Brief Overview of Some Futures Research Methods

Jerome C. Glenn, director
The Millennium Project
The Future will be more complex and change more rapidly... ...than most people think

• The factors that made such changes are changing faster now, than 25 years ago
• Therefore, the next 25 years should make the speed of change over the last 25 years seem slow
• Hence, we need to upgrade futures assessment and strategy capacities
# Futures Research Methodology

## Version 3.0 (Spring 2009)

1. Introduction to the Futures Research
2. Evaluation and organization of Methods
3. Environmental Scanning
4. The Delphi Method
5. Real-Time Delphi
6. The Futures Wheel
7. The Futures Polygon
8. Trend Impact Analysis
9. Cross-Impact Analysis
10. Wild Cards
11. Wild Cards
12. Structural Analysis
13. The Systems Perspectives
14. Decision Modeling
15. Substitution Analysis
16. Technology Sequence
17. Morphological Analysis
18. Relevance Trees
19. Scenarios
20. Interactive Scenarios (software)
21. Robust Decisionmaking
22. Participatory Methods
23. Simulation and Games
24. Genius Forecasting and Intuition
25. Visioning for Strategic Planning
26. Normative Forecasting
27. TRIZ
28. S&T Road Mapping
29. Field Anomaly Relaxation (FAR)
30. Text Mining for Technology Foresight
31. Agent Modeling (demo software)
32. Prediction Markets
33. Forecasting By Artificial Neural Networks
34. State of the Future Index
35. SOFI Software System
36. Multiple Perspective Concept
37. A Toolbox for Scenario Planning
38. Heuristics Modeling
39. Personal Futures
40. Causal Layered Analysis
41. Linking Methods
42. Integration, Comparisons, and Frontiers
Methods we’ll go over now

1. Scanning
2. Futures Wheel
3. Cross Impact Analysis
4. Delphi (conventional and real-time)
5. State of the Future Index - SOFI
6. Scenarios
7. Collective Intelligence
8. …and if time Frameworks, an example
Generic Futures Scanning System

- Press Releases
- Newsletters
- Journals
- Monitor Specific Websites
- Key Word Internet Searching
- Conferences Seminars
- Key Persons Tracking

SCANNING

Analysis & Synthesis
- Individual
- Staff
- Management

Collective Intelligence System

Management

Feedback & New Requirements

Decisions

Future-oriented understanding and learning
... May become a TransInstitution
Millennium Project Nodes...

are groups of individuals and institutions that connect global and local views in:

Nodes identify participants, translate questionnaires and reports, and conduct interviews, special research, workshops, symposiums, and advanced training.
Building on a 12-year tradition

- By and for businesses, governments, universities, NGOs, international organizations, and consultants
- Globalization requires global perspectives and global foresight for improved strategic thinking
Executive Summary

1. 15 Global Challenges
2. State of the Future Index
3. Real-Time Delphi
4. Gov Future Strategy Unite
5. Global Energy Collective Intelligence
6. Environmental Security

Plus 6,300-page CD of 12 years’ collective research from the Millennium Project
Futures Wheel

Trend or Event
Cross-impact of trends and/or potential future events

<table>
<thead>
<tr>
<th></th>
<th>SIMAD</th>
<th>InfoWar</th>
<th>Nanobots</th>
<th>OrgCrime</th>
<th>Terrorism</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMAD</td>
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Conventional Delphi

- First developed at RAND in the 1960’s
- A means of eliciting and combining expert judgments while avoiding the pitfalls of conference room confrontations.
- Used a sequential questionnaires, each building on the previous round.
- Required features:
  - Participants guaranteed anonymity
  - Feedback of reason for extreme opinions
- Has been used in thousands of studies
- But time consuming
Real-Time Delphi

