Title: A Critical Review of " Factors for Success in R&D Projects and New Product Innovation: A Contextual Framework" -2

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Abstract: A paper titled "Factors for Success in R&D Projects and New Product Innovation: A Contextual Framework" is critically reviewed in this individual report

A Critical Review of " Factors for Success in R&D Projects and New Product Innovation: A Contextual Framework"-2

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Research Paper on Factors for Success in R&D Projects and new Product Innovation: A Contextual Framework

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The authors R. Balachandra and John H. Friar prepared the research paper "Factors for Success in R&D projects and New Product Innovation: A Contextual Framework" in order to identify the critical factors that can indicate the success or failure of research and development (R&D) projects and new product development (NPD) [1]. This study was important to the authors, as bringing new products successfully to market has always been the lifeblood for most organizations. Of the nearly 16,000 new products introduced in 1991, almost 90% did not reach their business objectives.

The authors did not perform a survey of their own; they rather studied over 60 papers already published on this subject, since there is vast literature discussing success and failure in NPD and R&D. The factors identified in the research were categorized in order to group the large number of factors that determine success and failures, using a variant of the method used to structure information in marketing strategy studies. Once all the factors were categorized, the authors looked for convergence of factors that lead to the success and failure of R&D and NPD.

Study of the literature on success and failure factors for R&D and NPD projects allowed the authors to organize them into four major categories: market, technology, environment, and organization. Market analysis is important as a new product should meet customer needs. While the authors studied in Balachandra and Friar's paper disagree on several aspects of the market, they agree that the importance on the market factors are based on the potential size of the market, the expected market share, competition and the profitability of the product. The studied authors disagree on how market influences the R&D and NPD projects as some argue that it is a positive influence while others argue that it is a negative influence. Authors also disagree on the type of market that will lead to success. Some studied authors argued that the market should be new while others argued that the market should be existance. Several market assessment tools are available for analysis of effects of incremental products, but they are inadequate for highly innovative products.

The second factor category identified is technology. This factor is important as success has been defined by several studied authors as high performance to cost, and patentability. Studies agree that technology is influential to an R&D and NPD, but they disagree on the categorization of the factors as positive or negative. The studies agree that innovative product is an influential factor; but studies have found that innovative product have a greater chance of success in the market, while other studies have found that innovative products are more likely to fail.

The third factor category identified is the environmental factors. Studies agreed that a product cannot succeed in an environment that is not supportive. It was identified by most papers that public interest in the product, social acceptability, and assured availability of raw materials are key factors for success. There is also discrepancy in the studies analyzed as some of the researches did not find this factor significant at all.

The fourth factor category studied in this paper is the organizational aspect of the organization. This factor is significant as the product will not succeed if the organization is not capable of getting the new product into the market. On the subject of organization the authors also found a great deal of discrepancy on the papers used for this analysis. The study of the studies have found that companies with strength in the R&D functions often have weak or no marketing skills while other studies show that in order to be succesful a strong support from marketing is needed.

Balachandra and Friar could not find convergence in the important factors to have a successful R&D and NPD project from the research papers the studied. As no conclusion could be reached from the findings, the authors propose a contingency framework for the NPD and R&D projects. This contingency framework consists of a contingency cube with three contextual dimensions. The cube has three axis, technology that is divided into low and high, market that is divided into existing and new, and innovation that is divided into incremental and radical. The authors then proposed a set of propositions based on this model and framework to address each of the eight subdivisions of the contextual cube. The authors conclude this paper with a discussion of the implications of a contingent approach for both researchers and managers in the area of management of new products and R&D projects.

The authors' methodology to find success factors in R&D and NPD is based on analyzing over 60 studies in order to find convergence between them. The authors filtered the previous 60 analysis and only used in the convergence study the ones that fulfilled the following requirements:

- The study should have some empirical support, regardless of the methodology used.
- The study should identify a specific set of factors as being important for success or failure.
- Only one major study from an author or team should be considered.

These criteria selected 19 of the 60 studies. These selected studies collected a total 120 factors out of which 72 were chosen for Balachandra and Friar study. These factors were later divided into the categories of market, technology, environment, and organization. Eight percent of the factors influenced more than one of these categories.

Each factor was then divided in a binomial value, they were either positive or negative influence. If a factor influence was considered both positive and negative,

Friar did not accomplish. There was a wide dispersion of successful and non-successful companies that allowed the author to separate high and low performers. After the high and low performers were identified, Menke was able to identify practices performed by successful organizations that were not performed by non-successful organizations. The best practices documented by Menke where:

- Understand the drivers of industry change
- Coordinate long range business and R&D plans.
- Focus on End-Customer needs
- Agree on clear, measurable project goals.
- Use a formal development process.
- Use cross-functional teams.
- Coordinate development with commercialization
- Determine, understand and measure end-customer needs
- Refine projects with regular customer feedback
- Hire the best and maintain expertise.

Balachandra and Friar identified several weakness in their research. They identified that there were problems in the quality of data, in the definition of a product, and in the factor selection and definition. There are four common characteristics in the research studies that limited the quality of data. The characteristics are: timing of the studies, case selection, number of company respondents, and industry specificity. The definition of a product provided another problem in the research studied by the authors. It did not distinguish between a new product and the revision of an old one. Factor selection weakness shows if the set of factors used in the studies depends on the area of the study, the researcher's orientation, and the example of projects. The previous studies did not provide the ratings of the measured factors in order to do a cuantitative analysis.

It is my understanding that the major weakness in Balachandra and Friar's report is more basic, yet of greater importance than the weakness they identified. The weakness is in the definition of the goal of the project. Balachandra and Friar defined their goal as identifying if there was consensus in the factors leading to success or failure in R&D and NPD projects. This goal statement does not define what is a successful R&D or NPD project. The goal of identifying factors to achieve successful R&D projects is as broad and undefined as the goal of defining successful factors of what makes a good dog. Clearly policemen, farmers, hunters, blind men, and children all have a different definition of what a good dog should be. The same way, different research used in Balachandra and Friar's report may have different definitions of what successful research should be. This difference in definition may be the basis of why the authors may have contradictory information rather than information that converge. Balachandra and Friar did not examine the possibility that their research was at fault. They rather assigned the reason for failure to the fact that the industry does not agree in the factors for success. While on the other hand Michael M. Menke, who clearly defined success, was able to find consensus in the industry.