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Factors Influencing Consumers' Intention to Return the End of Life Electronic Products through Reverse Supply Chain Management for Reuse, Repair and Recycling

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Abstract: Resource depletion, population growth and environmental problems force companies to collect their end of life (EOL) products for reuse, recycle and refurbishment through reverse supply chain management (RSCM). Success in collecting the EOL products through RSCM depends on the customers' participation intention. The objectives of this study are: (1) To examine the important factors influencing customers' attitude to participate in RSCM; (2) To examine the important factors influencing customers' subjective norm to participate in RSCM; (3) To examine the main factors influencing customers' perceived behavioral control to participate in RSCM; (4) To examine the influence of attitude, subjective norms and perceived behavioral control on customers' participation intention in RSCM. The Decomposed Theory of Planned Behaviour (DTPB) has been chosen as the underpinning theory for this research. The research conducted employed the quantitative approach. Non-probability (convenience sampling) method was used to determine the sample and data was collected using questionnaires. Partial Least Squares-Structural Equation Modeling (PLS-SEM) technique was employed. A total of 800 questionnaires were distributed among customers of electronic products in Malaysia. Finally, the questionnaire was distributed among the customers in electronic retailer companies based on convenience sampling method. The empirical results confirm that consumers perception about the risk associated with EOL electronic products, consumers' ecological knowledge and relative advantages associated with reuse, repair and recycling can influence the attitude of consumers to return the EOL products for reuse, repair and recycling to producer.

Keywords: sustainable waste management; decomposed theory of planned behavior; theory of planned behavior; reverse supply chain management; reuse; repair; recycle

1. Introduction

Over the past century, the global population and the economic productions increased tremendously. As a result, demands for natural resources have risen greatly [1,2]. Human population growth is linked to increased use of energy resources, land for growing food and for living, and waste by-products. These waste by products can be wasted, disposed of, decomposed or be recycled [3]. Global economic development and high levels of industrialization are greatly endangering the natural environment [4]. Sustainable waste management is a key issue of implementing sustainable development principles. Besides, the electrical and electronic equipment (EEE) industry has increased its mass production; however, the EEE life span has similarly diminished. Owing to the rapid expansion of manufacturing, innovation and consumer demand, there has been a vast improvement in various electronic equipment, so the amount of waste electrical and electronic equipment (WEEE, or e-waste) generated has also increased proportionally to production [5]. Therefore, environmental management has become a topic of mutual concern of businesses, government and consumers [6].

Due to environmental problems, resource depletion and health and safety issues raised upon mass production and consumption of products new environmental standards and policies are established, besides booming new environmental paradigm among consumers and people. The environmental standards pursue the companies to move toward green production, while green supply chain management system (GSCM) reduces the environmental side effects associated with supply of material and products. However, according to extended producer responsibility, the responsibility of producers is not finished yet, and it is extended to the post consumption stage where they should be responsible about reuse, recycle and salvage of their EOL products so many companies established a reverse supply chain management for collection of EOL products [7]. As the producers have become responsible for collecting their EOL and used products, some researchers studied the process and application of reverse supply chain related to disposal and renewal of post consumption products [8] besides the post-purchase behaviors regarding disposing, and participation in recycling [9]. Up to now there is no study that examines the customers' behavior and intention to collaborate with producer for reuse, repair and recycling the EOL electronic products. All previous studies have focused on waste separation and/or consumers' recycling intention in the context of waste management by using the theory of planned behavior [10–13]. Taylor and Todd [14] firstly applied the TPB for understanding the factors influence the recycling and composting behavior. The past articles study the factors influence reuse and recycling behavior mostly in the context of waste management where the municipality is responsible for collection of all types of waste [14].

Scientists offer different explanations of reverse supply chain managements' scope. Hervani et al. [15] defines the reverse supply chain management as a part of green supply chain management. A more comprehensive and up-date definition of reverse supply chain is given by [16] who used reverse supply chain in the context of e-waste. He mentioned that one way of minimizing the environmental impact of e-waste is to use reverse supply chains to increase the amount of products and materials recovered from the continuous waste stream. They defined that "Reverse supply chain is a process by which a manufacturer systematically accepts previously shipped products or parts from the point of consumption for possible reuse, remanufacturing, recycling, or disposal".

In contradiction with previous studies which mainly map and estimate the flows of electrical and electronic equipment (EEE) and the corresponding waste (WEEE), Parajuly et al. [17] in their paper provided first time aimed to investigate factors influencing customers' intention to return EOL electronic products to producers through reverse supply chain management as a channel for reuse, repair and recycling of EOL products.

Since the behavior of customers is an important factor to participate in reuse, repair and recycling, DTPB is an appropriate underpinning theory which is used in the context of this study. The main objectives of this study are: (1) To examine the important factors influencing customers' attitude to participate in RSCM; (2) To examine the important factors influencing customers' subjective norm to participate in RSCM; (3) To examine the main factors influencing customers' perceived behavioral

control to participate in RSCM; (4) To examine the influence of attitude, subjective norms and perceived behavioral control on customers' participation intention in RSCM. The paper starts from literature review and provides the background for selection of hypothesis; further the conceptual model and applied methodology were presented; following discussion of results and conclusions.

2. Literature Review

This study uses the DTPB to model important factors those may influence the customers' intention to return EOL and e-waste products through RSCM channel for reuse, recycling and repair to the producers. Since the theory of planned behavior (TPB) and decomposed theory of planned behavior (DTPB) are the most appropriate theories for explaining the intention as a precursor of behavior hence these theories are selected for study the factors influencing the reuse, repair and recycling intention. The literature review will focus on the underpinning theories (TPB, DTPB) and will discuss the proposed hypothesis of this study.

2.1. Post Consumption Behavior and Recycling

Not just producers, but also the consumers are a key player in any environmental, social and economic activity hence increasing the understanding of green consumer behavior is important for environmental and business reasons [18]. Kuester and Sabine [19] defined that, "consumer behavior is the study of individuals, groups, or organizations and the processes they use to select, secure, use, and dispose of products, services, experiences, or ideas to satisfy needs and the impacts that these processes have on the consumer and society". "Green consumers' demonstrate an interest in such product's characteristics as chemical content and recyclability and, favorably discriminating consumption towards bioorganic, energy efficient or biodegradable packaging products [20]". In the same approach other researchers mostly agreed that consumption behavior, typically, focuses on post-purchase behaviors, namely, recycling and waste separation [21–23]. Luchs and Swan [24] defined that product's designers need to understand the consumer's purchase-use-disposal cycle of products. On the one hand most of the studies emphasizes on the recycling behavior in the context of waste management system implemented by municipalities. For instance, [12] tried to find that, which factors appear to be significant predictors of recycling participation. They found: "personal recycling attitudes, norms and skills", "satisfaction with service provided", "inconveniences", "awareness of consequences", "knowledge of issues", "social recycling attitudes and norms", "motivating factors", "intentions to act" and "scheme preference"—are important predictors of recycling behavior in Maltese residents. In a similar study Wan et al. [11] investigated the recycling attitudes and behavior of university students and staff members, they found that attitude, subjective norms, perceived behavioral control, awareness of consequences, the moral norms, and convenience influence the behavioral intention with regard to recycling. In construction management, [25] used Bayesian Network analysis to define causal behavioral determinants towards improving practices in construction waste management (CWM). They found that behavior is highly influenced by attitude, past experience, and social pressure.

