

Customising Foresight

Systemic and Synergistic Foresight Approaches in a small country context

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Need for a SFM: Contextual dynamics

- The increasing importance of **innovation** (both technological and organisational) and the development of service economies
- Shift from technology and markets to ecosystems of research and social networks, services and policy
- From linear models to multidisciplinary and technologically complex dynamic 'systems'
- Global innovation landscape – with advances coming from centers of excellence around the world and the demands of billions of new consumers
- Relationship between science, technology and society

Key requirements for Foresight

- **Understanding**

- Real-life systems and natural settings with a multi-contextual focus
- Increasing interrelationships and interdependencies and thus more complex and uncertain situations

- **Anticipation**

- Understanding, appreciating and modelling present & anticipated long-term developments
- Intelligence gathering to explore novel ideas and avoid shocks

- **Inclusivity**

- Interactive and participative ways of debate and analysis
- Continuous interaction of stakeholders on equal terms
- Establishment of new social networks

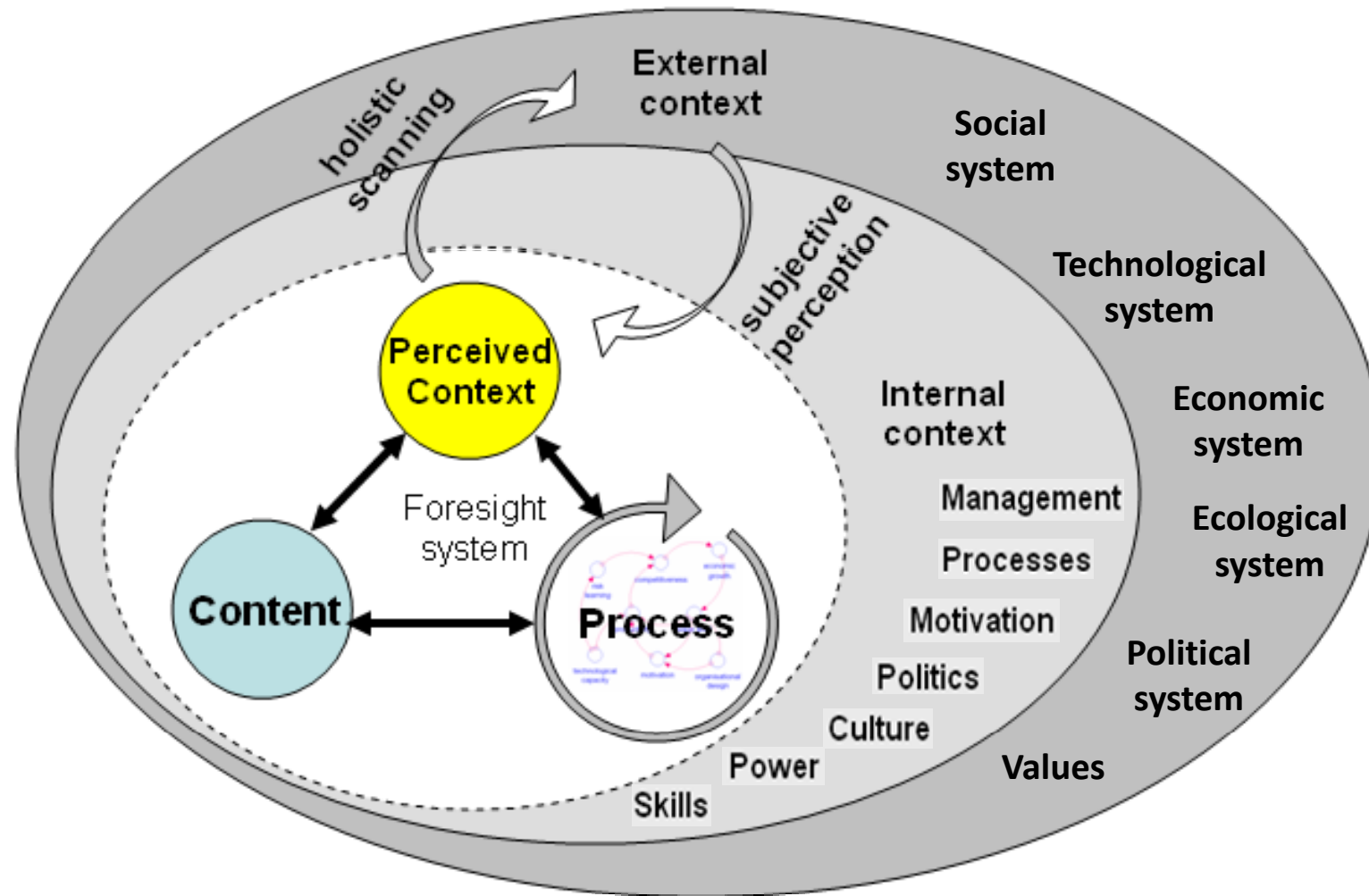
- **Policy and action orientation**

- Elaboration of strategic visions based on a shared sense of commitment
- Implications for present-day decisions and actions

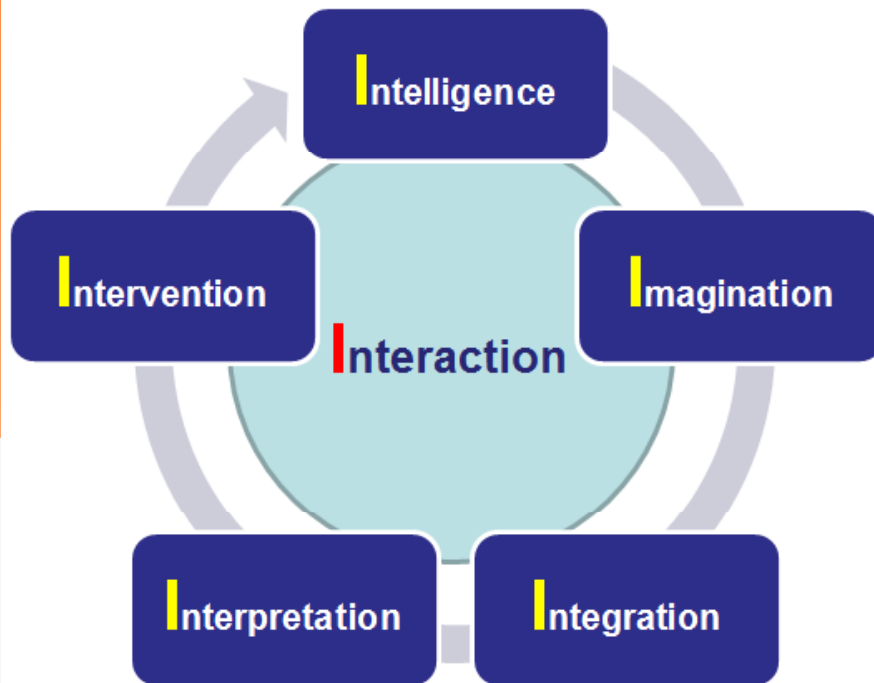
- **Methodological support**

- Using quantitative and qualitative methods and building methodologies by combining them to fit for purpose
- Integration of best practices, methods and tools

