GE's Imagination Markets - Oct 2007

Christina Lacomb

2007PRE027, October 2007
Public (Class 1)
GE's Imagination Markets - Oct 2007

Christina Lacomb

Computational Intelligence Laboratory, Niskayuna

2007PRE027

October 2007

15

Public (Class 1)

Information market, Idea generation, Brainstorming, Group support system.

Information markets combine the opinion aggregation capabilities of financial markets with the engagement of online games. This presentation discusses the results of the Imagination Market run at GE’s Global Research Center in Niskayuna, NY in the summer of 2005 as well as the results of subsequent Imagination Markets run in 2005 and 2006 for GE businesses.

Manuscript received October 25, 2007
GE’s Imagination Markets

Christina LaComb
GE Global Research
Niskayuna, NY
Imagination Markets

What Are Imagination Markets?

Virtual stock market games where the securities are ideas proposed by the participants

> **Ideas from Everywhere** – supporting potentially thousands of contributors,

> **Ranked Results** – trading results in the automatic ranking of the ideas from best to worst,

> **Real-Time** - Responsive to new information such as the release of a new product line by a competitor,

> **Responsive** - Real-time feedback on ideas as they are generated,

> **Transparent** – High visibility of the ideas and the process to all contributors, and

> **Consensus building** - where all participants have a voice in the ranking process.

Participants:
85 members of the Computing and Decisioning Sciences Laboratory

Duration:
3 Weeks

Ideas generated:
63 new technology ideas generated and ranked by market. Top ranked idea funded for $50K to explore idea.

Incentives:
IPOD & Amazon Gift Certificates for best portfolios

Benefits:
63 ideas formalized and ranked by profitability and viability.
65% participation due to fun-factor.

Subsequent Pilots
5 subsequent pilots across 5 GE businesses; some markets spanning multiple businesses
Imagination Market Process

1. The business poses a question.

2. Participants can then suggest answers. Those answers then are added to the market as securities (if approved).

3. Market participants buy and sell shares of ideas based on how well they believe the idea will contribute to the business objectives.

4. The ideas with the highest VWAP over the last five days of trading are declared the winners.
Markets have resulted in 60-150 proposed ideas, but only about 50 ideas are usually let onto the market.
Market participants seem to favor new ideas over old ideas, but winning ideas have been of both types.
2006 Market: Idea Clustering

Figure 4: Idea Clustering - Many ideas were stimulated by existing ideas in the market

Idea springboarding gives the market the benefits of a large brainstorming session
Incentives

Incentive types:

> Best idea:
  - Funding to allow submitter the opportunity to flesh out (Prototype market only)
  - Small Prizes & Bragging Rights
  - May incentivize manipulation

> Best portfolio:
  - Small Prizes & Bragging Rights
  - Incentivizes “market makers,” which add liquidity to the market
  - Incentivizes speculation, which may cause individuals to abandon their opinion
  - May incentivize manipulation

> Participation Lottery:
  - Lottery Prizes based on # of shares traded
  - Motivates participation without biasing trading behavior.

Prizes desirable to encourage participation. Lottery prizes best able to motivate the “right” behavior.
Validation

• Independent ranking by leadership team
  > Different ranking of the winning idea
  > Overall, not a significant difference between market and leadership ranking
  > Causes:
    – Wishful thinking
    – Differing private information
    – All at once vs. random-selection/appearance of market
  > Number of Ideas: 10=Greater, 1=Less
  > Quality of ideas: 4=Better, 5=Equal, 1=Less

• Business “gut” test

Validation is significant challenge with preference markets.
Participant Survey

How Often Did You Trade (N=53)

- Once or Twice a Week: 32%
- Most Days: 15%
- Every Day: 9%
- Never: 21%

If You Did Not Trade Most Days, Why Not? (N=40)

- Not Enough Time: 73%
- Too many securities to read: 35%
- It wouldn't work: 3%
- I was unavailable (vacation, traveling): 10%
- I couldn't understand how to use the software: 0%
- The prizes weren't adequate: 5%
- Other: 15%

If You Did Not Trade At All, Why Not? (N=11)

- Not Enough Time: 82%
- Too many securities to read: 0%
- It wouldn't work: 9%
- I was unavailable (vacation, traveling): 18%
- I couldn't understand how to use the software: 0%
- The prizes weren't adequate: 9%
- Other: 0%

Internal promotion used to encourage participation.
Typical participation rate is around 15-20%
Participants had more fun and appreciated the visibility. “Not easier” ratings were largely due to short selling, which was resolved in later versions.
Summary

• Fun and novel means to engage employees in innovation
• Allows everyone to be part of the decision making process
• Several design aspects of markets require further research:
  > Effective thin markets
  > IPO process to pre-filter ideas for markets
  > Validation of preference markets
  > Engagement strategies
  > Simplified markets
  > Incentives
  > Cashing out securities during the course of a market
Appendix
### 2005 Prototype Market Design

