Synergistics:

A PRACTICAL GUIDE

METHODS & TOOLS FOR MAPPING & DESIGN of SYNERGISTIC PATHWAYS FROM SMART TO WISE

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Note to reviewers: for the Deeper City concept, see Chapter 1 - Prologue, on https://urban3.net/urban-3-0-the-book

This Practical Guide is an illustrated manual for the Synergistic Toolkit. It includes sections of Deeper City:

- *Synergistic Toolkit: (Chapter 3)*
- *User Pathways & Collaboratorium (Chapter 10)*

CONTENTS

1) WHERE TO START: OVERVIEW

In a warming, urbanizing, informatic world, we need to talk about Low-Carb-Cities. We have to somehow put together knowledge of 'carbon' and 'cities' with social, economic, political and cultural issues. Local and global, shorter and longer term, facts and ideas and values, all seem to be mixed up. Is it possible to understand such combinations, and then to design ways forward? 'Synergistics' – the science and art of working with synergies – provides a practical Toolkit (at least a starter kit) for mapping such inter-connected problems, and designing pathways forward. This chapter is an outline of the Toolkit, as the foundation of the chapters which follow: it takes a Low-Carb-City (loosely based on Manchester) as a practical example.

Where to start? From experience, round table discussion, with diagrams and sketches on flipcharts or whiteboards, napkins or sticky notes, works well. So far, after various digital experiments, flexible low-tech methods still seem the best starting point, for 'mapping' of people and activities and systems (i.e. 'actors / factors / sectors'). The mappings show as little or as much detail as needed, for technical analysis or for social enquiry. Then we can start to explore more systematically, looking beyond the normal boundaries and silos, moving from 'mapping' towards creative 'design' of forward pathways.

Like a builder's toolkit, this one is a flexible kit of parts for a wide range of tasks. It uses a simple four stage scheme ('4S'), with 12 main steps, as in this summary:

Summary of the Toolkit

1) ***Syndrome / Baseline Mapping*** *is mainly about 'relational thinking', in the present. Leading questions – 'what's the scope of our problem, who is involved, how does the system work'.*

- ***A) 'Wider' / 'actors'****: explore the relations and interactions of actors in the system*
- ***B) 'Further' / 'factors'****: map the 'metabolism' of the enterprise or system flows.*
- ***C) 'Deeper / scoping'****: multiple layers of the problem / system /issue / agenda*

2) ***Scenario / change mapping*** *follows a* ***'divergent'*** *thinking process, for the future. 'What-if' questions are the ones to explore.*

- ***D) Drivers of change:*** *forces of change / uncertainty, on shorter / longer horizons.*
- ***E) Dynamics of change****: understand the cycles of change or transformation.*
- ***F) Scenarios for change:*** *explore alternative futures for the world around.*

3) ***Synergy mapping & design*** *uses* ***'emergent'*** *thinking, for transformations which turn problems ('syndromes') into solutions ('synergies'), for the future. 'Why not' questions apply, as the example of a city:*

- ***G) Linear / mode-I****: mechanical change and* ***'clever'*** *systems: 'a city as machine'*
- ***H) Evolutionary / mode-II****: biological evolution and* ***'smart'*** *systems: 'a city as jungle'*
- ***I) Co-evolutionary / mode-III:*** *human co-evolution and* ***'wise'*** *systems based on collective intelligence: 'a city as civilization'.*

4) ***Strategy / Pathway Mapping*** *with* ***'convergent'*** *thinking: design of pathways, road-maps, policies, projects and actions: linking the future back to the present. 'Where and how' questions. (Here we focus on the Pathways, as the other steps are more industry standard).*

- ***J) Pathway-mapping****: designing links between present 'syndromes' / future 'synergies':*
- ***K) Road-mapping****: designing links between objectives, resources, actions, enablers:*
- ***L) Management /evaluation****: action and evaluation, of outputs and outcomes.*

These 'mappings' are not only about *'things'* as with a street-map or wiring diagram – they are about *'thinking',* as with a concept map. And as such maps are beyond any single person or single expertise to produce, we need collaborative actions, and some kind of collective intelligence to guide them. The big questions follow – 'what if' we could organize cities, economies etc, with such collective intelligence, and how? So we need not only analytic mapping, but also creative 'design thinking' for the *'synergistic pathways from smart to wise'*, to turn visions into reality.

Overall the Toolkit helps to identify 'what kind of problems' are we talking about: and then link to 'what kind of opportunities / responses / solutions' are most relevant. For instance, for Low-Carb-City housing:

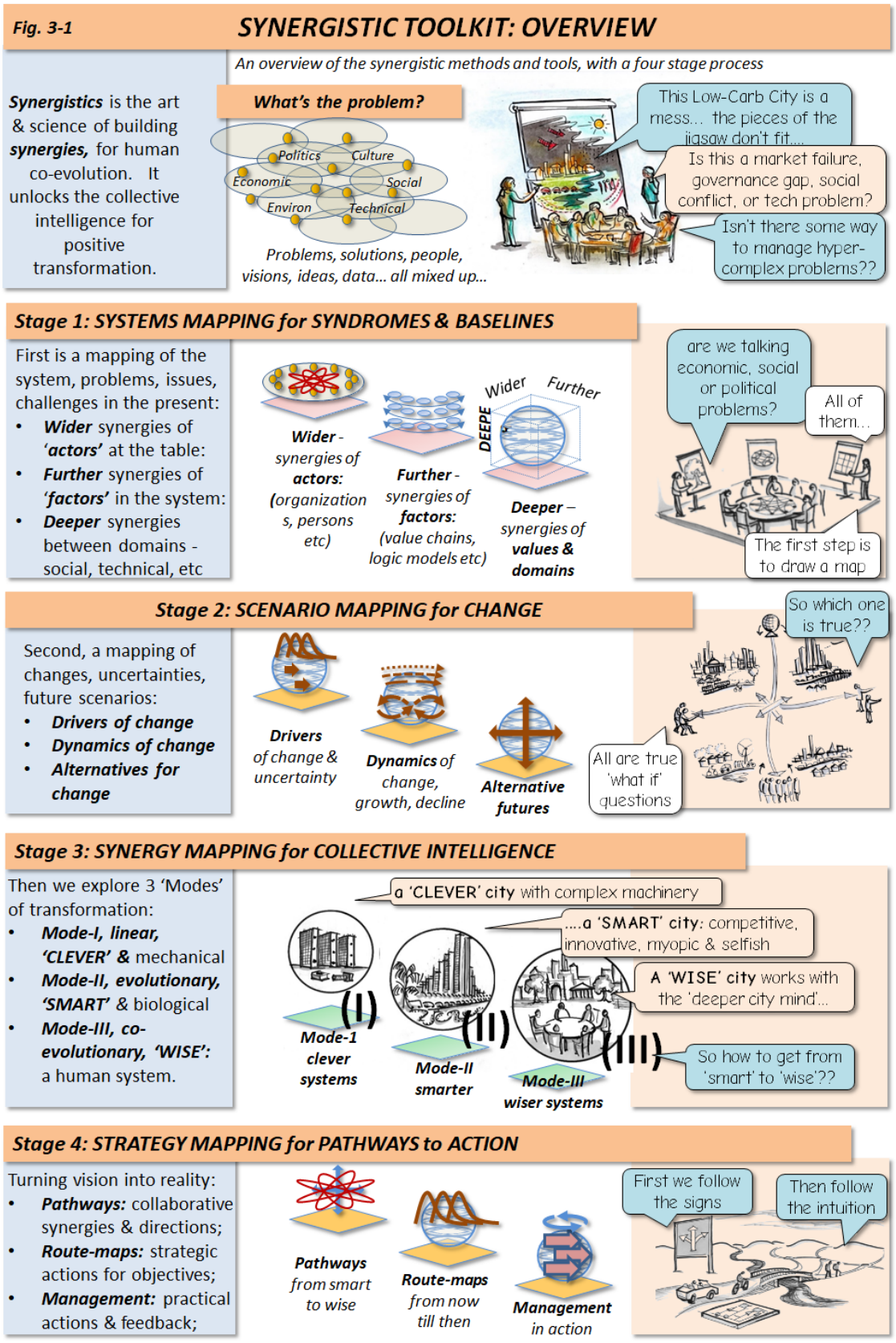
- If the problem is mainly functional or technical (e.g. we just need 500 houses in this town), then we look for ***'Clever'*** functional solutions.
- If the problem is mainly about competition and innovation, then we look for ***'Smart'*** and evolutionary solutions (e.g. we need better incentives for housing markets,).
- For human type problems (often messy and inter-connected), we look for synergistic and ***'Wise'*** *(*or 'wiser') solutions, (responsive, intelligent, integrated). For example, our real aspiration could be for 'liveable communities', and this is a rather different kind of problem...

Also, it turns out the four stages of this '4S'toolkit, are very similar to the cycle of cognitive thinking, to the cycle of *'learning, knowing, creation and production*'. For some pathways, such as finance, this 'circular' process is a useful way to frame the pathways towards collective intelligence.

This Toolkit underpins each of the 40 main Pathway Mappings through the book, shown with many variations. (Again, each Pathway Mapping is titled in ***SMALL-CAPS-BOLD-ITALICS***, e.g. ***FINANCE-III***). There's a more detailed template in the Annex, and a Practical Guide online. In the final part of Chapter 10, we look at the applications: how people, organizations, cities or governments can use the Toolkit 'out there', in a *Mind-Lab* or *Collaboratorium* or *Multi-versity*.

Overall, Synergistics doesn't claim to be a 'theory of everything': it doesn't forecast the future or provide easy answers. It's more like an 'heuristic' – probably more useful than not – based on practical experience and some insight. It's for users to adapt, improvise, and create their own versions of the pathways.

FIGURE 3-1: SYNERGISTICS-OVERVIEW



2) WHAT'S THE PROBLEM? SYSTEM MAPPING

This first stage of *System Mapping* (aka, Syndrome or Baseline Mapping) asks – what is the scope of our problem or challenge: who is involved: how does it all work: with which systems of activity or domains of value? Each of the steps A, B or C may be the starting point, depending on the problem to be addressed, and the interests of those involved. See the graphic at ***SYSTEM / SYNDROME MAPPING.***

Step (A): Actors / wider systems

For a live discussion the best starting point is the people: who is involved, what are their roles and relations, of power or wealth or knowledge? We can go around the table, asking 'who do you work with / not work with' and similar practical questions, using flipcharts or whiteboards to build up an 'actor mapping'. A growing web of interactions, exchanges and relations, can be typed as positive / negative, safe / risky, powerful / vulnerable: for more nuance on roles and attitudes, we can use schemes such as 'seven hats' or 'cultural theory'.[1]

Most of the diagrams here show 12 places around the table, not as a fixed number, but as a practical limit for interactive discussion (with 12 places there are 66 possible links between). If more than 12 are needed we start a sub-table next door. Some issues and relations are more about the external or global context, while others are more internal and local: in our Low-Carb-City the local government may not be 'running' the city, but 'running to keep up' with distant forces of power or money. To explore this we have to think 'out-of-the-box', exploring problematic or controversial issues, which might include power, paranoia, corruption or expropriation. For workshop discussions it's not always easy to get everyone into one room, and the most significant actors might stay away, so follow up meetings, focus groups or interviews may be needed.

