MSIN0094 First Assignment

Due 2pm, Monday, 27th October 2025

1 Marketing Planning for Tom's Side Business (16pts)

Since Tom epically screwed the NPV calculation at Apple Inc, he decided it was time to get his act together and focus more on learning R programming and Marketing Analytics. To his surprise, this was probably the best decision he had made in years! He totally nailed the launch of the M&S delivery pass program, proving he wasn't as hopeless as he feared.

He fondly remembered a promise he'd made to Dr. Meow back in his Business Analytics programme days. Over a shared cup of bubble tea (or three), they had vowed to one day open the ultimate bubble tea shop. Tom, feeling emboldened by his recent successes, decided it was time to cash in on that promise. He pitched the idea of a joint venture to Dr. Meow, who, unsurprisingly, was immediately on board. After all, what better way for a notorious bubble tea fanatic to secure a lifetime supply?

In the meantime, Tom remembers from the first week class that as the first step in a typical marketing process, he has to conduct a *situation analysis* and analyze the internal and external factors that may affect the business decision and marketing planning for the bubble tea shop.

Assignment Questions:

Question 1. (1) Conduct a situation analysis for Tom's new bubble tea shop. Discuss what each C is about in general terms, then further discuss each C in the context of bubble tea business in Canary Wharf. (2) What would be the next steps in the marketing planning process for Tom to launch the bubble tea shop? (open discussion question; **16pts**; 500 words)

- company (2pts)
- customers (2pts)
- competitors (2pts)
- collaborators (2pts)
- context (2pts)
- Discussion on the next steps in the marketing planning process (6pts)

2 Customer Acquisition (33 pts)

Now, Tom would like to evaluate the financial feasibility of the business. From the Marketing Analytics module, Tom learned that break-even analysis is a common tool for marketing managers to evaluate the financial feasibility of a marketing program. Nowadays, with better access to customer level data, marketing managers can calculate customer lifetime value (CLV) as a more powerful tool to guide marketing decisions. Such calculations do not always require complex software applications; they simply require estimates of certain customer metrics, such as the cost of contact, the likelihood of purchase, the purchase margin, and the churn rate. A business can then make critical calculations about its target customers and the profit potential of various marketing efforts using this data.

Tom expects the bubble tea shop to cater to two primary segments of customers: (1) bubble tea enthusiasts like Dr. Meow who would purchase regularly (hereinafter referred to as foodies), and (2) casual buyers who may randomly walk in when they are nearby (hereinafter referred to as non-foodies). Since this is a new business and Tom does not have existing data on local residents' preference for bubble tea, he is wondering the most cost-effective way to acquire customers.

First, Tom can hire someone to hand out bubble tea menus to residents in the neighborhood. Each menu costs £0.50 to produce, and Tom would pay a labor cost of £0.10 per menu distributed. Based on experience, such non-targeted marketing generally results in a relatively low response rate of approximately 2%.

Second, Tom is contemplating the purchase of a customer list from a Food & Beverage consulting agency for £0.60 per name. Tom would mail the bubble tea menus to customers on the list, and the postage costs £0.10 per customer through Royal Mail second class. The agency claims the list targets "foodies," though Tom is aware that such lists are often sold to multiple clients and may not be exclusive. Based on the agency's projection, such targeted mailing can generally result in a higher response rate of approximately 10%. However, the agency also warns that the list may contain some outdated or incorrect information, which could affect the actual response rate. Considering these factors, Tom decides to take a conservative approach and assume the actual response rate would be 5%.

Third, Tom also considers search engine marketing (SEM) as a potential customer acquisition channel. He plans to bid for the keyword "tea", "bubble tea", and "drink" on Google for users located in the Canary Wharf area. The cost per click (CPC) is on average £0.50. Based on industry benchmarks, he expects 0.5% of web users who use Google search will see the ads. Of these ads-exposed users, 20% are expected to click the link to view the menu. Among those who see the menu, 25% would eventually visit the store and make a purchase.

