

Performance of New Product Design Manufacturing in Malaysia: New Technology as a Strategic Opportunity in the Field of Engineering

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ABSTRACT

The aim is to demonstrate a case for the expansion of new product design performance topics related as a strategic opportunity for technology instruction. A brief literature review about a new product design performance topic is introduced, as well as an exploration of the current criteria for various technology issues. Approaches for achieving is presented noting that mechanical engineering and industrial engineering are often more closely associated with the new product design issue. Views of industry reveal the need for identifying preferred approaches. If a new product design topic is to be admitted as part of program, there are a number of potential attacks of all the new engineering sciences that will impact engineering technology where none is bigger than the internet. The number of new product design performance in the Malaysia is growing substantially. New technology is encouraged along with the review of content in traditional engineering disciplines, especially the related discipline of mechanical engineering. The study leads to believe that new product design performance topic represents a strategic management and opportunity for new technology to follow.

KEYWORDS: New Product Design, Technology and Innovation, New Technology, Industrial Design, Manufacturing Process.

1.0 INTRODUCTION

In the manufacturing sector in Malaysia, an effort for development of new products was done consistently and drastically, particularly in the segment of product design. This is in line in order to achieve the level of competitiveness and innovative capacity of the global standards; the manufacturing sector plays an important role and tries to do our best to achieve the goal. Malaysia also hopes will be a successful country in the production of high-tech products, an efficient value added and became a manufacturer of a wide range of more advanced services products. Therefore, joint ventures and strategic cooperation made with local and international institutions and developed countries will result in many benefits to the parties involved. After that, Malaysia will be at a higher level and respected globally. Furthermore, from this strategy, Malaysia can get the flow of expertise really needed and as well as benefit from transfer of technology in accordance with the agreed strategies. From another point of view for example, Malaysia can also carry out overseas projects with countries that have expertise in the manufacture of materials by using labour from Malaysia. This will provide profits for both parties. After the process of technology transfer occurs in some time, Malaysia will have his own energy experts and can be proud of when known as a developed nation.

As known that Malaysia is famous for its agriculture-based sector. In Malaysia, some commercial crops have greatly expanded. As a result of this plant are used to produce several types of raw materials such as palm oil, rubber, timber, rice and fibres. Unfortunately, the revenue that can be generated from agro-based sector does not really have a big impact when compared with the manufacturing sector. For that reason, Malaysia continues to develop the manufacturing sector and in the sector, Malaysia must not only rely on agro-based sector alone. In addition, the manufacturing sector will help in improving agriculture sector development by offering the ability of some downstream activities such as processing, packaging and distributing of the product.

An activity such as described above is useful to optimize the use of raw materials such as oil palm, rubber and rice to be finished products or semi-finished products. In addition, the manufacturing sector can help in research and development (R&D), the use of the design of new products and the latest technology for the purpose of manufacturing and business. Therefore, in this discussion, it is expected to be able to identify variables that may support in future research and be an indicator in the process of manufacturing new product designs, especially in Malaysia to compete and survive in the era of globalization.

2.0 LITERATURE REVIEW OF NEW PRODUCT DESIGN

In [12] stated that the concept of a new product can be defined in a variety of definitions. A definition can also be considered basically describes the types of products include original products, products that are better, which has been renovated and brand new products developed through research and development efforts

undertaken by the organization. Classification related [4, 11], stated that there are three different categories identified from the definition of these new products. Those that are really innovative product will meet the demand of the present that cannot be resolved by means of redesigning an alternate product that is different from existing either in form, function and advantages of the products available. New product design is the improvement of the production of new products to the market and organisations as well.

The next concept from [8, 15], is the design of new product have been classified into two dimensions, namely 'newness to the organization' and 'newness to the markets'. Starting from the lower level to the highest level in each dimension, there are six categories were identified. These categories are cost reductions, improvements in existing products, repositioned products, additions to existing product lines, new product lines allowing a firm to enter established markets and new to the world products that create new markets.

From the concept of generation is the process of producing new ideas. It was supposed to be synthetic rather than analytical. the goal was originally not intended to assess the possibility of a solution but to continually come up with new ideas, regardless of the situation practical or not. They need to think critically about these solutions. There are four steps in the creative process:

1. Preparation-collecting information about a problem.
2. Incubation-unconscious recombination of ideas (requires conscious thinking about the problem).
3. Illumination-moment of inspiration.
4. Verification-implementation/testing of the idea.

The concept idea first product developed through research on market demand and consumers. However, the critical judgments on the technical aspects of the product must be addressed. It is closely related to the company's needs and requirements of users. In a marketing context, a discussion between the groups needs to find the right information [5]. For new product design achievements especially in the field of industrial products, the concept of innovative products such as the use of new technologies should be preferred in order to enhance overall product performance. Studies on the concept of product ideas have led to the finding of more data and also ideas to product details including ideas usability.

