

# User Generated Content: Current research and areas for future exploration

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# Definition

UGC : any form of digital content that is produced by (typically) volunteer end users of an online service or website and (typically) publicly available for consumption by other users of the service or website.

Examples: videos, blogs, discussion forum posts, tweets, photos, product reviews, seller reviews.

Particularly interested in consumer communication about products and services.

Focus here on the structured communication of reputation systems and product reviews, but will say a little bit about online communication more generally.

# UGC- Pew surveys

- 2003 survey:
  - 24% of Adult American had posted some kind of content online (product review, photo, blog post, article comment, etc.)
  - Note: Internet users/all adults = 0.61 x .4 post content/Internet users.
- 2016 survey:
  - 82% of US adults say they at least “sometimes” *read* online customer reviews before purchasing something for the first time.
  - Pew found that 10% of Americans “nearly always” post their own reviews about products or services and 50% “sometimes” post their reviews about products and/or services.
  - 39% of US adults say they have shared their experiences or feelings about companies or products on social media sites.

# Plan for today

- Research that has been done
- Research that *has not* been done

# Reputation systems

- Product\service reviews in online marketplaces.
  - Peer to peer markets: ebay, Airbnb, TaskRabbit, freelancer.com, upwork, etc. plausibly couldn't exist without these systems.
  - Markets where reputation, branding, etc. weak.
  - Markets with both potential moral hazard and adverse selection problems.
  - Certainly an issue offline as well: auto repair shops, non-chain restaurants, etc., but limited empirical scope for economists to study it: (Hubbard(2002) and Jin and Leslie(2009)).

# Reputation systems literature

- Theoretical and empirical literature typically framed around vertical quality and opportunism.
- Inform future buyers about the outcomes of a seller's past behavior.
- Tadelis (2016) focuses on the role of a reputation system in turning a (hopeless) anonymous one-shot game into a repeated game, thus expanding the available equilibria.

# One-sided vs. Two-sided

- Covered well in Tadelis review (2016)
- Literature suggesting problematic retaliation/grade inflation issues in 2-sided systems. (Bolton et. al. 2013, Fradkin et. al. 2015, Horton and Golden 2015).
- Ebay eliminated the buyer side of the feedback system when Paypal became ubiquitous (and therefore buyer performance became trivial).
- If the buyer co-produces the output (Airbnb), buyer side non-trivial and two-sided rating inescapable.

Research idea: Tradeoffs in platform choices designed to mitigate two-sided problems.

# Causal impact of reviews

- Literature both in the context of the reputation systems created by online marketplaces and for online reviews more generally.
- Identification schemes:
  - cross-platform comparison (Chevalier and Mayzlin (2006))
  - Regression discontinuity((Luca (2011))
  - Field experiments (Resnick et. al. (2006)), Godes and Mayzlin (2009))

# Chevalier and Mayzlin (2006)

- Conceptual question: If a cranky consumer posts a negative review of a book on bn.com but not on Amazon.com, would the sales of that book at bn.com fall relative to the sales of that book at Amazon.com?
- We propose a "differences-in-differences" approach. For a sample of books, we measure reviews and a proxy for sales at Amazon.com and bn.com over three time points. We examine whether a change in the number and valence of reviews over time for a particular book at one site *relative to the other site* predicts a change in the *subsequent* sales of that book at one site relative to the other.
- Implicitly controls for unobserved book characteristics (same book on 2 sites)
- Implicitly controls for stable taste differences across sites (differences over time).

# Causal impact of reviews

- Impact of reviews on sales pretty well accepted, established.
  - Met the market test
    - Whole industry of review monitoring, response, management.
    - Marketplace for fake reviews
- Still room for a literature on causal impact of reviews on other things.
  - Firm strategy, offline sales, etc.

# Are reviews systematically biased?

- Reciprocity bias: Cabral and Hortacsu (2010), Fradkin et. al. (2015)
- Promotional behavior bias: Mayzlin, Dover, and Chevalier (2014), Luca and Zervas (2015)
- Positive selection: Hitt and Li (2008), Horton (2014), Nosko and Tadelis (2015)
- Systematic review dynamics over time: Li and Hitt (2008), Godes and Silva (2011), Moe and Trusov(2011)

# Fake reviews

- Positive review for own product.
- Negative review for substitute product.
- Positive review for complementary product.

