Class 3 Case Study: Customer Lifetime Value

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Class objectives

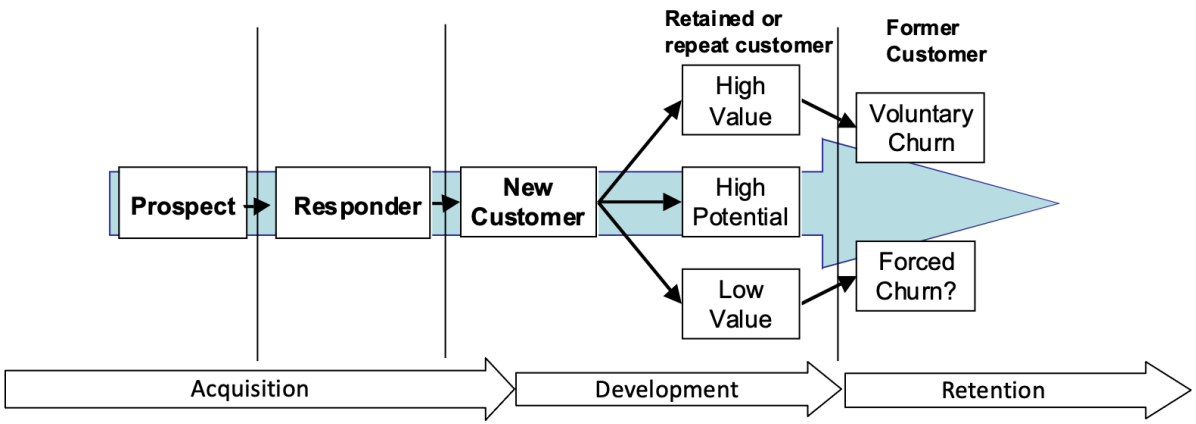
- How to apply CLV calculation in a real-life case study for i-basket grocery chain
- Discuss and see examples of how CLV can be used by marketers to guide marketing decisions

Section 1

Recap: Customer Lifetime Value

Customer Life Cycle

- We learned campaign-centric break-even analysis tools, such as **break-even quantity** and **net present value**. BEA is also referred to as cost-benefit analysis.
  - Costs of business activities
  - Benefits of business activities
- CLV is a customer-centric break-even analysis, which considers a customer as an asset to the company that generates future cashflows
  - Costs: customer acquisition costs (CAC)
  - Benefits: customer generates profits for the company in each period



Customer Acquisition Cost

- A new Bubble Tea shop in Canary Wharf is contemplating whether or not to attract new customers by sending ads leaflets to nearby residents.
  - randomly sending out leaflets: expected response rate of **1%**
  - using names purchased from a marketing agency: expected response rate of **4%**
- A intuitive way of computing CAC: think about to obtain **1 new customer**, how many offers to make; then multiply it with cost per offer

CLV: Formula

$$\text{CLV} = -CAC + \sum_{t=1}^{N} \frac{CF_t * r^{(t-1)}}{(1+k)^t}$$

where $CF_t = M_t - c_t$

- r is the average per period retention rate; $r^{(t-1)}$ is the cumulative retention rate in period t
- N is the number of periods over which the relationship is calculated
- M_t is the profit margin the customer generates in period t, which is typically $M_t = revenue * (1 - COGS)$
- c_t is the marketing costs per period to maintain customer relationship in each period t
- k is the interest (discount) rate for discounting future cash flows; $d = \frac{1}{1+k}$ is the discount factor