> ***Example****: for the Low-Carb-City, we have to debate 'whose problem', who are the main 'actors', and how they interact: governments, public services, communities, citizens or residents, energy providers, entrepreneurs, financiers, civil society and so on.*

Step (B): Factors / further systems

As we explore the actors and relations around the table, it's clear there are many layers to a Low-Carb-City. There's an energy metabolism from resources to emissions, an economic metabolism from production to consumption, and so on. These are all under the heading of 'factors', meaning things, institutions, technologies which interact (aka '*actants*' in Actor Network Theory).[2] For each there are causes 'upstream' and effects 'downstream' in some kind of 'value-chain'. There are also 'responses', as in management feedback, or more strategic 'pressure-state-response' model of policy.[3] We can use similar domains to the *Scoping / Deeper Systems* above, i.e. the STEEPCU or variations to suit the issue. If we map the social economic and technical value chains, this looks like the ***BUSINESS-MODEL-III***, with a cyclic view, where the economic domain has a circular flow of money, or the environmental has a cycle of material flows.

As to how much detail, these factor mappings could go into full scale economic models or climate models, or any other large complex system. The synergistic approach aims to keep the detail to a level where it can be visible and mobilized for the bigger picture of synergistic pathways.

> ***Example:*** *for the Low-Carb-City, we ask 'how does the system work?' We look at 'upstream' factors such as energy supply and house design / construction: and 'downstream' factors of well-being or climate emissions. A detailed economic model might be useful but would not include crucial factors such as learning, collaboration and trust.*

Step (C): Domains / deeper systems

Another starting point is to explore the different 'domains' of value and logic: these could include the 'social, technical, economic, environmental, political, cultural' ('STEEPC' from the foresight toolkit).[4] The domains can be drawn as circles or layers, bubbles, boxes, pictograms, clouds or cycles. A cloud view shows the overlaps and possible 'trading zones', e.g. between economics and ecology. A 'cycle' view shows more of the 'activity cycle' or value-chain: e.g. the economic domain contains a circular flow of money. Within each domain, there could be endless detail – hubs and peripheries, power and dependency, growth or decline. Pictograms are very useful for creative thinking, as used in the 'rich pictures' of Soft Systems Methodology, and cartoons and other media can then follow.[5]

Which domains to include, and how to arrange them? There's nothing fixed about the STEEPC scheme shown here, we just select which are the most relevant for the problem. However there are differences to standard Mind-Mapping, which puts one issue at the centre with branches and sub-branches: by contrast the synergistic method tracks multiple issues with multiple links. To visualize whole system effects the circles can be stacked up as layers inside a sphere, a 'cloudy crystal ball'.[6] This is just an image but it helps to see the whole system, its inter-connections and its whole system effects, such as extraction (as in profit), or recirculation (as in a circular economy). Similar ideas come from 'causal layer analysis' with surface, structural, and mythic levels.[7] The links between domains or layers can also appear as a ***Nexus***, such as the 'food-energy-water' nexus, a hub of inter-connecting problems. If we visualize the potential synergies between the domains, via the collective intelligence, this suggests a ***'Connexus'*** or 'cognitive nexus'. Each of Chapters 4-8 explores the pathways, from the *Nexus* at the beginning, to the *Connexus* at the end.

> ***Example:*** *in the Low-Carb-City we then ask 'what kind of problem?' there's a technical domain of energy physics: an economic domain, and social domain of behaviour and welfare. The overlaps show the challenges, where energy systems cause climate change, or market systems produce energy poverty: these also are the key to opportunities.*

FIGURE 3-2: SYNDROME / BASELINE MAPPING

Fig. 3-2

TOOLKIT #1: SYSTEM MAPPING

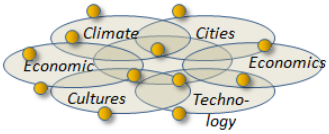
Systems mapping (syndrome / baseline) is about 'relational' thinking: what's the problem, who is involved?

STEP (A)

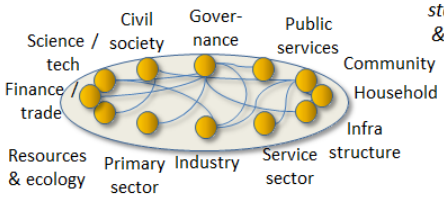
We can ask, 'who do you work with' (or not), & 'how do you create value' (or not). Many systems show up as dysfunctional, myopic & 'unsmart'

'WIDER' SYNERGIES – ACTOR MAPPING

'What's the problem'? Who should be around the table? People, questions, ideas, problems, data, visions, are all mixed up



(typical issues for a Low-Carb City)



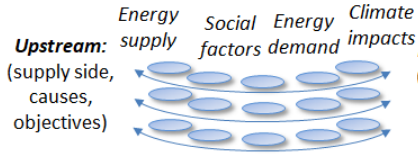
(typical stakeholders & relations)

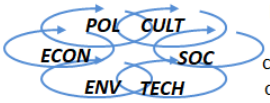
STEP (B)

Systems of factors can be mapped as 'upstream / downstream', for social, technical, economic, or political values

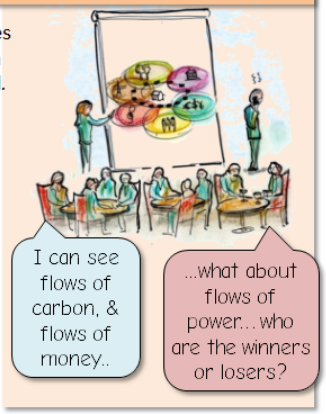
'FURTHER' SYNERGIES – FACTOR MAPPING

Next - the 'factors' that make the system work, e.g. supply chains, rules of the game, or public policies. Most show an upstream-downstream flow or 'metabolism': e.g. energy supply-demand, or a business model.





Inter-connections between value chains, can look like overlapping cycles.

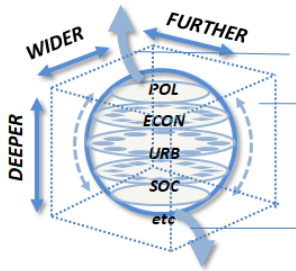


STEP (C)

Then for the bigger picture:
- ***Deeper*** synergies of values / domains (social, economic, political etc).
– ***Wider*** synergies of '***actors***' / stakeholders
- ***Further*** synergies of ***'factors'***, upstream / downstream

'DEEPER' SYNERGIES – VALUE MAPPING

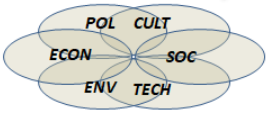
Then we can visualize the whole 'hyper-complex' system, like layers in a kind of crystal sphere (to be unwrapped with care..).



Extraction of value by super-systems

System effects of hierarchy & power

Impacts are dumped on sub-systems



Practical 'domain mapping' puts the layers side by side, to show a 'Nexus' of inter-connecting problems

3) WHAT LIES AHEAD? SCENARIO MAPPING

Change mapping centres on ***'divergent'*** thinking. This points in different directions, some positive, some risky and some just different. 'What-if' questions are the ones to explore. This stage generally follows more standard futures methods, but with the added scope of co-evolution and collective intelligence. In many workshop programs we start with change mapping, in order to get participants out of the silos and into creative space. See the graphics at ***CHANGE-MAPPING.***

Step (D): Drivers of change

Futures thinkers often start with the 'drivers of change', which includes external forces, internal forces, and compound effects from a complex inter-connected system. We can look for forces of change on 'three horizons'.[8] Horizon 1 is for shorter term tangible effects: Horizon 2 is about medium term strategic thinking: and Horizon 3 is about wider transformations (this is similar but distinct from the mode-I, II and III co-evolution above.

Standard futures methods would arrange a long list of drivers into categories of 'probability' and 'impact', and then focus on the highest probability / impact combinations. In contrast a synergistic approach looks for more inter-connected system-wide perspectives, as the right hand graphic: wild cards, changes of view, social change, unplanned natural change, all seem to overlap and intersect.

> ***Example:*** *for the Low-Carb-City, population or economic growth are obvious drivers of change. So are changes in domestic technology and social technology, with effects on lifestyles, mobilities, housing tenures, housing finance etc: and also the 'archetypes' where a house is a mythic object or symbol.*

Step (E): Dynamics of change

System change is not always about growth, but also cycles of growth, decline and transformation. Here we draw on the idea of adaptive renewal or 'panarchy' in ecological modelling.[9] A typical phase-space diagram shows a "Y-axis" of system potential / quantity (biomass, carbon etc): and an "X-axis" of system complexity / quality. The typical cycle starts with a phase of growth and exploitation, where both quantity and quality increase, heading towards a 'climax' condition. Sooner or later there is a crisis such as a forest fire or flood, followed with a 'back-loop' of re-organization, where a different system is reconstructed: eventually this sets the conditions for a new cycle of growth. This ecological concept can be useful for other domains: cities, economies, technologies and politics, as shown in each of the main chapters.

For complex multi-layer systems, such as cities, different domains – social, technical, economic and so on – will be at different points on the dynamic cycle. There are implications: urban planning, for instance, tends to focus just on the growth phase, and struggles with the rest of the cycle. We also look for multiple overlapping cycles: Manchester's post-industrial split economy, has a city-centre

growth phase, with peripheral areas in a regrouping phase, while local governance is in both financial crisis and political opportunity. We explore the synergistic potential in some of the chapter mappings: what is the potential for collective intelligence to stabilize the cycle of growth and destruction, by learning from experience, thinking ahead, and co-producing the dynamics of change?

> ***Example:*** *we could build Low-Carb housing to meet demand for local people, but then something happens like financial crisis or industrial shrinkage. The houses fall empty and derelict, ripe for future gentrification, which then raises the values, and locals can't afford to live in 'their' town.*

