

PERCEPTION OF AIRPORT USERS' ON ENVIRONMENTAL-FRIENDLY AIRPORT CHAIR DESIGN IN KLIA

Asa Naim Rusli^{1*} and Shukri Mohamed^{1*}
Faculty Of Forestry, Unviersiti Putra Malaysia, Malaysia

* Corresponding author:
Asa.upm@gmail.com
Shukri@putra.upm.edu.my

ABSTRACT

Malaysia Airport Holding Berhad (MAHB) has taken several measures to spread environmental awareness among the staff and communities. Nevertheless, the awareness appeared to be lacking in the context of eco-design product. Eco-design integrates multifaceted design aspects and reflects the environment concept. Understanding consumers' needs and desires is imperative in designing environmental-friendly product. As consumers' expectation plays an important role in developing eco-products, a survey was carried out to evaluate the user' (passengers) environmental-friendly perception and eco-design attributes on the current airport chair use in KLIA. In KLIA, airport chairs appear to be the significant facility used by the passengers. The results indicated that the most users rated that the existing airport chair did not apply environmental-friendly practices. Users viewed on attributes characteristics for eco-design chair was categorized into physical appearance (i.e.- attraction feelings, design and colour), sensational feeling (i.e.- physical, health, and usability) and physical characteristics (recycle, reusable, eco-material, reduce cost and reduce environmental impact). Based from these findings, this study contributed towards integrating environmental-friendly concept with users' perception as part to promote sustainable product.

Keywords: *environmental-friendly practices, eco-design, attributes, eco-design chair, users' perception.*

1. INTRODUCTION

The global industrial revolution which began in the early of eighteenth century prompted in high production of goods. Nevertheless, the development of the industrialization did not come without any impacts. It is recognizable that large numbers of resources are being used in the production to fulfil the increasing demand of products. Apparently, the discharge of different types and quantities of substances as a result of resources consumption threatened the environment (Maxwell et. al., 2006) Recently, the exhaustion of resources and environmental pollution caused by mass production and consumption of goods has sparked the interest to achieve the standards of ecological values.

Leonidou et al. (2010) highlighted that the exploration on better approaches in manufacturing products with the intention to protect the environment has been received extensive attention since the last four decades. Several studies have revealed that one of the most significant approaches were through the design of environmental friendly product, which is based on the consumers' expectation (Nizam et al., 2011; Haghiri, 2011; Chen and Yeh, 2010). Moreover, Hung and Chen (2012) emphasized that product appearance has been well-recognized as the most important factor in the success of product. Therefore, the growth of eco-product will promote into an environmental-friendly concept (Karlsson and Luttrupp, 2006).

Chen (2012) noted that few studies have been specifically focused on consumers' perception of eco-product design. Eco-design is a concept that integrates multifaceted aspects of design and considers the environmental concept with the intention to create sustainable solutions that satisfy user needs and desires (Borchardt et. al., 2011). In accordance to Boks (2006),

the factors that influence the implementation of eco-design were (i) external pressure and legal requirements, (ii) economic interest, (iii) consumers' perception and acknowledgment of the importance of eco-design and (v) availability of new technologies.

In recent years, the environmental awareness entailed Malaysia Airport Holding Berhad (MAHB) too. Thus, in order to promote and as market-driven for this company to grow, KLIA is committed to achieve environmental and social sustainability in operating its business. Currently, MAHB have taken steps to spread the environmental awareness regarding on efficiency use of water and energy in KLIA among the MAHB employees and communities (MAHB, 2012). However, the awareness and the implementation of environmental concern appeared to be insufficient. In reality, the environmental approach in KLIA needs to be expanded in the context of eco-design product from airport users' perception.

As such in KLIA, airport chairs emerge as the most important facility used by the users particularly the passengers. According to Li and Xu (2011), the seating has a big impact on users' visual experience and psychological reaction. However, the perception of product appearance value is frequently regarded as intuitive and emotional, and is hard to quantify, which has been overlooked in eco-products design (Chen and Yeh, 2010).