## Potential welfare effects

- Consumers believe reviews and use reviews and make suboptimal choices.
- Consumers distrust reviews and ignore reviews with helpful information and make suboptimal choices.

# Primary challenge: difficult (if not impossible) to tell the real from the promotional reviews



msextont...  
New York City,  
New York  
1 review

**“If you are traveling to the area; this is a must stay!”**



Date of review: May 4, 2011

I arrived at the Omni New Haven last Friday evening and was greeted by one of the hotel staff, who immediately recognized that I was driving an all electric car and directed me to the “Juice Bar” where my Tesla Roadster could replenish its lost energy. That was just the beginning, upon checking in at the front desk I was amassed that they knew exactly who I was (the valet takes credit for that) and within a few minutes I was off to my room. My room was nicely decorated, very warm with that at home kind of feeling, after 10 minutes or so, there was a knock at the door; it was room service greeting me with a batch of warm chocolate cookies... If you are traveling to the area; this is a must stay, especially if you are driving a plug-in electric car. My compliments to the Omni Hotel and its entire staff!

Reviewer ratings for this hotel:

Value	Service
Rooms	Sleep Quality
Location	
Cleanliness	

Date of stay: April 2011

Visit was for: Business

Solo Traveler

Member since: May 04, 2011

Recommended by this reviewer? Yes



Conferen...  
New York, NY  
1 review

**“If you're a group - you won't like the Omni”**



Date of review: Sep 30, 2008

1 person found this review helpful

I was part of a large conference of 400 that stayed at the Omini and I delt directly with the hotel staff. They made unexpected and unreasonable financial demands of us the day that the conference began and said they would cancel it all if we didn't pay immediately. We had been planning the event for a year and believed that we needed to pay a deposit up front and then the rest of the balance at the end of the conference. It caused a lot of stress and taking time that we didn't have to meet their demands that we pay everything in full the day the conference began. If they had stated this to us ahead of time (a week, if not months) then it could have been a lot different.

My advice: do not trust the staff at the Omni!

Reviewer ratings for this hotel:

Value	Service
Rooms	Business service (e.g., internet access)
Location	
Cleanliness	

Date of stay: April 2008

Visit was for: Business

Traveled with: Large group or tour

Age group: 35-49

Member since: September 30, 2008

Recommended by this reviewer? No

# Overview: Mayzlin, Dover, Chevalier (2014) empirical strategy

Diff-in-diff set up.

- Exploit the differences between websites with different policies regarding review posting.
- Hotel units with neighbors versus hotel units without neighbors.
- Hotel units with a high incentive to post (positive) fake reviews versus those with lower incentives.
  - Incentives derived from ownership structure
- Hotel units with neighbors with a high incentives to post (negative) fake reviews versus hotel units with neighbors with lower incentives.

# Cross-platform trick

- Chevalier and Mayzlin (JMR, 2006 Amazon vs. Barnes & Noble)
- Mayzlin, Dover, and Chevalier (AER, 2014 Tripadvisor vs. Expedia )
- Chevalier, Dover, and Mayzlin (MS, forthcoming, Tripadvisor/Expedia vs. Hotels.com, Priceline).

Research idea: Use matched objects across platforms to isolate a platform design issue and/or causal effects.

# Fake reviews

Research ideas:

Get all the way to consumer processing of reviews, welfare.

Do something with the strength of substitutes and complements.

# Who posts reviews and why?

- See survey Berger (2015)
  - impression management
  - emotion regulation
  - information acquisition
  - social bonding
  - persuasion
- Impact and ability to influence the audience.
  - Wu and Huberman (2008)
  - Moe and Trusov (2011)
  - Zhang and Zhu (2011)
  - Proserpio and Zervas (2017); Chevalier, Dover, and Mayzlin (forthcoming)
- Negative feedback particularly difficult to elicit
  - Nosko and Tadelis (2014)

Research ideas: Dynamic quality vs. static quality environments.  
Experiments on making reviewing more/less satisfying.

# Limitations to the literature

- Little on relationship between reviews/other UGC and more traditional IO/Policy concerns
  - Market structure, product innovation, product design price competition.
- In Econ & Marketing (but not CS): Substantial focus on quantitative review summaries (stars)
  - Challenge: bridge unstructured textual data created by UGC and quantitative inputs to IO/policy analysis.
- Little on commerce-related online communication not in the form of product reviews
  - One exception: Gans, Goldfarb, Lederman (2016) on customers tweeting at airlines and airlines incentive to respond.