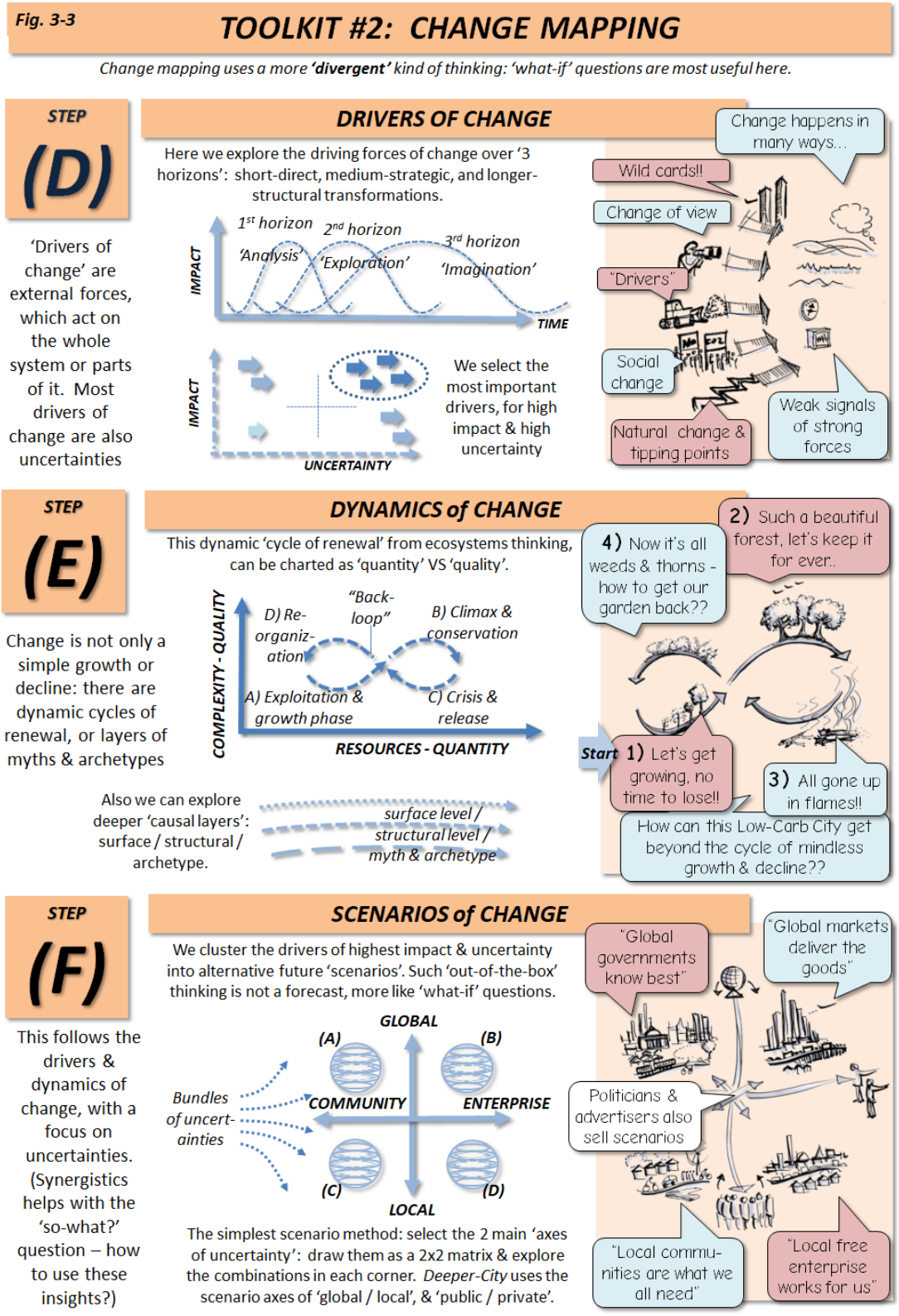
Step (F): Scenarios for change

To make sense of all this uncertainty, we cluster the drivers and the impacts along 'axes of change / uncertainty', and the combinations then point to alternative scenarios. Scenarios aren't forecasts, more like a series of 'what-if' questions, structured in a way that is most useful and relevant. This book uses in each chapter a common set of scenario axes, i.e. 'global-local' and 'public-private'. These originated with the IPCC 'SRES' scenarios and are since adapted for many other projects.[10] Many other combinations are possible, but these are a good starting point for alternative social, technical, economic and political futures.

At this stage the scenarios are focused on the surrounding context, of changes in the STEEPCU environment. The response to the scenarios, to opportunities or threats, comes later. Standard methods use 'success scenarios' or 'back-casting', overlapping on to 'road-mapping': in contrast the Toolkit opens the door to real transformation, by combining *Scenario Mapping* with the other stages. In *Synergy Mapping* we compare different modes: linear growth, evolutionary innovation (mode-II), and 'co-evolutionary' transformation (mode-III). *Strategy Mapping* then turns such opportunities into reality, using the context scenarios for 'future-proofing'.

> ***Example:*** *Low-Carb housing has many alternative futures. It could be run by a top-down public sector, or by global corporates. It could be self-organized by local communities, or provided in local free markets. Each has strengths and weaknesses, opportunities and threats, to be explored further.*

Figure 3-3: CHANGE & SCENARIO MAPPING



4) WHAT'S POSSIBLE? SYNERGY MAPPING

With a range of possible futures on the table, positive and negative, it's time for 'emergent' thinking. This stage is like a crucible or laboratory, a space where new ideas can emerge. We are looking at whole systems, and their potential for change, growth or transformation.

The graphic at ***SYNERGY-MAPPING*** shows three *connexus* spheres: from mechanical ***'clever'*** systems, to more complex ***'smart'*** systems, and then to ***'wise'*** Mode-III systems of collective intelligence. Mode-III doesn't replace the others: each has its role and can work in parallel. Our Low-Carb-City will need a Mode-I energy system for basic supply, Mode-II markets to allocate resources, and Mode-III systems for social equity and sustainability.

Step (G): Linear – 'Clever' – Mode-I

Here we track functional systems with an image of a complex but single purpose machine. While there might be growth, the structure of the machine is stable, and our cognitive understanding of the machine is also stable. In our Low-Carb-City, the machinery is (hopefully) clever at transforming fuel into heat or motion, but it can't transform into anything different. The image of the sphere shows the guiding intelligence outside of the system: i.e. the thinking of the engineers or entrepreneurs is outside of their products and assembly lines. Likewise, negative impacts are external, as the machines literally don't care about their emissions.

> ***Example:*** *for Low-Carb-City housing, we just need 5000 or 5 million houses / apartment to meet population projections. So we arrange a good supply of land and permissions, concrete and steel, construction workers etc: what could possibly go wrong??*

Step (H): Evolutionary – 'Smart' – Mode-II

The evolutionary idea sees both natural and human activities as 'complex adaptive systems', with a biological image of jungle or wilderness. In the natural world, complex adaptive systems evolve niches, habitats and symbiotic relations. In the human sphere this kind of system applies to markets or innovations, often with a 'winner-takes-all' motive of competition and extraction.

For our Low-Carb-City, a 'smart' energy system might be complex and adaptive, evolving new markets and product combinations. It would also tend to extract profit while dumping social or ecological impacts on others. The cartoon shows how the collective intelligence is clustered in elite pockets, while workers and customers are commodities for exploitation. But there are many nuances: socio-biology for instance shows how ecosystems evolve through cooperation, symbiosis and even altruism.[11] In human organizations, even the most rapacious firms or mafia gangs need internal cooperation and shared norms and values. The distinction between evolutionary and co-evolutionary will be argued, on the system boundaries of the profit-taking firm or the power-grabbing government.

> ***Example**: for Low-Carb housing, a Mode-I system may not work: landowners hoard their land and builders cut corners. So we need incentives, such as rising markets, energy innovation, financial products.... (If some people can't keep warm that's not our problem).*

Step (I): Co-evolutionary – 'Wise – Mode-III

At the core of this Toolkit are the human qualities of collaborative learning, thinking, designing, questioning, self-awareness and collective intelligence (however that is defined). The image here is of a *human psyche or human community*. The system architecture, seen in the *connexus* sphere, is more like a human brain than mechanical computer, with multiple feedbacks and inter-connections, flexible self-organization and 'neuroplasticity', parallel information processing, and higher-order reflexive consciousness.

There's a growing debate on collective intelligence, what it is, how it works, and how to grow or build it. We explore *'CHAI'* ('Collective Human-Artificial Intelligence') in ***INFORMATICS-III***, and then go further in ***DEEPER-MIND-III***. Collective intelligence may never be fully defined, but we can track technical intelligence, emotional, political or cultural intelligence. We can look at cognitive-collaborative processes, with the 'co-' word, as in 'co-learning, co-knowing, co-creation, co-production', from analysis to synthesis. A successful round table generates multiple synergies, adding up to a whole greater than the parts, and the effect can be transformative. In our Low-Carb City we can shift the problem / solution scope, from '500 houses' to 'liveable communities'.

> ***Example:** Low-Carb housing, integral to a Low-Carb city-region, is about liveable communities, micro-economies, social enterprises, neighbourhood cohesion etc. Housing designs and energy finance can be diverse, flexible, responsive and adaptable, guided by the collective intelligence of design, policies and markets.*

FIGURE 3-4: SYNERGY MAPPING

Fig. 3-4

TOOLKIT #3: SYNERGY MAPPING

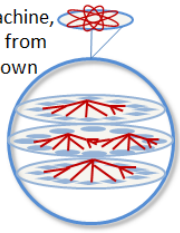
Synergy mapping explores the potential 'emergent' change: visions & transformations, evolution or co-evolution

STEP (G) — LINEAR – 'CLEVER' – MODE-I

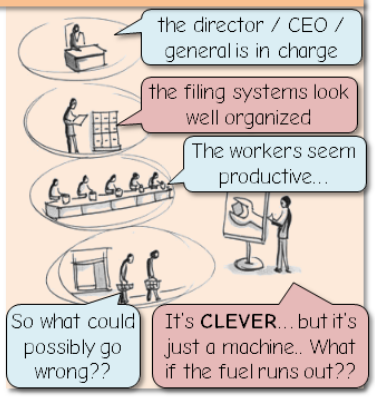
Now comes the creative part, using the crystal sphere image. At the technical level, could the system work better? We can look at systems theory in computing, cybernetics etc.

This linear Mode-I system is like a machine: hierarchical & predictable. A Mode-I city may be ***'clever'***: but it cannot adapt or evolve.

This sphere shows a machine, controlled from the top down



In Mode-I systems, the 'collective intelligence' is external, in a machine designed by others. Change comes by fixing mechanical problems: or by simple growth, e.g. 'more cars / more houses'

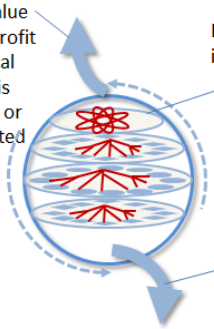


STEP (H) — EVOLUTIONARY – 'SMART' – MODE-II

Second, we look for 'emergent' systems & transformations. As in evolutionary biology, each species or community adapts, creates niches & evolves over time.

Mode-II evolutionary change works in 'complex adaptive systems': a wild west ***'winner-takes-all'*** or a ***biological jungle***. A successful Mode-II city would be ***'SMART'***.

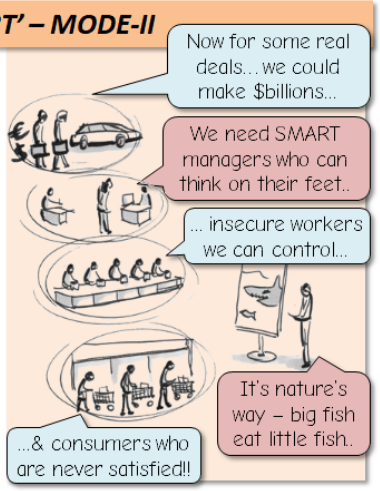
Positive value (financial profit or political power) is extracted or expropriated



Evolutionary 'design intelligence' is in the dominant layers.

Change comes by competition & enterprise: e.g. 'housing market innovation'

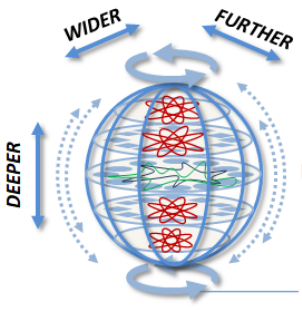
Negative impacts are dumped ('externalized')



STEP (I) — CO-EVOLUTIONARY – 'WISE' – MODE-III

Third, we look for 'co-evolutionary' systems & potential transformations. This is a whole new way of working with 'conscious complexity' & collective intelligence.

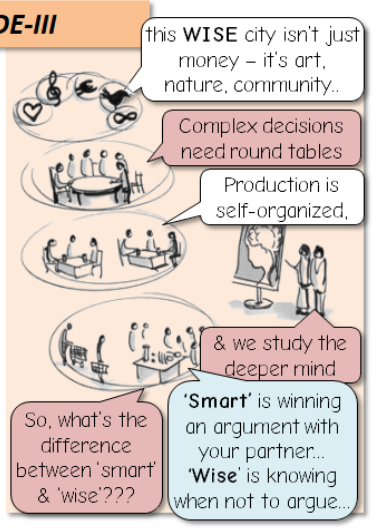
Mode-III *'co-evolutionary change'* works in conscious complex systems, where ***'winners-are-all'.*** This 'collective intelligence' works with ***wider*** synergies of actors: ***further*** synergies of factors: & ***deeper*** synergies of values.



Positive values (finance, power etc), are recirculated.

