Building brand awareness in dynamic oligopoly markets

Jingyu Lee
Rutger Ploeger
Outline

- Brand awareness
- Game theory
- Oligopoly market
- Paper
- Conclusion
- Questions
Brand awareness

Brand power

Brand image

Brand awareness

Brand recognition

category of product

Tangible Actual product

Perceived quality

Brand recall

Actual product

Perceived quality
Brand awareness

• Definition

The likelihood that consumers recognize the existence and availability of a company's product or service. Creating brand awareness is one of the key steps in promoting a product.
Brand awareness

Level of building brand awareness
1. Unaware of Brand
   - Customer doesn’t know brand.
2. Brand Recognition
   - Customer knows brand only with hint.
3. Brand Recall
   - Customer knows brand without hint.
4. Top of Mind
   - Customer thinks first of that brand.
Brand awareness

Ways of building brand awareness

1. Sponsor a booth at a trade show
2. Give a speech or participate in a panel discussion
3. Sponsor an online newsletter
4. Write an article
Game theory

• Definition:

Game theory attempts to mathematically capture behavior in strategic situations, in which an individual's success in making choices depends on the choices of others.
Game theory

• Types of games:
  – **Cooperative games**
    • Players are allowed to communicate
    • Players can make coalitions to create consensus in case of 3 or more players
    • Example: Contract negotiations
  – **Non-cooperative games**
    • Players are not allowed to communicate
    • Example: Chess
Game theory

• Types of games
  – Sequential
    • Players have (some) knowledge on earlier actions by other players
    • Example: sports competition

  – Simultaneous
    • Players choose simultaneously
    • Example: rock, paper & scissors
Game theory

• Types of games
  – Constant sum
    • The total sum of benefits for each player is equal regardless of the choices made
    • Example: poker

  – Non-constant sum
    • Gain by one player does not necessarily correspond with a loss by another
    • Example: prisoner’s dilemma
Game theory

- Prisoner’s dilemma

<table>
<thead>
<tr>
<th>Prisoner A</th>
<th>Cooperate</th>
<th>Defect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperate</td>
<td>1,1</td>
<td>0,10</td>
</tr>
<tr>
<td>Defect</td>
<td>10,0</td>
<td>5,5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prisoner B</th>
<th>Cooperate</th>
<th>Defect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperate</td>
<td>1,1</td>
<td>0,10</td>
</tr>
<tr>
<td>Defect</td>
<td>10,0</td>
<td>5,5</td>
</tr>
</tbody>
</table>
Game theory

• Dynamic oligopoly market can be characterized as a non-cooperative, sequential, constant sum game.

• By introducing marketing models, such as the influence of brand awareness, the game changes to a non-constant sum game.
Oligopoly Market

• Definition

  A situation in which a particular market is controlled by a small group of firms.

• An oligopoly is much like a monopoly, in which only one company exerts control over most of a market. In an oligopoly, there are at least two firms controlling the market.
Figure 1 The Four Types of Market Structure

**Number of Firms?**
- Many firms
- Few firms
- One firm

**Type of Products?**
- Identical products
- Differentiated products

**Monopoly**
- Tap water
- Electricity

**Oligopoly**
- TV
- Car

**Monopolistic Competition**
- Novels
- Movies

**Perfect Competition**
- Wheat
- Rice
Oligopoly market

Characteristic of Oligopoly market

1. Recognized interdependence among the sellers.
2. Changes in price, advertising, product characteristics, etc. may stimulate response by rivals.
3. Oligopolies have barriers to entry
4. Rivals may sell either identical (e.g. sulfur, gasoline of one grade, plate glass) or differentiated products (e.g. automobiles tires, cigarettes, TVs)
Oligopoly market

- Each firm selects strategy to win the game. Strategy will be determined why what rival firm does.

