

Current Reverse logistic for end of life computer in Malaysia

Siaw Hua Chong^{1,a}, Sulaiman B. Hasan^{2,b}, Chee Kiong Sia^{3,c}

^{1,2,3}Universiti Tun Hussein Onn Malaysia

^ashchong@uthm.edu.my, ^bsulaiman@uthm.edu.my, ^csia@uthm.edu.my

Keywords: Reverse logistic. End of life computer. Malaysia

Abstract High technology and affordable computers are highly demanded currently. Computers are much faster and with very high performance. This however resulted in short life cycle and there is a need for a system to manage used computer that is collected. The volume of end of life computer that will be generated in a developing country has been forecasted to be between 400-700 million units by the year 2016-2018. This paper reviews current the reverse logistic for end of life computer in Malaysia and how it will evolve in the near future.

Introduction

Technology nowadays mostly are integrated with electronic (e-) like e-commerce, e-banking and even cyber manufacturing. Computers become important tools which are needed almost all the time. Computers have become more affordable with the improvement of technology couple with mass production and cheaper material. However, the requirement of the computer to perform faster and better make the life cycle of the computer shorter. The computer which reaches its life cycle was defined as End of Life (EOL) computer in this article.

The volume of end of life computer generated in the developing country have been forecasted will exceed developed regions by the year of 2016-2018, which the number of the obsolete computer will be reach 400-700 million units [1]. Reverse Logistic system is one feasible method of solving this problem. A good reverse logistic system can minimize wastage of land filling recyclable recourses. Reverse Logistics stands for all operations related to the reuse of products and materials. The management of these operations can be referred to as Product Recovery Management (PRM). PRM is concerned with the care for products and materials after they have been used. Some of these activities are, to some extent, similar to those occurring in case of internal returns of defective items due to unreliable production processes. Reverse Logistics though refers to all logistic activities relate to collect, disassemble and process of used products, product parts, and/or materials in order to ensure a sustainable (environmentally friendly) recovery[2].

Reverse Logistic of EOL computer in Malaysia

Generation of EOL computer. According to expert survey from International Data Corporation(IDC) [3] , there is a total of 697,781 unit been brought into Malaysia's personal computer market in the 4th quarter of 2011. Forecasted increment of unit for the 1st quarter of 2012 is 300,000 netbooks under the Malaysian Communications and Multimedia Commission (MCMC) 1Million Netbooks program will be shipped. With these amount of shipment, some potential problem been identified; first what would happen to the old pc the consumer have on hand with the purchase of the new unit. Second consideration is what will happen to the 1 million units of netbooks after 4-5 years where will be those computers when it reaches its lifespan. In January 2008, Department Of Environment Malaysia had issued guidelines on e-waste which classify e-waste and characteristic of e-waste. However the guidelines do not include any information of how the e-waste should be managed[4]. Setting up the reverse logistic system and management will be a good option and contribute toward managing e waste.

Review of a Case Study. A survey has been done to 300 household at Shah Alam, Malaysia to identify current electronic waste management practices by households. Fig. 1 shows the amount of electrical and electronic equipment owned by 300 households in Shah Alam City.

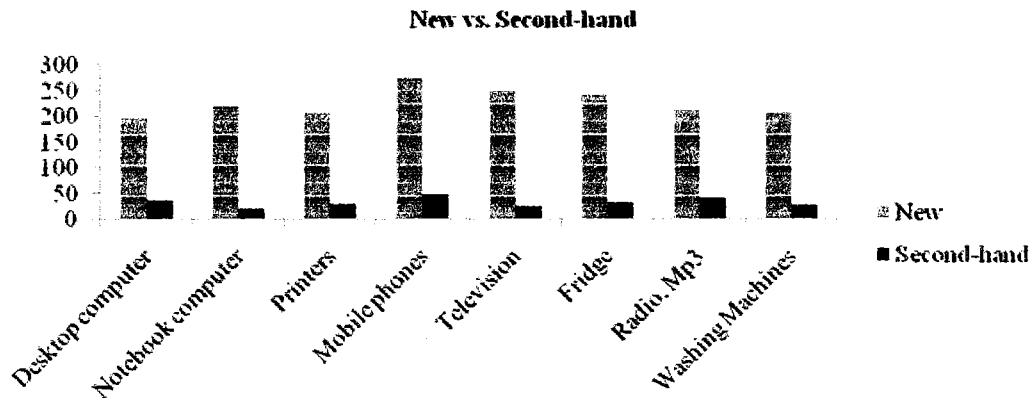


Fig. 1: Amount of new and second hand electrical and electronic equipment [5].