Systemic Foresight Methodology: Concept



Systemic Foresight Methodology: Phases



▪ ***Intelligence***

–Creates shared understanding and mutual appreciation of issues at hand

▪ ***Imagination***

–The input from scanning is synthesised into conceptual models of the situations involved in the real world

▪ ***Integration***

–Analyses the alternative models of the future and ‘prioritises’ them, through intensive negotiations among system actors and stakeholders, to create an agreed model of the future

▪ ***Interpretation***

–Translates future visions into long-, medium-, and short-term actions for a successful change programme

▪ ***Intervention***

–Creates plans to inform present day decisions for immediate change to provide structural and behavioural transformations

Synergistic Foresight Approach: Concepts

based on forthcoming book Synergicity by Joe Ravetz

- Systemic & inter-connected problems
 - *call for* –
- Systemic & inter-connected solutions (*“development pathways”*)
 - *based on* –
- Systemic analysis, methods, tools
 - *supported by* -
- Systemic theory & cognitive framework
 - *implemented with* –
- Systemic information / intelligence systems

BUT...

- Profound uncertainty & complexity
- Disconnection & displacement
- conflict & competition in v values & worldviews

SO....

- Explore ‘synergies’ – systemic critical links & pathways which link significant nodes
- Develop ‘shared intelligence’ – learning & innovation capacity which enables & enhances the synergies

Synergistic Foresight Approach (Ravetz, 2011)

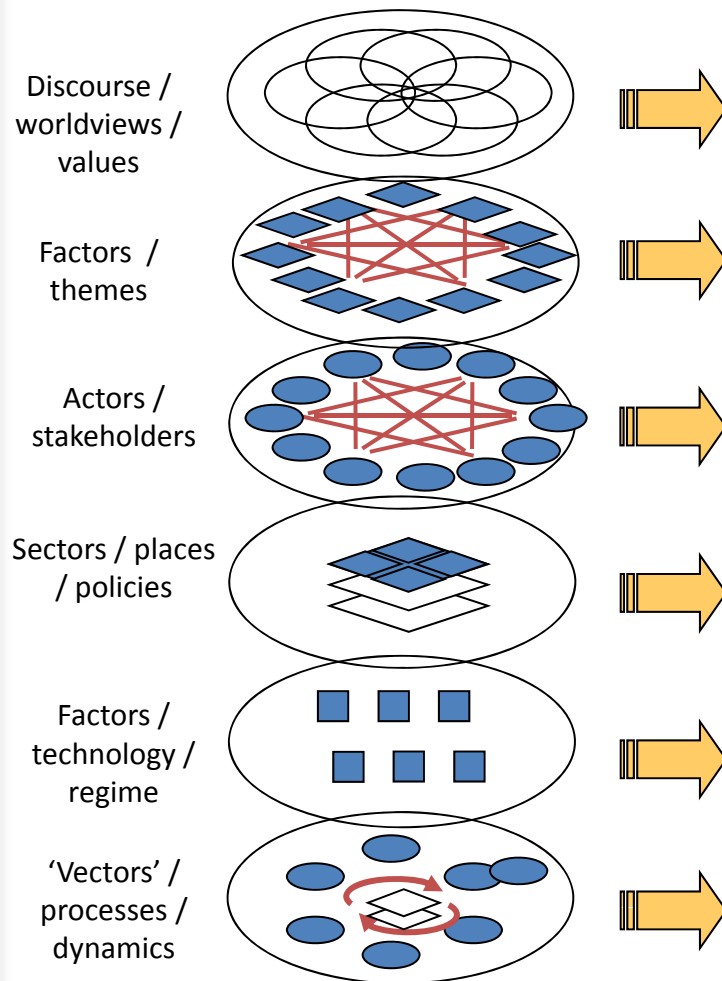
- Extending FS to wider & deeper applications with Synergistics approach
- 'Relational' / ecosystem principle looks at wholes not just parts
- 'Emergence' principle looks at co-evolutionary change & shared intelligence
- 'Mapping' approach explores & visualizes using multiple modes of intelligence
- This helps to select methods & target results

Foresight context & logic



Synergy maps & application to Foresight process (Ravetz, 2011)

Relational view



Emergence view

Explore multiple worldviews & looking for shared values, goals

Explore causal links & loops between themes & sectors

Explore relations between actors & look for synergies & shared interests

Focus on the sector/ place / situation, with internal & external relations / impacts

Focus on the system / technology / engineering & the opportunities

Explore the processes / metabolism & dynamics of change & transition

Synergy view

Shared intelligence between actors / factors / sectors etc: e.g. awareness of shared interests between students, institutions, regulators etc



Shared intelligence between parallel systems (e.g. other education / other public services / impact of student populations etc)

SFM + Synergistic approach: Architecture

Foresight process orientation (SFM)

	INTELLIGENCE	IMAGINATION	INTEGRATION	INTER PRETATION	INTER VENTION	
	<i>scope phase</i>	<i>creative phase</i>	<i>ordering phase</i>	<i>application phase</i>	<i>dissemination</i>	
Worldviews / goals (why)	the values, worldviews and discourses between different stakeholders					
STI regimes / inst.s (what)	factors in the regimes or institutions of STI that are also relevant					
Futures strand (when)	systematic exploration of trends, projections, scenarios, wild cards, and policy responses					
Capacity strand (who)	a systematic development of shared learning, networking, collaboration and intelligence between all stakeholders involved					
Strategy strand (how)	a systematic application to longer term policy, in the context of uncertainty, complexity and controversy of the issue					
Theme strand (which)	specific areas in sectors or technologies as the focus of enquiry					

Foresight agenda (SA)