- Developed in 2004 and published in Technological Forecasting and Social Change.
- Idea was to use modern technology to increase the efficiency of the Delphi process.
- Rapid collection of expert judgment to aid in rational decision making.
- With Internet, participants can see feedback instantly, participate where and when is convenient.
- Roundless – Participant returns to edit as many times as he/she likes until the deadline.
<table>
<thead>
<tr>
<th>Variables and Developments</th>
<th>Question 1</th>
<th>Question 2</th>
<th>Question 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VARIABLE: Korean export volume</strong> (billion euros)</td>
<td>What is the best plausible value this variable can achieve in 2017?</td>
<td>What is the worst plausible value this variable can achieve in 2017?</td>
<td>How important is this variable to the future of Korea over the next 10 years (10=essential)?</td>
</tr>
<tr>
<td>164.6 bn euros (2002)</td>
<td>The average group answer: will be shown after you have entered an answer above: Respondents: 12</td>
<td>The average group answer: will be shown after you have entered an answer above: Respondents: 12</td>
<td>The average group answer: will be shown after you have entered an answer above: Respondents: 14</td>
</tr>
<tr>
<td>251.6 bn euros (2006)</td>
<td>Reasons <a href="#">click here</a></td>
<td>Reasons <a href="#">click here</a></td>
<td>Reasons <a href="#">click here</a></td>
</tr>
<tr>
<td><strong>VARIABLE: Days Lost per Year Due to Labor Strikes</strong> (days per 1,000 workers)</td>
<td>What is the best plausible value this variable can achieve in 2017?</td>
<td>What is the worst plausible value this variable can achieve in 2017?</td>
<td>How important is this variable to the future of Korea over the next 10 years (10=essential)?</td>
</tr>
<tr>
<td>S Korea lost 111 days per 1,000 workers (2000-2002)</td>
<td>The average group answer: will be shown after you have entered an answer above: Respondents: 13</td>
<td>The average group answer: will be shown after you have entered an answer above: Respondents: 13</td>
<td>The average group answer: will be shown after you have entered an answer above: Respondents: 14</td>
</tr>
<tr>
<td>Germany lost 3 days per 1,000 workers (2000-2002)</td>
<td>Reasons <a href="#">click here</a></td>
<td>Reasons <a href="#">click here</a></td>
<td>Reasons <a href="#">click here</a></td>
</tr>
<tr>
<td><strong>VARIABLE: GDP per capita</strong> (ppp current Intl dollars)</td>
<td>What is the best plausible value this variable can achieve in 2017?</td>
<td>What is the worst plausible value this variable can achieve in 2017?</td>
<td>How important is this variable to the future of Korea over the next 10 years (10=essential)?</td>
</tr>
<tr>
<td>United States (2005)= $34,142</td>
<td>The average group answer: will be shown after 10 or more responses are received and you have entered an answer above. Respondents: 6</td>
<td>The average group answer: will be shown after 10 or more responses are received and you have entered an answer above. Respondents: 7</td>
<td>The average group answer: will be shown after you have entered an answer above: Respondents: 14</td>
</tr>
<tr>
<td>S. Korea (2005)= $17,380</td>
<td></td>
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</tbody>
</table>
Use of Delphi with scenarios drafts with fill in the blanks

• Use of Delphi to fill in the blanks – engage panel in the writing

• Normative scenarios – MEP scenarios asked for increased plausibility

• Descriptive scenarios – DOE – S&T Scenarios – open for cause or effect sections – online at our website.
State of the Future Index (SOFI)

- What do we mean by a better future?
- Very specifically – quantifiable indicators with reliable data over 20 years
- Projected ten years from synthesis of variables to help answer the question “Is the outlook for the future improving?”

- A tool for
  - Policy analysis
  - Improving discussion about the future
  - Education
  - National comparisons
  - Company planning
Global State of the Future Index

Example of SOFI variables:
Infant mortality
Food availability
Access to fresh water
GNP per capita
CO2 emissions
Literacy
Wars
AIDS deaths
Terrorist attacks
Debt ratio
Unemployment
Calories per capita
Health care
Forest lands
Rich poor gap
## Report Card for the World

### Where are we winning?
- GDP per capita grew
- Calories per capita increased
- Life expectancy grew
- Literacy grew
- Infant Mortality dropped
- Access to Fresh Water improved
- Access to Health Care improved
- School Enrollment Improved
- Reducing conflicts

### Where are we losing?
- CO₂ emissions grew
- Unemployment increased
- Forest Lands dropped
- Rich Poor Gap grew
- AIDs Deaths grew
- Developing Country Debt increased
- Terrorist Attacks more diverse
What’s Getting Worse

<table>
<thead>
<tr>
<th>Category</th>
<th>1987</th>
<th>1997</th>
<th>2007</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>% VOTING POPULATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO2 (M TONS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CORRUPTION (TI*100/7)</td>
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<tr>
<td>HOMICIDES / MIL</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>% UNEMPLOYMENT * 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEMPERATURE ANOM* 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TERRORISM (kill, wound)/1000</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

A scenario is a story with plausible cause and effect links that connects a future condition with the present, while illustrating key decisions, events, and consequences throughout the narrative. – J. C. Glenn
A Scenario is **not**:  

- A projection – although projections are included in a scenario.  
- A discussion about a range of future possibilities with data and analysis – It is like confusing the text of a play's newspaper review with the text of the play written by the playwright.
Classic Herman Kahn Scenarios

• Surprise-free, business-as-usual, reference, base-case scenario is a simple extrapolation of current trends and their interplay
• Worst case scenario based on mismanagement and bad luck
• Best case scenario based on good management and good luck.
“Scenario Space”
Defined by Axes

<table>
<thead>
<tr>
<th>Axes Define “Scenario Space”</th>
<th>Global Political Stability</th>
<th>Global Political Turmoil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Many High Tech Breakthroughs</td>
<td>Scenario 1</td>
<td>Scenario 2</td>
</tr>
<tr>
<td>Few High Tech Breakthroughs</td>
<td>Scenario 3</td>
<td>Scenario 4</td>
</tr>
</tbody>
</table>
Some Comments on Scenario Construction

• Don’t let the method trap you
• Let the cause and effect links develop their own dynamics
• Lean what you don’t know… that you need to know… that you didn’t know that you needed to know. Unknown, unknowns
Collective Intelligence (CI)

