

Research
Based
Curricula



**Decision Making in
Business**

Key Stage 5

Business Studies

Resource 5

2019



Resource Five Overview



Topic	Judgemental Adjustments (A Case Study)
A-Level Modules	Making operational decisions to improve performance; managing inventory and supply chains
Objectives	<p>By the end of this resource, you will be able to:</p> <ul style="list-style-type: none">✓ See how developments in technology are affecting decision making and activities in operations;✓ Understand how operational decisions influence business strategies;✓ Identify the connections between decision-making theory and practice.
Instructions	<ol style="list-style-type: none">1. Read the data source2. Complete the activities3. Explore the further reading
Context	<p>A statistical model is a mathematical model that embodies a set of statistical assumptions concerning the generation of some sample data and similar data from a larger population. A statistical model represents, often in considerably idealised form, the data-generating process.</p> <p>Fast-Moving Consumer Goods (FMCG) are products that are sold quickly and at a relatively low cost. Examples include non-durable goods such as packaged foods, beverages, toiletries, over-the-counter drugs, and other consumables.</p> <p>Stock replenishment is a restoration of stock or supply to a former level or condition.</p> <p>Forecast evaluation is a process of estimating how correct forecasts are.</p>

Resource Five Data Source



Taken from Anna
Sroginis' thesis

Human adjustments to statistical forecasts might be beneficial since two main features of statistical and judgmental forecasting are combined: statistical baseline gives a more consistent forecast for the whole time series while individual adjustments can incorporate contextual information that is not taken into account by a statistical model for specific periods.

Since human judgment is widely used in many organisations, the analysis of available cases is essential for describing this process in detail and identifying critical open questions. We collected and analysed data from a UK-based major retail company. In this section, we discuss the forecasting process followed in the case company, highlighting when adjustments occur and the information sources used.

Figure 1
Screenshot of an
example product



The case study is based on a retail company that focuses primarily on household and FMCG products. There are around 50 thousand products organised in 3 supercategories and around 20 categories. Only 20 thousand are regular items, and all others are either new or seasonal. The data has a lot of zero-demand periods (considering two years of weekly data). Moreover, items are heavily promoted, especially in the supercategory of FMCG (10 types of promotions and each type having many different durations).

Resource Five

Data Source



The company uses the SAP F&R software for forecasting and replenishment, where the implemented algorithm switches forecasting models between non-promotional and promotional periods. The system plots sales and forecasts with indicators for promotional and seasonal events, which help demand planners visually access the quality of system forecasts. Figure 1 provides a screenshot, where the dark red line corresponds to actual sales and the light green one to the company's estimates. The horizontal lines under the graph represent different types of promotions. Various events, including seasonal events and holidays, are also colour coded and presented in the same box as promotional markers.

Figure 2
Forecasting process in the case company

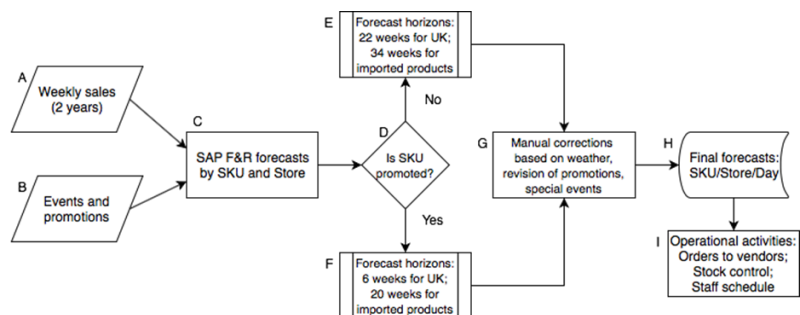


Figure 2 presents a flowchart of the forecasting process implemented in the case company. Initially, there are several inputs: a history of 120 weeks of sales as a base for its weekly forecasts; yearly promotional plans and calendar events (A and B input nodes in Figure 2).

In general, several operational forecast horizons depend on a type of a product (local/imported) and whether this product is on promotion or not. These horizons can be seen in boxes E and F in Figure 2.

Resource Five

Data Source



Statistical forecasts are produced at a store level for each SKU, weekly, using the SAP F&R system (Box C in Figure 2). Then these may be judgmentally adjusted based on weather, known special events and revisions of promotions (Box G). Finally, the resulting values are disaggregated into days and stored for the following operational activities: orders for distribution centres, stock control and staff scheduling (Boxes H and I respectively).

A critical problem of the F&R system is an absence of forecast evaluation. This is a common limitation of systems in practice, discussed by Ord, Fildes and Kourentzes (2017) (Chapter 13). According to Petropoulos et al. (2018), experts revise predictions better when provided with forecast bias feedback, which is also absent in the current process.

Resource Five Activities



Activities 1

1. What FMCG companies do you know?
2. Why do they do forecasting?
3. What is a replenishment system? Why companies need this?
4. What is the problem with the F&R system in this case?
5. How would you evaluate this forecasting process?

2

There is information about a hospital A&E unit. Look at Figure 3 below and answer the following questions.

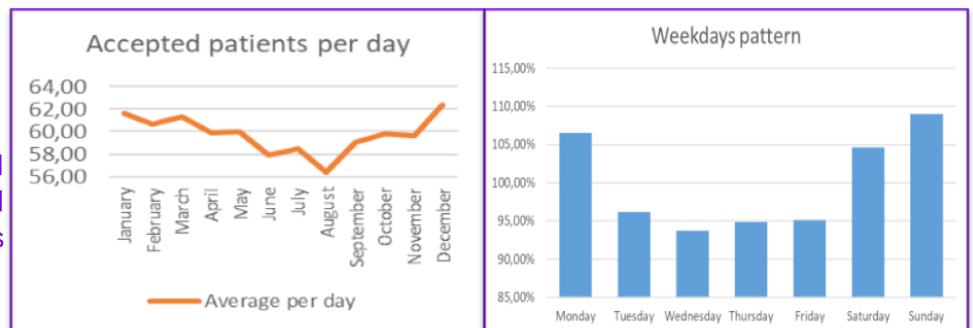


Figure 3: Accepted patients at a hospital and weekday patterns



- What is the maximum number of patients on average?
- What is the minimum number of patients on average?
- Can you list at least two reasons why August has fewer injuries than any other month?
- How would you explain similar patterns on Saturdays, Sundays and Mondays?

Resource Five

Further Reading



Explore Ord, K., Fildes, R., Kourentzes, N., 2017. Principles of Business Forecasting, 2nd Edition. Wessex Press Publishing Co.

Petropoulos, F., Kourentzes, N., Nikolopoulos, K., Siemsen, E., 2018. Judgmental Selection of Forecasting Models. Journal of Operations Management (May).



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100 Black Prince Road
London, SE1 7SJ



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