Foresight
The Manual

Global Centre for Public Service Excellence

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Resilient nations.*

FORESIGHT: THE MANUAL

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Contents

Foresight, Resilience and Sustainable Development

The premise of foresight is that the future is still in the making and can be actively influenced or even created, rather than what has already been decided, there only to unearth and discover, and passively accepted as a given. This is an empowering realisation for both governments and citizens. Foresight permits governments and public administrations to construct contingency plans for undesirable but possible and probable scenarios, while creating policies that capitalise the transformational possibilities of preferred futures, moving from foresight and insight to strategy and action. At the same time, practical application of government foresight in strategic planning and policy development can also be empowering for citizens. Participatory and inclusive foresight methods create spaces for dialogue and negotiations between a broad spectrum of stakeholders, perspectives and futures and taps into the distributed, often tacit, knowledge 'in the room'.

Applying foresight methods to traditional planning processes represents an opportunity for governments to address the two key issues - responsiveness to change and citizen-centred service design - shaping modern discourse about governance and functions of the State. For developing countries, approaching policy planning differently by increasing stakeholder participation and building in adaptability to change and resilience to shocks can only benefit the achievement of national development goals.

With the landscape of modern governments changing fundamentally and attention increasingly shifting to sustainable solutions in the post-2015 development agenda, "people across the world are looking … (for) a truly transformative agenda that is both universal and adaptable…. Their voices have underscored the need for democracy, rule of law, civic space and more effective governance and capable institutions…"[1] Foresight approaches in policymaking and statebuilding represent an opportunity for decision-makers to consider and integrate the aspirations of its populace in the design of institutional reforms and for states to secure, and restore faith in, the degenerating social contract with citizens.

Foresight can be instrumental at different levels of government and in various stages of the planning cycle. As a trendspotting tool, foresight is useful for looking at short-, mid-, as well as long-range futures, each valuable for their particular contributions to government schemes. At the national level, over-the-horizon strategic spotting can bolster governments' capacity for effective system stewardship, as well as the construction of coherent national narratives and identity. Moreover, the capacity to identify weak signals and emerging challenges or opportunities, but more crucially to re-imagine the future and accept that it will not be like the present, allows governments to design strategies to cope with and embrace inevitable change.

At the policy planning and implementation level, a big challenge for policymakers is navigating the complex and interconnected nature of seemingly unrelated social, economic and environmental issues facing modern societies. Aside from empowering governments to be more responsive and adaptable by looking beyond horizons or scanning the present more broadly, the practice of foresight in policymaking also enables planners to design strategies and policies that are resilient. The application of foresight methodologies that are capable of testing, simulating and modelling the impacts and crosscutting effects of policies is therefore also of great strategic value. Future-proofing policies by testing them in the context of alternative and uncertain futures ultimately enables the whole of society - governments, administrations, institutions, policies, as well as citizens - to be better equipped to withstand, adjust and react to changing environments.

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[1] Ban Ki-Moon, *Road to Dignity by 2030: Ending Poverty, Transforming All Lives and Protecting the Planet*, Synthesis Report of the Secretary-General on the Post-2015 Agenda, advance unedited draft (4 December 2014), para. 23. Available at: http://sustainabledevelopment.un.org/content/documents/5527SR_advance%20unedited_final.pdf.

Furthermore, participatory foresight at the civil society level enables greater citizen engagement and feedback, thus encouraging the co-creation of equitable and sustainable public service solutions, as well as an inclusive, whole-of-society approach to governance.

For a more in-depth introduction to foresight for development, refer to the UNDP GPCSE's publication, *Foresight as a Strategic Long-Term Planning Tool for Developing Countries*[2].

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[2] UNDP Global Centre for Public Service Excellence (GCPSE). 'Foresight as a Strategic Long-term Planning Tool for Developing Countries,' UNDP GCPSE, Singapore, 27 May 2014. Available at: http://www.undp.org/content/undp/en/home/librarypage/capacity-building/global-centre-for-public-service-excellence/Foresight.html

Foresight Applications for Development

Foresight is the umbrella term for methodologies and approaches that take volatility, uncertainty, complexity and ambiguity as their starting point, explore possible and probable futures, including a preferred one, and generate insights and 'cross-sights' that enable transformative actions in the here and now. The spectrum of foresight applications fall broadly into four categories:

- Strategic Foresight
- Participatory Foresight
- 'Revolutionary' Foresight
- Transformative Foresight

It is worth noting that this categorisation is, to some degree, artificial. Many applications blend into one another, and many methodologies are applicable across the range of applications. This is particularly true of many Participatory Foresight methods, which can be 'Revolutionary' or Transformative when applied differently.