In approaching to this issue, the perception from passengers is important to be taken into account for an effectiveness adoption of environmental friendly concept in KLIA. To date, there have been no studies carried out to claim the existing of airport chairs in KLIA committed to environmental friendly practices. Therefore, in order to fill the gap, the study focused on airport users' perception towards eco-design chair. In this study, the objective was to determine the perception of respondents towards the appearance of the existing airport chair in correspond with KLIA's environmental friendly practices. Meanwhile, the second objective was to investigate respondents' perceptions on eco-design attributes of the existing chairs in KLIA.

Based from the researcher's observation, the flow for departing passengers in airport are comprised of four service steps, namely the check-in process, passage through security, waiting time prior to boarding and the boarding process. The check-in process and passage through security are carried out in the Main Terminal Building, while the remaining two service steps are conducted at the Contact Pier Building and Satellite Terminal Building (STB). The contact Pier Building is used for domestic departure and arrival, with a few involves the international. On the other hand, STB is applied for international departure and arrival flights. Gasull (2002) pointed out

that between of these four services, three are tied to passengers procedures associated with airport service which makes it difficult to ensure definitive control of quality. Gasull (2002) also added that the service pertaining on the quality of waiting experience is closely related to physical elements and thus it can be controlled.

Therefore, the observation discovered the hinges on the quality and physical elements of chairs at the terminal building areas would have an impact to this study in view to the fact that passengers are required to wait for a certain time. Hence, the site of study is concentrate on each gates lounge at STB (Figure 1 and 2).

In addition to this, passengers used gates lounge at STB were preferred in this study owing to the fact that passengers spend much time at the boarding area for international flights than passengers in the Contact Pier Building. Figure 1 demonstrates the route of the survey activity conducted alongside of all the gates lounge. The images of the chair that was arranged nearby the gates lounge at STB, KLIA is presented in Figure 2. The areas at gates lounge was a strategic place to approach and propose the subjects to participate in the survey as passengers spend their times here (Figure 3) while waiting for boarding process.

