VALUING DESIGN

Alice M. Agogino
Mechanical Engineering
UC Berkeley
“Everywhere you look today design has taken on new meaning. Design (is critical) to business. The trick for all business people today is to learn to think like designers.”

- Fast Company magazine, 1999
Metrics for Valuing Design

• Usage
• Performance Ratings (J.D. Power, Consumer Reports)
• Expert Evaluation (IDEA/ Business Week, Consumer Electronics awards)
• Creativity (novelty, variety)
• Financial (stock performance, revenues, sales)
• Process (multidisciplinary team work, human-centered design)
• Societal Impact (environmental, emerging regions)
Nicholas Kirkwood Ankle Boots

Nest: Gizmodo – most popular of 2013

USAGE
USAGE

PERFORMANCE RATINGS
EXPERT RATINGS OF DESIGNS
Prediction Markets for Breakthrough Innovations

Soren Peterson, (Author of Profit by Design), Gamification Based Decision-Making in Breakthrough Innovation
DESIGN PROCESS AND FINANCIAL IMPACT
Early Phases of the Design Process Impact Product Cost

Late changes are costly

IQcontent, 2008
ISO Standard for Human-Centered Design

- Design is based upon an explicit understanding of users, tasks & environments,
- Users are involved through design and development,
- Design is driven and refined by human-centered design evaluation,
- The process is iterative,
- The design addresses the whole user experience, and
- The design team included multidisciplinary skills and perspective.
Benefits of a Well-Managed Product Development Process

% of revenue from new products

% of profits from new products

Source: Product Development Institute, Inc.
Evidence from the Corporate Design Foundation

BusinessWeek IDEA Design Award winners outperform those who didn’t win in stock performance.
Evidence from the UK Design Council

Firms with “design portfolios” outperform those without them in the stock market.
What is the Real Value of Design, Jeneanne Rae, Motiv Strategies & Design Management Institute, 2014
Design Value Index Selection Criteria

1. Publicly trades in the U.S. for 10+ years
2. Scale of integrated design organization & deployment as catalyst for change
3. Growth in design-related investments
4. Design is embedded within the organization
5. Design leadership at all levels
6. Senior-level commitment to design as an innovative resource for positive change
Portfolio of Design-Centric Organizations: Design Value Index

- Apple
- Coca-Cola
- Ford
- Herman-Miller
- IBM
- Intuit
- Newell-Rubbermaid
- Nike
- Procter & Gamble
- Starbucks
- Starwood
- Steelcase
- Target
- Walt Disney
- Whirlpool

What is the Real Value of Design, Jeneanne Rae, Motiv Strategies & Design Management Institute, 2014
Design Increases Revenues, Profit & Exports in the U.K.

- £20+ For every £1 invested in design, businesses can expect over £20 in increased revenues
- £4+ Design increases turnover
- £5+ For every £1 invested in design, businesses can expect a return of over £5 in increased exports
- Design boosts exports

*Design Delivers for Business*, Design Council U.K., 2012
OSOCIETAL & ENVIRONMENTAL IMPACT


“[Quote about sustainability and ethical questions from an Engineering Ethics event at UC Berkeley]
Restoked:
ReSurf the board. Replenish the Earth
New Business Models: WearPact

A socially responsible underwear business that combines students’ passion for the environment with new business models

www.wearpact.com
COMMUNITY CO-DESIGN PROJECTS

Darfur Stove

JustMilk

Zimba

Seguro: Pesticide Protection

CARES: Community Assessment of Renewable Energy & Sustainability

Pinoleville Pomo Nation (PPN) Innovation Workshop

Top Needs

• Learn and Use Traditional Techniques (Cultural Values)
  – Round Shape
  – Natural Materials
• Energy Conservation
• Water Conservation
• Privacy
• Exercise
• Storage
• Safety
• Comfort
• Lower Energy Costs
• Space
Pomo-Inspired Housing
Co-Designed

Co-Built

Co-Evaluated for Impact
Renewable Energy & Water Solutions

- Geothermal heat pumps
- Solar electric
- Solar thermal
- Energy conservations
- Water harvesting
  - Micro-hydroelectric
  - Wind

- Electric Vehicle Green Corridor on Pomo Tribal Lands

Renewable energy-efficient systems were co-designed and built by tribal citizens

Rainwater catchment and grey-water systems reduce vulnerability to water shortages

Smithsonian’s Museum of American Indian Case Study
Impact

• Empowered the PPN to make informed decisions about renewable energy options
• Capacity building in green technologies
• Students were able to develop professional design and communication skills
• HUD funding secured to build culturally inspired sustainable homes and buildings: ~$1.2 Million in 2009
• DOE funding secured to perform renewable energy feasibility studies: ~$120,000
Tribal CARES Partners

- Pinoleville Nation Tribal Council and Members, UC Berkeley Students
- Funding: HUD, DoE, EPA, CITRIS, California Energy Commission


Luce Foundation Video

- Sustainability in Products & Practice: http://vimeo.com/35283830
Pinoleville Pomo Nation