Values are exchanged between social, economic, political etc

Negative impacts are internalized



5) WHAT'S TO BE DONE? STRATEGY MAPPING

The fourth stage of the Toolkit is about 'convergent thinking', where future potentials are linked to present actions. (Only the *Pathway Mapping* step is shown in the following chapters, as *Route-Mapping* and *Management* are for specific times and places). See the graphic at ***STRATEGY-MAPPING.***

Step (J): Pathway-mapping

A *Synergistic Pathway* is a journey of mutual learning and collaboration with all involved: it aims to turn potential synergies, from the previous three steps, towards reality. Such pathways often face an uncertain landscape, disputed destinations, conflict among travellers, and few if any maps to follow – all the more reason to draw some... Again, there are different modes side by side:

- *Mode-I functional pathways* focus more on technical issues and analysis: for instance the Low-Carb-City could do technical pathways with energy or economic modelling.
- *Mode-II 'smart' pathways* are more about transition by evolution, innovation, incentives and competition. Many current pathway projects start with technical modelling, and then think about what policies or social changes could make the models realistic.
- *Mode-III 'wise' or synergistic pathways* explore the potential transformation via collective intelligence. The Low-Carb-City *synergistic pathways* look wider and deeper, at the integration of policies, technologies, markets, social networks and cultural waves.

Often the word 'pathways' is used loosely, so it's good to be clear about the options. *'Actor or factor pathways'* are about the potential for government or business, energy or transport systems, to move towards mode-III levels of collective intelligence. *'Synergistic pathways'* are more holistic, as they focus on the synergies between two or more domains. (For example the pathways in ***RETROFIT-III*** include the combinations of 'socio-technical' and 'financial-political'). The logic here is quite practical. As problems mount up in the overlapping circles of the *Nexus*, we look for *synergistic pathways* in those same overlaps, between social or economic or political. These pathways then form the basis of a *Connexus*. A summary table of all the combinations is in the Annex, with suggested titles such as 'livelihood' or 'democracy'.

For some pathways the basic framework of *'deeper, wider, further'* seems more useful. For others we use the '*circular'* cognitive process, i.e. learning, thinking, innovation. The proposed pathways in each mapping are all in the summary tables in the Annex, but these are suggestions and demonstrations, not at all fixed.

Generally, *synergistic pathways* adapt to uncertainties or risks across social, technical, economic, or political domains: they include for negative forces such as corruption, alienation, trauma or conflict. For guidance, there might be stepping stones, milestones, signals or signposts, as in the cartoon

here. Overall, a *synergistic pathway* is about the practicalities of transformation from 'syndromes' to 'synergies', and so is adaptable, improvised, self-organizing and self-questioning.

> ***Example:*** *in the Low-Carb city, a synergistic 'Livelihood' pathway aims to link wise community re-investment with local economy and capacity building. A synergistic 'Stewardship' pathway aims to link eco-investment with crowd-funding and inter-generational collateral. And so on…*

Step (K): Route-mapping

Road-mapping is a mainstream technique, (shown here in the eco-version), along with strategic planning, operational research, AIDA and others.[12] Route-maps tend to work with known objectives and targets, defined actors and factors, with specific ways to mobilize them. While 'pathways' generally point towards a 3rd horizon of change, road-maps are more focused on the 1st and 2nd horizon: there may be uncertainties and contingencies, but at least (in the jargon) these are 'known unknowns'. Wider or deeper uncertainties don't come into standard route-maps too much, or the darker dynamics of corruption and alienation. So there is a practical contribution from synergistic thinking. The Mode-I or Mode-II route-mapping are focused on tangible actions, but could fall down at the first unforeseen human factor or wild card. In contrast, a synergistic Mode-III route-mapping starts with these human transformations, from corruption or alienation, to co-creation and collective intelligence. It also includes for corruption and alienation and other anti-system dynamics, which can help to bridge the aspiration-reality gap.

> ***Example:*** *for the Low-Carb housing, we have a route-map with energy and economic and population modelling, but it doesn't go to plan. An alternative synergistic route-map starts with reality checks, such as the fragmentation of housing sector, and looks for responses.*

Step (L): Management & Evaluation

Finally come the practicalities of policies, projects, decision-making and management. Business and management books tend to assume a linear mode-I 'logical framework', where objectives are clear, inputs are known, and outcomes can be measured. Policy and management is then a 'cybernetic' process of monitoring and feedback and evaluation, in a well-oiled machine. A Mode-II evolutionary approach is more about competition and innovation, and smart psychology or behavioural economics such as 'nudge theory' are useful.[13] In contrast a Mode-III style of policy and management is more about co-learning and co-production, between policy-makers / managers, workers / suppliers, and stakeholders / users, upstream and downstream, as in ***ENTERPRISE-MODEL-III***. For most complex problems all three modes will be needed to work side by side:

> ***Example:*** *For Low-Carb housing: to upgrade 1 million dwellings, we need Mode-I type construction schedules, and Mode-II type finance and procurement. We also need Mode-III community energy companies, neighbourhood mentors, and climate learning schemes.*

FIGURE 3-5: STRATEGY-MAPPING

Fig. 3-5

TOOLKIT #4: STRATEGY-MAPPING

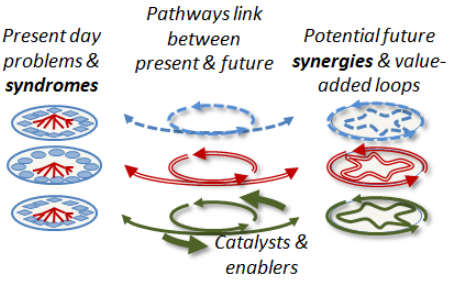
***Strategy mapping** is about **'convergent'** thinking: potential synergies now turn towards practical action.*

STEP (J)

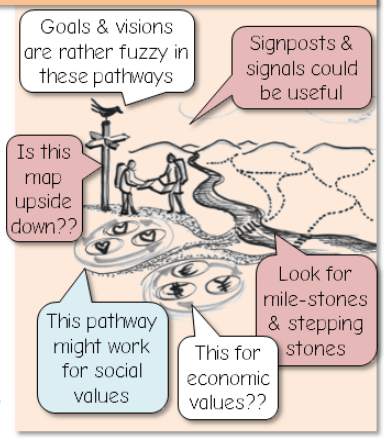
Pathways help to navigate change, when the goals are fuzzy, conditions are uncertain, & co-evolution is in progress

PATHWAYS

'Synergistic Pathways' connect the potential synergies with present day action. They generate value with collective intelligence which turns problems into opportunities.



Each synergistic pathway is a combination of 2 or more value domains: social, technical, economic, political, cultural etc

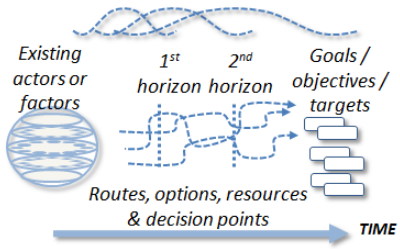


STEP (K)

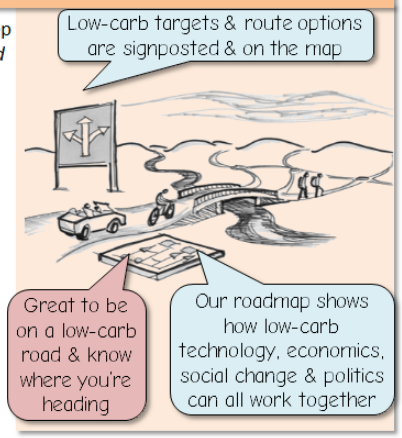
Route-mapping (with similar kinds of strategic planning), works towards defined objectives & targets, with known actors & factors, & clear chains of cause-effect

ROUTE-MAPPING

Putting the Synergistic Pathways into practice, the next step is strategy / route-mapping. *(Note: steps (K) & (L) depend on specific cases, so not covered in detail in Deeper City).*



Route-maps are focused on 1st & 2nd horizons of change, where uncertainties & contingencies can (in principle) be measured & managed.

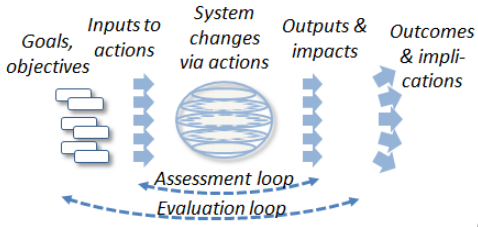


STEP (L)

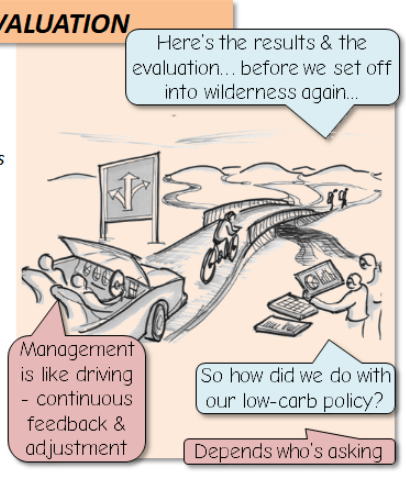
Management (as in the text-books) sees clear objectives & tangible results. A final evaluation is the essential learning to start the next cycle.

ACTIONS – MANAGEMENT & EVALUATION

Finally we put the pathways & route-maps into practical action via project management, with an assessment / evaluation loop.



Assessment is a focused comparison of inputs to outputs. ***Evaluation*** is a broader comparison of objectives to outcomes. Both can work in a simple Mode-I, or a synergistic Mode-III system.



6) THE TOOLKIT IN USE

To recap… the Synergistic Toolkit, shown here with four stages and 12 steps, is wholly flexible and adaptable, to almost any kind of human challenge. It provides a common thread and structure for synergistic knowledge and creative thinking. It feeds directly to the *Insights* of Chapter 9: ***FORESIGHT-III*** (looking to the future), ***E/VALUATION-III*** (learning from the past), or ***RESILIENCE-III*** (system change).

So far we talked mainly about the Toolkit used to generate the 'pathways from smart to wise', within this book. To discuss and debate these pathways, we have to involve the participants in some kind of human process or 'workshop' or 'forum'. Such a gathering is in ***TOOLKIT-IN-USE,*** upper part ***(A).*** Here is a busy creative dialogue, with all four stages in one room (in reality each could be in different rooms and at different times). The structure is flexible, from a few hours to days, weeks or months, depending on time, resources, and the participants. The basics can be sketched on a flipchart in a few minutes around a table: for full detail a full scale enquiry could work on themes and sub-themes in each of 12 steps, in a large phased program, along the lines of a ***FORESIGHT-III***. Such a program can be more focused on debate and deliberation, or more on technical analysis: more local or global, and more in the present or the future.