> ! For all calculation questions
>
> - Use R to do all the calculations
> - Do not directly use the raw numbers in the intermediate steps, but use R objects to represent the values, like what we did for case studies in class.
> - Please also explain each step of your calculations with code comments `# ....` These comments will count towards your marks.
> - You can use as many code blocks as you need
> - On the answer sheet, some variables have been pre-defined as placeholders for you to use.

Please make sure to stick to these variable names for your calculations, as the values of these variables will be printed out for marking. Of course, you can define additional variables as needed.

Assignment Questions:

Question 2. Use R code blocks to compute the customer acquisition costs for the three customer acquisition methods. Use `CAC_blanket` to denote the CAC for non-targeted method;[1] use `CAC_targeted` to denote the CAC for targeted mailing method; use `CAC_SEM` to denote the CAC for search engine marketing acquisition method. (**9pts**)

Question 3. Discuss the pros and cons of each of the three acquisition methods. You can refer to external sources to enhance your discussion (please remember to cite your sources if used) (**12pts**; 300 words)

- Pros of each acquisition method (6pts)
- Cons of each acquisition method (6pts)

Question 4. Based on the pros and cons discussed in the above question, now it's time to determine when to use which method. Discuss which acquisition method Tom should choose under what circumstances and explain why. (open discussion question; **12pts**; 300 words).

3 A Marketing Survey to Estimate Customer Metrics (18pts)

Tom has tentatively determined to use SEM channel to acquire customers in a targeted manner for the initial customer base building; he can then determine the customer lifetime value to decide whether it would be a profitable business to set up. To do the calculation and gain the necessary metrics for the CLV calculation, Tom commissioned a customer survey from the F&B marketing consulting company.

The marketing agency provides the survey results from 1000 local residents who have claimed to have purchased bubble tea in the past 6 months. The digital survey was conducted on iPad by intercepting customers outside a popular bubble tea shop Heytea in Canary Wharf during weekday lunch hours. The data file is named `survey_data.csv`. The survey was designed to collect data on customer purchasing habits, which is crucial for calculating the Customer Lifetime Value (CLV). The survey asked the following questions:

- `foodie`: Would you consider yourself a bubble tea enthusiast (foodie)? (1 = Yes, 0 = No)
- `purchase_frequency`: On average, how many times do you purchase bubble tea in a month? (enter a number)
- `average_spend`: On average, how much do you spend in each visit of a bubble tea shop? (£) (enter a number)
- `retention_rate`: On average, what is your probability of continuing to purchase bubble tea from the same shop next month? (enter a number between 0 and 1)

[1] Such non-targeted marketing is often referred to as blanket marketing, which is a strategy where a company targets a broad audience with the same marketing message, rather than tailoring the message to specific segments or demographics. The goal is to reach as many people as possible, and the approach assumes that the product has wide appeal and doesn't require customization.

Assignment Questions:

Question 5. Based on the case description, discuss any flaw(s) in the survey design and how would you improve the survey design (open question; **8pts**; 200 words)

Question 6. Load the `survey_data.csv` file into R using `read.csv()`. Report the summary statistics for all variables for each customer segment (foodie vs non-foodie). Comment on any noteworthy observations you feel relevant for Tom. (**4pts**)

Question 7. Use `dplyr` data wrangling funtions to compute the following 6 variables: average spending, average shopping frequency, and average retention rate for both foodie and non-foodie customer segments. Note that these values will be used for the CLV calculation in the next Section. (**6pts**)

- `avg_spending_foodie`
- `avg_frequency_foodie`
- `avg_retention_rate_foodie`
- `avg_spending_nonfoodie`
- `avg_frequency_nonfoodie`
- `avg_retention_rate_nonfoodie`

4 Customer Break-Even and Lifetime Value (12pts)

Tom has now acquired the necessary customer metrics from the survey data. To compute the CLV, Tom further collects the following additional information:

