Harnessing the Crowd for Business Gain: Applications of Online Crowdsourcing Platforms

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Is crowdsourcing a new phenomenon?

Oxford English Dictionary was crowdsourced in the late 1800’s.

An open call to the community was made, and over several decades tens of thousands of volunteers submitted definitions.

Agenda

• Amazing Times
• Collective Intelligence & Crowdsourcing
• Information Markets
• Open Innovation & Crowdsourcing Ideation
• Crowd services
• Crowd funding
• Crowd platforms
• Key Challenges and Issues

Amazing Times

– Simultaneous exponential growth in capabilities
  • Computing power
  • Communications
  • Data storage

– Exponential reach
  • Five billion global citizens with cell-phones
  • Billions of embedded sensors
  • One billion individuals on the still evolving social-graph
There is a big wave out there: cloud, big data, mobility, social computing, etc. Great time for universities to partner with industry to advance the IT field!

Collective Intelligence

Crowds

Social Networks

More than ever IT is enabling
- Knowledge sharing
- Content creation
- Social Interactions
• Diversity of Opinions
• Independence
• Decentralization
• Specialization
• Aggregation

What is being done?
Create
Decide

Who is doing it?
Hierarchy
Crowd

Why are they doing it?
Money
Love
Glory

How is it being done?
Create
- Collection
- Contents
- Collaboration

Decide
- Group
- Voting
- Consensus
- Averaging
- Individual

Making Sense
Collective Intelligence Genome Framework (Malone et al 2010)
• Crowdsourcing is the emergence of commercial firms that rely on **distributed innovation systems** as their core value proposition and business model.

Why crowdsourcing works

• Technological advances are breaking down cost barriers that typically separate amateurs and professionals.
  – Examples?

• Technology has also allowed the labor pool to exponentially increase.
  – Location of laborers doesn’t matter.

• Labor costs are typically lower, and intrinsic compensation can often be substituted for extrinsic compensation.

• Aggregation of workers efforts and distributed approaches often lead to better outcomes.
Crowdsourcing Business Models

- Social media and Internet technologies allow companies to access and aggregate opinions and skills of the crowd.

- Find the best match in the crowd
  - Use Internet and social media technology as a broker to better match service/product providers and buyers.

- Let the crowd work together to solve your problem
  - Provide mechanisms that allow people to collaborate
  - Aggregate opinions and collaborations to provide value.
Applications of Crowdsourcing

• Information Markets
• Open Innovation and Crowdsourced Ideation
• Crowd services
• Crowd funding
• Crowd platforms

Information Markets

• Speculative markets with uncertainty
  – prediction markets, decision markets, virtual markets, preference markets
• Often created to predict results about uncertain events in the future
  – e.g., 2012 U.S. president will be a democrat, swine flu to cause fatalities in the US, total sales number for HP for the next quarter
• Virtual securities (contracts) created whose final value tied to a particular event
  • $1 if next president a democrat; $0 otherwise
• Participants buy/sell securities at going prices
• Prices represent aggregate opinions and probability of events occurring.
Intrade Election Market

47% Video

Hollywood Stock Exchange
Interest in Information Markets

• Public markets

- Intrade
- Poolitics
- Hollywood Stock Exchange
- SimExchange
- IEM
- Tradesports.com
- Newsfutures

• Internal markets

- Yahoo!
- Microsoft
- Best Buy
- HP
- GE
- Google

Does It Work?

• Yes for prediction …

- Evidence from real markets, laboratory experiments, theory indicate markets are good at gathering information and combine it appropriately
  - IEM predict election outcomes better than polls (Forsythe 1992, 1999; Berg 2001; Pennock 2002)
  - HSX predict opening weekend box office sales and Oscar nominees quite accurate (Wolfers and Zitzewitz, 2004; Pennock et al., 2001)
  - Sports betting markets provide accurate forecasts of game outcomes (Gandar 1998; Thaler 1988; Schmidt 2002)
  - Laboratory experiments confirm information aggregation (Plott 1982, 1988, 1997; Forsythe 1990; Chen, EC-2001)
Predictive Power of IM

- U.S. presidential election
- Predicting movie success

Source: Wolfers and Zitzewitz, 2004, Data from 4 past presidential elections on IEM
Source: Wolfers and Zitzewitz, 2004, Data from 289 movies, 2000-2003, on HSX

A Large Company’s Quest for Innovation

Pre-Valuation Evaluation Process

Prospecting
- Identify unique and disruptive technologies, 24-48 months from market
- Communicate with over 200 up-and-coming technologists 8 times per year, totaling 1600 technologists

Valuation/Opportunity Assessment
- Employ systematic methodologies to determine potential tech value while considering short- and long-term risks

Evaluation
- Test, use, and demo tech.
- Feedback findings

Recommendation
- Communication to tech business development
- Use case
-Provide and demonstrate tech to technologist, students, vendors, and media
Prospecting for Ideas, Innovations, Emerging Technologies, etc.

