Mapping Wild Cards & Weak Signals (WI-WE) & Foresight

interconnecting Knowledge for the early identification of key issues (e.g. wild cards and weak signals) shaping or shaking the future of science, technology and innovation in the European Research Area

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• About iKNOW
  – Aim
  – Objectives
  – Ongoing work
  – Methodology

• Wild Cards (WI)
• Weak Signals (WE)
• Scanning strategy
• WI-WE Characterisation
• Interactive web 2.0 environments
  – iKNOW Community
  – WI-WE Bank, Dynamic Delphi, WI-WE Scan
About iKNOW project

- **Aim**
  - To elucidate and examine events and developments potentially shaping or shaking the future of STI in the European Research Area (ERA)

- **Objectives**
  - To develop and pilot *conceptual and methodological frameworks* to identify, classify, cluster & analyse *wild cards & weak signals* (WI-WE)
  - To assess WI-WE *implications for, and expected impact on*:
    - *science, technology and innovation (STI)*

and to assess WI-WE *relevance for the key dimensions of the ERA Vision*:

- Researchers
- Research infrastructures
- Research institutions
- Knowledge sharing
- Joint Programming (research programmes and priorities)
- International S&T cooperation
iKNOW’s logic

WP2: State of the art, literature review on Weak Signals and Wild Cards (WI-WE)

WP4: EU & International views
1 Cross-national Delphi survey
50 telephone interviews

WP5: National & Regional views
Four country surveys
(2 FP7 themes per country, implications on 6 ERA dimensions)

WP6: National Multi-Method Workshops
CZ FI GE UK

WP7: writing case studies
CZ FI GE UK IL

WP3 Characterisation of ERA WI-WE

WI-WE Bank

FP7 Themes & Sectors

ERA Dimensions

WI-WE Bulletins
Thematic / Sectors
Researchers
Research Infrastructures
Research Institutions
Research Progr. & Prior.
Knowledge Sharing
Internationalisation

WP8: Developing and piloting tools and applications
(iKnow Multi-Module Web-Environment/Wiki-Foresight)
- Wiki-Bank: using Web 2.0 approaches and tools
- Wiki-Scan: WI-WE scanning & search system
  (including WI-WE clustering and visualisation)

WP9: Disseminating and Interconnecting Knowledge
WP2: State of the art, literature review on Weak Signals and Wild Cards (WI-WE)

LR (UK)
LR (FI)
LR (GE)
LR (CZ)
LR (IL)

Synthesis (UK)
1. Need for a coherent WI-WE generation framework
   – What type of WI-WE?
   – Where to look for?
   – How to characterise WI-WE?
   – Who should generate WI-WE?

2. Need for an interactive WI-WE assessment framework
   – How to assess WI-WE?
   – Who should assess WI-WE?

3. Need for structured WI-WE analysis and sense-making
   – How to use WI-WE?
   – Who should use WI-WE?
1 WI-WE generation

1.1 What type of WI-WE?
What type of WI-WE?

- emerging issues
- re-emerging issues
- discontinuation issues
- past interpretation
- future assessment
- level of uncertainty
- past
- future

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• **What type of Wild Cards?**
  – **events** with *perceived low probability* of occurrence but *high potential impact* if they were to occur.

• **Wild Cards are often presented as “negative” events, including:**
  - **natural events**
    - tsunamis
    - mudslide
    - floods
    - earthquakes
    - ...
  - **human actions**
    - terrorist attacks
    - assaults
    - crimes
    - wars
    - ...
  - **consequences of human actions**
    - crises
    - errors
    - diseases
    - accidents
    - ...

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• We are also mapping “positive” wild cards...

natural events

human actions

consequences of human actions

dinosaurs extinction

paradigm shifts

scientific breakthroughs

technological revolutions

dinosaurs extinction

paradigm shifts

scientific breakthroughs

technological revolutions

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• **What type of Weak Signals are we mapping?**
  - (unclear) **observables** warning us about the probability of future events (including Wild Cards)
  - they implore us to consider **alternative interpretations** of an issue’s evolution to gauge its potential impact

What are ‘weak signals’?

Why are they important?

Who should look for?

Where to look for?

How to map them?

How to interpret them?

How to assess them?

How to use them?
Some signals have multiple meanings (i.e. weaknesses)...

Signals could trigger actions from a wide range of actors...

