Chapter 2
Framework for Measuring the Performance of Production Operations in the Dairy Industry

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ABSTRACT

For the business operations in the dairy industry, the quick, safe, and hygienic production processes are of crucial importance. The chapter is aimed to develop a framework for evaluating the performance of production operations in dairy industry. An optimum production model is developed through factor analysis and structural equation modelling (SEM) methods applied to the responses collected from different dairy industries. The hypotheses testing suggests that all five factors positively affect the production operations of dairy supply chain. The outcome of the study reveals that the dairy industry needs significant improvement in their production operations to attain competitiveness. Further, this study is helpful for the dairy industry in handling the demand fluctuation, execution of effective production and information systems, improved product quality, process flexibility, etc.

DOI: 10.4018/978-1-5225-8157-4.ch002
INTRODUCTION

India ranks first in the milk production and perceived approx. 4% growth annually in the last three decades which far surpasses the average global progress of approx. 1%. The primary goal of Indian dairy industry is to upgrade the milk production as well as milk processing through technological interventions. Currently, there exists 170 milk producers’ cooperative (coop.) unions being united into 22 milk marketing federations at state level in India. Milk unions save the milk producers from unfair trade practices of middlemen, dudhiyas (milkmen in unorganized sector) and milk contractors thereby improving their economic condition tremendously (Mor et al., 2018b; 2018c). The organized sector handles about 30% of the milk whereas the rest of the milk is being controlled by unorganized sector in the industry. The structure of the Indian dairy sector comprises of private units, coop. societies, milk unions, and coop. dairies. The primary objective of building the milk unions was to provide a ready market to the milk producers for the sale of milk in the villages through the coop. and to provide wholesome hygienic good quality processed milk to the urban consumers at a competitive price. Dairy supply chains start with procuring the milk from the farmers, transportation to the plant, milk processing, packaging and distribution to the retailers and finally to the consumer. Agri-food supply chains can be managed effectively through technological innovations and eradication of non-value adding activities along with green manufacturing practices. The milk processing sector entails improvement in the competitiveness status to fulfil the food safety & quality guidelines globally (Bhardwaj et al., 2016; Mor et al., 2018a; 2018d; 2015). Structural equation modelling (SEM) is a useful multivariate statistical method which has vast applications since its development in the 1980s. It is used to calculate the consistency and validity of the model of agile manufacturing predominant in the automotive industries (Roberts et al., 2010). SEM is favored by the academicians as it evaluates the multiple and integrated problems as a sole analysis and it allows the analysis of associations between multiple predictor and response variables (Bagozzi and Yi 1988). A linear structural SEM approach can be used to validate enablers of sustainable practices developed through interpretive structural modelling (Thirupathi and Vinodh, 2016). SEM methodology based on the Malcolm Baldrige measures can be used to estimate the performance of environmental aspects of SMEs (Hussey and Eagan, 2007). The SEM methodology includes two categories of variables, viz., endogenous & exogenous variables (Vinodh and Joy, 2012a). Latent variables cannot be perceived directly as a result of their abstract nature, whereas, the observed variables comprise unbiased facts and are easy to evaluate (Xiong, Skitmore, and Xia (2015). SEM can be used to study the structural associations and an interaction amid measured dimensions of model and its latent constructs (Tenenhaus, 2005). Vinodh et al., (2012b) worked on...
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