



Grand Challenges and S&T Foresight

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About Foresight

(Popper, 2011)

- **Foresight** is a systematic, participatory, prospective and policy-oriented process which, **with the support of environmental and horizon scanning approaches**, is aimed to actively engage key stakeholders into a wide range of activities **anticipating, recommending and transforming (ART)** technological, economic, environmental, political, social and ethical **(TEEPSE) futures**.
- **Key/Emerging/Frontier Issues**
 - Environmental Scanning
 - Horizon Scanning
- **ART**
 - Anticipating
 - Recommending
 - Transforming
- **TEEPSE futures**
 - Technological
 - Economic
 - Environmental
 - Political
 - Social
 - Ethical

About Grand Challenges

(Georghiou, 2008; Georghiou et al, 2008; iKnow, 2011)

1. Economic challenges

- need to engage business through a combination of supply-side measures for promotion of RTD and demand-side measures to create innovation-friendly markets – see [Aho Group Report](#)



2. Social and environmental challenges

- causes and consequences of issues such as climate change, food and energy security and the ageing society
- initial drive will have to come from governments.



3. Science and technology

- collective ability to respond to opportunities in frontier research



GCs must be **relevant, feasible** and have **research dimension**

iKnow Grand Challenges list

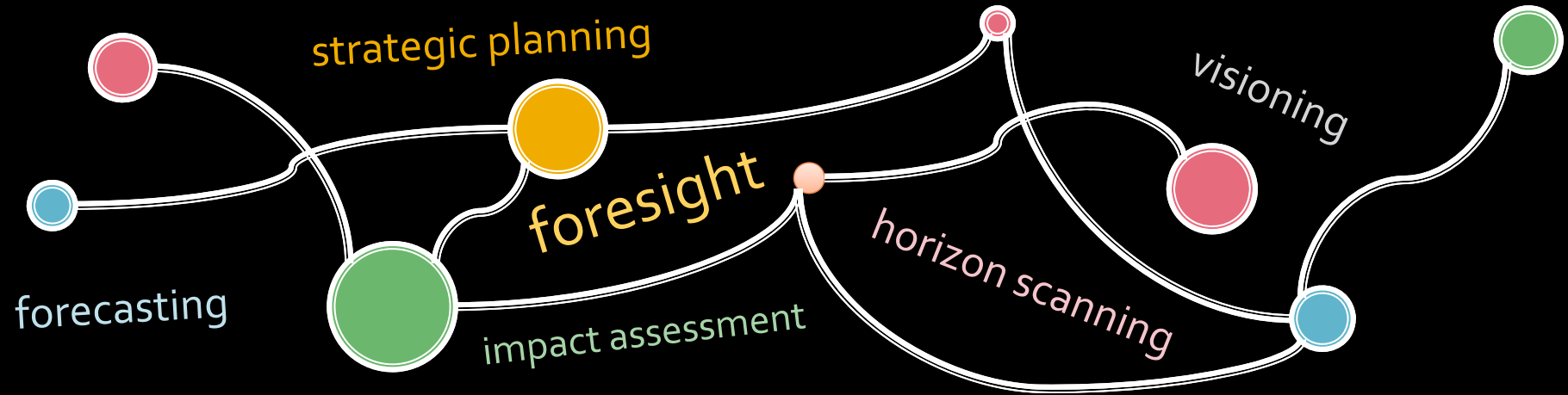


1. Water security and vulnerability
2. Energy security and vulnerability
3. Health, illness and well-being
4. Sustainability and climate change
5. Ageing and demographic issues
6. Food security and culture
7. Globalisation and localisation
8. Social cohesion and diversity
9. Technological security, hazard and risk
10. Consumption and behavioural change
11. Innovation, knowledge and technology dynamics
12. Work-life balance and mental health
13. Science, technology and ethics
14. Crime, security and justice
15. Governance, democracy and citizenship
16. Coexistence and conflict
17. Social pathologies and ethics
18. Social exclusion, poverty and affluence
19. Economic prosperity and growth dynamics
20. Urban and rural dynamics
21. Education and skills dynamics