<table>
<thead>
<tr>
<th>Marlboro’s Decision</th>
<th>Advertise</th>
<th>Don’t Advertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertise</td>
<td>Marlboro gets $3 billion profit</td>
<td>Marlboro gets $2 billion profit</td>
</tr>
<tr>
<td>Camel gets $3 billion profit</td>
<td>Camel gets $5 billion profit</td>
<td>Camel gets $4 billion profit</td>
</tr>
<tr>
<td>Don’t Advertise</td>
<td>Marlboro gets $5 billion profit</td>
<td>Marlboro gets $4 billion profit</td>
</tr>
<tr>
<td>Camel gets $2 billion profit</td>
<td>Camel gets $4 billion profit</td>
<td></td>
</tr>
</tbody>
</table>
Oligopoly market

• Collusion: In oligopoly market, few firms are agreed to behave like monopoly market.

• Nash equilibrium: When each firm knows other firm’s strategy and select best strategy to max their profit.
Oligopoly market

Kinked Demand curve model

• This typically happens in growth industries or in times of tough competition
• If an oligopolist cuts its selling prices, its rivals are quick to match.
• If an oligopolist increased its selling prices, its rivals would not change their prices.
• The oligopolist’s demand curve will become much more elastic for price increases than for decreases. (Kinked Demand Curve
Oligopoly market

Dominant Firm Model

1. Price Leadership
   • Clearly, one of the firms is so dominant that it is the leader
   • Leader sets price and allows the minor firms to sell all they can at that price; the dominant firm sells the rest

2. Barometric Price Leadership
   • Possible that smaller seller may become price leader after a turmoil in the industry.
Oligopoly Market

• Price
  1. Prices are higher than would prevail under perfect competition
  2. The price is decided by the number of firms in the industry and the barriers to entry.

• Profit
  1. Higher than in perfect competition
  2. Market capitalization of these firms is based on earning expectations that are higher than in perfect competition.
Oligopoly Market

- OPEC – Oligopoly in Oil market.
- Coca Cola, Pepsi – Oligopoly in beverage market.
- SKT, LGT, KTF – Oligopoly in Korean mobile phone market
- Insurance market
- Car market
Paper

• Brand awareness is considered to be very important

• Example: Gillette
  $11 billion in revenues
  $2 billion in earnings
  Sold for $57 billion to Proctor and Gamble
Paper

• Competition was ignored in brand awareness formation models

• Paper developed a brand awareness model that takes other brands into account as well
Paper

• Development of models
• One-brand model by Sethi (1983):

\[
\frac{dA(t)}{dt} = \rho u(t) \sqrt{1 - A(t)} - \delta A(t), \quad A(0) = A_0
\]

- \(A(t)\): awareness at time \(t\)
- \(\rho\): advertisement effectiveness
- \(u(t)\): advertisement effort
- \(\delta\): decay constant
Paper

- Two-brand model by Sorger (1989)

\[
\frac{dm_1}{dt} = \rho_1 u_1 \sqrt{1 - m_1} - \rho_2 u_2 \sqrt{m_1}, \quad m_1(0) = m_{10}
\]

\[
\frac{dm_2}{dt} = \rho_2 u_2 \sqrt{1 - m_2} - \rho_1 u_1 \sqrt{m_2}, \quad m_2(0) = 1 - m_{10}
\]

\[m_i(t)\] market share of brand \(i\) at time \(t\)
Paper

• N-brand model by Naik et al. (2008)

\[
\frac{dA_i}{dt} = \rho_i u_i \sqrt{M - A_i} - \sum_{\substack{j=1 \\ j \neq i}}^{N} \xi_{ij} u_i \sqrt{M - A_j}
\]

\[
M(t) = \sum_{i=1}^{N} A_i(t)
\]

\[
\xi_{ij} \quad \text{effect of brand awareness of brand } i \\
\text{on the brand awareness of brand } j
\]
Paper

• Several optimal strategies for this oligopoly game are derived.

• Using this model, managers can assess advertising effectiveness and predict awareness levels of their own and competitor’s brands.
Conclusion

• Brand awareness is important.

• Most markets are oligopolies.

• Game theory can be applied to forecast brand effects and choosing appropriate strategy.
References

- http://brand-t.tistory.com/tag/recognition
References


References


References


Questions