

Factors Influencing Undergraduate's Intention on E-Waste Recycling

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Abstract

Rapid advancement of electronic wastes becomes a huge problem for human and environment. Undergraduates can be identified as one of the major group of people who uses electronic equipments for various purposes. Thus, this paper attempts to identify the factors that impact for the intention of e- waste recycling within undergraduates. After reviewing literature, a conceptual model is developed which can be further used by the researchers for the empirical testing.

Keywords: Intention, E-Waste Recycling

Paper type: Model Development

Introduction

With the rapid globalization and with the help of technology, it creates a new demand for new electrical and electronic equipments around the world. While the global market for new high-technology electronic products continues to grow, the amount of discarded products also grew up. This led to a significant rise in e-waste in the global arena. Electronic waste is one of the fastest growing component of the municipal solid waste stream and according to the studies conducted in the European Union e-waste is growing at a rate of 3-5% per annum or approximately three times faster than other individual waste streams in the solid waste sector (Schwarzer et al., 2005).

The new electrical and electronic equipments adoption among the teenagers has increased substantially compared with the elder generation (Y MARY MADDEN, 2013). The rapid rate of product development in the electronic industry has shorten the life span of electronic equipment average into one or two years. If the e- waste is properly managed, it can become an environmental friendly step towards sustainable development of any country. E-waste recycling is considered to be a fastestest growing concept in the prevailing context. Irrespective of its economic importance, some countries

continue to dump e-waste, ideally in grounds due to various constraints. E-waste comprises electrical appliances such as fridges, air conditioners, washing machines, microwave ovens, and fluorescent light bulbs; and electronic products such as computers and accessories, mobile phones, television sets and stereo equipment.

When considering university students they are more exposed to technology than other groups in the society. As well as they represent the youth of the society. They are generally well educated and easy to accept the fangle, and have strong consumption ability (Bo Li, 2012). They like to shift to new electronic equipment so rapidly showing their life style behavior. The usage of electricity and electronic equipments has become an important part of a university community. This creates a new demand for managing e-waste properly within the university community. Therefore, this paper is an attempt to identify the undergraduates' intention and awareness towards the recycling of E-Waste by reviewing the existing literature and developing a conceptual model. Thus, this paper identifies the impact of undergraduates' e-waste recycling related factors towards the intention of recycling.

Literature Review

Electrical and Electronic wastes (e-waste) are created due to the rapid increase of technology and economic activities in developed and developing countries in the world. This is largely due to increasing market penetration of products in developing countries, development of a replacement market in developed countries and a generally high product obsolescence rate, together with a decrease in prices and the growth in internet use (Samarakoon, 2014). According to the studies conducted in the European Union, e-waste is growing at a rate of 3-5% per annum or approximately three times faster than other individual waste streams in the solid waste sector (Schwarzer et al., 2005).

Sri Lanka also now produce and import many electronic products. It has been realized recently that the education system alone is a powerful medium to ensure environmental protection (Samarakoon, 2014). It should reach most parts of the population at a young age, and more e-waste friendly behavior should be practiced on daily basis(Sikdar & Vaniya, 2014). The electrical and electronic equipment has become an important part of the university campus community (John, 2013). With the increase in the use of EEE also comes the challenge of their proper management and disposal. A good example of such management is the action of Indiana University Bloomington and Indiana University – Purdue University Indianapolis (IUPUI) Electronic Waste Collection Days at which a

grand total of 832,000 pounds or 416 tons of electronic waste WEEE were amassed (Knudsen, 2009).

