Evaluation System of the Industrial Design Product under Project Quality Management

HAIBO YANG

ABSTRACT

Project quality management concerns the quality of product design. At the same time, the implementation of industrial design product evaluation under the project quality management is beneficial to perfect product design and improve the quality of industrial design products. Based on the knowledge of project quality management and industrial designs, the author develops an evaluation system of industrial design products combined with the customer demand psychology and other factors, which provides an objective and comprehensive selection for the related development and design.

KEYWORDS
Project quality management; industrial design; user

INTRODUCTION

With the continuous development of modern industrialization, it has become the aim of modern industrial products to promote product development and achieve better benefits by making use of advanced design, which put forward higher requirements on the industrial design. To achieve good industrial designs following the principle of design evaluation in the increasingly harsh requirements for industrial product design, what is needed is not only a better evaluation scheme but also a new evaluation concept as the support, so as to comprehensively determine the value of each program, and carry out evaluation of various aspects, such as the practicability, aesthetic feeling and reliability.

BASIS OF INDUSTRIAL DESIGN EVALUATION MODEL

Concept of project quality management

Project quality management refers to a series of management measures and methods formulated for the full realization of the functions and purposes of a specific project, which can promote the project to be completed under the guarantee of certain deadline and related requirements. Its performance mainly depends on the quality assurance system formed by the plan, quality control system, quality assurance and supervision. The quality plan primarily determines the application of quality standards for key aspects of certain projects and, to a certain extent, determines how that is achieved.

Haibo Yang, University of Jinan; Jinan 250022 China
The quality control system generally refers to the specific quality requirements set for quality inspection of the key points of various links in the project, which is used to examine whether there is any substandard activity in the implementation process.

According to the requirements of project quality management, some steps (design, inspection, revision and implementation) are needed to complete a project, while the quality management is the key to ensure the continuous realization of the various requirements during the implementation of the project. In different projects, these steps may be repeated once or many times, and each step is coordinated with each other to form a quality management environment for achieving good quality of goods.

**Process of industrial design**

“Design”, according to the definition in MBAlib and related literature, is the process of presenting the imagination and planning in the mind in a certain form. The word “design” can be interpreted as construction, arrangement and planning. Therefore, the traditional design is the process of realizing the thinking in the human mind, which is original and represents the thinking and logic of the designer. The realization form of different designer to the same idea may be greatly different. Design is also the process of thinking and logical architecture, and thus a design work is the synthesis of its designer's knowledge and inner pattern. Good design works are the perfect tuning of aesthetics and philosophy, the fullness of thought in a certain form and the process of physical body becoming well-developed. At the same time, design is everywhere, so difficulty of designs can be divided into different levels. In the most general concept, design is the enrichment and extension of concepts that exist in life. Industrial design can be divided into various categories, such as the mechanical product design, environmental design, communication design, and so on. Although their specific working contents are different, they all serve the people and things in life. In recent years, with the development of design concept, it is not only for the design of existing objects, but also for the reconstruction of aesthetic concepts. Industrial design runs through every stage of product development. According to its functions, it can be divided into 4 aspects: conception formation, concept development, product sample design and sample making. Different design stages are usually accompanied by different design ideas and requirements.

**Evaluation system of industrial design**

Product evaluation in industrial designs usually revolves around consumer satisfaction and social satisfaction. Satisfaction includes many aspects, mainly covering consumers' satisfaction with product quality, convenience, functions, appearance, etc. Generally, consumer satisfaction with an industrial product is a major consideration to evaluate whether the product design is success. Therefore, the design of industrial products should take into account the user's environment, preferences, and their demand for appearance. In addition to the basic material satisfaction, consumers also need to get a certain degree of spiritual satisfaction through industrial design products. Specifically, the satisfaction of consumers can be achieved by his spiritual pleasure and good psychological feelings generated by the product. In this sense, an industrial product should do more than reflecting its serious and responsible attitude to consumers with its quality. In other word, it is necessary to bring good
product appearance, high quality service, after-sale protection and good brand awareness to consumers through specific products, so that industrial products can be in line with consumer demands in the process of use.

The evaluation factors of industrial design also come from the level of social satisfaction. This requires that the product should not only be limited to the business-product-consumer model, but should also satisfy needs of the whole society, such as the demand for low-carbon life, appeal for good eco-environment, desire for human industry development, etc. A good product is not only a leader in its functional field but also a product that can meet the social and human needs, aiming at achieving the maximum guarantee of social benefits (such as energy consumption, pollutant emission levels, etc.) while satisfying consumer expectations.