SFM + Synergistic approach: Methods & Tools

	SCOPE / SURVEY PHASE	CREATIVE PHASE	ORDERING PHASE	STRATEGY PHASE	ACTION PHASE	
	INTELLIGENCE	IMAGINATION	INTEGRATION	INTER PRETATION	INTER VENTION	
	<i>Survey, scan, evidence</i>	<i>Concept model, visions, scenarios</i>	<i>Priorities, analysis, negotiations</i>	<i>agendas & strategies</i>	<i>Plans, policies, actions</i>	
"Divergent" methods <i>(more open, creative,)</i>	Horizon scanning Weak signal	Visioning / social priority choice	Backcasting Wild card study	SWOT analysis		
	Trend analysis	Scenario stories / images	Success scenarios	Scenario planning	Strategic planning	
	Social Network analysis	Policy scenarios	Risk assessment	Roadmapping	Critical / key technologies	
	Knowledge / research map	Scenario analysis	Delphi / online Delphi	Cross impact analysis	Operational research	
	Literature review	Agent based modelling	Multi-criteria	Logic framework		
	STI policy analysis	Scenario modelling	Social cost benefit	Linear programming	Policy impact assessment	
"Convergent methods" <i>(more specific, quantitative)</i>	Bibliometrics Patent analysis	System dynamics	Cost benefit analysis			

Mauritius National Research Foresight Exercise



Challenges and Opportunities for Small islands

Typical challenges of small nations & islands include (Georghiou & Cassingena-Harper):

- Lack of critical mass in research & STI capacity
- Vulnerable to changes in external markets & political conditions
- Culture of conservatism & possibly nepotism
- Internal pressures on resources & finances

Some opportunities

- Ability to create sustainable life styles including renewable energy systems and waste water recycling
- Smaller and more transparent administrations
- Specialisation and niche market opportunities

Experience & Expectations

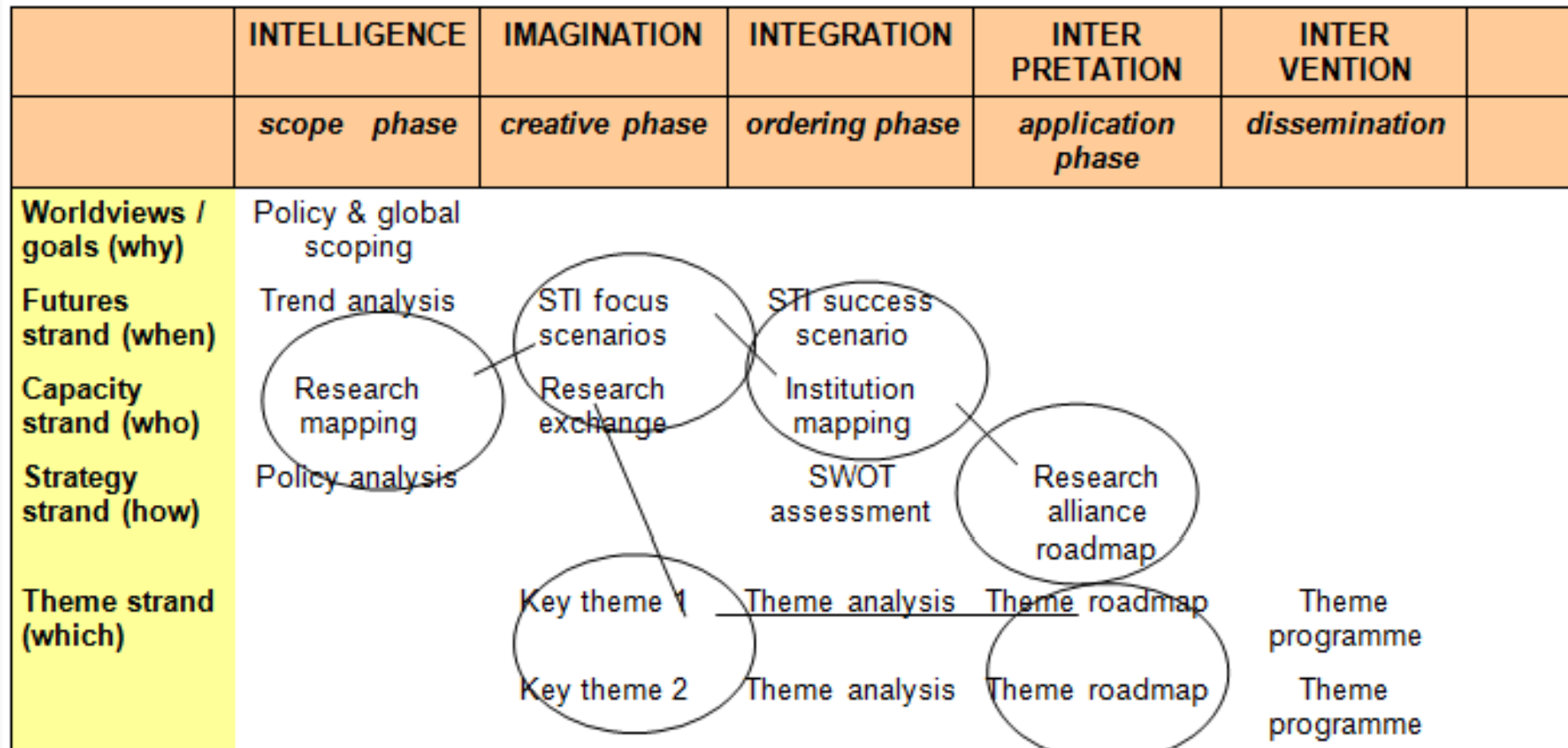
- Vision 2020 (1998)
- MRC STIP strategy 2007-11:
 - Increasing Investment in R&D (R&D exp. 1% GDP by 2015)
 - Promoting Science and Technology Education
 - Upgrading Human Competencies
 - Enhancing the Public R&D System
 - Empowerment of Women in the STI Sector
 - Recognition of the Scientist: Public Understanding of Science
 - Strengthening the IPR Framework
 - Enhancing competitiveness of SMEs by supporting compliance to standards
 - Promoting Innovation in Enterprises
 - Setting up of the National Innovation Fund
- The national policy framework in the 'Government Programme 2010 – 2015':
"Government will organise a National Research Foresight Exercise with the participation of all scientists engaged in scientific research. The ultimate objective will be the preparation of a time-bound Action Plan on Research and Development with clearly defined deliverables."

- To propose a research & innovation strategy & action plan for Mauritius
- To inform & involve research community in national priorities
- To promote links between disciplines & institutions & public / private sectors & pure / applied research

Three-phased process

- **Phase 1** covers the Inception Workshop, report on results, and submission of the detailed proposal: this will be effectively completed with this report.
- **Phase 2** covers the period months 1-3, leading up to a full Steering Group and 5 thematic Working Groups, proposed in month 3. This will include the survey and scanning activities, and the draft materials for the SG. It will also cover the setting up of the Theme Working Groups.
- **Phase 3** covers the period months 4-6: Produce full range of materials for wider scientific community and society; and provide recommendations on the Final Report which goes forward to the policy process.

