

Review Article

E-WASTE MANAGEMENT STRATEGY IN ORGANIZATIONS - A CONCEPTUAL FRAMEWORK

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Abstract

Existing studies on consumer response to e-waste management mainly focus on the household consumers and little attention has been given to study the role of bulk consumers, despite the fact that they create majority of e-waste. The aim of the present study is to build a proposed conceptual framework of the key factors shaping the organizational e-waste strategy as well as the organizational challenges related to its implementation through a review of the current literature. The proposed model takes into consideration studies previously carried out by the authors in the areas of e-waste and environmental management in general. An extensive literature survey has been carried out to derive the constructs of the conceptual framework as a basis for further empirical research. Based on the review of existing literature, a conceptual framework of determinants of e-waste strategy and organizational challenges related to strategy implementation are identified. The model depicts that various internal and external factors served as key strategic drivers for e-waste management in the organizations and the hurdles faced to implement it. The proposed conceptual framework for organizational e-waste management strategy developed through literature review is yet to be empirically tested and validated using appropriate tools and techniques. Future research can be carried out to test the applicability of the proposed framework to a wider spectrum of organizations in varying contexts. The study proposes a novel framework of strategy for e-waste management in the organizational context.

Keywords: Corporate Strategy, E-waste management, Consumer Electronics, Business and the Environment.

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INTRODUCTION

In an information technology era, electrical and electronic devices are essential to business operations for their capability to increase both efficiency and productivity at work, irrespective of the nature of the business. As technology changes at a fast pace, many companies modernize their old piece of equipment quite frequently to sharpen their competitive edge. The rapid production and planned obsolescence, practiced by manufacturers of electrical and electronic equipment, has further shortened the useful life of consumer electronics contributing to rapidly rising e-waste quantities. E-waste is defined as "a term used to cover items of all types of electrical and electronic equipment (EEE) and its parts that have been discarded by the owner as waste without the intention of re-use" (STEP, 2014). It has attracted the attention of business, academicians and policy makers increasingly as one of the most crucial waste disposal issues of the twenty-first century (Heeks et al., 2015).

E-waste is generated at a global rate of approximately 50 million tonnes annually which is worth 62.5 billion dollars, according to a joint report by United Nations University, 2019. Ironically, only 20 per cent of the total e-waste is formally recycled and the remaining 80 per cent remains undocumented. E-waste contains high-value as well as rare materials such as platinum, gold, beryllium, silver, gallium, and many others that have economic value when recycled. As per the joint UN report, a tonne of e-waste contains hundred times more gold than that present in a tonne of gold ore. However, it is also packed with potentially hazardous materials like lead, mercury, cadmium, Polybrominated Flame Retardants, Lithium, Barium and others that create environmental risks and occupational health hazards. Unfortunately, the major portion of e-waste is recycled illegally in the unregulated informal sector which rely on rudimentary methods to extract valuables from e-waste and thus poses a threat to the environment and human health.

The existing literature on e-waste has mainly concentrated on the generation and quantification of e-waste (Miller et al., 2016; Kumar et al., 2017), legislation on e-waste (Kumar et al., 2017), e-waste recycling (Cucchiella et al., 2015; Kumar et al., 2017), resource extraction from e-waste (Tuncuk, 2012; Cucchiella et al., 2015; Tesfaye, 2017), environmental impacts of e-waste (Balde et al., 2015) and an international trade in e-waste (Sthiannopkao & Wong, 2013; Khan, 2016). However, the studies focusing on the underlying factors that may either support or inhibit an implementation of e-waste strategy in an organization is nascent.

Although e-waste management has received an increasing attention over the years, the practical implementation of e-waste management practices has been somewhat modest (Khatriwal, 2009; Osibanjo and Nnorom, 2007). Only few organizations have a proactive e-waste management practices since others adopt a passive or reactive approach to e-waste management. Therefore, it is important to identify the key drivers that can help organizations progress towards more environmentally proactive strategies of e-waste management. These drivers are usually accompanied by the barriers that can hinder progress towards advanced or proactive strategic positions. A number of studies have analyzed barriers hindering the implementation of e-waste management practices in organizations (Delgado-Ceballos et al., 2012; Murillo-Luna et al., 2011), however, a holistic perspective incorporating factors that may either drive or inhibit an organization's implementation of e-waste strategy has been less studied. In addition to it, prior studies on consumer response to e-waste management mainly focus on the household consumers and little attention has been given to study the role of organizational consumers of electrical and electronic equipment (also called bulk consumers), despite the fact that they create majority of e-waste (Rajya Sabha, 2011). The aim of the present study, therefore, is to build a proposed conceptual framework of the key factors shaping the choice of organizational e-waste

strategy as well as the challenges related to its implementation, through review of the current literature.