The way by which the university could play the active roles in the recycling of e-waste have been indicated. One of these ways includes creating awareness on campus, which is important to increase undergraduate participation in recycling (Greulich and Akers 2009). Sikdar & Vaniya (2014) stated based on the analysis of data, the awareness of e-waste among students, who are future citizens, is indeed in a positive direction. However, awareness regarding their recycling was only satisfactory. The majority of students were aware about the harmful effects of e-waste to the environment and also to all living beings on earth. The majority of students knew that E-waste could create various diseases of the human body and they realized the fact that e-waste materials were non-degradable. Majority of students viewed recycling of e-waste materials as a must in present times. Some students opined that Recycling could offer employment also. Such views expressed by higher secondary students, show that students were not only aware about e-waste and recycling, but also identified recycling as an effective field of trade and commerce or for entrepreneurship. Based on the survey they conclude that the majority of students agreed that waste materials of television, computers could create pollution. Also the students were aware of the harmful effects of mercury contained in cathode ray tube in the human body. But they show that the majority of the students were not aware of the harmful effects of the printed circuit board of the computer when it was not functioning well and were not aware how to dispose their pen drive with proper methods. Most of the students would not store their pen drive at home, while very few students were not sure what to do with pen drive when not functioning. Moreover the majority of students were not aware about the official recycling center of the particular electronic company nearby their home or city.

Greulich and Akers (2009) argue that attitude towards recycling must be positively altered to achieve successful recycling practice. Similarly Pro-environmental and recycling attitudes were shown to be generally positive among students (V.Iu). Although John (2013) analysis of the data shows a negative relationship between participation in e-waste recycling and level of education and positive relationship between employees' attitudes towards repair/refurbishing and their level of income and age respectively. Vining and Ebreo (1990), Oskamp et al (1991) Gamba and Oskamp (1994, 1995) and Meneses and Palacio (2005) reported that education has no significant effect on recycling behavior. Some studies find a positive relationship between income level and recycling involvement (Vining and Ebreo, 1990; Oskamp et al., 1991, Gamba and Oskamp 1994). In this study education, income level and age are considered as demographic factors.

The study of Barker et al. (1994), whilst self-reported attitudes toward recycling and self-reported recycling behavior were highly positive, only 13.5% of all participants actually recycled. Additionally, a further investigation could be conducted on whether the Theory of Planned Behavior (TPB) (Ajzen, 1991) could influence recycling attitudes and behavior in this study. The researcher was inspired by the following similar studies: Tonglet et al. (2004) discussed that the TPB provides a useful model for exploring the factors influencing householders' recycling decisions. A great number of studies have been done on the applicability of the TPB in explaining student recycling behavior; some found that the intention to recycle had an impact on attitudes and norms of student recycling behavior (Goldenhar and Connell, 1993); the linkages between values, attitudes and recycling behavior were investigated by McCarty and Shrum in 1994 in a study of North American undergraduate students; Rise et al. (2003) examined the influence of implementation intentions on the actual behavior regarding recycling drinking cartons. A significant relationship between attitudes towards recycling and self-reported recycling was found by Kelly et al. (2006).

Demographic factors such as race, age, gender and income will significantly influence the likelihood of e-waste recycling. There is also a relationship between e-waste recycling rates and consumers' perception of how effectual their behavior is in influencing environmental change, a theory called Perceived Consumer Effectiveness (PCE). PCE is a framework for understanding how consumers perceive the impact of their consumption behavior, which can be influenced by their background (such as race, socio-economic status, education, etc.), general environmental knowledge, as well as cultural and personal norms (Chen & Tung, 2010; Ellen, Wiener, & Cobb-Walgren, 1991). Also Perceived Consumer Effectiveness was influenced by demographic characteristics, information and attitudes (Nicholas Garcia 2011).

To better understand the factors influencing cell phone recycling behavior, this study uses three analytical frameworks: economic, environmental attitudes and behaviors, and perceived consumer effectiveness. Also Information, pro-environmental behavior and attitudes, and perceived consumer effectiveness were positively correlated with cell phone recycling. (Nicholas Garcia 2011).

Theories about recycling behavior suggest that inconvenience is a major barrier for consumers; this study suggests that recycling rates could be increased by encouraging consumers through information campaigns that seek to increase their knowledge of cell phone recycling, and perceived consumer effectiveness. Perceived inconvenience of e-waste recycling will decrease a person's likelihood of recycling (Nicholas Garcia 2011).