For the first time, Taylor and Todd [26] decomposed the factors influence household recycling and composting behavior. They found in composting behavior: attitude positively influenced by relative advantages and negatively by complexity. Efficacy and facility condition and resource positively influenced perceived behavioral control and compatibility was negatively related. Internal and external normative influences positively influenced subjective norm. Intention influenced by attitude, subjective norm and perceived behavioral control. They findings about recycling behavior indicated that: Attitude toward recycling was influenced by relative advantages but not complexity. Internal and external normative influences positively influenced subjective norm. Perceived behavioral controlled was influenced by efficacy and resource facilitating condition but not with compatibility. Intention influenced by attitude and perceived behavioral control but not with subjective norm.

Ramayah et al. [27] assessed the recycling behavior of university students. The results provided that the s towards recycling are influenced by awareness, perceived value and real gains perceived

by the consumers. This study mainly investigates what will influence customers' intention if they are asked to return their EOL or e-waste producers for reuse and recycling and repair through a RSCM channel. As this study investigate the post-consumption behavior regarding, reuse, repair and recycling of EOL products through RSCM channel so the TPB [28] and DTPB [14,26] are good theories that can predict the behavior and are used as underpinning theories. For understanding the reuse and recycling behavior in the context of this study, several variables are added to the context of the DTPB to investigate their influence on customers' post-consumer behavior regarding reuse, repair and recycling.

2.2. Linkage between Complexity and Attitude

Complexity appears to be an important factor in decision to adopt technology [26]. There are several studies investigating the impact of complexity on attitude in different contexts. In the context of waste management, Taylor and Todd, [26] also declared that, complexity is not influencing the household attitude toward waste recycling intention while it is influencing the household attitude towards their waste composting intention. Shih et al. [29] found that complexity has a negative impact on attitude for using internet banking. Complexity in this study is defined as the degree that consumers think that returning the EOL products for reuse, recycling and repair is hard issue for them. Therefore, the following hypothesis is proposed:

Hypothesis 1. *Complexity negatively influences the attitude of consumer to return the EOL electronic products for reuse, recycle and repair through RSCM.*

2.3. Linkage between Knowledge (Eco-Literacy) and Attitude

Eco-literacy is defined as the ability of understanding the natural systems that make life on earth possible. The term was described by American educator, Orr in 1992 and physicist Capra in 1990s—thereby a new value entered to education: “well-being of the earth”. Studies of prior scholars have illustrated that the environment quality depends essentially on the level of peoples' knowledge, attitude, values and their practices. For example, in some empirical studies [16,28] confirmed that the eco-literacy have strong correlations with attitudes towards purchasing the environmentally friendly products. Numerous studies have attempted to explain the relationship between eco-literacy and environmental friendly behavior. Babaei et al. [30] conducted a survey among the Abadan residents seeking to evaluate their knowledge linked to solid waste (SW) reduction, source separation and recycling of SW. The findings of study [30] confirmed that awareness is an important factor driving households intention on waste separation and recycling. In a study linked to consumer recycling behavior [27], it was found that the attitude towards recycling is significantly influenced by perceived value, awareness and actual gains perceived by the consumers. Hence, the following hypothesis will measure the relationship between eco-literacy and attitude and behavior for people participation in GRSC:

Hypothesis 2. *Ecological knowledge (eco-literacy) positively influences the attitude of consumer to return the EOL electronic products for reuse recycle and repair through RSCM.*

2.4. Linkage between Financial Incentive and Attitude

Rationally, various incentives can impact customers' attitude for motivating them to participate in an activity. By the definition of Armstrong [31], an incentive is something that motivates a person to perform a certain action. Incentives aim to provide value for money. Scholars [31] examined the effect of various types of incentives on employees' attitudes towards work. They found that there is strong relationship between incentives and employees' attitudes towards work [31]. Owusu et al. [32] tried to understand: “do economic incentives affect attitudes to solid waste source separation?” The decisions by the households to accept cash and non-cash incentives to participate were jointly

estimated. The results showed that the households are willing to accept a mean cash incentive of about 1.198 USD per month to participate in solid waste separation activities. The study of behavior of residents linked to electrical and electronic waste (e-waste) recycling, found that economic benefits are one of four determinants of Beijing residents' behavior in e-waste recycling [33]. The above studies investigated the impact of incentives on attitude or behavior. In study by Bergeron and Francis [34] the recycling and sorting practices of household waste in Geneva were assessed. The study showed the effectiveness of incentive instruments (e.g., incineration tax) in encouraging the Geneva municipalities to implement sorting infrastructures and services [34]. The operational definition of incentives in this study is any rewards given by companies in exchange of returning their EOL products by their customers. It is assumed that the incentives can influence the intention of customers through attitude for returning the EOL products to their producers or companies [35]. Hence, the following hypothesis has been developed:

Hypothesis 3. *Financial incentives positively influence the attitude of consumer to return the EOL electronic products for reuse recycle and repair through RSCM.*

2.5. Linkage between Perceived (EOL) Product Risk and Attitude

In this study, customer intention to recycle the EOL products through returning the EOL products to producers might be influenced by safety, health and environment risks associated with EOL electronic products. The study [36] revealed that perceived risks have negative effect on consumer attitude toward street food, and perceived benefits positively affected attitude towards street food. Therefore risk perception has negative effect on behavioral intention. In another study, [37] authors showed that three perceived benefits (price benefit, convenience benefit, and recreational benefit) and three major factors that together represent trust of the initiator (perceived reputation, structural assurance, and website trustworthiness). Therefore according [37], the perceived benefits and trust of the initiator have positive impact on customer behavior. Hence the following hypothesis is developed:

Hypothesis 4. *Perceived EOL product risks positively influence the attitude of consumer to return the EOL electronic products for reuse, recycle and repair through RSCM.*

2.6. Linkage between Relative Advantage and Attitude and Participation Intention in RSCM

According to [28], the relative advantage is the degree to which an innovation provides benefits, which supersede those of its precursor. Relative advantage may incorporate factors such as economic benefits, satisfaction, image enhancement and convenience. Relative advantage should be positively related to attitude. The relative advantage is similar to the attitudinal beliefs addressed in the theory of reasoned action [38] and theory of planned behavior [39] linked to the advantages and disadvantages associated with specific behavior performing. There are also empirical studies supporting this relationship. Taylor and Todd [14] found that relative advantage has a positive influence on both attitude and perceived behavioral control. Yi et al. [40] concluded that prior studies provided evidence that relative advantage is one of the most important factors in predicting users' intentions to use technology. The study by Lee [36] confirmed that usefulness (Relative advantage), has significant effect on customers' attitude about their intention of using internet banking. Taylor and Todd [26] found that relative advantage has positive influence on both composting and recycling behavior. In this study, operational definition of relative advantage refers to advantages associated with returning the EOL electronic products through reverse supply chain management for reuse, repair and recycling. So according to what has been discussed about relative advantages the following hypothesis is proposed:

