

BUS100
Business Skills and Management

Tutor-Marked Assignment

January 2022 Presentation

TUTOR-MARKED ASSIGNMENT (TMA)

This assignment is worth 30% of the final mark for BUS100 Business Skills and Management.

The cut-off date for this assignment is **11 March 2022, 2355 hrs.**

Note to Students:

You are to include the following particulars in your submission: Course Code, Title of the TMA, SUSS PI No., Your Name, and Submission Date.

Read the following Case Study. Create appropriate Excel models to analyse it. You need to have your models in an appropriate xlsx Excel file. You should only submit one workbook for this TMA. It is **individual assignment** and there is a severe penalty to refer to others work.

All questions will need to be answered in your Excel file. The answer for each question must be in its own worksheet. Organise your workbook with worksheets as follows: Cover, Q1, Q2, and Q3. The Cover worksheet should contain your Name, PI Number, Seminar Group, Assessment Name and Module Code.

Each model should fit into one worksheet (A4 page), with user-friendly formatting and layout, clear documentation and print-ready state. You must provide answers to the individual questions posed in the problems.

Note that for take-home assignment, students are expected to research beyond the school textbook and course materials.

Refer Sample TMA and Sample TMA solutions as your guide to the standard expected. See also the rubric below given for grading each problem.

TMA Grading Rubric	
Criteria	Percentage
Correctness (Numeric answer) and proper documentation	80%
Formatting (For professional quality & bonus for advanced features and in-depth analysis and comment)	20%

For your submission, you will need to upload a single Excel workbook (xlsx) file for grading via Canvas. Please remove any VBA or Macro from your workbook.

Important Note: Grading of TMA Submissions

Marks awarded to your assignment are based on the following guidelines:

1. 80% of the marks are allocated to the content of your answers:

- The marks awarded to *what your answers cover* depend on the extent to which they cover the key points that correctly and comprehensively address each question.
- The key points should be supported by evidence drawn from course materials and, wherever relevant, from other credible sources.

2. 20% of the marks are allocated to the presentation of your answers:

Wherever applicable, the marks awarded to *how your answers are presented* depend on the extent to which your answers:

- form a sound reasoning by developing those key points in a clear, logical and succinct manner;
- provide proper and adequate in-text citations and referencing to content drawn from course materials and other credible sources;
- strictly follow APA formatting and style guidelines¹, in particular for:
 - in-text citations and end-of-report references;
 - the identification of figures and tables;
- use, wherever relevant, the specialised vocabulary and terminology commonly used in discussions about the topic(s) covered by each question;
- provide a reference or bibliography at the end of the main report;
- include the less relevant details in an Appendix;
- use sentence constructions that are grammatically and syntactically correct;
- are free from spelling mistakes; present the workings, numerical formulations and results in a logical manner that follows the APA formatting and style guidelines;
- design and present graphs, diagrams and plots that follow the APA formatting and style guidelines;
- are highly original;
- have proper formatting, which may:
 - include a properly formatted cover page;
 - respect the answer length/word count set out in the assignment guidelines, if any is prescribed;
 - present answers in paragraphs with proper spacing and page margins;
 - include page numbers and appendices, if necessary.

¹ You can find a short tutorial on the APA formatting and style guidelines here: <https://is.gd/mgEOnC> . Additional details (pertaining to tables and figures) can be found here: <https://is.gd/O4vDdT> .

Question 1

Green Urban Solutions and Technology Pte Ltd (GUST) is a local business start-up that has chosen to focus on commercially viable sustainability solutions for urban environments. In Budget 2021, the Singapore Government had announced that petrol-driven cars would be completely phased out by 2040. New car registrations would only be for electric vehicles (EV). The Government had also set a target of installing 60,000 charging points (CP) by the year 2030 from some 1,900 CP's presently. These CP's will be operated by private enterprises. GUST decided to pursue such an opportunity.

GUST plans to roll out Type 3 superchargers that can re-charge an EV from 0 to 80% in about 20 minutes. Each supercharger constitutes one CP. These chargers will be installed island-wide in clusters of 2 to 4 CP's per location. Every such CP will require a standard-size parking lot which GUST will rent from building owners and car-park operators. These CP's will operate on a self-service basis over 24x7 hours. EV customers will use a mobile phone app to operate the CP and pay for the charging service. Every customer will be allowed up to 30 minutes to charge their cars at a CP. Penalties will be imposed on those who stay beyond the 30-minute charging timeslot. On a typical day, a CP can be used for up to 48 charging timeslots.

EV cars and EV chargers have very few parts and are known to be robust and reliable, requiring very low maintenance, if any. The chargers can be operated continuously over 24 hours with almost no operational impediment. It is the ideal digital solution for sustainable urban transportation and GUST hopes to be a significant player in this economic sector.

This assignment requires you to apply spreadsheet modelling techniques to analyse and solve business problems in this case study. Note that all numerical results must be stated in words explicitly, and not left as-is in your models.