The paper is structured as follows: Section 2 presents a theoretical framework build around the literature that studies the driving factors and barriers determining the implementation of e-waste strategy in general as well as organizational context, followed by research design/methodology in Section 3. Section 4 present the relevant results and discussions as well as their implications, limitations, avenues for further research before closing with conclusions in Section 5.

CURRENT STATE OF KNOWLEDGE

Since there have been relatively limited literature to date on e-waste in the organizational context, the studies related to environmental management, organizational response to environmental management, Green IT, corporate sustainability, corporate greening have been incorporated.

Corporate Environmental strategy

Corporate environmentalism refers to the recognition and integration of environmental issues into an organization's strategic planning process. There are two dimensions of corporate environmentalism: corporate environmental orientation and corporate environmental strategy (Banerjee et al., 2003). Environmental orientation denotes the importance of recognizing the impact an organization has on the environment and the need to minimize such impact and environmental strategy refers to the extent to which environmental concerns are integrated into strategic planning process (Banerjee, 2002).

An organization exhibits a broad range of strategic responses while responding to environmental issues (Banerjee, 2001). Some organizations consider it sufficient to adhere to laws and regulations and react to environmental concerns when it is required, whereas others arrive at the subject more strategically and adopt more proactive environmental strategies. Environmental strategies have been classified along a continuum that ranges from passive or reactive to proactive strategies (Hunt and Auster, 1990; Hart, 1995; Sharma and Sharma, 2011; Fraj-Andrés et al. 2009; Kim 2018). Buysse and Verbeke (2003) discovered empirical support for existence of the continuum.

The literature classifies various drivers of environmental management as internal and external to the organization. (Zhu and Sarkis, 2007; Walker et al., 2008; Gonzalez and Gonzalez, 2008; Harms, Hansen and Schaltegger, 2013; Schrette, et al., 2014)

Key Internal Drivers identified from literature

A growing body of research has identified economic opportunities, organizational culture and ethical influences as key antecedents driving organizations to develop environmental strategies (Bansal and Roth, 2000; Lynes & Dredge, 2006; Lynes and Andrachuk, 2008). It has been argued that reducing the environmental footprints results in resource saving and bring cost advantage to organizations (Hart, 1995; Christmann & Taylor, 2001; King and Lenox, 2002). Revenues can be enhanced through selling recycled products, increased demand from environmentally sensitive customers (Cordano, 1993; Elkington, 1994). Moreover, an organization that adopts sound environmental initiatives will probably acquire a high ecological reputation (Miles and Covin, 2000).

The importance of Organizational culture and leadership in inducing corporate ecological responsiveness has been widely recognized (Hanfield et al., 2011; Fraj et al., 2011; Lynes and Andrachuk, 2008). Organizational culture has been regarded as a strategic asset that allows organizations to translate their environmental strategies into better performance (Fraj et al., 2011). Researchers also agree on the point that leadership involvement is a prerequisite in order to diffuse and implement

environmental practices within the organization (Stoughton and Ludema, 2012).

Managers' attitude and motivation towards the corporate environment have a significant impact on the outcomes of implementation of environmental practice (Bansal & Roth, 2000; Vithessonthi, 2009; Ervin et al., 2013). Managers' attitude towards sustainable development is found to be positively linked with proactive environmental strategies (Fraj-Andrés et al., 2009; Ervin et al., 2013). Organizations are likely to implement proactive environmental strategy if the managers pay high concern to the environment and its protection (Ashford 1993; Bansal 2003; Eiadat et al., 2008.) The selection of a more proactive environmental strategy in an organization is determined by the manager's interpretation of environmental issues as opportunities rather than threats (Sharma, 2000).