Strategic Foresight

Strategic foresight is most commonly used by strategic planning units of national governments. A methodology first practiced by the military, classical applications usually focus on possible future trends and developments ('horizon scan') of one crucial driver, such as The Future of Technological Development (one of the earliest non-military applications), The Future of Transport, The Future of Aid etc. Strategic planning units forecast a particular future for a key driver and developed detailed recommendations for policy makers. Its main aim is a long-term strategy to capitalise on a promising future trend.

Increasingly, strategic foresight is now also applied by government units to make sense of the complexity and interdependency of a multitude of factors (economic, social, environmental, political etc.). There is rising awareness that national development goals have to be planned for and realised in uncertain and unpredictable environments, in which 'black swans' feature prominently, and over which authorities have less, little or no control. This particular application typically results in possible and probable scenarios, in which existing and new policies are tested for their resilience and compatibility with any possible emerging future ('windtunneling'). The main aim of this application is to enhance classical strategic planning and to strengthen anticipatory and adaptive government.

The latest addition to strategic foresight is the 'quick-and-dirty' exploration of possible futures, with the explicit aim to broaden the horizon and identify strategic opportunities and high-leverage entry points for innovation. These typically concern short-term cycles, in which the potential of opportunities is tested through prototypes and leveraged by scaling up. The aim is not long-term planning, but immediate action.

The first application is commonly driven by traditional expert knowledge (e.g. through the Delphi method). The second application is still heavily dominated by traditional expert knowledge, but there is a growing awareness that non-traditional expertise plays an important role in making sense of and designing pathways through complexity. The third application usually thrives on the inclusion of as many possible perspectives as possible.

Participatory Foresight

Participatory Foresight, like Strategic Foresight, has been around for a while. Its broad aim is aspirational, its method emphatically inclusive and democratic and its application increasingly varied. It has important links with the shift of emphasis to distributed knowledge, the explosive

growth of networks flows beyond traditional types of association, and the proliferation of enabling technologies.

Participatory Foresight is based upon the originally ideological but progressively practical argument that whoever has a stake and a role in the realisation of a particular future, is also entitled and required to have a say in how that future should look like. The United Nations' *My World* Campaign is a good illustration of the more ideological roots of this type of foresight, while respected methodologies such as *Appreciative Inquiry*, *Future Search Conference* and strategic planning tools pioneered by private corporations like Shell emphasise the practical side.

Participatory Foresight is most often concerned with identifying a *preferred* future, from among many possible (and undesirable) ones. It is a crucial part of a visioning process and, in the case of *Causal Layered Analysis*, goes a step further in the direction of 'grand' narratives. Participatory Foresight is often the first step in the collaborative effort to realise the desired future, with specific roles and responsibilities for all concerned.

'Revolutionary' Foresight
'Revolutionary' Foresight is an extension of the practical application of Participatory Foresight and aims to address the behavioural and political aspects of change. It recognises and accepts that transformational change is, to a large degree, about power, politics and vested interests. 'Revolutionary' Foresight incorporates political economy issues at the inception or conceptualisation stage of a preferred future, vision or 'grand' narrative' to mitigate their disruptive influence during execution. Its aim is to find *and* provide a solid and sustainable platform for collective action.

By focusing on the identification of a *future* state of affairs agreeable to most, if not all, stakeholders, 'Revolutionary' Foresight creates a relatively safe and open space to negotiate different and sometimes competing perspectives, values, considerations and interests. The 'future' is less contentious than the past or the present and usually, at least initially, conjectural, allowing for current controversies to be addressed in hypothetical, solution-oriented terms. The process of collectively finding agreement on key elements of this future, for example common problem-definition, common ground on essentials, representation and realisation, and timing of transition, involves negotiation of narratives, worldviews, perspectives, values, interests and the relative importance of particular sets of data at every step.

