

Concurrent Engineering: Impact on New Product Design and Development in Indian Two Wheeler Auto Industry

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Abstract: Concurrent Engineering (CE) has a great deal of importance in design and development of new products in automobile industry and is posing a big challenge to Indian firms in the wake of globalization. Success of CE demands that major areas of product design and development of an organization need to be under constant focus. Most of the companies adopt CE procedures to reduce the time of launching the new product in the market, especially firms of western countries and Middle East. This paper analyzes the influence of concurrent engineering practices followed by some selected Indian two wheeler automobile manufacturers in the area of new product 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 pre-tested questionnaire. The findings reveal that the selected two wheeler manufacturing companies in India are realizing maximum benefits with the implementation of the concurrent engineering in new product design and development.

Keywords: Concurrent Engineering, New Product Development, Product and Process development, Optimization.

I. Introduction:

In the present global business world market needs are volatile, the firms must be able to act and react quickly and responsively. Moreover, they must be able to significantly reduce their product introduction time to market and adapt to the changing business environments, because of shorter life period of the product's. Therefore, concurrent engineering (CE) has emerged as a way for rapid solutions in design and development process.

Concurrent engineering is no doubt the mark of future for new product introduction and development for all companies regardless of their size, sophistication. In order to be competitive, firms must revise their product and process development cycle to be able to complete diverse tasks concurrently. This process will benefit the company, although it requires a great deal of refinement in its implementation, as concurrent engineering is a process that must be reviewed and regulated for continuous improvements of both engineering and business processes.

According to Pennell and Winner, (1988)¹, "Concurrent Engineering is a systematic approach to the integrated, concurrent design of products and their related processes, including, manufacturing and support. This approach is intended to cause the developers from the very outset to consider all elements of the product life cycle, from conception to disposal, including cost, schedule, quality and user requirements". This strategy focuses on the optimization and distribution of a firm's resources in the design and development process to ensure effective and efficient product development process also enhances productivity and leads to high-class designs.

II. Literature Survey:

Shina S.G. in his paper "Concurrent engineering: new rules for world-class companies"(1991)² discussed how concurrent engineering technique is best suitable for manufacturing of high quality products by companies highlighting the benefits such as shorter time for product introduction, improved design quality, reduced design iterations, and shorter production time. Also enlightened the effects of multifunctional teaming which include design for manufacturing (DFM) continuous process improvement (CPI), total quality management (TQM), and quality function deployment (QFD) i.e., product development with concurrent engineering involves all parts of organization.

Rob Kinna, in his paper "Team working and Concurrent Engineering – A Success Story" (1995)³ has discussed the experiences and success of adopting Concurrent engineering highlighting the criticality of team selection, building and empowerment. He is of the opinion that the concurrent engineering team must include both internal group and external group such as customers, suppliers.

David Bradley in his paper, "Concurrent Engineering for bespoke products" (1995)⁴, discussed the disadvantages of traditional design techniques and shown how concurrent engineering benefits the organization. He says that concurrent engineering will advocate building teams working together from initial phase and in close contact with the customer. He has also discussed the benefits of developing computer modelling for further development including virtual reality.

III. Purpose of the Study:

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

IV. Methodology:

The evaluation of the study is based on a data 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 66% (see the Table 1)

Table 1: Response Rating of the Survey

	Number of Organizations		Response Ratio (in percentage)
	Questionnaire Sent to	Response Received	
Two Wheeler Industry Automobile manufacturers	03	03	100%
No. of Respondents	234	155	66%

V. Data Analysis and Interpretation:

The data pertaining 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 1

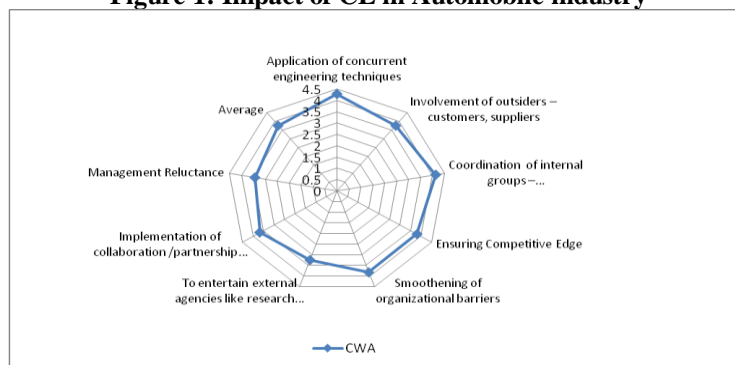
Table 2: Impact of Concurrent Engineering

Variables	Cumulative Weighted Average
Application of concurrent engineering techniques	4.28
Involvement of outsiders – customers, suppliers	3.76
Coordination of internal groups – design, Manufacturing	4.12
Ensuring Competitive Edge	3.8
Smoothering of organizational barriers	3.82
To entertain external agencies like research organizations	3.24
Implementation of collaboration /partnership of managements	3.66
Management Reluctance	3.42
Average	3.7625

Source: Field Survey

CWA: Cumulative Weighted Average

Figure 1: Impact of CE in Automobile industry



VI. Interpretation:

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: Application of concurrent engineering techniques, Involvement of outsiders – customers, suppliers, Coordination of internal groups – design, manufacturing, Ensuring competitive edge, Smoothering of organizational barriers, are identified as key areas that realized most of the benefits.

VII. Results 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.

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