Hypothesis 5a and 5b. *Relative advantage positively influences the attitude and perceived behavioral control of consumer to return the EOL electronic products for reuse, recycle and repair through RSCM.*

2.7. Linkage between Compatibility and Attitude and Perceived Behavioral Control

According to [28], the compatibility is the degree to which the innovation is linked with the potential adopter's previous experiences, current needs and existing values. It is usually positively related to adoption. Exposure to, and experience with, related products may increase perceived compatibility. In addition an innovation is expected to be adopted if there is a direct need for the function which innovation will effect [14]. In a study about organ donation, Siegel et al. [41] showed that, lack of attitude-behavior consistency in the organ donor domain could be explained by limited compliance with the principle of compatibility. In a different study, Lai and Chang, [42] found that compatibility besides convenience, and media richness, all significantly influence the attitude of e-book reader. In contradiction to previous findings, Shih and Fang [29] found that compatibility does not impact the attitude of customers for using internet banking. The operational definition for compatibility in this study is: the fitness between customer existing values, abilities and their intention to return the EOL electronic products through reverse supply chain management for environmentally friendly purposes such as reuse and recycling. So the following hypothesis is proposed:

Hypothesis 6a and 6b. *Compatibility positively influences the attitude and perceived behavioral control of consumer to return the EOL electronic products for reuse recycle and repair through RSCM.*

2.8. Linkage between Normative Influence and Attitude and Subjective Norm

Several studies stressed the importance of decomposition of normative belief structures [43,44], others have failed to identify a multi-dimensional structure for normative belief weighted with motivation to comply [39,45]. There are also empirical studies those support this relationship. Fishbein and Ajzen [46] presented strong evidence that consumers' normative moderate the relationship between the impulse buying trait and consumers' buying behavior. The relationship between the buying impulsiveness trait and buying behaviors is significantly important only when consumer believes that acting on impulse is appropriate behavior. Taylor and Todd [26] declared that impact of normative influences on subjective norm is higher in decomposing behavior in comparison with recycling behavior. This comparison led to a significant influence from subjective norm to composing behavior while the relationship between subjective norm and recycling is not significant. Another study published by White et al. [47] supported the view that social influence is important within the TPB and dispel the belief that norms cannot play a consistently impactful role in the relationship between attitudes and action. Shih and Fang [29] found that normative influence positively affects the attitude and subjective norm for using Internet banking. In the context of this study the operational definition of normative influence is the people, society, friend that influence or shape, norms, or normative beliefs. The following hypothesis is developed:

Hypothesis 7a and 7b. *Normative Beliefs positively influence the attitudes and subjective norms of consumer to return the EOL electronic products for reuse, recycle and repair through RSCM.*

2.9. Linkage between Collection Method (Returning Method) and Perceived Behavioral Control

Collection method is one of the important variables and factors that will be discussed in following sections. Normally the collection method is not discussed separately and it is always under the category of facility condition [48]. Following this approach, collection method is considered to be a factor that can influence customer's perceived behavioral control for returning the EOL products. The study conducted by Wang et al. [48] showed that, collection method is not discussed directly from customer's perspective, but it is discussed in reverse supply chain management, from manufacturer perspective. Bartel [49] and Nagel and Meyer [50] quoted that "customers can be more or less active concerning the returns". In another study, Greve and Davis [51] found that end-of-life programs are used to pull older, outdated products from the primary sales channel in order to make way for new models. Partridge [52] reviewed several companies those practically collect their material through

returning their customers used product. These companies have different collection methods that help them to collect the end of life products from their customers directly. Babaei et al. [30] made survey of Abadan residents in order to assess their attitudes towards solid waste (SW) source separation, recycling, collection and willingness to pay (WTP) for SW services. The results of these studies provided that programs for promotion of SW sources separation and recycling hold great promise as behavior-changing interventions. The operational definition of collection method is a comfortable returning system established by companies for returning EOL products for repair, reuse and recycling purposes. Considering the previous discussion following hypothesis is developed:

Hypothesis 8. *Collection Method positively influences the perceived behavioral control (PBC) of consumer to return the EOL electronic products for reuse, recycle and repair through RSCM.*

2.10. Linkage between Information and Perceived Behavioral Control

In this study, information is considered to be a variable that can influence perceived behavioral control. It is supported by Cleveland [53] and Marchand [54] who defined the information as a “resource on its own, as well as an important asset to others”. Several authors [28,55–57] tested theoretically and Taylor and Todd [14] tested empirically, that resources have relationship with perceived behavioral control. Lim-Wavde et al. [58] evaluated the importance of the degree to which households have the necessary information to make utility-maximizing decisions about the waste handling. The study by Lim-Wavde et al. [58] proved that: (1) providing of HHW public education positively effect the amount of HHW collected and recycled; (2) environmental quality information about contaminant violations in drinking water is negatively related with the amount of HHW collected; and (3) when information is sent directly via mail to households, an increase in the number of contaminant level (MCL) violations is positively related to the amount of HHW collected. According to [59] the information on how to use and to dispose the product or package contained on the label is one of the elements in packaging that significantly influence consumer buying behavior. In this study, information is treated as shared information by company about the producer, products attribute and returning the product for the purpose of reuse, recycle and refurbishment. Therefore, based on information definition provided above in this study information is any information about returning process, name of company, recyclability, reusability, service ability, life of products, advantages linked to returning of the products etc. The following hypothesis is developed based on discussion above:

Hypothesis 9. *Information positively influences Perceived Behavioral Control (PBC) of customers to return the EOL electronic products for reuse, recycle and repair through RSCM.*

2.11. Linkage between Self-Efficacy and Perceived Behavioral Control

According to [60,61] the self-efficacy is an individual’s self-confidence in his/her ability to perform a behavior. The self-efficacy is an internally based concept. Taylor and Todd [26] found that self-efficacy influences perceived behavioral control in both recycling and composting behavior in waste management. Ralf and Alexandra [62] also found that self-efficacy and perceived behavioral control appear to be almost synonymous constructs. However, self-efficacy is more precisely related to one’s competence and to future behavior and mainly linked to health behavior theories. Nor [63] used new variables to extend the decomposed theory of planned behavior for studying the Internet banking acceptance in Malaysia. His finding indicated that self-efficacy has positive impact on perceived behavioral control. Nasri, and Charfeddine [64] in Internet banking study claimed that self-efficacy has a positive impact on consumer perceived behavior control of the use of Internet banking. Therefore, if a customer believes that most important resources are available then customer has the self-confidence for returning the EOL products for reuse, repair and recycling. Therefore, following hypothesis is developed:

