Prospective of Product Development and Improved Production Processes

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Abstract

Product development is an integral part of an organization that plans to stay relevant and competitive in today’s world. Several companies have research and development sections, which are most times responsible for developing new products. Still, there are other processes such as technology development, technology acquisition, capacity acquisition, and project management in which product development can be achieved. Improved product development processes such as lean manufacturing, six sigma, and a hybrid of the two known as lean six sigma (LSS) are platforms that enhance product development, which helps organizations remain relevant.

Keywords: Product; Development; Production; Processes; Capacity.

1. Introduction

There is a noticeably and rapid change in the world economy and this is due to the present globalization. Different approaches have been applied by several companies around the globe to reduce greenhouse gas effect which could arise from use of product or from the processes used in developing the product, apart from the environmental consideration companies also make sure whatever process they employ gives them a competitive edge amongst others [1]. Developing and launching a product early enough with the aim of meeting the ever-increasing needs of customer is a key feature that distinguishes companies. Product development is a continuous process and reduction in lifecycle of products by companies make this department actively engaged in order to stay relevant. Technological advancement coupled with the increase in world population led to increase in demand for products worldwide. The 21st century has witnessed a sharp rise in world population from about 6.1 billion to 7.7 billion, and according to [2], it is observed that literacy rate worldwide increased by 4% every 5 years from 42% in 1960 to 86% in 2015. Therefore, majority of the consumers are technologically inclined, which means manufacturers must find ways to produce high quality products with new features at a cheaper price and in a short period.
For organizations to meet up with the regular demand by consumers, key factors such as product development process, breakthroughs in process standardization, information and communication technologies, process overlap, project management techniques, platform and module thinking, cross-functional teams, and knowledge management systems must be implemented in the most beneficial way. Product development is the processes used in developing a product with the help of collective or system activities that transforms ideas and technology to a range of products that satisfies customer needs and strategic objectives. The functions of product development have become more complex and it’s key to making profits and also determines the survival of any organization.

2. Product development processes

A product development process is launched to produce something new, whether it involves a gradual change to an existing feature or fundamental reevaluation of the traditional method of doing things [3]. According to Jensen all organizations are learning organizations. If not, they could not survive in a changing environment. This shows that the process of product development includes some level of learning. Environmental consideration for is crucial in product design and manufacturing [4]. It is therefore important to create more proactive strategies for sustainability and product development. The percentile of organizations that includes sustainability in their product development phase is still low despite the fact that majority of the organizations have the intention of including it [5].

3. Improved production processes

Improved production process refers to an approach of making a product in faster way and also at reduced cost, this determine the total throughput and lead-time during development of new product, it is however essential to make use of improved production processes to increase production rate which gives organizations a competitive edge over others. Several improved production processes have been uncovered in the past few decades and has been useful in improving product development. Improved production processes involves ideal generation, ideal screening, concept development and testing, marketing strategy and development, business analysis, product development, Test marketing and commercialization.

3.1. Lean manufacturing

[6] reveals several ways to improve new products' performance for viable product innovation. Lean principles are widely circulated in order to remove waste, deliver value and continuously improve product development. Everyone must know the appropriate practices on each point and the type of lean product development to ensure that these principles are implemented and products get to the market without waste. Companies’ success depends on their number of successful products on the market. Several companies have taken part in innovative, highly qualified, value-added activities to ensure competitiveness. Product development includes product development resources, functions and technologies that contribute to the satisfaction of the customer's needs [7]. Innovation is difficult to produce in agricultural and livestock farms because their products are characterized by pushed production [8]. The pressures of these firms are growing, which have an impact on production activities directly [9]. The Lean Manufacturing Principles provide a broad range of value and disposals of waste in the manufacturing processes proposed [10, 11]. However, in the 2006 report, Morgan and Liker reported that the Lean approach could be broadened far beyond manufacturing and process improvement to include Lean principles [12] and Lean Startup and Lean Product Development [13, 14]. The approach employed by several
organizations has been highlighted, but companies are finding it difficult to adapt the principles originally developed for production companies to various contexts and objectives.