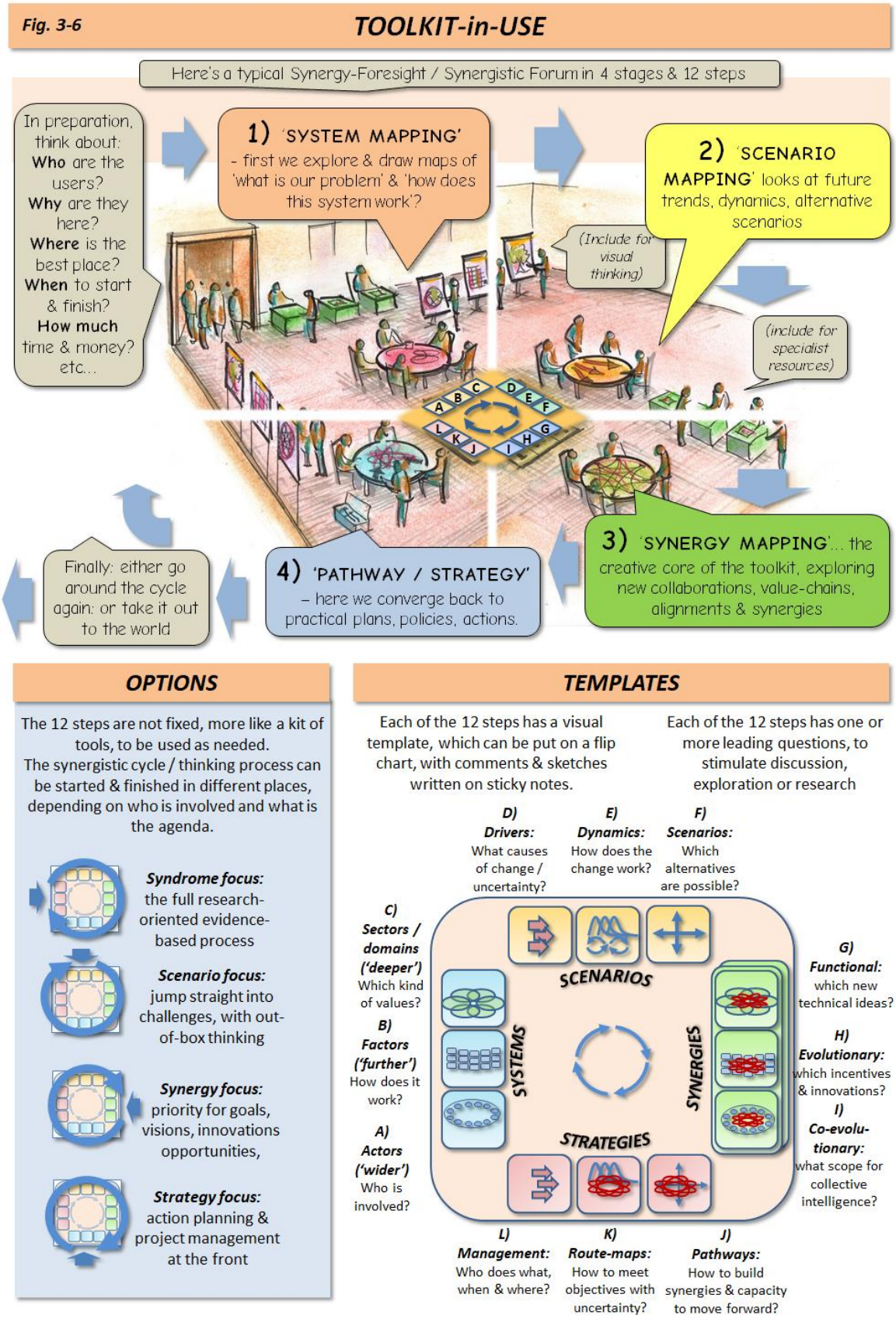
So far we labelled the steps in the order of A, B, C. But just as a builders toolkit is flexible, this Toolkit is flexible, with many combinations. The lower left at ***(B)*** shows some options, depending on which kind of broad question and thinking style is most relevant:

- ***'What-if'*** - *divergent thinking* starts with the *Scenario Mapping:* this is good for getting participants out of their mental boxes and silos.
- ***'Why not'*** - *emergent thinking* starts with the *Synergy Mapping*: especially good for visioning and goal-setting, which then works back into practice.
- ***'How, when, where'*** - *convergent thinking* starts with the *Strategy Mapping*: a first practical focus on actions, which can then raise bigger questions on scope and purpose.

From experience, the *Synergy Mapping* is the most challenging, and the most rewarding when it works, wherever in the cycle it comes. The quality of collective intelligence may show up in unexpected ways. It often shows as an imaginary connection between vision and reality, which is hard to express in current words. This is all the more reason for out-of-the-box ways to bring new ideas to the surface.

Visual templates are essential in all this, and the 'visual starter pack' is shown in ***SYNERGISTIC-TOOLKIT*** lower right ***(C)***. Most participants need something simple and tangible, to help visualize and organize ideas which can be complex and intangible. Each of the images and questions here can be sketched quickly on a flip chart: ideas / comments by participants added on sticky notes, moved around, with possible connections drawn in. If participants don't read or write, then pictures / icons, or stones / lego / clay can be used to great effect. Workshop organizers / facilitators can adapt all this according to ideas and experience (some sample packs are online).

FIGURE 3-6: TOOLKIT-IN-USE



Self-evaluation and summary

This also flags up the 'self-evaluation' summary tables at the end of each of Chapters 4-9. These chart the Modes-I, II and III against the 'deeper' domains and 'wider' actors in each chapter. Some also show the 'circular' process of learning, thinking, creating and producing.

The tables have several uses: they provide a rough summary and orientation for the chapter contents. They can be used as guidelines for a self-evaluation. In *Cities*, for instance, we can debate the difference between 'housing as quantities' and 'housing as liveable communities', and compare this to policy intentions, or outcomes in reality. In some cases there are useful metrics or indicators for each field, as per the 'scanning tool' in ***DEVELOPMENTAL-III***.

The table also helps to track the varieties of Pathways. This is important, as (a) the word is often used very loosely, and (b), it shows that things aren't simple, that complex problems call for a multiplicity of pathways. With the table we can track different pathways, either with horizontal linkages along the rows, or vertical linkages down the columns. Summary tables for all *Pathway Mappings* in the book are in the Annex: again these are not blueprints or fixed in stone, but likely combinations, to be explored.

Mind-lab, Synergy-Lab, Collaboratorium

Ideally this synergistic workshop is part of a larger program, of route-mapping, capacity building, or collective intelligence, with various 'Lab' type words to describe it. From experience these are some options, with more in in Chapter 10:

- A *Mind-Lab* is more focused on the potential for collective intelligence;
- A *Synergy Lab* is more focused on the practical synergies and ways forward;
- A *Collaboratorium* is a longer program of enquiry, or permanent facility, which might include both the above.

Context

Each of these involves a context of users, uses, usage, use-ware and so on. This is covered with around 9-10 key questions, of which the first three are set out in this Chapter. *'When'* is about the '4S' process: *'whither'* (an old English word) is about the underlying theory. *'Which'* refers to the key themes, social, technical, economic, and so on. The remaining questions, shown in Chapter 10 with ***USER-PATHWAYS***, are about the workings of the *Mind-Lab* or *Collaboratorium*:

- ***Where*** are the best kind of places for this, physical and otherwise? (labs, incubators, hubs, forums, platforms, agoras, round tables).
- ***How*** to use the various tools? (network mapping, visual thinking, matrix analysis, etc).
- ***How much*** is needed (financial or human resources)
- ***What*** kind of applications will result? (evaluation, foresight, management etc).
- ***Who*** are the users or stakeholders? (governance, enterprise, societal, included /excluded):
- ***Why*** are they involved? Knowledge, wisdom, practicality are three reasons, and each provides the logic of a ***USER- PATHWAY***.

Visual Thinking and the Pathway Mappings

Here and there is a cartoon 'visual activist' with a flip chart, trying to look beyond the technical-rational left-brain, towards other kinds of experience.[14] Visual thinking is not the only way, for instance video or role-play can be better, but cartoons and diagrams are cheap and quick, easily linked to text, and most important, can be done by anyone (no artistic skill is needed).

As for mapping – even a small map in a large city can be more useful than a long list of directions. Such maps / mappings are not 'theories', any more than a map of London is a theory of London: a good mapping is a visual dialogue with different users. Engineers work with electrical diagrams for calls to 'rewire the economy'. Sociologists look for networks and interactions, economists for cycles of money, ecologists for flows of energy. Designers look for physical archetypes, such as the 'Pattern Language', while managers look at organization archetypes.[15] Some look for transformations, such as the Unflattening, as a visual journey not only of things but of 'thinking'.[16] In each of the full page *Pathway Mappings* in the following chapters, there's a similar format. The upper part shows cartoons, and the lower part wiring diagrams. Then, from left to right, each page shows the transformations and pathways, from the 'syndromes' of Mode-I&II systems, towards the 'synergies' of the Mode-III systems. (Some pages show Mode-I, II, and III separately). In the small space here we have to be very selective, leaving the larger versions online.

Overall, all this is but a first sketch, and it calls for others to improve and build on it.

So with the Toolkit in hand, we are ready for the first reality check, the Cities which surround us…

7) WHAT NEXT: THE COLLABORATORIUM

Synergistic thinking is the foundation of the 40 or so pathways in this book – on paper quite nice, but in reality, each will have to engage wider, further and deeper in a problematic world outside. So many practical questions come up. 'Who' can use all this, and 'why' would they want to? 'Where' are the best kind of spaces, and 'how' to use the tools? 'How much' is needed in resources, and 'so what' would be the results? And so on. Here we finish what was started in the *Toolkits* in Chapter 3, a practical guide to turn vision into action.

The last kind of pathway here is that of the 'users' themselves, the people or organizations or societies out there. The 'users' of synergistic tools are each in their own way, on some kind of journey of experimentation and learning and collaboration, in other words, on a *User Pathway*.

The setting for such pathways goes by different 'Laboratory' names, depending on the focus and the choice of tools (see ***TOOLKIT-IN-USE***).

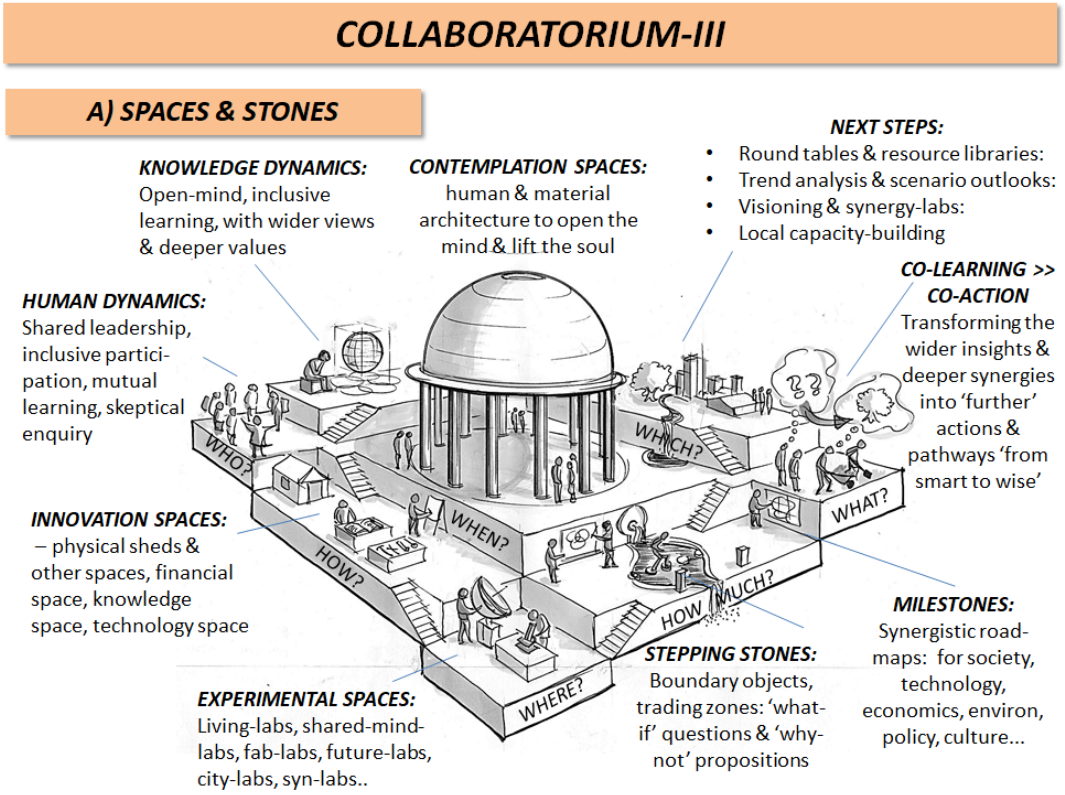
- ***Mind-Lab*** for general experiments with collective intelligence;
- ***Scenario-Lab***, with a focus on the future;
- ***Synergy-Lab,*** to explore the co-evolution potential;
- ***Strategy-Lab*** for practical plans and projects.

