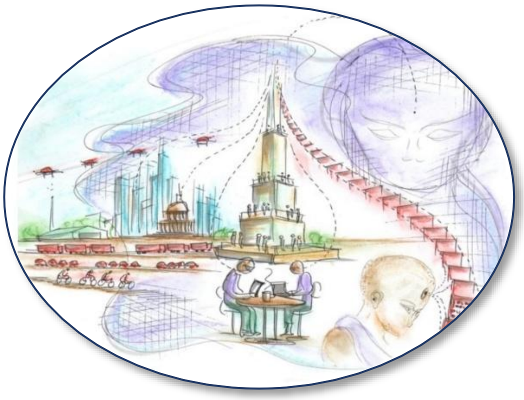
	Mind-Lab ***(Laboratory of collective intelligence)*** ***Working Paper***
	# ***FORESIGHT-CHAI*** ***(Foresight with 'Collective Human-Artificial intelligence')***
	***OUTLINE of PILOT DEMONSTRATION PROJECT***
Deliverable #	
Version, Date	**V0.3** **25-11-25** **Work in progress** **for internal discussion** **not for circulation**
Lead author	**Joe Ravetz** **University of Manchester** **With notes by** **Prof. Yuan Fei, BJUT** **Wensupu Yang, SAMI Consulting**

FORESIGHT-CHAI

(Foresight with 'Collective Human-Artificial intelligence')

OUTLINE of PILOT DEMONSTRATION

Mind-Lab Working paper

(Part version work in progress)

JR v0.3 – 25-11-25

Contents

List of figures

List of tables

Abbreviations

AI/AGI	Artificial Intelligence / Artificial General Intelligence
BJUT	Beijing University of Technology
CASTED	Chinese Academy of Science and Technology for Development
CASISD	Chinese Academy of Science Institute for Science and Development
‘CHAI’	‘Collective Human Artificial Intelligence’
CHI	Collective human intelligence
CIQ	Collective Intelligence Quotient
CISTRAT	International Research and Training Center for Science and Technology Strategy
FOCI	‘Future oriented collective intelligence’
GAFA	‘Google, Apple, Facebook, Amazon’
GoS	UK Government Office of Science
IOT	Internet of Things
R&I	Research & Innovation’: similar to ‘R&D’ (research & development), ‘RTD’ (research & technology development’ or ‘STI’ (science, technology, innovation).
SAMI	SAMI Consulting
‘STEEPC’	Futures/foresight domains for analysis (‘socio-technical-economic-ecological-political-cultural’) with many variations
UoM	University of Manchester, UK

1 Overview

This working paper is an outline of an experimental innovation on ‘Foresight-CHAI’: a structure of enquiry and workshop plan.

Foresight 3.0 is based on the principles of *‘collective human intelligence’*, and AI offers powerful new resources and functionalities: we can frame the combination as ‘***Foresight-CHAI’ (‘Collective Human-Artificial Intelligence’).*** Generally,

- ***AI*** can provide foresight-related ***content***, which appears to be very fast and efficient, along with existential risks;
- Our focus is then on the ***context*** – the ***CHI or ‘collective human intelligence’*** – the social / institutional framing, agenda setting, synergy forming, co-learning, co-creation & co-production into the ‘real world’, all needed for transformational change;
- the combination of foresight with AI-enabled process, and CHI-focused applications, is explored here as ***Foresight-CHAI*** (‘*Collective Human-Artificial Intelligence*’).

This raises further questions –

- Challenges of AI-enabled power, control, colonization, into a human domain already divided and conflicted;
- Challenges of disruption / transformation in futures thinking & strategic planning in many domains: public policy, corporates, media, civil society etc.

This paper is produced from the current Foresight-CHAI program at the *Laboratory of Collective Intelligence (Mind-Lab*). The program aims include:

- Generally, to explore the potential of Foresight-CHAI:
- Review current tools & resources.
- Develop & test prototypes (‘proof of concept’) on topical themes: e.g. urban climate, circular economy, food systems, demographic change.
- Build a research-policy community of interest & publish results.

Foresight-CHAI & pathways toolkit

The figure below is based on the synergistic method & pathways toolkit (see annex for general outline). These are then focused & targeted on the foresight challenge / question, with a focus on the CHAI interface: i.e. combination of ‘collective human intelligence’ (CHI) with machine information (AI).

Generally, the human side can provide scoping & framing, reality checks, mutual learning, creative responses, empathy, trust & norms, and overall synergy formation, leading towards the CHI (collective human intelligence).

The AI side can provide structured information in response to questions / prompts, at a growing level of sophistication: it can also learn from the human responses and interactions.

The cartoon here shows the typical 12-step process of Foresight-CHAI: with the AI 'info-cubes' as a resource for human discussions at each stage.

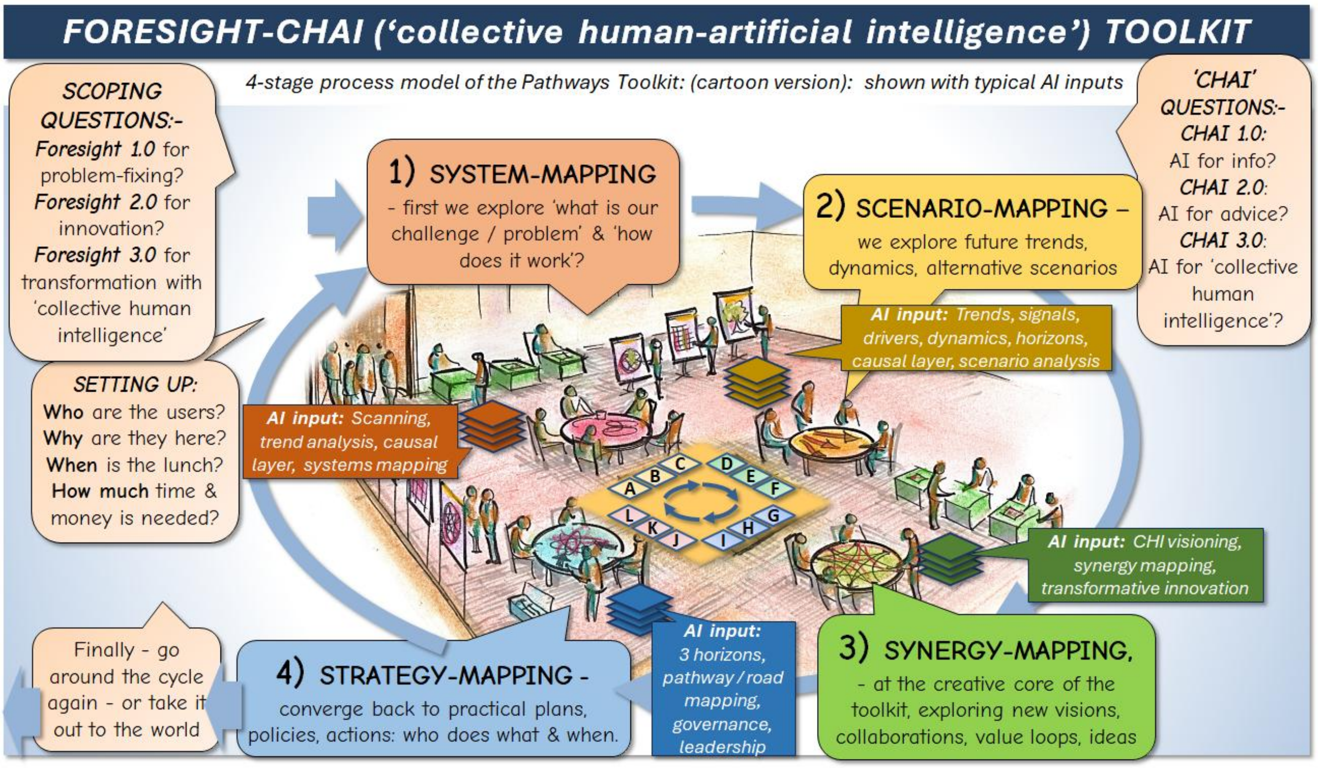


Figure 1: Foresight-CHAI - pathways toolkit

This 4-stage process model of the Pathways Toolkit raises some strategic questions:

First, there are strategic questions on scope:

- ***Foresight 1.0*** for problem-fixing?
- ***Foresight 2.0*** for innovation?
- ***Foresight 3.0*** for transformation with 'collective human intelligence'

Also there are strategic questions on the role of CHAI

- ***CHAI 1.0:*** with AI for info?
- ***CHAI 2.0***: with AI for advice?
- ***CHAI 3.0***: with AI for 'collective human intelligence'

The process model includes 4 main stages:

1) SYSTEM-MAPPING - first we explore 'what is our challenge / problem' & 'how does it work'? ***AI input:*** *Scanning, trend analysis, causal layer, systems mapping*

2) SCENARIO-MAPPING – we explore future trends, dynamics, alternative scenarios: ***AI input:*** *Trends, signals, drivers, dynamics, horizons, causal layer, scenario analysis*

3) SYNERGY-MAPPING - at the creative core of the toolkit, exploring new visions, collaborations, value loops, ideas: ***AI input:*** *CHI visioning, synergy mapping, transformative innovation*

4) STRATEGY-MAPPING - converge back to practical plans, policies, actions: who does what & when. ***AI input:*** *3 horizons, pathway / road mapping, governance, leadership*

Finally – we go around the cycle again - or take it out to the world… Also review the ***SETTING UP*** questions: **Who** are the users? **Why** are they here? **When** is the lunch? **How much** time & money is needed?

The pilot tests aim to implement and evaluate this as far as possible, by focusing on practical and tangible issues, such as '*What are the best transformation pathways for this city / sector / technology by 2050'*. Applications could include: -

- circular economy: advanced materials & logistics for local livelihoods
- sustainable food systems: bio-tech & market transformation
- climate adaptation: land, agriculture, livelihoods, infrastructures
- ageing society: intelligent systems for sustainable communities.