Signals require continuous and systematic monitoring and analysis...
1
WI-WE generation

1.2
Where to look for?
An interview with Dr. Olivier Da Costa

Taming wild cards and identifying weak signals affecting the European Research Area

The iKnow* project conducts interviews with experts in science and technology, EU research policy, and foresight. The aim of these interviews is to enrich participating projects in the project and to broaden our understanding of thinking about Wild Cards and Weak Signals. Alexander Magaard, iKnow* partner and the Interdisciplinary Center for Technology Analysis and Forecasting at Tel Aviv University, International St. Oliiver Da Costa, a Program Officer at the European Commission/JRC Information Society, Dr. Da Costa has a PhD in physics from the Ecole Polytechnique, and has a particular interest in leveraging technologies (nano- and info-technologies and epigenetic sciences) and science and technology roadmapping.

Can you envision major wild cards, promises or challenges, that may occur in the next 10 years? Which ones are particularly relevant to research in the EU and may dynamically affect the ERA?

The major trend in the next 10 years is global warming. Its consequences for ecosystems, economies and societies, as well as the actions of countries and counties to mitigate it or to deal with its effects, will be at the heart of this issue. The carbon emissions from the world are the major consequence of the lack of action on climate change. The world will need to make significant changes in the way it produces and consumes energy, and this will have major implications for the research community.

What would be the impact of the wild cards you mentioned, and how should those be addressed by research?

Rapid environmental changes, which could be amplified by the melting of the ice, the rising of the oceans, and the desertification of the Earth, will have major consequences for ecosystems and societies. The consequences will be seen in the loss of biodiversity, the loss of natural resources, the loss of food security, and the loss of human health. The consequences will be severe and difficult to address.

What are the most pressing emerging issues in the EU that are immediately relevant to the new research agenda?

The most pressing emerging issues in the EU are climate change, the energy transition, and the fight against climate change. The EU needs to take swift action to reduce its carbon footprint and to move towards a low-carbon economy. Climate change is one of the most pressing issues in the world, and the EU needs to take a lead role in addressing it.

Can you identify any causal relationships between the wild cards or weak signals you mentioned? Which of them should be given top priority in EU research?

Global warming, the loss of resources, and the economic crisis can be linked to the wild cards and weak signals. The EU needs to take action to address these issues and to prioritize research on ways to tackle them.

Who?

- Foresight
- S&T
- ERA

How many?

- around 50
ongoing work...

- **Scanning**
  - nomination
  - basic
  - advanced
  - fully-fledged

- **Bulletins**
  - Fully-fledged characterisation
  - Structured narratives
  - Relevance for ERA and STI

- **Interviews**
  - several wild cards and weak signals
ongoing work...

• **Workshops**
  – Thematic orientation
  – Possible links to Grand Challenges
  – Brainstorming session to generate WI-WE

• **Surveys**
  – Fully-fledged characterisation
  – Structured narratives
  – Relevance for ERA and STI

• **Community building**
  – Researchers involved in futures research
  – Researchers involved in FP7 research
  – Policy-making
1
WI-WE generation

1.3
How to characterise WI-WE?
1. EC FP7 research
2. Foresight projects
3. Academic journals
4. Websites, blogs, interviews, science fiction
5. …
1. Headline
2. Description
3. Key words/tags
4. Type
5. Importance
Advanced Characterisation

6. Early indicators
7. Life cycle
8. Triggers/drivers
9. Risks & Opportunities
10. Stakeholders’ actions
11. Likelihood
12. Scenario features
13. Relevance for Grand Challenges
14. Relevance for Research Areas
15. Relevance for ERA priorities
16. Relevance for other ERA strategies
17. Relevance for STI policies
• Small scale nuclear power to private energy demands
• The "Internet of Things" totally rejected by society
• Mass suicide of aged population in Europe
• Mass migration from ‘risk’ areas in Europe
• Nano-enabled privacy invasion
• Untraceable nanoweapons
• Information crisis
• ...

>70 issues

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Inspired by...

