ABSTRACT

The global competition and expectation have made customers to pick and choose the application specific customized products or services. This situation often demands Low Volume And High Variety (LVHV) products by customers. One of the main challenges that a LVHV product manufacturing firm faces is On Time Delivery (OTD) to their customers. Lean Manufacturing (LM) techniques, implementation in various industries is growing in parallel in this era, as LM proved to eliminate waste and strengthens firm's competitiveness specifically in achieving OTD. LM is proven methodology and sustained in mass production and batch production firm's but when applied to LVHV, the results were often not sustained due to various challenges. When the product volumes are very low with high variety then the product delivery performance was one of the repeat challenges in LVHV firm's. The purpose of this research was to understand the LVHV delivery related issues, find the true root cause using systematic analysis and develop an order processing model for LVHV products manufacturing firm's to improve the delivery performance through suitable lean strategies. The LVHV firms either follow Engineer-To-Order (ETO) or Make-To-Order (MTO) strategy according to the customer's requirements. Lean mandates elimination of waste like inventory, waiting, defects, overproduction, motion, and transport and over processing. Among these lists of waste "waiting" is classified as one of the largest waste that affects the OTD performance. LVHV product manufacturing firm in most occasions "waiting" for material to produce and deliver the final product. Therefore, the Material planning, Production planning and the supply chain integration with LVHV firms order processing model is focused.

This research developed a model that incorporates Enterprise Resource Planning (ERP), lean methodology, Integrated Lean Live Tracking (ILLT) and Cross Functional Team (CFT) approach to improve OTD. The CFT should feed the necessary ERP data into ILLT as per scheduled interval for order processing. This means the supplier purchase order and internal production orders are tracked at regular intervals and commitment date are updated by CFT. The ILLT tracking software will keep calculating the material arrival date, further process release date, completion date and final product delivery date. This approach will eliminate the waiting time and helps to improve the delivery performance. The developed model was implemented in a selected LVHV product manufacturing firm that has poor OTD performance. From the selected LVHV firm a systematic, data collection, data validation done to perform the root cause analysis of poor OTD performance. The major root cause identified as poor in coming material delivery performance from LVHV firm suppliers. Secondly, there was no revised commitment date given to recalculate the final delivery date and hence poor OTD performance to customers. The developed model implemented with specifically developed ILLT software specific to the selected LVHV firm. The CFT team also formed, working and review mechanism established to update on a daily basis. After implementing the model in a comprehensive manner OTD performance was improved from 30 percent to 90 percent in about eight months. Moreover the developed model helped to reduce the average material purchase lead time from 94 days to 58 days. This improvement at LVHV firm has significantly reduced the fine amount of customers and improved the delivery competitiveness at the market place.