

ANALYZING THE IMPACT KNOWLEDGE IDENTIFICATION, CYCLE TIME, SEGMENTING CUSTOMERS OF PRODUCT DESIGN IN ACCELERATING CUSTOMER ACCEPTANCE

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ABSTRACT

New product development (NPD) are deliberately essential to meet customer demand and customer acceptance. It be able to keep up or expand market share, sales and income and consequently the aggressiveness of an organization. The market success of a product is largely depends on clearly identifying customer needs and providing a product for the same at reasonable cost to the customer. The ability to develop new products and to improve the existing one governs the growth and market share. NPD has been highlighted as a leading driver for revenue, profit and market share growth. A typical issue faced by the products offering firms is to comprehend the way of customer requirement, interpret them accurately and classify them to decide the configuration that will satisfy maximum requirements with minimal cost. This research aim to analyze cycle time, impact of product related features, number of task and task time, segmenting customer and knowledge identification toward product design. Limitation are company do not review their product development activities and time constraints due to the limited time. Multiple regression indicates all relationship between the variable towards product design supported.

Keywords: cycle time; product design; impact of product; number of task and task time; segmenting customer; knowledge identification

INTRODUCTION

New product development (NPD) are strategically important to meet or create customer demand and customer acceptance. It be able to maintain or increase market share, sales and revenue and hence the competitiveness of an organization. The market success of a product is largely depends on clearly identifying customer needs and providing a product for the same at reasonable cost to the customer. The ability to develop new products and to improve the existing one governs the growth and market share (Tarasewich, P. and Nair, S, 2001). For maximizing profits through customer satisfaction, a product line is offered rather than a single product (Ho, T.H. and Tang, C.S, 1998). NPD has been highlighted as a leading driver for revenue, profit and market share growth (Aberdeen Group, 2004).

A typical issue faced by the products offering firms is to comprehend the way of customer requirement, interpret them accurately and classify them to decide the configuration (combination of features in a product) that will satisfy maximum requirements with minimal cost.

Furthermore, to highlight structure of product their prices likewise influence the buyer decision. Firstly, customer to decide on their budget for the product class and they assess subsets of features within the product class (Gavish, B., Dan, H. and Srikant, K, 1983). Similarly, “customer value” (customer worth), i.e. what a product or a service worth to the customer in financial units, it is another vital factor that impact the customer product decision making (Haji, A. and Assadi, M, 2009).

Lastly, Successful product design and the capacity of organizations to continuously enhance their innovation processes are quickly becoming essential. For an efficient and timely product design, organizations need to utilize information of knowledge over the different practical divisions. Product design activity will also encourage learning and knowledge transfer within and between organizations. Knowledge management is thusly essential in product design.

LITERATURE REVIEW

This project study about product design and manufacturing. It also focus on development of current product design toward customer acceptance. Product design as a verb is the procedure of creating a new product to be sold by a business to its clients. An extremely wide idea, it is basically the efficient and effective generation and development of ideas through a procedure that prompts to new products. Product design process: the set of strategic and tactical activities, from thought era to commercialization, used to make a product design.

Cycle time of market toward product design

A research done by (Campbell, R.J, 1995) cycle time is the period between a product’s design and the time of delivery of the product to the customer. Advocates of shortened cycle times contend that achievement in such an exertion will prompt to improved profitability, more elevated amounts of customer satisfaction, and increased market share. Approaches to cycle time decrease are various. Most cycle time reduction programmers are firmly attached to an organization’s quality improvement programmer. Thus, cycle time reduction is not a segregated action within an organization.

Besides, cycle time includes process time, during which a unit is acted upon to bring it closer to an output, and delay time, during which a unit of work is spent waiting to take the next action. If task times are small respect cycle time there should be more station loads with low idle times because it is easier to combine small items than large ones to fit within the cycle time constraint (Andel, T, 1994). As an example in a product design the tasks could be subdivided into smaller tasks to reduce the average task time respect cycle time, more task duration variability could be composed and more adaptable assembly sequences could be devise.

Impact of product related features on the performances of assembly line manufacturing systems toward product design

Product features are identified with the characteristics of a product that help to meet the fulfillment level of consumers' needs and wants through owning the product, utilize, and usage of the product. Smartphones like iPhone and BlackBerry have bigger and higher determination screens and offer buyers a wide cluster of features, including mobile web searching, a great many of applications, e-mail, texting, picture messaging, video, and audio playback, global positioning system (GPS), games, a video camera, picture, and video editing.