Desktops and Notebooks computer gain a ratio 2/3 for each separate item and almost every family will have a computer. Out of the total electrical and electronic device, only 22% of the e-waste have been sent for recycle as shown in Fig. 2[5].

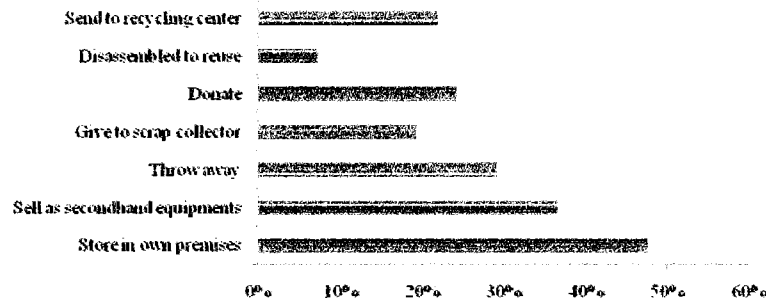


Fig. 2: E-waste disposal practices [5].

Current trend of reverse logistic for EOL computer in Penang. In October of 2011, a group of expert has started a project to formulate implication of new policy for enhancing e-waste collection in Malaysia. The pilot project will start in Penang Island Malaysia. The project is a cooperation Department of Environment Malaysia, Majlis Perbandaran Pulau Pinang, manufacturer, home appliance selling store and recovery centre at Penang.

An interview session has been carried out with the expert who leads the pilot project of E-waste recycling at Pulau Pinang to explore the current flow of reverse logistic for EOL computers. Outcome of the interview are as below: The discarded amount of EOL computer in 2012 is 2714 units where 2645 units are desktop computers while only 69 units are laptops.

Fig. 3 showed the percentages of the disposal practice of EOL desktop computers which are in practice now. Currently most of the EOL computer will be collected by the waste collector. All the residents prefer to do so as the collector collect the EOL computer directly from their home. The waste collection centre is normally located nearby most of the residential area is also the other reason. 18.1% of the EOL computers will be sent to the second-hand and repair shop. Only 15% of the computers have been repaired and resell to customer. Waste collectors will sent the EOL computer to junk shop and also partial recovery facilities for disassembly process and which around 65% of those items will go to dealer/trade; where only 11.6% of the dismantled part will be sent for recycle.

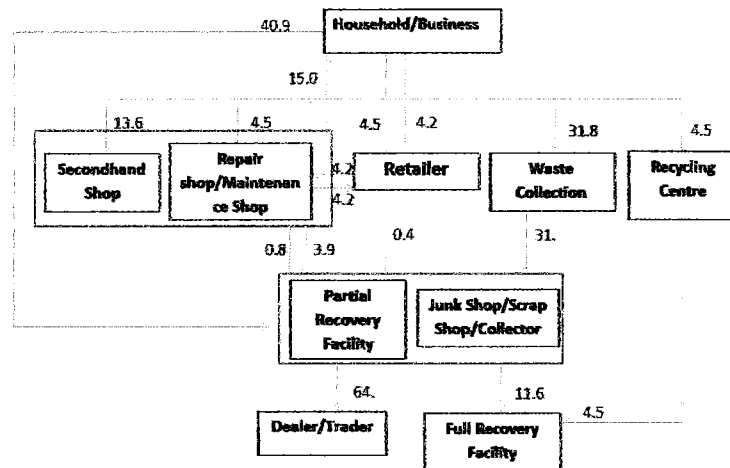


Fig. 3: Current EOL desktop disposal trend in Penang [6].

Fig. 4 showed the current practice of EOL notebooks disposal in Penang. 70% of the notebooks will be sent to shop for repair or trade for new computer. 67.4% of notebooks will be resell as second hand goods. 20% of the notebooks will be sent to trader while only 3.3% will be recycled.

