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AI case study 1: Demand Forecasting using Artificial Intelligence

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today is demand volatility in relation to demand forecasting. Whereas data availability continues to increase, customer purchase patterns are becoming increasingly complex, and therefore harder to detect or predict (Symphony Retail, n.d.).

There are too many factors influencing demand, ranging from weather fluctuations to posts by social media influencers, causing customers to frequently changing their minds. Even worse, things that will reshape customer intentions will mostly happen quite unexpectedly (Alexsoft, 2019). Traditional Forecasts are only as accurate as the data, models, resources and people that have to interpret them (Symphony Retail, n.d.). So, how can we respond to these challenges?

The Solution

AI-powered demand forecasting

A response to demand volatility is demand forecasting using Artificial Intelligence. Traditionally, demand forecasting is a form of predictive analytics, where the process of estimating customer demand is analysed using historical data (Dilmegani, 2021). Using AI, organisations can make use of Machine Learning algorithms to predict changes in consumer demand as accurately as possible. These algorithms can automatically recognise patterns, identify complicated relationships in large datasets and capture signals for demand fluctuation. See figure 1 for a side-by-side comparison between traditional forecasting

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Typically, organisations use this form of AI to avoid inefficiencies caused by misalignment of demand and supply throughout the operational process. Honestly, this will never be 100% accurate (Alexsoft, 2019). Yet it can offer companies the opportunity to significantly reduce supply chain costs and make improvements in financial planning, workforce planning, profit margins and risk assessment decisions (Dilmegani, 2021).

> Uncategorized

	Traditional forecasting	Machine Learning forecasting
Ability to consider numerous variables and data sources	Adding extra variables and sources requires substantial effort	Multiple variables and sources can be smoothly incorporated thanks to the high level of automation
Volume of manual work	High	Low
Amount of data required	Small	Large
Maintenance		

	Traditional forecasting	Machine Learning forecasting
Technology requirements	Low	High
Best fit	Mid / long-term planning Established products Stable demand	Short / mid-term planning New products Volatile demand scenarios

Figure 1: Comparison of Traditional and Machine Learning Forecasting solutions

Source: (Alexsoft, 2019)

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French manufacturer of food products. Danone implemented a machine learning system to make better demand forecasts. The company required more accurate and secure demand forecasts, due to the short shelf-life of its fresh products and volatile demand (Brosset, et al.). Danone uses many promotions and media events. More than 30% of the total volume is sold through promotional offers such as discounts and leaflets, so the demand forecasts were somewhat ad hoc (Best Practice AI, n.d.).

The implemented machine learning system did not only improve forecasts, but also improved planning between different departments such as sales, supply chain, finance and marketing. This system improved efficiency and inventory balance, allowing Danone to achieve its target service levels for channel or store-level inventories (Brosset, et al.).

Benefits

Several advantages of AI in demand planning have already been mentioned. Below are the key benefits that demand forecasting with AI can bring to any company in the manufacturing industry:

- **Improvements in accuracy over time:** Better forecasts will be made over time as machine learning algorithms learn from existing data.
- **Higher customer satisfaction:** When products are 'out of stock', this will decrease customer satisfaction, whereas customer satisfaction will increase when products are always available. This improves

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considerations between full-time or part-time staff mix, thus optimising HR costs and effectiveness.

- **Improved markdown/discount optimisation:** Cash-in-stock is a common situation for retail companies, where products remain unsold for a longer period than expected. This often causes higher expected inventory costs and the risk of products becoming obsolete and losing value. In this scenario, products are sold at lower selling prices. With demand forecasting, this scenario can be minimised.
- **Overall efficiency:** With demand forecasting, teams can focus on strategic issues instead of trying to reduce or increase inventories and staffing levels (Dilmegani, 2021).

Impact

What value can AI add to a company? Let's look at the numbers.

