

에코 디자인 체크리스트의 분류 체계 개발

A Taxonomy of Eco-Design Checklists

Ali Masoudi^{1,*#}, 유희천¹, 박현지¹, 유택호¹, 김은하¹, 서석환²

A. Masoudi^{1,*#}, H. C. You(hcyou@postech.ac.kr)¹, H. J. Park¹, T. H. You¹, E. H. Kim¹, S. H. Suh²
¹포항공과대학교 산업경영공학과, ²포항공과대학교 엔지니어링대학원

Key words : Early stages of product development, environmental impacts, eco-design checklists, application guidance

1. Introduction

In recent years, in light of increasing awareness of society about various environmental impacts of products, companies have come to the conclusion that environmental performance of products, eventually, will become a significant competitive advantage in the global market. In the context of new product design, environmental sustainability of products performs an essential role, and it is of a major importance for addressing the environmental impacts of products' at the early stages of product development. To fulfill of this purpose, "Eco-Design" has been developed and a torrent of different eco-design tools for analyzing environmental aspects of products have been developed thus far [1, 2]. The authors of this paper have found more than ninety multifarious eco-design tools in the literature classified in three categories including: quantitative, semi-quantitative and qualitative tools. Currently, eco-design practitioners are disinclined to utilize the quantitative and semi-quantitative tools in light of their time- and energy-demanding natures. Among the qualitative tools, checklist tools are preferred for quick consideration of environmental impacts over the entire life cycle of a product. In spite of the fact that several eco-design checklists have been developed so far [3, 4, 5], Lindhal [6, 7] articulate that today's eco-design tools selection is unstructured. As a result, application guidance is needed for eco-design checklist tools so that practitioners can apply them congruously to their product development context. This paper aims to investigate and

analyze variegated eco-design checklists, and proposes an application guidance to assist product designers.

2. Approach

According to the literature, there are approximately twenty-one existing eco-design checklists which have been developed thus far such as "The EcoDesign Checklist" [4], Eco-Design Health Check [8], ECODESIGN PILOT [3], Eco Mark Checklist [9], and so on. Since product-based firms have their own and specific product development processes with various objectives in accordance with environmental performance and eco-design practices, it seems that there is a need for application guidance for these companies in order to help them choose an appropriate eco-design checklist in their specified product development contexts. For the purpose of analyzing existing checklists, they have been categorized by their main characteristic including Assessing Target, Coverage of Life Cycle, Screening, and Guidance & Strategy. Based on the category of existing checklists, application guidance is proposed, as depicted in Fig. 1. This system is based on key questions that must be addressed precisely, e.g., What is the target of assessment?, What type of input is needed?, and etc.

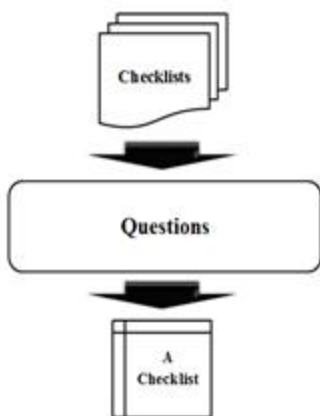


Fig. 1 Application Guidance

3. Results and Discussion

As an illustration to demonstrate how to apply this guidance system, a company that intends to assess environmental aspects of its products must choose those checklists which have been developed for this target. As shown by the application guidance, there is an array of practical eco-design checklists available to be utilized by designers, and selection of which tool to apply in eco-design practices and integrating them into product development process depends on various needs of companies as well as determining which one is most compatible with the culture and current system at the company

However, a variety of eco-design tools have been invented thus far, almost there is no one single paper which classifies all the existing tools. The authors of the paper did an in-depth research and analysis of developed tools and found more than ninety applicable tools. It seems that most of eco-design checklists do suffer from quantitative or objective measurements since their requirements are mostly evaluated as “Yes” or “No.” Consequently, in order to address this shortcoming, it appears that a new and comprehensive and at the same time simple and quick eco-design checklist should be developed in order to be applied at the early stage of product development.

Acknowledgement

This work is financially supported by Korea Ministry of Environment (MOE) as “EcoDesign Human Resource Development Project.”

References

- [1] Hojer, M., Ahlroth, S., Dreborg, K. H., Ekvall, T., Finnveden, G., Hjelm, O., Hochschornera, E., Nilsson, M., and Palm, V. (2008). Scenarios in selected tools for environmental systems analysis, *Journal of Cleaner Production*, Vol.16, pp.1958-1970.
- [2] Finnveden, G., and Moberg, A. (2005). Environmental systems analysis tools: an overview, *Journal of Cleaner Production*, Vol.13, pp.1165-1173.
- [3] Wimmer, W., and Züst, R. (2003). *ECODESIGN PILOT, Product-Investigation, Learning- and Optimization-Tool for Sustainable Product Development*, Kluwer Academic Publisher: Dordrecht, the Netherlands.
- [4] Brezet, C. H., and Hemel, V. (1997). *Ecodesign - A Promising Approach to Sustainable Production and Consumption*, United Nations Environment Programme, Paris, France.
- [5] Gertsakis, J., Lewis, H., and Ryan, C. (1997). *A Guide to EcoReDesign - Improving the environmental performance of manufactured products*, ISBN 08-6444-650-0, Australia.
- [6] Lindhal, M. (2005). *Engineering Designers' Requirements on Design for Environment Methods and Tools*, Doctoral thesis, Industrial Engineering and Management, Stockholm, Sweden: KTH.
- [7] Lindahl, M., Hjelm, O., Sundin, E., and Thuresson, L. (2005). What could be learned from the utilization of Design for Environment within manufacturing companies?, the 2005 IEEE, Hong Kong.
- [8] The International Network for Environmental Management, Germany (1991). *Eco-design Health Check*, available online at: <http://www.inem.org/Default.asp?Menu=190>
- [9] Japan Environment Association, (2007). *Eco Mark - Product Categories (Certification Criteria)*, available online at: <http://www.ecomark.jp/english/index.html>