GC's Broad & Deep Research Agenda

www.iknowfutures.eu & [follow-up proposal summary](#)

- Need for a **broad** research agenda
 - addressing 'wicked' problems
 - interconnecting knowledge
 - resolving conflicts in:
 - definitions
 - methodology
 - policy responses
- Need for a **deep** research agenda
 - Addressing grand challenges
 - Addressing grand responses
 - Addressing emerging issues
 - Addressing knowledge governance
 - Applying a 'worldviews' approach
- Forward-looking
 - Practices
 - Players
 - Outcomes
- Robust methodology
 - Explanatory
 - Participatory
 - Exploratory
 - Advisory
- Worldviews approach
 - Conservative
 - Reformist
 - Radical



1st message

**There are many ways of
addressing GCs and
shaping our future...**

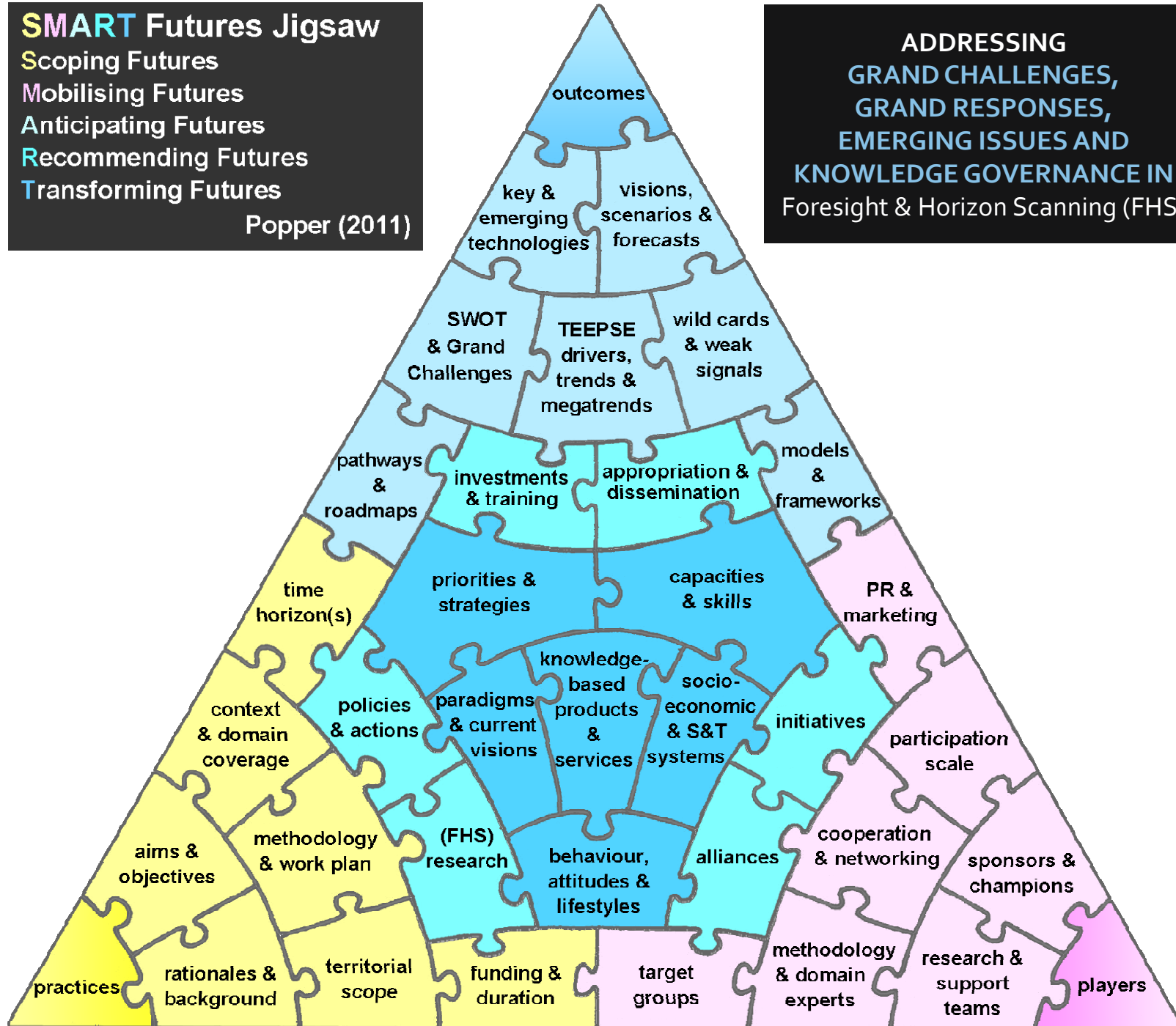
Therefore, we need systematic activities aimed at
**anticipating, recommending and transforming
futures**