Process design with research focus



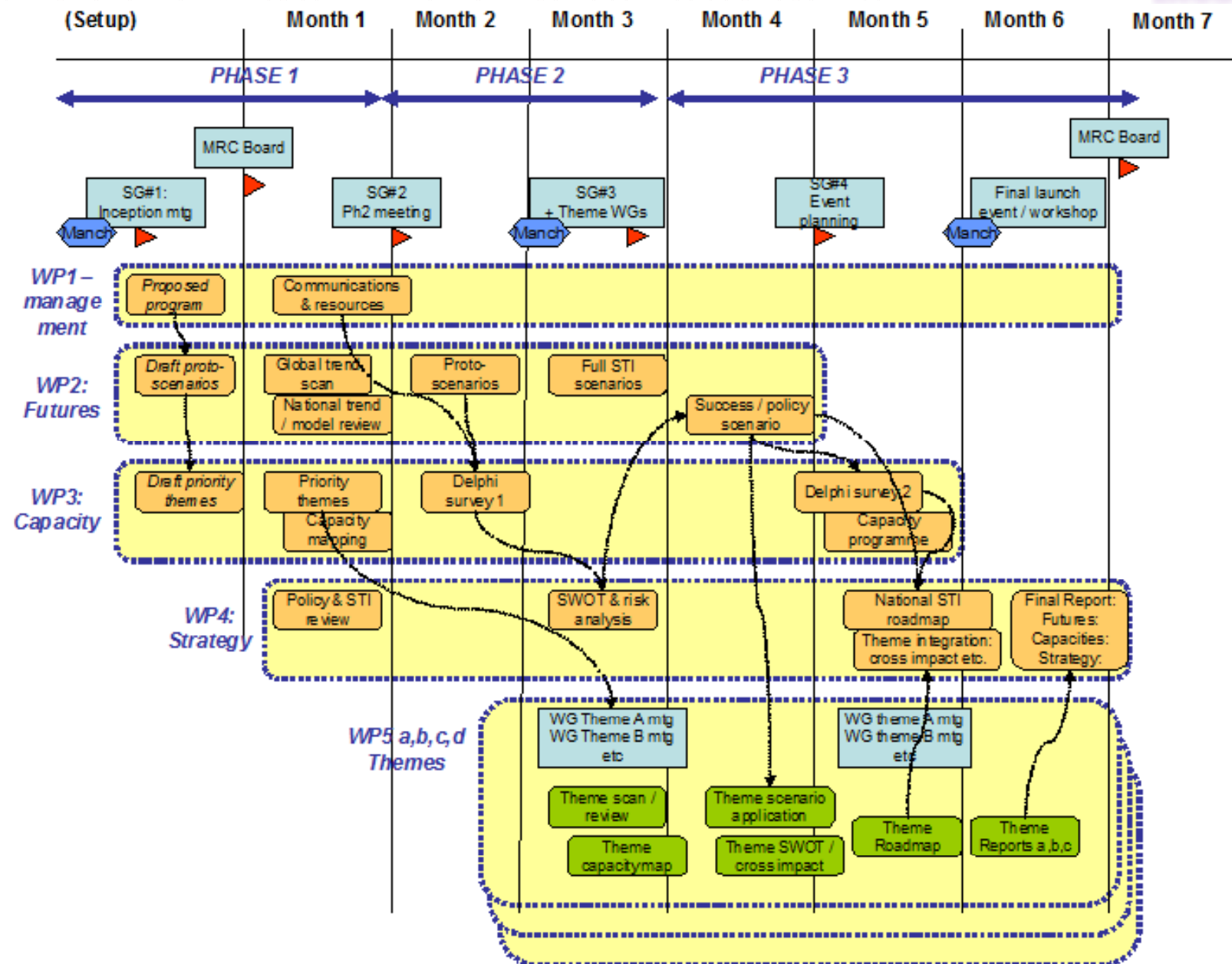
Methods and tools with research focus

	INTELLIGENCE	IMAGINATION	INTEGRATION	INTER PRETATION	INTER VENTION	
	<i>Survey, scan, evidence</i>	<i>Concept model, visions, scenarios</i>	<i>Priorities, orders, negotiations</i>	<i>agendas & strategies</i>	<i>Plans, policies, actions</i>	
Divergent methods	Global trend review					
	Research / citation mapping	External scenarios	Response scenarios			
	Policy review	STI scenario	Network mapping	R&D roadmaps	STI strategy	
	Education survey	Scenario analysis	Demand side model / analysis	Technology assessment	Technology strategy	
Convergent methods	Bibliometrics Patent analysis					

Participants of the programme

	SCOPE PHASE	CREATIVE PHASE	ORDERING PHASE	APPLICATION PHASE	DISSEMIN ATION	
	<i>Intelligence</i>	<i>Imagination</i>	<i>Integration</i>	<i>Interpretation</i>	<i>Intervention</i>	
Stakeholders	Res alliance Themes / sector					
Events	SG + Full workshop	Theme workshop	Theme workshop	SG	SG	
Information	Research focus	Creative focus		Strategy focus	Policy focus	
Resources						
Comms	Res alliance	Res alliance	Theme / sectors	Theme / sectors	Policy & public	

Programme design with research focus



Progress so far

- **Inception Workshop**

Meeting with the members of the Steering Committee

- **Drivers of change and key challenges**

Most significant drivers of change and key challenges for Mauritius by using “STEEPV + Urban and Resources” framework

