

Indian Two Wheeler Auto Industry and Concurrent Engineering

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ABSTRACT

In the wake of globalization, concurrent engineering (CE) is a promising connote for design, modification and development of new products for the challenging Indian auto industry. Success of CE demands that key areas of new product design and development of an organization need to be under constant focus. Most of the companies adopt CE procedures to reduce the time for introducing new product in to the market. This paper analyzes the impact of concurrent engineering practices followed by some selected Indian two wheeler automobile industries in the area of new product design and development as they seek to improve their competitive position in global markets. The research survey presents its evaluation based on analysis by application of statistical tools on the primary data which was collected through a well structured and pre-tested questionnaire. The results disclose that the selected two wheeler manufacturing companies in India are realizing maximum advantages with the implementation of the concurrent engineering in design and development of their new products.

KEYWORDS: Concurrent Engineering, New Product Development, Product and Process development, Statistical Tools.

I. INTRODUCTION

In the present global business scenario market is ever changing and volatile, resulting in shorter product life span. The firms must be able to take decisions on the spot instantly and responsively so as to reduce their product introduction time to market parallelly adapt to changing markets. Therefore, concurrent engineering (CE) has emerged as a way for rapid solutions in design and development process. The process of concurrent engineering is no doubt the mark of future in new product design and development for all companies regardless of their size, sophistication and to yield the gains, it requires a great deal of refinement in implementation of concurrent engineering process as it must be assessed and controlled continuously both in engineering and business processes. According to Clark and Fujimoto (1999)¹, "New product design and development is information and knowledge intensive work". Developing successful new products is possible through integration of abilities of both design and manufacturing expertise along with deriving firm's capabilities like ability to create, utilise and distribute knowledge throughout the process. Also knowledge sharing is unique and valuable resource for competitive advantage. Parsaei and Williams (2001)² state that CE is a product development methodology, which enhances productivity and lead to better overall designs relies strongly on the quality of information, interpretation, execution and implementation. CE is a "product or project approach where all activities of new product design and development operate simultaneously" and are closely coordinated to achieve optimal matching of requirements for effective cost, quality, and delivery. The automotive industry is the front-runner in many of the disciplines in their race to cut cost whilst remaining competitive. Smith (1998)³ discusses that the automotive firm's are seeking to take on major design responsibilities which need to significantly improve their ability to effectively conduct concurrent engineering early and often throughout the production process. Figure 1 shows a diagram representing the Concurrent Engineering (CE) Model.

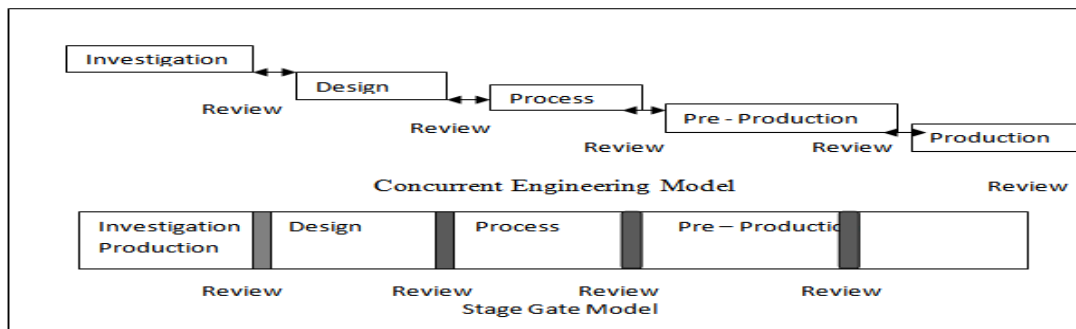


Figure 1: CE and Stage Gate Models

II. REVIEW OF LITERATURE

King N. and Majchrzak A. (1996)⁴ in his paper “The effect of project and process characteristics on product development cycle time” discussed about design integration as a “management process that integrates all activities from product concept through to production using multidisciplinary teams, to simultaneously optimize the product and its manufacturing processes to meet cost and performance objectives”. Griffin A. (2000)⁵ feels that design integration uses design tools such as modeling and simulation, teams and processes to develop products and their related processes concurrently. Design integration evolved in industry as an extension of work, such as Concurrent Engineering to improve customer satisfaction and competitiveness in a global economy. Verganti R. (1999)⁶ illustrates the importance of anticipating the capabilities of design integration during early development of the product. Early anticipation also referred to as forward planning means that information is anticipated as early as possible in the product development process so that solutions generated in the early phases already account for manufacturing constraints and opportunities. The challenge for global new product design and development with design integration is to achieve the prescribed activity whilst operating under the problems faced by teams are differences in communication and time, barriers between design, intermediate departments and customer lack of supplier involvement, management and teams working towards different goals and targets.