SMART Futures Jigsaw

Scoping Futures
Mobilising Futures
Anticipating Futures
Recommending Futures
Transforming Futures

Popper (2011)

ADDRESSING
GRAND CHALLENGES,
GRAND RESPONSES,
EMERGING ISSUES AND
KNOWLEDGE GOVERNANCE IN
Foresight & Horizon Scanning (FHS)



1

Addressing Grand Challenges

www.iknowfutures.eu & [follow-up proposal summary](#)

- consensus about the need to address GCs
- huge amount of information on GCs
 - **problem of effective knowledge management** (e.g. impact of climate change on cities, consequences of ageing population for workforce skills, etc.).
 - **problem of interactions between various GCs** (e.g. impact of climate change on water and food security, impacts of ageing or migration).
 - **problem of Information overload**, with studies at various levels of granularity, and considerable controversy in many topics.
 - **problem that GCs are NOT just “big problems”**. They represent agendas for RTD, innovation and the development of conducive environments for adoption of innovations.
 - **problem of classifying GCs** in terms of:
 - Geographical relevance
 - Knowledge domain and RTD relevance
 - Feasibility as an economic or social investment
- **Classifying GCs**
 - Economic
 - Social & Environmental
 - Science and technology
- **Selecting GCs**
 - Geographical relevance
 - RTD relevance
 - Socio-economic feasibility
- **Defining GCs space**
 - Strata
 - Linkages
 - Borders of strata
 - Control mechanisms

2

Addressing Grand Responses

www.iknowfutures.eu & [follow-up proposal summary](#)

- GRs to GCs will almost certainly require:
 - **interdisciplinary knowledge development**
 - **multi-stakeholder** contributions to and applications of this knowledge base
 - **a policy mix of actions** (developing a policy roadmap that spans several traditionally distinct policy domains).
- **Far too often specific efforts to address GCs** – such as geoengineering plans, or calls for massive change in consumer behaviour, smart metering and carbon taxes (all these in the context of energy/climate change challenges) – **are conceptualised in very narrow ways.**
 - The social resistance, technical difficulties, leads and lags in adjustment and transition, are poorly taken into account.
- **Applying multiple approaches to GRs**
 - Interdisciplinary
 - Multi-stakeholder
 - Policy mix
- **Promoting stakeholder engagement through:**
 - Delphi surveys
 - Expert workshops
 - Gaming activities
 - Scenario building
 - Roadmapping
 - Visualisation tools
 - Networking tools
 - Etc.

3

Addressing Emerging Issues

www.iknowfutures.eu & [follow-up proposal summary](#)

- Applying horizon scanning & issue mapping
- Mapping issues against GCs and GRs
 - *Assessing factors shaping the trajectories of*
 - GCs
 - GRs
 - *Paying particular attention to*
 - *Seeds of change ("weak signals")*
 - *Potential surprises ("wild cards")*
- Using **bottom-up approaches** such as **surveys**, **citizen panels** and **web-based crowdsourcing** for the analysis of emerging issues relevant to GCs & GRs
- **Developing a robust emerging issues MAP**
 - Monitoring issues
 - Analysing issues
 - Positioning issues
- **Mapping emerging 'issues' such as:**
 - Weak Signals and potential Wild cards
 - Key technologies
 - Visions & scenarios
 - TEEPSE drivers
 - SWOT & GCs
 - Roadmaps
 - Models
 - Etc.

