SUMMARY

WEEE reverse logistics and its impact on economic and environmental sustainability: computer industry case studies

Created by Roesfiansjah Rasjidin B.Tech., M.Eng.

Subject : SAMPAH ELEKTRONIK

Subject Alt : ELECTRIC WASTE, ELECTRONIC EQUIPMENT

Keyword : : computer;toxic chemical

Description :

High consumption and shorter product life cycle of EEE (electrical and electronic equipment) have been generating huge WEEE (waste electrical and electronic equipment) over time. However, simply low percentage of them is reprocessed and most of them end up in landfill. It significantly threatens human and ecological health due to hazardous materials and toxic chemicals contained in WEEE particularly computer waste. The circumstances urge local and federal governments to enact regulations and legislations regarding electronic waste (e-waste) in order to protect the environment. In addition to legislation compliance intention, EEE manufacturers have to manage their reverse logistics properly for profit-oriented purpose. Therefore, how to manage WEEE reverse logistics in computer industry with financial and environmental performance criteria becomes a research question. Accordingly, long-range economic and environmental sustainability of reverse logistics systems constituting part return management by its own manufacturer in computer industry are studied in this research. Two models by means of system dynamics (SD) methodology have been developed to represent the reverse logistics (RL) or reverse chain and the closed-loop supply chain (CLSC) systems. In the first model which is for economic sustainability (EconS), the network consists of collection, shipment, repackage, repair, recycling, supplier's credit, supplier's exchange, recovered part sales, recycled material sales and disposal activities. Moreover, the second model which is for environmental sustainability (EnviS), the structure integrates the reverse chain of the first model and a forward chain containing material procurement, production, distribution and part sales. Subsequently, two respective case studies have been executed to validate the models and evaluate two particular sets of influential factors on manufacturer's profitability and environmental sustainability index as the systems performance measurements consecutively. In the first case study, six influential factors namely part type, return quality, market attractiveness, custom duty percentage, shipping cost and re-processor location attractiveness are evaluated on economic sustainability of the part recovery systems. Further, in the second case study, five significant factors namely part type, return quality, re-processor location, collection percentage and recycling percentage are examined on environmental sustainability of the CLSC part recovery systems. Based on both simulation results, the corresponding optimal policies are recommended for the company in managing its reverse logistics systems. In order to maximise profitability, the recovery option decisions should be prioritised for buy part type especially under inferior quality and high market attractiveness circumstances,

higher quality return of make part type specifically under high market attractiveness, and higher quality return of buy part. Moreover, the operational features of the RL systems should be applied on higher market attractiveness particularly at low custom duty circumstance, lower custom duty especially under high market attractiveness circumstance, lower shipping cost and higher re-processor location attractiveness in particular for make part type.
Furthermore, maximisation of environmental sustainability index in the closed-loop supply chain can be achieved by managing the recovery option decisions. In addition, the operational feature of the CLSC which maximises the environmental sustainability index is managed by locating the recovery facility close to where the returns are collected. The developed SD models can be utilised by relevant companies as experimental tools in managing their reverse logistics operations in order to maximise their profit and environmental sustainability index.

Date Create	**:**	17/02/2017
Type	**:**	Text
Format	**:**	pdf
Language	**:**	Indonesian
Identifier	**:**	UEU-PhD-Dis_Rasj
Collection	**:**	Dis_Rasj
Source	**:**	A thesis submitted in fulfilment of the requirement for the degree of Doctor of Philosophy

Full file - Member Only

Contact Person :

Astrid Chrisafi (mutiaraadinda@yahoo.com)

Thank You,

Astrid (astrid.chrisafi@esaunggul.ac.id)

Supervisor