

## STRUCTURAL EQUATION MODELING APPROACH TO ENHANCE OVERALL EQUIPMENT EFFECTIVENESS IN SRI LANKAN STEEL MANUFACTURING INDUSTRY

S.A.U. Sarangi and K.D.D.N. Dissanayake

*Department of Industrial Management, Faculty of Applied Sciences, Wayamba University of Sri Lanka, Kuliyaipitiya, Sri Lanka*

Corresponding author: umesha.sarangi26@gmail.com

The Metal Fabrication Industry is a fast growing and highly competitive sector. Most of the roll former machines in this industry perform below their true potential. Rather than upgrading this capacity, many companies tend to purchase additional machines and expand their facilities. Instead of that, these manufacturers have the opportunity to enhance capacity utilization and efficiency by using a simple performance metric, Overall Equipment Effectiveness (OEE). Further, they can maintain continuous improvement in productivity, quality, and reliability of their operation which reduces the cost of production and the unit cost. OEE is an aggregated measure of availability, performance, and quality of individual equipment which is subjected to several points of critique ranging from the exclusion of planned downtime in the OEE calculation to the question of whether OEE is in fact the multiplication of availability, performance, and quality with equal weights. This study was carried out based on a structural equation modelling approach to OEE to investigate the components and structure of OEE, as well as to assess whether a relationship between OEE and financial performance exists with the data collected at a metal product manufacturing company in Sri Lanka. It followed the same approach which was previously used by Anne Sophie Rohbek Hansen and Christina Baekkelund Breum in their research at Arla foods in 2010. The data were collected from KPI records of Roll-Former for a period of one year and they were analysed using Partial Least Squares algorithm and bootstrap technique in SmartPLS and SPSS Software. According to the structural model results (standardized) Performance Loss had the strongest effect on OEE, followed by Availability loss, and Quality loss with expected negative variance. Moreover, the three constructs explained 80.6 percent of the variance of the endogenous latent construct productivity ( $R^2 = 0.806$ ). Further, it can be concluded that by reducing 10% of each type of effectiveness losses the company can be enhance OEE by 5.8%, 4.47%, 0.43% respectively. Effect on availability loss by idling, setup & adjustments are highly significant. The established relationship between OEE and financial performance proves to be strong.

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