- COGS is 45% for a typical bubble tea shop.
- Since there are multiple competitors in the area including YiFang, T4, Lucky Tea, Heytea, and Chatime. Tom decides to take a conservative approach and consider **2 years** as customer life. He also plans to book all revenues **at the end of each month** for the CLV calculation.
- Tom has checked with HSBC and confirmed that the bank is willing to finance his business with a SME loan at an **annual rate of 10%**. If you need to convert between annual rate and monthly rate, please follow the Week 1 Apple case study to do the conversion (please do not use the compound conversion methods outside what we learned in class from Finance or Accounting, or you will get a different answer).
- Since bubble tea may have strong seasonality throughout the year, Tom decides to compute the future cash flows on **a monthly basis**.
- Other than the initial customer acquisition costs, Tom does not plan to invest in additional variable marketing costs in each period at this stage.

  When computing the CLV, please use the the following variable notations:

  - `N`: number of periods
  - `COGS`: cost of goods sold
  - `M`: profit each period from selling products
  - `c`: variable marketing costs each period
  - `g`: profit each period net of variable marketing costs; g = M - c

- `g_seq`: profit sequence for all periods
- `r`: retention rate
- `g_seq_after_retention`: profit sequence after applying retention rate
- `d`: discount factor
- `k`: discount rate
- `g_seq_after_retention_discount`: profit sequence after applying retention rate and discount factor

Assignment Questions:

Question 8. Use R programming to compute the CLV for **foodie customers** using the information given; For `g` you should use the data from the marketing survey in the previous section. Use (`avg_spending` * `avg_frequency`) to compute the average monthly revenue of customers. Use comments `#...` to explain your steps. This exercise is similar to what we have done in Week 2's case study. Discuss whether or not foodie customers are profitable to acquire (**6pts**).

- correct `g_seq` **(2pts)**
- correct `g_seq_after_retention_discount` **(2pts)**
- correct `CLV` **(2pts)**

Question 9. Similarly, use R programming to compute the CLV for non-foodie customers; use comments `#...` to explain your steps. Discuss whether non-foodie customers are profitable to acquire (**6pts**).

- correct `g_seq` **(2pts)**
- correct `g_seq_after_retention_discount` **(2pts)**
- correct `CLV` **(2pts)**

5 A Loyalty Program for Tom's Bubble Tea Shop (21 pts)

Tom is thinking about whether to launch a loyalty program when setting up the bubble tea shop. Under this program, a customer can enjoy a free drink worth £4 after every fourth order (i.e., after 4 purchases, the fifth drink is free). Even if the average frequency may not be an integer from the survey data, you can still compute the *expected* cost of the free drink based on the average purchase frequency. For instance, if the average purchase frequency is 3.6, you can compute the expected cost of the free drink as £4 * (3.6 / 4) = £3.6.

This loyalty program is expected to increase the retention rate of customers. Tom projects that the loyalty program can increase the monthly retention rate of foodies to 90% and the monthly retention rate of non-foodies to 75%. On the other hand, Tom assumes that customers do not change their original purchase frequency, but consume the free drink in addition to their regular purchases.

Question 10. Should Tom go ahead with the loyalty program for the bubble tea business? Explain your codes and calculations in detail. You can use either comments in code blocks or normal texts to annotate your answers. (**9 pts** in total)

- correct coding (3pts)
- correct explanations of codes and calculations (3pts)
- correct final decision and explanation (3pts)

- hint: you would need to re-calculate the CLV for both foodie and non-foodie customers under the new retention rates and the cost of the free drink; then you can compare the overall profitability impact of the loyalty program on all customers to make your decision.

Question 11. Discuss how Tom can use CLV as a customer relationship management tool to guide his future marketing decisions after the shop is established (**12pts;** open question; 400 words; you can follow the customer lifecycle diagram as well as Lecture 2 slides in Week 2 to provide a structured discussion).

Question 12. What name would you give for Tom's new bubble shop ;-) Let your creativity flow—just don't name it MeowMeow Bubbletea because I already called dibs on that in class! (**0pts**)