VIEW POINT

THE POWER OF PREDICTIVE ANALYTICS IN SUPPLY CHAIN MANAGEMENT

Abstract

In today's fast-paced business environment, supply chain management (SCM) is a critical pillar for success, but is ridden with complexities and uncertainties. The integration of predictive analytics is a game-changer for SCM as it revolutionises traditional approaches. From demand forecasting to inventory optimisation and risk mitigation and more, predictive analytics empowers organisations to make data-driven decisions with foresight. By harnessing historical data, machine learning algorithms, and real-time insights, businesses can enhance operational efficiency, minimise disruptions, and meet customer demands with precision.

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"Looking backwards to predict what's coming up ahead" – if predictive analytics as a paradigm had a tagline, it would approximate to something like this. This branch of analytics has become all the more powerful with the advent of Artificial Intelligence (AI). Predictive Analytics has become increasingly prevalent across a multitude of industries and functions, being used for forecasting inventory, managing resources, setting ticket prices, managing equipment maintenance, developing credit risk models, and much more – much, much more!

In Supply Chain Management (SCM) domain, it is vital to understand the forces at play that are driving market dynamics and consumer demand, which in turn, impact logistics. Consider this scenario – a less severe winter in Europe may drive down natural gas prices, but it will mean a drier summer implying reduced hydropower generation potential, and possible logistical challenges on key river systems. River transport is a key link for supply chains throughout the continent. This example is but one among a bewildering number of scenarios that predictive analytics-driven models can project for SCM decision makers, helping them anticipate the most likely scenarios, and to plan for them.

Consider another factor that has overloaded warehouses post-pandemic: inventory managers, previously used to a 'just-in-time' type of lean management of inventories resorted to a 'just-in-case' management approach after the huge supply chain issues they faced during the pandemic. This has led to soaring global retail, wholesale and manufacturing inventories, which is surely not good news when the Consumer Confidence Index and Business Confidence Index are so volatile.

What is a supply chain manager to do in such a volatile environment? How can the supply chain be made more resilient to market shocks and unexpected disruptions? In the path towards the digital transformation of supply chains to make them modern and efficient, as well as resilient, predictive analytics can play an outsize role. The previous two scenarios described the 'Why' very vividly, let's now discuss the 'how', that is, the various parts of SCM that predictive analytics can make a positive difference in.

a. **Demand forecasting:** AI algorithms have become more efficient at reading historical data, recognising patterns and forecasting demand. Some supply chains, such as the pharmaceutical supply chains, are particularly vulnerable to demand fluctuations, as the lead times to raw material procurement are long, mainly due to regulatory requirements. Such supply chains suffer from a 'bullwhip effect' – small fluctuations in demand at the retail level can cause progressively larger fluctuations in demand at the wholesale, distributor, manufacturer and raw material supplier levels. Such issues can cripple supply chains, leading to stockouts.

   AI-modelled forecasting is found to reduce errors between 20 to 50%, and also catch lost sales opportunities by a whopping 65%, per a McKinsey report. This virtuous cycle continues into a savings of 10-15% in warehousing costs,

and 25-40% in administrative costs. Savings all around, plus the power of more accurate demand forecasting.

b. Risk management: Predictive models can better spot risks and bottlenecks in the supply chain, moving SCM risk management firmly from a reactive machine to a proactive assistant for decision makers. Whether the risk is due to demand fluctuations, supplier performance issues, or natural disasters, models can ingest historical data such as demand patterns, supplier performance data and market trends, correlate the data and give prediction scores for certain risks occurring. Supply chain managers can then use risk mitigation strategies such as route optimisation, building supplier redundancies, and inventory or cash flow management.

c. Operational efficiency: Harvesting efficiency out of operations is another area where AI-driven predictive analytics can shine. Automation can, for example, ensure product quality standards are maintained, or offer missing parts analysis, mitigating downstream product recalls which can be costly financially as well as reputation-wise.

The bullwhip effect and other such demand forecast inaccuracies can, in turn, lead to higher operating costs to maintain optimum levels in warehouses. This may affect cash flows as the cash-to-cash cycle time increases. The other costly side effect of this is wastage due to damage and expiry of products.

There are plenty of practical challenges to getting this done. For one, predictive analytics practices typically rely on high-quality data. This can be particularly challenging in 'data light' organisations, where data is locked up in silos in legacy technology systems, or worse, in paper. Data scientists who understand the complexities of supply chains are also needed. Finally, the predictive analytics models that get built must be constantly updated, as market dynamics, weather, political movements and a host of other contributing dimensions change.

But all is not lost. Data light environments can rely on multiple strategies to start the journey. Starting from choosing an optimal model depending on the type and quality of data available, supply chain managers can leverage data smoothing and augmentation techniques, and connect to external data sources via APIs to add on data. Smoothing anomalous or temporary issues (for example, seasonality spikes in call centre calls) can help the model better learn the overall pattern, and make more predictions.

You can also incorporate scenario-planning tools or 'forecasting as a service' that let you insert a wide range of parameters to play out 'what-if' scenarios when your own forecasting models are not highly accurate, or if the historical data is not deep enough. What-if gaming is particularly valuable when data samples are quite light, leading to inaccurate predictions. It's important to define the critical parameters in such scenario planning, to ensure that reasonable ranges are used for these parameters when building the 'what-ifs'. For example, temperatures could be a critical parameter in shipping route optimisation, and reasonable winter temperature ranges could be used to model possible weather-induced disruptions.

How can Infosys BPM help?

Consider allying with service partners with deep supply chain practices to analyse your data and requirements. The marketplace today offers such sophisticated toolsets and technologies, giving supply chain leaders the freedom to start their supply chain's digital transformation journey.

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