

# Chapter 18

## Identifying the Key Success Factors of Innovation for Improving the New Product Development Process

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### ABSTRACT

*This chapter is concerned with the study of success factors identification in product innovation. The critical success factors are identified on the basis of project management software database and questionnaires concerning communication and quality management in new product development. The model of measuring innovation includes the indicators connected with the fields such as research and development, purchasing and materials management, manufacturing, sales and marketing, and communication. The proposed methodology enables merger of objective indices and subjective judgments with the use of fuzzy logic. In order to identify the relationships between product success and project environment parameters, the artificial neural networks are used.*

### INTRODUCTION

A turbulent environment and fast changes of market trends imposes organizations to improve their performance and flexibility for the business requirements. In order to maintain competitive position and continue business success, companies have paid increasing attention to new product development (NPD). As market competition and

product technology advancement are often intense (McCarty et al., 2006), NPD is a relatively risky activity (Kahraman et al., 2007). It is reported that the success rate of product development projects is unsatisfactory, with more cost and time than expected having been consumed to achieve the project goals. The main reasons why most companies have failed in the development of new products derive from extrinsic and intrinsic

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problems. Extrinsic problems include changes in market trends, changes in regulations or simply competition develops product first (Cooper, 2003). Intrinsic problems can be considered from the perspective of limited resource constraints (e.g. temporal, financial, human) that result in the difficulties to meet the project goals, including product innovativeness.

Innovation is a key factor in economic performance and it can be considered as the process of ideation, evaluation, selection, development, and implementation of new or improved products (Eversheim, 2009). Product innovativeness reflects the degree of information search, behavioural change and learning effort required by customers to adapt the new product, and a company's experience with similar product development projects in the past (Langerak & Hultink, 2006). Although some of success factors (e.g. legal regulations) are beyond the firm's control, a company can use its experience to improve the accuracy of new product evaluation (Ozer, 2005). A key challenge connected with new product development projects is how to acquire knowledge, select the most promising set of new products for development, sustain innovation rate among the products, and manage the project in order to reduce the risk of failure of the product (Cooper, 2003). Both the acquisition of outside knowledge (e.g. through market research) and internal knowledge (e.g. through firm's databases) is critical and can help search factors that impacted on the success of the previous products. However, in the further considerations mainly the aspect concerning the use of internal databases is involved. Company can easier influence on the changes in the field of project management than on the market, and it should try to recognize the possibilities of improvement of new product development on the basis of own accessible resources.

Internal knowledge can be acquired from company databases (e.g. from Enterprise Resource Planning (ERP) system, customer relationship management system, project management soft-

ware, financial statements, reports, etc) or from project team members through direct interview, questionnaires, etc (Relich, 2013c). Human statements often base on the subjective judgments that can be expressed in the imprecise form. It can result in the difficulties with knowledge acquisition, its codifying, and processing. The reasons of this limitation are also connected with the intangible nature of communication as well as with the inadequate techniques for measuring knowledge. One of the techniques that are able to operate with the notation of the linguistic variables is fuzzy set theory.

The chapter aims to develop an approach that identifies the relationships between the success of new product and the key factors in the field of project management that influence on this success. This approach bases on the data from project management software and the subjective judgments of project members in the aspect of communication in team. The measurement of communication requires the notation including linguistic terms that can be described with the use of fuzzy logic. This study also presents the way to combine quantitative data with linguistic terms. The potential relationships are used to forecasting the innovativeness (success) of products that are in the development process and proposing the changes in project management that can increase the chance to develop a successful product.

The chapter also highlights the issue of communication in NPD that influences on the coordination of people, processes and activities in projects, which are extremely critical to the success of the project. The novelty of this research concerns the proposed model of measuring product success that is adjusted to the structure of an ERP system and communication in project team, and methodology that uses the fuzzy numbers to describe the subjective judgments of project members, and the neural networks to estimate the success of a new product. The proposed methodology enables the identification of the key success factors of a product on the basis of the qualitative and quan-

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