Sustainable product design strategy based on product service system

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Abstract.this study provides the principles of a sustainable design philosophy. Discuss a framework concept for a PSS and supplies a continuous service to create an operation construction with higher profit and lower risk .

Introduction

"Reduce, reuse and recycle" definitely becomes a new life trend. Under this concept, product Service System (PSS) is a new way to satisfy the customers' needs by means of a complete process in products and services. Product service systems is a task oriented logical system that has an end result of stabilizing the relationship between production and consumption. The flow of logic involved with the product service system can be applied to both tangible and intangible production processes. This means that applying the principles of a product service system can take place in both the business world and in other applications, such as the world of academics. As long as creation takes place, and there is someone who functions as the recipient of the creation, the process of a product service system can be applied. lt can make resource usage become a closed loop, thus reducing total product quantity and enhancing resource usage sufficiency. To support this change and to provide the basis for realizing customer solutions in terms of customer life cycle-oriented product-service systems (PSS), processes for product and service planning, design and realization need to be integrated.

According to the research of PSS[1-4] , a PSS can be classified as belonging to one of three main categories as shown bolow:

A. Result-oriented PSS

The customers and service providers agree on the desired outcome(s) without specifying the product involved.

B. Use-oriented PSS

Products remain central but are owned by service providers and made available to users in different forms (e.g., product leasing or sharing.

C. Product-oriented PSS

The business model still is largely associated with

the sale of products to consumers with some additional services(e.g., maintenance contract, a financing scheme, and the supply of consumables).

The rest of this paper is organized as follows: Section 2 introduces the framework concept of the proposed systematic decision-making approach for PSS planning. Section 3 presents the structure of sustainable product design strategy. Section 4 gives conclusions achieved in this research.

The Framework Concept of the Proposed Systematic Decision-making Sustainable Design for PSS Planning

In this paper, we first conduct literature review and experts survey with interview in order to

establish theoretical structure of PSS. Furthermore, the author develops evaluation guidance and check list to make sure the target achievement of product sustainable design. Utilizing a sustainable design philosophy encourages decisions at each phase of the design process that will reduce negative impacts on the environment and the health of the occupants, without compromising the bottom line. Sustainable design principles include the ability to optimize site potential minimize non-renewable energy consumption use environmentally preferable products protect and conserve water enhance indoor environmental quality optimize operational and maintenance practices The Sustainable Development aspects of any product will not only be a reflection of the design, but also the company that manufacturers the product and the particular manufacturing site. The Sustainable Product Development Assessment will therefore need to include. According to George Howarth[5], the actual assessment of the product, company and site needs to define the following

1) A generic list of issues/concerns – topics.
2) Ability to add additional specific issues/concerns.
3) More detail on these issues to check and revise the level of understanding.
4) Level of importance of these topics/issues.
5) The sustainable development aspects – environmental or social or economic or a combination?
6) Are these impacts high, medium or low?
7) Are the impacts a risk or a benefit?

The Structure of Sustainable Product Design Strategy

ln the chart of structure of sustainable product design strategy by PSS, we construct product service system and equip with design principles of product life cycle structure. A new product progresses through a sequence of stages from introduce to growth, maturity, and decline. This sequence is known as the product life cycle and is associated with changes in the marketing situation, thus impacting the marking strategy and the marking mix, as shown in figure1. Through the analysis of the basic marketing needs in structure, we can summary the consumers' preferences. Also, the analysis of using efficiency and satisfaction item can tell if the producer provides consumer with information presentation about utilizing their products more efficiently. We will give strategy enhances environmental protection for product of green transportation and brings a new chance of sustainable operation.

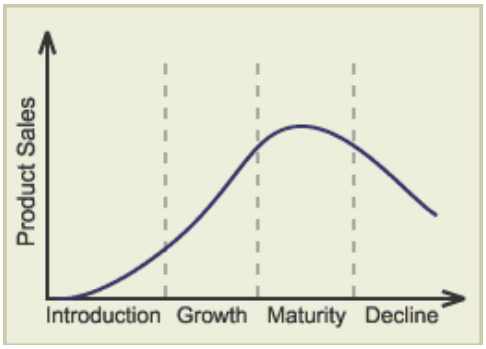

Figure1 The product life cycle

Conclusion

The concept of PSS can be deemed as a competitive strategy to satisfy diverse requirements from customers as well as manufacturers. The main purpose of this study is to investigate the application of PSS in process and principles of sustainable design and development strategy. In this paper, we develop a complete set of evaluation guidance and applied strategic structure of PSS' s product sustainable design. This result could be an important practical policy for carrying out sustainable design.

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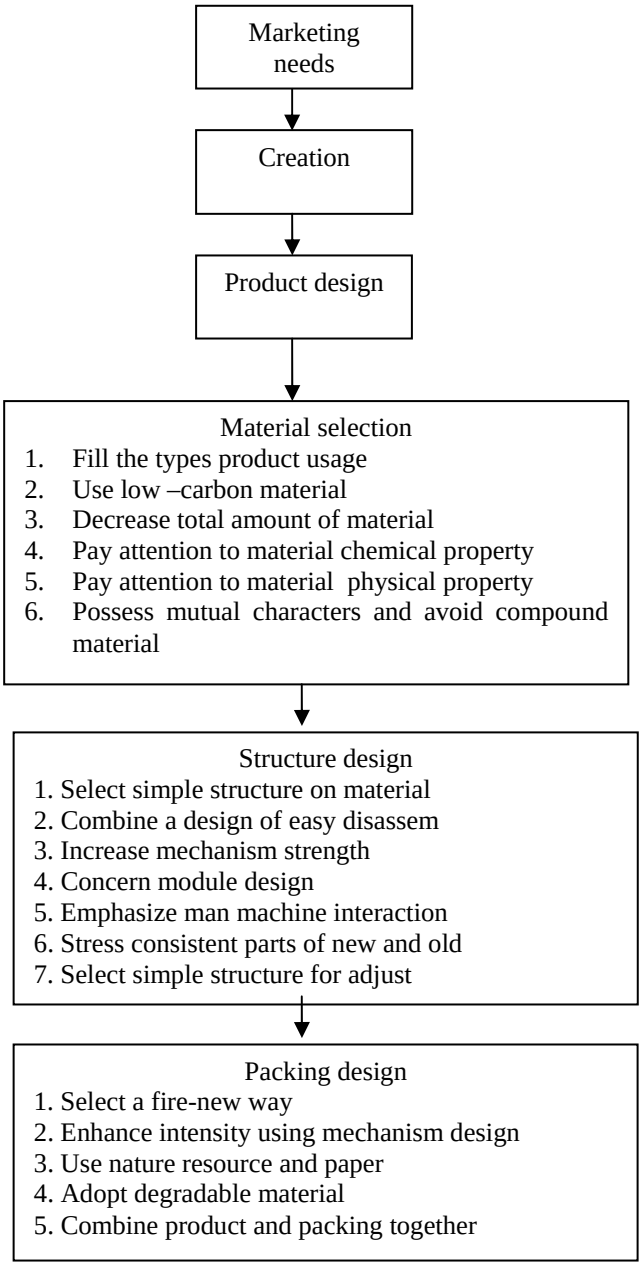

Figure2 The Structure of sustainable product design strategy

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