Hypothesis 10. *The Perceived Behavioral Control (PBC) of consumer to return the EOL products for reuse, recycle and repair through RSCM is positively affected by Self-Efficacy.*

2.12. Linkage between Attitude and Participation Intention in RSCM

According to [28], the attitudes toward behavior can be assessed in terms of the degree to which a person has a favorable or unfavorable opinion about the behavior in question. Several authors have empirically examined the influence of perceived behavioral control on intention to behave in specific ways. Bakshan et al. [25] defined the causal behavioral determinants of improving practices of construction waste management (CWM). Bakshan et al. [25] showed in their study that attitude and past experience have significant impact on specific behavioral patterns. Behavior in construction waste management is more sensitive to changes in personal factors such as attitude than to changes in corporate factors such as training. When all factors are being simultaneously controlled, it appears that the behavior is improved with personal factors by 9% more than with corporate factors [25]. Babaei et al. [30] conducted a survey on Abadan residents with the aim to assess their attitudes linked to solid waste (SW) collection, source separation and recycling. Also willingness to pay (WTP) for SW services was assessed by [30]. The results of the study provided Abadan community had a very positive attitude to be part of SW source separation and recycling system. Lee and Back [65] studied the meeting participation behavior of association members' by applying the created meeting participation model (MPM). This model was developed based on existing human behavior models linked to the theory of reasoned action and the theory of planned behavior. The attitude was an important factor (among other main predictor variables), in predicting association members' intentions to participate in the meeting. In the context of recycling behavior, Taylor and Todd [26] revealed that attitude significantly influenced the household recycling behavior in both composting and recycling areas. In other study by Pynoo and Breaak [66] it was provided that positive teachers' attitudes towards the portal; the more likely they will upload information on this portal. Jalilvand et al. [67] concluded that attitudes linked to visiting a destination appear to be drivers of intention to travel to a certain destination. Therefore, in the context of customer participation in RSCM, it is hypothesized that consumers having favorable attitude toward the reuse, repair and recycling the EOL electronic products, are more likely to return the EOL products to the manufacturer or producer. Based on analysis of literature and discussion above, the following hypothesis is offered:

Hypothesis 11. *Favorable attitude positively influences the consumers' intention to return the EOL electronic products for reuse, repair and recycling through RSCM.*

2.13. Linkage between Subjective Norm and Participation Intention in RSCM

According to [68], a subjective norm is linked to perceived social pressure to perform or not to perform the certain behavior. During analysis of subjective norm, it was found that there is a significant influence of subjective norm on perceived usefulness and behavioral intention [68]. In the context of construction waste management, [25] determined the causal behavioral determinants linked to improving practices in construction waste management. The findings of Bakshan et al. [25] indicated that social pressure has a strong positive impact on behavior in construction waste management. In another study, conducted by Cho [69], it was revealed that both social influences (perceived critical mass) and cognitive instrumental processes (perceived usefulness and perceived ease of use) significantly influenced behavioral intentions to participate in 3G mobile services in Singapore. Taylor and Todd [26] proved that in both composting and recycling behavior, subjective norm influence the household recycling behavior in waste management. The study showed that, although customer intention to return the EOL electronic products is voluntary, the pressure from colleagues, advisors, friends, society, or family have significant impact on their behavior. For example, if colleagues, family, society etc. think very highly of a customer as a society member participating in RSCM through

returning the EOL products to the manufacturer, this might encourage the member of the society to participate in RSCM. Based on literature analysis the following hypothesis is formulated:

Hypothesis 12. *Subjective norms positively influence positively the consumers' intention to return the EOL electronic products for reuse, repair and recycling through.*

2.14. Linkage between Perceived Behavioral Control and Participation Intention in RSCM

The influence of perceived behavioral control on intention and behavior has been empirically investigated and proved by several authors. Nasri and Charfeddine [64] found that perceived behavioral control significantly and positively influences the intention to use of Internet banking. Cestac et al. [70] indicated that perceived behavioral control has the greatest impact on driving behavior among the more experienced drivers. In study by Taylor and Todd [14] it was revealed that in both composting and recycling behavior, perceived behavioral control significantly influenced the household recycling behavior in waste management. According to [14], a customer may have a favorable attitude about returning the EOL product to the producer for reuse, recycling and repairing. However, if person is faced with a situational constraint such as lack of information, difficulties to access collection methods or lack of transportation, time limitation etc., he/she may not feel in full control of the situation and have no intention of participating in RSCM. Therefore, the following hypothesis is represented bellow:

Hypothesis 13. *Customers perceived behavioral control (PBC), positively influences the consumers' intention to return the EOL electronic products for reuse, repair and recycling through RSCM.*

The conceptual model was built based on literature review and 13 hypotheses. Figure 1 illustrates the conceptual model and hypotheses of this research.

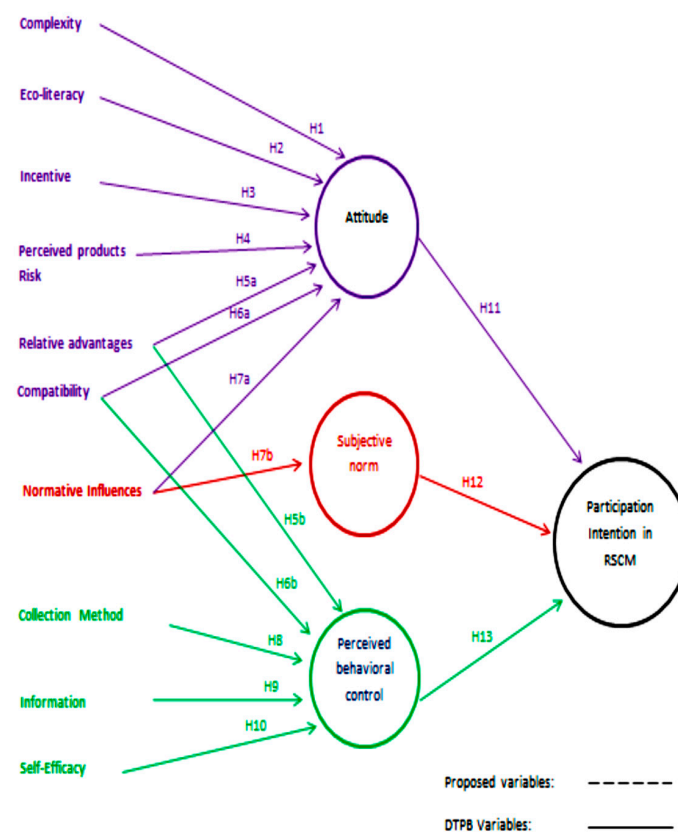


Figure 1. The conceptual model of the research.