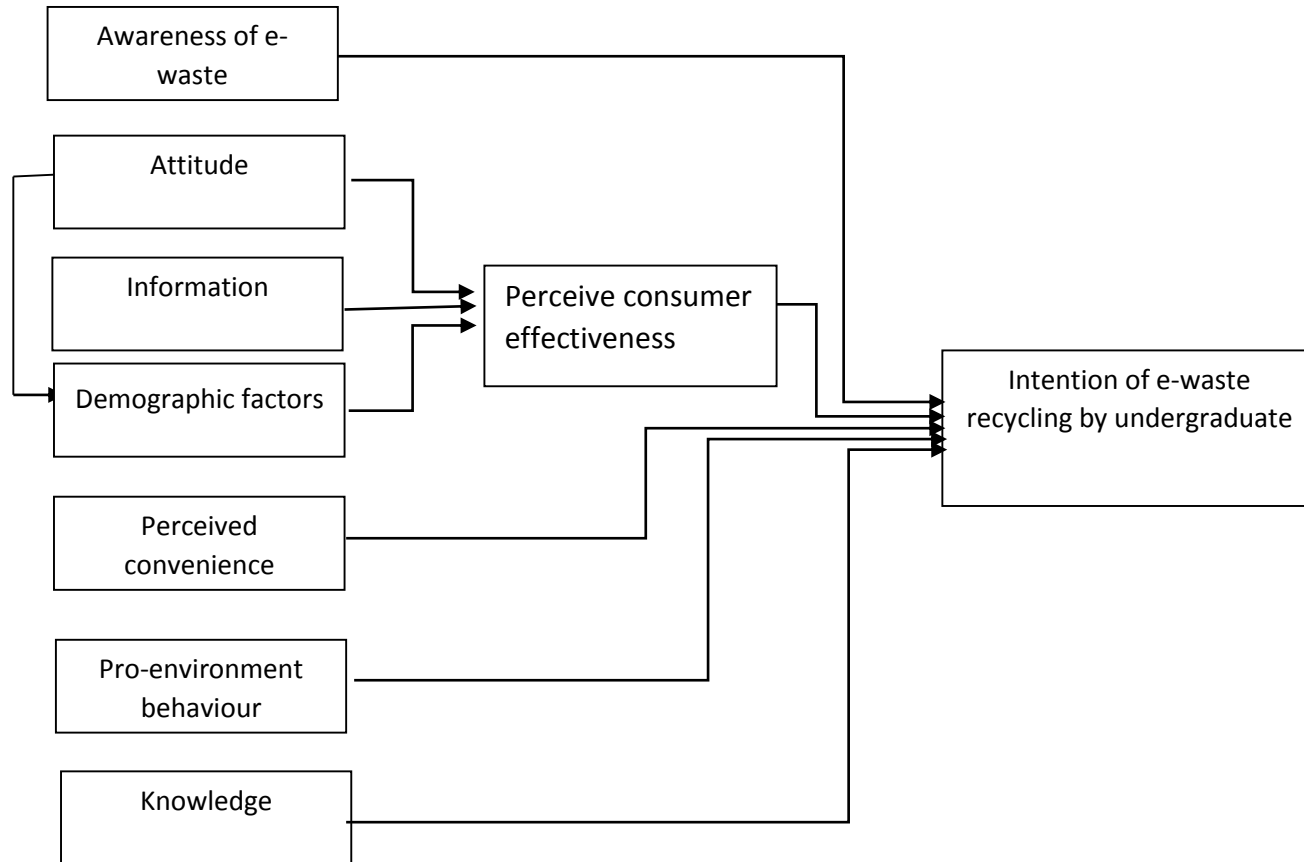
There is such a low incidence of e-waste recycling, but evidence points to the general lack of knowledge about proper disposal and the perceived inconvenience of special disposal of e-waste (Iyer & Kashyap, 2007). Carlson (2001) argues that environmental awareness is not enough to encourage pro-environmental behavior, but that convenience is most important to consumers (Chen & Tung, 2010; Steg & Vlek, 2009). Studies have shown that consumers stockpile their e-waste until they find a convenient time to dispose of it (Saphores, Nixon et al., 2009). One study found that California households were willing to pay a 1% Advanced Recycling Fee, a recycling tax paid at the time of purchase to support local recycling (Nixon, Ogunseitani, Saphores, & Shapiro, 2007). Their findings suggest that the biggest barrier to e-waste recycling is an inconvenience, not the cost of recycling or the opportunity cost of storage, and that inconvenience may take precedent over pro-environmental attitudes (Nixon et al., 2007).

