investigate determinants of responsible consumption of computers among Malaysians, and (3) provide better insights to researchers, academics, government and non-governmental organizations and policy-makers in Malaysia, who could then tailor appropriate policies to promote responsible consumption behaviour.

2 PREVIOUS STUDIES

Research on responsible consumption behaviour has been heightened due to increased degradation of the environment, as evidenced by the unsustainable consumption and production pace over the past

three decades (Fraj & Martinez, 2002). A few gaps in literature were identified. First, prior research mainly investigated factors influencing responsible consumption behaviour either at pre-purchase (e.g. Ali et al., 2011; Chan, 1999; Chan, 2001; Kim, 2011) or at the end-of-life phase of a product (e.g. Alwitt & Berger, 1993; Ebreo et al., 1999; Granzin & Olsen, 1991; McCarty & Shrum, 1994). There had been less focus placed on the impact of individual usage on the environment (Feldman, 1971; Follows & Jobber, 2000; Kotler, 1972). Second, most of the studies conducted were related to the consumption of green products such as detergents, home appliances, or recycled products, rather than computers. Additionally, none of the studies concentrated on Green IT. "The first phase of literature on green IT focused on energy efficiency, in which IT vendors optimized the usage of data centers to reduce electricity consumption"(Kurp, 2008), and the second phase concentrated on the disposal of waste computing resources (e.g. obsolete monitors, mouse pads and batteries). None of the studies formulated an empirical research model to investigate the antecedents of responsible consumption behaviour of individuals with regards to green acquisition, green use, and green disposal of computers in Malaysia, where Green IT adoption is still in its infancy (Makuhari, 2009). To fill these gaps in the literature, this study attempts to develop a research framework through integrating the Theory of Planned Behaviour with the Value-Belief-Norm model, together with elements of habits from the Theory of Interpersonal Behaviour, to investigate responsible consumption practised by Malaysian consumers. The justification for the chosen models, together with additional variable habits, will be discussed in the following section.

3 THEORETICAL FRAMEWORK

3.1 Theory of Planned Behaviour (TPB)

The TPB served as base model in predicting and investigating wide pro-environmental behaviour - from recycling (Davies et al., 2002; Taylor & Todd, 1995;), travel mode choice, energy consumption, water conservation, food choice, to ethical investment (Stern, 2000; Staats, 2003). It comprises three independent variables, namely, attitude toward behaviours, subjective norms, and perceived behavioural control. It is an extension of the Theory of Reasoned Action (TRA) (Fishbein, 1967; Fishbein & Ajzen, 1975) that addresses criticisms of TRA, which assumed that individuals have all the conditions (full volitional) such as skills, ability, and resources to perform the task (Ajzen, 1991; Taylor & Todd, 1995; Valle, et al., 2005). It is noted that the predictive power (R^2) of TPB increased by 8% with the inclusion of perceived behavioral control into the TRA model (Venkatesh et al., 2003).

Conner and Armitage (1998), Egmond et al. (2007), Tonglet et al. (2003), and Valle et al. (2005) argued that the TPB has shortcomings in predicting human behaviour, thus suggesting that additional variables should be included within the model. For instance, Ajzen and Madden (1986) expanded the TPB to include personal norms in investigating moral behavior. The findings of Harland et al. (1999) revealed that the explained variance of intention to commit driving violation has increased by 10% to 15% after personal norms entered into the regression analysis (Harland et al., 1999). Manstead (2000) pointed out that the inclusion of personal norms increased the predictive power of the model for various behaviours with relevant pro-social dimensions.

3.2 Value Belief Norms (VBN)

Stern et al. (1993) developed VBN by linking value theory with Norm Activation Theory (NAT). Stern et al. (1993) highlighted that Schwatz's NAT neglected several value orientations deemed important in prior studies. They argued that NAT implicitly assumes that people are altruistic i.e. "people have a general value orientation toward the welfare of others, that is they value outcome that benefits others and can be motivated to act to prevent harm to others" (p.324). However, many scholars (e.g. De Grout & Stag; 2007; Karp, 1996; McCarty & Shrum, 1994; Schwartz, 1994; Stern et al, 1993; Stern et al., 1999) have noted that other than altruism, egoistic and biospheric value orientations are also relevant in understanding environmental attitudes and behaviour. As such, Stern et al. (1993) extended NAT by incorporating THREE value orientations, namely egoistic, biospheric,

and altruistic, as factors in predicting the awareness of consequences, not only in regard to other persons, but also to non-human species and the self.

