Historical Trends in Demand and Future Projection

Posted on September 29, 2018

View this essay online:
https://academic-master.com/historical-trends-in-demand-and-future-projection/

Introduction

The Axon purchasing case asks how historical spending on finished plastic products should inform future demand across five suppliers: Trocha, Integrity, Rapid Cut, Yuyao, and the newer supplier Airspeed. The most important correction is conceptual. Supplier spend is not the same as customer demand because expenditure can rise when quantity increases, unit price changes, product mix shifts, freight or expedite costs rise, currencies move, or business is reallocated among suppliers. The source case indicates that Trocha received the greatest share of spending and Airspeed the least, but the embedded historical graph does not preserve readable supplier values. An exact future dollar projection would therefore create false precision. A sound forecast begins by reconstructing transaction data, separating units from prices, identifying the products and customers that generated demand, and documenting known operational events. Forecasting should then occur at the product or product-family level before management decides which supplier receives the business. This approach converts an unsupported trend line into a transparent planning process that connects demand, price, supplier performance, capacity, inventory, and risk.

Reconstructing a Reliable Historical Baseline

Axon should first rebuild a clean historical baseline from purchase orders, receiving records, inventory movements, customer shipments, invoices, and quality records for the available 2015–2017 period. The company should reconcile duplicates, cancellations, returns, open orders, engineering changes, and product-code changes so that one item is not counted differently across years. At minimum, management needs separate series for units ordered, units received, unit price, total landed cost, rejected units, late deliveries, emergency purchases, and stockouts. This decomposition matters because a ten percent rise in spending can mean something very different if physical demand was flat and prices increased than if customers actually purchased ten percent more product. Historical events should be placed beside the numerical series, including new customer contracts, product launches, quality incidents, supplier onboarding, capacity shortages, and changes in sourcing policy. Trocha’s high spending share may reflect strong service, but it could also reflect that Trocha supplies the largest product family or owns approved tooling. Clean data allow management to distinguish performance from inherited dependency.

Demand Drivers and Forecasting Hierarchy

Demand should be forecast where it is generated rather than where it is purchased. Axon should therefore estimate demand by item or coherent product family and then reconcile those forecasts upward to category totals and financial budgets. Direct drivers include confirmed customer orders, active contracts, backlog, sales pipeline adjusted for probability, seasonality, product life cycles, promotions, customer concentration, and changes in finished-goods inventory. Engineering revisions may end demand for one component while creating another, and service-level commitments can alter the inventory required even when average demand is unchanged. Forecasting directly by supplier would embed the existing sourcing decision into the demand estimate. If an item moves from Trocha to Airspeed, supplier history would make it appear that market demand shifted even though only allocation changed. A hierarchical approach avoids this error. Sales and operations teams should also document qualitative overrides instead of silently changing statistical forecasts. When a salesperson expects an order because of a customer conversation, that assumption should have an owner, probability, time horizon, and later review so the organization can learn whether judgment improved or weakened forecast accuracy.

Models, Validation, and Scenario Forecasting

Model building should begin with simple benchmarks before more complex techniques are considered. Last-period demand, seasonal naive forecasts where seasonality exists, and moving averages provide reference points that more advanced methods should outperform. Exponential smoothing or regression can then be tested when the data contain sufficient history and meaningful drivers. Hyndman and Athanasopoulos recommend evaluating forecasts against withheld observations rather than assuming that a sophisticated model is automatically better. Rolling-origin evaluation is especially useful because the model is repeatedly trained through historical cutoffs and judged on what actually happened afterward. With only a few annual observations, however, Axon should avoid projecting a smooth long-term trend from three points. Monthly or transaction-level history should be recovered wherever possible and supplemented with scenarios. A base scenario can represent confirmed business and ordinary growth, an upside case can reflect credible pipeline conversion, and a downside case can reflect customer loss or weaker conditions. Each scenario should state operational assumptions and observable triggers, not merely apply arbitrary percentages to last year’s spending.