Crucially, 'Revolutionary' Foresight intends to provide a more *effective* platform for broader stakeholder inclusion and engagement, beyond the often perfunctory 'consultation' mechanisms. It aim to open up the political space for crucial decisions about aspects of the future to non-elitist stakeholders and non-traditional decision-makers, in order to include more views and interests and generate a more solid and sustainable foundation for collective action.

Transformative Foresight
Transformative Foresight takes the idea of a 'preferred future' among many possible futures a step further. Transformative Foresight is about challenging the received wisdom about how the future will develop (the 'used future'), imagining and creating an alternative (but equally valid) future and thereby regaining agency over one's own future. It is the most radical, creative and aspirational application of foresight. While many foresight methodologies and applications tend to be, to a certain degree, reactive to change and disruption, Transformative Foresight is about actively creating and shaping the desired change.

Causal Layered Analysis (CLA) serves as a good introduction to Transformative Foresight. CLA identifies many different levels that are changing or need to change in order to shape a coherent desired long-term future. It sees data and trends, or any view of the future based on quantitative trends, as only one level - albeit a dangerously predominant one - that might shape the future. Social causes and systems, including economic, cultural, political and historical factors, form another level. Beyond that, it is the level of how people look, know and talk about the 'world', the level of worldviews. The deepest level is moulded by how the information of the other levels crystalize in people's brains: narratives and metaphors. CLA suggests that re-imagination of that narrative produces an enabling environment to reinvent and shape the future.

Doing Foresight Well

There are many foresight methods and techniques available that are considered part of futures analysis. These span the gamut from long-term processes and quantitative data collection/analysis to participatory workshops and qualitative assessment of narratives.[3] Some foresight methods have been widely tested, others less so; some are already practiced in many government departments and others are unheard of. It is worth remembering, however, that futures analysis is not a panacea. There are some common pitfalls in foresight, which might turn into weaknesses if not properly addressed.

Hyperbole, Pretext and Reality
From the outset, all 'participants' must be clear about what foresight is and isn't, what it can and can't do, and how it can be used and abused. Foresight is not a universal cure to all planning ills. Foresight is not a substitute for traditional planning. Foresight is not an excuse to skip the hard work necessary to realise the desired future. And foresight does not provide an alternative to tough structural choices for organisations to become more adaptable and thorny political decisions for societies to become more 'developmental' and inclusive. Foresight enhances existing planning methods by broadening our horizon; by enabling planning in an uncertain and unpredictable reality; by opening up space for other stakeholders in the future and by offering a platform to start negotiating values, perspectives and vested interests right from the beginning of our response to or initiation of change.

Thinking about *the* Future vs. Future*s*
Foresight is not easy. People's habits of thinking about the 'future' run deep. Humans have a cognitive and social bias to deny change and cast reality in familiar categories. Age-old cultural belief systems, in which a given future is unfolding or the past is eternally repeated, are always lurking in the back. Powerful social processes, such as hierarchy and 'groupthink', shut out alternative views. Experts doggedly protect their prediction monopoly on which their status in based.

As a result, foresight exercises sometimes struggle to get beyond '*the* future' and move on to 'future*s*', fail to produce new, transformative insights, and leave people and organisations stuck in the 'old' approach of producing the 'used future'. Hence, foresight activities need extensive preparation, including development of non-directive illustrations of 'futures' thinking, selection of methods that emphasise and stimulate creativity (e.g. 'games', 'wild cards', etc.), and identification of strategies that ensures an 'equal playing field'.

Who to invite?
Who participates in foresight matters significantly. The choice of participants has a huge impact on the quality of the insights and the sustainability of implementation, although perspectives on 'quality' might differ. To a large extent, choosing the right blend of participants for a particular foresight method depends on the interpretation and importance given to the following factors: **inclusiveness**, **implementation**, **expertise**, **process** and **output**.