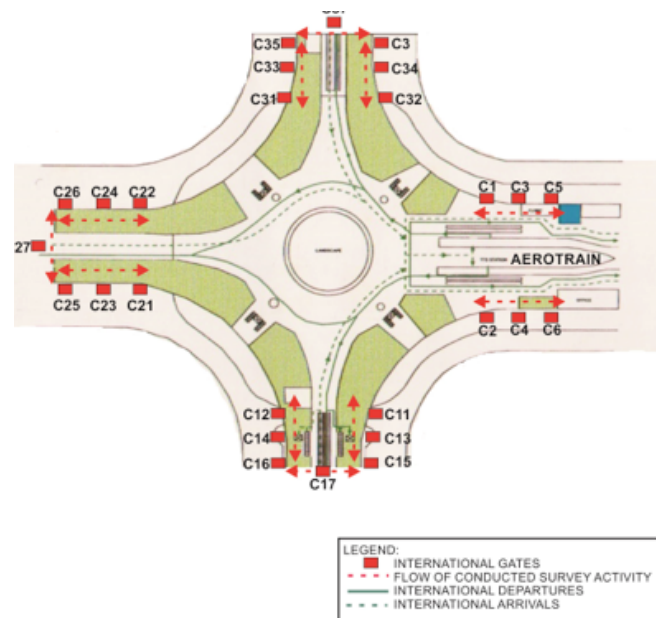


Figure 1: Satellite Terminal Building as Site Study area

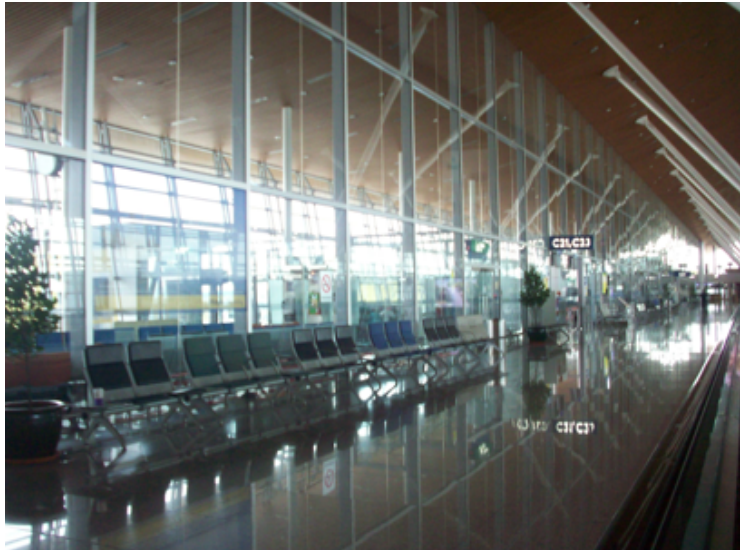


Figure 2: The real images of the chair specimens that has been arranged near by all gates lounge, STB, KLIA.

2. METHODOLOGY

The research methodology framework was designed to gather data in accordance to Kansei Engineering (K.E) Type I as this approach is suitable for small data set with simple relationship among variables (Pitaktiratham, et. al., 2012).

The study began with the preparation of instruments, which comprised of (i) The recruitment of evaluation respondent, (ii) The selection of specimen and (iii) Type of measurement tool. Table 1 describes the instrument tools used in this phase.

Table 1: Instrument tools used in the preliminary evaluation survey

Instrument Tools for Evaluation Experiment		
(i) The recruitment of evaluation respondents	(ii) the selection of specimen	(iii)types of measurement tool

i. The Recruitment of Evaluation Respondent (Target Respondents)

The respondent for this study was the passengers at the STB, KLIA. 200 passengers were chosen randomly based on their convenience, availability,

and willingness to participate for this survey. The respondents participated in this study were differed in background of demography which were observed in terms of gender, continent, ages, occupation and education background.

ii. Selection of Specimen

The airport chairs that have been chosen for this survey was used by passengers at the departure gates lounge, STB while waiting for boarding process. The types of chair used are differed in design, as illustrated in Figure 3.



Figure 3: The selection of airport chair specimens used for Phase II (Part A and Part B)

iii. Measurement Evaluation Tools (Questionnaire-based Survey)

The measurement on users' perception have be conducted throughout the psychological measurement by employing personality test i.e. questionnaires techniques of semantic differential scales and open-ended questions. A three part questionnaire was designed in this study to obtain the required information and explore some undiscovered data pertaining with respondents' perceptions towards airport chair in reflecting to environmental-friendly practices in KLIA.

The first part of the questionnaire gathered date on the demography background of respondents. The respondents' background included in the study was age, continents, education background, gender and occupation. The second part of the questionnaire evaluated the respondents' perception towards the existing chair in KLIA The third part of the questionnaire required respondents' opinion on the characteristics that would make a chair as environmental friendly product.

3. DATA COLLECTION

The questionnaires were distributed to respondents who agreed and willing to participate the survey. The respondents were required to evaluate the existing of airport chair as accordance to their feeling and personal perception while they were sitting on the chair at the lounge gate areas in STB, KLIA. The

average time for respondents to evaluate the chair and completed the survey was between 10 to 15 minutes per respondent. Figure 4 demonstrates the respondents filling up the questionnaires while sitting on the chair used for the evaluation.



Figure 4: The survey activity on subjects while they are doing the evaluation survey.

4. RESULTS AND DISCUSSION

The findings from this study are presented into three parts: (1) demographic background; (2) respondents' perception towards the existing chair at Satellite Terminal, Building, KLIA; and (3) respondents opinion on what of the attributes that would make a chair as environmental friendly product.

Part 1: Respondents' Demographic Background

This section describes the demographic profile of the two hundred (200) respondents involved in the survey. The demographic background of 'gender', 'nationality', 'age group', 'occupation', and 'education background' is summarized as in Table 2.