Section 2

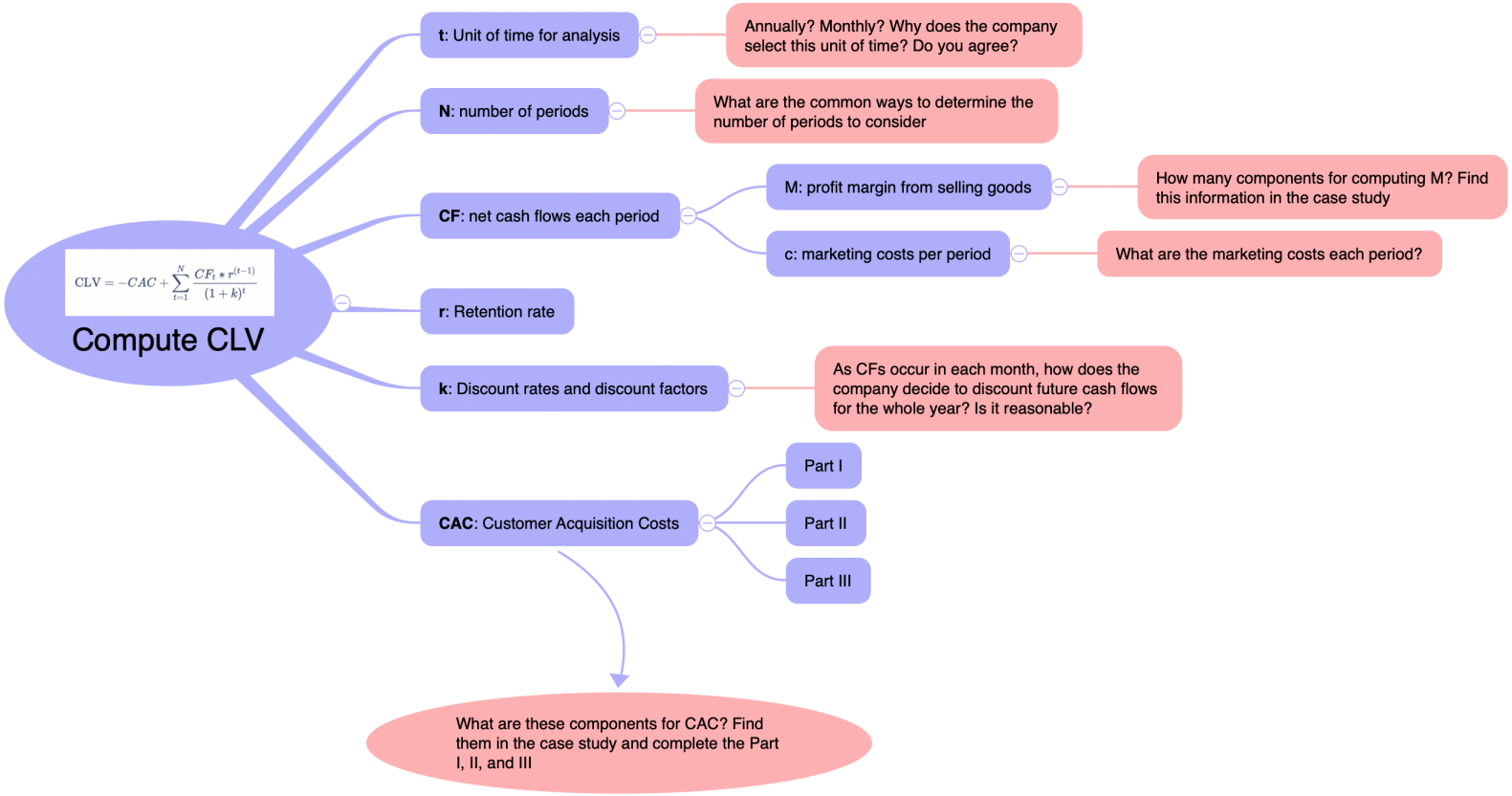
Case Study: i-basket CLV

Situation Analyses for a Grocery Company

Let's use a UK grocery retailer Marks and Spencer as an example

- Company
- Customer
- Collaborators
- Competitors
- Context/Climate

Overview for Computing CLV



Step 1: Determine time unit of analysis

- Time unit of analysis
  - *[...] (find info in the case study)*
    - When should we use monthly analysis or other units of time?

Step 2: Determine number of years

- N: the number of years over which the customer relationship is assessed
  - *[...] (find info in the case study)*
  - How can you do better here?

```
1  N <-
```

Step 3: Compute CF for each period

$CF = M - c$: **gross profit each year, which is the profit from sales M minus marketing costs c**

- *most customers paid the $99 annual membership fee*

```
1 membership <-
```

Step 3: Compute CF for each period

- *40 times each year; each time $100; with profit margin 7% (COGS 93%)*

```
n_visit <-
revenue_each_visit <-
profit_margin <-
## think carefully about how M is calculated, it's tricky ~~~~
M <-
```

- *variable delivery costs each order:*
  - *[...] find info in the case study about delivery costs*
  - Why classified as variable marketing costs? Does it make a difference?

```
deliverycost_each_visit <-
c <- deliverycost_each_visit * n_visit
```

Step 3: Compute CF for each period

- The annual CF from customers CF

```
# CF is the cash flow for one year
CF <-

# create a sequence of CF for N years
profit_seq <- rep(CF,N)
```

Step 4: Compute sequence of retention rate

4. r: retention rate
   - *[...] (find info in the case study)*

```
# retention_rate is the probability of customer staying with us after 1 year
retention_rate <-

# create a geometric sequence of accumulative retention rate for N years
retention_seq <-
```

Step 5: Compute sequence of discount factors

5. k: the discount rate
   - *[...] A yearly discount rate of 10%*

```
discount_rate <- 0.1
discount_factor_seq <-
```

