Forecast to Fulfil (F2F) – Inventory Management (Work In Progress)

Working Capital Series

By Perry Tong

Deliveries to the customer are often delayed due to lack of appropriate product mix. Meanwhile the factory floor looks like it could serve the same number of customers or more for the next two years without replenishing any inventory. Raw material fed into the production unit seems to be never enough. WIP goods are stacked along walls and corridors or any available space – until a new warehouse is available. Work centres are filled beyond capacity and people and machines work around the clock to make the next customer order.

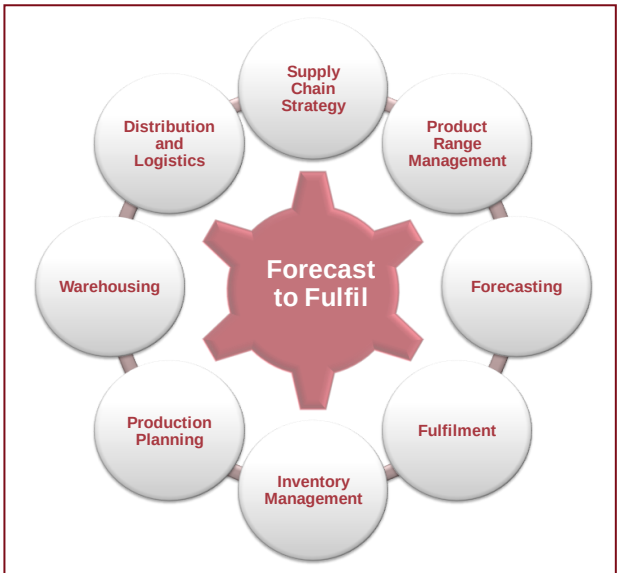

Figure 1: Forecast to Fulfil Cycle

Sounds somewhat familiar?

Inventory management vexes many production professionals year round. Seasonality or not. Total inventory management from raw material through finished goods can be tough. Balance sheets tell an approximate story in relation to where inventory might be residing within the value chain of a firm. This week's focus is on Work in Progress (WIP) inventory.

Primarily residing on the 'shop floor', WIP commonly results from several factors:

- Poor quality in the manufacturing / assembly process (not to be confused with process quality)
- Inappropriate batch sizing: often to 'fit' a particular operation these batch sizes then throw off other operations in terms of flow
- Overly large batch sizing / continuous runs: often a result of 'scientific management' which proposes that efficiency and productivity KPIs are the be-all-end-all solutions to measuring performance
- 'Running bottleneck' operations: where the shop floor and sequential operations were set up in a logical fashion from an engineering perspective – though it may not be conducive to helping inventory 'flow' through smoothly

An opportunity presented itself on such a manufacturing shop floor to us. A re-engineering (clean sheet) approach was utilized.

Operational shop floor layouts were adjusted to facilitate ease of flow throughout the plant from raw material incoming to final assembly and packaging. Changes made to operating batch sizes (minimised to a local and logical quantity) for every finished good SKU ensured that bottle-necking (capacity constraints) in sequential operations were well understood and controlled.

After a week-long pilot with a portion of the finished goods SKUs produced by this plant for proof of operational capability of the process with new batch sizes we proceeded to adjust inventory requirement settings in the plant's MRP system (SAP). Time fences for production were adjusted at the same time to account for the increased speed owing to the dramatically reduced batch sizes. Raw material coming in was adjusted in relation to these changes.

Lean Six Sigma 'lite' was introduced to the plant personnel. Over the duration of the project lasting 9 months this program eradicated 85% of quality issues found in processes thus increasing velocity further.

Benefits of Managing WIP Inventory

We chose WIP as a starting point for managing inventory (in a production setting) as this is the area that determines how raw materials are ordered and how well finished goods are capable of being delivered on-time-in-full (OTIF) to customers.

Project yields:

- an increase in customer service levels, OTIF, to internal distribution centres from 78% to 95%
- in-plant inventory levels decreased by 70%
- product velocity (per standard order) decreased from 3 weeks to 4 days
- WIP rejects and re-work decreased by 85%

No plant personnel were let go as a result of these improvements. They were re-assigned to bottleneck operations to provide interim manual assistance in clearing bottlenecks as and where these occurred.

About the Author

Perry Tong is the Singapore-based Managing Consultant for Centre for Organisational Effectiveness Pte Ltd. He helps companies in Asia, Europe and North America understand the importance of process improvement with impacts on working capital as a primary objective and increased customer service levels as a secondary objective. He has extensive experience in implementing process and organisational improvements for various industries. Perry can be reached at Perry.Tong@COE-Partners.com