Besides, design and manufacturing activities have occurred consecutively rather than simultaneously prompting wasteful and time consuming iterations between designs and manufacturing stages (Shukor, S.A. and Axinte, D.A, 2007). Concurrent engineering philosophy (Nevins, J.L. and Whitney, D.E, 1989) advocates, truth be told, to complete the product at the same time and process design with the aim of minimizing the product life cycle cost and the time to market while giving high added value products for the consumer, (Prasad, B, 1996) In this structure, Design for Manufacturing and Assembly (DFMA) techniques are generally utilized. However, the traditional DFMA approach basically concentrates on acquiring a product with a high level of manufacturability.

In fact, the review of literature in this field demonstrates an absence of a methodology for effectively incorporating the concerns of production into the early design stages, and that the vast majority of the design for manufacturing approaches do not consider limitations identified with operations of manufacturing systems, but instead manage assembling procedures (Govil, M.K. and Magrab, E.B, 2000).

Task time toward the product design

Task time is the average unit production time expected to meet of customer demand. For instance, if buyer needs to purchase 10 units per week, the average time to manufacture a unit must be 4 hours (or less) and if the units are assembled around 40 hour work week. Thus, industrial manufacturing lines must have creation process duration at least as short as the task time then the production can meet the customer demand. This production 'cycle time' must be less than or equivalent to task time.

Besides, task time is to help calculated on for every task and each undertaking in a business environment. It is utilized in the manufacturing such as casting of parts, drilling holes or preparing a workplace for another task, and control tasks (testing of parts or adjusting machinery). However, it is most common in production lines that move a product along a line of stations that each perform a set of predefined tasks (Cheong, J.H. and Park, M.C, 2005).

The higher the number n of tasks to be performed the higher will be the number of workstation and the number of feasible task sequences to be investigated (disregarding precedence requirements there are $n!$ feasible task sequences). Hence, the problem complexity is expected to develop exponentially increasing n , however the higher number of possible sequences may increase the probability of discovering an effective one.

To present a systematic methodology for segmenting customers based on the preferred product features, its cost and worth toward product design

A product to be successful in the market, it should be created from customer perspective (Shehab, E.M. and Addalla, H.S, 2001). Customer understands product by its features (attributes). For example, mobile phone product important features include camera, MP3, expandable memory card, FM radio, light, versatile tracker, double sim, 3G and so forth. Essentially, different products (e.g. car, tablet, home security system) will have diverse elements. Each customer will have different needs that request different combination of features in a product. Subsequently, the preference and the significance of each feature in a product vary with customers.

According to (Dibb, S. and Simkin, L, 1997) customer segmentation approach is adopted for distinguishing and grouping customers with common features requirements from a wide range of product features. The approach encourages the designer to develop a product suitable for a target group of customers. Customer segmentation is the most usually utilized approach in marketing domain to device suitable marketing strategy. However, there is scarcity of literature on customer segmentation for creating suitable product configuration design.

To improve the understanding of knowledge identification toward product design

Effective product design and the capacity of organization to consistently enhance their innovation processes are quickly becoming essential. For an efficient and timely product design, organizations need to utilize knowledge across the different functional departments. Product design activity will likewise foster learning and knowledge transfer within and between organizations. Knowledge management is subsequently essential in product design. On the other hand, most organizations and designers do not know what knowledge should and can be managed. Although many individuals, including product designers, feel overloaded with information, little work has been done in this area.

Knowledge management is important to organizations. It is urgent and significant to direct research on recognizing what knowledge is utilized as a part of product design process, in this manner having the capacity to indicate and optimize the huge and unpredictable learning in organizations. In this section, based on the designer's decision making process, knowledge in product design is identified in detail. (Rasmussen, J., Pejtersen, A.M. and Goodstein, L.P, 1994).

Product design

Product design process: the set of strategic and tactical activities, from thought era to commercialization, used to make a product design. In a precise methodology, product designers conceptualize and evaluate ideas, transforming them into substantial developments and products. The product designer's role is to consolidate art, science, and technology to create new products that individuals can utilize. Their developing role has been encouraged by digital apparatuses that now permit designers to communicate, visualize, analyze and actually create unmistakable ideas in a way that would have taken more manpower in the past.

