Marketing Using Social Networks: Practice and Theory

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Lecture Outline

• Practice
  – Marketing Usage of Social Media
  – Measuring Social Media Influence

• Theory
  – Homophily or Influence? An empirical analysis of purchase within a social network
  – Problem
  – Framework
  – Results

Types of social media

• Discussion Forums
  – Amazon, eBay, Usenet Groups, epinions

• Blogs
  – Blogger, blog, Tumblr, Weebly, Xanga, LiveJournal, WordPress

• Wiki’s
  – Wikipedia, Knol

• Social Networks
  – SixDegrees.com (early effort in 1997, shutdown in 2000)
  – Open Social Networks: MySpace, Facebook, Bebo, Club Penguin
  – Vertical Network Sites: LinkedIn
  – Mobile social networks: Dodgeball

• Video-, photo-, and news-sharing sites
  – FlickR, YouTube, Digg
Marketing use of Social Media

- Forrester Research reports US online advertising spending in 2009 was approximately $25b or 12% of overall advertising budgets.
- Most of the online budget went to search and display advertising.
- Social media is only $560m or less than 3% of the US online advertising budget in 2009.
- Expected to almost triple to $1.76b by 2013.

BzzAgent: HTC Windows 7

- **Goal:** Increase Awareness, Drive recommendations, drive trial.
- **Strategy:** Sample Experience
  1. 1000 T-Mobile or AT&T customers (age 18-49 who were not current i-Phone users) were given a free HTC phone to try out.
- **Results:** Reach, High-Volume Activity, Brand Perception
  - Reached 234,000+ people via in-person and digital conversations.
  - Each Agent influenced 235 conversations.
  - Drove activity among core HTC segment: 25-34 year olds, influenced 499 Facebook posts and 651 Tweets.
  - Increased brand opinion by 36 percentage points.
  - Increased advocacy levels by 85 percentage points.

Coke and the 2008 Beijing Olympics

- **Challenge**
  As the official sponsor of the Olympic Games, Coca-Cola needs to find an innovative way to amplify the brand message by connecting young targets to celebrate the first ever Olympics in China, and to bond the brand tightly to this special moment.
- **Approach**
  At the night of March 24, 2008, Coca-Cola China launched a breakthrough digital activation on QQ Instant Messenger (iCoke.qq.com, the IM platform with the largest user base in China), the first ever Coca-Cola Olympic Virtual Torch Relay ("VTR" for short).

OldSpice on YouTube and Twitter

- Old Spice body wash sales increased 107% in one month due to social media marketing (55% over past three months).
Ford Fiesta

- For used a campaign centered on user-generated content to generate buzz and interest around the US launch of its Fiesta model.
- 100 individuals test-drove a Ford Fiesta for six months.
- Document their experiences and travels in the car on social media networks.
- Content was personalized and authentic since it came from actual users.
- Ford generated a 500,000 member email list to further promote the car.

Nike+

- Nike+ community allows users to track their runs and challenge friends to distance and time running competitions.
- In Feb 2011, it had more than 2 million members who logged in over 336 million miles.
- Sponsors the Human Race 10K.
- According to SportsOneSource, Nike's share of running shoes increased from 48% in 2006 to 61% in 2008.

“United Breaks Guitars”

- Dave Carroll, who had been making a modest living as a musician performing pop/folk music with his band, Sons of Maxwell.
- On March 31, 2008, Carroll and members of the band were flying from their hometown of Halifax, Canada, for a week of shows in Omaha, Nebraska.
- During a connection in Chicago, other passengers aboard the flight noticed some very rough handling of cargo, and Carroll's bandmates watched helplessly as Dave's $3,500 Taylor guitar was mishandled by United's baggage handlers.