- (a) Develop a spreadsheet model that will enable GUST to analyse the number of Charging Points (CP) that it needs to install and the utilisation rate of these CP's.

You may organise your model as shown in table 1 below.

Cars to charge Per Day	10,000
No of CP points	800
No of Charging Slots	38,400
Utilisation	26.0%

Table 1: Simple CP Analysis Model

The example shows that if GUST had 800 CPs and 10,000 cars needed to be recharged, the utilisation rate of its infrastructure would be 26%.

*[Hint: Utilisation Rate = Number of Charging Slots Used / Total Number of Charging Slots Available * 100%]*

All the cells shown shaded (in yellow) must be automatically computed using appropriate Excel functions and formulae. Hardcoding is not permitted.

From a business viewpoint, what would be the optimal number of CP's if 15,000 cars needed to be charged? Explain how you derive your answer using the model.

(12 marks)

- (b) Develop a second model for GUST to determine the potential profit from this venture. You may copy your model from part (a) above and enhance it further for this part.

You may wish to factor in the following parameters. The cost of electrical equipment for each CP is \$90,000 inclusive of hardware, installation and maintenance by the supplier over a 10-year period. Rental for parking lot per CP is expected to be \$500 per month. Cost of Electricity is \$0.22 per kWh. The average charge per EV car is 40 kWh for each 30-minute slot. GUST plans to charge the customer \$0.33 per kWh, which is a 50% premium. For this analysis, assume that GUST has 15,000 customers per day and has installed the optimal number of CPs from part (a). Equipment is evenly depreciated over 10 years.

What is the optimal Annual Gross Profit? Is this optimal profit achievable? Why?

[Hint: Gross Profit = Sales – CP Depreciation – Parking Lot Rental – Electricity Cost]

Using your model and scenario for this part, what is the breakeven number of charging points needed? What is the corresponding utilisation rate? Explain how you obtain this answer.

[Hint: At breakeven point, the Gross Profit is 0.]

(20 marks)

Presentation, layout and formatting

Your models for Q1 must be neatly laid out and presented. You must apply appropriate colours, alignment, labels and formatting of numbers. Documentation and legend are expected.

(8 marks)

Question 2

Over the next 10 years from 2021 to 2030, GUST needs to plan out the number of charging points (CP) that it will install at various places. The number of CPs that will be viable clearly depends on the car population size and EV adoption rate. Future car population numbers are not known. However, the Land Transport Authority (LTA) has provided the car population figures for the last 10 years as shown in table 2 below. The number of EV cars may be assumed to be negligible over this period.

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Car Population	597746	606280	620011	623688	619023	604722	603763	614789	618055	632681	636180

Table 2: Car Population Numbers from 2010 to 2020

Nevertheless, GUST hopes to be able to project future demand for EV cars based on this historical data. Clearly, the number of EV cars on the road will translate into potential demand for its electrical charging services.

- (a) Describe four key insights disclosed by the set of car population figures shown in table 2. Your description must be supported and verified by a suitable spreadsheet model.

[Hint: Consider the use of statistics and graphing.]

(8 marks)

- (b) GUST has been advised by its land transport consultant that EV adoption rate from 2021 to 2030 will likely be 5%, 6%, 8%, 10%, 12%, 16%, 20%, 26%, 38% and 55%, respectively. The LTA has indicated that there will be no further growth in total car population. Instead, for the next 10 years from 2021 to 2030, the yearly car population will be stabilised at the average of the car population in the years 2010 to 2020. For urban usage, every EV car is expected to need a re-charge every 5 days. GUST is confident that it will be able to capture 20% of the market share of EV cars in Singapore.

The Project Director of GUST plans to install 20 CP's in 2021 and will double the number of CP's from year to year till 2030. By 2030, it will have a total of 10,240 CP's. The company has a required return rate of 8% for all its investments and projects.

Create an NPV-based model to analyse the net present value of this venture. Hence, advise the CEO of GUST whether the Project Director's plan is viable.

For this analysis, you may assume that all CP installations can be implemented expeditiously at the beginning of each year and that they are operational immediately. Year 0 may be assumed to be 2020. CP's are only installed from 2021 onwards.

[Hint: Outflows consists of equipment depreciation, lot rental and electricity charges.]

(16 marks)

- (c) How would you determine the number of CP's to be installed year by year from 2021 to 2030 in order to achieve the best results for GUST? Justify your method. (8 marks)

Presentation, layout and formatting

Your models for Q2 must be neatly laid out and presented. You must apply appropriate colours, alignment, labels and formatting of numbers. Documentation and legend are expected. (8 marks)

Question 3

- (a) Compare and contrast the differences between the juice business in the MonsoonSIM game and the EV charging business in this case study. Explain at least 3 differences. (10 marks)
- (b) Relate 3 different ways for the GUST company to market its services in order to increase market share. (10 marks)

For Q3, you should keep your answer to within 300 words for each part. Use of in-text citations to support your answer is expected.

---- END OF ASSIGNMENT ----