These tests may run in various locations, from local to global levels, each combining online / in person participants.

2 Program & partnership

2.1 International collaboration:

With notes by Prof. Yuan Fei of BJUT

An international collaboration with China-UK is now in discussion, with key roles including:

1. **University of Manchester & SAMI (UK)** - The *"Framework & Wisdom Provider*" ('CHI')
   - Role: Provides the foresight methodology and process detailed in the toolkit.
   - Value: Brings the experience in workshop design, stakeholder facilitation (FOCI), and the crucial "soft skills" to ensure the results have real-world impact .
2. **BJUT -** The *"Intelligence Engine & Domain Expert"* ('AI')
   - Role: Serves as the technical core for "Intelligent Foresight."
   - Value: Develops and applies the "Swarm Intelligence" (multi-agent simulation) models to *computationalize* the qualitative framework. Also provides the essential Domain Knowledge for "Future Industries" and "Innovation Hubs." The specific functionalities to be discussed: also the priority domains, industry sectors, strategic technologies, etc.
3. **Platforms:** – fully developed interfaces, which provide practical connections between human users and the AI content:
   - 7 leading platforms are under review, as in the next section
   - UoM and SAMI are currently working with Preempt and Signals, both very powerful, and also in rapid development.
   -
4. **'Toolkits':** general frameworks which provide guidance to users on which tools to use, when, where, for which applications, etc.
   - ***Pathways Toolkit*** – the application of FOCI 'Future oriented collective intelligence' – informal and flexible guidance.
   - ***Futures Toolkit***: hosted by UK Government Office of Science, developed by SAMI Consulting: policy focus & open source: further developments are in discussion.
   - ***UNIDO Handbook of Technology Foresight*** – work in progress on Chinese translation
5. **Policy users:** - the *"problem & context provider"*
   - Role: Acts as the primary end-user and problem-definer.
   - Value: Provides the real, high-stakes strategic challenges (the "Scoping Question & Sense-Making" that the toolkit identifies as the critical first & last step).

- Potential program partners include:

- CASTED / CASISD / CISTRAT: organizations to promote science / technology linkages and skills, with government and industry
- UK Government Office of Science (Department of Science Industry & Technology): special expertise in managing national STI foresight.
- UNIDO: long history of UoM collaboration & practical experience of STI foresight programs. (the UNIDO Handbook above)

A summary of the collaborative R&D program is in the figure below.
This shows the human 'CHI' on the left: machine 'AI' on the right: and a 'CHAI framework' in the centre. This is based on a CHAI interface, i.e. where CHI combines with AI. The 'CHAI framework' is then a structure for design, development, testing and evaluation of results.

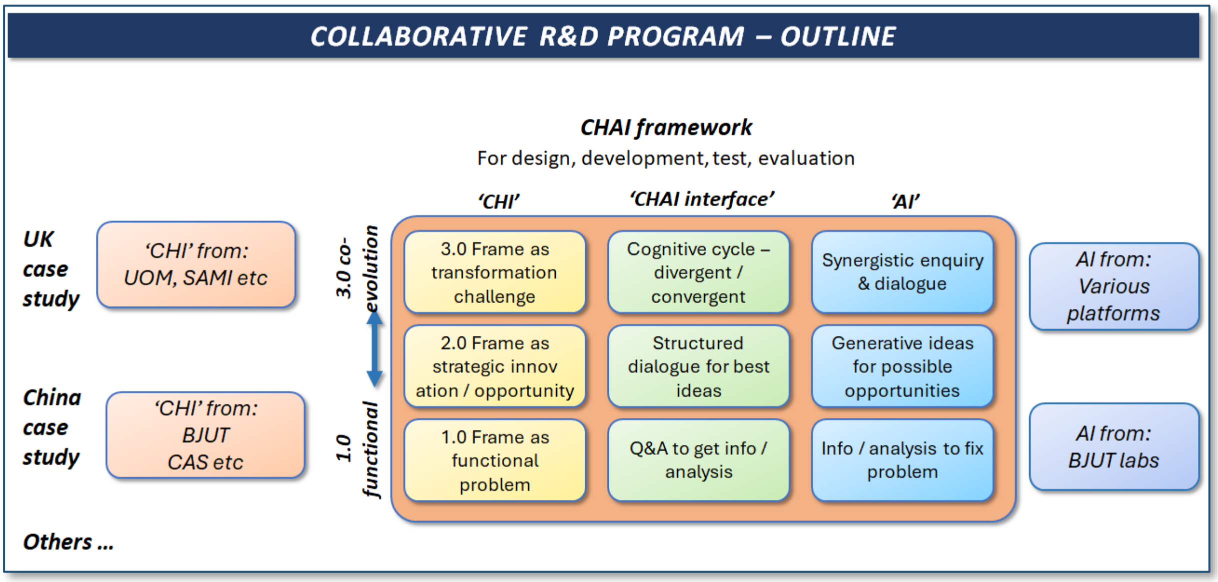


Figure 2: collaborative R&D program

2.2 Practical pilot test programs

For practical pilot test projects, some options under discussion include:

1) Local pilot option: 'GM2050' (Future of Greater Manchester)

Policy partners: GM Combined Authority, Manchester Climate Change Partnership, etc.

Service partners: SAMI Consulting, BJUT, selected foresight platform.

The likely topic for a pilot is on the theme of low carbon / circular economy

Program for the pilot:

1) Select topic for the pilot, and engage with foresight community:
   - Academic test with the Humanities-AI forum
   - Policy pilot with the Manchester Climate Change Partnership
2) Develop 'CHI framework' with foresight community
   - Identify hotspots on the CHAI interface mapping
   - Test in F2F discussion
3) Select & configure 1 or more AI systems
   - Identify specific requirements on the CHAI interface mapping
   - Review existing high-level platforms
   - Review operational capabilities: scan, agent, swarm, multi-media etc
4) Develop prompt / interaction framework,
   - Specific linkages from the CHAI interface mapping
   - Translate to technical specifications
5) Apply to details of selected topic:
   - Investigate likely training data & access
   - Discuss with partners: policy scope, supply chain reach, demand side access
6) Run trials: first desk study, then as a real-time pilot foresight
7) Dialogue with potential foresight users & wider community
8) Evaluate & report…

2) Global pilot option: strategic foresight on leading technologies:

Policy partners: CASTED: CASISD: UNIDO (to be confirmed)

Service partners: BJUT, SAMI Consulting, selected foresight platform.

Likely topics for a pilot:

First option: 'society pull': start from a 'grand challenge', and work back to the strategic technologies / applications which are most relevant: e.g.

- ***ageing society: intelligent systems for sustainable communities.***

- Also discussed: sustainable food systems: bio-tech & market transformation

Second option: 'technology push': start with a leading technology and explore the trends. alternative futures, implications and applications. e.g.

- Robotics: future developments, market applications, risks & rewards, policy implications.
- Quantum computing etc

The development program will be similar to the above.

Security issues

As a foresight method / tool testing process, this program is not aiming at development or deployment of any technologies or related IP:

Therefore, the whole program stays at the 'advisory' level, and should present minimal issues for security, data protection or export controls.

Current platform reviews

There are a growing number of AI-enabled platforms with various foresight / futures capabilities, each powerful and fast developing. They are being reviewed in the current program of quarterly 'Foresight-CHAI Forum' meetings.

The first 2 – Preempt and Signals – are also in active development with UoM / SAMI. See further notes on Preempt below. Current platforms include:

a) Pre-empt: https://www.preempt.life/
b) Signals - https://signals.envisioning.io/
c) Next Atlas: https://www.nextatlas.com/foresight/why
d) Algorithm: https://thealgorithm.me/
e) 4Strat: https://www.4strat.com/
f) *4CF Sprawlr: https://4cf.eu/sprawlr/*
g) Thinkscape: https://Thinkscape.ai
h) Par Evo: https://parevo.org/
i) Futures Lab: https://www.thefuturelaboratory.com

Toolkits: as above:

- Pathways Toolkit: Synergistics | Toolkit
- Futures Toolkit: https://www.gov.uk/government/publications/futures-toolkit-for-policy-makers-and-analysts/the-futures-toolkit-html

- Futures4Europe - a general site for development of tools & applications - www.futures4europe.eu

Further work aims to analyse the specific functionalities and the interface design for each of these, in order to design and develop the best possible CHAI interface.

Next steps:

To be discussed, including:

- Consider project development program
- Organization objectives & partnership formation
- Review capabilities, technical & policy
- Explore resource requirements & funding sources

3 Program framework

This section includes general context on CHI and CHAI:

- Foresight for 'transformative innovation'
- Example foresight - Circular economy
- Collective human intelligence and CHAI framework
- Foresight-CHAI interface & framework.

3.1 What is Foresight 3.0 for transformative innovation?

The first practical focus in a foresight is the innovation process, transition curve, or innovation chain.

This may be a specific scope on the 'push' factors of new technologies and products. Or, it may take a wider focus on the societal value chain, to include the wider / deeper impacts, risks, opportunities and transformative potential of new technologies and products.

