Class 3 Workshop: Break-Even Analyses and Customer Lifetime Value

Dr Wei Miao

UCL School of Management

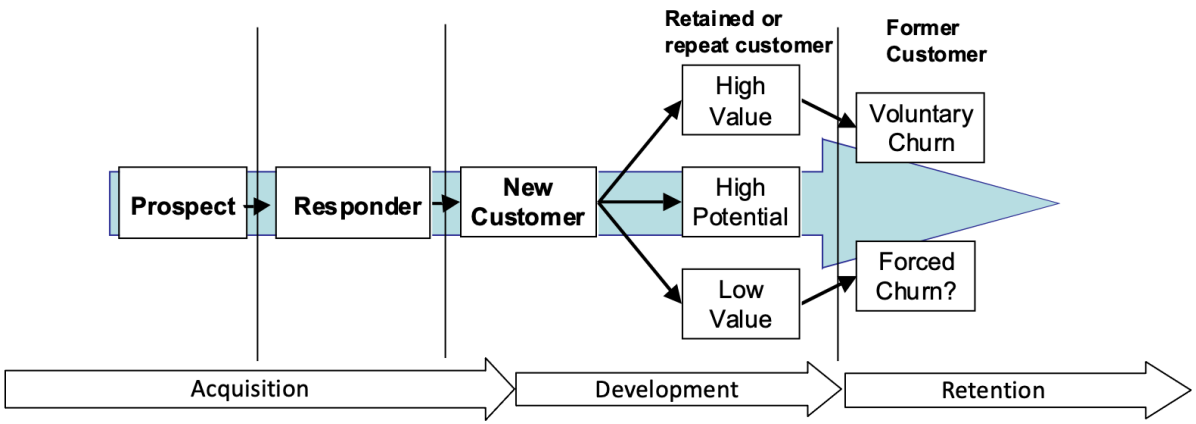
October 11, 2023

Section 1

Recap: Customer Lifetime Value

Customer Life Cycle

- CLV is a break-even analysis from the perspective of **a single customer**, which considers a customer as an asset to the company that generates future cashflows
  - incurs customer acquisition costs (CAC)
  - customer generates profits for the company in each period
  - customer churns at some point in time



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 annual retention rate; $r^{(t-1)}$ is the cumulative retention rate in year t
- N is the number of years over which the relationship is calculated
- M_t is the margin the customer generates in year t
- c_t is the expected cost of marketing communications or promotions targeted to the customer in year t
- k is the rate for discounting future cash flows

Section 2

Case Study: i-basket CLV

Situation Analyses: i-basket

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

Step 1: Determine time unit of analysis

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

Step 2: Determine number of years

- N: the number of years over which the customer relationship is assessed
  - *[...] (find info in the case study)*

```
1  N <-
```

Step 3: Compute profit margin for each period

$CF = M - c$: **gross profit each year**

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

```
membership <-
```

- *40 times each year; each time $100*

```
n_visit <-
revenue_each_visit <-
```

Step 3: Compute profit margin for each period

- *profit margin 7% (COGS 93%)*

```
profit_margin <- 0.07
## think carefully about how M is calculated, it's tricky ~~~~
M <-
```

- *variable delivery costs each order*

```
deliverycost_each_visit <- 5 + 100 * 0.035
c <- deliverycost_each_visit * n_visit
```

Step 3: Compute profit margin 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%*

