

Application of DMAIC approach to reduce on-time delivery failures in a fabric printing plant

Fernando H. A. S.¹ , Ranasinghe G. M.²


Abstract

On-time delivery is one of the key indicators of any industry's performance, and the apparel industry is no exception. As one of the top apparel producers of the world and as a major contributor to the Sri Lankan economy, ensuring on-time delivery across the supply chain has become one of the critical requirements of the Sri Lankan apparel industry. Given that, we identify the importance of addressing on-time delivery failures and apply the six-sigma DMAIC (i.e., Define; Measure; Analyze; Improve; Control) approach to a selected fabric printing plant in Sri Lanka. The main objective of this study is to identify the root causes of on-time delivery failures and provide recommendations to address the identified causes. Among various reasons, we focus our analysis on the six most frequently occurring reasons (i.e., production drop, absenteeism, hanger delay, efficiency drop, quality issues and, first-day drop) using historical data. We also observe the delivery variation using the Outside-In Span metric and visualize the root causes for the on-time delivery failures using the fishbone diagram. The study also identifies the possible preventive actions to address each root cause of on-time delivery failures by conducting brainstorming sessions with industry personnel. The study suggests that conducting motion studies, implementing a proper performance appraisal system, assigning skill printers to get bulk approval, analyzing daily production downtime, creating effective line layouts, use of Kaizen and Yamazumi methods, conducting equipment audits, and enhancing production capability and infrastructure can help improve the on-time delivery performance. The results also suggested that with the implementation of these recommendations, the organization reduced its delivery variation from 14.05 days to 6.8 days. Thus, this study provides important implications to the industry while fulfilling the empirical gap in the relevant literature.

Keywords: *Delivery performance, DMAIC approach, fabric printing plant, on-time delivery*

¹ Department of Industrial Management, Faculty of Applied Sciences, Wayamba University of Sri Lanka, Sri Lanka

² Department of Industrial Management, Faculty of Applied Sciences, Wayamba University of Sri Lanka, Sri Lanka

 Corresponding Author: gayani.ranasinghe@wyb.ac.lk