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Elevating Supply Chain (SC) planning IQ via data analytics.

Overview

Supply Chain (SC) is the largest expense for any product company, generally accounting for 60% to 90% of all costs[1]. Research suggests the existence of a statistically significant relationship between analytical capabilities and SC performance. In other words, data analysis can assist in controlling SC costs. Further, an analysis of 310 companies from different industries in the U.S, Europe, Canada, Brazil and China indicate that analytics of the SC plan has the second biggest influence on SC performance[2].

This article details out Supply Chain Analytics from supply chain (SC) planning perspective. SC planning is the strategic & most critical component of Supply Chain Management (SCM) which drives other components i.e. raw material sourcing, manufacturing, goods delivery, goods return etc.

Traditional SC planning is majorly supported by reports generated by an Enterprise Resource Planning (ERP) system. The best an ERP system can offer is historical transactional data and a standard demand forecasting algorithm. Some critical challenges faced by ERP dependent CPG companies are:

- Inability to provide insights that optimize SC planning decisions. Example, how much should individual demand driven/s be varied to control forecast bias
- Stretched lead time to understand how interdependency among Key Performance Indicators (KPIs) result in experience / gut-feel based optimized decision making
- Standard demand forecasting techniques don't accommodate ever-changing product behavior during its product lifecycle (sudden growth, seasonality, demand stability, etc.)
- Absence of future outlook / prediction feature

SC planners are keen to link planning related metrics to business critical KPIs. Connecting demand drivers, estimated demand, planned / actual production / dispatch, planned logistics cost, opening inventory, etc., to on-time in-full (OTIF), sales target achievement, excess / low inventories, actual raw material and logistics cost, lane optimization.

Analytics addresses traditional SC planning challenges by providing solutions for future outlook generation, optimization, inter-KPI dynamics, quantification of impact of SCM metrics, accurate forecasting, etc. This leads to better, more informed decisions.

SC planning analytics is a combination of business analysis supported by analytics techniques, such as exploratory data analysis, forecasting, regression, correlation, etc., and software tools, depending on scenario. Dependency on different components of analytics varies from case to case.

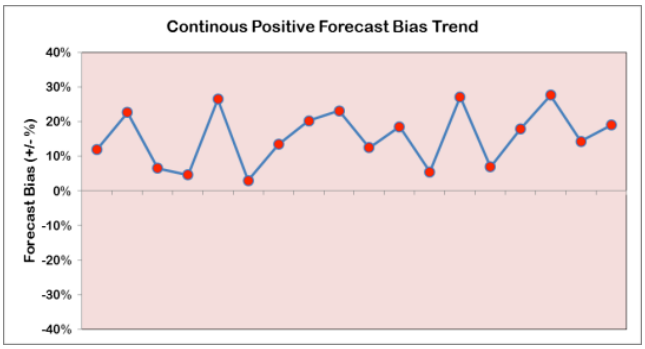
[1]Measuring Supply Chain Performance - SCOR
[2]Ellram, L. M., and Cooper, M. C.: The Relationship Between Supply Chain Management and Keiretsu. The International Journal of Logistics Management 4(1), 1–12 (1993).

SCM (planning) analytics as a concept

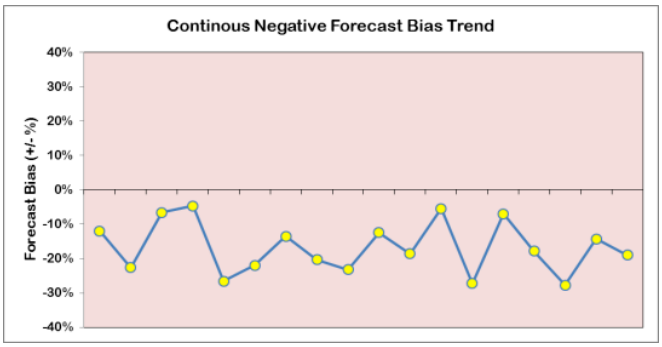
The SCM planning department primarily targets accurate forecasts regarding product demands in the near future. Demand forecast figures further drives production, distribution, freight cost, budgeting, etc.

Like any other business activity, inefficient SCM planning stumbles upon varied issues such as:

- **Demand volatility:** Continuously over- or under-forecasting trend during the last 3-6 months. A constant biased product is detrimental for the supply chain



Increased cost due to excess inventory in the system



Sales lost due to unmet market demand

- **Low market serviceability:** Example, a particular market demand for 1000 tonnes within a week was unmet because only 750 tonnes could be dispatched on time, and the remaining only after two weeks. In other words, OTIF is approx. 75%. Below the market threshold of 90%

- **Excess / insufficient inventory:** Example, a new medicinal soap was developed and launched via an intensive advertisement campaign. The development and advertisement costs millions. But, though customers are excited about the new product, demand planning under-forecasted. So, the estimated demand is less than actual orders, causing insufficient inventory at distribution centers