Later, Stern et al. (1995) proposed a comprehensive social-psychological model of environmental concern with the inclusion of the new ecological paradigm (NEP), defined as "a measurement of broad belief about the environment", into their previous VBN model. The theory shows a causal chain of five variables: values, NEP, awareness of consequences belief, ascription of responsibility belief and personal norms for pro-environmental action. Stern et al. (1995) proposed to link the norm activation theory with NEP because they identified that specific belief about adverse consequences can be deduced from general belief i.e. environmental concern. Similarly, Dietz and Stern's (1995) findings also showed that "people use cognitive processes that ignore details and problem-specific information. Instead, they classify a topic and make reference to general attitudes and values in responding and filtering information". Furthermore, the rationale and empirical support for this causal ordering are supported by previous works (Black et al., 1985; Stern and Oskamp 1987). Additionally, NEP accounted for 45.6% of variances in awareness of consequences (Stern, 1999).

3.3 Theory of Interpersonal Behaviour

Triandis' Theory of Interpersonal Behaviour (TIB) is a more comprehensive model as it includes all aspects of TRA and TPB and has additional components, namely, habits, facilitating conditions, and affects that add to its predictive power (Limayem et al., 2004; Woon & Pee, 2004). Bamberg and Schmidt's (2003) study compared the explanatory power between TPB and TIB models and revealed that the R square of actual car use in TPB was 45% while TIB was 51%. They found that the predictive power of TIB was higher by 6% due to the the additional components. Nevertheless, TIB is not widely used by researchers, compared to TPB and TRA, due to the following reasons:

> (1) The complexity of TIB contains more variables and constructs to account for more variances of behaviour than TPB and TRA, which then account for the most variance with the fewest variables (Godin, 2008; Robinson, 2010);

> (2) The operational definitions of the variables within the TIB are vague, as Triandis did not specify the items that measure each construct in reference to a particular behaviour (Godin, 2008; Robinson, 2010). For example, Triandis combines norms, roles, and self concepts under social factors, but many researchers (e.g. Ahn, Koo &Chang, 2012; Harland et al., 1999; Stern, 1993) found that personal norms (self-concept) and social norms (norms and roles) are distinct. They asserted that personal norms are free from social expectations; instead, they arise from an individual's self-expectation, whether he or she should perform a particular act.

Due to these limitations of TIB, many researchers choose to employ TPB or other models in predicting specific behaviours (Godin, 2008; Robinson, 2010). Some researchers primarily added important constructs, i.e. habits (from TIB model), into the respective models, like Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2012), and TPB. For instance, Bamberg and Schmidt (2003) discovered that the predictive power of TPB increased by adding habits into the model in order to predict choices of travel mode.