1. EC FP7 research
2. Other research projects
3. Foresight research
4. History
5. Policies/legislation
6. Academic journals
7. Websites
8. Blogs
9. Corporate press
10. Alternative press
11. Science fiction
12. Social networks
13. Interviews
14. Futures groups
15. Among others...
1. Headline
2. Description
3. Key words/tags
4. Type
5. Potential implications
advanced characterisation

Mapping Weak Signals » advanced characterisation

6. Filters
7. Drivers
8. Risks & Opportunities
9. Stakeholders’ actions
## Step 4

### Mapping Weak Signals

**Fully-fledged characterisation**

<table>
<thead>
<tr>
<th>Mapping Weak Signals &gt; fully-fledged characterisation</th>
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</tbody>
</table>

13. Relevance for **Grand Challenges**

14. Relevance for **Research Areas**

15. Relevance for **ERA priorities**

16. Relevance for **other ERA strategies**

17. Relevance for **STI policies**
• Concerns of nanoparticles becoming nanopollutants
• Some opinion shifts towards pro-nuclear power
• Research on privatisation of war
• More research on STIndicators
• ICT services migration
• Neuro-Enhancements
• Nanotubes ‘asbestos’ warning
• ...

>50 issues

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1
WI-WE generation

1.4
Who should characterise WI-WE?
Hubs and wires: Internet use in Indonesian NGOs is strengthening civil society

Two days after the tsunami hit the northern tip of Sumatra on Boxing Day 2004, Yeyasan Airlfitri (Airlfitri or i) began working quietly, far from publicity, to reconstruct the communication backbone destroyed by the disaster. Using VHF (Very High Frequency) radio, V Sat and wireless technology, Airlfitri restored communication in Aceh, making its first Internet broadcast on 30 December 2004. This was in spite of the radio silence policy imposed by the local military and government. Yeyasan Airlfitri also provided the first free satellite telephone and wireless Internet connection in Banda Aceh for humanitarian aid organisations working in the area and continued to do so until the last of money. In addition, Yeyasan Airlfitri played a vital role in establishing the first media centre (acaramediacenter or MC), which relayed to the world what happened at ground zero, channelled support and coordinated humanitarian aid. Without Yeyasan Airlfitri, the reconstruction of an information infrastructure and initial relief in Aceh after the disaster would have been impossible.

The urgent need to reconstruct Aceh’s information infrastructure, and in particular to provide Internet access, reflects the importance of this technology to the work of both Indonesian and foreign NGOs and aid organisations. Yet Internet use among Indonesian NGOs is a relatively recent phenomenon. It is only in the last decade or so that the Internet has become more widely available and the technology adopted by Indonesian NGOs. However, in the time, Internet use has had a significant impact on the organisations and their work.

Read the full article in INSIDE INDONESIA here.

Science and society, democracy and social change, NGOs, CSOs, civil society, ICT

Last updated 55 days ago by Pauline
2
WI-WE assessment

2.1
How to assess WI-WE?
**Wild Cards > Wiki-Delphi**

<table>
<thead>
<tr>
<th>FP7 Wild Cards</th>
<th>link to quality of life</th>
<th>link to economic growth</th>
<th>need for research &amp; development</th>
<th>need for monitoring</th>
<th>need for change in behaviours &amp; attitudes</th>
<th>timeframe for at least 50% probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass migration from &quot;risk&quot; geographical areas in Europe</td>
<td>☑️</td>
<td>☑️</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Genetic manipulation eradicates most crop and cattle diseases</td>
<td>☑️</td>
<td>☑️</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Autonomous passenger aircrafts fly without pilots in Europe</td>
<td>☑️</td>
<td>☑️</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Widespread use of ICT creates a world without &quot;secrets&quot;</td>
<td>☑️</td>
<td>☑️</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Biofuel production leads to major environmental crisis in Europe</td>
<td>☑️</td>
<td>☑️</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
</tbody>
</table>
3

WI-WE analysis & sense-making

3.1

How to use WI-WE?
What for:
interconnecting knowledge (convergence-interdisciplinary)
new research questions
impact on Grand Challenges
identification of problems
identification of solutions
relevance to FP7 research
sense-making
pattern recognition
emerging issues
informing policy
possible futures
Who can use WI-WE?

- EFMN Mapping has produced a vast amount of information on foresight unprecedented in the world.
- The mapping has been useful to understand foresight practices in Europe and other regions of the world.

2004: 100
2005: 437
2006: 767
2007: 846
2008: >1000

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• Practices
  – projects, programmers, etc.
  – WI-WE as input

• Players
  – sponsors
  – practitioners
  – users, etc.

• Products
  – formal, informal, etc.
  – WI-WE as output
WI-WE Bank