Key External Drivers identified from literature

Pressures from regulatory stakeholders has been identified as one of the key driver affecting an organization's environmental response (Walton et al., 1998; Beamon, 1999; Zhu & Sarkis, 2007; Marshall et al., 2005; Eiadat et al., 2008; Huang et al., 2009; Arnold and Hockerts, 2011; Paraschiv et al., 2012; Berrone et al., 2013). Rising legal costs, penalties and fines further accentuate the importance of abiding by legislation (Cordano, 1993).

Some studies have shown that firms adopting environmental management practices were motivated by green customers' concerns (Henriques & Sadorsky 1996; Christmann & Taylor 2001; Khanna & Anton 2002; Marshall et al., 2005; Zhu & Sarkis, 2007; Eiadat et al., 2008; Huang et al., 2009; Arnold and Hockerts, 2011). Kagan et al. (2003), Buysse and Verbeke (2003) and Guoyou et al. (2013) observed that pressures from customers motivate organizations to incorporate environmental management practices.

Several authors have identified that competitive factors may play a significant role in corporate environmental response (Kagan et al. 2003; Christmann 2004; Zhu & Sarkis, 2007; Lynes and Andrachuk, 2008; Huang et al. 2009; Arnold and Hockerts, 2011). Bergh (2002) observed that organizations response to environmental issues were greatly influenced not from their own experiences or regulatory coercive pressures, but by paying close attention to actions of other organizations such as their competitors.

Dummett, 2006 in his study found protecting or enhancing corporate reputation as the second most important driver for corporate environmental responsibility after legislation. According to Hart, (1995), Porter and Linde (1996), Khanna & Anton (2002), Hu and Wall (2005), Chen (2008), Lynes & Dredge (2006), Lynes and Andrachuk (2008), Chang & Fong (2010), enhanced environmental performance adds to the corporate reputation and brand image and provides competitive advantage to the organizations.

Key Barriers identified from literature

Previous studies suggest that a lack of resources to implement environmental protection measures, environmental awareness among consumers, lack of top management commitment and dominance of unorganized sector negatively affects the development of proactive environment strategies in an organization.

Lack of resources is remarked as one of the most significant barriers to implementing environmental policies in an organization (Ravi and Shankar, 2005; Murillo-Luna et al., 2007; Shi et al., 2008; Dahmann et al., 2008; Hung Lau and Wang, 2009; Wath et al., 2010; Chan, 2011; Delgado-Ceballos et al. 2012; Kumar et al., 2016; Kumar & Dixit, 2018).

Implementation of an environmental practices are hindered by adequate knowledge, lack of environmental awareness among organizational members, lack of knowledge and skills, Lack of environmental training of the employees, lack of sense of urgency

(Chan, 2008; Chan 2010; Seroka-Stolka and Lukomska-Szarek, 2016; Kumar & Dixit, 2018).

Owing to the lack of stringent government regulations and framework in the adoption of environmental policies, the growing unorganized sector is of vital concern (Chi et al., 2011; Qu et al., 2013; Chaturvedi & Arora, 2013; Milovantseva and Fitzpatrick, 2015; Heeks et al., 2015; Kumar & Dixit, 2018).

Lack of leadership and support, particularly from top management, lack of commitment and attitude of employees limited the implementation of an environment management system (Post, 1994; Murillo-Luna et al., 2007; Setthasakko, 2009; Ralph & Stubbs, 2014; Delgado-Ceballos et al. 2012; McEwen, 2013; Berrone et al., 2013).

Control variables

The size of organization affects the development of corporate environmental practices (Sharma and Henriques, 2005; Chen, 2008; De Marchi, 2012; Demirel and Kesidou, 2011; Bossle et al., 2016; Kim, 2018). The literature revealed that large organizations are in a better position as compared to small organizations to implement environmental practices (Wagner and Schaltegger, 2004).

