

NEW INNOVATION PRODUCT DESIGN STRATEGIC IN MANUFACTURING. LOOKING AT INCREASING CUSTOMER ACCEPTANCE

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Abstract

The aim is to investigate the expansion of new product design topics related education as a strategic opportunity for technology and manufacturing approach related to increase customer product acceptance. A brief literature review about a new product design topic is introduced, as well as an exploration of the current criteria for various manufacturing technology issues. Views from industry and customer as user reveal the need for identifying preferred approaches. If a new product design topic is to be admitted as part of an entrepreneurship program, there are a number of potential customer acceptance of the new engineering approach that will impact engineering new product. The number of new product design training program together with course educational programs also contribute significantly blended with customer need help accelerating new product acceptance substantially. New programs are encouraged along with manufacturing environment and related review of educational content in traditional engineering product disciplines-. The study leads us to believe that new product design topic represents a strategic management and opportunity for manufacturing and technology production in accelerating product acceptance. This study include 56 manufactures include small medium enterprises producing different product design in Malaysian which focus on increasing product acceptance to customer. Variable in the survey such as cost and simplified standardation ,ease of use of product design.

Keywords: *New Product Design, Technology and Innovation, Entrepreneurship*

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Introduction

Training, according to Mullins (2010), is the process of systematic education related knowledge, skills and attitudes required to perform efficiently and effectively in carrying out its tasks in an organization. This statement also stated that knowledge and skills during the training is not purely in the industrial and commercial enterprises, but it is a utility that

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influence an organization to invest in the manufacture of new products. It is widely agreed that education and knowledge to design new products is becoming increasingly important to the profitability and competitiveness, especially for large manufacturers in technology-intensive industries such as electrical and electronic equipment, telecommunications, semiconductors and information. According to Cooper (2001), since the character of existing products have a high failure rate in new product development especially the manufacturing sector; the management has acknowledged that the reevaluation of the success of the product is of paramount importance for the success of a new product program. Agreeing with the opinion of Bartners (2009), Kuczarski, (1988), Crawford, (1989), and O'Connor, (1996), which says that risk occurs at every stage of new product development risk. One of the methods and criteria used to evaluate the information obtained in the market and determine the results and speed up the process of product accuracy. It needs to be both more effective and more efficient. In the opinion of Teece (2010), companies consider innovation business model as an opportunity to build a sustainable competitive advantage. Therefore according to Westera (2004) and Anderson Weller (2013), the challenge is to encourage growth and increase education and knowledge in the field of design new products. To implement the changes, the Organization must work with educational institutions to address these challenges.

Literature Review of New Product Design

According to Kessler and Bierly (2000), and Kleinschmidt et al, (2007) the management of new product development must make choices about the design of their products. Zirpoli and Becker (2011), argue some internal and external factors may affect the performance increase acceptance of their products to the market.. This statement also discussed that the choice is often linked to the performance of these products on the market, and customer acceptance. In contrast, the opinions expressed by McCarthy and Gordon (2011), which states that the interpretation of changes in the performance of new product designs will vary depending on their customer feedback, which triggers a variety of responses. Another study by Bajaj et al (2004), relating to the success of new product design and product design activities performed found about 34% of businesses surveyed that do all involving activities in the field of design in new product. Therefore it affects their decisions to develop strategies to design new products that increase customer acceptance. Some businesses not only want to step up production of new products, especially in terms of their design, but they also like to be 'first to market' business. However, Porter (1985) showed that this strategy has its own risks as well as competitive advantages. There are many cases where the first business to launch new products and demand do not benefit from the innovations that they have earned. In discussing the matter, in fact, also believes that the way to evaluate the performance of new products must be understood by management, particularly in the manufacturing sector. Thus it will be able to anticipate the decisions to be taken in order to develop strategies for new product design production output. According to this perspective, which has been declared by Cyert and March (1963) and Levinthal(1981), that those responsible are trying to identify the relationship between behaviour and results. Therefore, in accordance with the opinion of Devaraj et al. (2004), in which a firm manufacturing sector can achieve their goals by different measures such as the recent the target sales volume, sales revenue and net profit.. The new product are described as the newness to the organization and the newness to the markets. Based on these dimension,

there are six categories have been identified which are the cost reduction, repositioned product, additions to existing product lines, new product lines for firm to enter the markets and new to product world with the new markets (Illori et al., 2000; Pujari et al., 2003).

