

Case Study (Background to Mitchies Superstore)

Mitchies Superstore is one of Australia's leading supermarket chains. There are 500 stores in the chain. Originating from a family-based chain of general stores, Mitchies Superstore now has stores all over Australia, with the first one being established 55 years ago. Regarding operation, individual store management has wide-ranging powers about the day-to-day operations of their stores. However, Mitchies Superstore's strategic planning and direction take place in the company Head Office in Dandenong.

Despite their successful operations and strong financial turnovers in the last two years, Mitchies Superstore is forecasting a shift in the business climate within the next five years. This is a result of ever-increasing competition in the grocery supermarket sector. Now more than ever, Mitchies Superstore management team feels the need to ensure a good understanding of their business performance. The Mitchies Superstore Head Office is slightly confused about the lack of enthusiasm of store managers to open their stores on Sundays or to open an online sales channel given that Mitchies Superstore Head office has invested heavily on digital platforms, self-checkout machines and staff. Also, they are planning to put in place a formal procedure to forecast their Sales.

Subsequently, Mitchies Superstore has approached BEAUTIFUL-DATA (a market research company) and asked them to conduct a study to understand the characteristics of Mitchies Superstore's stores and their business performance.

The Data

For this study, BEAUTIFUL-DATA has collected two sets of Data:

1. The data related to stores were extracted from the company's datamarts. It is a random sample of 150 stores in the supermarket chain. A complete listing of variables, their definitions, and an explanation of their coding are provided in Working Sheet "Stores-Variable Description."
2. Time-Series data is available on Working Sheet "Quarterly Sales".

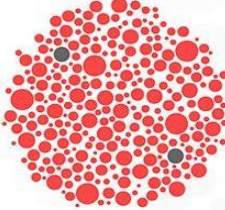
Your Role as a BEAUTIFUL-DATA Data Analyst Intern

You are a postgraduate student doing an internship at BEAUTIFUL-DATA. The research team manager (Todd Nash, with a PhD in Data Science and a Master Degree in Digital Marketing) has asked you to lead the data analysis process for the Supermarket project and directly report the results to him. You and Todd just finished a meeting wherein he briefed you on the vital purpose of the project.

Todd explained that a model should be built to estimate Sales. Therefore, the first goal is to identify key factors that influence Sales. The second goal is to understand the relationship between "number of competitors" and "Sales". He is also interested in gaining insights into factors that influence stores to open an online sales channel. The final goal is to construct a forecasting model, which forecast Sales in the upcoming four quarters. From these insights, Todd and consequently Mitchies Superstore will be in an excellent position to develop plans for the next financial year.

Todd also allocated relevant research tasks and explained his expectations from your analysis in the meeting. Minutes of this meeting are available on the next page.

Now, your job is to review and complete the allocated tasks as per this document.

| | | | | | |
|---|---|--|----------|-----------|-------------------------------|
|  BEAUTIFUL DATA | | BEAUTIFUL-DATA, 727 Collins St, Docklands VIC 3008 Phone: (+61 3 212 66 000) info@beautiful-data.com.au | | Reference | PH-102 Supermarket Project |
| | | | | Revised | 25 th August 2019 |
| | | | | Level | Expert Analysis |
| Meeting Chair | Todd Nash | | | | |
| Date | 25 th August 2019 | Time | 11:00 AM | Location | BEAUTIFUL-DATA F3.101 |
| Topic | Supermarket Project – Analytics Details | | | | |
| Meeting Purpose: | Specifying and Allocating Data Analytics Tasks | | | | |
| Discussion items: | <ul style="list-style-type: none">• Variable(s) <u>description</u>.• Predict <u>Sales</u>.• Predict the <u>likelihood of a store opening an online sales channel</u>.• Forecast <u>Sales</u> in the upcoming four quarters.• Produce a <u>technical report</u>. | | | | |
| Detailed Action Items | Who: Graduate Intern | What: 1. Provide an overall summary of the following variables: 1.1. Sales 1.2. Open on Sundays 1.3. Online Sales Channel 2. Using an appropriate model building process, build a model to predict Sales. 3. Todd has done a separate regression analysis to predict Sales using the number of competitors and stores open on Sundays. He believes that the relationship between Sales and the number of competitors should be weaker for those stores that are open on Sundays. Your task here is to test Todd’s assumption by modelling the interaction between the predictors mentioned above and the target variable. Comment whether there is sufficient evidence that the interaction term makes a significant contribution to the model. 4. Using an appropriate model building process, build a model to predict the likelihood of a store opening on Sunday. 5. Finalise Todd’s model to predict the likelihood of a store opening an online sales channel: | | | |

| | | |
|--------------|---------------------------------|---|
| | | <p>5.1. Todd has already done an initial analysis for this task. Based on his analysis, he has narrowed down the key predictors of the likelihood of a store opening an online sales channel to “Manager’s Age, Experience and Gender”. Your task is to continue his work and develop a predictive model to ascertain the “likelihood of a store opening an online sales channel”.</p> <p>5.2. Todd is specifically interested in understanding the probability of stores which meet the following criteria to open an online sales channel: Those stores with managers,</p> <ul style="list-style-type: none"> a) in their mid-thirties; b) with varying levels of Management Experience (i.e. 2-16 years?); c) and across both, male and female store managers. <p>He believes that the age, experience and the gender of the store manager may influence the decision to open an online sales channel. Therefore, it is essential for the client’s management team to know whether effort and money should be put into recruiting tech-savvy young managers. Accordingly, your job is to visualise the predicted probability of a store opening online sales channel with the attributes described earlier.</p> <p>6. Develop a time-series model to forecast Sales in the next four fiscal quarters.</p> <p>7. Produce a written report detailing ALL aspects of your analysis. Your description should be as detailed as possible and should describe ALL critical outputs of your analysis. Make sure to provide recommendations to the client’s management team that will guide them to improve their decision-making. The results of your analyses should drive your recommendations/insights.</p> |
| Next meeting | Monday 07 th October | |