Table 2: Demographic data of 200 subject involved in the evaluation survey

Description	Variable	n (%)
Gender	Male	97(48.5)
	Female	103(51.5)
Nationality	Asia	95(47.5)
	Oceania	18(9.0)
	Europe	41(20.5)
	Africa	4(2.0)
	United State of America	31(15.5)
Age	17-19 Years old	3(1.5)
	20-25 Years old	56(28.0)
	26-35 Years old	62(31.0)
	36-45 Years old	29(14.5)
	46-55 years old	26(13.0)
	56-65 Years old	14(7.0)
	66 Years old and above	10(5.0)
Occupation	Professional	
	Academic	16(8)
	Administration	21(10.5)
	Finance	4(2.0)
	Law	3(1.5)
	Medication	12(6.0)
	Engineering	25(12.5)
	Non-Professional	
	Business	11(5.5)
	Services	22(11.0)
	Computer & IT	4(2.0)
	Designers	2(1.0)
	Art and Entertainment	4(2.0)
	Agriculture	15(7.5)
	Researcher	7(3.5)
	others	5(2.5)
	Non-Working	
Retired	11(5.5)	
Student	38(19.0)	
Education	Primary	5(2.5)
	Secondary	15(7.5)
	Technical collage	19(9.5)
	University	

Note: All entries are in frequency and percentage; n = 200

Part 2: Respondents' Perception towards Existing Chair at Satellite Terminal, Building, KLIA

Descriptive Analysis for Question 1

Question one (Q1) was regarded on the respondents' viewed on the level of environmental friendly practice of KLIA towards the existing chair in the STB. Table 3 shows that most of the respondents (67.5%) strongly claimed that the chair they are sitting were not representing the environmental friendly practices at KLIA. The finding was supported by Rodriguez-Lozano, (2002) which stated that the existing of airport chairs is not designed to be known as environmental friendly chair.

Table 3: Descriptive of Respondents' Perception towards Existing Chair at STB, KLIA

Question	Frequency Level ¹		
	Reflective n(%)	Neutral n(%)	Not reflective n(%)
Q1: How would you rate the chair that you are sitting on now in representing with the environmentally friendly practices of KLIA?	28(14)	37(18.5)	135 (67.5)

Note: All entries are in frequency and percentage; n = 200

¹ Frequency level are based on Reflective = Very Reflective + Reflective; Neutral = Neutral; Not Reflective = Not Reflective + Very not Reflective. It was based on the original scale of 5=Very Reflective, 4=Reflective; 3=Neutral; 2= Not Reflective; and 1= Very not Reflective.

Descriptive Analysis for Question 2 and Question 3

Table 4 reveals the respondents viewed on which part(s) of the chair fits or does not fit with the environmentally friendly practices (EFP) in KLIA. It can be summarized that 70% of the respondents agreed that the component parts of the existing chairs does not fit with EFP KLIA.

Table 4: The comparison of descriptive frequency findings between Q2 and Q3

Evaluation Survey Question	Frequency n(%)
Q2: Fit to EFP of KLIA	59(30%)
Q3: Does not fit to EFP of KLIA	139(70%)
Total	198 (of 200 subjects)

Descriptive Analysis for Question 4

Table 5 summarizes the findings on the respondents' evaluation on the existing chairs based on the attributes of eco-design. In accordance to the assessment, the highest rated was the simplicity form in design with 63.5%. Based on

respondents' perception, the airport chairs have minimum shape of pattern simple form appearance. It was followed by unnatural looks (61.5%), user-friendly (49.5%) and sustainable design (46.0%).