As a result, this study merges two attitude-behavior theories –TPB (Azjen, 1991) and VBN (Stern et al., 1995), along with habit elements from TIB, to develop an integrated model that explains responsible consumption with regards to purchase, use and disposal of computers (see Figure 1). This integrated model aims to achieve the following research objectives: (1) to investigate the factors influencing an individual's responsible consumption patterns with regards to the purchase, use, and disposal of computers, (2) to investigate the relationship between TPB, VBN and TIB factors, and (3) to address criticisms of Rational Choice Theory (RCT). The operationalised definitions and relationships of each construct will be discussed in the following section.
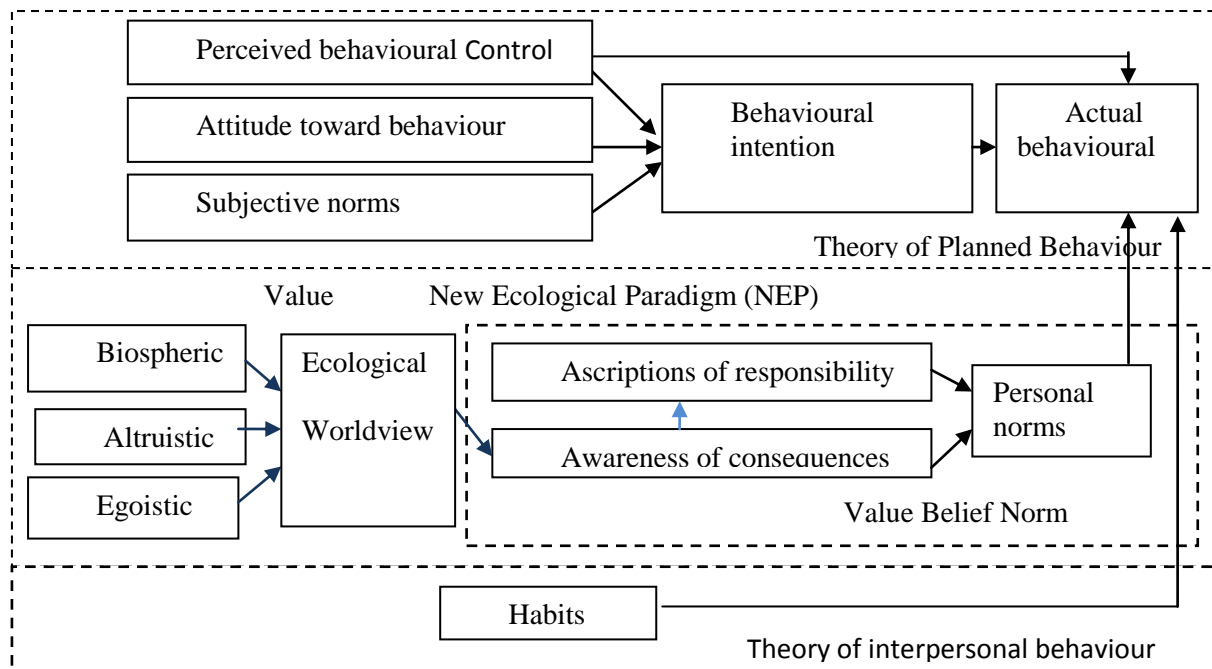
3.4 Research Framework

Figure 1: Factors influencing green acquisition, use and disposal of computers

3.5 Dependent Variables

3.5.1 Responsible Consumption Behaviour

This study classified responsible consumption behaviour of computers into three different types of behaviour: acquiring, using, and disposing of computers. Stern (2000) stated that each different kind of environmental behaviour should be theorized separately as different determinants, as causal factors may vary greatly across behaviours. The computers in this study include laptops, desktops, hand-held Personal Digital Assistants (PDAs), tablet personal computers (PC), and smartphones, as these items are accessible throughout the population.

Green acquisition refers to the responsible purchase of green computers or appropriate computers based on their environmental attributes, via Electronic Product Environmental Assessment Tools (EPEAT) or computers from manufacturers who offer a take-back option. Green computers mean computers that are produced with less or non-toxic materials, have recycled contents, are energy-efficient, and can be easily reassembled or upgraded to expand their lifespan. Green use is defined as the responsible use of computers, from turning off computers when they are not in use, to using blank screensavers, or putting computers in hibernation or sleep mode. Green disposal is described as the responsible disposal of computers through reusing, refurbishing, and recycling. Reusing includes donating, giving away or selling computers to other people or second-hand shops to extend the lifespan of the computers. Refurbishing refers to the upgrading of obsolete computers. Recycling refers to segregating, selling, or giving away of used computers to collectors, in order to ensure that they will reach the right destination for recycling (Theng, 2008).

3.5.2 Responsible Consumption Behavioural Intention

"Behavioural" is defined as "the likelihood of an individual performing the behaviour in the future" (Ajzen & Fishbein, 1980). The present study operationalises responsible consumption intention as a consumer's plan to acquire, use, and dispose of computers responsibly in the future.

TRA posited that intention is situated between antecedent variables and actual behaviour. This is strengthened by prior findings which showed that "environmental voting behaviour" (Gill et al., 1986)

and "tin recycling behaviour" (Kok & Siero, 1985) are predicted by intention. Consequently, a scale measuring intentions of acquiring, using, and disposing of computers responsibly, is included for the purpose of predicting the consumption behaviours.