Some of that is shown in the figure below, 'Foresight 3.0 for transformative innovation'. The lower part shows the innovation chain with 5 types of enablers and 2 types of outputs (based on the WIPO Global Innovation Index 2025). The upper part suggests a societal value chain with 8 types of structural indicators based on the goals of collective intelligence, as far as these can be defined (based on Ravetz 2020: 10-2)

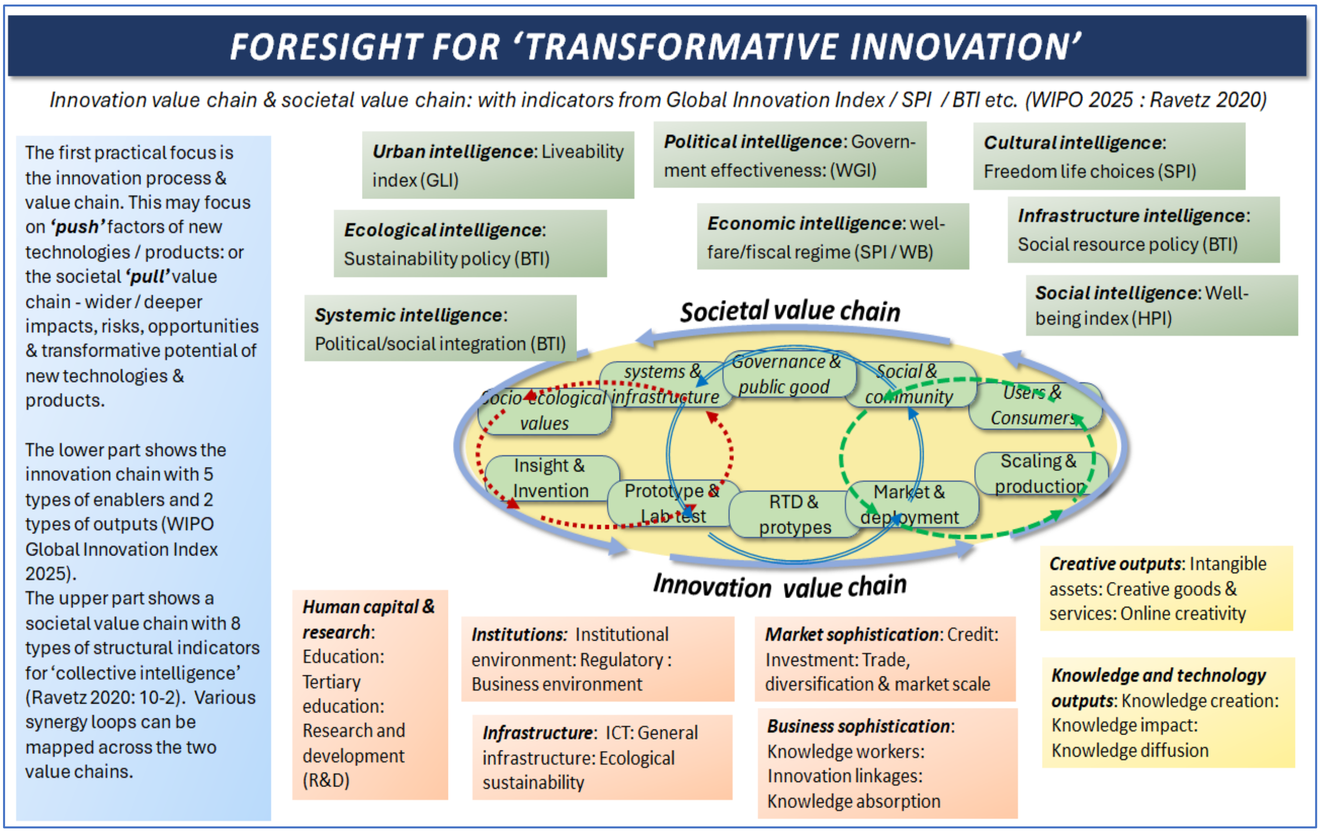


Figure 3: Foresight 3.0 for transformative innovation

The context of this Foresight-CHAI can be framed as 'transformative innovation' -

We take the example of the circular economy (CE): with text / graphics from the example of the UNIDO foresight on CE Ukraine (Ravetz et al 2023): *'the CE is not only about materials… it's a transformation in socio-technical systems – and the 'paradigm' which underlies them'*.

So a foresight-CHAI application on circular economy would explore, first and last with humans, but including the AI contribution:

a) ***'Systems'***: scope of the CE & the challenge: external pressures & hierarchies: internal mechanisms.

b) ***'Scenarios'***: trends, driving forces, dynamics of change & alternative futures:

c) ***Synergies***: visions, synergies & opportunities for transformation in each sector & domain: e.g.

- *Business-finance* – from 'product' to 'service':
- *Policy-governance* – from 'regulation' to 'partnership'
- *Social-community* – from 'consumers' to 'citizens':
- *Design-technology-innovation* – from 'products' to 'value chains':
- *Industrial ecology* - from 'resource efficiency' to 'circularity':
- *Urban infrastructure* – from 'waste' to 'resources':

d) ***Strategies***: pathways and roadmaps for action

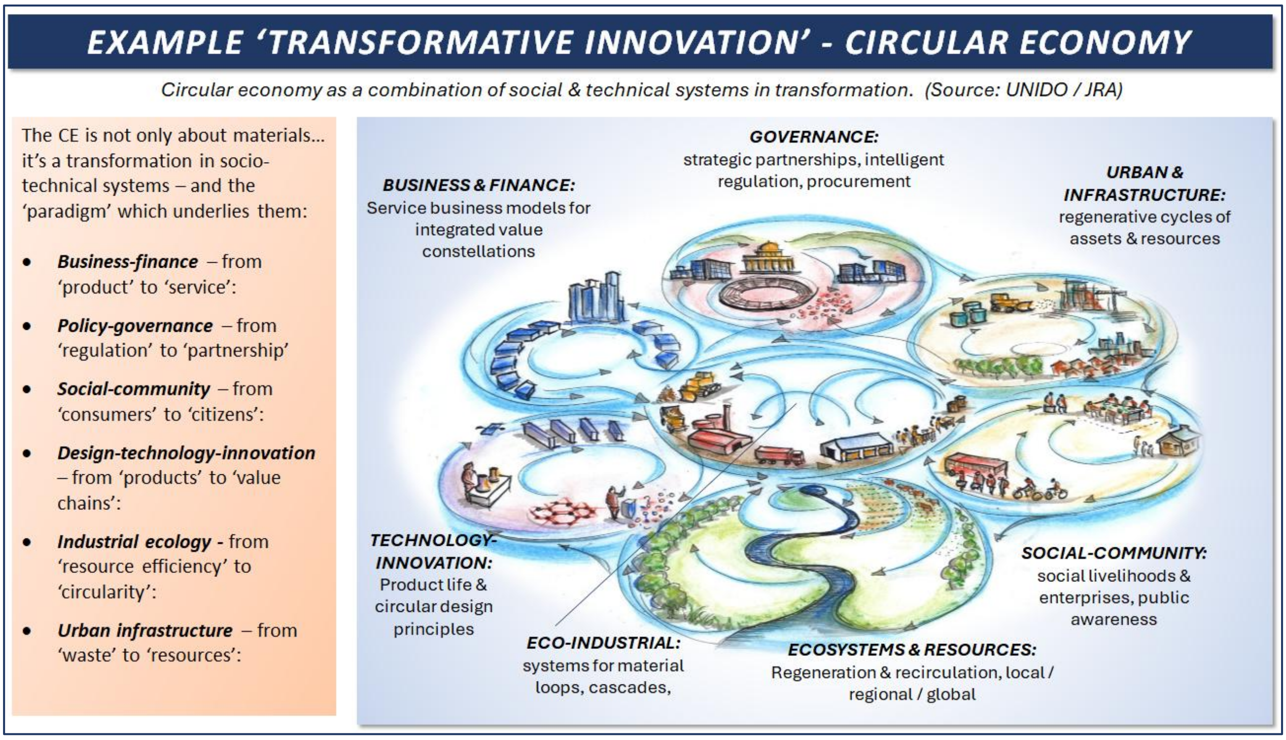


Figure 4: -Example foresight for 'transformative innovation' - Circular economy

3.2 What is collective human intelligence & CHAI?

The key question of 'what is CHI'? ('Collective Human Intelligence'), can be discussed at great length (see Ravetz 2020: Critchlow 2022). Figure 5 shows a summary of CHI and the CHAI framework, firstly at the inter-personal level.

MULTI-LEVEL: systemic qualities

- 3.0 co-evolutionary
- 2.0 evolutionary,
- 1.0 functional,

COGNITIVE CYCLE – as implemented in the 4-S pathways toolkit

- Communication: relational thinking
- Co-learning: divergent thinking
- Co-creation: emergent thinking
- Co-production: convergent thinking

COGNITIVE MAPPING: scoping the boundaries and framing of question and response

- Wider community
- Deeper values
- Further horizon

SYNERGIES – as mediated by human relationships…

- Power
- Competition
- Ideology
- Real-life synergies are VUCA - volatile, uncertain, complex / controversial, ambiguous, dynamic

The CHAI framework is shown on the right:

- 3.0 – transformative system guidance
- 2.0 – information for agency & innovation
- 1.0 – information for problem-fixing

Each level is then mediated by the interaction of CHI with AI via the 'CHAI interface'.