A view on a strategic role in the management of new product design has great potential to contribute to the new design and product development studies. Performance of new product design must be continued to generate innovation. It has become a priority in research, which is a special issue of the Journal of Product Innovation Management featuring articles on topics such as the role of design in discontinuous product development, links between marketing, new technology and engineering on product design [15], the effect of product appearance on customer choice [4] and the financial rewards to superior industrial designs [5]. Indeed, recent work in [3] reports that design investments enhance firm performance.

2.1 NEW TECHNOLOGY IN MANUFACTURING OF NEW PRODUCT DESIGN

It provides for the definition of opportunities as situations in which new goods, services, raw materials and business rules can be introduced and sold at a price higher than the cost of production [2]. According to [16], the product design is part of the people's response to changes in lifestyle needs and to improve the quality of life by designing and creating innovation. Product design improved through knowledge of social factors, technology, economics, history, ethics, legislation, environment and culture. These factors affect the aesthetics, form and function of a product that has been developed in the past and that has not been developed. Product design process involves the identification of the actual needs and then translated in designing new products. It needs to be reviewed and informed by research to help find a solution with regard to the physical and allows the product to function in three dimensions. This method requires the use of new technology solutions and creative skills including think to design products, drawing with computer aided design, testing processes and materials, planning, construction, manufacturing and evaluation. Knowledge especially in engineering and use of resources is a matter of great importance in designing the product. These resources include a wide range of materials, equipment and machinery to transform these elements in the right way and securely into products more innovative and useful. Increasingly, consumer awareness of the importance of environmental sustainability has an impact on the development and design of new products. A more sustainable approach is to be performed primarily by management at the forefront to maintain product lifecycle.

To product design processes that are effective, it must identify customer needs and requirements, thus realizing the product and make it producible, where decision-making was identified as a credible alternative. In a race competition in the marketplace, organizations need to make the right decision and drastic. What is important is to get a strategic position and is exclusively in the market in order to guarantee the product to continue to be competitive. On the other hand, the rapid advances in technology, market and innovation have accelerated changes in previous decades. This requires a method and new techniques to bring new products to

market successfully. However, [14] said the new product design which has long been recognized as one of the major corporate functions. Over the past 25 years, the new product design has been increasingly recognized as a critical factor in ensuring the longevity of a firm will remain. The rates of growth of the market and technological changes have been affecting factors of consumer needs and this requires methods and new techniques for making new products successfully on the market. Information technology (IT) is one of the factors that have increased the flexibility to new product design. New product design requires good cooperation from members of the new products team within or outside the firm. This will create new opportunities in the field of technology to generate profit. This put researcher in a position of uncertainty when found that new technology opportunities in the market are the most profitable is by the internet. Many businesses now have changed their marketing strategy to suit the current market conditions [9]. For companies that do not want to make changes to its marketing strategy, no new opportunities that will exist and it will not develop entrepreneurial potential [1].

2.2 HOW INDUSTRY MEASURES PERFORMANCE OF NEW PRODUCT DESIGN

According to [7], the product is designed based on the experience and creativity of designers is made on a subjective feeling. Therefore the designs of new products are constantly being introduced to the market all the time, but most of them failed. Many inventors are not aware that their failure is not due to some huge faults in the product itself, but how it's presented. Through some of the methods below, the performance of the new product design should be successful if appropriate planning and development at different stages of operation.

Address Customer Needs

Many products fail due to their unclear handle any needs or solve any particular problem in meeting the needs of users. Often, customers are not only looking for new features stylish, but they find the solution method with the availability of new product designs. For example, users are not concerned with the preparation of food using microwaves, but they are looking for a simple solution to the problem of preparing dinner after spending the day at the workplace. A successful product is a product that can fill in the lives of our customers. In a successful marketing strategy, the vacancy must be clearly identified. Once they are identified, it is time to introduce a solution by way of manufacturing a new product designs.

Offer Good Price for Value

As soon as the customer needs have been identified and offers a possible solution, the next step is to determine the value. Although it is a common problem and there is no other product on the market and the firm offers the perfect solution, but if there is no demand, the solution becomes worthless. If the price is not reasonable, the client will try to get their needs by using products that are not quite appropriate. For example, if the client needs to drill the hole but require high costs, the customer may try to use other tools to lower costs because the goal is just to drill the hole. Price is an important factor for the customer to justify the purchase of a product, especially new products.

Communicate

Often, marketing strategy only works in one way. Through advertising, the firm will try to attract potential customers with the advantage of the characteristics of their products. But at the same time do not try to solve each client's needs. For example, firms may be approached and started a dialogue to learn consumer needs to suit their new product design through target groups, consumer associations and review. Creating a platform for effective communication with customers is important because it will give a clear representation about the perspective of a new product release to the company. Directly from the client perspective, this will result in the performance of new products design successful. Often the customer feedback has been taken into justification the consideration of cost. The firms need to make significant changes to their products and plan effective marketing strategies that can lead to increased sales.

Availability

All new product design can be perfect. But if the products are hard to come by, customers will choose a different solution way and avoid buying the products. The company must be very careful in considering the means of distribution, when and how the customer can get the product. Whatever else the method taken for distribution, it should be easy for the user. For example, product purchase through online. Should it do not need instructions too complicated just to purchase a product. Simple, honest and straightforward is the factor that will provide assurance to customers that they have made a good choice and ensure long term relationships with the company.

