CONSUMER VOICE TOWARDS ENVIRONMENTAL GREEN MOBILE PHONE: A CASE OF UNIVERSITI TEKNOLOGI MALAYSIA STUDENTS

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This dissertation is dedicated to God Almighty, through His endless mercy and support I gained strength, knowledge and guidance to complete my study.

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ABSTRACT

Rapid growing of electronic products waste such as mobile phone has become a main issue of waste stream in Malaysia. This can be explained by the fact that current process of product development is lack of consumer voice which led to poor eco-design of the green product in the marketplace. Therefore, this study aimed to investigate consumer concerns and considerations towards environmental green mobile phone which will better address consumer perspectives in the planning stage of product development. This study applied quantitative methods of investigating consumer voice for green definition of the mobile phone as well as main criteria that affect consumer choice and consumer priority criteria for mobile phone green design idea. To achieve assigned objectives, this study used exploratory Factor Analysis and Analytic Hierarchy Process to determine priority of criteria for mobile phone green design idea. The findings of the study revealed that consumer defined green mobile phone, that produce the least amount of pollution and consumes the least amount of energy and resources. Furthermore, consumer selected priority criteria is green mobile phone that has higher quality with innovative features and it is considerably safe to the living environment, with energy efficiency and resource efficiency features but with considerably lower price. The implication of this study proposed an approach of eliciting consumer voice in the planning stage of the product development which assist designer to take into account consumer voice for environmental green mobile phone eco-design development. The results of the study recommended further research in exploration of consumer perspective in design for recycling, design for waste reduction as well as design for reuse by using the proposed approach.

ABSTRAK

Kadar peningkatan alatan eletronik e-sisa yang mendadak seperti telefon bimbit menjadi isu utama dalam pengurusan sisa di Malaysia. Fenomena ini terjadi disebabkan kurangnya perhatian terhadap suara pengguna di dalam proses penghasilan produk yang seterusnya membawa kepada reka bentuk yang yang tidak mesra alam di pasaran. Oleh itu, kajian ini adalah bertujuan untuk menyelidik isu pengguna dalam mempertimbangkan telefon bimbit yang mesra alam di peringkat perancangan dalam pembangunan produk. Kajian ini menggunakan kaedah kuantitatif dalam menyelidik definisi telefon bimbit mesra alam dan ciri-ciri yang mempengaruhi pilihan pengguna untuk reka bentuk telefon bimbit ini. Kajian ini turut menggunakan kaedah analisis faktor penerokaan bagi mendapat keputusan ciri-ciri tersebut. Selain itu, *Analytic Hierarchy Proces s*turut dig unakan bagi menentukan ciri-ciri yang utama yang perlu dalam reka bentuk telefon bimbit yang mesra alam. Penemuan daripada kajian ini mendapati, pengguna memberi definisi telefon bimbit mesra alam sebagai alat yang menghasilkan pencemaran yang rendah dan menggunakan tenaga dan sumber yang sedikit. Tambahan pula, kajian ini turut menemukan ciri-ciri utama pilihan pengguna tentang telefon bimbit mesra alam yang berkualiti tinggi dengan ciri-ciri inovasi dan mempertimbangkan keselamatan persekitaran, dengan tenaga dan sumber yang efisien tetapi dengan harga yang rendah. Dari kajian ini, dicadangkan pendekatan bagi mendapatkan suara pengguna di peringkat perancangan dalam pembangunan produk yang membantu pereka bentuk mempertimbangkan nilai mesra alam dalam menghasilkan telefon bimbit.

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CHAPTER 1

1.1 Introduction

Young people tend to use cell phones more than older generations in their day-to-day lives. They represent a key target market for cell phone marketing, and most of them grew up in the technological age. According to Business Monitor International (2011), the number of mobile phone users in Malaysia is estimated at 33.9 million in 2010 and this number is constantly increasing. However, increased consumption for electronics including mobile phone products resulted in increasing waste and pollution to the environment (Sheng et al., 2013).

Consequence of increasing environmental pollution has lead to increasing consumers' concern and awareness of various environmental issues (Sakao & Fargnoli, 2013). This also influenced consumer to demand from companies to produce high quality products which are consistent with environmental standards as well as satisfying their needs (Chang & Fong, 2010). Although many mobile companies like Samsung, Motorola, Nokia constantly developing their products by elimination of hazardous substances which is harmful to the environment, user related perspective that mainly influences market demand remains unaddressed. The result of the findings showed that manufacturers performance for developing greenproduct put relatively low effort on consumer side which caused consumer dissatisfaction (Sakao & Fargnoli, 2013). Since consumer play important role inproduct development process which mainly express priority criteria for various environmental issues (Tsai, 2012), this study aims to determine priority of the consumer choice criteria for environmental green mobile phone which mainly contributeconsumer longer usageby identifying consumer needs for environmental preservation as well as allowing to gain competitive advantages in marketplace.