- Reach of global economy
  - Existing knowledge stock does not go as far
  - Need to constantly replenish
- Low cost, rapid innovation is the name of the game
- Inside versus outside creation
- R&D versus “open” innovation

<table>
<thead>
<tr>
<th>Then</th>
<th>Now</th>
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<tbody>
<tr>
<td>Superior human capital – hire best people, motivate, develop, and retain</td>
<td>Openness, Sharing: - Best ideas and talent often reside outside the firm</td>
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<tr>
<td>Hierarchies as the key structure of value creation</td>
<td>Distributed development, Peer production.</td>
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<tr>
<td>Websites, Clicks, Eyeballs. Publish and browse</td>
<td>Participation - Communities, - Engage and co-create</td>
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Prospecting: 3Cs of Open Innovation

- Crowds
- Contests
- Community

Global Crowds on the Web

- Internet is the Platform
- Low participation costs - amateurs compete with professionals
- Low search costs
- Digitization
- Global Reach
Contests as Motivation

- Open Calls
- Incentives (money, fame, and respect)
- Excitement of participation
Contests

- **2009 DARPA Network Red Balloon Challenge**
  - prize competition for exploring the roles
    - Internet, social networking → play in the real-time communications, wide-area collaborations

The MIT Red Balloon Challenge Team won the competition in under 9 hours. The MIT team used a technique similar to multi-level marketing to recruit participants, with the prize money to be distributed up the chain of participants leading to successful balloon sightings, and all prize income remaining after distribution to participants to be given to charity. The team's strategy for public collaboration in finding the balloons was explained on their website:

We're giving $2000 per balloon to the first person to send in the correct coordinates, but that's not all — we're also giving $1000 to the person who invited them. Then we're giving $5000 to whomever invited the invited, and $250 to whoever invited them, and so on... (see how it works). It might play out like this: Alice invites the team, and we give her an invite link like http://balloon.media.mit.edu/invite. Alice then sends her link to Bob, who uses it to join the team as well. We make a http://balloon.media.mit.edu/invite link for each, who passes it to Facebook. The friend Carol sees it, signs up, then forwards about http://balloon.media.mit.edu/invite to Dave. Dave sees Carol's link to join... then signs up. One of the DARPA balloon teams was the first person to report the balloon's location to us, and the MIT Red Balloon Challenge Team was the first to find all 15. Once that happens, we seed Dave $1000 for finding the balloon. Carol gets $500 for inviting Dave, Bob gets $50 for inviting Carol, and Alice gets $250 for inviting Bob. The remaining $250 is donated to charity.


Communities generating ideas

- **Membership has its privileges**
  - Competition
  - Feedback and support
  - Learning and experience
  - A sense of belonging

- Open or inside the (large) company
  - GE
  - Raytheon
Threadless Community

Sustainability is key

Chen, Goes, Marsden and Zhang, 2009
Interesting questions

- Participant behavior
- Longevity and sustainability
- Designing the platform
  - Visibility of submissions
  - Contest Feedback
  - Incentive Structures
  - Measuring Quality

Open Innovation Tradeoffs

Distributed models of innovation are notoriously hard to control, manage, and commercialize.

When companies look outside their own boundaries, they can gain better access to ideas, knowledge, and technology than they would have if they relied solely on their own resources.
Crowd Services

• In addition to innovation, many new companies offer crowd-based services
  – Work that can be easily outsourced
  – Digital footprint makes transfer of work artifacts easy
  – Find talented workers anywhere in the world
  – Cost is often much less
  – But… mechanisms are needed to ensure quality
  – Double-sided markets
- Reverse Auction
- Tech services
- Virtual Assistants
- Acquired by Freelancer.com
Crowd Funding

- Collective financing to support efforts initiated by people or organizations.
- Lots of small investors, spreading the risk
- Over 450 crowdfunding platforms
- Applications
  - Supporting creative works
  - Startup investments
  - Lending to individuals or organizations
  - Non-profit/philanthropy

- Abuse?
- Risks of reputation and IP?
- Donor exhaustion?
Vitendo Bora is a group of 21 farmers in Chisite District represented by Jeff. The group has 9 women and 12 men. Jeff is on the right of the photo with his hand raised. Farming inputs will be delivered to him on credit consisting of the necessary materials to plant 1/2 acres of sweet potatoes, millet and sugarhut. Jeff first enrolled with One Acre Fund.

99% Repayment Rate

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Latest Stats

As of 12/31/11

$1,831,134,175

Loans funded

$127,030,650

$132,886,609

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Start Investing
Enterprise Crowd Platforms

- Software companies offering platforms for companies to manage their own crowdsourcing efforts.
  - Information Markets
  - Ideation platforms
  - Group Decision Making: Voting and polling
  - Collaboration tools
- Hosted and local solutions
- Internal and external applications
Amazon's Mechanical Turk

Mechanical Turk is a marketplace for work. We give businesses and developers access to an on-demand, scalable workforce. Workers select from thousands of tasks and work whenever it's convenient.

39,357 HITs available. View them now.

Make Money by working on HITs
HITs - Human Intelligence Tasks - are individual tasks that you work on. Find HITs now.

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- Can work from home
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- Get paid for doing good work

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- Get thousands of HITs completed in minutes
- Pay only when you're satisfied with the results

Open Source Software Development

SourceForge is your location to download and develop free open source software.
Conclusions

• Crowdsourcing is effective for
  – Division of labor, tedious tasks 
  – Casting a wide net for ideas
  – Aggregating knowledge
  – Finding the best talent at an affordable cost
  – Financing

• Crowdsourcing is quickly becoming a common strategy for large and small companies.

• Going beyond business
  – Crowdfunding to support research
  – Crowdsourcing big scientific problems

General Issues and Concerns

• Incentives
• Participation: initial and ongoing
• Interaction and guidance
• Bias
• Preventing hijacked contests
  – Taco Bell: send Pitbull to Alaska
  – Mountain Dew: “Diabeetus” Green Apple Soda
• Ethical concerns: exploitation?
• Legal issues and liabilities
• Managing the crowd and collaboration process.
Academic Research to the Rescue

Paulo Goes
Department Head
Salter Distinguished
Professor in Technology
and Management

Mingfeng Lin
Assistant Professor
Management Information
Systems

Corporate Research Partners
- Raytheon
- Microsoft
- Sanofi