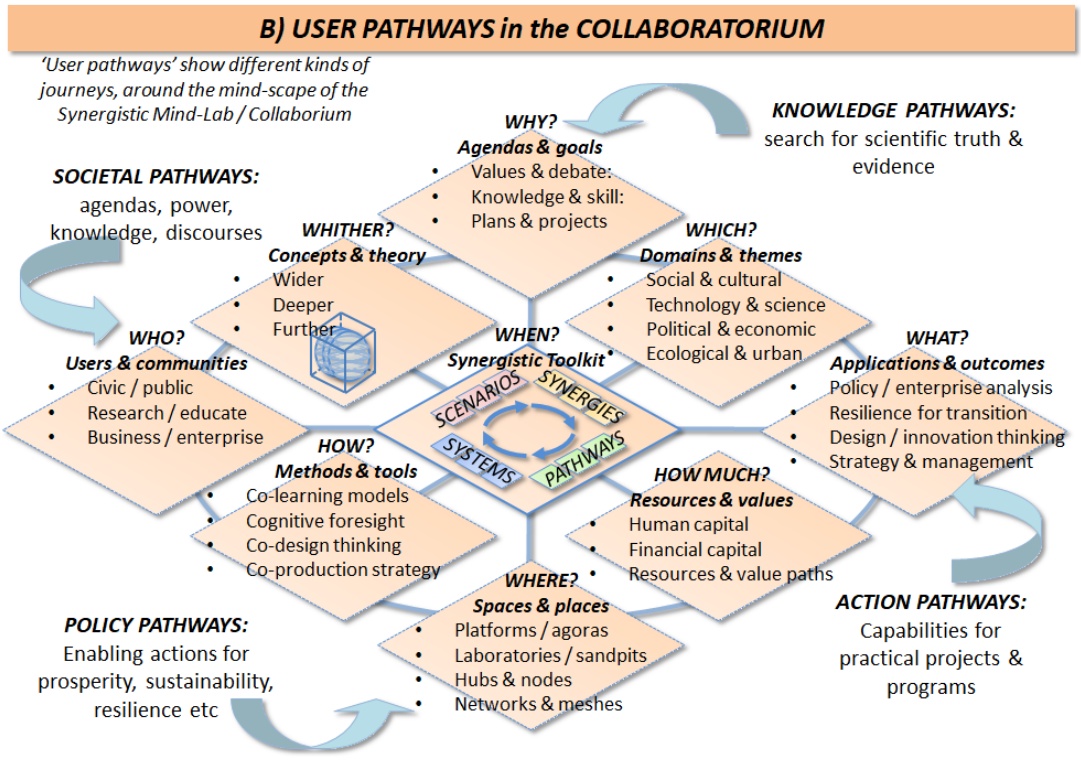
If all these are involved in a longer program we have a ***Collaboratorium,*** a 'laboratory for collaboration'. And a series of *Collaboratoria* would be an integrated ***Multi-Versity,*** a city or community where everyone learns with / from everyone. At the moment Labs are in fashion, with city-labs, policy-labs, future-labs, think-labs, and a Mind-Lab in Copenhagen:[1] but other images are also useful, such as gardens, big tents, sand-pits or idea-pools. If we focus on the 'workshop' idea, a hub of creative activity, we can do *'walk-shops'* (out in the landscape), *'talk-shops'* (speaking for itself), *'draw-shops'* (for visual thinking), or *'dream-shops'* (into the subconscious). Actually there are several thousand years of forums, think-tanks, circles, away-days and *symposia* (from the Greek *'drinking together'*…). But too often these fall short: power dominates, participants stay in silos, key persons are missing, time is too short, problems are not well defined, discussion goes in circles, and the questions are too easy or difficult. So it's crucial to keep in view the principles of collective intelligence, and the synergistic processes to unlock it.

So here are the last pathways of this book – '*User-Pathways'* – in the context of a *Collaboratorium* or *Multi-Versity*. This is but a snapshot, as every day there are new technologies, political models, social innovations: the synergistic methods have been visible only since 2014, so the library of experience is as yet young...

[1] Mindlab 2015

FIGURE 10-4: USER PATHWAYS





Collaboratorium & Multi-versity

As above, a ***Collaboratorium*** is a series of Labs, and a ***Multi-versity*** is a series of *Collaboratoria*. Each may have many kinds of users, uses, usage, use-ware, and so on. Nine basic questions are just enough to describe this, shown in ***USER-PATHWAYS,*** lower part ***(B)***. The *Toolkits* in Chapter 3 was mainly about the '*when'* question (the '4S' process), and the *'whither'* question (the underlying theory). This section here is about the others: *How* to use the tools: *Where* are the best places: *How much* resources are needed: *What* are the expected results: *Who* are the users, and *Why* are they here? This last question of *Why* is then the key to a set of practical *User Pathways*.

'Where' are the best spaces and places?

Civilization – the word shares its roots with 'city' and 'civic' – has physical 'spaces and places' at its core. The marketplace, agora, hub, chamber or forum, is essential for an open democratic society: it can also be captured by dictators or demagogues. The same applies even more to virtual-digital spaces, where unseen algorithms are open to misuse and abuse.[2] For both human and technical there are general principles for 'round tables', 'platforms' or 'observatories', and the famous 'outlook tower' in Edinburgh took this quite literally. The point of all these is to enable the inter-connections of creative strands – social innovation, deliberative co-creation, rapid prototyping, change management, action learning, design thinking and so on. Spaces, whether physical, virtual, cultural or social, can help or hinder these processes, for success or failure. The picture in ***USER-PATHWAYS*** upper part ***(A)*** shows a garden with spaces for both contemplation and co-creation. (Full disclosure – as a 'space activist' / community architect, I go around the world's meeting rooms, shifting straight rows of chairs in linear Mode-I style, to circular patterns more suited to Mode-III creative thinking).

'How' to use the methods and tools?

Our Synergistic Toolkit looks well-ordered with 12 steps, but comes with a deliberately loose portfolio of methods and tools, mainly centred on systems thinking, futures methods and strategic intelligence. Each fits to one of four stages in the Toolkit, and the synergistic dimensions are sketched in the *Insights* of Chapter 9, and particularly in ***FORESIGHT-III***. For the *Systems Mapping* stage there is Soft Systems Methodology for more fuzzy issues, the cybernetic Viable Systems Model, and systems dynamic modelling if the parameters can be measured and hard-linked. For *Scenario Mapping* there are libraries of futures tools: horizon scanning, Causal Layer Analysis, scenario inductive logic, success or back-casting scenarios, wild card analysis, cross-impact analysis, Delphi and expert elicitation.[3] For *Synergy Mapping*, there are many kinds of creative process, Design Thinking, 'sandpits', 'unconferences' and other open brainstorming. For *Pathway Mapping* there are common methods of road-mapping, strategic planning and management.

[2] Pariser 2011

[3] Ringland et al 2010: Miles et al 2016

In each of these, synergistic thinking pushes standard tools in the direction of collective intelligence: in each we aim towards 'wider' synergies of actors, 'further' linkages of actors, and 'deeper' layers of values. As to software, the potential seems endless: for example, 'Futurescaper' enables horizon-scanning and sense-making: 'Metro-Quest' links mass online participation with visualization: C-Maps tracks loose intuitive concepts: Social Network Analysis maps the tangible links between actors or factors. We use complex technical models for complex technical systems such as energy or transport. But from experience so far, low-tech tools, flipcharts and sticky notes can be more responsive to fuzzy messy societal challenges.

'What' are the main applications?

In many walks of life, yesterday's linear thinking isn't enough, for the inter-connected challenges of today and tomorrow. For instance, it's now accepted that flood resilience needs not only 'hard' concrete walls, but 'soft' social inter-connections, which can be tricky for the engineers in charge. Resilience to flooding can be framed as a mode-I mechanical problem, as a mode-II evolution, or a mode-III co-evolutionary challenge. So the Insights of Chapter 9 provide a starting point for the knowledge which is needed: a ***RESILIENCE-III*** for flooding can then work alongside the insights of ***FORESIGHT-III, EVALUATION-III,*** and ***DEEPER-MIND-III***. These four *Insights* are a start, and more could follow, as every stage of managing policy and governance, business and enterprise has a synergistic dimension. For instance, our Low-Carb-City calls for new forms of business models, finance, spatial planning, organization types, multi-level governance and digital services. These all rest on collaborative learning as in ***DEEPER-MIND-III,*** integrated assessment in ***EVALUATION-III***, the systems view of ***RESILIENCE-III,*** and strategic thinking of ***FORESIGHT-III***,

'Who' are the users and 'why' are they involved?

The most crucial questions are, who will use this synergistic toolkit, and why? In principle any person, organization or community can be a user: in practice, more likely to be those already looking ahead, aware of the possibility of wider and deeper thinking (one of the best ever climate change meetings was in Blackpool 2012, where business leaders mixed with schoolkids). As to why, Aristotle set out different knowledge types as '*phronesis, episteme* and *techne'* in the 'Ethics'. In modern equivalents, *phronesis* is something like 'practical wisdom' or judgment for complex societal issues. *Episteme* is more akin to scientific knowledge for research or education. And *techne* is more about practical knowledge in business or governance or civil society, where the main goal is to make things happen. Here we divide *techne* into a policy type knowledge, more strategic, and an enterprise type, more about direct action.

In practice these user types and knowledge types are quite inter-connected. A real-world challenge, such as the Low-Carb-City, calls for the whole mix – public debate on the scope and implications, scientific evidence where possible, enabling by policy and action by enterprise. So how to bring these different knowledges together in a meaningful way?

Mapping User Pathways

This is the role of the User Pathways. To visualize, each pathway starts at one of the four corners of the concept landscape in ***USER-PATHWAYS*** lower part ***(B)***. The pathway looks like a winding route through the garden, up and down stairs, past the fountains, through the arbours and so on. Each pathway takes these questions above – what, why, where, who, etc – to traverse in a great circle and and arrive back. This framework is loose, results are not guaranteed, fixed plans will change, time is too short, sponsors move goalposts, participants or researchers argue, and it's quite an achievement to get through in one piece (from experience)… but very much worth striving for.

Societal user pathways

Some are more actively involved in the shaping of society and the future, and their pathway starts with the 'who' and 'why' and 'what' questions. For citizens, households, communities, networks or organizations, meaningful knowledge comes firstly by the round tables and spaces of enquiry and deliberation. This can now be augmented by digital tools, online or off-line, virtual or distributed, but whether human or digital, the people ('actors') are at the centre. To start a session we go around the table, asking who is connected to whom – and who is NOT connected to whom. Then we get into multiple economic, political, cultural layers, with present or future trends, and opportunities or threats. It seems every human problem is about multiplicity and contradiction, which certainly tests the skills of facilitators.

At the core of such human interactions is the *Synergy Mapping*, where creative potential can be realized, where the sum is greater than the parts. Many similar versions have worked in different times and places, such as the *parliament, potlatch, panchayat, althing* or *indaba.* Each has potential to free the collective imagination, by exploring and deliberation, and to bring the visions and insights back to practical actions. We could also include paint-ball weekends and away-days, visioning forums and community blackboards, un-conferences and goldfish bowls, 'think-and-do-tanks', Planning for Real, Lego-days and Ketso leaf-maps, role-plays and sand-pits. Such experimentation needs to spread and grow.