4

Addressing Knowledge Governance

www.iknowfutures.eu & [follow-up proposal summary](#)

- Effective knowledge governance (KG) requires:
 - Overcoming language barriers, cultural differences, competition and fragmentation of knowledge across disciplines, professions, and localities.
 - Exploiting creative environments, commercialisation, standardisation and innovations (technological & social)
- Governance involves the codification of knowledge and the development of mechanisms to:
 - Improve access/location
 - Promote validation/evaluation
 - Assess implications for action (both present and future)
- KG must be supported by social technologies:
 - situating and interconnecting **codified knowledge**
 - situating and interconnecting **knowledge communities**
 - enabling better communication and networking between experts and stakeholders of different types
- **Identifying the right balance of methods supporting:**
 - Knowledge **push**
 - Knowledge **pull**
- **Using a wide range of KG strategies:**
 - Balancing interactivity
 - Responding to 'hot' & current topics
 - Promoting 'gaming'
 - rating
 - scoring
 - user rights
 - badges & titles
 - Etc.

5

Applying a 'worldviews' approach

www.iknowfutures.eu & [follow-up proposal summary](#)

- Effective use of 'worldviews' approach requires **interactive/participatory settings** capable of:
 - Identifying **key features** of different worldviews
 - using deskwork
 - using workshops by proponents, or
 - using experts familiar with the worldviews
 - enabling **direct comparison around specific points**
 - Identifying **key limitations** in their abilities to grasp major problems and solutions
 - Identifying **key points of potential agreements** about gaps in knowledge (though not necessarily about how to most effectively resolve these).
 - Identifying **key "boundary objects"** for potential agreement about key features of a phenomenon, and **alignment in terms of action** without necessarily achieving consensus about many other things
- **A worldviews approach can help to identify:**
 - Key features
 - Key limitations
 - Key similarities
 - Key 'boundary objects'
- **Worldviews approach**
 - Conservative
 - Reformist
 - Radical
 - Etc.



2nd message

We use a wide range of tools to support foresight & horizon scanning processes addressing Grand Challenges...

We often customise our methodologies, frameworks and systems to support a wide range of futures research & innovation activities

FUTURES DIAMOND
R. POPPER (2011)

NEW
Methodology
Toolkit

44



FUTURES
DIAMOND

methodology toolkit



We use web 2.0 tools



iCommunity

iLibrary

iOracle

iNews

iDelphi

iBank

iScan



3rd message

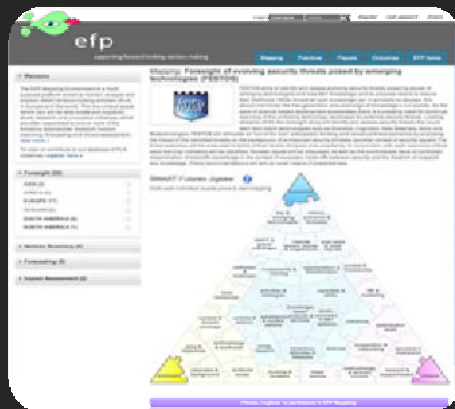
We use networked innovation approaches to provide information technology (IT) and software solutions to government, business, research and education actors at local, national and international levels.

Our IT systems can be adapted to meet the methodological needs of most research and innovation processes

“Futures Thinking Applied”



IT Solutions for foresight and horizon scanning in action...