3. Methodology

The research conducted employed the quantitative approach. Non-probability (convenience sampling) method was used to determine the sample and data was collected through distributing the seven point Likert scale questionnaire. The questionnaires of this study are self-administrated questionnaire. Self-administered questionnaires are useful to avoid positive answers by respondents then they believe that certain responses are more socially desirable [71]. The questionnaires of this study are also manually delivered to respondents and latter collected by researcher, hence they are known as delivery and collection questionnaire. The questionnaire consisted of closed-ended questions and was divided into the following parts:

Part 1: Information about the research and the questionnaire

Part 2: Demographical information (general format)

Part 3: A set of questions about different factors influencing customers behaviors for participating in RSCM.

A total of 800 questionnaires were distributed among customers of electronic products. Finally, the questionnaire was distributed among the customers in electronic retailer companies based on convenience sampling method. E-Retailer companies are the places where it is easy to find more respondents. These respondents are customers who buy reusable, repairable and recyclable electronic products such as tablet, laptop, cellphones, TV and speakers which are mainly portable. It is also notable that variables were defined based on the context of the study and all questions were self-designed or adapted based on the TPB manual or the questionnaire designed by Taylor and Todd [26] and Ajzen [56]. The self-defined questions belonged to the newly added variables that did not have any questionnaire related to the context of this study. For this reason, constructs (variables) were defined and the questionnaire was designed according to TPB and decomposed TPB.

The proposed model in this study consisted of 10 exogenous latent variables (dependent) and 4 endogenous (independent) variables. The measurement model shows the relations between the latent variables and the indicators. This study tries to add new factors in order to study customers intention to return the electronic products for reuse, repair and recycling through RSCM based on DTPB model, and it is a combination of proposed variables and new variables. Hence, PLS-SEM was selected as a reasonable technique for data analysis.

Partial Least Squares-Structural Equation Modeling (PLS-SEM) technique was employed to analyze the relationships among variables. The questions were adopted and self-designed from [14,26,46]. Before distributing the questionnaires, content validity has been accomplished by asking three experts' opinion those are familiar with the constructs and questions in TPB and context of this research. To measure the consistency of question reliability test has been conducted by using SPSS software and the Cronbach's alpha test result shows that all the items have Cronbach's alpha above 0.07. Besides Test-retest reliability has been performed by administering the same test twice over a period of time to 40 individuals and the scores from Time 1 and Time 2 have been correlated which shows majority of items have an acceptable correlation above 0.07.

4. Results

The first step to establish the validity of any instrument is an evaluation of its content validity. The content validity is conducted to ensure that the respondents understand the purpose of the researcher without difficulty. Some scholars recommend at least three experts for validating respondents [72–75].

Furthermore, a pilot study was conducted among a few respondent of the target sample group, who were customers of electronic products from different companies, such as Asus, Acer, Apple, Samsung etc. The strategy was to distribute two sets of questionnaires among the same respondents and then compare the correlation and the Alpha Cronbach. Hence, the questionnaires were distributed on 10 January 2015 among 50 potential buyers of electronic products.

The first set of questionnaires was distributed and gradually collected over three weeks with a return rate of 70 percent. For the final survey, 800 surveys were selected via convenience sampling. Of the 800 surveys, 580 surveys, which were equivalent to 72% response rate, were returned. Of the 580 surveys, 36 surveys were found to have more than 10 percent of unanswered items and some surveys were excluded, because respondents provided the same responses to all questions in the survey, resulting in an effective sample of 544 usable completed surveys. The summary on the response rate of the questionnaire is illustrated in Table 1.

Table 1. Questionnaire Response Rate.

Questionnaire	Number	Total Remaining
Distributed	800	800
Did not returned	220	580
Discarded due to missing value, redundancy or similarity in the answers	36	544
Discarded due to outliers	76	468

Although there are some disagreements about the respondent rate among the researchers, the majority of the researchers agreed that more than 50% response rate is considered acceptable [76]. The response rate of the usable questionnaires in this study was 72%, which is considered appropriate, since it is higher than 50%. The background information of the respondents was collected, including their gender, age, level of education, and income. The results are summarized in Table 2 in form of percentage and frequency.

Table 2. Respondents' General Descriptive Statistics.

Gender	Frequency	Valid Percent	Cumulative Percent
Male	273	58.3	58.3
Female	189	40.4	98.7
Other	6	1.3	100.0
Total	468	100.0	
Education	Frequency	Valid Percent	Cumulative Percent
SPM/TPM	79	16.9	16.9
Diploma	243	51.9	68.8
Master	80	17.1	85.9
Doctorate	7	1.5	87.4
Other	59	12.6	100.0
Total	468	100.0	
Income	Frequency	Valid Percent	Cumulative Percent
Under 999	27	5.8	5.8
1000–1499	42	9.0	14.7
1500–1999	53	11.3	26.1
2000–2499	84	17.9	44.0
2500–2999	83	17.7	61.8
3000–4999	115	24.6	86.3
5000–9999	52	11.1	97.4
10,000–14,999	12	2.6	100.0
Total	468	100.0	
Ethnicity	Frequency	Valid Percent	Cumulative Percent
Malay	179	38.2	38.2
Chinese	149	31.8	70.1
Indian	66	14.1	84.2
Other	74	15.8	100.0
Total	468	100.0	

The descriptive analysis showed that 58% of the respondents were male and 40 percent were female. The majority of respondents had high school diploma, while only one percent had a doctoral degree. In terms of income level, the majority of the respondents (24%) had a monthly salary of 3000 to 4999 Ringgit Malaysia. It is also notable that the majority of the respondents were from Malay (38%) ethnicity followed by Chinese (31%) and Indian (14%).

4.1. Measurement Model

Since in this research the analysis method is adopted from Hair et al. [77] hence the analysis procedure would began with assessment of validity and reliability of reflective constructs. For testing the reflective constructs, validity and reliability, three steps are followed [78]. These steps are necessary for assessment of internal consistency, individual indicator reliability, and average variance extracted (AVE) (Table 1). In addition, the Fornell-Larcker criterion and cross loadings were applied to define discriminant validity.

In order to check whether the indicators of each construct measure what they are supposed to measure, all measurements were assessed in terms of internal consistency. Internal consistency was examined as a test of reliability [79]. To assess the internal consistency of the constructs, composite reliability and Cronbach's alpha was used. The acceptable reliability threshold commonly used for internal consistency reliability for composite reliability is above the value of 0.70. For Cronbach's alpha, 0.6 is also acceptable [80,81]. However, composite reliability is highly recommended, because it covers some of Cronbach's alpha deficiencies [78].

To assess the internal consistency of the constructs, composite reliability and Cronbach's alpha were used. The acceptable reliability threshold commonly used for internal consistency reliability for composite reliability is above the value of 0.70. For Cronbach's alpha, 0.6 is also acceptable [80,81]. In this study, 0.8360 to 0.9339 was the range of composite reliabilities, and 0.7423 to 0.9055 was the range of Cronbach's Alpha extracted, both exceeding the acceptable values of threshold (see Table 3).