In the modern manufacturing world, the company adapt the advances of technology and information technology to become more competitive advantages and generate cost efficient high profit product. Hence, the company need to integrate their companies, suppliers and their distributors together in seamlessly integrated organization. However, without proper and efficient strategy, these integration might influent the process of new product development and become catastrophe to the company and project. Therefore, the needs of supply chain and new product development strategy can be neglected at all. These strategy affect and influence the framework of company objectives, corporate strategic decision, the resources and the markets across from manufacturer networks to the customers.

Product development projects require continuous support and collaboration among group or team from different functional specialties who have or create specific information about the markets and customers (Islam et al. (2009). At the same time, this collaboration also share the cost, resources and costing while development is on progress. This information, cost and others must be shared all across the company with the monitoring of the management and top management. Hence, the important of management and top management can't be neglected in product development process. The management also prepares the idea and innovation, flexibility and other resources that are important during the integration of supply chain and new product development process.

Developing a new product is priority for organization as the key of successfulness and remains competitive in the markets. New product development is the process of creating an improved product, modified product, new brand product or to cover the original product through the company's research and development efforts (Ulrike, 2000 and Kotler, 1991). Today's, the globalization has hits many of the manufacturer in the world which the development of the new product demand the high contribution and integration of all the manufacturer as these process is sophisticated and challenging. Eppingger and Chitkara (2006) defined the global product development as the activities or the process that spreading across multiple region of the entire world as the method to achieve high value-added to the cost. Global product development lead to maximum value-added to the cost by segregates the high value activities and resources to lower value activities and resources. These ability enhances the capability of developing the new product at the same time mitigate the risk within the operational in the entire region of the world.

New Product Development Strategies in Accelerating Product Acceptance

New product development plays as a critical role in ensuring the substantial share on company's turnover (Debruyne et al. 2001). In today's business environment, the product that produced by the companies are become as their image or "public face" where customer judge

them either great product or great company's (Holtzman, 2011). Throughout the globalization market, there are many competitors that offering the same product and services. As a result, a little advantages in the specification over the other competitors will influence and give impact on competitiveness and product survival. Therefore, introducing the new products in an efficient, effective and interesting ways will allow the company to take the advantage in the competition (Holtzman, 2011).

The strategic decision will characterized the market introduction for every new product (Debruyne et al. 2001). Hence, the need of new product development strategy is very important as the successful of every product is depending on the strategy that being created and used by the company. New product development strategy is defined by Firth and Narayanan (1996) as innovators, investor in technology, searching for the new markets, business as usual and middle of the road. Based on this definition, Fifth and Narayanan comes out the most important aspect in the new product development. These three important aspect are new embodied technology, new market applications and innovation in the markets. Song and Montoya-Weiss (1998) stated that, the new product development strategy are the development strategy that track the new market with the offering of new product and technology which at the same time create "real new product". These strategy involving with the new product on the current and new market is categorized as a moderate innovation.

New product development strategy has been viewed as the strategy that important in ensuring the progress of product development. Many researchers characterized the new product development strategy into several classifications. Debruyne et al. (2001) and Wilson et al. (1992), classified the new product development strategy into two types namely defensive and offensive. Offensive strategy is the strategy on aggressively explore the new market or enlarges the existing market with the careful planning. At the same time, these environments will stimulate the defensive strategist into action. The companies that engaged with the offensive strategy will encountered the high degree of risk and investment in money, time, resources and skill but the potential of higher return also increased. This is opposite to the defensive strategy which usually planned on low risk and low return strategy (Liu et al., 2004; Kim et al., 2004).

Formulating the strategy for new product development is important. John and Snelson (1990) line up two approaches in formulating the new product development strategies which are the traditional asset based and market based. Traditional asset based approaches are product cost cutting, product modification, product life extension and new product line up. These all approached are majorly on build on existence product with existing technology. While market based approaches are the activity that seek for wider, more profitable and new potential market opportunities outside the company business and capabilities.