- **Proto-scenarios**

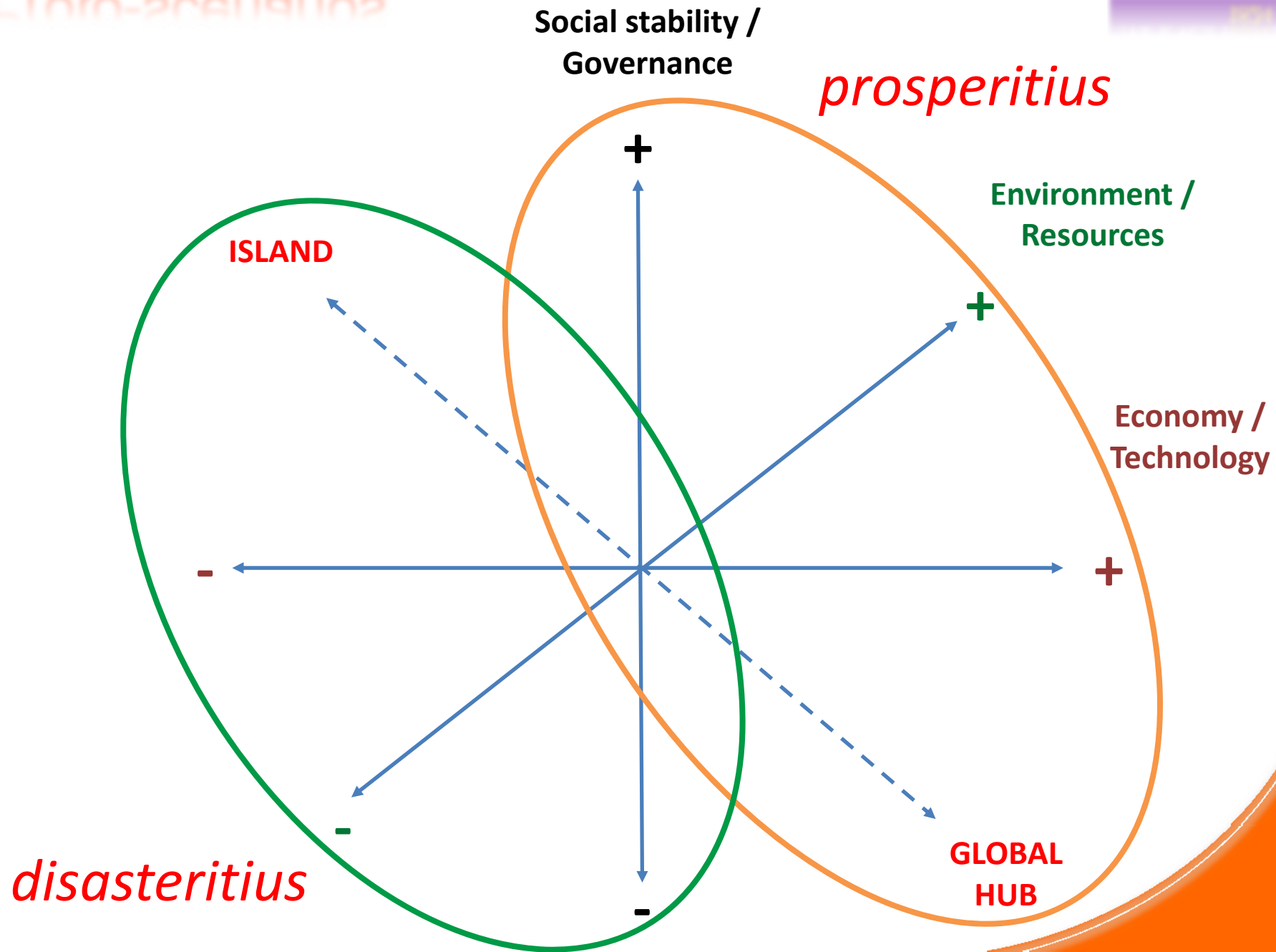
To accelerate the development of scenarios, by using the results from the Inception Workshop with the selection of the ‘most interesting and significant’ out of a large number of combinations, and the exploration of the implications.

Three main axes, which are combined to form eight combinations (shown in the form of a ‘cube’). Each of these is then subject to the fourth axis, a contrast between an inward looking ‘Island’ context, and an outward looking ‘global hub’ context.

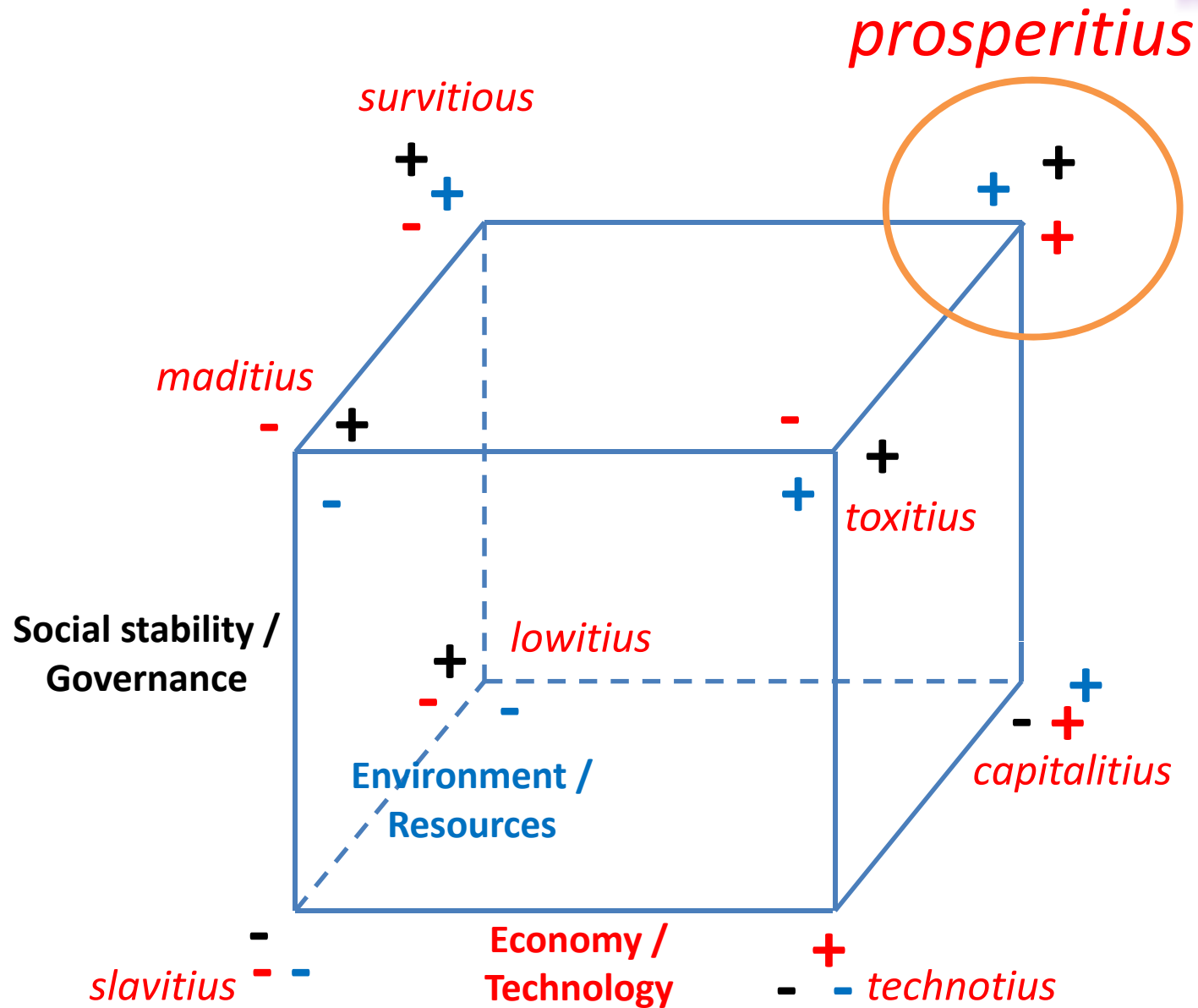
- **Prioritisation survey**

To prioritise 5-6 ‘interdisciplinary’ areas to be focused on with the use of Social Network Analysis