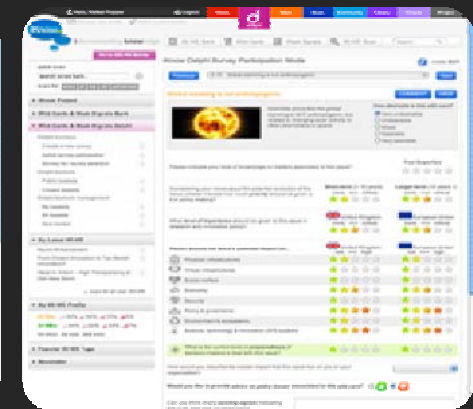
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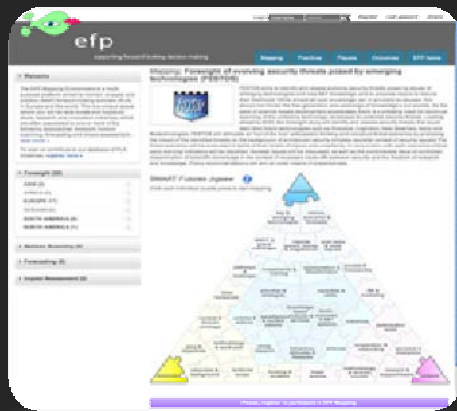


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The Innovation Systems Company
www.futuresdiamond.com



“ *Foresight Knowledge System* ”



A European Union supported platform aimed to explore, share and analyse forward-looking practices, players and outcomes in the world.

1

<http://www.mappingforesight.eu>

The Innovation Systems Company
www.futuresdiamond.com



“ *Horizon Scanning Platform* ”



A horizon scanning system on key issues affecting the future of the health and social care workforce planning in the United Kingdom.

2

<http://www.futuresdiamond.net/cfwi>

The Innovation Systems Company
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“ *Emerging Issues Platform* ”



An interactive system to map emerging issues, future 'shakers' (wild cards) and 'shapers' (weak signals) of science, technology and innovation in the world.

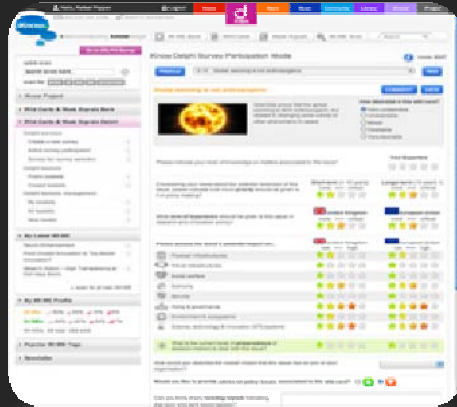
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<http://bank.iknowfutures.eu>

The Innovation Systems Company
www.futuresdiamond.com



“ *Stakeholder Engagement System* ”



An participatory system aimed to improve short-medium-to-long-term decision-making of public, private & international actors.

4

<http://delphi.iknowfutures.eu>

MANCHESTER
1824

The University of Manchester



FUTURES
DIAMOND

“ *Thank you for your attention* ”

Any questions?

Foresight: Exploring the Future, Shaping the Present
A course for sponsors and practitioners of foresight
25th June - 29th June 2012



- The course is aimed at:
 - **sponsors of foresight projects**
 - **foresight practitioners**
 - **entrepreneurs**
 - **senior managers**
 - **company directors**
- **Special offer to HSE delegates**
 - 6 people @ £1,400 = £8,400
 - 5 people @ £1,500 = £7,500
 - 4 people @ £1,600 = £6,400
 - 3 people @ £1,700 = £5,100
 - 2 people @ £1,800 = £3,600
- **Course fee**
 - The full residential fee is **£1,950 per person** fee includes all the course materials, accommodation for five nights (June 26th to June 30th inclusive) and all meals.
- **Discount for early bookings and HSE delegates**
 - This year we are offering a discount to participants whose application is received before **16th April**. For applications received by this date the course fee will be reduced to **£1,800 GBP**.
- **Registration**
 - Please use the downloadable registration form and return it to Lisa Gledhill by fax to **+44 161-275-0923** or email lisa.gledhill@mbs.ac.uk