Table 5: Descriptive finding of Q4

Evaluation Survey Question	Frequency Level ¹		
	Disagree n(%)	Neither agree nor disagree n(%)	Agree n(%)
Q4: How would you rate the airport chairs in the KLIA Satellite Terminal Building based on the following eco-design attributes:			
Q4.1: Attractive	101(50.5)	54 (27)	45 (22.5)
Q4.2: Fashionable Design	109(54.5)	52 (26)	39 (19.5)
Q4.3: Green Design	133(66.5)	37(18.5)	30 (15.0)
Q4.4: User-Friendly	48 (24.0)	53 (26.5)	99 (49.5)
Q4.5: Form Simplicity	23 (11.5)	50 (25.0)	127(63.5)
Q4.6: Sustainable Design	53 (26.5)	55 (27.5)	92 (46.0)
Q4.7: Unnatural Look	24 (12)	53 (26.5)	123(61.5)
Q4.8: Recyclable Design	93 (46.5)	58 (29.0)	49 (24.5)
Q4.9: Reusable Design	68 (34.0)	63 (31.5)	69 (34.5)
Q4.10: Harmonious with the Environment	75 (37.5)	72 (36.0)	53 (26.5)
Q4.11: Stylish Design	100 (50)	51 (25.5)	49 (24.5)
Q4.12: Timeless Style Design	93 (46.5)	56 (28.0)	51 (25.5)
Q4.13: Elegant Design	115 (57.5)	46 (23.0)	39 (19.5)
Q4.14: Classic Design	91 (45.5)	49 (24.5)	60 (30.0)
Q4.15: Comfortable	72 (36.0)	63 (31.5)	65 (32.5)

Note: All entries are in frequency and percentage; n = 200

¹ Frequency level are based on Agree= Agree + Strongly Agree; Neither agree nor disagree = Neither agree nor disagree; Disagree= Disagree + Strongly Disagree. It was based on the original scale of: 1= Strongly Disagree; 2= Disagree; 3=Neither agree nor disagree; 4=Agree; 5= Strongly Agree

Part 3: The opinion on what of the characteristics that would make a chair as environmental friendly product.

The third part of the questionnaire was constructed in the form of open-ended evaluation survey.

Descriptive Analysis of Question 5

The study identified respondents' direction feelings of thoughts, expectations and aspirations for the attributes of eco-design chair that can represent the environmental friendly concept for the airport chair. The respondents' opinions are based on the factors of; (i) experienced with other airports; (ii) experienced in using environmental friendly products or services; (iii) knowledge on the environmental friendly concept; (iv) background education; and (v) occupation. The finding on how the respondents feel the airport chair attributes should be as environmental friendly chair consisted of 212 opinions. Therefore, the finding is divided into three categories:

- i. Category A: Physical Appearance of Eco-design for Airport Chair
- ii. Category B: Sensational feeling of eco-design for airport chair
- iii. Category C: Designing process of eco-design for airport chair

As shown in Figure 5, 58 percent of respondents were related to the effectiveness in designing of eco-design airport chair (category C), while 26 percent were regarded in category A regarding the appearance of airport chairs should be in order to represent the environmental-friendly practice in KLIA (category A). In the meantime, 16 percent are related to sensational feeling of eco-design for new airport chair (category B).

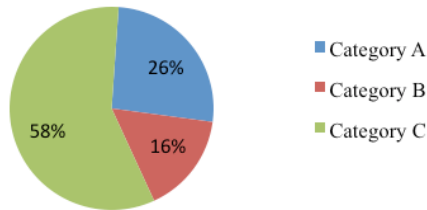


Figure 5: The subjects' opinion regarding the attributes of eco-design chair for representing the environmentally friendly concept in KLIA.

Category A: Appearance of eco-design for airport chair

Figure 6 shows that only 16 percent of respondents felt as attraction feelings for appearance of eco-design in airport chair. In the meantime, 42 percent of respondents viewed that design style and colour scheme, respectively, are the most important element in design. Table 6 presents the list of respondents' opinions for the appearance of eco-design in airport chair.

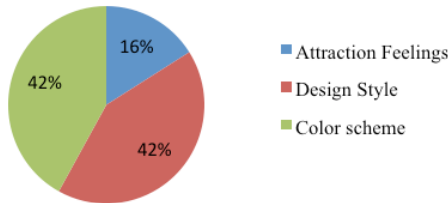


Figure 6: Category A: Physical appearance of eco-design for airport chair

Table 6: The list of respondents' opinions for the appearance of eco-design in airport chair.