To establish convergent validity, researchers consider the outer loadings of the indicators, as well as the average variance extracted (AVE). The AVE values of the constructs were more than 0.5 [82], implying a sufficient convergent validity. In other words, the latent variable explains more than half of its indicators' variance, and consequently, these constructs are valid. Results from Smart PLS, shows that all items were acceptable due to factor loadings higher than 0.5. Discriminant validity can also be assessed by examining the cross loadings of the indicators. Specifically, an indicator's outer loading on the associated construct should be greater than all of its loadings on other constructs—i.e., the cross loadings.

Discriminant validity is the extent to which a construct is truly distinct from other constructs by empirical standards. Therefore, discriminant validity shows that a construct is unique and captures phenomena not represented by other constructs. Two measures of discriminant validity were applied: the examining of the cross loadings of the indicators and Fornell-Larcker criterion. The presence of cross loadings that exceed the indicators' outer loadings represents a discriminant validity problem [82]. The Fornell-Larcker criterion is more conservative approach for defining discriminant validity. According to this criterion, in order to ensure discriminant validity, the square-root of average variance extracted of each latent variable should be higher than the correlation with all other latent variables (Table 4).

The logic behind this method is based on the idea that a construct shares more variance with its associated indicators than with any other construct. Results from Smart PLS, Table 4 shows that shows that all square roots of AVE of each latent variable are higher than the correlation with all other latent variables.

Table 3. Measurement model.

Variables	Name of Items	Factor Loading	AVE	Composite Reliability	Cronbach's Alpha
Attitude	A1	0.790	0.5816	0.8457	0.7604
	A2	0.742			
	A3	0.741			
	A4	0.777			
Participation Intention For EOL Products	BI1	0.769	0.5753	0.8439	0.7617
	BI2	0.759			
	BI3	0.799			
	BI4	0.704			
Compatibility	CB1	0.805	0.6524	0.8823	0.8225
	CB2	0.860			
	CB3	0.767			
	CB4	0.796			
Complexity	CX1	0.762	0.6114	0.8627	0.8059
	CX2	0.834			
	CX3	0.751			
	CX4	0.779			
Eco-Literacy	EL1	0.775	0.5935	0.8536	0.7728
	EL2	0.819			
	EL3	0.756			
	EL4	0.730			
Collection Method	RM1	0.835	0.7795	0.9339	0.9055
	RM2	0.887			
	RM3	0.915			
	RM4	0.893			
Subjective Norm	SN1	0.858	0.7542	0.9247	0.8915
	SN2	0.871			
	SN3	0.885			
	SN4	0.860			
Financial Incentives	FI1	0.689	0.5677	0.8397	0.7464
	FI2	0.767			
	FI3	0.773			
	FI4	0.781			
Information	I1	0.851	0.7141	0.9088	0.8661
	I2	0.869			
	I3	0.774			
	I4	0.883			
Normative Influence	NI1	0.764	0.6521	0.8821	0.8215
	NI2	0.789			
	NI3	0.853			
	NI4	0.821			
Perceived behavioral	PBC1	0.776	0.6635	0.8872	0.8304
	PBC2	0.802			
	PBC3	0.799			
	PBC4	0.878			
Perceived Product Risk	PR1	0.804	0.7013	0.9037	0.8582
	PR2	0.840			
	PR3	0.859			
	PR4	0.846			
Relative advantages	RA1	0.748	0.6286	0.8704	0.802
	RA2	0.862			
	RA3	0.855			
	RA4	0.693			
Self-efficacy	SE1	0.671	0.562	0.836	0.7421
	SE2	0.743			
	SE3	0.839			
	SE4	0.736			

Table 4. The square root of AVE and correlation of variables.

Name of Constructs	Attitude	Compatibility	Complexity	Eco-Literacy	Financial Incentives	Information	Intention to Return EOL Products	Normative Influences	Perceived Behavioral Control	Perceived Product Risk	Relative Advantages	Returning Method	Self-Efficacy	Subjective Norms
Attitude	0.763	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Compatibility	0.457	0.807	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Complexity	0.220	0.262	0.782	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Eco-Literacy	0.595	0.535	0.175	0.770	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Financial Incentives	0.341	0.253	0.099	0.279	0.752	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Information	0.126	0.133	−0.066	0.151	−0.163	0.829	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Intention to return EOL Product	0.544	0.415	0.182	0.517	0.247	0.116	0.844	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Normative Influences	0.224	0.216	0.119	0.239	0.167	0.061	0.328	0.859	0.000	0.000	0.000	0.000	0.000	0.000
Perceived Behavioural Control	0.271	0.232	0.086	0.327	−0.063	0.507	0.335	0.289	0.815	0.000	0.000	0.000	0.000	0.000
Perceived Product Risk	0.444	0.271	0.182	0.260	0.288	−0.062	0.431	0.143	−0.018	0.837	0.000	0.000	0.000	0.000
Relative Advantages	0.503	0.465	0.264	0.506	0.307	0.069	0.361	0.265	0.240	0.124	0.793	0.000	0.000	0.000
Returning Method	0.166	0.193	−0.040	0.144	−0.212	0.560	0.101	−0.038	0.508	−0.132	0.101	0.748	0.000	0.000
Self-efficacy	0.363	0.319	0.183	0.315	0.227	0.151	0.492	0.339	0.320	0.412	0.370	0.126	0.750	0.000
Subjective Norms	0.355	0.312	0.041	0.342	0.001	0.405	0.306	0.444	0.654	−0.023	0.332	0.480	0.313	0.868

4.2. Assessing the Structural Model Collinearity

High correlations between two constructs also referred to as collinearity, can prove problems methodological and interpretational problems. Collinearity problems may appear in the structural model if, for example, redundant indicators are used as single items to measure two (or more) constructs. If this occurs, researchers need to eliminate the redundant indicators. While perfect collinearity occurs quite rarely, high levels of collinearity are much more common [77]. Table 5 shows the results of collinearity.

Table 5. Collinearity of Constructs.

First Set		Second Set		Third Set	
Name	VIF	Name	VIF	Name	VIF
Compatibility	1.584	Compatibility	1.342	Attitude	1.149
Relative Advantage	1.588	Relative Advantage	1.371	Perceived Behaviour	1.757
Risk	1.211	Self	1.263	Subjective	1.865
Complexity	1.129	Collection Me	1.222		
Eco-literacy	1.667	Information	1.257		
Financial	1.203				
Normative	1.158				

An applied measure of collinearity in this study is the variance inflation factor (VIF). VIF is defined as the reciprocal of the tolerance (i.e., $VIFx = 1/TOLx$). The tolerance and VIF are both provided in the regression analysis output. In the context of PLS-SEM, a tolerance value of 0.20 or lower and a VIF value of 5 and higher indicate a potential collinearity problem, respectively [82]. The obtained results show that 80% of an indicator's variance is accounted for the remaining formative indicators associated with the same construct. The results of the collinearity assessment in this study (Table 5), which was done in three phases, revealed that collinearity did not exist among the constructs.

