EFENDI. Design of Supply Chain Performance Improvement System of Aromatic Chemical Industry. Supervised by ANAS MIYTA FAUZI, MACHFUD and SUKARDI.

Competitiveness of Indonesian essential oil industry is still low due to inefficiency in the production and uncertainty in the availability. Lean production system is reported to have the capability to improve efficiency through lowering cost, reducing lead time (faster delivery) and higher quality. The purpose of this research is to design supply chain performance improvement system of aromatic chemical industry, using modified Rother and Shook’s value stream mapping (VSM) model for aromatic chemical industry. Aromatic chemicals of clove leaf oil derivative were used in this research.

VSM – current state of clove leaf oil supply chain showed that total lead time starting from clove leaf was collected up to clove leaf oil received by aromatic chemical company is 34 days, and the processing time is only 3 days. VSM – future state of clove leaf oil supply chain showed that total lead time can be reduced to only 16 days. There is 53% improvement of clove leaf oil supply chain performance. The improvement needs institutional engineering that is clove leaf oil Cooperative set up.

VSM – current state of Eugenol production showed that total production lead time of Eugenol is 33.9 days, while total processing time is only 5.2 days. Production lead time is total time needed for processing raw material into product, while processing time is time needed in the production process. VSM – future state of Eugenol production showed that total production lead time can be reduced to 12.2 days, with the same total processing time. There is 64% improvement of total production lead time of Eugenol. This improvement is achieved by implementation of pull system and small lot size production. VSM is successfully used for production losses identification in the Eugenol production.

VSM – current state of Isoeugenol production showed that total production lead time of Isoeugenol is 31.9 days, while total processing time is only 5 days. VSM – future state of Isoeugenol production showed that total production lead time can be reduced to 9 days, with the same total processing time. There is 72% improvement of total production lead time of Isoeugenol. This improvement is achieved by implementation of pull system production, continuous system and small lot size production. VSM is also successfully used for production losses identification in the Isoeugenol production.

Based on the research on the supply chain performance improvement system of clove leaf oil and on the production performance improvement system of aromatic chemical industry, which is in this research used clove leaf oil derivatives, can be design supply chain performance improvement system of aromatic chemical industry. Supply chain performance improvement system of aromatic chemical industry consists of two interrelated system, that is production performance improvement system of aromatic chemical industry and supply chain performance improvement system of essential oil, which is raw material of aromatic chemical industry.
Improvement of production performance of aromatic chemical industry, which is in this research used aromatic chemical of clove leaf oil derivatives, is achieved by implementation of modified lean production, according to aromatic chemical industry characteristics, that is implementation of pull system, continuous system and small lot size. Pull system and continuous system can be implemented by combining with product inventories. Based on the research, aromatic chemical company of clove leaf oil derivatives needs to build up product inventories 4 – 6 weeks of sales.

In the supply side, that is clove leaf oil used for aromatic chemical industry, pull system can only be implemented when aromatic chemical industry has enough inventories of clove leaf oil. Aromatic chemical industry needs to have clove leaf oil inventories equivalent to minimum 3.6 months of sales in the end of every year. Based on cost calculation of clove leaf oil inventories, the additional cost of clove leaf oil inventories is IDR 1,467 / kg clove leaf oil. This cost is relatively small compared to the risk of not having them, that are losing sales opportunity and price increase of clove leaf oil. If clove leaf oil supply in the certain period is abundant, aromatic chemical industry is suggested to still buy the clove leaf oil, even though the inventories ratio is above 3.6 months of sales, considering cost of inventories that is relatively small.

Implication of this design of supply chain performance improvement system of aromatic chemical industry are (1) institutional engineering in the form of clove leaf oil Cooperative set up, (2) product inventories 4 – 6 weeks of sales in the aromatic chemical industry derivative of clove leaf oil, and (3) clove leaf oil inventories in aromatic chemical industry equivalent to minimum 3.6 months of sales in the end of every year.

Key words: efficiency, lead time, lean production system, pull system, value stream mapping.