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# Product Quality as Factors and Measures for New Product Development Success in Indian Manufacturing Industries

Sudeshna Roy[a]*, Nipu Modak[a], Pranab K Dan[b]

[a]*Jadavpur University,188 Raja S.C.Mallick Road, Kolkata 700032, India*
[b]*Indian Institute of Technology Kharagpur, Kharagpur 721302, India*

**Abstract**

The key purpose of this study is the identification of factors governing the quality of newly developed products to recognize the importance of control over the product quality in Indian manufacturing industries. The quality measures such as meet quality guidelines, achieved product performance goal and achievement of design goals, have also been considered as the success measures of new product development success. The Structural Equation Modeling (SEM) approach has been used to build a causal relationship between success factors and measures by using AMOS 5.0 software package along with SPSS.
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## 1. Introduction

Various constituents affecting firm's performance and plays a vital role for their success and survival is termed as critical success factors in previous literaturesby Ernst [1] and Bhuiyan [2]. As per Buyukozkan and Arsenyan [3] new product development (NPD) activity has become indispensiblefor betterment of firm's performance for sustaining in the volatile and competitive market environment in the global perspective. According to empirical study of previous researchers NPD success can be influenced by various factors such as market analysis which have been discussed by Medeiros et al. [4] and Sadeghi et al. [5], top management support by Felekoglu and Moultrie [6] and Yeh et al. [7], cross functional team by Yeh et al. [7] and Lau [8], planning by Sadeghi et al. [5] and Tsai [9], HR management by Medeiros et al. [4] and Sadeghi et al. [5], strategic management by Medeiros et al. [4] andBuyukozkan and Arsenyan [3], technological improvements such as integration of rapid prototyping and manufacturing with CAD/CAM to improve the capability of rapid product development in SMEs by Matta et al.

* Corresponding author. Tel.: +91-943-284-6563.
*E-mail address:*sudeshnaroy689@gmail.com

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[10].Product quality has also been considered as a vital factor which is critical to success by various researchers. According to the research finding by Yeh et al. [11] the quality standards of products and complete quality management system are the two dimensions with highest impacts in the customer-oriented business environment. Ahmad [12] clarifies that behind the economic success of any manufacturing firm product quality is the main factor with again influences the sustainable product development. According to the author quality has a relation with organizational performance. In the article by Iamratanakul et al. [13] the market share of any product depends upon the quality of product that is the flexibility, robustness of it which can fulfil customer requirements. Cooper and Kleinschmidt[14] highlights the high quality product development process which can provide quality products as per consumers' needs. To add more value-added edges to their products Sun and Wing [15] suggests the Hong Kong toy industries to implement the quality standards which can differentiate their products from their close competitors.According to Mohanty and Mahapatra [16] set of optimum design parameters are also very important for customer satisfaction which in turn influences the product development success.Same as the various success factors numerous measures of product development success indexed in previous literatures by Kazerouni et al. [17], Huang et al. [18] and Lipovetsky et al. [19] is essential for complete SEM framework development. The previously identified success measures can be segmented such as measures related to time, cost, quality, customer, technology and additional features as per experts' opinion of various manufacturing industries. The measures related to quality have been considered over here as success measure.

The objective of this study is to develop a framework with the help of SEM approach considering the product quality as a factor which is critical to success for new product development success of Indian manufacturing industries and at the same time the success is again manifested by quality related measures such as meet quality guidelines, achieved product performance goal and achievement of design goals.

## 2. Methodology

The Structural equation modelling (SEM) approach is used here to build the relationship among those factors which are critical for organizational success and survival and correlate them with the new product development. According to Rigdon [20]SEM is a methodology for representing, estimating, and testing a theoretical network of (mostly) linear relations between variables. It is a comprehensive statistical approach for testing hypotheses about relations among observed and latent variables [21]. This paper focuses on the SEM model formed by the above mentioned factor which is product quality and hypothesis to relate with the product development success and helps the firms to survive in the competitive market. Here, manufacturing industries in India are chosen for the survey purpose and data are collected from their NPD personnel and managers. The statistic used in this work is obtained from the respondents of 27 engineering product development companies' especially electrical manufacturing and structural fabrication companies in India. The reliability of the survey data is examined by Cronbach's Alpha Reliability test. SPSS 21.0 software package is used to calculate the value of the alpha (α) which has been stated by Ong et al. [22]. AMOS 22.0 software is used to build the SEM structure for the above mentioned 19 variables problem. Thus, this paper provides empirical data supporting the objective of our study, which is to examine the relation in between product quality and its manifests variables as well as the relation of product quality with product development success as perceived by personnel and managers of the Indian manufacturing industries.

This work involves formulation of the hypothesis which is tested using Structural Equation Modeling (SEM) on primary data set obtained from survey. The hypothesis is mentioned below.

H1: Product Quality (PQ) has a positive impact on Product development success.

## 3. Results

### *3.1. Analysis of measurement validity*

To accomplish research objectives, questionnaire consisting of manifests of input and output latent variable that is product qualityand product development success respectively listed in Table 1 has been developed (Appendix A) to

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