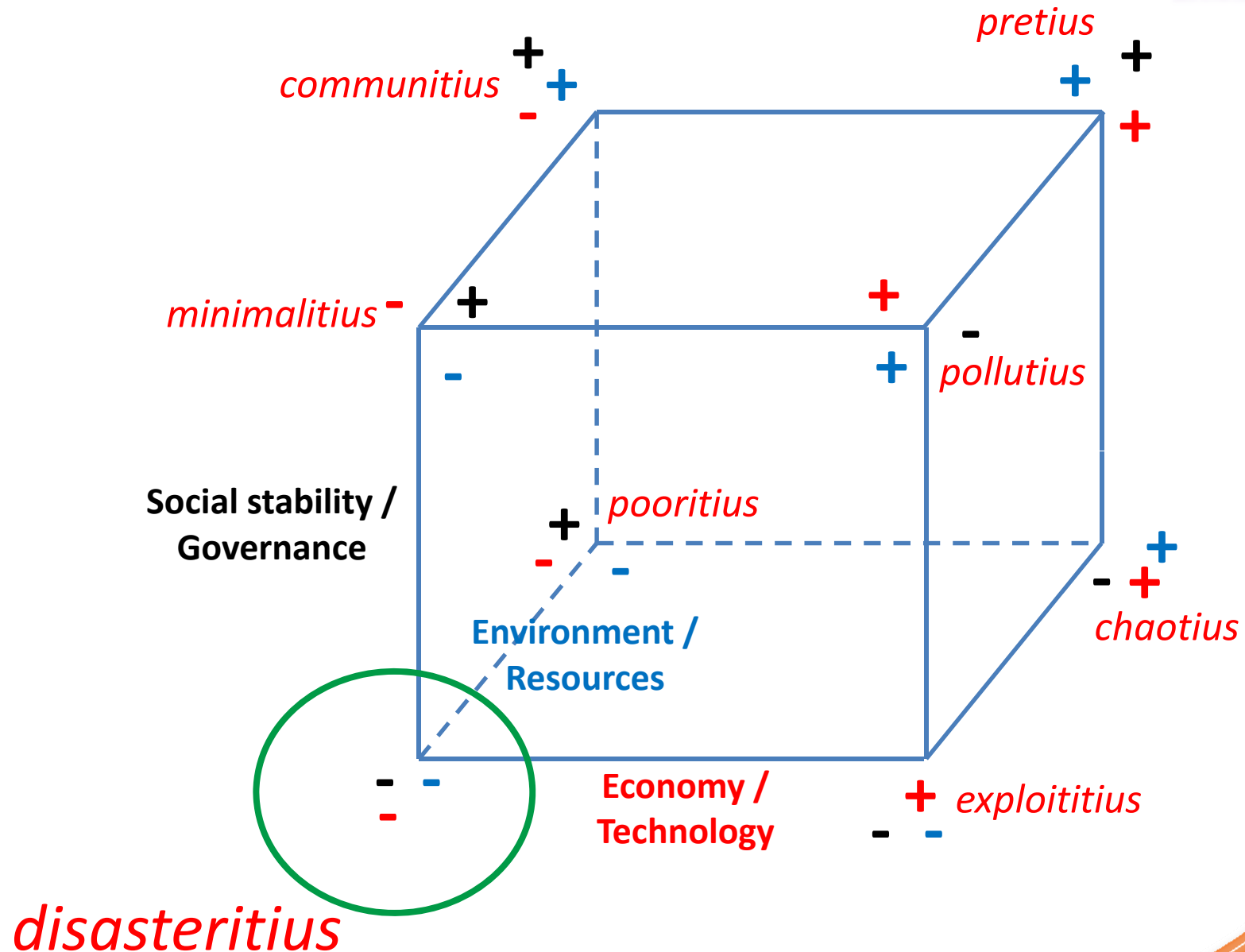
Proto-scenarios



Global hub scenarios (outward looking)



Island scenarios (inward looking)



Prioritisation survey



RESEARCH PRIORITIES & CAPACITIES

NOTES for the Research Priorities and Capacities section

This section asks - which research themes / fields do you see as **national priorities**? (i.e. which are both 'important' and 'feasible', over the next 5-10 years). And for which does your institution have capacity?

This section also asks - in which research themes / fields **is there a capacity in your institution**?

This survey is in three parts, over the next three pages:

1. Cross cutting 'Grand Challenges' (based on the European 'ERA Toolkit').
2. Scientific Fields & disciplines (based on a full listing from the OECD science classification)
3. Mauritius National Industrial Standard Classification (NISIC) based on the International Standard Classification of Economic Activities (ISIC)

Cross cutting themes - '21 Grand Challenges'

Which of the 'Grand Challenges' below do you see as a national priority for the next 5-10 years?

i.e.