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[3] The methods included in this guide are drawn from descriptions in: Michael Jackson, *Practical Foresight Guide*, (Creative Commons License: Shaping Tomorrow, 2013), available at http://www.shapingtomorrow.com/media-centre/pf-complete.pdf.); and the United Kingdom Government Office for Science, *The Futures Toolkit: Tools for strategic futures for policy-makers and analysts*, (UK: Government Office for Science, 2014).
Information on specific methodologies were also drawn from overviews of foresight methods assembled by FOR-LEARN, "Description of main methods." FOR-LEARN online foresight guide website, accessed from
http://forlearn.jrc.ec.europa.eu/guide/4_methodology/methods.htm on 25 September 2014; Federico Nicolini and Marina Bagni. Inventory of Foresight Methodologies and Studies – work package 5, STAR-IDAZ Seventh Framework Programme Cooperation, Theme 2: Food, Agriculture and Fisheries, and Biotechnology (June 2012), accessed from http://www.star-idaz.net/wp-content/uploads/2012/10/WP5-Inventory-of-Foresight-Methodologies.pdf on 25 September 2014; Anna Evely, Mark Reed, Alister Scott, and Mike Hardman, "Future Tools Literature Review," National Ecosystem Approach Toolkit website, accessed from http://neat.ecosystemsknowledge.net/futures-tools.html on 25 September 2014; and others.

- '**Inclusiveness**' refers to the ideological principle that whoever has a stake in a certain future should have a say in it. This is the foundation of participatory foresight and a crucial element of 'revolutionary' foresight.
- '**Implementation**' emphasises the principle that people are more committed when engaged, and that greater commitment makes for more sustainable action. This is an important consideration in organisational change processes.
- '**Expertise**' raises the thorny question of the respective value of technical expertise vs. distributed knowledge in exploring *complex* futures, and whether to invite a panel of well-known technical experts or a broader range of non-traditional experts. As the current social innovation wave has demonstrated, the answer to this question is not as straightforward as once thought.
- '**Process**' puts more emphasis on foresight as a starting point where competing interests can find sufficient common ground to move towards the initial steps of collective action, the aim of 'revolutionary' foresight.
- '**Output**' stresses the quality of the insights for future policy decisions and is highly valued by specialised government foresight and strategic planning units.

Foresight, insight, action

Many foresight exercises suffer from a lack of follow-up. Most strategic planning events struggle with translating strategic insights into concrete action, but foresight has some unique problems. First, sharp focus, appropriate methods and carefully selected participants generate high quality insights. The mere organisation of a strategic planning event, traditional or innovative, is by itself *no* guarantee for quality insights. As described above, foresight is raising the bar for quality insights even higher, by explicitly exploring VUCA realities, alternative futures, etc. and by asking people to forsake their cognitive and behavioural biases.

Second, good action plans can only be derived from high quality insights. There are no short cuts. Many strategic planning events insist on the inclusion of action planning sessions, regardless of the quality of the insights. Foresight events should avoid the temptation to cut corners and move on to action planning too quickly.

Third, organisations usually lack the capacity to act upon the results of a foresight event, especially strategic foresight. Strategic foresight produces scenarios of alternative futures, agile strategies with sets of alternative policies, and short, non-traditional feedback loops. Many bureaucratic structures and procedures do not allow for the kind of adaptability and flexibility required for implementation of action plans derived from foresight (e.g. budget cycles, work plans with strictly sequenced deliverables, long-term evaluation strategies etc.)

A widespread approach is to accommodate strategic foresight in classical strategic planning structures. Many governments have dedicated foresight teams in conventional planning divisions or even in strategy units at prime minister or president offices, which churn out meticulously researched reports on emerging trends and give policy recommendations. More mature strategic foresight structures have moved towards a more decentralised approach and established foresight teams at individual line ministries, in a deliberate attempt to translate insights into action. Whatever approach is chosen, it is crucial that the capacity question is addressed at the same time as the action planning.

Methods and Approaches

The foresight methodologies and techniques selected for inclusion in this guide are particularly useful for framing policy discussions and decision making. They may be used in various stages of policy planning cycles and in combination with other methods. A full-scale foresight exercise rarely relies on one single method.

A brief guide to practical considerations on arranging suitable methodological frameworks is available at the FOR-LEARN website. The European Foresight Platform provides a more comprehensive overview on how to do foresight. For a critical evaluation about the challenges of selecting foresight methods, refer to Rafael Popper's detailed study "how are foresight methods selected?"[4]

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[4] Rafael Popper, "How are foresight methods selected?" *foresight* 10, no. 6 (2008): 62-89. Available at http://dx.doi.org/10.1108/14636680810918586.