Social Networks

“This new organizational framework for online communities transformed the earlier topic-driven models like forums to user-centric networks...with the individual at the center of their own community. This more accurately mirrors unmediated social structures, where “the world is composed of networks, not groups”, D.M. Boyd and N.B. Ellison (2007), *Journal of Computer Mediated Communication*.”
Reluctance by Some Brands to Use Social Media

- Cost and time
  - Companies fear that social media may require too much creative staff and too much time.
- Knowledge risk
  - Senior managers are less familiar with new media, so they avoid it.
- Incentive structure
  - Advertising firms with traditional media expertise have strong incentives to maintain the current fee structure.
- Measurement
  - Gross rating points and click-through rates are more comfortable measures than page views or engagement.
- Loss of control
  - Marketers are accustomed to taking a top-down approach to brand positioning and fear loss control of their brands.

Source: Sunil Gupta, Kristen Armstrong, and Zachary Clayton (2011)

Using Blogs to Detect Market Structure

Civic vs. Corolla by mcmanus · Jul 21, 2007 (4:05 pm)
Yes DrFil, the Honda car model is sporty, reliable, and economical vs the Corolla that is just reliable and economical. Ironically its Toyota that is supplying 1.8L turbo ... Neon to his 16 year old brother. I drove it about 130 miles today. Boy does that put all this Civic vs. Corolla back in perspective! The Neon is very crudely designed and built, with no low ...

Audi A6    Honda Civic    252
Audi A6    Toyota Corolla 101
Honda Civic Audi A6    252
Honda Civic Toyota Corolla 2762
Toyota Corolla Audi A6    101
Toyota Corolla Honda Civic 2762

Associative Network

Source: Netzer, Feldman, Fresko and Goldenberg (2011) "Mine Your Own Business"
**HokeyPokey.in**

*A Social Media Experience for an Indian Ice Cream Parlor*

- **Goal**
  - How to use social media to help this ice cream parlor to market itself?
- **Method**
  - Quantify individual's influence in a social network
  - Predict impact of customer's influence
  - Measure net value of the individual's influence
- **Implementation**
  - "Creations on the Wall"
  - "Share your brownies"

Source: V. Kumar et al "Creating a Measurable Social Media Marketing Strategy for Hokey Pokey"

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**Perils of Social Coupons**

- How a Social Coupon Campaign Affected Three Businesses
  - Each of the three businesses sustained a substantial loss immediately after the social coupon launch.

![](chart)

- Can substantially increase new customers
- However, the margin of these new customers is very low (Groupon charges 50% of promotion cost)
- Can take over a year – perhaps even 8 years for beauty salon (if the customer is retained) to recover from initial losses


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**Using Social Media to Influence Activity**

- Disney/ABC wants to know how social media reflects and influences consumers' television viewing
- Goal is to develop metrics of social media to predict and influence audience viewership
- Ultimately wish to influence viewership
Homophily or Influence?
An Empirical Analysis of Purchase within a Social Network

Liye Ma, Alan Montgomery, and Ramayya Krishnan
Research Question

Why?

Potential Reasons

Homophily

Influence

Why Do We Care?

Promotion

Why Do We Care?

Promotion

Refer a Friend?
Research Objective

• Quantify the effect of homophily and social influence in consumer’s purchase decision.

It Can Be Tricky...

• Manski (1993)
  – Correlated effects
  – Endogenous effects
  – Exogenous effects
  – Identification!

What Data Do We Need?

• Consumers who are connected …
• Communicate with one another…
• And purchase products…
• Over time…

• Identification: homophily is static, while influence is dynamic, contingent on communication.
Data

- Obtained from a large Indian telecom company
  - Over 3-month period
  - Cell-phone call records of more than 3.7 million users with
    300 million phone calls in a major city
- Observe:
  - Caller phone number
  - Callee phone number
  - Date and time of call
  - Length of the conversation
  - The purchase records of caller-ringback-tones (CRBT)

Data – Preliminary Analysis

Can we do better?

Maybe, but needs modeling now

Data – Preliminary Analysis

Consumer Adoptions By Degree

Node degree helps a lot (need for social network)!
Exposure To Influence

If A calls B, and B has a certain CRBT, then we know A is exposed to it.