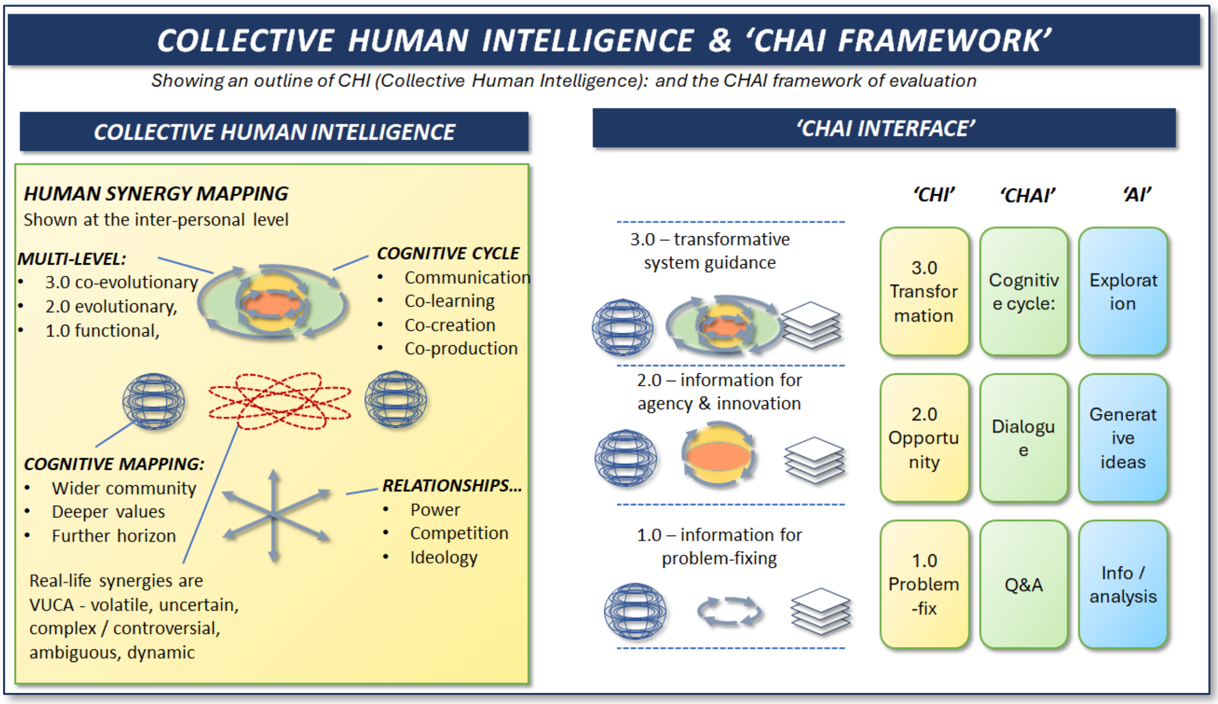


Figure 5: Collective Human Intelligence & CHAI framework

3.3 CHAI interface overview

This shows a more detailed picture of the ‘CHAI interface’, i.e. the various options for each stage in the combination of human synergies (CHI) with machine inputs (AI) .

Each program / project will need to decide on a certain combination for each of these fields, on both human and AI sides. We suggest a simple ‘default setting’, as shown with red circles, with possible variations and extensions as in blue.

This is then a backdrop for the program design, in the next section.

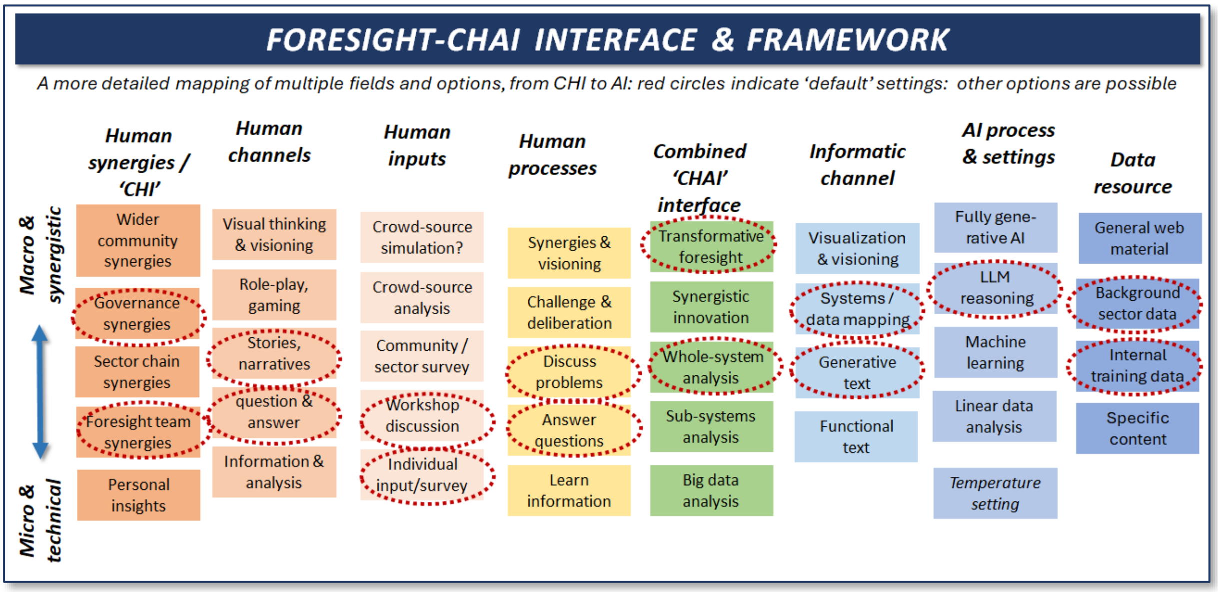


Figure 6: CHAI interface overview

4 Pilot program design

There follows a more detailed outline of the pilot projects, in terms of the Foresight 3.0 methods and CHAI interface.

- Foresight-CHAI demo: 'pathways' toolkit & process model
- Foresight-CHAI structure: example platform 'Pre-empt'
- Foresight-CHAI - multi-level applications

4.1 Foresight-CHAI pilot: 'pathways' toolkit

This shows a typical 12-step process of Foresight-CHAI with the pathways toolkit:

AI-enabled content is on the inner yellow circle: Collective Human Intelligence (CHI) responses / 'reality-vision testing' is on the outer green circle.

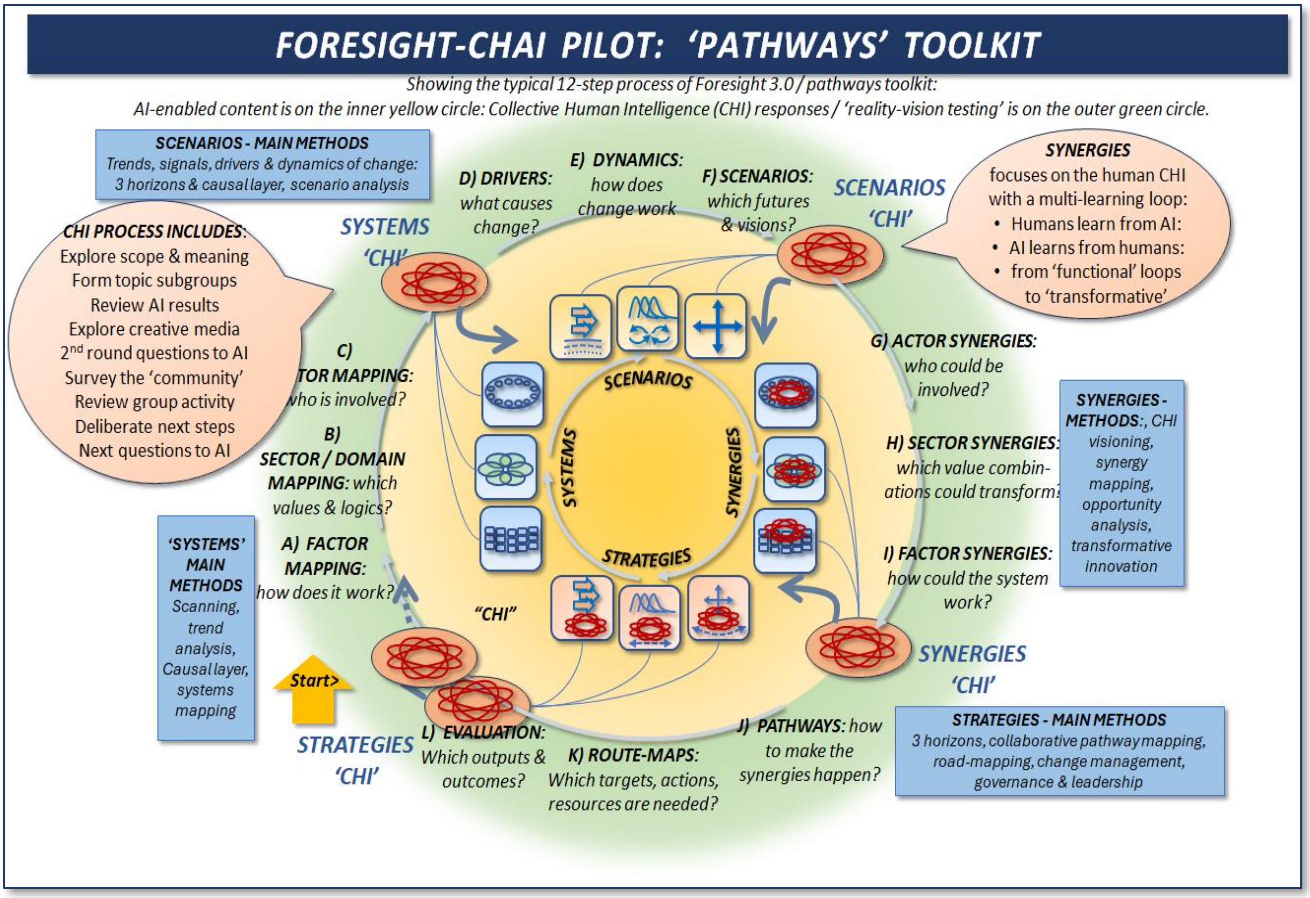


Figure 7: Foresight-CHAI pilot: 'pathways' toolkit

The basic scheme is for humans to debate, learn, critique and review for meaning and significance – receiving AI inputs and providing further questions – at each of the 4 stages in the '4S' toolkit – systems, scenarios, synergies, strategies.

Each of 4 stages includes 3 main types of questions, e.g. '*who is involved in this challenge / system?*', etc. These can be fed to the AI prompts, and/or discussed by humans.

The CHI process includes at each stage:

- Explore scope & meaning
- Form topic subgroups
- Review AI results
- Explore creative media
- 2nd round questions to AI
- Survey the 'community'
- Review group activity
- Deliberate next steps
- Next questions to AI

The 3rd stage - synergies – has a special focus on the human CHI i.e. the AI inputs are more in the background: these also explores with a multi-learning loop:

- Humans learn from AI:
- AI learns from humans:
- General shift from 'functional' loops to 'transformative'

The AI inputs are structured by the 4 stages:

- ***'SYSTEMS' -*** Scanning, trend analysis, Causal layer, systems mapping
- ***SCENARIOS -*** Trends, signals, drivers & dynamics of change: 3 horizons & causal layer, scenario analysis
- ***SYNERGIES -*** CHI visioning, synergy mapping, opportunity analysis, transformative innovation
- ***STRATEGIES -*** 3 horizons, collaborative pathway mapping, road-mapping, change management, governance & leadership

More detailed questions / worked examples are in the Annex.

