

**Abstract No: PO-32**

## **A lean maturity assessment model to improve warehouse operations for the 3PL industry in Sri Lanka**

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Warehousing plays an important role in the logistics sector in order to facilitate economic and business benefits for both parties including customer and the service provider. 3PL (third-party logistics) service providers are specialized in providing end-to-end logistics solutions including warehousing, transportation and distribution. Efficient warehouse operations can yield a win-win situation for both parties. Lean management has become a well-accepted and most commonly used approach in identifying waste and non-value-added activities in warehousing industry. However, majority of the 3PL service providers in Sri Lanka have not incorporated those practices into their operations mainly due to lack of domain knowledge. Maturity assessment models can be used as a self-assessment tool and are useful for the company to assess the current stage of lean implementation. It guides the company to set benchmarks and enhance the overall productivity of the operation. Although there are many maturity assessment models developed focusing on various domains such as software development and project management, no such work has been carried out for the field of 3PL warehouse operations in relation to application of Lean management practices. In this research, the authors have developed a lean maturity assessment model to assess the level of lean maturity applicable for the 3PL warehouse operations. A systematic review of literature was conducted by referring 25 research articles. Existing maturity models developed for other applications and lean warehouse practices were also studied in order to develop a suitable maturity model. A pilot study also was carried out with a 3PL provider, in order to study on the practical aspect of lean implementation. Based on these, a Lean maturity assessment model which consists of stages providing a clear roadmap to a company was developed. The results of the study will lead the relevant 3PL service provider to identify the level they are existing and decide the strategy they need to implement in order to improve warehouse efficiency. It is recommended to validate this model through multiple case studies and also the reviews of experts in 3PL warehouses as further research area.

**Keywords:** Maturity assessment model, Lean practices, Warehousing operations, 3PL service providers