Each industrial sector has different polluting potential and may adopt a different level of environmental management practices to avoid environmental risks associated with their operations (Gonzalez and Gonzalez, 2006; Gonzalez-Benito, 2008; Elsayed and Paton, 2009; Ervin, 2013; Singh et al., 2014)

Table 1: Variables identified from the various sources

Variables	Description	References
Internal Drivers		
Economic opportunities (Financial benefits)	Financial implications are seen as a key driver of corporate environmental strategies.	Cordano, 1993; Elkington, 1994; Hart, 1995; Miles and Covin, 2000; Christmann & Taylor, 2001; King and Lenox, 2002; Marshall et al., 2005; Lynes & Dredge, 2006; Eiadat et al., 2008; Tseng et al., 2013; Heeks et al., 2015
Environmental culture and leadership	An organization's leaders shape its culture - a strategic asset that translate environmental strategies into better performance.	Hanfield et al., 2001; Huang et al., 2009; Lynes and Andrachuk , 2008; Fraj et al., 2011; Paraschiv et al., 2012; Stoughton and Ludema, 2012; Heeks et al., 2015
Managerial Attitude and Motivations	Managers' Attitude and Motivation is positively linked with proactive environmental strategies.	Williamson et al., 2006; Kasim, 2007; Bansal & Roth, 2000; Sharma, 2000; Marshall et al., 2005; Lynes & Dredge, 2006; Lynes and Andrachuk, 2008; Eiadat et al., 2008; Carballo-Penela & Castromán-Diz, 2015; Vithessonthi, 2009; Ervin et al., 2013; Hunt and Auster, 1990; Liu et al., 2012
External Drivers		
Regulatory pressures	Pressure exerted by government agencies, local, regional and international regulators, certifications (e.g., ISO), compliance with current regulations, preemption of future regulations.	Cordano, 1993;Walton et al.,1998; Beamon, 1999; Marshall et al., 2005; Zhu & Sarkis, 2007; Eiadat et al., 2008; Berrone et al., 2013; Huang et al., 2009; Arnold and Hockerts, 2011; Paraschiv et al., 2012; Heeks et al., 2015
Customer demand	End-users' concern for environmentally friendly products, requirements for environmental actions or standards motivate organizations to incorporate environmental practices.	Henriques & Sadorsky 1996; Christmann & Taylor 2001; Khanna & Anton 2002;Kagan et al.,2003; Buysse and Verbeke, 2003; Marshall et al., 2005; Zhu & Sarkis, 2007; Eiadat et al., 2008; Huang et al.,2009; Arnold and Hockerts, 2011; Guoyou et al., 2013
Peer Pressure	Related to the issue of legitimacy – organizations compare themselves to their peers and try to behave in accordance with standards or norms prevalent in the same institutional field.	Bergh, 2002; Kagan et al. 2003; Christmann 2004; Zhu & Sarkis, 2007; Lynes and Andrachuk , 2008;Huang et al. 2009; Arnold and Hockerts, 2011
Reputation	To enhance a positive public perception of organization in the marketplace as being a good corporate citizen.	Hart, 1995; Porter and Linde, 1996; Khanna & Anton,2002; Hu and Wall,2005; Lynes & Dredge, 2006; Dummett, 2006; Lynes and Andrachuk , 2008; Chen, 2008; Chang & Fong, 2010; Heeks et al., 2015
Barriers		
Lack of resources	Lack of technology and expertise for e-waste recycling, Financial constraints.	Ravi and Shankar, 2005; Shi et al., 2008; Hung Lau and Wang, 2009; Wath et al., 2010; Chan, 2011; Delgado-Ceballos et al. 2012; Kumar et al.,2017
Lack of awareness among consumers	Limited interest in environmental issues	Chan 2011; Heeks et al., 2015;Wath et al., 2010; Mudgal et al., 2010; Garlapati, 2016; Hung Lau and Wang, 2009; Nnorom et al., 2009; Welfens et al., 2016; Kumar et al.,2017; Kumar & Dixit, 2018.
Competition from informal sector	Dominance of unorganized sector	Medina, 2000; Chaturvedi et al., 2007; Williams et al., 2008; Chi et al., 2011; Qu et al.,2013;