3.6 Independent Variables

3.6.1 Attitude toward behaviour

Attitude toward behaviour can be described as "the enduring positive and negative feeling about performing some targeted behaviour". Attitudes are formed by cognitive components (evaluating outcomes) and emotional components (likes and dislikes) (Chen & Chai, 2010). The present study operationalizes attitude towards behaviour as the consumer's positive and negative feelings while performing green acquisition, use, and disposal of computers.

Attitude towards behaviour is "the most consistent explanatory factor in predicting the behavioural intention to perform particular behaviours" (Ajzen & Fishbein 1980; Balderjahn, 1988; Chyong et al., 2006). Attitude is found to be strongly correlated to behaviour, when attitudinal and behavioural measures correspond in specificity (Gill et al., 1986, Olsen, 1981). This is supported by Follows and Jobber's (2000) findings that "attitude towards the environmental consequences of the purchase of diapers" is positively related to "environmentally responsible purchase intentions". Therefore, this study postulates that attitude towards behaviour positively influences the behavioural intentions of acquiring, using, and disposing of computers responsibly.

3.6.2 Subjective Norm

Subjective norm refers to "the individual's perception of social pressure to perform the particular behaviour" (Fishbein & Ajzen, 1975). Subjective norm is influenced by "normative belief" and "motivation to comply". "Normative belief" refers to whether others think the individual should or should not perform the target behavior, whereas "motivation to comply" is the individual's motivation to comply with social pressure (Fishbein & Ajzen, 1975). The present study operationalises subjective norm as defined by Fishbein and Ajzen (1975).

Subjective norms are found have direct and significant effects on behavioural intentions (Kalafatis et al., 1999; Lee & Green, 1991). Similarly, this study demonstrates that the consumer's referent groups like family members and friends, as well as social status, play an important role in influencing his or her intention to acquire, use, or dispose of computers in a responsible manner.

3.6.3 Perceived Behavioural Control (PBC)

Perceived behavioural control refers to "people's perceptions of the ease or difficulty of performing the behaviour of interest" (Ajzen, 1991; Bandura, 1977; 1982). Specifically, PBC consists of two dimensions: (a) the individuals' external conditions that facilitate their ability to adopt certain behaviours, and (b) the individuals' perception of ability to perform these behaviours. Hence, this study operationalises PBC as the individual's perception of possible obstacles in external conditions and his or her ability to practice green acquisition, use and disposal.

PBC predicts the specific behaviour directly and indirectly through intentions (Valle et al., 2005). Prior studies supported the findings. PBC was found to influence pro-environmental behaviour such as the recycling, green purchasing of household appliances, etc. (Cheung et al., 1999; McCarty & Shrum, 2001). Hence, this study postulates that PBC is positively associated with green acquisition, use, and disposal of computers, either directly or indirectly, via intention.

3.6.4 Values Orientation – Egoism, Altruistic and Biospheric

Values are "unique beliefs that lead to actions and judgments". Values consist of two functions, "conduct guide" and "motivation" (Rokeach, 1973). Stern and colleagues (Stern, 2000; Stern & Dietz, 1994; Stern et al., 1993) proposed that the three different value orientations, namely, egoistic (i.e. value focusing on self-interest), altruistic (i.e. value which concerns the welfare of others), and biospheric value orientation (i.e. value emphasizing the environment and the biosphere), may affect environmental beliefs. Hence, this study operationalises values, i.e. altruistic, biospheric and egoistic, as unique beliefs that transcend specific situations, and guide the selection and evaluation of responsible consumption behaviour (green acquisition, use, and disposal).

Values influence environmental behaviour indirectly via environmental concerns. Each value orientation could produce environmental concerns under different conditions (Stern, 1993). For instance, individuals with biospheric value will be concerned about environmental conditions that threaten the natural environment. Therefore, this study predicts that values influence environmental concern.

3.6.5 New Environmental Paradigm (NEP) - Environmental Concerns

Dunlap and his colleagues define "new ecological paradigm" (NEP) as "a general belief that measure individuals' concerns on the environment" (Dunlap et al., 2000; Dunlap et al., 1978, 1984; Dunlap et al. 1992; Stern et al., 1995). This study operationalises NEP as the environmental concern of individuals.