2.3 THE PROPOSED NEW PROGRAMME CONTENT RELATED TO THE DISCIPLINE OF ENGINEERING

In recent years, many studies have been conducted in many countries to determine the technical and personal abilities needed by engineers in the industry today [6, 13]. The results of these studies have shown there are some major concerns. Engineering graduates today mostly do not have communication, team work and high skills. Graduates also do not have a broader perspective of issues affecting their profession such as social issues, the environment and the economy. After undergoing a process of education, finally, they graduate with a deep knowledge of basic engineering science and computer literacy, but they do not know how to practice it.

The approach of new accreditation emphasis is shifting from 'what is being taught' to 'what is being learned' [10]. Engineering programs that are especially at technical institution now have to demonstrate that their graduates can achieve a specified set of learning outcomes, and methods will be received to decide and implement. There are also a number of requirements in each country to improve education management and industrial design association programs. When examined the results of industrial research, and review the accreditation criteria for programs of new product design, it is clear that the profession, employers and students themselves require significant changes during the preparation of the programs for new product design. What are the critical issues that need to be addressed? The finding can be summarized as follows:

1. Engineering curriculum is to focus on engineering science and technical courses without providing sufficient integration of these topics or relating them to industrial practice. Programs are content driven.
2. Current programs do not provide sufficient design experiences to students.
3. Graduates still lack communication skills and teamwork experience and programs need to incorporate more opportunities for students to develop these.
4. Programs need to develop more awareness amongst students of the social, environmental, economic and legal issues that are part of the reality of modern engineering practice.
5. Existing faculty lack practical experience, hence are not able to adequately relate theory to practice or provide design experiences. Present promotion systems reward research activities and not practical experience or teaching expertise.
6. The existing teaching and learning strategies or culture in engineering programs is outdated and needs to become more student-centred.

In Malaysia, the solutions generally proposed to overcome most of these issues involve a fundamental redesign of the curriculum in engineering programs. Revised course accreditation criteria through Malaysian Qualifications Agency (MQA) and Asia Pacific Accreditation and Certification Commission (APACC) will mean that all technical and vocational education and training (TVET) institutions in the Malaysian will need to develop revised program and course structures, and teaching methods such as the use of new technologies can help graduates acquire skills and meet the desired quality of the industry in the future. Most institutions will probably choose to "nibble" gradually at the edges of their existing programs, constrained by financial considerations, tradition and the expertise and experience of their existing faculty. Others may adopt a more radical approach by shifting the fundamental basis of their educational approach to a project or problem based learning model. But, why use problem based learning in engineering? The answer to this question is fairly straightforward. If we examine the six critical issues for new product design programs proposed above, then problem based learning is a strategy that can be used to directly address numbers 1 to 4 and 6. For it to be successfully introduced, and then issue number 5 must also be dealt with.

3.0 DISCUSSION

Traditional mechanical engineering courses are oriented towards performance based analysis sprinkled with some design. If manufacturing is to be included as part of a mechanical engineering program, there are a number of possible approaches. Noted below are 7 possible scenarios:

1. Increase the awareness of manufacturing through modifications of existing mechanical engineering courses. This could be done without a complete overhaul of the curriculum.
2. Review of educational content in traditional engineering with increasing manufacturing content in mechanical engineering.
3. Present a product design applications as part of the instruction in traditional areas. In many courses, educators choose application areas to illustrate the concepts they are teaching. Some applications could be chosen from real design.

4. Use new technology manufacturing applications in laboratories. Traditional laboratory experiences could include manufacturing applications such as automated assembly operations or measuring variation from a fabrication process.
5. Design assignments that include process and tooling design. Design assignments could include the requirement to address new product design process and tooling design, as well as the traditional functional design.
6. Economic studies that include manufacturing issues. Discussions of economics could include manufacturing issues.
7. Use manufacturing vocabulary in the classroom. Discuss manufacturing considerations as part of materials course. Materials subjects are natural places to discuss manufacturing processes.

4.0 CONCLUSION

In the context of learning and requests from the industry about what they need from graduates of engineering, it seems that this request could not be met by traditional engineering education system applicable at the time right now. Mixed mode approach is found to be successful in practice in several institutions surveyed in most previous studies. With some traditionally taught courses, mixing with a number of project-based components and with a growing new component of technology, it appears to be the best way to satisfy industry needs without sacrificing knowledge of engineering fundamentals. It has also been demonstrated that the engineering profession and academics are more familiar with the concepts in their professional practice, than with the concepts of problem-based learning. Therefore seems that project-based learning is likely to be more readily adopted and adapted by university engineering programs. The use of new technology as a key component of engineering programs should be spread as widely as possible. It is clear that any improvements, especially the use of new technologies in the process of manufacturing new product designs, will improve performance against engineering disciplines and are highly welcomed by industry, institutions, and consumers.

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