- Errors in supply chain networks can be reduced with 30 to 50% with AI-powered demand forecasting.
- Warehousing costs decrease with around 10 to 40%.
- The loss in sales due to inventory out-of-stock situations can be reduced up to 65% with the improved accuracy.
- In general the estimated impact of AI is between 1.2 and 2 trillion dollars in the manufacturing and supply chain planning (Dilmegani, 2021).

For Danone Group, AI in demand planning ultimately led to a 30% reduction in lost sales, a 30% reduction in product obsolescence, a 20% reduction in wrong

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Accessibility and Requirements

In order to implement machine learning in demand planning and forecasting, the ideal AI system is trained using data from different sources such as: weather data, financial data and third-party data (e.g. social media, historical sales data and macroeconomic data). The AI system makes predictions on how event combinations in the past effected demand for future consumer demand (Brosset, et al.)

Data sources. Built upon statistical models, machine learning utilizes additional internal and external sources of information to make more accurate, data-driven predictions. ML engines can work with both structured and unstructured data including past financial and sales reports (historical data), marketing polls, macroeconomic indicators, social media signals (retweets, shares, spikes in followers), weather forecasts, and more.

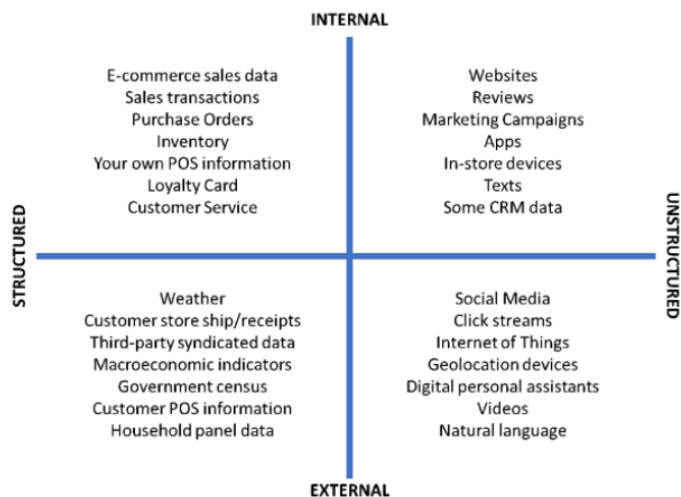


Figure 2: Example of data types, structures and sources


Source: (Alexsoft, 2019)

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sales and predict customer demand. The sources they used included social media, weather and financial market indicators and data gathered at point-of-sales, such as collection, reception and inventory. Combining these datasets, and identifying which variable combinations affected consumer demand, allowed L'Oréal to target end-customers more effectively and respond to the challenge of demand volatility (Brosset, et al.).

However, no matter how smart the forecasting solution may be. Human logic is still needed to evaluate the relevance of the outcomes produced by AI solutions. To draw conclusions with common sense and domain expertise. Companies should invest in industry specialists to determine what factors should be taken into account in predictive algorithms/models. Only by combining the strengths of both human and artificial intelligence can a company foresee and plan for a better future (Alexsoft, 2019).



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AI case study 5: Workflow automation with TradeCloud One

The Business Problem In this business case, AI workflow automation will be exemplified using the example of a TradeCloud client. The client is a manufacturer of machines for the sorting of eggs and [...]



AI case study 4: Machine Learning in the Manufacturing Process

The Business Problem The manufacturing process of memory chips involves around 1,500 steps that need to be performed in sterile conditions to avoid specks of dust from damaging the wafers. However, damages occur [...]



AI case study 3: Cost-saving AI in Manufacturing Logistics

The Business Problem In the world of logistics, empty fleet management cannot be overlooked. For



AI case study 2: Efficient inventory management using Artificial Intelligence

The Business Problem A major challenge for manufacturing companies is to know what, when,

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a shipping line's operating costs relate [...]

traditionally calculate this manually using Excel, Google Sheets [...]



AI case study 1: Demand Forecasting using Artificial Intelligence

The Business Problem One of the biggest challenges for business executives today is demand volatility in relation to demand forecasting. Whereas data availability continues to increase, customer purchase patterns are becoming increasingly complex, and [...]

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