

## **CHAPTER 3: MATERIALS AND METHODS**

### **3.0 Introduction**

The research methodology for this study covers questionnaires/survey administered to the public and interview session with management staff from selected electronic industry. As EPR looks into different aspects of responsibilities among the stakeholders, opinion from them, the public and groups concerned towards the practice of EPR are analyzed through this study.

The methods can be divided into 3 parts: 1)Public feedback or opinion towards EPR, 2)Interviews related to EPR practice in selected Electronic Industry which includes electronic companies and 3) To analyse the feedback of data from electronic companies and public using Expertchoice and SPSS software, respectively. The research was conducted over several phases between September 2011 and June 2012.

### **3.1 Literature Review**

The literature study helped in terms of EPR case studies as well as practices undertaken in Malaysia. Learning about issues involving EPR and e-waste, as well as, comparison with other developed and developing countries has further enhanced the study. Overall, this is to get an overview on EPR targeting the electronics industry with other additional information gained through the internet as well as journals.

### **3.2 Identification of Stakeholders**

In this field of study, the stakeholders interviewed were from the electronic industry particularly the computer based sector. The companies in this sector that responded are top multinational companies headquartered within Klang Valley. They are

decision makers in terms of the EPR practice in the e-waste management of their respective companies. They do not directly get involved in the e-waste process but could influence the recycling process in the near future.

### **3.3 Company survey through interview session**

The section involves mostly interview sessions which are confidential and depends on a set of questions (See Appendix A for the Company survey). The stakeholders approached were identified through company's websites, as well as, through personal contacts from the initial stakeholders interviewed.

Interviews were undertaken to assess the following:

- i. Basic background information on EPR definition, the company's role etc.)
- ii. The responsibility of the producers, challenges and problems encountered associated with environmental, social, and economical aspect.
- iii. Costs and prices of products including sales and competitiveness of the product.
- iv. Take-back system.

Most of the interviews were carried out during company visits. This serves a better understanding in evaluating the quality of work, and shed light on many unforeseen aspects of the process. Interviews were also conducted via e-mails and phone calls. In relation to EPR and e-waste management, the company stakeholders were contacted by phone to determine if they were responsible for EPR and e-waste management, this was so as to determine if they were the right contact persons for the study interview sessions. Three stakeholders from each company were interviewed from the top management and between five to ten management or representative staffs were also interviewed for each company. A total of 10 companies were covered in the project.

The interviews conducted varied from 45 minutes to 2 hours in length. The session with the companies was carried out between September 2011 and April 2012. There are more than 1000 companies in the Electronics Industry in Malaysia of which only 15 are under the “computer sector” and are top multinational companies. Classified out of the 15 companies contacted, only ten companies were interviewed successfully. Some of the companies from other states did not respond favourably in getting permission to conduct the interview. Almost all the interviews were conducted in person except for two interviews through telephone.

Prior to conducting the interview, initial contact was made through e-mail to the personnel under the environment field in the selected companies. During the initial contact, focus study of research and purpose was communicated, together with the request of introduction to the officer working in areas that are relevant to the research. Once the company contacted has given permission to conduct the interview, a number of issues to be addressed during the interview was sent. The issues were based on the understanding of various factors, such as EPR, the responsibility of producers towards consumers demand on safety and quality of their product, costs and prices involved and take-back requirements that would eventually influence the design of a product.

The data collected from the manufacturers was followed by the interview with professionals related to the research field (i.e. product policy, environmental product design and etc.). The recorded interviews were then transcribed. Whereas, the written materials obtained during the interviews was reviewed and summarized according to the list of issues sent in advance. The findings of the interviews and collected materials contributed a large part of the study analysis. The interviews were further analysed to identify the common situation and the reasons for similarity and

differences. This applies to all electronic companies interviewed within the computer sector. The summary of the respective interviews were then compiled, sorted and analysed through the Expertchoice software.

#### **3.4 Questionnaire/ Survey with the public**

This was conducted among the public consumers throughout Klang Valley. In carrying out the actual survey, the validity and reliability test was carried out among 15 random respondents in getting their feedback on the questionnaire. Based on their response, amendment was done. Based on the statistical test done, with population of 7.5 million and confidence interval of 7, the appropriate sample size was determined to be 200 respondents. Their knowledge and awareness regarding EPR, e-waste and the take-back scheme were evaluated accordingly.

The questionnaire(as attached in Appendix B) or survey is an attempt to justify information coming from interviews and literature review. To some of the stakeholders or private consumers, the questionnaires was sent by e-mail and returned the same way. The survey was designed to gain information involving both qualitative and quantitative data.

The questionnaire for the public consumers consist of 50 set of questions. The first section looks into the demographic details of the respondents, followed by other sections which consist of knowledge on Extended Producer Responsibility (EPR) and e-wastes. Some section of the questionnaire employed the 5-point Likert scale which rated from 1 (strongly disagree) to 5 (strongly agree). All the questionnaires were given out in both English and Bahasa Malaysia version to overcome the language barrier that might affect the response rate. In ensuring an effective completion, the

public took 10-15 minutes in completing the questionnaire given. Thus, in analyzing the situation more precisely, further research was done.