III. OBJECTIVE OF THE STUDY

The objective of the research study is to explore and establish the benefits gained by using concurrent engineering in product design and development on selected Indian two wheeler automobile industries.

IV. METHODOLOGY

The evaluation of the study is based on analysis of the primary data using Cumulative Weighted Average statistical analysis technique. The primary data was collected through a well-structure questionnaire from a sample size of 234 respondents of design, production and marketing groups of selected two wheeler manufacturing companies in India.

The questionnaire was sent to all respondents of 3 automobile companies and the usable response rate was 61% (see the Table 1)

Table 1: Response Rating of the Survey

Type of organization	Number of Organizations		Response Ratio (in percentage)
	Questionnaire Sent to	Response Received	
Two Wheeler Industry Automobile manufacturers	03	03	100%
No. of Respondents	234	143	61%

Data Analysis and Interpretation:

The data appropriate to the outcomes of concurrent engineering in new product design and development in two wheeler manufacturing companies are presented in the Table 2 and the same is depicted in the Figure 2.

Table 2: Impact of Concurrent Engineering

Variables	Cumulative Weighted Average
Use of concurrent engineering techniques	4.28
Encouraging external participation (suppliers and customers) in developing and designing the new products	3.76
Coordination of internal groups – design, Manufacturing	4.12
IT support and the knowledge management	3.82
Cross functional co-operation of multifunctional teams & Smoothing of organizational barriers	3.96
Ensuring Competitive Edge	4.06
Implementation of collaboration /partnership of managements	3.46
Management Reluctance	3.42
Average	3.8225

Source: Field Survey (Primary Data)

CWA: Cumulative Weighted Average

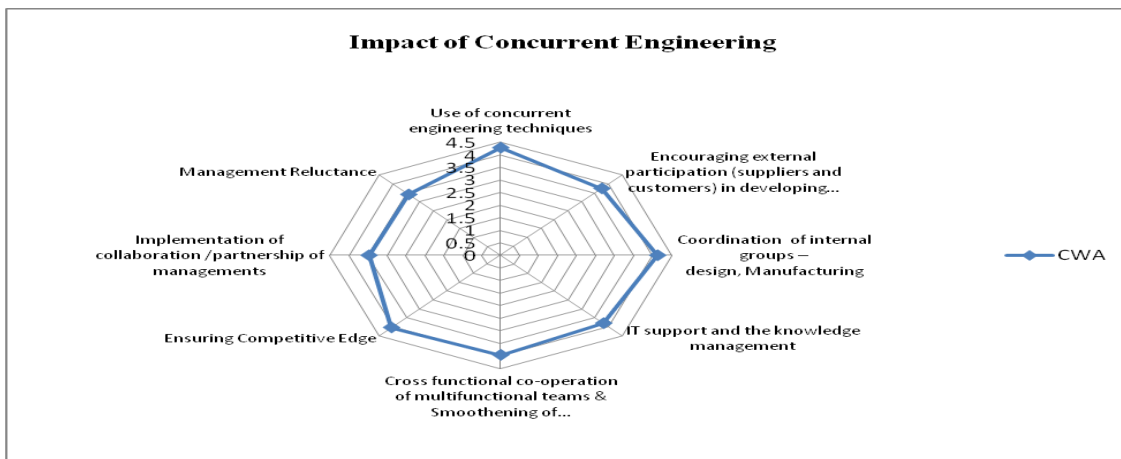


Figure 2: Impact of CE in Automobile industry

V. ELUCIDATION

The data presented in the Table 2, clearly establishes that the influence of concurrent engineering in new product design and development of two wheeler companies is considerably high in India. In specific, the variables with CWA score of greater than 3.75 on a 5-point scale: Use of concurrent engineering techniques, Encouraging external participation (suppliers and customers) in developing and designing the new products, Coordination of internal groups – design, manufacturing, IT support and the knowledge management, Cross functional co-operation of multifunctional teams & Smoothing of organizational barriers, Ensuring Competitive Edge, are identified as some of the key areas that realized most of the benefits.

VI. OUTCOMES AND DISCUSSION

Concurrent engineering has shown a very positive impact on design, development and introduction of new product in two wheeler automobile companies. Though companies are implementing concurrent engineering and realizing maximum benefits, they need to focus their attention in identifying the appropriate revolutionary technologies for proto-typing and thus increase cost savings and reduce time to market ultimately satisfying the customer needs.

VII. SCOPE FOR FUTURE WORK

The survey clearly reveals the facts that the CE has a great influence globally in new product design and development and stimulating the Indian auto sector currently. The survey made involved number of people related to the NPD, but ignored the expertise of the skilled people who are working in the concerned area but not qualified and the demographic factors such as gender and age were not taken into consideration which might influence the process to a greater extent. Further studies can be made by considering the above factors will reveal much more interesting facts. In addition the evaluation techniques such as ranking correlations can be applied to rank the different variables that are influencing the GNPD.

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