Technology and Innovation in Increasing Customer Acceptance

According Zizlavsky (2011), the term 'innovation' was first used by Schumpeter in the early 20th century. Ideas and his research have been developed by several other authors. Schumpeter

defines innovation as product, process and organizational changes that do not necessarily come from new scientific discoveries but may arise from a combination of existing technologies and adapt to new contexts. The success of an innovation depends on the workers who have knowledge, experience, creative and innovative activities in line with the emphasis placed on teaching and research in developing a product. Thus in addressing by Bain (2012) and Nielsen (2013), the rapid development of technology and innovation plays an important role and have a profound impact on changing the behaviour of consumers and businesses. Roman Martinez-Romero (2012) and Kangasharju Pekkala (2002), states that innovation is still seen as a significant driver for measuring economic performance. In this case, education has become a key aspect for the economic success of any organization. According to the statement, science knowledge is a basic factor in innovation and assimilation of new technologies, training to become a leading role that will contribute to the generation of new ideas for the production of the product. This statement was also agreed by Bartes (2009), which stated that the 21st century is the century of technology-based knowledge, information and innovative product design. According to Tidd et al. (2006) innovation that contributes to competitive advantage consists of several aspects. The most important characteristics are:

1. Strong relationships between market performance and design of new products.
2. New products can help maintain the market and increase profitability.
3. Growing through non-price factors (design, quality, individualization, etc.).
4. The ability to replace outdated products (shorten the product life cycle).
5. Innovation processes leading to accelerated production times and development of new products compared to competitors.

Martín de Castro et al. (2013), are saying that the success of the innovation technology development is important for creating and maintaining competitive advantage an organization especially in the manufacturing sector. According to this statement, through research, development and innovation is the introduction of important features to determine the acceptance of products based on technological innovation in the current market. This statement is supported by Autant-Bernard (2001) and Fadairo Massard (2013), which in their study also shows how important the role of innovation and they said that the Organization should have a strategy to support the existing knowledge.

All of the above facts showed that innovative activities and technological developments that significantly affect an organization, especially the manufacturing sector in terms of product competitiveness based on the skills and abilities. Achieving higher competitiveness through innovation means producing cheaper and have better quality and state of the art compared with products manufactured by competitors. Nowadays, with the development of technology and innovation, it has played a very important role, particularly in the manufacturing sector, especially in the design of new products. For example, in digital mobile technologies, by designing new products, they help to create and provide a more appealing to customers.

With the advent of higher and advance manufacturing technology along with the exploding markets of product either in local or global market, the need of efficient supply chain and new product development strategies has been discussed and being research by the many researchers. The strategy has enable the managers to clearly understand the links among the products, the

process on produce and delivery, and the supply chain activities management among the companies. Besides, the good and efficient strategy also support the execution of corporate strategy with the resources alignment in respond of the markets demand (Stavrulaki and Davis, 2010).

During the product development process, all resources, department and specialties group are gathered together to manufacture the high technology, high value and more sophisticated product. The complexities of systems and product nowadays require integration from all diverse knowledge and personal skills where these cooperation is crucial for new product innovation (Islam et al. 2009). These new product development teams is led by the leader which encourage the newly information for the current and future new product development efforts. In addition, these leader or top management has a significant role in simulating the innovation in the companies and product development process. At the same time, these top management also have positive correlated with the successful product development (Richtner and Ahlstrom, 2007). Therefore, the understanding for the important of top management towards new product development must be clearly identify to ensure the success of product development.

Manufacturing Entity in Standardation of Product Design

According to Ulrich (2012), to compete in a global market, companies must continuously develop new products and manufacturing processes to meet new demands from customers. Production of new products requires advanced engineering process, strict quality requirements and has a tendency for such products remain on the market. To remain competitive in the future, more cost-effective manufacturing methods and better technology needed for the production of a product. Development of new technologies such as rapid prototyping, advanced industrial robot, digitization and advanced control systems may enable the production of new products made on a competitive basis where labour costs are reduced. Furthermore, according to him it has become a requirement, especially for companies in the manufacturing sector to be innovative and able to develop the design of new products and better technology. There is also the risk of loss of efficiency in manufacturing and engineering for the long term. Thus according to Houqe (2013), standard manufacture must be taken into interpretation. Among the factors are:

Integrated Product and Process Development

According to Swink (2006), introduction of new products can either be done by the manufacturing process or by the process of modifying of existing products would require new manufacturing process is complete. However according to Dewhurst (2012), studies show that up to 85% of the production costs needed to design new products. Therefore, to achieve a reduction of costs in the manufacturing sector, it is necessary to consider that the design of new products and manufacturing closely interconnected with each other. If the design and manufacturing work at an early stage in the project design of new products, balance and

compromise can be made between product and process design to save cost and time and also can prevent the occurrence of wasteful redesigns.