- Rising heating and cooling costs
- HUD-financed housing
- Did not reflect cultural and traditional values
- Drought conditions
Comprehending Place in ParticiPlace
Crowd Sourcing Design

Locations of Designers for Living Cultural Center Competition (37 team registered, 17 submitted)

Living Cultural Center Entries

Amirhesam Mohtasebi
British Columbia, Canada

Studio MTB
California, USA

Daniel Prostak
California, USA

Elsa Dinorah Gil, Santo Domingo, Chi Tai Yu, Tommy Rodriguez
Dominican Republic

Emily Kwok, Hien Vuong, Gwen Fuertes
California, USA

Gabriel Kaprielian, Liz Kee, Marisha Farnsworth, Jonghoon Im
California, USA

Kengo Sato
Tokyo, Japan

Kenji Takagi
Kanagawa, Japan

Kadi Franson, Nathan Pundt
Leah Nichols
California, USA

Manuel José Rodríguez Hernández, Natalia Vera Rodríguez, Tiago Sanches de Castro Coelho
Las Palmas, Spain

Max Edwards, Ben Golze, David Heinzerling
California, USA

Ray Everett
Connecticut, USA

Sanjay Ektate
Maharashtra, India

Shunsuke Nakano
New York, USA

Tengiz Alaverdavshvili
Tbilisi, Georgia

Thamby Kumaran, Hara Kumaran
California, USA

Elements Architectural Group
Illinois, USA
Design Experts versus Customers

Living Cultural Center Pinoleville

Pomo Nation – 1st Place – Interwoven Communities
PPN Gave High Rating to Entry from Georgia (Country)
PPN Did Not Value Novelty, but Experts Did

Expert building designers did not rate this high as it looked too much like the California Academy of Science
Research in Crowd Sourcing Design with Open IDEO

- 24 challenges
- ~60,000 registered
- ~5,000 design participants
Poor for Idea Generation

Good for Idea Generation

Max. Clustering

Min. Clustering

Open IDEO as a Social Network

Connected core that communicates frequently (large circles). Blue nodes give more comments than get, red less. Building on the Ideas of others. No strong correlation between a user’s position and winning.

Open IDEO as a Social Network

Design Research: Open IDEO

• Research Question:
  
  *Is there a correlation between Human-Centered Design process characteristics and successful designs in Open IDEO?*

• 4 Challenges and 76 Concepts Analyzed
  – 38 “winners”
  – 38 randomly selected non-winning concepts for comparisons
ISO Standard for Human-Centered Design

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- The process is iterative,
- The design addresses the whole user experience, and
- The design team included multidisciplinary skills and perspective.
Example Challenge: How might we improve maternal health with mobile technologies for low-income countries?

- Concept description
- Submitter description
- Links to previous submissions that were used for inspiration

Challenges
1. Affordable Learning
2. Human Sanitation
3. Maternal Health Care
4. Social Businesses
## Research: 4 Open IDEO Challenges

<table>
<thead>
<tr>
<th>Challenge</th>
<th># Inspirations</th>
<th># Concepts</th>
<th># Winners</th>
</tr>
</thead>
<tbody>
<tr>
<td>How might we increase the availability of affordable learning tools and &amp; services for students in the developing world?</td>
<td>269</td>
<td>104</td>
<td>9</td>
</tr>
<tr>
<td>How can we improve sanitation and better manage human waste in low-income urban communities?</td>
<td>122</td>
<td>68</td>
<td>9</td>
</tr>
<tr>
<td>How might we improve maternal health with mobile technologies for low-income countries?</td>
<td>278</td>
<td>176</td>
<td>10</td>
</tr>
<tr>
<td>How might we use social business to improve health in low-income communities?</td>
<td>290</td>
<td>97</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>698</strong></td>
<td><strong>445</strong></td>
<td><strong>38</strong></td>
</tr>
</tbody>
</table>
# Results

## HCD Metrics

<table>
<thead>
<tr>
<th>HCD Metrics</th>
<th>Winners (38)</th>
<th>Non-Winners (38)</th>
<th>p (t-test)(^1) or Pearson’s Chi-Squared)(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hear:</strong> How many Inspirations served as the foundation for each concept?</td>
<td>5.34</td>
<td>1.68</td>
<td>0.035(^1)</td>
</tr>
<tr>
<td><strong>Create:</strong> How many ideas?</td>
<td>2.18</td>
<td>1.42</td>
<td>0.008(^1)</td>
</tr>
<tr>
<td><strong>Deliver:</strong> Did they actively elicit feedback on the prototype outside of using comments?</td>
<td>19.7%</td>
<td>1.3%</td>
<td>0.001(^2)</td>
</tr>
<tr>
<td><strong>Deliver:</strong> Did they answer comments on their prototype?</td>
<td>39.5%</td>
<td>22.4%</td>
<td>0.024(^2)</td>
</tr>
</tbody>
</table>


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Sophie’s Super Hand
Fabricating custom prosthetics
Discussion: Metrics for Valuing Design

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• Performance Ratings (J.D. Power, Consumer Reports)
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Open IDEO Interaction Over Time

Open IDEO Interaction