### **3.5 Analysis & Interpretation**

Based on the findings, a comparative analysis was made from both the public respondents, as well as, the stakeholders interviewed from electronic based companies. The findings from the public survey responses were analyzed using SPSS software and the data gained from interview with company stakeholders was analyzed using Expertchoice software. SPSS was used in this study to calculate the mean score and standard deviation for each statement for analysis. The standard deviation showed the responses were widely dispersed. In addition, paired t-test and Pearson correlation test were performed to find out if there is any statistical differences present in gender, age, race, occupation, education level, salary and nationality.

The Expert choice software employs the Analytical Hierarchy Process (AHP) which is an evaluation process using hierarchical structure for prioritizing objectives. Based on the interview or survey done with the stakeholders of electronic companies, the questions were divided into elements in a hierarchy tree structure form. The software further evaluates the elements using pairwise comparison by giving relative importance to the objective which is to determine on the factors that encourages the adoption of EPR practice in respective electronic companies. Based on the analysis done, the Expert choice calculated the global weights of each elements or objectives according to AHP methodology. The analysis was done continuously for all the 10 companies interviewed in this study and it was evaluated accordingly. Based on that, a comparative analysis was also done amongst the companies.

### 3.6 Flow Chart of Company and Public Survey

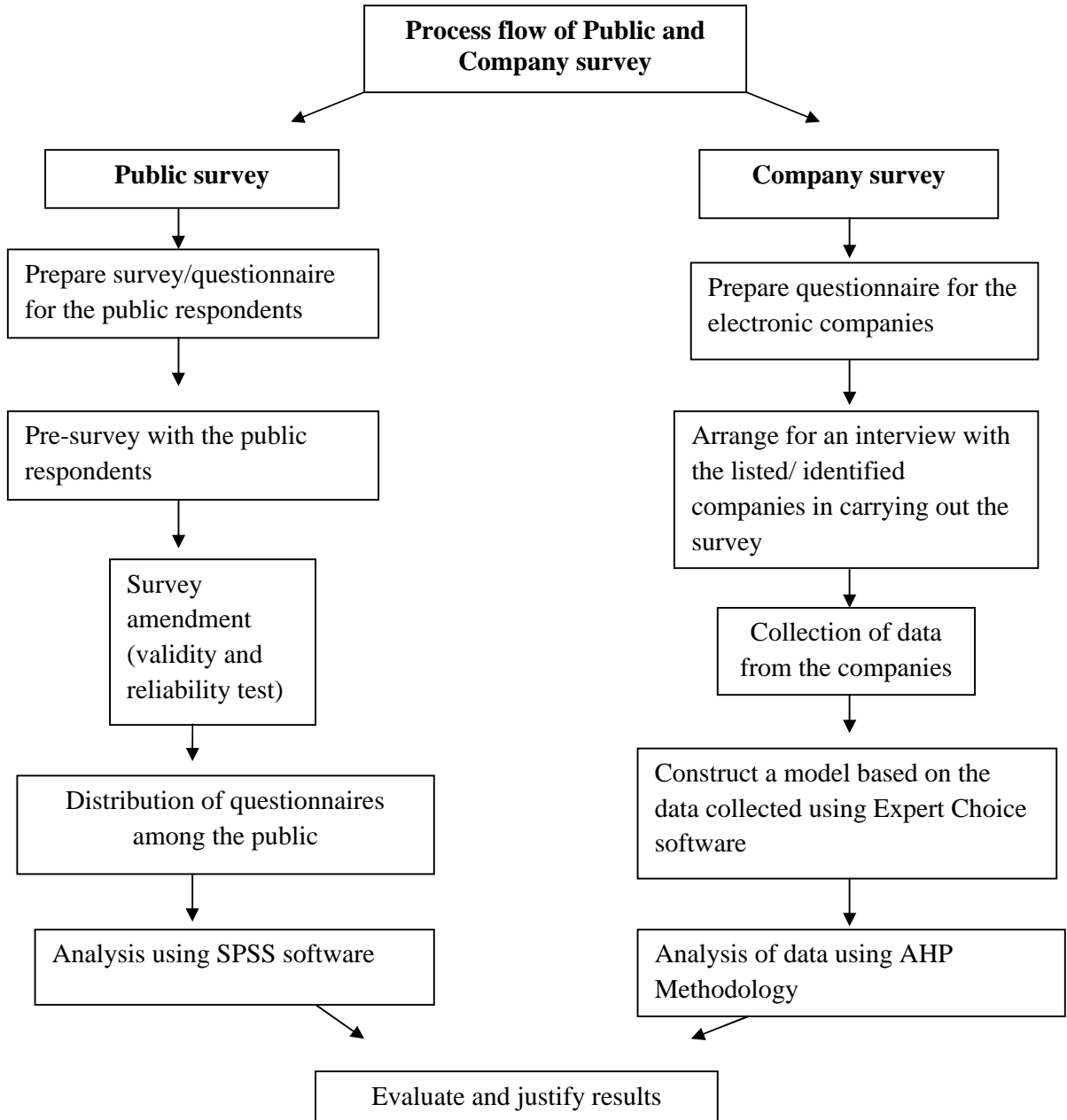


Diagram 1 : Process flow of the study