		Chaturvedi & Arora, 2013; Milovantseva and Fitzpatrick, 2015; Heeks et al., 2015; Kumar & Dixit, 2018.
Lack of leadership and support	Level of involvement with environmental issues, Resistance to change, Limited understanding and skills, poor communication.	Post & Altma, 1994; Murillo-Luna et al., 2007; Setthasakko, 2009; Ralph & Stubbs, 2014; Delgado-Ceballos et al. 2012; McEwen,2013; Berrone et al., 2013
Control Variables		
Organization Size	Structural characteristic that affects strategic choices in an organization.	Sharma and Henriques, 2005; 2013; Chen, 2008; Lee, 2008; Demirel and Kesidou, 2011; De Marchi, 2012; Liu et al., 2012; Berrone et al., 2013; Bossle et al., 2016; Kim, 2018; Tang, 2018
Industry sector	Each sector differ in their polluting potential and adopt varying degrees of environmental management practices to avoid environmental risks.	Gonzalez and Gonzalez, 2006; Gonzalez and Gonzalez, 2008; Elsayed and Paton, 2009; Ervin,2013; Singh et al., 2014

METHODOLOGY

The data was gathered from the multidisciplinary review of existing body of literature. In order to be considered for the study, publications had to meet the following criteria for inclusion:

1. Studies in the area of environmental management in general as well as in an organizational setting
2. Studies explaining corporate environmental strategy approaches and factors influencing it.
3. E-waste management frameworks
4. Relevance with regard to research objectives
5. No limitation with respect to publication date of studies

The study selection was based upon the following exclusion criteria: [1] "Environment" is viewed as system environment, not nature; [2] Studies that examine households' e-waste recycling behavior and practices; [3] Studies not meeting the objectives of the study.

The data was gathered from multiple databases such as Springer Link, Science Direct, Web of Science, IEEEExplore, ResearchGate, Jstor. All titles and abstracts of the studies from different disciplines were reviewed and the inclusion and exclusion criteria is checked for each entry.

Abstracts identified through database searching are 278 including observational studies, case reports and reviews. Abstracts screened after removing the irrelevant and duplicate studies are 253, Full text papers assessed for eligibility are 99, papers included in the final study are 34.

CONCEPTUALIZING THE POPOSED FRAMEWORK

As a result of review of literature, the following conceptual framework of antecedents of E-waste strategy in an organization was proposed and is illustrated in Figure