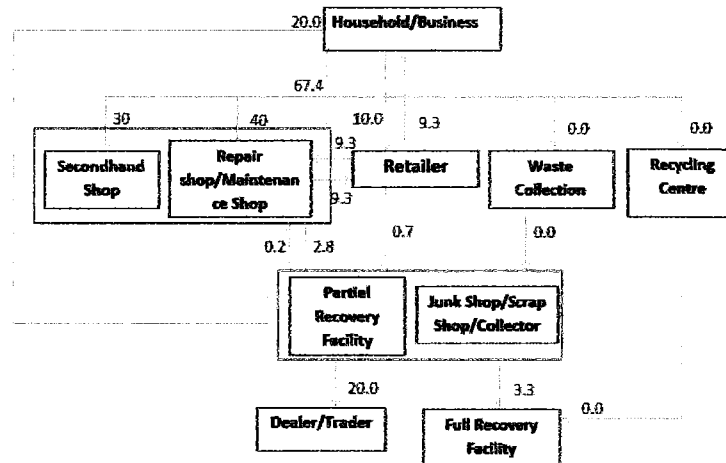


Fig. 4: Current EOL laptop disposal trend in Penang [6].

Issues to improve reverse logistic. Expert data noted that in current practice most of EOL computers end up in the trader's hand (Fig.3&4). The problem is the flow after traders is hard to control and define. At the moment question are asked about the legality of the management of the EOL computer or will it end up in landfill or recycled, The pilot project in Pulau Pinang are directed towards a better flow of reverse logistic and good handling, maximum the recyclable product and should be achievable.

Current practices of reverse logistics will deliver EOL computers to a full recovery centre, partial recovery centre and most probably high percentage of goods will send to trader. Trader will sell EOL computers to other countries or else in Malaysia where the final destination of these items are untraceable. With the implementation of the new model, almost all the EOL computer will be sent to a recovery centre where recyclable resource can be sold back into market rather than ending in a land filled (Fig.5)

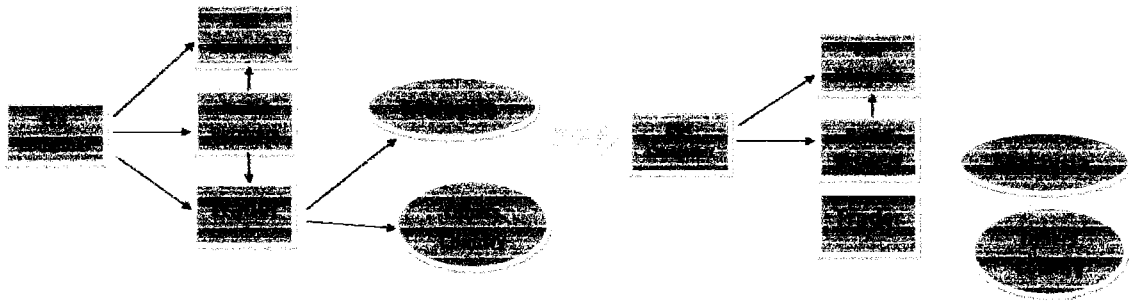


Fig. 5: Evolution of reverse logistic model

Conclusion

The EOL computer will be increased tremendously through the coming years. Reverse logistic of EOL computers will become critical to ensure recyclable resources can be retrieved and thus reduce waste and pollution to environment. Proper handling of landfill is important in ensuring hazardous materials are not released into the environment. There must also be a clear, traceable flow of EOL computers to ensure proper management of hazardous material. The government especially the relevant authority must draw a good policy on reverse logistic to ensure a sustainable and health environment is always maintained in the future.

Reference

- [1] J. Yu, E. Williams, M. Ju, and Y. Yang, "Forecasting Global Generation of Obsolete Personal Computers," *Environmental Science & Technology*, vol. 44, no. 9, pp. 3232-3237, Mar. 2010.
- [2] "What is Reverse Logistics?," 2012. [Online]. Available: <http://www.reverselogisticstrends.com/reverse-logistics.php>.
- [3] "Floods in Thailand leave Malaysia PC Market Stagnant in 4Q11, Says IDC," *idc*, 2012. [Online]. Available: <http://www.pressebox.com/pressreleases/idc-central-europe-gmbh/boxid/490761>.
- [4] F. O. Ongondo, I. D. Williams, and T. J. Cherrett, "How are WEEE doing? A global review of the management of electrical and electronic wastes," *Waste Management*, vol. 31, no. 4, pp. 714-730, Apr. 2011.
- [5] K. J. Ahmad, "Electrical and Electronic Waste Management Practice by households in Shah Alam, Selangor, Malaysia," *International Journal of Environmental Sciences*, vol. 1, no. 2, pp. 132-144, 2010.
- [6] Wadi, Hideki. E-waste management pilot project at Penang. [interv.] Chong Siaw Hua. 06 22, 2012.