4.2 Foresight-CHAI with 'Pre-Empt' platform

For a comprehensive ready made platform, the Pre-Empt platform seems the most suitable reviewed so far.

This diagram shows the typical Foresight 3.0 '4S' and 12-step process with the basic modules of the Preempt system.

The PreEmpt process model shown at the top ('scan, plan, act, lead, govern, report') - has an approximate fit to the 4-stage Pathways toolkit, so we suggest to use individual modules as shown here, to best suit the 4S cycle.

- ***Systems stage***: modules include: '*assumptions, crowd-sourcing, sentiment, stakeholders, research, regional*':
- ***Scenarios stage***: modules include '*drivers, threats, scenarios'*:
- ***'Synergies' stage***: here the focus is on the human CHI synergy forming process: i.e. Pre-Empt modules are more in the background. Where possible we follow a multi-learning loop from 'functional' to 'transformative' cycles, i.e: 'Humans learn from AI: and the AI learns from humans'. (modules include *'stakeholders, values, gamechangers';*
- 'Strategies' stage: modules include '*investment, game-plan, policy, governance'.*

Also there are two modules for management of the process: *'dashboard: scorecard'.*
Further details on the PreEmpt system are in the Annex.

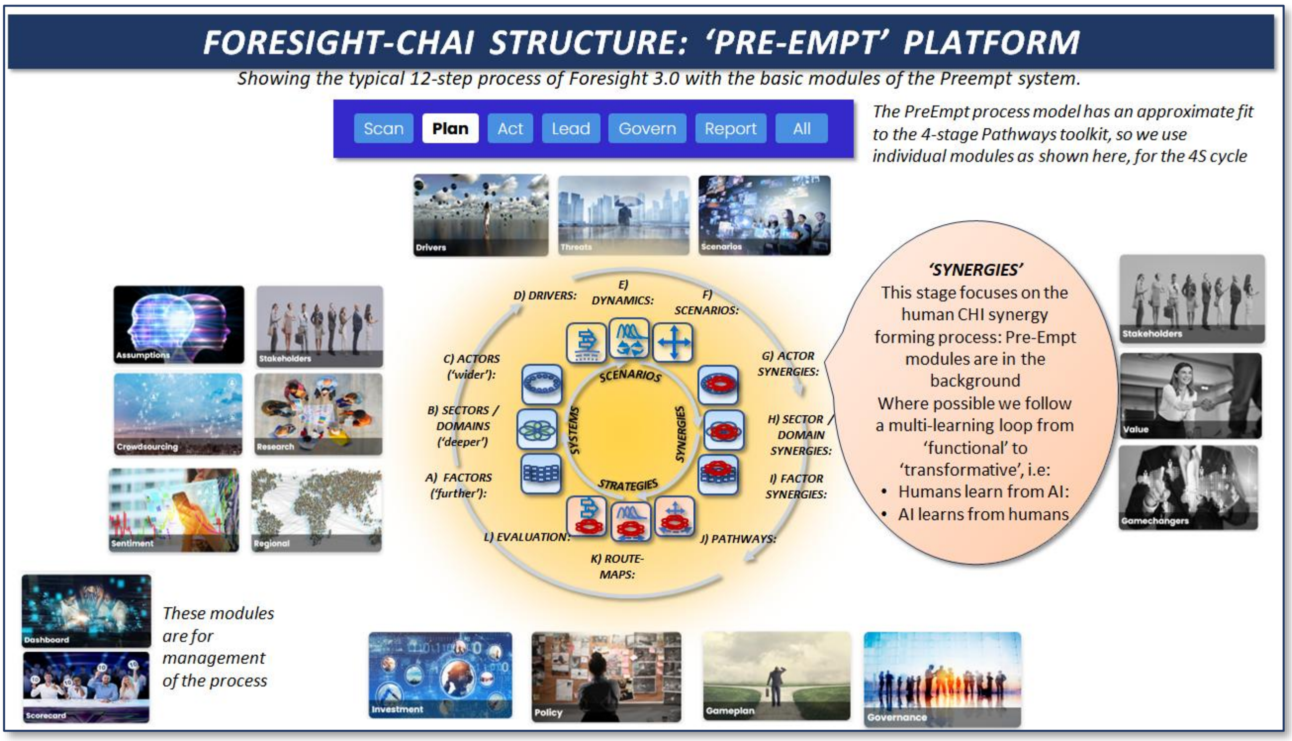


Figure 8: Foresight-CHAI structure: 'Pre-Empt' platform

4.3 Foresight-CHAI - multi-level applications

(work in progress)

This diagram shows the multiple levels of application, from 'many' to 'group' to 'user' / individual level. For each level there are new possibilities coming from the AI potential.

COMMUNITY SYNERGIES - From 20 to 20 million..

'Many to many' :

- Group chat / swarm intelligence
- Dynamic survey, trend analysis, idea mapping
- Dialogue & synergy simulation

'1 to many'

- Q&A survey
- problem / opportunity analysis

'Many to 1'

- Crowd-source info & response
- Cluster & sentiment analysis

GROUP SYNERGIES - From 2 to 20…

- ***'Group to group': -*** Synergy analysis & recommendation
- ***'Group to 1':*** Synergy analysis & recommendation
- ***'1 to group'***

USER SYNERGIES - From 1 to 2…

- ***'user to AI'***
- ***'AI to user'***

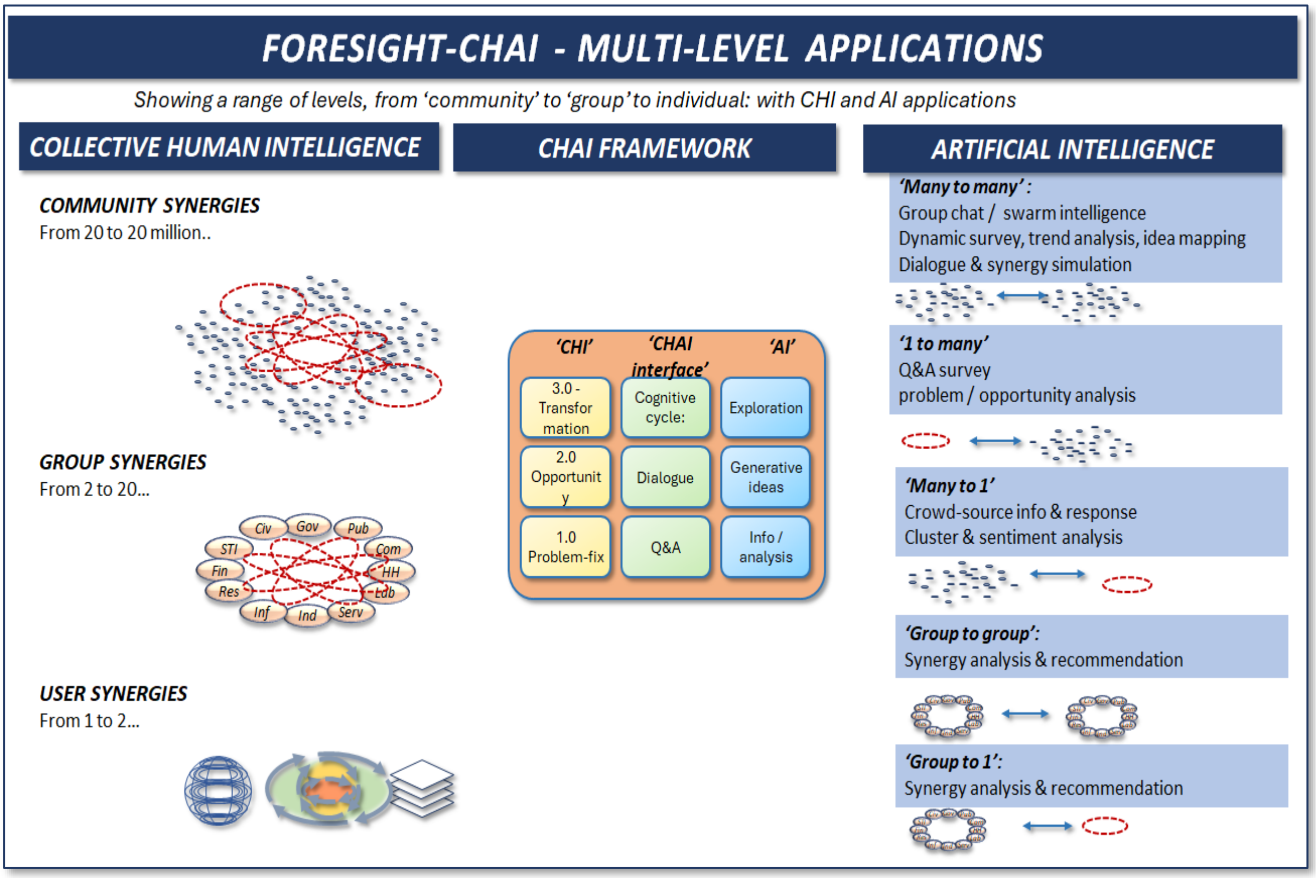


Figure 9: Foresight-CHAI - multi-level applications

For typical applications, the table shows some basic combinations:

	Nearer	***Medium***	***Further***
Macro	Policy development	Policy foresight	Strategic foresight
Meso	Sector / area planning	Sector / area foresight	Sector / area strategic foresight
Micro	Local action	Local planning	Local visioning

Table 1: Foresight-CHAI - multi-level applications

5 Annex A: summary tables

The following tables are summaries of a framework: this starts from the 12-step pathway toolkit, and then identifies some of the specifics for each step:

- 'AI-informatic' processes & functionalities,
- 'CHI' processes & functionalities

The tables at the moment are work in progress.

