BALA 301 – Autumn 2024

Assessment 2 Case study

Smartt Distribution Group (SDG) is a distribution company operating in Wollongong. SRG has been the main distributor of a type of washing machine for the past few years. They are planning for their next operational year and are looking to optimize their operations, mainly, warehousing and delivery management to maximise their profits while meeting the fluctuating demand.

Washing machines are imported from one provider based overseas and arrive at Port Kembla every Sunday. They can be shipped to any of SRG distribution centres (warehouses) in the same day they arrive to the port, and hence, all warehouses are replenished to their full capacities at the beginning of each week. There are three potential locations to establish warehouses, each with a known capacity. SRG has enough budget to establish two warehouses, but the management team is not sure which two locations are the best. The decision about establishing the warehouses will be made at the beginning of each year.

SRG distributes washing machines to its 7 partner retailers at the beginning of every week. A retailer receives washing machines only from one warehouse. The demand for washing machines at each retailer can be estimated based on historical data. SRG has already processed the demand data and fitted a distribution to the demand at each retailer.

Details of the assumptions are as following:

- The wholesale price (the price the retailers pay to SDG) is $400 per washing machine.
- At the beginning of the first week, both selected warehouses can be assumed to be full.
- The shipment cost to all SRG distribution centres can be considered the same as the main shipping cost incurs from the international shipment. The estimated cost is fixed and known (as provided in the Excel file).
- The fixed cost of opening a warehouse at each location is fixed and known (given in the Excel file). The capacity of each potential warehouse is fixed and known (as provided in the Excel file).
- The shipment cost from each potential warehouse to each retailer is $4 per kilometre distance per washing machine, if SDG operates the shipments. Distances from each potential warehouse to each retailer are provided in the Excel file.

- There is no need to consider holding cost as all warehouses are replenished to full capacity every week. There is also no need to consider stock-out costs.

The main decisions to be made at this stage are:

1- Which two potential warehouse locations to be chosen for the next year operations. (70% weight in marking)

2- The management team wants to establish a “service level” for their growth strategy. In particular, they want to find a metric representing their service level in order to use in future negotiations. The service level should be based on their ability to fulfill customer demands. Based on the model and the simulation results, advise the management on an appropriate definition for the service level. Also let the management team know the service level that can achieve under the current capacity limits (20% weight in marking).

3- There is an offer from a shipment company to deliver the washing machines to retailers. The offer is as follows (10% weight in marking):

   - $4.5 per kilometre per washing machine for deliveries containing up to 30 washing machines to a retailer.
   - $3 per kilometre per washing machine for deliveries containing more than 30 washing machines.

   Help the management team decide whether this offer reduces their shipment costs.

Write a report, following the format described on the third page of this document, and address the above concerns of the SDG management team. Upload your report (in word or pdf format) as well as a supporting Python file used for implementation.

Report format:

Margins: 2.5cm on all sides. Font: Arial. Font size: 12. Line-spacing: 1.5

Your business analytics report must consist of the following:

1. **Title Page**: Should contain your name, student ID, and the subject code.
2. Abstract: Should contain objectives, methods, limitations and findings.
3. **Introduction** (~ 300 words): Identify and discuss the problem and highlight the focus and purpose of your research report. Research questions and objectives should be discussed here, so that the scope of the study can be clearly and easily identified.
4. **Research design** (~ 800 words): Explain and justify the business analytics method(s) that you will adopt to analyse the data required for addressing the problem.
5. **Findings and implications** (~ 1000 words): Your key findings, their interpretation and a discussion of the results.
6. **Recommendations and Conclusion** (~ 400 words): Explain how and why the management team might benefit from your proposed research. Include an overall evaluation of the research, potential limitations of the study, and recommendations for future research.
7. **References**: These must be provided in Harvard format (see http://uow.libguides .com/refcite for further information) in-text as well as at the end of the report. Do not number the references. List them in alphabetical order by the first author's last name.
8. **Appendices**: All the graphs, tables and images from web sources should be provided. Note that the core messages you are trying to convey should be contained in the body of your report and that the reader would only be expected to refer to the appendices if they needed further detailed information.