4.3. Structural Model

The structural model covers the relationships among hypothetical constructs. If the outer model (measurement model) is reliable, the valid assessment permits an evaluation of the inner path model's (structural model's) estimates [77]. Figure 2 presents the PLS function's result for structural equation modelling.

Another criterion for this assessment was the coefficients of determination (R^2) of the endogenous latent variables (Table 6).

Table 6. R Square and Community.

Construct	R Square	Community
Attitude	0.5087	0.5816
Perceived Behavioural Control	0.4451	0.6635
Subjective norm	0.1069	0.7542
Customer Participation intention for returning EOL products	0.5015	0.5753

According to [78], the coefficients of determination (R^2) values of 0.67, 0.33, and 0.19 in PLS path models are being considered as substantial, moderate, and weak, accordingly. The R^2 s in this study were attitude $0.508 > 0.33$, which is moderate; perceived behavioral control $0.445 > 0.33$, which is moderate; customer participation intention $0.50 > 0.33$, which is moderate; and subjective norm $0.10 < 0.19$, which is not significant at all.

The hypotheses formulated in this study were verified by evaluating the statistical importance of the path coefficients with t-statistics, which were computed by means of the bootstrap resampling

method for 5000 samples [77,78]. After conducting bootstrapping, hypothesis testing was performed to reject or accept the relationships. Hypotheses testing results are presented in Table 7.

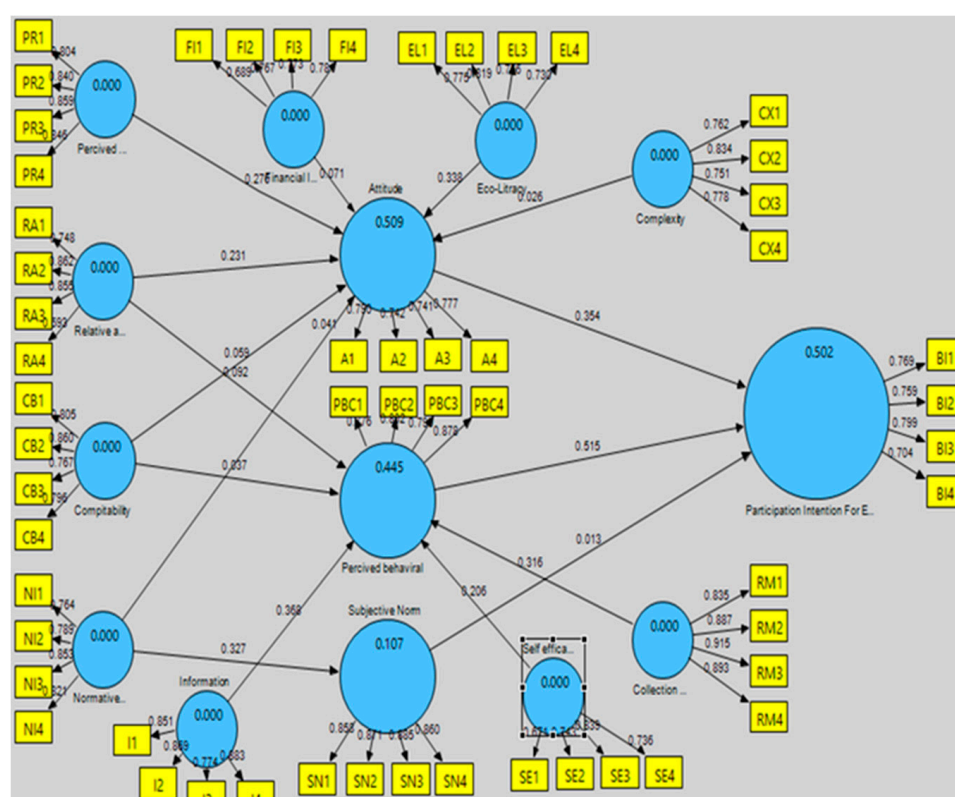


Figure 2. Structural Equation Model.

Table 7. Hypotheses Testing Results.

Hypotheses	Path Coefficient	T Statistics	p-Value	Result
H1: Complexity negatively influences the attitude about customer participation intention for returning EOL products through RSCM.	0.0257	0.7707	0.4412	(Rejected)
H2: Ecological knowledge (eco-literacy) positively influences the attitude about customer participation intention for returning EOL products through RSCM.	0.3383	7.9223	0.000	(Not rejected)
H3: Financial incentives positively influence the attitude towards customer participation intention in RSCM for returning EOL products.	0.0711	1.8167	0.0699	(Rejected)
H4: Perceived EOL product risks positively influence the attitude of customers toward participation intention in RSCM for returning EOL products.	0.2763	6.2036	0.000	(Not rejected)
H5a: Relative advantages positively influence the attitude about customer participation intention for returning EOL products through RSCM.	0.2307	6.0398	0.000	(Not rejected)
H5b: Relative advantages positively influence the perceived behavioural control about customer participation intention for returning EOL products through RSCM.	0.0916	2.1971	0.0285	(Not rejected)

Table 7. Cont.

Hypotheses	Path Coefficient	T Statistics	p-Value	Result
H6a: Compatibility positively influences the customers' attitude about their participation intention in RSCM for returning the EOL products.	0.0594	1.3923	0.1644	(Rejected)
H6b: Compatibility positively influences the customers' perceived behavioural control about their participation intention in RSCM for returning the EOL products.	0.0372	0.9104	0.3630	(Rejected)
H7a: Normative beliefs positively influence the attitude regarding the customers' participation intention in RSCM for returning the EOL products.	0.0413	1.2583	0.2089	(Rejected)
H7b: Normative beliefs positively influence the subjective norm regarding the customers' participation intention in RSCM for returning the EOL products.	0.327	8.2268	0.000	(Not rejected)
H8: Collection Method positively influences the perceived behavioural control toward customer participation intention in RSCM through returning the EOL products.	0.3162	7.7118	0.0000	(Not rejected)
H9: Information positively influences Perceived Behavioural Control (PBC) about customer participation intention in RSCM through returning the EOL products.	0.3682	8.8102	0.0000	(Not rejected)
H10: Self-efficacy positively influences Perceived Behavioural Control (PBC) about customer participation intention in RSCM through returning the EOL products.	0.206	4.7976	0.0000	(Not rejected)
H11: Attitude positively influences Customer participation intention in RSCM through returning the EOL products.	0.3535	7.4034	0.0000	(Not rejected)
H12: Subjective norm positively influences customer participation intention in RSCM through returning the EOL products	0.013	0.2454	0.8062	(Rejected)
Customers perceived behavioural control (PBC), positively influences customers participation intention in RSCM through returning the EOL products.	0.5155	9.9015	0.0000	(Not rejected)

According to the results, the majority of the hypotheses (10 hypotheses) were not rejected, while some of them (6 hypotheses) were rejected. However, in some parts, different results were obtained regarding the context of Malaysian post-consumption behavior and their intention to collaborate with the producers of electronic products to return the EOL electronic products through RSCM for reuse, repair, and recycling purposes. The research objectives of this research and their respective hypotheses are discussed in following parts.