5.1 Summary of Foresight-CHAI

Leading questions include:

- What is the difference between standard foresight and Foresight 3.0? (i.e. 'foresight CHI' with collective human intelligence).
- What are the strategic contributions of AI to Foresight 3.0?

This table is adapted from the standard 'foresight 3.0' table in *Ravetz 2020 (9-4)*.

	Mode-I Linear	***Mode-II Evolutionary***	***Mode-III Co-evolutionary***	***AI contribution to CHI***
GENERAL SCOPE -	***'CLEVER': Problem-fix intelligence***	***'SMART': Entrepreneurial intelligence***	***'WISE': 'Collective human intelligence' (CHI)***	
WIDER: (actors & factors)	Elite/experts with top-down programme	Elite/experts with open enterprise	Participative co-learning & co-production	stakeholder analysis: game analysis: potential synergy formation
DEEPER: (social, technical etc)	Bounded functional analysis	Multi-functional analysis	Multi-dimension, multi-valent synthesis	multi-level systems & value chain analysis: multi-cultural perspectives:
FURTHER: innovation/transition	Problem-solving foresight: for technical innovation	Opportunity-seeking entrepreneurial innovation	Agenda setting & transformative innovation	Transition planning: change management: transformative innovation
PROCESS CYCLE				
Communication: *(Relational thinking):*	Tangible system mapping	Systems of incentives, competition, enterprise	Cognitive capital & *connexus* mapping	Application to multiple knowledges: boundary objects & trading zones: weak signals
Co-learning: *(Divergent thinking):*	Tangible trends / scenarios	Evolutionary trends/scenarios	Alternative futures & synergistic potential	trend & risk analysis: systemic change dynamics: multi-horizons: wild cards: alternative scenarios
Co-creation: *(Emergent thinking:*	Specific problem-solving	Innovation & problem insight	Societal co-design & co-innovation	Collective visions: synergy formation: new value chain opportunities: potential partnerships & reality testing.
Co-production: *(Convergent thinking):*	Specific actions/responses	Enterprise strategy & road-mapping	Societal transformation pathways	Pathway & road-mapping: strategic planning: governance & policy applications: management & evaluation

Table 2: summary of Foresight-CHAI

5.2 'Systems' stage (work in progress)

'Reality check' here refers to the human side – agenda setting, scoping& framing, relevant & significance etc.

	General questions	***Informatic process (AI-generated)***	***Potential functionalities / AI-platforms***	***Typical prompts for pilot***	***Intelli-matic process (CHAI-generated)***
1. SYSTEMS					
A) FACTORS ('further'):	*how does the 'challenge' / system work?*	*Horizon scanning: causal chain analysis*		*(AI) What are the overall material resource flows of our city?* *Which key factors drive these flows?*	*Reality check: focus on systems scoping*
B) SECTORS / DOMAINS ('deeper'):	*which values & logics?*	*STEEP analysis*		*(AI) How do the social, political, economic and cultural systems (SPEC) drive these material resource flows?*	*Reality check: focus on knowledge domains*
C) ACTORS ('wider'):	*who is involved?*	*Actors roles & objectives*	*large networked groups hold real-time conversations, optimize **group insights** e.g. https://Thinkscape*	*(AI) Who are the main actors/stakeholders involved with the material resource flows: what kind of relations & power structures (SPEC)?*	*Reality check: focus on stakeholder agendas, power structures*
				(CHI) ***Factors:*** are these results realistic: relevant: timely: in scope: in context: problematic: controversial/VUCA? Is there anything to change, add, delete? ***Sectors / actors***: ditto	Deliberations on scoping, framing, nuance, context, VUCA ('volatile, uncertain, complex/ controversial, ambiguous')
		Forming next AI prompts>>			

Table 3: summary of 'Systems' stage

5.3 Scenarios stage (work in progress)

	General questions	*Informatic process (AI-generated)*	*Potential functionalities / AI-platforms*	*Typical prompts for pilot*	*Intelli-matic process (CHAI-generated)*
SCENARIOS					
D) DRIVERS:	*what causes change?*	*Trend & drivers analysis:*	*Reality check: focus on scope & analysis*	*weak signal analysis for market trends, consumer behaviors*	*(AI): what are the current trends in the material resource flows, and what drives these trends?*
E) DYNAMICS:	*how does change work?*	*Horizons, dynamics, principal axes of change*	*Reality check: focus on horizons & axes*		*(AI): what the key types of change: and when are they expected, horizon 1 (3 years): horizon 2 (10 years): horizon 3 (25 years)*
F) SCENARIOS:	*which futures & visions?*	*Alternative futures based on principal axes*	*Creative scenario imagineering / vision forming*		*(AI): which are the 2 most significant drivers of change & uncertainty? which alternative future scenarios emerge from the combinations? How do these look to key actors / roles?*
			Deliberations on nature of change: alternative axes: creative scenarios: goals & proto-visions.		(CHI) ***Drivers:*** are these results realistic: relevant: timely: in scope: in context: problematic: controversial/VUCA? Is there anything to change, add, delete? ***Horizons / scenarios***: ditto
		Forming next AI prompts>>			What are the implications of drivers, dynamics, scenarios results, for next questions?

Table 4: summary of 'Scenarios' stage

5.4 'Synergies' stage (work in progress)

The term 'synergies' refers to any kind of collaborative value added relationship, including competition. Such competition in markets, games etc, is generally based on some level of collaboration: e.g. agreement on rules, mandates, sanctions, regulations: there is also value in collective organization of competing actors, e.g. an industry association or labour movement.

	General questions	***Informatics (AI-generated)***	***Intelli-matics (CHAI-generated)***
3. SYNERGIES			
G#1) ACTOR SYNERGIES	*who can realize the vision with who? (1/1)*	*Potential 1/1 stakeholder synergies: analysis & recommendation*	Reality / vision check: by each 1/1 stakeholder pair (or role play)
G#2) ACTOR SYNERGIES	*who can realize the vision with who? (many/many)*	*Potential multi-coalition synergies: analysis & recommendation*	Reality / vision check: by each stakeholder coalition (or role play)
H) SECTOR SYNERGIES:	*which could be new values & logics?*	*Potential synergies against STEEP domains*	Reality / vision check: by each STEEP domain type
I) FACTOR SYNERGIES:	*how would the new synergies work?*	*Testing potential synergies against causal chains*	Reality / vision check: by causal chain logic
			Deliberations on scoping of vision: multi-level systems of power & ideology: feasibility of transformation: formation of strategic goals.
		Forming next AI prompts>>	

Table 5: summary of 'Synergies' stage

5.5 ‘Strategies’ stage (work in progress)

4. STRATEGIES			
J) PATHWAYS:	*how to take the potential goals / synergies into reality?*	*Form & test potential priority pathways, based on actor/sector/factor synergies*	Reality / vision check: by actor/sector/factors
K) ROUTE-MAPS:	*Which strategic actions & resources are needed?*	*Form & test potential road-maps, based on goals, actions, resources*	Reality / vision check: by goals, actions & resources
L) MANAGE-MENT	*What actions, when, where, how much: evaluation & feedback*	*(this is not included at this stage)*	*(this is not included at this stage)*
			Deliberations for consensus on visions, synergies, goals, strategies
		Summary of foresight-CHAI	Human presentation & application

Table 6: summary of 'Strategies' stage

5.6 WIPO Global innovation index

China 10

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
5	19	Upper middle	SEAO	1,419.3	37,072.1	26,310

			Score/ Value	Rank	
	Institutions		**60.0**	**44**	◆
1.1	**Institutional environment**		**63.9**	**44**	◆
1.1.1	Operational stability for businesses*		68.0	47	
1.1.2	Government effectiveness*		59.7	43	◆
1.2	**Regulatory environment**		**44.9**	**80**	○
1.2.1	Regulatory quality*		38.5	94	○
1.2.2	Rule of law*		51.3	64	
1.3	**Business environment**		**71.1**	**16**	◆
1.3.1	Policy stability for doing business†	⊙	73.0	17	◆
1.3.2	Entrepreneurship policies and culture†		69.2	13	◆
	Human capital and research		**52.0**	**20**	◆
2.1	**Education**		**74.0**	**[4]**	
2.1.1	Expenditure on education, % GDP	⊙	4.0	76	○
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years		n/a	n/a	
2.1.4	PISA scales in reading, maths and science	⊙	579.0	1	●◆
2.1.5	Pupil–teacher ratio, secondary		13.3	64	
2.2	**Tertiary education**		**22.3**	**90**	○
2.2.1	Tertiary enrolment, % gross		74.6	38	
2.2.2	Graduates in science and engineering, %		n/a	n/a	
2.2.3	Tertiary inbound mobility, %		0.3	107	○
2.3	**Research and development (R&D)**		**59.5**	**16**	◆
2.3.1	Researchers, FTE/mn pop.		2,129.1	42	◆
2.3.2	Gross expenditure on R&D, % GDP		2.6	14	◆
2.3.3	Global corporate R&D investors, top 3, mn USD		89.9	3	●◆
2.3.4	QS university ranking, top 3*		87.2	4	◆
	Infrastructure		**64.3**	**6**	◆
3.1	**Information and communication technology (ICT)**		**89.3**	**25**	◆
3.1.1	ICT access*		89.2	57	
3.1.2	ICT use*		87.5	28	
3.1.3	Government online service*		91.1	11	◆
3.2	**General infrastructure**		**64.5**	**7**	◆
3.2.1	Electricity output, GWh/mn pop.		6,747.7	30	◆
3.2.2	Logistics performance*		72.7	18	◆
3.2.3	Gross capital formation, % GDP		42.3	2	●◆
3.3	**Ecological sustainability**		**39.1**	**22**	◆
3.3.1	GDP/unit of energy use		6.9	102	○
3.3.2	Low-carbon energy use, %		18.4	70	
3.3.3	ISO 14001 environment/bn PPP$ GDP		9.8	3	●◆
	Market sophistication		**57.3**	**13**	◆
4.1	**Credit**		**50.0**	**27**	◆
4.1.1	Finance for startups and scaleups†		66.1	22	◆
4.1.2	Domestic credit to private sector, % GDP		194.7	3	●◆
4.1.3	Loans from microfinance institutions, % GDP		0.6	43	○
4.2	**Investment**		**29.3**	**19**	◆
4.2.1	Market capitalization, % GDP		76.2	24	
4.2.2	Venture capital (VC) received, deal count/bn PPP$ GDP		0.2	36	◆
4.2.3	Late-stage VC deal count, % global VC		6.5	2	●◆
4.2.4	VC investors, deal count/bn PPP$ GDP		0.2	52	
4.2.5	VC investor co-participation/bn PPP$ GDP		0.2	36	
4.3	**Trade, diversification and market scale**		**92.6**	**2**	●◆
4.3.1	Applied tariff rate, weighted avg., %		2.7	75	
4.3.2	Domestic industry diversification	⊙	98.5	5	◆
4.3.3	Domestic market scale, bn PPP$		37,072.1	1	●◆