Besides, there is a developing recognition that product design is rising as a key marketing element according by (Kotter, Phitip and G. Atexander Rath, 1984). This is particularly valid for the segments of product design that include development for human interaction and aesthetics. Design, which refer to the organization of component of an object, and aesthetics are innately

linked subsequent to the design or physical form of a product encompasses aesthetic aspects of the product such as shape, color, and texture.

METHODOLOGY

In this study, the methodology research is using quantitative method. This chapter will explain the method used to conduct the study including the research design, and data collection being used to process the data collected to achieve the discussed objectives. The respondent of this research topic will be the personal in charge of product design and manager's of the firm in Malaysian manufacturing industry.

As the main objective of this study is to identify critical factors related to successful new product development in a manufacturing environment. There will be minimal interference as reply is obtained in a normal setting of a manufacturing organization. The study will be a cross sectional study as data shall be gathered once over a period of time from persons who work in manufacturing firms who adopted new product development in their organizations. This study shall be carried out using structured questionnaire.

A questionnaire method shall be used to collect feedback from the potential respondents. The questionnaire will be distributed to the managers company. There will be 30 questions being prepared in the sheet whereby the questions will be divided into two sections. The first section is aim to collect personal details and organization information, followed by second section which aims to assess in the respondents' experience which consist five variables of top management support, external support, NPD strategies, NPD teams and NPD success.

Descriptive analysis is to explain about descriptive statistics of each variable. In descriptive analysis it will showed us about the range, minimum, maximum, mean, standard deviation and variance of each variable as the table below. By doing this, we will more understand about the information from the data analysis.

Descriptive statistics compute mean and standard deviation of all six variables in this study. From the table above, we can know that the mean for variables product features, product design, cycle time, segmenting customer, task time, and knowledge identification are 3.740, 3.872, 3.608, 3.930, 3.880 and 4.324 are respectively. From the data, we can know that the new knowledge identification has highest mean compared to other variables which is 4.324, whereas cycle time variables have lowest mean which are 3.608.

Table 1: Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
ProductFeaMean	100	2.20	2.60	4.80	3.7400	.47610	.227
ProductDesMean	100	2.40	2.40	4.80	3.8720	.50414	.254
CycleMean	100	2.60	2.40	5.00	3.6080	.47730	.228
SegmentingCusMean	100	2.00	3.00	5.00	3.9300	.48021	.231
TaskTimeMean	100	2.40	2.60	5.00	3.8800	.41487	.172
KnowledgeIdenMean	100	1.60	3.40	5.00	4.3240	.40280	.162
Valid N (listwise)	100						

FINDINGS/RESULTS AND ANALYSIS

Regression analysis is a statistical method for testing the relationship among variables. It focuses on testing the relationship between a dependent variable and other independent variables. In this study, we are going to test the relationship between the dependent variable which is the product design and other independent variables which are the cycle time, product features, segmenting consumer, task time and knowledge identification.

Table 2: Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.841 ^a	.810	.000	.15233

a. Predictors: (Constant), KnowledgeIdenMean, CycleMean, ProductFeaMean, SegmentingCusMean, TaskTimeMean

From the table above, we can see that the R square is 0.810 (81%) of the variance in the dependent variable (product design) that can be explained by the independent variables. It also indicates that there are strong relationship between dependent variables and independent variables.

Table 3: Anova

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	32.123	4	2.844	124.533	.000 ^b
	Residual	3.534	95	.030		
	Total	35.657	99			

a. Dependent Variable: ProductDesMean

b. Predictors: (Constant), KnowledgeIdenMean, CycleMean, ProductFeaMean, SegmentingCusMean, TaskTimeMean

The significance value above is 0.000 which is less than 0.05 and it indicates that the regression test is significance and acceptable. Therefore, we can summarize that there is a relationship between product design and independent variables which are the cycle time, product features, segmenting customer, task time and knowledge identification.

CONCLUSION

This project study about product design and manufacturing. It also focus on development of current product design toward customer acceptance. Besides, limitation of this project are do not expose whatever product activities that carries out by company activities, companies do not review their product development activities, and time constraints due to the limited time.

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Organizations increased product variety permits a closer match between customer preferences and offered products. It has turned into a critical technique to increase market share, sales and profits. An organization can have different variations of the same product in order to create customer esteem. The primary text to a firm is to discover which features offered by their product matters most to the customers. Organizations can modify the features offered by their products based on customer quality investigation study, such that they secure more customers and retain their current ones.

From the findings, multiple regression indicates all relationship between the variable towards product design supported.

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