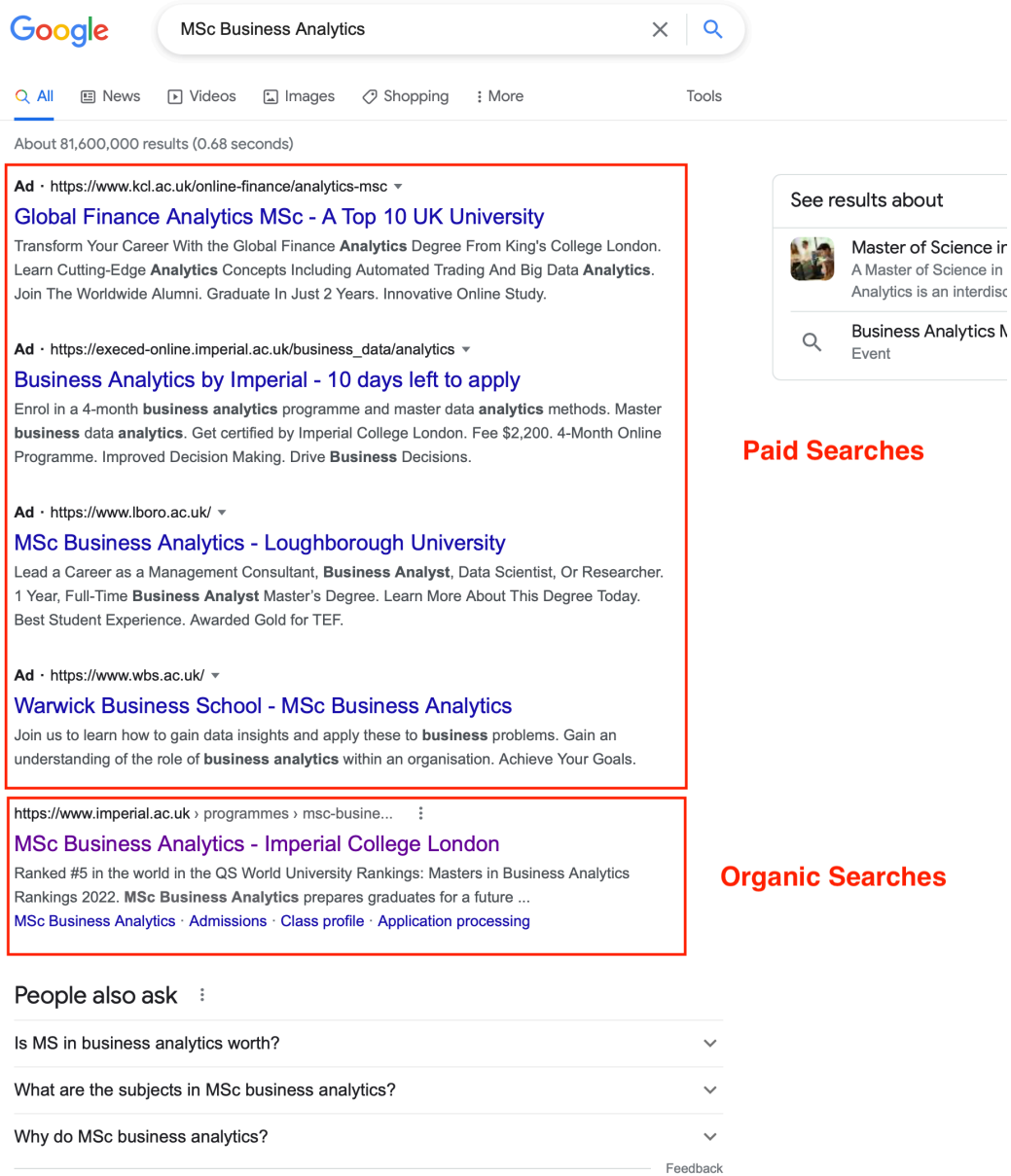
   - *[...] The team decided to take a conservative approach whereby all profits are booked at the end of year.*
     - All profits earned per customer in year 1 need to be discounted once, the profits earned in year 2 need to be discounted twice, and so on

Step 6: Compute customer acquisition costs

6. What does the CAC include in the case study?

[...] (find info in the case study)

Paid Search Advertising (Search Engine Marketing, SEM)



- Brands/companies (Uni)
  - bid on keywords
- Advertisers (Google)
  - decides listings
- Customers
  - paid search (bids-based)
  - organic (quality-based)

Marketing Funnel for Paid Search Ads

Marketing Funnels

A marketing funnel is a model that represents the customer's journey from the initial awareness of a product or service to the ultimate action, often a purchase. This journey is depicted as a funnel to illustrate the decrease in the number of potential customers at each stage–Awareness, Interest, Consideration, Intent, Evaluation, and Purchase - each representing a different stage in the customer's journey toward transaction.

Step 6: Compute customer acquisition costs

CAC Part I: Costs of paid search ads to get 1 new member.