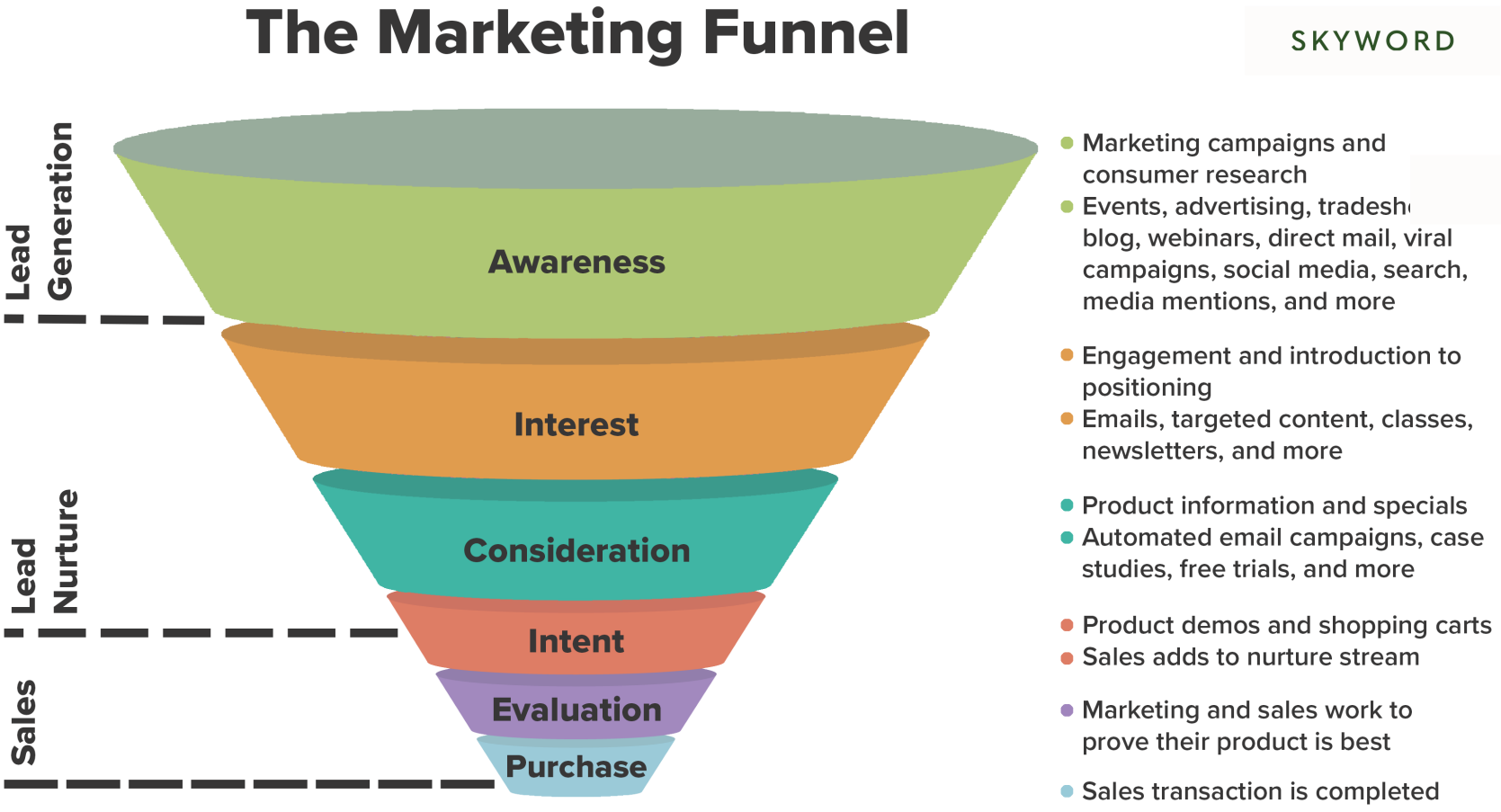
```
discount_rate <- 0.1
discount_factor_seq <-
```

   - *[...] 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. CAC = **total costs for customer ad clicks** + total costs of \$15 promo + total costs of free deliveries

- How the Marketing Funnel Works From Top to Bottom



Step 6: Compute customer acquisition costs

6.1 Total costs for customer clicks

- [...] *a fifth of those who clicked on an ad were willing to give the service a try*
- *[...] 20% of those that signed up for the free trial ended up becoming members*

```
# click_to_trier_rate is the % of trier customers from clickers
click_to_trier_rate <- 0.2

# trier_to_buyer_rate is the % of final customer from trier customers
trier_to_buyer_rate <- 0.2
```

- How many customers need to click the ad to get 1 new customer?

```
n_clicks_1newcustomer <- 1/click_to_trier_rate/trier_to_buyer_rate
```

- Total costs for customer clicks

```
total_cost_clicks <- 0.4 * n_clicks_1newcustomer
```

Step 6: Compute customer acquisition costs

6. CAC = total costs for customer ad clicks + **total costs of $15 promo** + total costs of free deliveries

6.2 total costs of $15 promo for first order each trier customer

- How many customers need to try the service to get 1 new customer?

```
n_triers <- 1/conversion_rate
```

- 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 * (1 - profit_margin) * n_triers
total_cost_promo
```

Step 6: Compute customer acquisition costs

6. CAC = total costs for customer ad clicks + total costs of $15 promo + **total costs of free deliveries**

6.3 total costs from free deliveries

- Assume two visits, the delivery costs for each visit

```
deliverycost_1st <- 5 + 115 * 0.035
deliverycost_2nd <- 5 + 100 * 0.035
deliverycost_each_trier <- deliverycost_1st + deliverycost_2nd
```

- We also make a profit from each trier

```
profit_each_trier <-  revenue_each_visit * profit_margin * 2
```

- Net delivery costs for each trier

```
NetDeliveryCost_each_trier<- deliverycost_each_trier - profit_each_trier
total_cost_delivery <- NetDeliveryCost_each_trier * n_triers
```

Step 6: Compute customer acquisition costs

6. CAC = total costs for customer ad clicks + total costs of $15 promo + total costs of free deliveries

```
CAC <- total_cost_clicks + total_cost_promo + total_cost_delivery
CAC
```

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 * retention_seq
```

   - 7.3 Apply discount factor

```
profit_seq_after_churn_discount<- profit_seq_after_churn * discount_factor_seq
```

   - 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!

Discussion

1. How important is it for i-basket to measure CLV? Can you think of other companies or industries where CLV is particularly relevant?
2. Conduct sensitivity analyses
   - what assumptions have we made here? Are these assumptions sensitive to different values?
3. From our analyses, what suggestions would you offer to i-basket in order to improve its customer profitability? How are you going to evaluate the feasibility of your proposal?
   - acquisition/development/retention

Exercise

1. How much annual membership fee should the company charge to break even?
2. The company is looking to develop a personalized recommendation system that can increase the average shopping basket to $150. Compute the upper bound for the company's investment in developing the algorithm in order to break even? Assume the company has 10,000 customers at this moment.