BUSINESS PROCESS IMPROVEMENT IN INDIAN INDUSTRIES THROUGH STATISTICAL TECHNIQUES

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Declaration

I do hereby declare that this thesis entitled "**Business Process Improvement in Indian Industries Through Statistical Techniques**" is a bonafide record of the research work carried out by me during the course of research and that the thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar title or recognition of any University or Society. I also declare that to the best of my knowledge and belief it contains no materials previously published by any person, except where due references are made in the text of the thesis.

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Certificate

This is to certify that the thesis entitled "**Business Process Improvement in Indian Industries Through Statistical Techniques**" is a record of bonafide research carried out by Gijo. E.V. under my supervision in the Department of Statistics, Nirmala College, Muvattupuzha and that no part of this work has formed the basis for the award of any Degree, Diploma or other similar titles of this or any other University or Society.

Dr. Johny Scaria

(Research Guide)

Abstract and Keywords

Abstract: In the present scenario of economic and competitive pressure, it is essential that industries have business processes that can be designed, developed, and implemented quickly. In order to remain successful in this complex, competitive, and global world of business we have to find out ways to significantly accelerate productivity, as the pace of business continues to rapidly change year after year. In this context, the main objective of this work is to study application of various statistical techniques at different stages of the organizational processes for performance improvement in Indian industries.

Each chapter in this thesis addresses the application of specific statistical techniques in diverse fields of industry and business. Chapter 1 provides basic concepts and review of literature. In Chapter 2, the application of Six Sigma methodology was studied. During this work, problems in various industries starting from manufacturing, engineering and wind energy to hospital processes were considered. The advantages and challenges in implementation of Six Sigma methodology in each type of industry was discussed in this chapter. It also includes the shortcomings of Six Sigma implementation. In the present work, an attempt was made to study the failures of Six Sigma implementation and identify specific improvement areas during implementation.

In Chapter 3, the application of Taguchi method was described. Two application areas of Taguchi method were explored here, one for designing a new product and another for improving existing processes. The advantages of using Taguchi's parameter design approach in product design were highlighted through two case studies. The process optimisation through Taguchi method for reducing the process problems also were

presented in this chapter. General problem solving in industrial scenario is discussed in Chapter 4. When organizations are not following any systematic methodology like Six Sigma and TQM, how a process related problem can be addressed is illustrated here. Few industrial problems of reducing rejection, rework and scrap in the processes were discussed under this chapter.

Chapter 5 deals with business forecasting problems generally faced by the industry. A study was conducted on how effectively the time series forecasting techniques can be applied to address the operational problems in industry. This was illustrated with the help of a time series data on monthly demand. Reliability modeling and analysis is discussed in Chapter 6. A study is being carried out on progressive type - I interval censoring scheme and the parameter estimates are obtained through various methods for lognormal distribution. Both classical and Bayesian approaches are adopted for the same.

Keywords: Auto correlation function, Bayes estimation, Beta correction, Business forecasting, Cause and effect diagram, Control chart, Design of experiments, EM algorithm, Lognormal distribution, Main effect plot, Maximum likelihood estimate, Measurement system analysis, Partial auto correlation function, Process capability, Progressive censoring, Regression analysis, Reliability, Robust design, Seasonal ARIMA, Signal-to-noise ratio, Simulation, Six sigma, Taguchi method, Value stream mapping, Variance inflation factor.

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