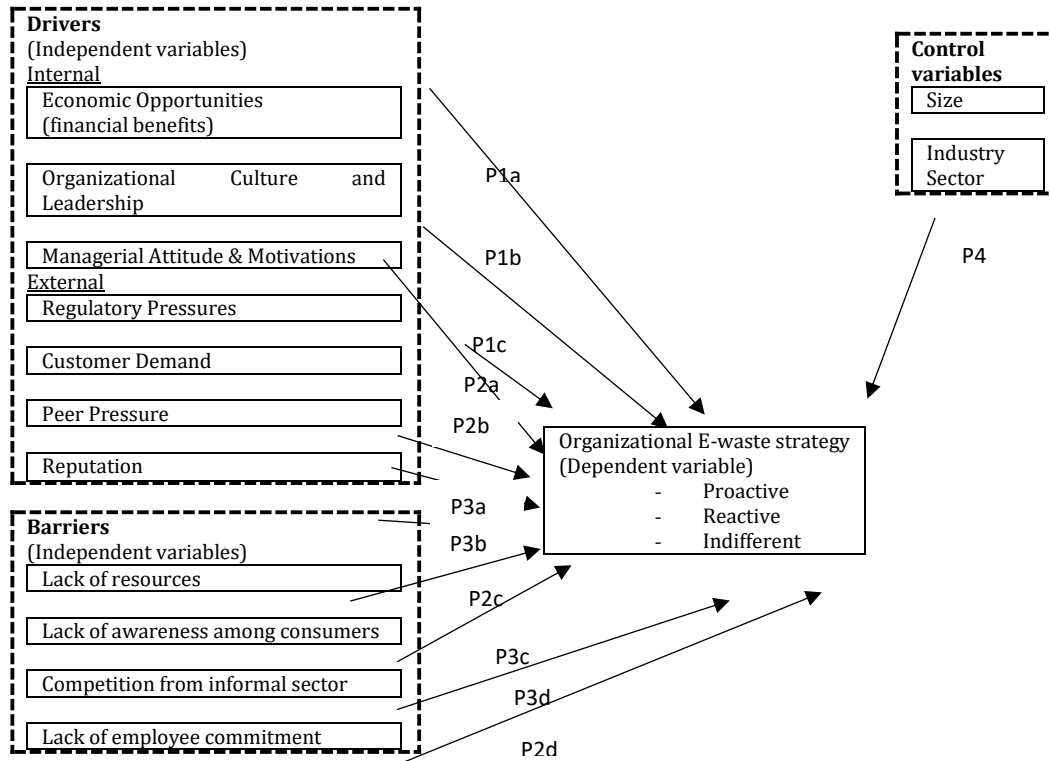


Figure 1: Conceptual Framework depicting antecedents of implementing E-waste strategy in an organization

The framework identifies two group of key factors that determine the organizational response to the issue of e-waste, as independent variables. First, Internal and External factors that serve as key strategic drivers for e-waste management in an organization. Economic opportunities, organizational culture and leadership, managerial attitude and motivations are the factors that foster the adoption of e-waste strategy in an organization. External factors include regulatory pressures, customer demand, peer pressure and reputation. A second group of factors called barriers, are those variables that hinder the implementation of organizational e-waste strategy. These are lack of resources, lack of awareness among consumers, competition from informal sector and lack of employee commitment. Referring to the prior studies, firm size and industry sector have been incorporated as control variables in the study (Lee, 2008; Liu et al., 2012; Tang, 2018; Gonzalez and Gonzalez, 2008; Ervin, 2013; Singh et al., 2014). Organizational e-waste strategy is taken as dependent variable.

The conceptual framework (Figure 1) is supported with the following propositions which further needs to be empirically tested:

Proposition 1: Internal factors: (a) Economic Opportunities, (b) Organizational Culture and Leadership, (c) Managerial Attitude and Motivations foster the adoption of e-waste strategy in an organization.

Proposition 2: Factors external to the company, that is (a) Regulatory Pressures, (b) Customer Demand, (c) Peer Pressure and (d) Reputation, foster the adoption of e-waste strategy in an organization.

Proposition 3. Hindering factors, that is (a) Lack of resources, (b) Lack of awareness among consumers, (c) Competition from informal sector, (d) Lack of employee commitment, limit the implementation of organizational e-waste strategy.

Proposition 4: Factors such as (a) Firm Size, (b) Industry Sector, moderate the adoption of e-waste strategy in an organization.

Theoretical & Managerial Implications

The study contributes to the literature on e-waste management in the organizational context that has received little attention from researchers. The framework provides managers and policy-makers with a list of drivers and barriers that can provide directions for setting up appropriate policies that encourage organizations to adopt proactive E-waste strategy. Understanding the drivers and barriers in implementing e-waste strategy could help organizations in developing more specific interventions to improve the e-waste initiatives. Further, the study raises the level of awareness of E-waste issues to those organizations who earlier may not be aware of it to a significant level.

Study Limitations & Future Research

The findings of the study are subject to some limitations that can be addressed in future research. First, the proposed framework of organizational e-waste strategy is conceptual in nature and solely based on the review of existing literature. However, the framework can be empirically tested and validated using appropriate statistical tools and techniques in any organization within different industries. Further, it can also be applied in practice in an organization, after empirical testing, by incorporating the results of the tests in the model. Therefore, the basic limitation of the proposed framework is that the framework lacks validation from extensive empirical evidence. Second, it is likely that the factors influencing the implementation of organizational e-waste strategy chosen in this study are not exhaustive. Hence, there may be other key variables influencing the organizational strategy of e-waste management which are not covered in the present study.

CONCLUSION

The related literature on e-waste, environment management, organizational environment strategy, corporate sustainability, corporate greening was reviewed to explore organizational response to e-waste management. Inferring from the previous related studies, the paper proposes a conceptual framework of the key factors driving the organizational response of bulk consumers to the e-waste issue as well as factors which may hinder the implementation of the e-waste strategy in an organization. The framework comprises of internal drivers, external drivers and barriers to the organizational e-waste strategy. Further development of the proposed framework by way of testing and refining using empirical evidence through survey will be undertaken. The framework proposed in this paper is likely to support organizations developing E-waste initiatives and stimulate further research in the domain of e-waste management.

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