Design for Manufacture and Assembly

Concurrent development of product and process includes design concept for manufacturing (DFM) and design for Assembly (DFA). It is to reduce manufacturing costs and facilitate the manufacturing design of complete sections without compromising the quality of the end product. Design for installation pioneered by Boothroyd Dewhurst (1983), which aimed to get the lowest installation cost. This means that an efficient installation cycle can be done with the availability of suitable installation system, such as special-purpose machine or programmable machine assembly. It also contends that the effect of reducing costs is more effective and can be achieved through the initiation process of product design and components. Therefore a lot of cost savings will be achieved through optimum use of DFM and DFA's.

Manufacturing Strategies

According Säfsten (2007), the strategy needs to be a priority in the manufacturing sector to competition and to continue the ability to continue to operate in the future. According to the statement, there are things that need to be addressed to the new product design process. In the event of wrong strategy, it can have negative consequences on the competitiveness of a company. Lindstrom (2010), believes that a successful outcome is a decision that is in line with what the company's strategy in the context of long term and short term. This opinion is in line with the statement by Frohm (2008), which states that successful results should be in line with the company's manufacturing strategy and its implementation should be accelerated in accordance with the company's goals personalized to the capabilities of today.

Acceleration to Customer Acceptance

According to Robinson and Mai (2002), acceleration issue is a positive step in understanding how companies can accelerate their innovation process. However, it needs an effective empirical test to determine the best strategy, especially for the marketing of a new product. According to the statement, there are proposed several strategies to accelerate the development of products and processes and this can be classified as:

1. Depending on external sources of purchase, licensing or supply of raw materials.
2. Depending on the program, R&D, research and implementation of innovative performance in the various stages of product manufacturing.
3. Depending on management strategy and taking into account the needs of customers to accelerate progress and better integration between RD, research and implementation of innovative and also other functions related.

However according to Cooper and Kleinschmidt (2000), found that although some companies especially in the manufacturing sector have a systematic plan for the production of their new products, but not implement maximally. Therefore, according to the study of Bajaj (2004), pointed out that the success of a new product depends on the design of new products made and also acceptance of the product in the market. Findings also found carrying out more new product design products relative to engage in activities of conventional products, have the potential to accelerate the product more successful.

Discussion

This paper has focused on three objectives. First, it examines the relationship between strategy and performance of new products, new product design. The aim is to investigate the development of new product design topics related to education as a strategic opportunity for technology and related manufacturing approach to enhance the product that is acceptable to the customer. Second, it explores patterns of strategy the use of highly innovative new products and exploration of the current criteria for making technology issues. The approach to achieve this strategy was closely related to the field of mechanical engineering and industrial engineering in addressing the design of new products. And finally, this paper tends to discuss the actual situation regarding the evaluation criteria for each division involved in the process of designing new products based on strategies that have been identified.

First of all, our findings indicate that any new product strategy can be effective, therefore no one strategy can be considered better than others. For example, the marketing strategy is most often used for the evaluation of ideas, business direction and study after launch. Categories of financial strategy were used to assess the cost of their teeth and are used for technical strategy related to product testing. In addition, the technical strategy is most often used to evaluate the design of new products with new product strategies. Some implications in management can be taken from this study. Management, especially in the manufacturing sector cannot rely on its own strategy. Therefore, management needs to focus on critical factors such as the skills, resources, information, strategies for entrepreneurship and the ability to guarantee the continuity of corporate organization, especially in the production of new product design.

Finally, through this discussion it can be concluded that in order to make a successful product on the market, the management needs to have a better understanding in terms of knowledge in a variety of strategies. Thus in the process of production of new products, the management needs to follow, to compare and make decisions with strategies that have been assigned to drive and thus makes the product more accelerate and well received by users.

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