Knowledge user pathways

Knowledge-based and 'cognitive' users are more focused on Aristotle's *episteme:* their pathway gravitates to the questions of 'whither' and 'how' and 'when'. With a scientific rationale and worldview of evidence and rational debate, these users could be researchers and academics, teachers and students, consultants and advisors, knowledge-based professionals of all kinds. In an ideal world they gather information on everything in sight: in practice, resources are tight and knowledge is prioritized for relevance and significance. So there are many overlaps to the societal user pathways, for the relevance and the 'why' questions: and to enterprise pathways, for the 'what' questions.

This pathway should also explore in depth the scope of the problem and/or solution: is our Low-Carb-City an economic, social, technical or cultural problem? Whose knowledge is relevant, and is this likely to be clever, smart or wise? (or possibly, stupid, un-smart, unwise)? Such issues are generally messy and fuzzy and controversial, and working with them is as much an art as a science

(more on this in ***SCIENCE-III***). For this pathway, the 'how' question of methods and tools, is connected with the 'how much' question of resources, and the 'who' question of actors and sponsors. We can write scientific papers, but to be really useful, we have to link these with other kinds of actors, and travel the pathways through this more multi-layered knowledge landscape.

Policy user pathways

Policy might aim for 'prosperity' or 'resilience' or other grand system effects, but on a practical level it has to start with enabling actions – providing spaces, resources, tools, incentives, plans or coordination of various kinds. This fourth pathway is pictured at the lower part of ***USER-PATHWAYS-(B).*** It focuses on the 'where' questions of spaces and places: the 'how much' questions of resources, and the 'what' questions of the applications and insights which come out.

In practice, policy is often less than clear on how to achieve its goals, so it works on enablers, such as labs, forums, hubs, platforms, or subsidies. It's also surprising how much policy is constructed on a negative and 'unwise' basis: as seen in ***LOCAL-ONOMICS-III***, public funding often goes to branch-plants of global firms, rather than providing resources for a more synergistic local innovation capacity. So a more intelligent policy user pathway will look for spaces and enablers of wider synergies and deeper values. It will look for synergistic value chains with the question of 'how much'. And it will look for *Insights* for the complete cycle of policy, from problem analysis via ***DEEPER-MIND-III***, to strategic intelligence via ***FORESIGHT-III***, to policy analysis via ***E/VALUATION-III.*** So, this policy user pathway underpins each of the others by linking debate with knowledge and action.

Enterprise user pathways

Enterprise users 'get things done' by practical strategy and management, in private sectors or public sectors. This pathway centres on the 'how' and 'how much' and 'what' questions of resources and results. At each stage in the cycle of thinking and action, from the largest project to the smallest, there's a menu: enterprise-business-models, risk-resilience, futures-foresight, organization-learning, innovation-transition, project management, and assessment-evaluation.

Under the surface this is all about collective intelligence of the firm or enterprise or organization. This can be guided by the four Toolkit stages, of 'co-learning, co-knowledge, co-creation and co-production'. We need the enterprise to 'co-learn', in the creative spaces of labs or hubs or platforms: and then gather 'co-knowledge' via scanning, delphi or technology foresight. The enterprise will 'co-create / co-design' in science parks or incubators, enabled by seed-funds or venture capital. If it's on the other side of the tracks, then we look to the energy of the slums, the micro-entrepreneurs and the excluded. In both system then we look to 'co-innovate' and 'co-produce' with partners and value chains, helped by intelligent feedback for evaluation and management.

Where to start?

If in doubt, keep it simple: start with a *Societal Pathway*, and branch into a *Knowledge Pathway* or *Enterprise Pathway* as and when needed. Any creative thinking process works better with good surroundings, so if possible borrow a large country house for a long weekend, as pictured here in

USER-PATHWAYS, or in the ***MIND-GAMES*** of Chapter 11. But in practice synergistic thinking may be more urgent in war-torn basements, deracinated slums, narcotic dens, post-industrial sink estates or other front-line situations. Luckily the basics of synergistic mapping can be done with napkins and bus tickets, leaves or Lego or stones in the sand.

The garden here shows some essentials. Set up some round tables and resource libraries: think ahead with trends and 'what-if' scenarios. Make space for visioning and synergy forming, with feedback to some kind of action. We can enable positive dynamics of knowledge, of human resources. We can enable this with spaces for experimentation and contemplation. A typical synergistic program can run for hours, days, weeks, months or years, with numbers from three to 300 or 300,000 with digital media. The key thing is a positive mind, honest and open, creative but critical, ready for serious fun. If the synergistic process goes well, it will challenge boundaries between sectors or professions, explore controversial issues and problematic relations, and surface hidden controversies and conflicts. As in other processes of mediation or actualization, skill and judgement can avoid traps and mobilize opportunities.

And most important in all this are people. We need people who are creative, collaborative, critical and constructive, committed to the future, who can challenge their communities or sectors or professions where needed. Leadership is much studied and promoted, but it seems even more important to spread such capacities around, so that leadership is everywhere.[4]

Often the best place to start is the practical surroundings, the local community or social ecosystem, and it seems each decade brings its own version. As a 1980s community architect-planner I worked with Planning For Real, Design Charettes, Urban Forums and Community Visioning. We shifted in the 1990s to Round Tables, Local Agenda 21, Business Compacts and Local Strategic Partnerships. Now we have Occupy, Resilience Forums, Liveability Partnerships, Fab-Labs and Vision Labs. Here and there on such journeys we learned about round (or square) tables, about the power of ideology and the ideology of power, and about co-learning and co-creation. Now there are extraordinary new possibilities, as digital tools evolve and multiply, as a Web 2.0 world shifts towards a Web 3.0 '*CHAI*' (Collective Human-Artificial Intelligence). No-one can predict the potential even a decade ahead: but we're still looking for a digital system which can support but not substitute for what's most important – humans and their boundless potential.

So, these *Mind-Lab* and *Collaboratorium* prototypes aim towards a next generation of synergistic thinking and action. Gathering up every 'co'-word in sight, we aim for co-learning in the round tables, and co-knowledge for a multiplicity of experience. We foster co-creation in spaces of experimentation, and aim for co-production, with all available human resources. This isn't often a smooth or predictable journey – it's more about transformation and disruption. If the results are not yet challenging and controversial, then we need to raise the game.

[4] Levin 2013: Parkin 2009

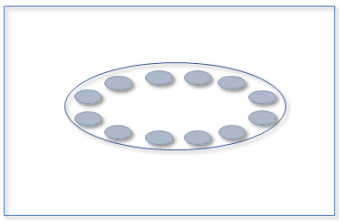
8) ANNEX – VISUAL TEMPLATES

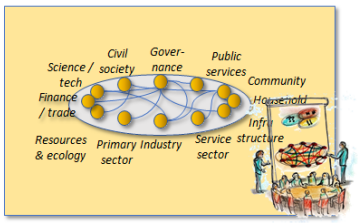
Stage 1: *'tables'* (system mapping): *'what's the problem?'*

a) Actors mapping – ('wider' synergies): *'round table'* template

- *Q: Who is involved?*
- *Q: how do they interact?*

Identify the most important people, stakeholders, communities: explore their roles & relations (social, economic, political etc).



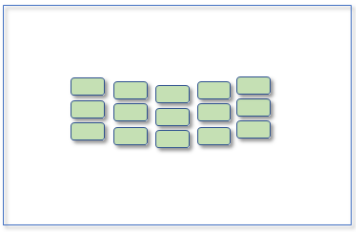


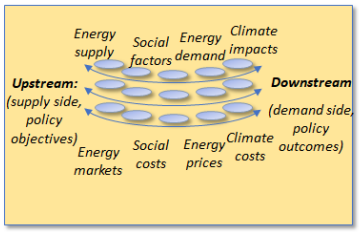
b) Factors mapping – ('further' synergies): *'business model'* template

- *Q: How does the system work?*
- *Q: Where are the upstream / downstream factors?*

Explore the metabolism or flows (resources, money, policy, labour, social value etc):

Look for upstream causes / downstream effects of the flows, (e.g. ecological / social impacts)



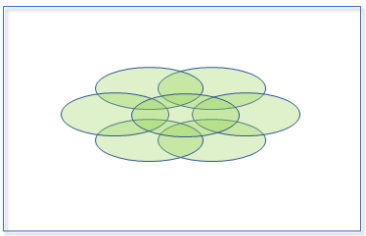


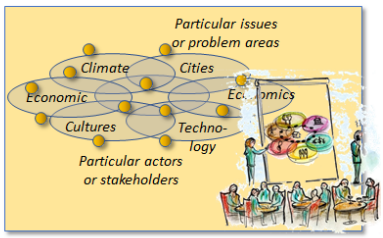
c) Domain mapping – ('deeper' synergies): *'cloudy crystal ball'*.

Questions to be addressed:

- *Q: Why is this project important?*
- *Q: Which values & domains are involved?*

Explore what kind of problems & what is the scope: which are the goals / visions? (social / technology / economic / environment / political /cultural etc).



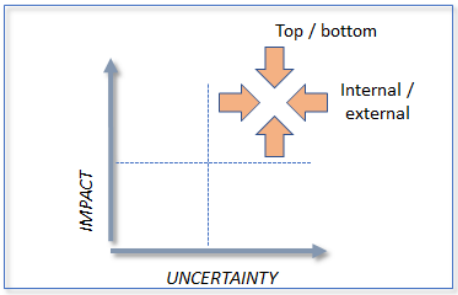


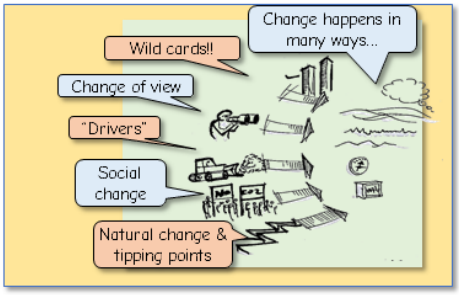
Stage 2: *'crossroads'* (scenario mapping): *'what's changing?'*

d) Drivers - *'Force fields'* template

- *Which forces of change?*
- *Which uncertainties?*

Identify each kind of change, for impact & uncertainty. Select the top 2 or 3 most important changes.



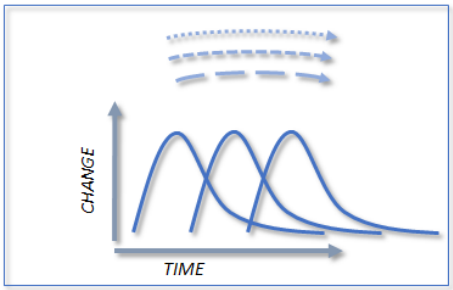


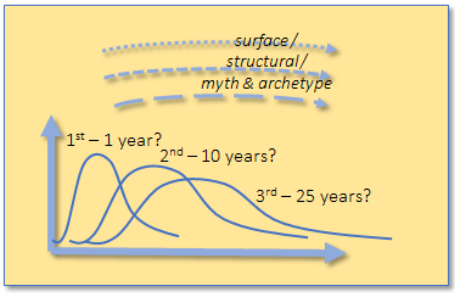
e) Horizons - *'3 mountains'* template

- *When are the horizons of each change?*
- *Which are surface / structural / archetype changes?*
- *When is there growth / decline/ restructuring?*

Explore which are short / medium / longer term changes:

Explore the patterns or cycles of change



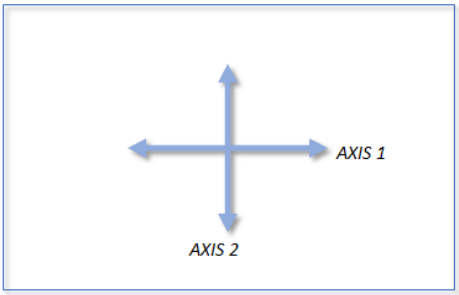


f) Scenarios - *'Cross-roads'* template

- *What if the best / worst happens?*
- *Which are the most 'interesting' alternative futures?*

Explore 'what-if' the top 2/3 changes are high / low impact, positive / negative.