A wide scope of research has been conducted with regard to recycling. One area of research focuses on consumers being motivated by cost and benefits. It appears that convenience and cost significantly impact recycling behavior (Jenkins, et. Al., 2003). Numerous studies attempt to link demographics and socioeconomic variables, such as income, education, age, and gender, to recycling behaviors. The education level of consumers has been inconsistent in its relationship with recycling. Some researchers found that education had a positive relationship with recycling (Owens, Dickerson, and Macinitsoh, 2000), while other research did not find such a relationship existed (Gamba and Oskamp, 1994, Werner and Makela, 1998). The relationship of age is ambiguous as well, some studies conclude that age is a significant variable (Gamba and Oskamp, 1994, Scott, 1999) and others reportage is insignificant (Werner and Makela, 1998, Foster, 2004, and Gronhoj and Olander, 2007). According to some researchers (Schultz, Oskamp, and Mostafa, 2007), females are more likely to recycle than males; however, other researchers have not found a relationship between gender and recycling (Gamba and Oskamp, 1994 and Werner and Makela, 1995).

According to some researchers, the biggest barrier to recycling is an inconvenience, not the cost of recycling or the opportunity cost of storage (Sphores, Nixon, Ogunseitani, and Shapiro, 2007). In Garcia's research, perceived inconvenience and increased exposure to E-waste was studied. Only 6 percent of non-recyclers reported that the inconvenience of mobile phone recycling was a driving factor in their decision to recycle (Garcia, 2011). By comparison, 27 percent of non-recyclers reported a lack of information as a barrier to mobile phone recycling (Garcia, 2011). Lack of information and knowledge significantly impacts post purchase behaviors of consumers, such as recycling.

Theoretical Framework

The theoretical framework is the structure that can hold or support a theory of a research study. Also theoretical framework consists of concepts and, together with their definitions and reference to relevant scholarly literature, existing theory that is used for particular study. The following conceptual framework is derived grounded on the literature survey. Based on that, Awareness of consequences, Demographic, Information, Perceived convenience, Attitudes and pro-environment behavior identified as the independent variables that influencing undergraduate's intention on e-waste recycling. The intention on e-waste recycling considered as the dependent variable.



Conclusion

Recycling of e-waste such as mobile phones, laptops, pen drives, CDs, and other electronic equipment plays a vital role in environmental protection. Also, it helps to recover the important natural resources like copper, silver and iron by reusing. When considering university students they are more exposed to technology than other groups in the society. As well as they represent the youth of the society. They are well educated. They like to shift to new electronic equipment so rapidly showing their life style behavior. This paper is an attempt to identify the undergraduates' intention and awareness towards the recycling of E-Waste by reviewing the existing literature and conducting a survey. We tried to recognize the relationship between this intention and related factors towards that intention, whether recycling or not. Finally, we demonstrate the results of this survey by developing a model.

Awareness of e-waste recycling, attitude towards recycling, demographic factors such as race, age and gender and information about recycling, perceive convenience, pro- environment behavior and knowledge can be considered as independent variables which influence on undergraduates' intention of recycling. So the intention of recycling behavior can be identified as the dependent variable. These factors are positively correlated with the independent variable. Considering the amount of e-waste generated in the universities it will be a good step If we can introduce sustainable e-waste recycling systems to the university community-waste recycling would be a good cause rather than harmful to the environment thereby fostering a sustainable society. If anyone who are interested in the academic area can proceed this further and based on the construct can develop sustainable e-waste recycling. A system either solely or in collaboration with companies or organizations that might be interested to partner with them. The output of these systems might not only help to university communities but also for the municipalities too. For developing such systems it is very much essential to align with new technology too. As well as by educating undergraduates more and more regarding e-waste recycling would be a long term investment for making solutions to this burning e-waste problem up to some extent.

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