- Is it of scientific / technological importance?
- Is it of national importance?
- What is the Scientific / technological feasibility?
- What is the national feasibility?

demand

supply

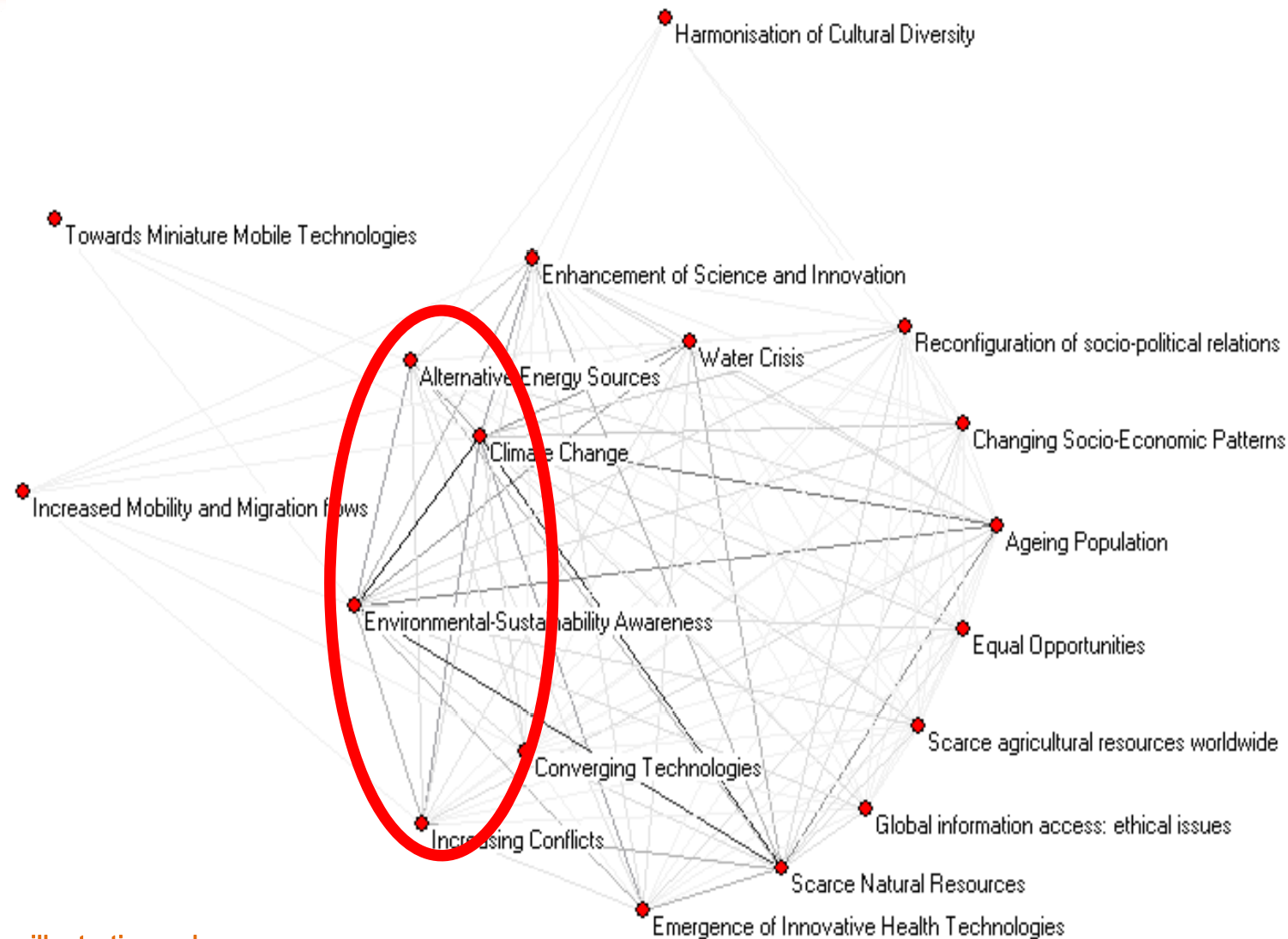
capacity

research

Please observe '*' marks for further guidance notes.

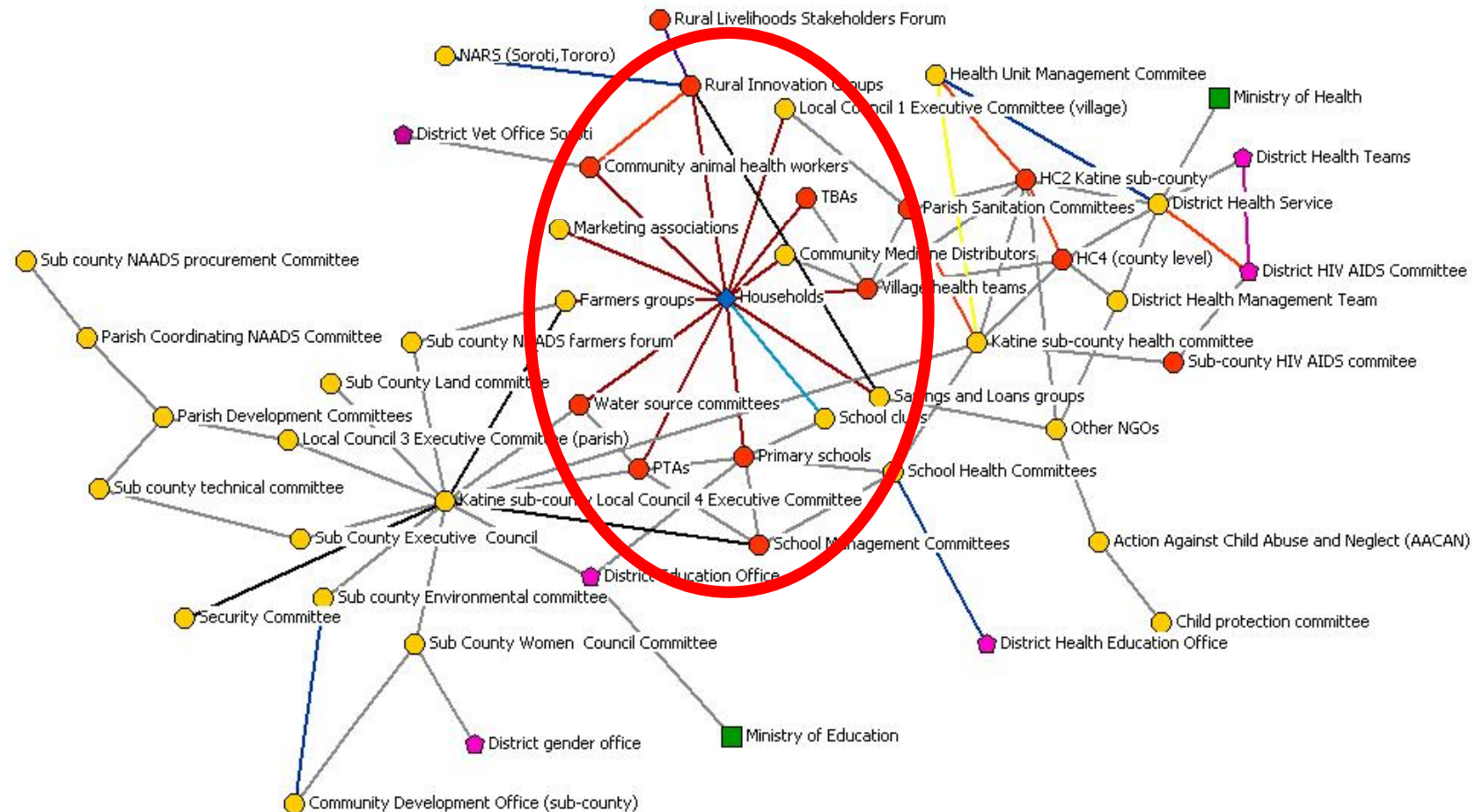
	Scientific / technological importance (i.e. opportunities for Mauritius)					National importance (i.e. economic, social, environmental benefits to Mauritius)					Scientific / technological feasibility (i.e. potential to achieve real research results)					National feasibility (i.e. potentials to achieve real contributions to economic, social, environmental benefits in Mauritius)					Existing research capacity (i.e. level of expertise on the theme)					Research mode*		
	very low	low	average	high	very high	very low	low	average	high	very high	very low	low	average	high	very high	very low	low	average	high	very high	unfamiliar	casually acquainted	familiar	knowledgeable	expert	basic research	applied research	experimental development
Water security / vulnerability	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Energy security / vulnerability	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Diseases / health and well being	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Sustainability and climate change	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ageing & other demographic tensions	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Food security / diet & culture	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Globalization vs. Localization	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Social cohesion and diversity	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Technological security, hazard & risk	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Behavioural change, lifestyles	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Thematic networks for interdisciplinary working groups*