Furthermore, prioritizing consumer criteria choice for environmental green mobile phone help researcher to come up with green design idea alternatives which aid design engineer to select the most appropriate design idea for developing environmental green mobile phone.It is expected that the results of this study could help developers and design engineer to develop environmental green mobile phone eco-design that could promote consumer longer usage and less frequent disposal.

1.2 Background of the problem

Environmental issues such as the problem of E-waste in Asian countries like China, India, Indonesia and Malaysia is increasing. One of the reasons is growing number of electronic industries. On the other hand, rapid development of new electronic products, that contributed to high consumption of the new products and falling prices which consequently resultedin fastest growing e-waste of the obsolescent electronic devices. Cellular phones have been recognized as a rapid growing component of the solid-waste stream in developing and developed countries. The impact of e-waste considered to be dangerous not only to the environment but to human health as well since certain components of electronics contains toxic materials increasing risk to surrounding living environment (Maheshwari et al., 2013).According to the findings obtained from a survey, Malaysia is generated 1.1 million tonnes of e-waste only in 2008 and this number is constantly increasing (Pariatamby & Victor, 2013). Due to this, Malaysian government adopted several significant polices towards environmental protection to promote green technology within country. This includes:

- Increasing production of local Green Technology products
- Larger local market shares in Green Technology
- Become as a major producer of Green Technology in the global market. (Chua & Oh, 2011).

However, there are certain challenges that many company faces, are lack of criteria and definition of the green mobile phone product which could help companies

to develop better strategy for sustainable development of the green mobile phone in the marketplace. Some companies emphasize that lack of clear definition of what criteria a green product needs to meet, creates uncertainty that could not direct companies towards successfully developing a green product in Malaysian market. According to the WECAM's Secretary General Piarapakaran Subramanian statement: “The research should identify 'green initiative' products that would encourage the emergence of sustainable consumers with technology” (Euromonitor International, 2012).

1.3 Problem statement

Lack of consumer consideration of environmental value of the mobile phone tec hnology has become the main barrier for sustainable development of the green mobile p hone in the marketplace.

1.4 Research questions

1. How does consumer define green product?
2. What kind of criteria and preferences should be considered from the consumers’ point of view?
3. How AHP approach can assist to deal with complex problems with many criteria and alternatives to be considered?

1.5 Aim of the study

This study aims to investigateconsumer consideration towards environmental green mobile phone which will help to better understand and address consumers’ perspective in the development of green mobile phone.

1.6 Objectives of the study

1. To identify mobile phone green definition based on the consumer consideration
2. To identify consumer choice criteria for green mobile phone
3. To prioritize consumer criteria choice for various design alternatives
4. To develop aprototype as a proof for proposed green mobile phone design idea.

1.7 Significance of the study

It is expected that this study would aid companies, industries, developers, and business organizations to develop environmental green mobile phone eco-design that could promote consumer longer usage and less frequent replacement.

1.8 Scope of the study

The scope of the thesis is as below:

1. It covers only UTM students of Skudai Campus, Johor, Malaysia.
2. It focuses on green mobile phone.
3. And lastly, it considers consumer selected criteria and definition for green mobile phone.

1.9 Methodology

With the purpose of reaching first and second objectives; firstly, we used literature review to collect relevant information and afterwards distributed questionnaires to carry outa survey to determine significant variables. Obtained data were analysed using exploratory factor analysis for data reduction as the number of

variables for the green mobile phone were abundant with multiple sub items, thus from the first set of questionnaires we applied factor analysis to remove redundant and insignificant variables for further analysis. As exploratory factor analysis is a complex, multi-step process; essentially, the main role of using factor analysis is to explore significant numberof variables and their interrelationships.

In order to achieve the third objective, we also, applied Analytical Hierarchy Process - AHP approach to develop a decision-making method to make better and informed decisions in selecting the most appropriate design concept for green mobile phone. The proposed method utilizes all natures of the AHP to make paired comparisons based on Saaty`s 9 point ranking scale to evaluate consumer green consideration for mobile phone. This method is used to cope with Multi-Criteria Decision Making matters. The main advantages of applying AHP are:

- Enable complex problems with many criteria and alternatives to be solved.
- Can deal with tangible and intangible attributes
- Take into account qualitative and quantitative factors
- Easy to refer to previous pair-wise comparisons while making judgment

1.10 Chapter summary

In the first chapter a brief introduction about the research and how research is going to be executed had been discussed. The problem background and the main statements have also been discussed in this chapter to give an introduction of the research and to explain why this study has been proposed. It is expected that, by completion of this study, the objectives and aims of the research would be achieved.

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