<table>
<thead>
<tr>
<th>Design Constraint</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participants</strong></td>
<td>All members of the Computing and Decisioning Sciences Technology Center, including lab managers, project leaders, individual contributors, contractors, summer interns, and other support staff. Team members administering the market were not allowed to participate.</td>
</tr>
<tr>
<td><strong>Securities</strong></td>
<td>The market was seeded with five ideas generated before the market opened so there would be securities to trade at the start of the market.</td>
</tr>
<tr>
<td><strong>New ideas (securities) were entered into market throughout the course of the market</strong></td>
<td>There was no limitation on entry of new ideas into the market (e.g., ideas were entered as late as two days prior to market close). Ideas submitted by participants were only screened for similarity to those already proposed.</td>
</tr>
<tr>
<td><strong>Short selling allowed</strong></td>
<td>We felt that traders should be allowed to make a profit from identifying good ideas as well as identifying bad ideas. Therefore, short selling was allowed.</td>
</tr>
<tr>
<td><strong>Security values could range from $1 to $99</strong></td>
<td>Design aspect of the Foresight software.</td>
</tr>
<tr>
<td><strong>All securities IPO’d 100 shares at $50</strong></td>
<td>To help provide an easy way for participants to buy initial shares of securities, we IPO’d all securities at $50 per share. The $50 price was selected since it was the midpoint between the price caps of $1 and $99 and therefore indicated no preference for or against the idea.</td>
</tr>
<tr>
<td><strong>Overall market design</strong></td>
<td>This was done to limit any impact of manipulation and to discourage tournament behavior, the tendency of low-performance players to make high-risk trades at the end of the market in the hopes of raising their net worth enough to qualify for performance-based awards. The best idea was the security with the highest volume-weighted average price (VWAP) during the 5 business days prior to market close. Traders were paid VWAP for securities they owned; this both rewarded traders for owning shares of ideas ranked high by the market and penalized traders for owning shares ranked low. Traders who short sold were paid $100 minus VWAP for the security; again, this rewarded traders for short selling ideas that were ranked low by the market and penalized traders for shorting ideas ranked high.</td>
</tr>
<tr>
<td><strong>Portfolio valuation, as viewed by each participant during the course of the market, was based on the most recent trading price for each security</strong></td>
<td>Design aspect of the Foresight software.</td>
</tr>
<tr>
<td><strong>Market duration: 3-4 weeks (actually ran 3 weeks, 2.5 days)</strong></td>
<td>We did not publicize a specific market close date to mitigate the risk of manipulation and tournament behavior as the close date approached.</td>
</tr>
<tr>
<td><strong>$10,000 initial grant to participants</strong></td>
<td>Initial play money granted to each participant for trading.</td>
</tr>
<tr>
<td><strong>$1000 week stipend to participants</strong></td>
<td>A weekly play money allowance was given to all registered participants to add liquidity as ideas were added to the market. Late registrants all started with $10,000.</td>
</tr>
<tr>
<td><strong>Anonymity was maintained for all participants within the market</strong></td>
<td>Whether suggesting a new idea or trading, all participants were only known to each other through their trader ids. This was to make traders feel more comfortable expressing their true opinion about ideas without fear of retribution from other participants. However, this did not preclude traders sharing identity information outside of the market.</td>
</tr>
<tr>
<td><strong>Weblogs available for sharing information</strong></td>
<td>We wanted participants to share their opinions about the securities in an online discussion format, so we added blogging capability.</td>
</tr>
</tbody>
</table>
## 2005 Prototype Market Design (cont.)

### Incentives & Participation

<table>
<thead>
<tr>
<th>Incentives &amp; Participation</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incentive for best idea: research funding</td>
<td>The reward for the best idea was $50k of research funding to pursue the idea.</td>
</tr>
<tr>
<td>Portfolio value-based incentives</td>
<td>The top two traders (based on portfolio value) received Apple iPods[1]. The next ten traders received $25 gift certificates. Although performance-based rewards have been proven to encourage tournament behavior, we felt that these incentives were necessary to encourage participation (James and Isaac, 2000).</td>
</tr>
<tr>
<td>Lottery incentive</td>
<td>An additional Apple iPod was awarded by random drawing (lottery). Lottery entries were created for each trade so the more a participant traded, the better chance they would have to win the lottery.</td>
</tr>
<tr>
<td>Training sessions</td>
<td>Three training sessions were scheduled during the first week of the market. The purpose of these sessions was twofold: to ensure that participants understood how to trade (particularly, short selling), and to increase participation.</td>
</tr>
<tr>
<td>Incentives for new participants during the course of the market</td>
<td>Due to the low participation in the first week of trading, three random drawings for $25 gift certificates were held halfway through the market: one for current participants, one for registered traders who had not traded yet, and one for new participants.</td>
</tr>
</tbody>
</table>

### Trading parties

In order to boost participation, we held two trading parties for an hour during lunchtime with free lunch provided. Participants brought laptops and traded while chatting about their trading experience and their opinions about the securities. Market administrators were available to assist with questions.

### Limits imposed on traders

<table>
<thead>
<tr>
<th>Limits imposed on traders</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>After-hours trading only</td>
<td>To ensure that the market did not interfere with regular work time, participants were asked to trade before or after work, during lunch, or for only a few minutes at a time during work hours.</td>
</tr>
<tr>
<td>Encouraged to trade honestly and without intent to manipulate</td>
<td>Integrity is important within GE and we used this to encourage appropriate, non-manipulative behavior within the market. All participants had to agree to the market rules upon registration.</td>
</tr>
<tr>
<td>One participant = one user id</td>
<td>Since we were able to base market registration on a standardized company-wide user id, we could force one trader to have only one user id. This helped mitigate manipulation.</td>
</tr>
</tbody>
</table>