Purchase Incidence: Song-Change

Product Choice: Song

Smooth it out:

\[ E_{g_it,k} = \kappa_{g_it} E_{g_{i-1},t,k} + (1 - \kappa_{g_it}) \tilde{E}_{g_{i-1},t,k} \]

smoothed exposure parameter “raw” exposure

Consumer Decision – Purchase Incidence

Proportional hazard-rate, with time-varying coefficients

\[ S_{g_{it}}(t) = (1 + \lambda_{g_{it}} \cdot t) \exp(-\lambda_{g_{it}} \cdot t) \]

Out-group exposure

\[ \lambda_{g_{it}} = \lambda_{g_{it}} \exp(\gamma_{g_{it},In} E_{g_{it},In} + \gamma_{g_{it},Out} E_{g_{it},Out}) \]

Intrinsic purchase rate

“Intrinsic purchase rate” to influence

“In-group exposure”

“when-to-buy”
Consumer Decision – Product Choice

Discrete-choice model

\[ U_{gi,jt} = X_{gi} \beta + \rho_{gi,ln} E_{gi,jt,ln} + \rho_{gi,Out} E_{gi,jt,Out} + \varepsilon_{gi,jt} \]

Intrinsic utility “Susceptibility” to influence

Out-group exposure

Multinomial Logit

“what-to-buy”

Homophily

In-group correlation of parameters

\[ \theta_i \sim N(\bar{\theta}, \sigma^2_\theta) \]

\[ \left( \begin{array}{c} \theta_{g1} \\ \vdots \\ \theta_{gI} \end{array} \right) \sim MVN \left( \begin{array}{c} \bar{\theta} \\ \vdots \\ \bar{\theta} \end{array} \right), \sigma^2_\theta \begin{bmatrix} 1 & r_\theta & r_\theta \\ r_\theta & 1 & \vdots \\ r_\theta & \vdots & 1 \end{bmatrix} \]

\[ r_\theta > 0 \] Indicates homophily

\[ \theta \] Each of the parameters:

\[ \lambda \quad \gamma \quad \beta \quad \rho \]

Hierarchical Bayesian Model

Population

\[ \bar{\theta} \quad \sigma^2_\theta \quad r_\theta \]

Group/Consumer

\[ \theta_{g1} \quad \theta_{g2} \ldots \theta_{gI} \]\n
\[ \theta_{g1} \quad \theta_{g2} \ldots \theta_{gI} \]

Data

\[ D_{g1} \quad D_{g2} \ldots D_{gI} \]\n
\[ D_{g1} \quad D_{g2} \ldots D_{gI} \]

Model Summary

Two Components about consumer behavior

- When to purchase?
  - Proportional hazard model
  - Relates exposure to others within a group and outside of a group as well as baseline factors to predict when a purchase is made

- What to buy?
  - Multinomial choice model
  - Relates song characteristics as well as in-group and out-of-group exposure to which song genre’s will be chosen

- Framed in a hierarchical Bayesian model to allow for individual variation
Results

Findings

- Strong social influence effects in both purchase-timing and product-choice decisions
- If we distinguish influence of in-group versus out-group we find that former is more important in purchase timing, while the latter is more important in product choice decision
  - E.g., although customers are subject to influence by their friends, this may be moderated by a desire not be perceived as imitating
- Strong homophily effect in the product-choice decision, where customers who are close by tend to have similar product tastes as well as similar susceptibility to influence

Policy Simulation

4-10% Improvement In Purchase Probability
Conclusions

- We are starting to see a shift in marketing emphasis on social media. This is not new, word-of-mouth has always been a dominate way of promotion.
- What is different is that marketers can now directly measure it, participate in it on a massive scale, and influence it.
- Applications and research on social network influence is still early, but results show that it is impactful if used properly.
- It is critical to understand the difference between correlation and causality in this context. Both are present, but have very different implications.