BSAN3209 Project report guideline (A2)

The course BSAN3209 Prescriptive Analytics for Business has three assessment items: a project plan, a project and project report, and a final examination. These notes outline my expectations for the project report. The project report restates key elements of the plan, documents the method and results of your project, and highlights the implications for the client. Note the project report should be prepared and submitted in PowerPoint format (whereas the project plan was in the form of a Word document). The proposal is not a binding document. That is to say, you are very welcome to revise your proposal if you think revision is needed to it.

Key Sections

The project report will likely have the following sections.

1. Background
2. Business problem
3. Proposed solution/method of analysis
4. Analysis plan
5. Results and interpretation
6. Strategy/recommendations (and business case)
7. Future research

Per the project plan, the **background** section introduces the project, placing emphasis on the broad context. The general expectation is some key business process and/or management decision will be improved through the use of perspective analytics in your project report.

The next section of the report should restate the **business problem** you are attempting to address. What is the problem you are trying to solve? The **business problem** outlines what the problem you are trying to solve. A starting point is to specify an objective the target business/client is trying to achieve. What issue you hope to be able to address with your analysis. Addressing the following questions will help you conceptualise this. (1) What is the objective the business wanted to minimise or maximise? (2) What are the constraints? (3) Why do you consider those objective and constraints?

The section on the **proposed solution**– really, the analytical "line of attack" – should focus on the prescriptive analytics – This section outlines the functional form of the solution and provides technical details about what considerations must be made when using prescriptive analytics. Describe the method in detail, including providing details about the data you will be using (i.e., the **NSD file**). Highlight the key variables you will be including in your optimisation model(s), and what steps and/or issues are important in its implementation and estimation. For example, you might write-out the optimisation model in formal fashion

with reference to the specific variables you will select for study. Why these variables? In summary, this section should be specific about the proposed method and the data to be used.

The **analysis plan** extends on the last section, and outlines in a procedural fashion how the analysis will be implemented. What functions in R you are planning to use in different steps. This should be a concise step by step plan that satisfies some of the points raised as part of proposed solution. For example, a linear/nonlinear optimisation analysis might involve several key steps, including the appropriateness of the data for the planned application, the specification of variables, etc.

The **results and interpretation** may be in three parts. Firstly, you might provide some summary information about the dataset you are working with. How you prepared data for creating the objective function and constraints? You might provide some visualisations guiding you to create the objective functions. Second, you might provide the result of optimisation model(s) and finally interpret the results. Do not copy and paste raw R output from the console. Ensure any results you include are in professionally formatted publishable tables.

A key section of the report is the **strategy and recommendations** section. The implications of your project should become clear in this section. Think about the value of your results from the perspective of the client. What insights have you generated that might be important for the client to know? Provide a succinct list of insights (a numbered list or dot points is encouraged here). Given your results, are there things the client should do more of or things the client should do less of or stop doing? Where should the client start in actioning your results? As you start to address these questions, you might find that your insights become the precursor for a set of recommendations. Also, think about some of the potential costs associated with your recommendations

Finally, I would like you to include a section on **future research** in your project reports. Think about what should be done next – what is the next project, what does it look like? One way to think about this question is to think about what you pilot project could have achieved if you had more time, more and/or different data, and more resources. What would you have done differently if you had had more time and resources? Another way to address the question of what further research should be done is to focus on one or more very specific findings from your project. A good project finishes by outlining the next project a business analyst might address!

Submission Guidelines

The report is worth **50 percent** of your score in the course. In terms of length, I would expect your slideshow to be in the range of 20-25 slides (maximum). Submit only one single file. A .pptx file (made using PowerPoint) **or** a .pdf file (exported from Google Slides, Apple Keynote, LibreOffice Impress, Prezi, Canva

A Context for Study

This Semester, you are encouraged to focus on Australian Newspapers as the hypothetical client for project plans/project reports. I will leave you to do some background research (simple "desk research", i.e., using Google and some peer-reviewed scientific research) on this industry. One of the key challenges might be that the newspaper has tried many different price points to help establish the revenue-optimising price. I will separately introduce you to the dataset, and challenge you to think about the appropriate variables to use for optimisation model. Try to use only the available information from dataset to create the objective functions and constraint(s). If you use an external information for objective functions or constraints you need to provide clear and strong justifications and evidence.

The file is labelled "NSD.xlsx" and contains information on the subscription choices of 272 newspaper subscribers living in Sydney. These 272 subscribers participated in a study of newspaper subscription choices. For a ten-month period, the monthly subscription choices of each subscriber were recorded.

At the beginning of each month, each subscriber was presented with four different subscription alternatives: The Australian, The Australian Financial Review, The Daily Telegraph, and The Sydney Morning Herald. Prices varied from month to month and from one masthead (newspaper brand) to another. Note The Australian and The Daily Telegraph are owned by News Corp and The Australian Financial Review and The Sydney Morning Herald are owned by Nine Entertainment.

There are different points for each of the mastheads with the prices for each masthead varying across slightly different ranges. Note the numbers in the dataset are weekly subscription prices in dollars.

For each subscriber, the dataset records the masthead the subscriber subscribed to in each month of the ten-month study and the weekly price the subscriber paid for that subscription (for each month's subscription to a masthead). Note subscribers held only one newspaper subscription at a time. However, subscribers were permitted to choose a different subscription package at the beginning of each month. Further note that subscribers may choose to not subscribe to a newspaper in any particular month. An assumption is that the subscription choices of the subscribers are reflective of the overall market.

Outside of the study, the usual (or "current") weekly prices charged to subscribers are as listed below for each of the mastheads.

Masthead	Weekly Subscription Price
The Australian	$8
The Australian Financial Review	$18
The Daily Telegraph	$5
The Sydney Morning Herald	$8

The primary question is to estimate the revenue-optimising prices for each of the mastheads (and to compare these revenue-estimates the revenues the mastheads generate at their current prices). This will require some manipulation of the data to solve for the

revenue-optimising prices. The first step is to estimate the demand function for each masthead. Then the revenue-optimising prices can be estimated for each masthead. Appropriate visualisations of the data should accompany the analysis (for example, the demand and revenue functions for each of the mastheads). For each masthead, establishing the shape of the revenue function and its maximum is critical and it implications for pricing. (What is the shape of the revenue function? How much scope is there to increase revenue by adjusting prices?)

Bonus point

A secondary question (an optional, challenge question) is to establish the revenue optimising prices for the portfolio of New Corp papers (The Australian and The Daily Telegraph) or the portfolio of Nine Entertainment (The Australian Financial Review and The Sydney Morning Herald) or even the portfolio of all four newspapers. If you are able to successfully solve this optimization problem, you will receive bonus points. This may be possible by using information that estimated the price elasticities of demand for each of the mastheads (and the cross-price elasticities for each pair of mastheads). The price elasticities of demand are the (percent) change in demand for each (percent) change in price – they are always negative. The cross-price elasticities show the (percent) change in demand for a masthead for each (percent) change in price of a competing masthead – they are always positive (and often asymmetrical).

Masthead	The Australian	The Australian Financial Review	The Daily Telegraph	The Sydney Morning Herald	Not subscribe
The Australian	-.59	.08	.11	.06	.04
The Australian Financial Review	.04	-.45	.04	.06	.03
The Daily Telegraph	.28	.19	-.72	.18	.19
The Sydney Morning Herald	.18	.30	.17	-.78	.14

Consider the following examples. For each percentage increase in the price of The Australian there is a -.59 percent decrease in demand for The Australian. For each percentage increase in the price of The Australian there is a .08 percent increase in demand for The Australian Financial Review.