3.2. Lean six sigma manufacturing

[15] sought to ascertain, in their research projects, how Lean Six Sigma (LSS) could have an effect on organizational sustainability, because few scientific studies attempt to assess the current link between these three streams: Sustainability, Lean, and Six Sigma. The methodologies used in this study are qualitative, based on the perception of experts and collected by survey. The authors structured a 13-fold questionnaire from LSS, which was then used by more than 106 international LSS experts. The study examines the expert view of LSS impact on the triple bottom line (TBL) in the three pillars. The correlation between organizational sustainability and LSS, is mainly because of the impacts of this research on the financial beacon of TBL, was identified. The authors also clearly identified that 5 further impacts on the organization and the value of sustainability costs in organizations. The study supports the expansion of knowledge regarding the use of LSS, evaluates the impact of methodologies on the sustainability of organizations and provides a deeper understanding of their relationship.

3.3. Agile manufacturing

High-wage manufacturing companies are currently facing the challenge of using new development processes to overcome the challenge of launching even shorter time for innovative and complex products. Agile methods already provide proof that they are suited in the software industry, which enhance customer satisfaction and reduce development and market time. Due to disciplinary differences such as software immateriality, the direct transmission of existing agile methods is expected to be deficient from the software industry to product development [16]. Rather, agile methods are extracted which can subsequently be adjusted to the attributes of product development. Therefore values, principles and practices on iteration, iteration-specific and activity level development are converted into agile mechanisms based upon analysis of already existing approaches such as Scrum, XP or Crystal. These mechanisms are later compared to product development characteristics in order to design agile processes of product development.

4. The impact of technological advancement on product design

For the sustainability of production, it is important to see the entire supply chain, including the manufacturing systems, throughout several product life cycles, as well as the product and manufacturing processes involved. This calls for better product, process and system level models, sustainability assessment measurements and optimization techniques [17]. According to [18], firms must constantly introduce new products in order to survive in the current hostile economic environment and change their strategies. As a result, product diversity management can be viewed as a major competitive factor. But this calls for human resources, machinery, stocks and resources, all of which are contrary to the Lean Strategy [19]. Mastering complexity becomes increasingly important in several industries and companies should figure a way to balance slender and product diversity. With robots cheaper and smarter, automated mounting in combination with sophisticated CAM solutions is beneficial in many fewer amounts than in recent years. New production process developments may also permit new
product designs to be developed and vice versa [20].

4.1. Product development in practice

The best practices for literature emerged as the concurrent product development process and the integrated product development teams, according to [20, 21]. However, empirical evidence of its impact on product development success remains unclear. It examines the direct and joint influence on NDP performance of the NDP on the basis of OIPT (Organizational Information Processing Theory), the two main features that dominate NDP best practices and project complexity and project uncertainty. The analysis found no evidence of any direct consequences of the process competition nor of team integration overall NPD performance in the 266 projects in three industries (electronic, automotive and machines) in contrast to the best practices applied in nine countries (Spain, Sweden, Germany, Austria, Finland, Italy and the United States) [22]. There have been already proven negative effects on overall performance by the interaction between project uncertainty with the concurrent NPD process, and the positive interaction of project complexity and team integration.

Conclusion

In conclusion, product development is said to be a vital and important part of any organization. It determines the sustainability and lifecycle of any product because if a product stops adding value or extra features customers tend to move to other products that have such features and this leads to the end of a product. In order to ensure continuity of any product organizations must set out departments with cross-functional team members that generates new product development, also there are other ways like lead user innovation and customers suggestions for improving a product. Organizations must also incorporate improved production processes such as lean manufacturing, six sigma, agile manufacturing etc. These improved processes help in determining the success of new developed. Also, Product development practices are discussed in the paper.

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