Multi Criteria Measurement and Decision Model

By

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Abstract

This thesis presents the development of a Productivity measurement model and the use of the Productivity measurement model as an optimisation tool. The project could therefore be divided into two stages and these are:

Stage 1 - Development of a Productivity measurement model.

Stage 2 - Optimisation of the Productivity measurement model in order to generate technical parameters.

The current Productivity measurement models could be broadly categorised as Quantitative and Qualitative. Each category of the current Productivity measurement models suffer from inherent limitations. The approach suggested is to effectively combine the strengths of Quantitative and Qualitative models and evolve a hybrid technique.

The intangible criteria of "Effectiveness" and "Efficiency" was defined using several relevant tangible variables and was finally correlated to Productivity using **Principal Component Analysis** (PCA). The Productivity measurement model derived, is immensely useful in the following areas:

(a). Measurement tool to observe trend in Productivity.

(b). Any adverse/favourable change in Productivity could be analysed in depth and the exact cause for the change identified. It could be thus utilised for **Productivity Audit**.

(c). Identification of the "**top five**" tangible variables creating the greatest impact on Productivity. This enables Organisations to set priorities in their Productivity improvement programmes.

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In the final stage, the Productivity measurement model is optimised (using Non Linear programming) in order to generate future target figures for machine failure rates and Effective utilisation of Plant and machinery. An assumption of no capital infusion is maintained throughout the Optimisation exercise. These targets are for the years 1994 and 1995 and their achievement ensures that the objective of the business is optimised.

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"For by Him were all things created, that are in heaven, and that are in earth, visible and invisible, whether they be thrones, or dominions, or principalities, or powers: all things were created by Him, and for Him. " - Bible

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