			Score/ Value	Rank	
	Business sophistication		**56.0**	**8**	◆
5.1	**Knowledge workers**		**56.0**	**[19]**	
5.1.1	Knowledge-intensive employment, %		n/a	n/a	
5.1.2	Females employed w/advanced degrees, %		n/a	n/a	
5.1.3	Youth demographic dividend, %		27.0	105	○◇
5.1.4	GERD performed by business, % GDP		2.0	11	◆
5.1.5	GERD financed by business, %		79.3	2	●◆
5.2	**Innovation linkages**		**69.2**	**4**	◆
5.2.1	Public research–industry co-publications, %		7.7	4	◆
5.2.2	University–industry R&D collaboration†	⊙	65.3	11	◆
5.2.3	University industry and international engagement, top 5*		78.3	19	◆
5.2.4	State of cluster development†	⊙	96.9	2	●◆
5.2.5	Patent families/bn PPP$ GDP		1.5	22	◆
5.3	**Knowledge absorption**		**42.7**	**21**	◆
5.3.1	Intellectual property payments, % total trade		1.4	25	
5.3.2	High-tech imports, % total trade		18.0	11	◆
5.3.3	ICT services imports, % total trade		1.2	83	○
5.3.4	FDI net inflows, % GDP		1.1	110	○
5.3.5	Research talent, % in businesses		59.2	16	◆
	Knowledge and technology outputs		**60.7**	**1**	●◆
6.1	**Knowledge creation**		**70.3**	**1**	●◆
6.1.1	Patents by origin/bn PPP$ GDP		44.1	2	●◆
6.1.2	PCT patents by inventor origin/bn PPP$ GDP		1.8	13	◆
6.1.3	Utility models by origin/bn PPP$ GDP		88.5	1	●◆
6.1.4	Scientific and technical articles/bn PPP$ GDP		20.4	32	◆
6.1.5	Citable documents H-index		70.3	8	◆
6.2	**Knowledge impact**		**60.2**	**3**	●◆
6.2.1	Labor productivity growth, %		5.4	2	●◆
6.2.2	Unicorn valuation, % GDP		3.6	13	◆
6.2.3	Software spending, % GDP		0.3	33	
6.2.4	High-tech manufacturing, %	⊙	48.4	11	◆
6.3	**Knowledge diffusion**		**51.6**	**9**	◆
6.3.1	Intellectual property receipts, % total trade		0.4	34	◆
6.3.2	Production and export complexity		80.1	17	◆
6.3.3	High-tech exports, % total trade		23.9	5	◆
6.3.4	ICT services exports, % total trade		2.7	50	
6.3.5	ISO 9001 quality/bn PPP$ GDP		18.3	6	◆
	Creative outputs		**49.7**	**14**	◆
7.1	**Intangible assets**		**81.2**	**1**	●◆
7.1.1	Intangible asset intensity, top 15, %		62.8	29	
7.1.2	Trademarks by origin/bn PPP$ GDP		202.3	1	●◆
7.1.3	Global brand value, top 5,000, % GDP		9.3	18	◆
7.1.4	Industrial designs by origin/bn PPP$ GDP		23.3	1	●◆
7.2	**Creative goods and services**		**31.9**	**26**	◆
7.2.1	Cultural and creative services exports, % total trade		0.6	49	
7.2.2	National feature films/mn pop. 15–69		0.7	76	○
7.2.3	Entertainment and media market/th pop. 15–69		11.0	34	○◆
7.2.4	Creative goods exports, % total trade		9.5	1	●◆
7.3	**Online creativity**		**4.6**	**[131]**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		4.6	64	
7.3.2	GitHub commits/mn pop. 15–69		n/a	n/a	
7.3.3	Mobile app creation/bn PPP$ GDP		n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⊙ indicates that the economy's data are older than the base year; Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

6 Annex B: future Foresight-CHAI potential

This section raises questions on the future potential of agentic AI as a dynamic force in enabling the human CHI: all work in progress

6.1 Pathways toolkit - 'systems & scenarios' stages

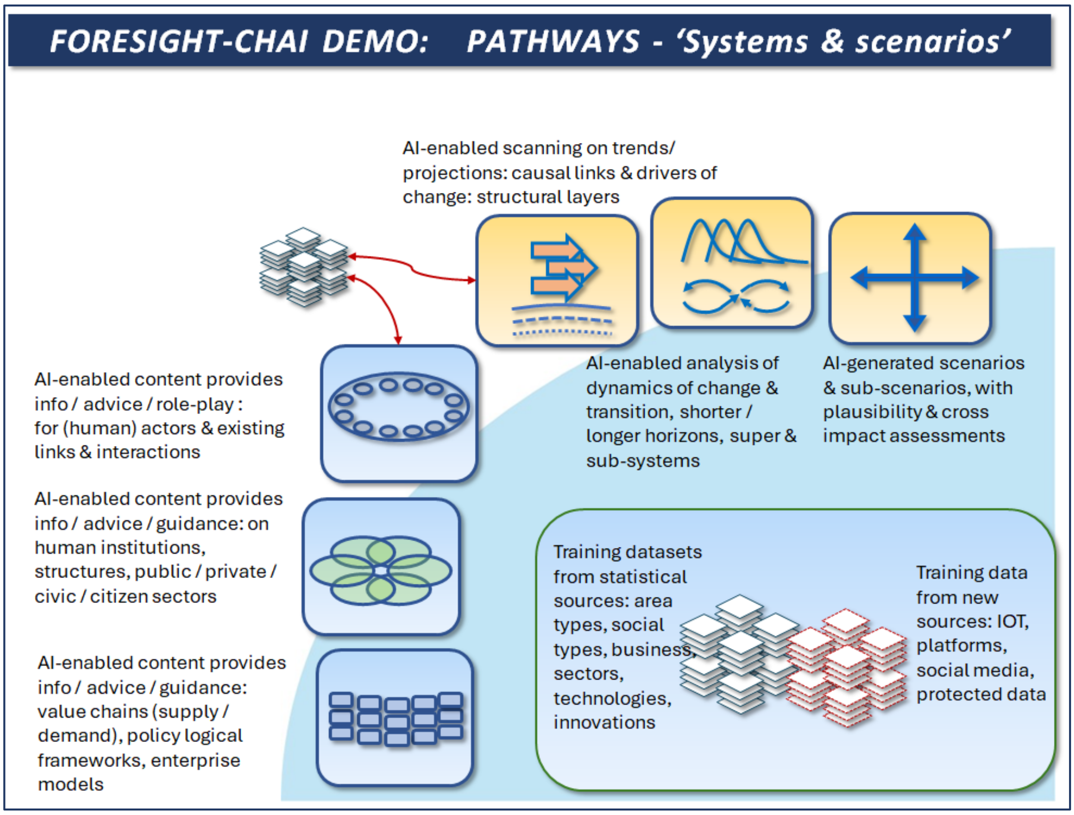


Figure 10: Foresight-CHAI demo: pathways - 'systems & scenarios'

Here we see a graphic version of the first 2 stages of the process in Figure 1: '*systems & scenarios'*. Also there are further notes on each of the 3 steps in each stage:

a) AI-enabled content provides info / advice / guidance: value chains (supply / demand), policy logical frameworks, enterprise models
b) AI-enabled content provides info / advice / guidance: on human institutions, structures, public / private / civic / citizen sectors
c) AI-enabled content provides info / advice / role-play : for (human) actors & existing links & interactions
d) AI-enabled scanning on trends/ projections: causal links & drivers of change: structural layers
e) AI-enabled analysis of dynamics of change & transition, shorter / longer horizons, super & sub-systems
f) AI-generated scenarios & sub-scenarios, with plausibility & cross impact assessments

6.2 Pathways toolkit – 'synergies' stage

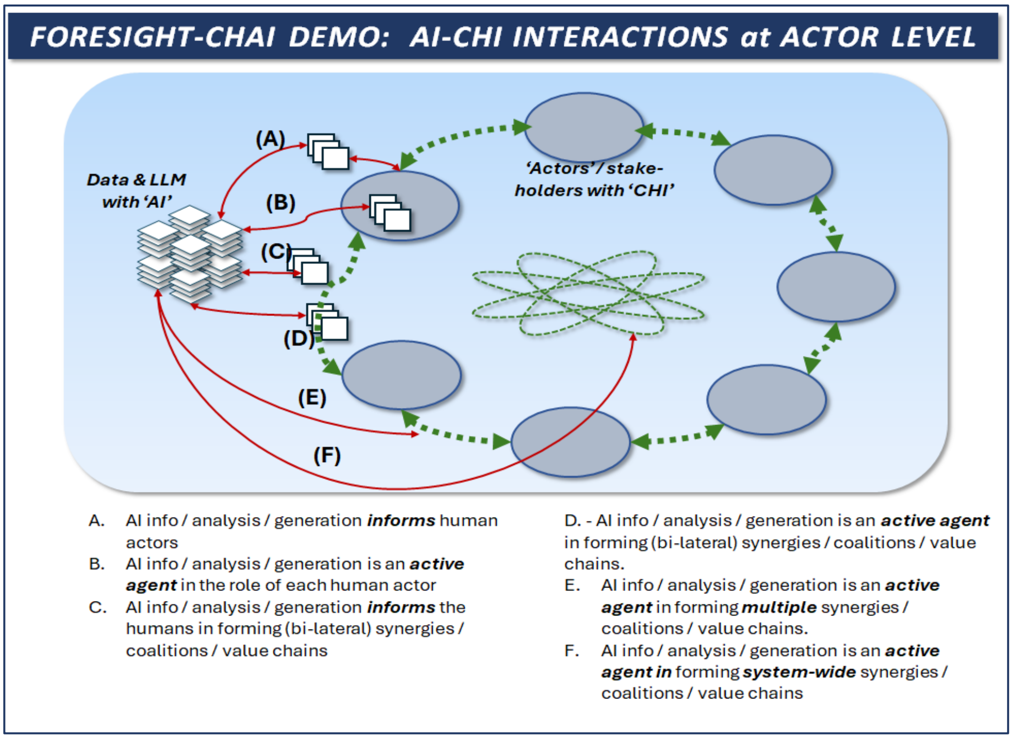


Figure 11: Foresight-CHAI demo: AI-CHI interactions at actor level

Here we see the crucial exchange between AI and CHI, visualized as a hierarchy of stakeholder synergies.

