

## Products design process within the principles of lean management

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### **Abstract:**

The importance of dealing with the concept of lean management in product design comes from the fact that is a scientific approach whose applications affect the design content and procedures, which is reflected in creating value for the product and thus fulfilling the user's needs at all levels. This is what drives the designers to higher and more proficient levels in managing the design process. It also affects from simply dealing with the physical and formal properties of the product to more broad dimensions in the marketing and economic environment, which leads to compatibility with the formal cultural and behavioural elements, as well as expected competencies of the product in the usage environment for the customer. And because excitement does all economic resources and employs them in order to spread the needs of the individual and the group in society, then the lighting social talk is made, and states depend on it in achieving progress and hope for its citizens, and successful management at the bottom in the success of the organization and outperform its competitors. It is necessary to study the principles of lean management and how to apply them in designing products so that they provide access to all the user's requirements of all categories. This may be done through industrial towels alone or with the participation of the user in the design process so that he achieves his needs at the lowest possible cost. In an industrial institution, as in many countries such as China and Japan, the principles of lean management have proven their superiority over other management trends taking into account the age differences between users, their different self-abilities, and the diversity of their requirements, as well as competing products in the markets, with a commitment to improving and simplifying the design solution. The design activity was found with the first human presence on earth, as it is a human phenomenon that is human lifelong, and evolves with the development of living conditions. So it is a human activity that creates from some perceptions and concepts and achieves what a person needs in all areas of life with specifications that help reach the optimal situation in a way that satisfies his mind and his needs, for any kind of creative products that advance human life. Since the development in the areas of design philosophies and trends requires that product design be integrated with the designer's interest in the design is media and administrative axis of the design process, which creates dispersion at times, but the economic point of view adopted by the philosophy: product mainly concerned with marketing and production techniques and what follows the emergence of the product from commercial considerations, which also focus on user expectations and the technical and financial suitability of the product. In this philosophy, the designer also focuses on techniques extensively, as he has to focus on the tools, equipment and technical methods that must be employed in order for this product to come into being. Therefore, designers have to take advantages of all available resources to achieve their goals at the lowest cost and highest quality, which often requires reducing the internal processes of designing products. When the user expects to get more from the designer, the increased cost puts great pressure on the industrial enterprises, which reveals their need for restructuring , managing resources effectively and improving their ability to respond to external demand. Therefore, these changes and challenges made it appropriate to direct these organizations Towards applying management strategies that are more accommodating to cultural change in order to maintain product design that meets user needs at the lowest cost and highest quality .

**Research Problem:** The research problem is represented in the complexity of the processes within the product design process.

**Research Objective:** Placement the principles of lean management to simplify the design process to become less expensive and more quality to meet the needs of the user.

**Research hypotheses:** 1- Lean management principles focus on user needs. 2- The use of lean management works in order to reduce effort and cost in product design.

**Research Methodology:** The research follows the descriptive analytical approach.

**Results:** 1. The principles of lean management provided multiple stages of the internal processes of product design, allowing it to contribute to the field of design directly through the design stages and indirectly during

the production stages. 2. By analyzing the design steps resulting from the application of the principles of lean management, we find that it did not replace the traditional steps of the design process, but rather helped to develop it. Its development, as we see in the merging of more than one stage through prior solutions, where it became possible to find immediate and tested solutions by the facility without the need to repeat the same traditional steps and waste time, effort and money, and thus increase the cost to the user. 3. Lean management design procedures using modern and smart applications provide communication between reducing costs and improving production and quality in order to obtain user satisfaction. 4. Lean management provided the field of product design with richness and diversity through the user journey, as its means allowed to reduce supplies and increase the capacity for standard and harmonious operations of product quality.

**Recommendations:** 1. Viewing of what product designers have achieved globally using the principles of lean management in developing and improving the internal processes of design, it is imperative for us in Egypt to start studying and applying this well in all design and industrial facilities to benefit from it in achieving user requirements. 2. Lean management must be in the philosophy of the designer and the organization in order to be able to reduce waste to the maximum degree and thus reduce the cost and focus on customer service and expect what he wants and thus create value for the product and obtain higher quality.

### **Keywords :**

product design , design process , lean management

### **References :**

1. Michael Sony (2018) Industry and lean management: a proposed integration model and research propositions .
2. Mark Anthony camiller (2017) Under standing customer needs and wants .
3. WeiGuo / QingZheng / WeijinAn / WeiPeng (2017) User roles and contributions during the new product development process in collaborative innovation communities .
4. Fathi Bashier (2017) Design Process-System and Methodology of Design Research Department of Architecture, Urban Planning & Development, CET, Wollega /University, Ethiopia.
5. Boban Melović, Slavica Mitrović, Andrey Zhuravlev and Natalia Braila (2016) The role of the concept of LEAN management in modern business (Mster) Faculty of Economics Podgorical/ University of Montenegro .

### **Paper History :**

Paper received February 10, 2023, Accepted April 14, 2023, Published online May 1, 2023