The NEP is a worldview that describes an individual's specific belief (i.e. awareness of consequences) resulting from general beliefs (i.e. environmental concerns). Similarly, VBN postulates that environmental concerns influence awareness of consequences. Mainieri et al. (1997) argued that consumers with a stronger concern for the environment are more likely to be aware of the environmental conditions that pose threats to self, society, and environment, than consumers who are less concerned (Stern et al., 1995).

3.6.6 Awareness of Consequences (AC)

Stern et al. (1995) extend Schwartz's 1977 model, arguing that AC applies not only to other people but also to "non-human species" and "adverse consequences for the self". Hence, Stern et al. (1995) redefined AC as "people who believe an environmental condition has adverse consequences for other people, other species, or the biosphere." This study adopts the definition by Stern et al. (1995).

Stern et al. (1993) stated that awareness of adverse consequences will lead to an acceptance of responsibility. Individuals with high awareness of consequences are presumed to be more aware of the extensive and specific consequences of possible acts, and to be more likely to adopt the perspective of those affected when weighing decisions (Schwartz, 1968). Hence, this study proposes that the more awareness people have of adverse consequences of not practising green acquisition, use, and disposal, the more likely they are to assume responsibility for environmental problems (ascription of responsibility).

3.6.7 Ascriptions of Responsibility (AR)

Ascriptions of responsibility (AR) refer to an individual's belief that he or she would bear significant responsibility for consequences (Stern et al., 1999; Stern, 2000). This study operationalises ascriptions of responsibility as the individuals' belief that they are responsible for the consequences of not practising green acquisition, use, and disposal of computers.

Stern (2000), and Hopper and Nielsen (1991) found that feelings of responsibility will lead to the development of personal norms. As such, this study predicts that individuals who feel responsible for the consequences (AR) will feel morally obligated to practise green acquisition, use, and disposal.

3.6.8 Personal Norms (PN)

Personal norms are defined as "self-expectations that are based on internalized values i.e. feelings of personal obligation to engage in a certain behavior" (Schwartz, 1977). Valle et al. (2005) further explained that PN reflect "the beliefs held by the individual with regard to how he or she should behave." An individual will experience a strong sense of pride if he or she acts in accordance to these norms. This study conceptualises personal norms as an individual's feeling that practising responsible consumption (green acquisition, use and disposal) is his or her personal obligation.

PN are assumed to be positively related to actual pro-environmental behaviours. Therefore, those who feel morally obligated to practise responsible consumption (green acquisition, use and disposal) will engage in such behaviour.

6.9 Habits

Habits are defined as "an automatic link between a goal and a specific behavior" (Verplanken et al., 1998). Limayem et al. (2007) defined habits as "the extent to which people tend to perform the behaviours automatically", while Kim et al. (2005) equate habit with automaticity. This study conceptualises habits as the extent to which people tend to automatically acquire, use, and dispose of computers responsibly.

Eriksson et al. (2008) and Thogersen and Moller (2008) studies found that habits are conceptually related to green consumer behaviours. Hence,in the present study, it is posited that habits, such as responsible purchase, use, and disposal of computers, are predicted to influence responsible consumption behaviours.

4 Conclusions

This study is the first that investigates factors that affect responsible consumption of computers among private households in the Southeast Asian region, specifically in Malaysia. It examines the applicability of the integrated model, i.e. TPB, VBN, and habits elements from TIB, in predicting responsible consumption behaviour. Successes in green IT are hinged on private households acquiring, using, and disposing of computers in an environmentally friendly manner, so as not to jeopardize the lives of future generations (Tan & Lau, 2009; Yahya & Hashim, 2011).

This study will contribute significantly to literature in Information Systems (IS) and Information Technology (IT) by proposing a new research framework. This new research framework will (1) explain the factors that influence responsible consumption behaviour in Malaysia; and (2) integrate TPB and VBN models together with the habits elements from TIB, in order to increase explanatory power. Additionally, this study provides insights not only for the Malaysian government and policy-makers, but also for governments of other countries, with the objective of promoting responsible consumption practices, which will help to mitigate environmental issues prevalent worldwide.

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