Explore the scenarios with stories, headlines, images.

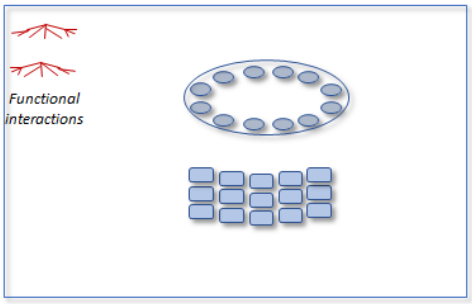


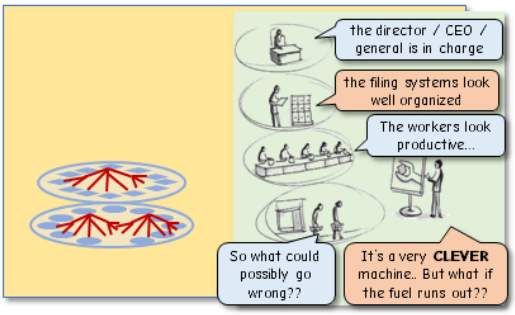
Stage 3: *'visions'*: (synergy mapping): *'what opportunities?'*

g) Linear – (Mode-I) - *'Clever ideas'* template

- *How to improve the functions & operations?*

Explore practical ideas & synergies between the 'actors' & 'factors' (social / technology / economic / environment / political /cultural etc). Draw the possible inter-connections.

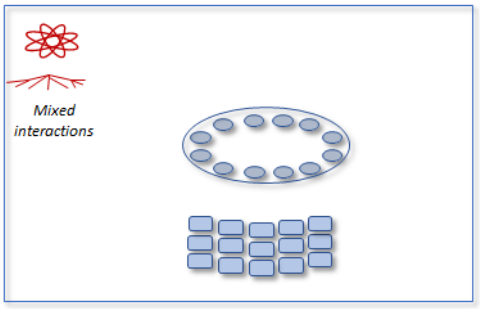


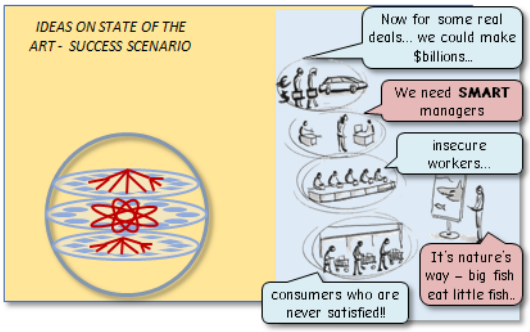


h) Evolutionary (Mode-II): *'Smarter ideas'* template

- *How to make smarter inter-connections?*

Explore the state-of-the-art entrepreneurial ideas & synergies between 'actors' & between 'factors'. Draw the possible inter-connections.

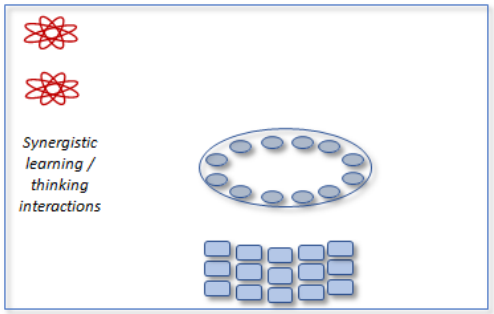


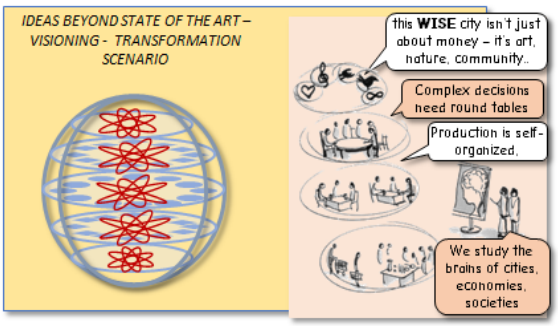


i) Co-evolutionary (Mode-III): *'Wiser ideas':* template

- *How to grow a wiser kind of intelligence?*

Explore beyond state-of-the-art 'visionary' ideas & synergies, between different 'actors' & 'factors'. Draw the possible inter-connections, with multiple layers.





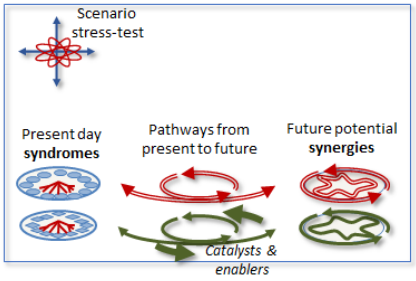
Stage 4 - *'route-maps'*: (strategy mapping): *'what's to be done?'*

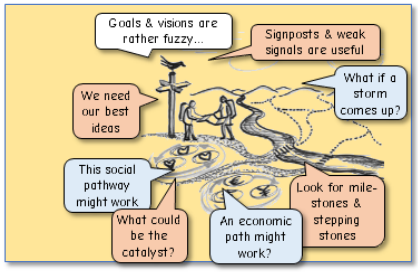
j) Pathways - 'Pathways'

- *Which pathways could best realize the opportunities??*
- *Are these future-proofed?*

Develop 'pathways' of strategic change, which connect the most robust ideas / synergies (internal / external: short /medium / longer). *(there are different formats to show the pathways)*

Test the best ideas / synergies against each scenario: & select the most robust.

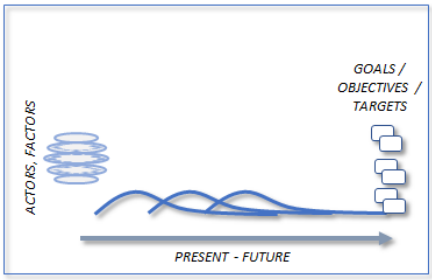


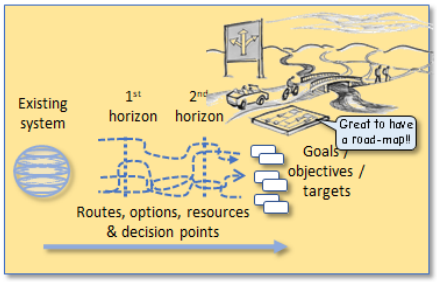


k) Route-maps - 'Route-maps'

- *What strategies could turn the pathways into reality??*
- *When are the key stages?*
- *How much resources are needed?*

Identify the goals & objectives: Identify links to plans & actions, actors involved, factors & resources needed. (internal / external: short /medium / longer)

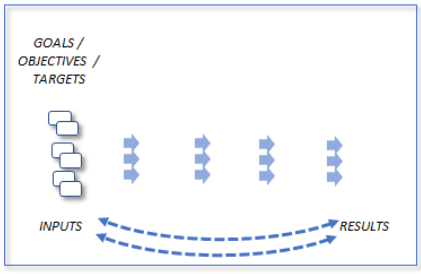


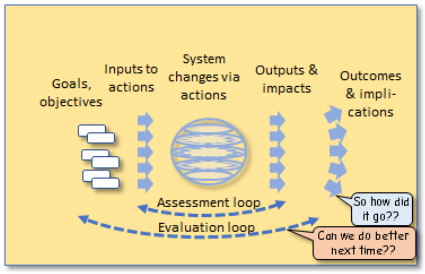


l) Management/ Evaluation - 'Action plans'

- *How to manage the actions?*
- *How to evaluate the results??*

Set up management plan with practical priorities & actions: Identify the next steps with actors & resources: Explore how to monitor performance, evaluate results & feedback.





Summary Table

This table is a summary of the 12 steps in the Synergistic Toolkit, with key questions to be addressed, & examples of urban development. Note the steps can follow in different orders (not always A, B, C)

	KEY TASKS	*KEY QUESTIONS*	*URBAN EXAMPLE*
SYSTEM / SYNDROMES			
A) Scoping	Explore the scope of the problem / system /issue / agenda / problematique…	what is the agenda or problem for today: where are the boundaries?	*What is the scope & agenda: housing / infrastructure / public space?*
B) 'Wider' synergies	Explore how the system works, , and the relations of the actors in the system,	how do the actors / factors interact: what kind of system, hierarchical or networked?	*E.g. who are the key actors- investors /owners / developers / designers / residents?*
C) 'Deeper' synergies	Map the overall 'metabolism' of the system, with inter-connections between domains.	Which are the key domains e.g. social / technical / economic / ecological /political ?	*What are the main forces shaping behind the peri-urban syndromes*
SCENARIO MAPPING			
D) Drivers	Explore the forces of change, both external and internal.	what are the driving forces of change, uncertainty, internal / external, near / far horizon?	*What are key drivers of change & uncertainty ('21 drivers')*
E) Dynamics	define the most significant dynamic cycle effects.	what dynamics of change – succession / renewal / tipping points / transitions?	*How does the cycle of renewal work here: (e.g. development / conservation / restructure?*
F) Scenarios	explore alternative futures with structured 'what-if' questions.	which projections and scenarios are most relevant & plausible?	*How could the future peri-urban be different from today?*
SYNERGY MAPPING			
G) Linear mode-I	map the system qualities which are more linear & mono-functional	what opportunities for functional efficiency & performance of the system? Any negative effects?	Is the key peri-urban issue ***linear growth****? (housing, services, infrastructure etc)*
H) Evolutionary mode-II	map the qualities which are evolutionary & inter-connected.	opportunities for creative enterprise, new functions & niches? Any negative effects?	Is the key peri-urban issue ***adaptation / evolution****? (housing, services, etc...)*
I) Co-evolut-ionary mode-III	Map the qualities which are more co-evolutionary & synergistic	how can opportunities emerge via synergistic collaboration, co-learning & social intelligence?	Is the key peri-urban issue ***co-intelligence / co-evolution****? (housing, services, infra, etc...)*
STRATEGY MAPPING			
J) Pathways	look for synergistic pathways, to link between present 'syndromes' & future 'synergies'	which synergistic combinations can form pathways to bring actors/ factors into alignment & added value.	*How to make real positive change in the peri-urban? (housing, services, infra, public realm...)*
K) Road-maps	look for synergistic links between objectives, resources, actions, enablers.	which pathways, actors and factors can be combined into practical strategies & actions? what implications for resources?	*Which resources, actions, timescales to realize these? (housing, services, infrastructure, public realm...)*
L) Management / Evaluation	rational /relational management methods with assessment & evaluation.	how can results be evaluated, with feedback & learning into the next cycle?	*How to learn: before, throughout & following the urban policy process?*

[1] Thompson et al 1999
[2] Latour 2005
[3] Ravetz 2000
[4] Loveridge 2008
[5] Checkland and Scholes 1990
[6] EEA 2000
[7] Inayatullah 2011
[8] Sharpe 2012
[9] Gunderson & Holling, 2002.
[10] IPCC, 2001: Piorr et al 2011
[11] Wilson, 1994
[12] Phaal et al 2007
[13] Thaler & Sunstein 2008
[14] Ravetz, 2011 and 2013: Horn 2015
[15] Alexander et al, 1977
[16] Sousanis 2015