Separating Price from Quantity and Landed Cost

Budget forecasting requires a separate projection of quantity and price. Unit prices may depend on resin or other material costs, labor, energy, supplier productivity, exchange rates, freight, duties, tariffs, minimum-order quantities, tooling, and negotiated contract terms. International purchases

from a supplier such as Yuyao can add currency and transit exposure that should be distinguished from the supplier's underlying local price. Landed cost should include more than the invoice: quality failures, rework, expedited shipping, long lead times, and administrative effort can make a nominally cheaper supplier more expensive in practice. Separating price from quantity also clarifies accountability. Sales and operations can explain volume assumptions, while procurement can explain commercial assumptions and supplier negotiations. Management should not treat a proposed price reduction as certain until it is documented in a contract or credible sourcing plan. Forecasting in this form allows the budget to show whether future spending changes because customers need more product, sourcing shifts, or commercial conditions change. It also makes scenario analysis much more useful because volume and price risks can move independently.

Supplier Allocation, Capacity, and Risk

The demand forecast determines what Axon may need, but supplier allocation should follow a separate sourcing decision based on capability and risk. A scorecard can combine conformance quality, on-time-in-full delivery, lead-time stability, capacity, technical support, corrective-action performance, financial resilience, and total landed cost. Trocha's historically high share should prompt both recognition of any strong performance and a concentration-risk review. Airspeed's low share is consistent with a newer supplier being qualified and should lead to controlled expansion only if quality and capacity evidence support it. Integrity, Rapid Cut, and Yuyao should be evaluated for overlapping capabilities rather than assumed interchangeable because they appear in the same category. Capacity must also be compared with the forecast by period, not only on an annual basis. A supplier may have enough annual capacity but still fail during seasonal peaks. Safety stock should reflect demand variability, replenishment time, supplier uncertainty, criticality, and service targets rather than a fixed percentage of annual spend. The objective is a consciously designed supplier portfolio, not equal spending across five vendors.

Governance, Accuracy, and Business Outcomes

Forecast governance should connect sales, operations, finance, procurement, and key suppliers around one documented set of assumptions. A monthly sales-and-operations planning process can compare the statistical baseline with customer intelligence, inventory, capacity, supply risks, and financial targets. Overrides should be recorded with a reason and owner so they can be reviewed later instead of becoming invisible adjustments. Suppliers should receive enough forward visibility to plan capacity while clearly distinguishing nonbinding forecasts from firm purchase commitments. Axon should measure forecast accuracy at the level and horizon where decisions are made and should track bias as well as average error. Operational outcomes such as fill rate, stockouts, obsolete inventory, expedite cost, schedule changes, and customer complaints matter as much as a statistical accuracy percentage. Fast-moving items and intermittent-demand items should not be judged through the same method automatically. A forecast creates business value when it improves

purchasing, capacity, inventory, and customer-service decisions. Governance turns forecasting from an annual spreadsheet exercise into a repeatable learning system in which assumptions can be challenged and performance can be traced.

Conclusion

Historical spending provides useful evidence for Axon, but it cannot by itself determine future demand. The unreadable source graph and absence of reliable quantity data make an exact future dollar estimate unjustified. The stronger approach is to reconstruct transaction-level history, separate physical volume from unit price and landed cost, identify customer and product drivers, and forecast demand before deciding how purchases will be allocated among suppliers. Simple forecasting benchmarks should be tested before more complex models, while base, upside, and downside scenarios should be used when historical data are too short for a reliable trend. Procurement can then combine the quantity forecast with explicit price assumptions and a supplier scorecard covering quality, delivery, capacity, total cost, and resilience. Trocha's large historical share deserves concentration analysis, while Airspeed should be expanded only as qualification evidence supports it. Monthly cross-functional review should track bias and operational consequences, not merely forecast error. The best projection is therefore not one unsupported number. It is a transparent range whose assumptions, risks, and sourcing implications can be reviewed as new information arrives.

References

Hyndman, R. J., & Athanasopoulos, G. (2021). *Forecasting: Principles and practice* (3rd ed.). OTexts. https://otexts.com/fpp3/

Monczka, R. M., Handfield, R. B., Giunipero, L. C., & Patterson, J. L. (2020). *Purchasing and supply chain management* (7th ed.). Cengage.

Syntetos, A. A., Boylan, J. E., & Croston, J. D. (2005). On the categorization of demand patterns. *Journal of the Operational Research Society, 56*(5), 495–503. https://doi.org/10.1057/palgrave.jors.2601841

Thomé, A. M. T., Scavarda, L. F., Fernandez, N. S., & Scavarda, A. J. (2012). Sales and operations planning: A research synthesis. *International Journal of Production Economics, 138*(1), 1–13. https://doi.org/10.1016/j.ijpe.2011.11.027