Category A: Physical appearance of Eco-design chair	Attributes	Frequency (n)
1. Attraction Feelings	The eco-design chair should be	1
	Looks fresh and pleasant	1
	The appearance of eco-design chair must reflect the eco-friendly concept	2
	The eco-design chair should be	6
	Looks comfortable	6
2. Color Scheme	The eco-design chair should be looks attractive	6
	Earth colour	1
	Bright colour	2
	Blue	3
	Brown colour	4
	Natural colour	4
	Green	13
3. Design Style	Classic looks	1
	Unique looks	1
	Simple looks	2
	Modern looks	4
	Natural looks (green design or greenly looks)	19
	Total Statement of Opinion	64

Category B: Sensational feelings of eco-design for airport chair

Out of the total of 45 statements from this category, 71 percent of the respondents agreed on physical feeling, 18 percent were on health's sensational, 11 percent on were on the usability sensation. The details of the sensational perception were described in Figure 7 and Table 7.

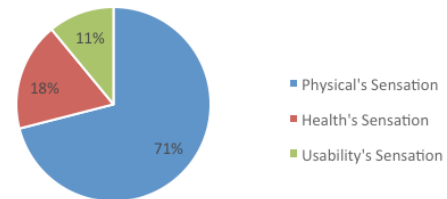


Figure 7: Category B: Sensational feelings of eco-design for airport chair

Table 7: The list of respondents' opinion for Sensational feelings of eco-design in airport chair

Category B: Sensational Perception of eco-design for airport chair	Attributes	Frequency (n)
1. Physical's Sensation	Reliable	1
	Durable	1
	Sustainability	1
	Long Lasting	2
	Comfortable	27
2. Health's Sensation	The chair able to Refresh the tiredness	1
	Fits in with surrounding environment	1
3. Usability's Sensation	Provide healing for back bone	1
	Healthy to use	1
	Pleasing to look at	1
	Feels relaxing	4
	User friendly	4
	Total Statement of Opinion	

Category C: Designing process of eco-design for airport chair

Designing process of eco-design for airport chair was classified in category C. The survey indicated that 104 statements were given for the designing process of eco-design for airport chair. Based from this finding (Figure 8), recycled material appeared to be the most significant element in eco-design chair with 43 percent. Meanwhile, reusable material with 8 percent and reducing cost with 4 percent indicates the most low percentage. Table 8 shows the description of the opinion given by the respondents for this category.

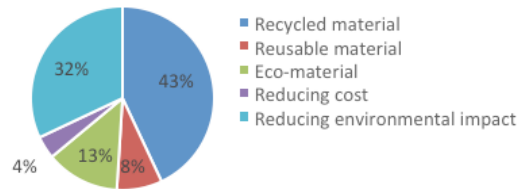


Figure 8: Category C: Designing process of eco-design for airport chair

Table 8: The list of respondents' opinion for designing process of eco-design in airport chair

Category B: Designing process of eco-design for airport chair	Description of Opinion	Frequency (n)
1. Eco-material	Made from bamboo	2
	Made from wood	11
	Reducing cost	4
2. Low cost	Using reusable material in designing process	8
3. Reusable	Strong lifecycle management	1
4. Reducing environment impact	Harmonious with environment	2
	Biodegradable	2
	Suit to human needs	3
	Toxic and chemical content must be avoided	5
	Avoiding using plastic material	5
5. Recycle material	Use of resources and production that not harmful to environment	15
	Reduce in using plant material	
5. Recycle material	Use recycle materials in designing Process	45
	Total Statement of Opinion	104

CONCLUSION

Based from the survey, the study revealed that there is an absence of physical interaction between airport users (such as passengers and visitors) with the implementation of environmental-friendly practices in KLIA. Therefore, it is important to reflect the environmental-friendly concept from users' point-of-views as Malaysia Airport Holding Berhad (MAHB) has stressed out that global perceptions (such as passengers) are MAHB's concern. MAHB stressed on environmental aspects subsequently will put Malaysia as a place to live and work, to trade and to host local and international tourists.