CONSTRUCTION OF INDUSTRIAL DESIGN EVALUATION MODEL BASED ON PROJECT QUALITY MANAGEMENT

The industrial design evaluation model applies comprehensive analysis on various factors of an industrial product, and then, based on the concept of quality management, sets the scope of the evaluation and subdivides evaluation questions to evaluate the design procedure, contents, user satisfaction and other aspect of the industrial product, so as to evaluate the design and implementation direction of the product.

Participants in design evaluation

The theory of project quality management is the key to the realization of industrial design evaluation system. It is constructed based on the customer satisfaction, which also highlights the principal position of customers in the industrial design evaluation. As a result, producers or marketers and users of products are participants in the design evaluation. At the same time, because the design project generally has different specific use environments and principal parts, it needs the participation of product markets.

Construction principle of evaluation system for design scheme

1. Scientificity. The principle of scientificity requires that there will always be a good technical index system or the standard of implementation as the reference content in the process of constructing the evaluation system, so as to embody the planned characteristics of industrial design products and reflect the performance objectives and scientific targets in product design accurately, reasonably and objectively.

2. Comprehensiveness. It implies the good evaluation of functions and value of the whole project, so as to avoid adverse impacts of excessive weight of a single factor weight or imperfect evaluation indexes. Or, the evaluation system cannot fully reflect the level of industrial design.

3. Practicability. The principle of practicability requires that the practicability of the evaluation system should reach a certain level and it can provide reference for the relevant users in the actual application environment striving to achieve the right index selection, simple and efficient evaluation link, complete and concise, representative data system, etc.
4. Efficiency. The principle mainly emphasizes the flexible evaluation ability and wide evaluation efficiency of the evaluation system. In other words, the evaluation system should be used to evaluate the service condition and design level of different industrial products according to relevant standards; a relatively effective evaluation conclusion should be received, which is required to have good universality without many non-serviceable indexes.

**Evaluation indexes of the evaluation system for industrial product design**

1. Evaluation procedure. In order to construct a reasonable evaluation index system of the industrial design product, a reasonable evaluation procedure should include self-evaluation of the construction side, evaluation of the project review unit and user evaluation. The basic index system is established and the reference factors are constructed through the evaluation link.

2. Selection of reference factors. The selection of reference elements is mainly based on the specific situation of project design and use in the process of actual concept development and project implementation.

3. Determination of the hierarchy index system. The determination of relevant evaluation factors of the index system determines five levels (excellent, good, general, poor, very bad) for corresponding factors.

4. Determination of the scoring method. The scoring method calculates the total score according to qualitative evaluation and quantitative evaluation. Each accounts for 50% of the total score which will be ranked according to the actual experience results of different industrial products. The total score of the qualitative score is 100 points, self-assessment accounting for 20%, the team assessment accounting for 30% and user or unit evaluation accounting for 50%. The qualitative evaluation is the composite score composed of the individual self-evaluation score × 20% + team self-evaluation score × 30% + the self-evaluation score given by users or units × 50%. Quantitative evaluation is to determine the evaluation result based on the existing evaluation criteria.

**Description of relevant reference factors of the evaluation index system**

Reference elements of the evaluation index system of this green industrial product design mainly include the energy consumption, design concept, use logic and comprehensive environmental protection.

Energy consumption: including the daily energy consumption of the industrial product, the adverse energy dissipation rate and the configuration of auxiliary energy saving facilities.

Degree of environmental protection: whether disposable materials are used, whether harmful decorative materials are used and the proportion of renewable materials used.

Design concept: whether the convenience and the logic complexity of the corresponding functions in the process of use are taken into account, whether the “people-oriented” design concept dominates the product design, etc.

Comprehensive environmental protection: it refers to the overall environmental protection degree of products, involving product specifications, resource use, energy consumption, etc.
Combined with the specific evaluation indexes above, the industrial product design scheme is examined uniformly in the real evaluation links.

CONCLUSION

In conclusion, the evaluation system of industrial design products plays a good role in promoting the realization of the design innovation, design ideas optimization and quality optimization of the industrial product based on the project quality management. Customers join the construction of the evaluation system of the industrial design product through experiencing the applications, functions and services of products in the real environment, and finally show their evaluation of industrial design products, which accords with the method of design system of modern industrial products. At same time, it will further promote the comprehensive progress of China's industrial design products. The evaluation factor, evaluation index and other aspects of the evaluation model are analyzed in this paper, which can give some reference experiences to the relevant projects.

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REFERENCES