*figure for illustration only

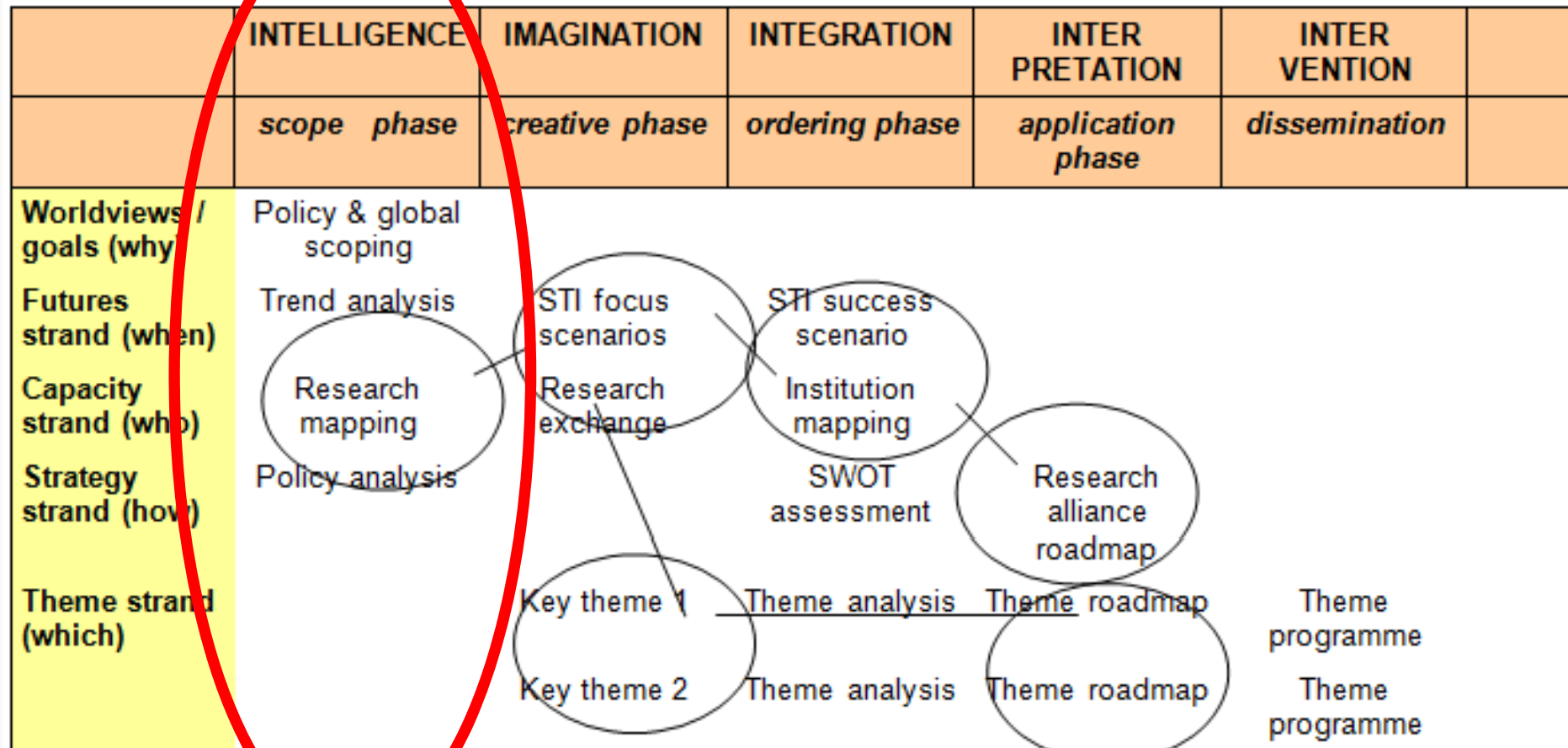
Network of institutions to be represented*



*figure for illustration only



Progress forward: phases



Progress forward: methodology

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	Trend analysis	Scenario		Scenario	Strategic planning	
	Social N		Ris ass	ing	Critical / key technologies	
		Scenario analysis	Delphi / online Delphi		ational earch	
	Literature review	Agent based modelling	Multi-criteria	Logic		
"Convergent methods" <i>(more specific, quantitative)</i>	STI policy analysis	Scenario modelling	Social cost benefit	Linear programming		
	Bibliometrics Patent analysis	System dynamics	Cost benefit analysis			

'Circle of synergicity' >>
(transition & co-
evolution)

'Circle of scenarios >>
inter-connection
mapping'

'Circle of concern
issues/ trends /
shocks'

'Circle of wisdom >>
strategic agendas'

'synergicity of actors'

Synergicity of policies
& actions

'Synergicity of
sectors' >> inter-
connections

'synergicity of shared
intelligence' >> feedback to
governance & management
systems

Some conclusions

- Quick, but not a dirty Foresight programme
- Methodological sophistication with a mix of theory and practice (systems thinking + experience + expectations)
- Benefits of combining methodological orientation (SFM) and contents (SA) to set up an “agenda” for Foresight programmes