  On the other hand, where demand is over-forecasted and there are actually fewer sales, the enterprise could end up with excessive inventory. Resulting in a sudden decrease in profits because of the expense of carrying this excess

- **Misguided future outlook on the SC efficiency:** When a 100% order fulfillment is expected in the coming month, but on analyzing, the production plan states insufficient planned production to meet the forecasted demand

- **Sales growth analysis:** When the enterprise is aiming at a 20% Q-on-Q sales growth supported by accurate demand planning figures, but production and dispatch non-compliances result in a 15% sales growth

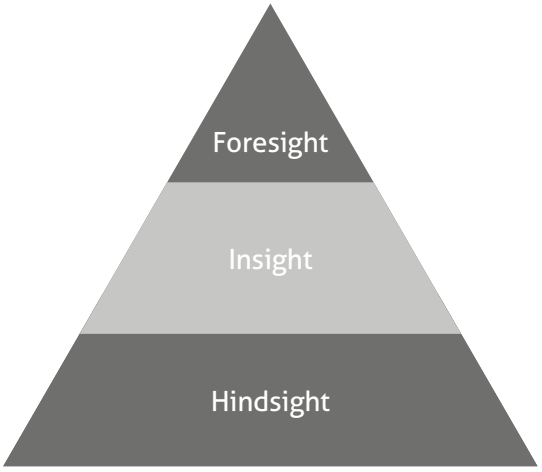
- **Inefficiencies in an organized and unorganized offline trade environment with multi-layered sales and inter-dependencies:** Multi-layered sales implies a combination of primary sales, to private distributors, and secondary sales, to retail outlets

Analytical capability will assist SC planning to mitigate issues by way of:

- Analyzing sales data vis-à-vis SCM planning KPIs and interpretation of trends and patterns
- Analyzing different aspects of SC production efficiency, stocking norms and distribution efficiency
- Analyzing variations and inefficiencies in logistics costs incurred at various legs of stock movement till it reaches the end consumer
- Utilizing statistical techniques to identify controlling parameters towards SC planning, efficiency KPIs and quantify the impact of individual parameters. For example, Forecast bias (positive / negative) = fn (base demand, demand drivers, adjustments, etc.)
- Provide future outlook on KPIs such as SC efficiency, forecast bias polarity (under / over-forecasting), etc.
- Statistics-based customized forecasting approach for individual products, categorized into different scenarios like strong / weak seasonality, stability, small packs, etc.

SCM (planning) analytical construct

SCM planning analytical construct comprises of hindsight, insight and foresight. It can be better understood through a consumer promotion scenario thus: the analyzing impact of SC planning numbers on a particular promotional event as per the Temporary Price Reduction (TPR) on the promotion calendar is scheduled during January and February. A 200% uplift is expected. For the desired outcome, supply chain planning should be aligned to promotion-related operations. The following scenarios can be envisioned:



- **Advance analytics model**
  A what-if scenario, to arrive at an approximate uplift based on SCM variables e.g. forecast bias, OTIF, delivery compliance (%), etc.
- **Hypothesis testing of causals:** E.g. does market serviceability support a positive uplift during TPR promotion type?
- **Basic analysis based on SCM cube slice-n-dice:** E.g. visualization of supply chain KPIs during past instances of TPR
- KPI conceptualization and calculation

Best practices for SC planning analytics capability

- Conceptualization of an SCM analytics cell for smooth churn-out of analysis request/s via
  - Faster data extraction and cleaning methodology
  - Documented analytics frameworks and analysis reports
  - Project governance
- Regular interactions between analysts and SC planners, in terms of the existing SCM process, SCM reports and KPIs, business logic, etc.
- SLA-driven processing of analytics requests

Conclusion

In conclusion, analytics plays a role of support system for a SC planner by providing business specific insights in identifying issues and helping mitigate those issues. It not only provides a means to act in the present, based on the past but also provides a future outlook. Supported by data-driven insights, an SC planner will be able to improve forecasting accuracy, understand patterns, trim inventory fat, reduce stock-outs, optimize raw material and logistics costs.

Romi Malik is an expert in analytics consulting and data analysis. A manager with the Data and Analytics Solution (DAS) practice, he has more than eight years of experience in the manufacturing and analytics industry. He has been working in the CPG and retail domain with CPG giants and retailers, delivering analytics projects for over five years now. Romi was involved in developing SC analytics cell for a leading CPG organization in India.

About author

Romi Malik is a Manager in the Data & Analytics Solution (DAS) practice with more than 8 years of experience in the manufacturing & analytics industry. For the past 5+ years, he has been working in CPG & Retail domain with CPG giants and retailers, delivering analytics projects. Analytics consulting and data analysis are his areas of expertise. Romi was involved in developing supply chain analytics cell for a leading CPG organization in India.

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