# Possible research avenues

- How does existence/proliferation/nature of UGC *drive* variables of interest in IO/policy?
- How can UGC be used to *measure* variables of interest in IO/policy?

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- How does existence/proliferation/nature of product reviews/UGC *drive* variables of interest in IO/policy?
- How can UGC be used to *measure* variables of interest in IO/policy?

# Market Structure

- Intuition from Bar-Isaac, Caruano, Cunat:
  - More product information (lower search costs)
    - Superstar effect
      - Consumers more likely to find the “best product”
      - Encourages more-advantaged firms to choose broad designs
    - Niche effect
      - Consumers are more likely to buy better-suited products
      - Induce more firms to choose more niche designs
  - Search costs and comparison impacts both markups and product design.

# Bar-Isaac, Caruano, Cunat

Consumer  $i$ 's utility from firm  $j$ 's product:

$$U_{ij} = v_j + \varepsilon_{ij} - p_j$$

Firm can choose  $p$  and the distribution of  $\varepsilon_{ij}$ .

Broad and modest--- broad product.

Short and high – niche product.

What happens as the cost of learning  $p$ ,  $v$ , and  $\varepsilon_{ij}$  fall?

Can lead to a nonmonotonic relationship between search costs and prices.

# Empirical findings

- Relationship between existence of ecommerce platforms in general and product variety, value of variety.
  - Brynjolffson, Hu, and Smith (2010)
  - Quan and Williams (2017)
- Relationship between UGC specifically and product variety.
  - Luca (2011)

# Impact of UGC on quality provision

- Quality improvements
  - Klein, Lambertz, Stahl (2015)
- Reviews and market outcomes in a multitasking framework.
  - Example: patient reviews of doctors

# What have we missed

Consumer  $i$ 's utility from firm  $j$ 's product:

$$U_{ij} = v_j + \varepsilon_{ij} - p_j$$

Product reviews lower the cost of learning about  $v_j$   
---that is effectively what the literature is about.

Product reviews presumably also lower the cost of learning about  $\varepsilon_{ij}$ . The assortment literature looks at that, but not so much the review literature.

# Astonishingly little research

- Reviews/UGC and the provision of *horizontal* quality information.
  - Render the undifferentiated differentiated.
  - Allow for creation/discovery of niche products.
  - To what extent do product reviews on sites like Tripadvisor allow the creation of niche products or to what extent do they just disintermediate an older information provision sector (travel agents, Zagat, Fodors, etc.)?
  - Does making information available sharpen or dull competition?
  - How do consumers with different preferences use reviews to obtain information about product characteristics?
  - Are there platform design decisions that would use UGC to do a better job matching consumers to products that consumers would like?

Research idea: This.

# Possible research avenues

- How does existence/proliferation/nature of UGC *drive* variables of interest in IO/policy?
- How can reviews/UGC be used to *measure* variables of interest in IO/policy?

# Measurement of characteristics

- Inputs to demand analysis
  - We typically use introspection/data availability to choose characteristics to include in models.
  - UGC contains rich information about characteristics that consumers evaluate.
    - Or at least a selected set of consumers.
  - Closest paper: Archak, Ghose, Ipeirotis (2012)

# Measurement of characteristics

- Challenge: Bridge from textual content to quantitative data required by demand/IO models
- Possibility: Import tools from giant/growing CS literature on textual analysis.
  - Example: Latent Dirichlet Allocation
    - HB model- given a set of documents, learn the latent topics underlying the set and find words associated with topics.
- Idea: use characteristics derived from product reviews in demand estimation rather than just data like Horsepower, engine size, etc.

# Second choice/Close competitor modelling

- Anything like second choice data helpful in demand system modeling (see BLP 1998)
- Textual analysis of UGC can be used for “brand associative network” (see Netzer et al 2012).
  - In reviews/blog posts about product x, what other products are referred to and how many times?

# Measures of heterogeneity

- Harder: measurement of disagreement/ heterogeneity of preferences over specific characteristics.
- Even harder: measurements of the distribution of the heterogeneity.

# Possible research avenues

- How does existence/proliferation/nature of UGC/reviews *drive* variables of interest in IO/policy?
- How can UGC/reviews be used to *measure* variables of interest in IO/policy?

Questions? Comments?