As corresponding to this aim, it is highlighted that the physical appearance of eco-design chair should be looks attractive with the design style in natural looks (or greenly looks), and nevertheless, in the same time, the new design of eco-chair is also should able to provide a comfortable feelings to the user. Besides that, in order to dominate the global perception pertaining with the

awareness of environmental concept occurred in KLIA, the designers should emphasize more on the use of recycled material in design specifications and designing process for new eco-design of airport chair. Therefore, it is recommended to study users' perception on desirable eco-design chair which involving of; environmental concept, aesthetics and function (ergonomics) in the future.

REFERENCES

- Boks, C. (2006). The soft side of ecodesign. *Journal of Cleaner Production*, 14 (15-16), 1346-1356.
- Borchardt, M., Sellitto, M.A., Pereira, G.M., Poltosi, L.A.C. and Gomes, L.P.(2011). Identifying and prioritizing ecodesign key factors for the automotive industry, New Trends and Developments in *Automotive Industry*, Prof. Marcello Chiaberge (Ed.).
- Chen, C.-F. (2010). *Value Evaluation of Eco-Products for Design Decision Support*. A Dissertation for the Degree of Doctor of Philosophy. Faculty of Information Technology Monash University Australia.
- Gasull, D. (2002). Waiting game. The comfort of the seats is a fundamental element in user appreciation of the overall quality of an airport. *Passenger Terminal World*. Annual Technology Showcase.
- Haghiri, M. (2011). Consumer Perceptions of Environmentally Friendly Products in Newfoundland and Labrador. *Journal of Food Distribution Research* 42(2)
- Hung, W.-K. and Chen, L.-L. (2012). Effects of novelty and its dimensions on aesthetics preference in product design. *International Journal of Design*, vol.6, No.2, 81-90.
- Karlsson, R. and Luttrupp, C. (2006). EcoDesign: what's happening? An overview of the subject area of EcoDesign and of the papers in this special issue. *Journal of Cleaner Production* 14, 1291-1298.
- Leonidou, L.C., Leonidou, C.N. and Kvasova, O. (2010). Antecedents and outcomes of consumer environmentally-friendly attitudes and behaviour. *Journal of Marketing Management* (Special Issue of the Academy of Marketing Conference).
- Li, J. and Xu, B. (2011). Application of kansei engineering in the high-speed train interior design. *ICTE 2011-Proceedings of the 3rd International Conference on Transportation Engineering*, 2619-2624.
- Malaysia Airports Holdings Berhad. (2012). *Sustainability Report* (2012). (487092-W). www.malaysiaairports.com.my
- Maxwell, D., Sheate, W., Vorst, R. (2006). Functional and systems aspects of the sustainable product and service development approach for industry. *Journal of Cleaner Production*. Vol. 14, (17), pp.1466-1479, ISSN 0959-6526.)
- Nizam, N.Z., Mansor, N., Mukapit, M. and Yahaya, S.N. (2011). Factors Influencing Customers' Decision to Buy Green Product Design in Malaysia. *Persidangan Kebangsaan Ekonomi Malaysia ke VI (PERKEM VI), Ekonomi Berpendapatan Tinggi: Transformasi ke Arah Peningkatan Inovasi, Produktiviti dan Kualiti Hidup, Melaka Bandaraya Bersejarah*.
- Pitaktiratham J., Sinlan T., Anuntavoranich P., Sinthupinyo S. (2012). Application of Kansei Engineering and Association Rules Mining in Product Design. *World Academy of Science, Engineering and Technology* 69,198-203.
- Rodriquez-Lozano, F.(2002). Comfort and Versatility. Passenger Terminal World. *Annual Technology Showcase*.