5. Discussion

The first research objective of this research examines the important factors influencing customers' attitude to return the EOL electronic products for reuse, repair and recycling through RSCM. After conducting the statistical analysis first objective achieved and main factors influencing the customers' attitude regarding their intention to return the EOL electronic products through RSCM, are determined those are: eco-literacy ($T = 7.9223$, $p = 0.00001$), perceived EOL product risk ($T = 6.2036$, $p = 0.0001$) and relative advantage ($T = 6.0398$, $p = 0.00001$). However the influence of complexity ($T = 0.7707$, $p = 0.4412$), financial incentives ($T = 1.8167$, $p = 0.0699$), compatibility ($T = 1.3923$, $p = 0.16449$), social influences on attitude ($T = 1.2583$, $p = 0.2089$) are not approved.

The second objective examines the relationship between normative (social) influence on consumers' subjective norm which in turn can influence consumers' intention to return the ELO

electronic products through RSCM for reuse, repair and recycling. This hypothesis is constructed based on the original DTPB model [26]. The statistic result confirms the influence of normative (social) influences on consumers' subjective norm ($T = 8.2268$, $p = 0.00001$) regarding their intention toward returning the EOL electronic products through RSCM for reuse, repair and recycling. Third objective is achieved through testing its hypotheses. The statistical result confirms the influence of relative advantages ($T\text{-value} = 2.1971$, $p = 0.028$), collection method ($T\text{-value} = 7.7118$, $p < 0.00$), information ($T\text{-value} = 8.8102$, $p = 0.00$) and self-efficacy ($T = 4.7976$, $p = 0.000$) on consumers' perceived behavioral control regarding their intention toward returning the EOL electronic products through RSCM for reuse, repair and recycling. Compatibility does not influence the perceived behavioral control. The fourth objective is based on the TPB which is divided to three hypotheses and examine the influence of attitude, subjective norm and perceived behavioral control on intention. Empirical result only confirms the influence of attitude ($T\text{-value} = 7.4034$, $p < 0.00$) and perceived behavioral control ($T\text{-value} = 9.9015$, $p = 0.00$) on consumers' intention for returning the EOL electronic products for reuse, repair and recycle through RSCM.

6. Conclusions

The results of this study offer valuable implications for managers in electronic companies and recyclers to understand how can influence the consumers or customers behavior' for returning the EOL electronic products for reuse, repair and recycling. The empirical results confirm that consumers perception about the risk associated with EOL electronic products, consumers' ecological knowledge and relative advantages associated with reuse, repair and recycling can influence the attitude of consumers to return the EOL products for reuse, repair and recycling to producer or authorized recycler. The results confirms that the way companies or recycler collect their EOL electronic product in terms of suitability, accessibility can influence their perception over their control for returning their EOL electronic products for reuse, repair and recycling through RSCM. Beside the collection method, information about how, where and when to return a EOL electronic products and self-efficacy which is related to the ability and self-confidence about returning the EOL electronic products are two important factors which influence the consumers' perceived behavioral control for returning the ELO electronic products through RSCM. Finally, Consumes intention for returning the ELO electronic products through RSCM for reuse, repair and recycling of their EOL electronic products is influenced by their attitude and perceived behavioral control.

The major contribution of this research hinges on the theoretical side. Theoretically, this study contributed to enriching the knowledge about the interest of producers and recyclers to understand what factors influence customers' behavioral intention for returning their EOL products for reuse, recycle, and repair. This research provided a model that contributes to the understanding of the important factors that influence the customers' intention to return their EOL products for reuse, repair, and recycling, whereas the previous models solely discussed consumers' recycling behavior in the context of waste management and, in some cases, in the context of electronic products. This study, in contrast, contributes to the understanding of the recycling behavior in the context of reverse supply chain, provided by producers based on the producers extended responsibility policy. In studies on recycling behavior, many studies simply modelled the factors that influence recycling behavior in the context of waste management. Taylor and Todd [14,26] were among a few researchers who used the DTPB for investigating customers' recycling behavior in the context of waste management. Several new studies were also analyzing the main factors influencing reuse and recycling behavior in the context of waste management [83–86].

Since this study used DTPB to understand what factors influence customers to collaborate with producers in the endeavor to save the environment and resources, new constructs were added to the DTPB model. The new constructs that are modified based on the context of this research are information, financial incentives, EOL product risk, eco-literacy, and the collection method (returning method). The general forms of those constructs are: knowledge, information, perceived risk, incentives,

and facilitating conditions. The new constructs that were introduced as the research contribution, along with the main DTPB constructs, can be used for future studies examining the intentional behavior of people in different contexts. Moreover, this study made the following contributions: it contributes to a better understanding of the concepts of reuse, recycle, and repair (refurbishment) by making a distinction between waste management and reverse supply chain management. It extends the regular task of reverse supply chain, which is returning the end-of-season products or products to be repaired, to an environmentally friendly task for saving the environment, reusing and recycling the old products and using them as raw material for production lines, and reducing the cost associated with production of new products. It emphasizes on the role of customers in RSCM and tries to enhance the productivity and efficiency of RSCM by understanding what influence the customers or consumers to use RSCM to return their EOL products for reuse, refurbishment, and recycling purposes. This study attempted to understand what factors influence customers' behavior to purchase and use the products more responsibly and to return their EOL products to producers, or recyclers, in order to help save the resources and the environment. If the customers, or consumers, of electronic products get used to recycling their EOL products, will lead to a healthier society, less waste of the resources, less cost associated with new products, and the environment will be protected, which finally help us to achieve the triple bottom line concept. Another contribution of this study is encouraging both producers and customers to reduce the landfill volume by using a reverse supply chain which is cleaner, more efficient, and well-organized compared to the waste management system. Basically, waste management is for disposal purposes, while reverse supply chain management is considered to be a well-organized and sophisticated system for collecting the valuable EOL products containing toxic materials. This study was limited in two main ways. First, what the limitations the researcher faced while conducting the study; and, second, the limitations related to the study in practice. These limitations are discussed in following paragraphs: The first limitation happened at the beginning of this study when the researcher intended to examine the reverse supply chain practices, and the drivers and barriers in retailer companies. While this study tried to contribute to both theory and practice, it still had limitations that should be taken into consideration. This study mainly added new constructs for understanding the customers' intentional behavior and their use of RSCM for the purpose of recycling, reuse, and repair; it may not be suitable in other contexts and should be modified by adding or removing some of the constructs. Future works can focus on producers and customers responsibility regarding protecting society and environment (triple bottom line). Moreover, future studies can explore the customers' post-consumption behavior to address the concerns about the environmental, economic, and social side effects of irresponsible consumption.

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