A. AI info / analysis / generation ***informs*** human actors

B. AI info / analysis / generation is an ***active agent*** in the role of each human actor

C. AI info / analysis / generation ***informs*** the humans in forming (bi-lateral) synergies / coalitions / value chains

D. AI info / analysis / generation is an ***active agent*** in forming (bi-lateral) synergies / coalitions / value chains.

E. AI info / analysis / generation is an ***active agent*** in forming ***multiple*** synergies / coalitions / value chains.

F. AI info / analysis / generation is an ***active agent in*** forming ***system-wide*** synergies / coalitions / value chains

In the current pilot we aim to include A, B, C: if successful then we begin to look at D & E.

7 Annex C: notes on Pre-empt platform

Background notes on the Pre-Empt system: as from https://www.preempt.life/guide.html

Seven-Component Architecture

1. My Life (Personal Decision Intelligence)

- **Purpose:** Individual scenario planning and life reimagining
- **Users:** Individuals seeking personal strategic guidance
- **Outputs:** Personal life scenarios, trend analyses, opportunity identification

2. Our World (Organizational Decision Intelligence)

- **Purpose:** Complex future questions for any topic/organization/country
- **Users:** Businesses, governments, researchers
- **Outputs:** Decision intelligence reports, implementation plans, multi-language support

3. Team Workshops (Collaborative AI)

- **Purpose:** Facilitated team decision intelligence with AI companion (Alexis)
- **Users:** Teams, departments, organizations
- **Outputs:** Collaborative scenarios, stakeholder insights, shared strategic vision

4. Have Your Say (Public Surveys)

- **Purpose:** Free public participation in futures research
- **Users:** General public, communities, interest groups
- **Outputs:** Aggregated insights, democratic input on future scenarios

5. Training Courses (Decision Intelligence Education)

- **Purpose:** Professional development in futures thinking and decision intelligence
- **Users:** Professionals, organizations, academic institutions
- **Outputs:** Certified practitioners, enhanced organizational capability

6. Co-creation Workshops (Facilitation Services)

- **Purpose:** Expert-led collaborative strategy development
- **Users:** Organizations seeking facilitated futures workshops
- **Outputs:** Custom scenarios, strategic roadmaps, stakeholder alignment

7. Horizon Scanning & Alerts (Real-time Service)

- **Purpose:** Dynamic monitoring of emerging trends and weak signals
- **Users:** Subscribers, organizations, decision-makers
- **Outputs:** Real-time alerts, trend reports, early warning notifications

System Integration Flow

- **Historical Analysis:** System analyzes past patterns, trends, and historical data relevant to the query
- **Present Context Mapping:** Relates historical patterns to current conditions, emerging signals, and weak signals
- **Future Scenario Generation:** Applies 1,000+ methodologies to create multiple future scenarios across time horizons
- **Temporal Integration:** Links past-present-future in non-linear, holistic framework with continuous learning
- **Actionable Outputs:** Delivers reports, implementation plans, videos, blog articles, and strategic recommendations

New functionalities

1. Real-Time, Free Instant Alerting and Horizon Scanning with Automated Scenario Creation and Preemption Recommendations.

- Delivers real-time monitoring and detection—instantly alerts all members, free of charge, to early worldwide threats, weak signals, and emerging opportunities.
- Instantly generates automated scenarios for each alert, letting users envision impacts and choose effective, preemptive actions before escalation.
- Includes tailored preemption strategies for every alert and scenario, empowering individuals and teams to act defensively or opportunistically as needed.
- Any registered member can trigger or collaborate with alert-driven, scenario-based planning and preemptive action at any time.
- Client search query customization on any topic.

2. **Dashboard for Trust, Audit, Compliance, Nutrition Labels, and Faith Score**

- Provides at-a-glance, transparent metrics for trust, audit, global compliance, explainability ("Nutrition Labels"), and reliability/ethical alignment ("Faith Score") for every key outcome. PreEmpt.life now leads all comers on all Decision Intelligence/Strategic Foresight performance metrics.

3. **Critical Friends and Contextual Insights (100,000+ Human and Non-Human Agents, Randomly Selected Per Task)**

- Leverages human experts, professionals and lay people, and non-human reviewers (AIs, bots, simulations), randomly selects 10,000 per task to ensure maximum independence, diversity, and impartial assessment for every decision or scenario. Critical Friends multi-task as citizens, juries, laboratory assistants, auditors, and advisors ...

4. **Free Education for All**

- Delivers universal, open-access education in decision intelligence, strategic foresight, critical and systems thinking, and scenario planning—all within the workflow at zero cost to users. (Early version which will lead to full gamification and certfication, and a student option to select a linked interest domain).
- Learning and skill development are now integrated into every platform experience, so anyone, anywhere, can build future-ready capabilities without formal requirements or financial barriers.

5. **Interoperability**

- Professional third party open datasets (viewable by all) and closed private client databases (viewable only by the client) now in situ.

5. **Readability Levels for Ages 12+ on up**

- All outputs and guidance are crafted for accessibility at a 12+ reading age, ensuring inclusivity for multi-generational groups, youth, and novices and can be reset for members educational level.

6. **Technical and UX Improvements**

- Includes streamlined interfaces, natural language Ask Free Question, Jobs-to-be-Done work flow (Scan>Plan>Act>Lead>Govern), enhanced search, feedback, skill profiling, policy tools, and dispute resolution features.

7. **New Tools**

- We are grateful to Gill Ringland and Patricia Lustig for asking us to digitize their new Possibiity Wheel co-creation method.

8. **API:**

- Clients can now use APIs to export their answers to Claude, Perplexity, Anthropic, and to other third party applications, and to their own inhouse systems if desired.

Summary

PreEmpt.Life now stands out as a real-time, alert-driven, fully participatory platform—delivering anticipatory action, transparent benchmarks, unbiased review, and universal, free education for all, making collective intelligence accessible everywhere on tap.

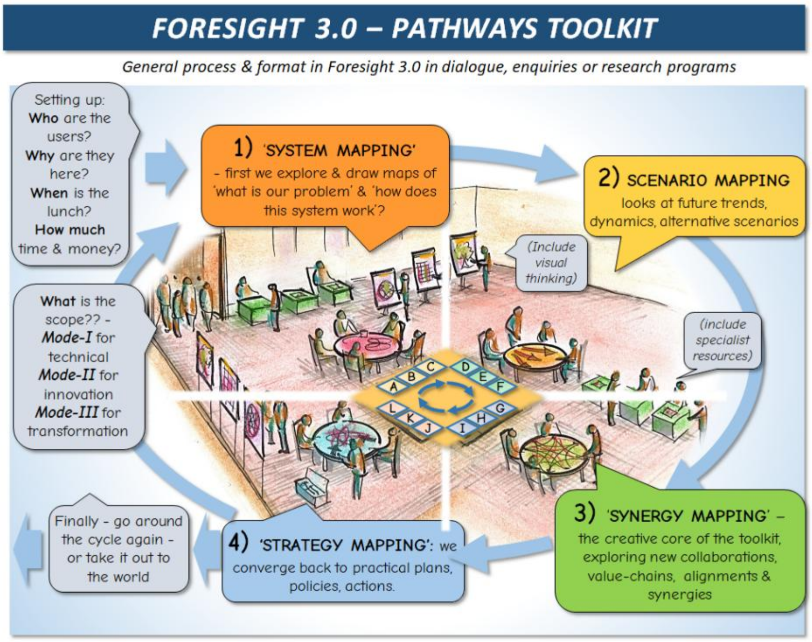
Planned Upgrades in 2026

- Infrastructure upgrade
- Gamification layer
- Research laboratory capabilities
- Visualization and virtual reality
- Extended and improved education to Master's level

8 Annex D: Background - Pathways Toolkit

The foundation of the Foresight-CHAI is the Foresight 3.0 / 'pathways toolkit'. We use visual thinking where possible, with a menu of simple templates as in Figure 2. These can work both on-site and on-line, and where possible, we combine system mapping with creative thinking such as cartoons, stories, role-plays etc: (generative AI brings new possibilities to be explored).

The process can range from creative free thinking, to highly structured questions with technical analysis. Similar programs can be designed for hours, days or months, depending on resources.



Sources:

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- Foresight 3.0 theory & practice - *https://doi.org/10.1108/FS-01-2025-0007*
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- Example foresight in Ukraine - *http://www.recpc.org/circular-economy/.*
- Source text on collective intelligence - ***https://tinyurl.com/567j2yzd***
- Resources for China-UK exchange - https://tinyurl.com/2s3yresh