- CI is an emergent property from synergies among data/information/intelligence, software/hardware, and experts, that continually learns from feedback to produce just in time knowledge for better decisions than these elements acting alone.
- Wikipedia is an early example. GENI-S is another.
GENIS (Global Energy Network and Information System)

- The **Global Energy Network** (GEN), providing communications and collaboration capabilities for a worldwide community of experts and others working on, or concerned with, energy issues;

- The **Global Energy Information System** (GEIS), a repository (knowledge base) and associated interactive access facility for as much of the world's total knowledge (actual content, pointers to external systems, and ability to mashup from other databases into one integrated set of outputs) about energy as can be accumulated.
Conventional user interface will be offered as well as alternatives.
User interfaces should show relation of parts and the whole.
An Information unit can be:

- linked with ‘attributes’ in the column at the right
- edited wikipedia-like by GEN
- Receive additional inputs to be added to open-ended non-peer reviewed
Example of an Issue overview

<table>
<thead>
<tr>
<th>Issue Questions</th>
<th>Positions Answers</th>
<th>Arguments Pros &amp; Cons</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q</td>
<td>A</td>
<td>+</td>
<td>References</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>+</td>
<td>References</td>
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<td></td>
<td></td>
<td>-</td>
<td>References</td>
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<td>+</td>
<td>References</td>
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<td>-</td>
<td>References</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>References</td>
</tr>
<tr>
<td>Definition</td>
<td>Current Status</td>
<td>Legislation</td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>1. Space solar power satellites convert sunshine, microwave to electric grids on earth;</td>
<td>1. Nagoya Robotics software to support orbital manufacturing</td>
<td>1. Pending energy bill S-123 allocates $10 billion for SSP R&amp;D</td>
<td></td>
</tr>
<tr>
<td>2. SSP variations - manufactured on earth, orbit, or moon</td>
<td>2. NSF research results</td>
<td>2. Current NSF/NASA/IPRI provide $5 million for university research</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Unresolved Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unlimited energy source</td>
<td>1. Public fear of health effects from beam</td>
<td>1. Health impact research</td>
</tr>
<tr>
<td>2. No GHGs or nuclear waste</td>
<td>2. Large-scale dependency, space junk</td>
<td>2. Protection from space junk</td>
</tr>
<tr>
<td>3. Managing day/night base load on global basis</td>
<td></td>
<td>3. Earth to orbit launch costs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Forecasts</th>
<th>Staff/GEN Misc.</th>
<th>Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. NASA Fresh Look study estimates that...</td>
<td>Why hasn't this been done already? When could this provide 1/2 the world's electricity?</td>
<td>1. Demonstration of wireless transmission from Space Shuttle</td>
</tr>
<tr>
<td>2. Nagoya University study estimates that...</td>
<td></td>
<td>2. Health and environmental impact studies</td>
</tr>
</tbody>
</table>
• Executive Summary
1. 15 Global Challenges
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Conscious-Technology
(Post-Information Age)

When the distinction between these two trends becomes blurred, we will have reached the
Post-Information Age

HUMANS BECOMING CYBORGS

1985
2000
2015
2030

BUILT ENVIRONMENT BECOMING INTELLIGENT
# Simplification of History and an Alternative Future

<table>
<thead>
<tr>
<th>Age or Era</th>
<th>Product</th>
<th>Power</th>
<th>Wealth</th>
<th>Place</th>
<th>War</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Extraction</td>
<td>Food/Res</td>
<td>Religion</td>
<td>Land</td>
<td>Earth/Res</td>
<td>Location</td>
<td>Cyclical</td>
</tr>
<tr>
<td>Industrial</td>
<td>Machine</td>
<td>Nation-State</td>
<td>Capital</td>
<td>Factory</td>
<td>Resources</td>
<td>Linear</td>
</tr>
<tr>
<td>Information</td>
<td>Info/serv</td>
<td>Corporation</td>
<td>Access</td>
<td>Office</td>
<td>Perception</td>
<td>Flexible</td>
</tr>
<tr>
<td>Conscious-Technology</td>
<td>Linkage</td>
<td>Individual</td>
<td>Being</td>
<td>Motion</td>
<td>Identity</td>
<td>Invented</td>
</tr>
</tbody>
</table>
By 2030? what will be emerging? And from what?
For further information

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WEB 2.0 www.mpcollab.org
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1. Applied Materials (overhead)
2. Azerbaijan Ministry of Communications (Government training)
3. Deloitte & Touche, LLP (overhead)
4. Foundation for the Future (Energy Collective Intelligence design)
5. Government of the Republic of Korea (Korean SOFI & Gov Strategy units)
6. The Hershey Company (overhead and RT Delphi)
7. Rockefeller Foundation (Futures Research Methodology 3.0 and capacity for Developing countries)
8. U.S. Army Environmental Policy Institute (Environmental Security reports)
9. UNESCO (use of RT Delphi for World Water Scenarios)
10. World Bank (via World Perspectives, Inc. use of RT Delphi to evaluation of Global Environment Facility)