- [...] *The click-through rates varied across these digital platforms, but hovered around 1-2%.*
  - How to incorporate this information?
- [...] *a fifth of those who clicked on an ad were willing to give the service a try*
  - How many clickers do we need for 1 new "trier"?

```
# clicker_to_trier_rate is the % of trier customers from clickers
clicker_to_trier_rate <-
```

- *[...] 20% of those that signed up for the free trial ended up becoming members*
  - How many triers do we need for1 new member?

```
# trier_to_member_rate is the % of a new member from triers
trier_to_member_rate <-
```

Step 6: Compute customer acquisition costs

- How many clickers do we need for 1 new member?

```
n_clickers_for_1newmember <- (1/clicker_to_trier_rate) * (1/trier_to_member_rate) # 5 * 5 =
```

- Finally, based on the the cost per click information, we can compute the total click costs to get 1 member.

```
total_cost_clicks <- 0.4 * n_clickers_for_1newmember # 0.4 * 25
```

Step 6: Compute customer acquisition costs

CAC Part II: total costs of $15 promo for first order each trier customer

- What is the total promo cost for these "trier" customers' first order?

```
promo_first_order_each_trier <- 15

total_cost_promo <- promo_first_order_each_trier * # promotion amount = $15
  (1 - profit_margin) *    # 7% profit margin
  (1/trier_to_member_rate) # num of triers = 5
```

Step 6: Compute customer acquisition costs

CAC Part III: total costs from selling groceries

- For each trier, 2 visits , the profits from the 2 visits are:

```
profit_each_trier <-  revenue_each_visit * #$100 per visit
  profit_margin * # 7% profit margin
  2 # a trier shops twice
```

- For each trier, the 2 visits are free of delivery charges, which are marketing costs to i-basket

```
deliverycost_1st <- 5 + (revenue_each_visit + promo_first_order_each_trier) * 0.035
deliverycost_2nd <- 5 + revenue_each_visit * 0.035
deliverycost_each_trier <- deliverycost_1st + deliverycost_2nd
```

- For each trier, compute net marketing costs from the 2 visits (marketing costs - earned profits)

```
netcost_each_trier <- deliverycost_each_trier - profit_each_trier
```

- Total net profits from all 25 triers

```
totalcosts_from_all_triers <- netcost_each_trier * (1/trier_to_member_rate)
```

Step 6: Compute customer acquisition costs

6. CAC = total costs for customer ad clicks (for all clickers) + total costs of $15 promo (for all triers) + total costs of selling groceries (for all triers)

```
CAC <- total_cost_clicks + total_cost_promo + totalcosts_from_all_triers
```

Step 7: Compute CLV

7. Compute the CLV based on the CLV formula (Table A)
   - 7.1 Revenues, variables costs, and profit for the next 5 years

```
profit_seq
```

   - 7.2 Apply retention rate

```
profit_seq_after_churn <- profit_seq *
```

   - 7.3 Apply discount factor

```
profit_seq_after_churn_discount<- profit_seq_after_churn *
```

   - 7.4 Compute CLV by summing up future expected profits

```
CLV <- sum(profit_seq_after_churn_discount) - CAC
```

Section 3

CLV for Marketing Decisions

CLV as a Key Management Tool

We can use CLV as the key managerial tool for evaluating different marketing initiatives!

User Defined Functions in R

A **User Defined Function** (UDF) in R refers to a function created by the user, as opposed to built-in functions, to perform specific operations or actions. UDFs are useful for automating and coding specific tasks that aren't covered by R's rich set of built-in functions, allowing the user to specify exactly what the function should do.

1. **Function Name**: The user decides the name of the function.
2. **Function Body**: Contains the code that performs the operation.
3. **Arguments**: (Optional) Values that can be passed into the function to influence its behavior.
4. **Return Value**: What the function outputs after it is called and executed.

Syntax of UDF

```
function_name <- function(arg1, arg2, ...){
    # Code to perform operations

    return(output)
}
```

Use UDF to Compute CLV and Guide Marketing Decisions

1. (To guide customer acquisition) What if the company only offers \$5 for first time purchase? This will save some CAC but the cliker-to-trier rate will decrease to 10%. Please compute the new CLV. Should you go ahead with the proposed change?
2. (To guide customer retention) What if the company increases the annual membership fee to \$119? This will increase revenue from memberships but will also make some customers unhappy so their retention rate reduce to 60%. Please compute the new CLV. Should you go ahead with the proposed change? What if the retention rate reduces to 50%?
3. (To conduct sensitivity analysis; after-class) Due to post-COVID economic recession, new members' spending is uncertain: there is a 60% chance of \$30 revenue per visit, 30% chance of \$40 revenue per visit, and 10% chance of \$50 revenue per visit. What would be the expected CLV for a new member customer?