Key Concepts

- **Black swans**
  Rare and discontinuous events that are unprecedented, unexpected and have major effects. They are often inappropriately rationalised after the fact with the benefit of hindsight, but this tendency to see coherence can obscure future threats.

- **Cognitive bias**
  A pattern of deviation in judgment that influences the way information is received, processed, retained or called. Cognitive biases influence how inferences, judgements and predictions are drawn.

- **Cognitive dissonance**
  The mental stress or discomfort one experiences when confronted with new information or views that contradicts existing values or beliefs. Because humans strive for internal consistency, individuals tend to reduce cognitive dissonance by denying or devaluing new information and views, or rationalising their own values and beliefs.

- **Complexity**
  Complex systems are non-linear and diverse networks made up of multiple interconnected elements. Cause and effect relationships within the system are not easily discernable or predictable. Historical extrapolation is futile for predicting emergence (new patterns and behaviours) in complex systems.

- **Cross-cutting issues**
  Issues or challenges that affect more than a single interest area, institution or stakeholder, and that need to be addressed from all points of view. A Whole-of-Government or Networked approach is useful for addressing cross-cutting issues.

- **Design thinking**
  An end-user centred approach to problem-solving that places the final experience at the heart of developing solutions. Following an iterative approach, the rapid prototyping component of design thinking allows for quick adaptation in uncertain environments and continual improvement.

- **Experimentation and prototyping**
  Experimentation is a process that seeks to test and validate competing hypotheses. Prototyping refers to creating models or sketches to test ideas and spot problems. Experimentation and prototyping are effective ways to navigate and test hypotheses and ideas in complex or rapidly changing environments.

- **Interdependence**
  A relationship of mutual reliance between two or more factors within a system such that changes in one area affect the other(s).

- *Path dependency*
  Describes the inclination to stick to past practice despite the availability of newer, more efficient practices as a result of cognitive biases such as risk aversion, or concerns over sunk costs. Designing contingency plans with ample space for flexibility can reduce the constraints of path dependency.

- *Resilience*
  A system's ability to cope with and recover from shocks or disruptions, either by returning to the status quo or by transforming itself to adapt to the new reality. Resilient systems view change as inevitable and failure as opportunities to learn from. Social cohesion, trust in government and national pride can be indicators of resilience.

- *Retrospective coherence*
  The act of assigning coherence in hindsight in order to make sense of what is happening. Practicing retrospective coherence presents the danger of making decisions for the future based on the lessons of history that may not apply in similar situations.

- *Signposts*
  Milestone markers between a given future and the present day that aid visualisation by breaking up the path to the future into manageable blocks of time. They can help to gauge the extent to which a particular scenario has materialised, and can be events, thresholds or trends and patterns.

- *Systems thinking*
  An analytical problem solving approach that looks at a system as a whole rather than in isolation, and that considers the interactions between various elements. The big-picture overview helps decision makers see linkages across different sections within the system and can foster collaboration and shared understanding within an organisation. Systems thinking also helps policymakers identify cause-effect relationships and how they might manifest in the larger system.

- *Unknown unknowns*
  Issues and situations in organisations that have yet to surface and which are blind spots for planners who are unaware that they do not know about them.

- *Whole-of-Government (WG)*
  A 'joined-up' or networked approach to governance that represents a shift from vertical to horizontal decision-making, and which is built on inter-agency collaboration and collective problem-solving. Whole-of-government involves a process of identifying, analysing and managing wide-ranging and cross-cutting issues.

- *Wicked problems*
  Large and intractable issues and challenges that have no immediate or obvious solutions and whose causes and influencing factors are not easily determined. Wicked problems are characterised by many agents interacting with each other in often mystifying ways, and involve multiple stakeholders operating with different perspectives and goals.

Institutional Foresight

Visioning

Visioning is method for determining a compelling vision of a preferred future. Visioning a desirable future is the first step in creating a powerful strategy to achieve a particular purpose. Clarifying a vision is one of the most powerful mechanisms for engaging a team, organisation or community and getting them excited to push forward into new territory. A successfully designed product, service or policy should intentionally impact the thoughts and behaviors of society and culture, and serve as an example of the mindset and values of its creators. Creating that clear vision is a precursor to planning, and a key to creating the conditions to mobilise a group of collaborators around a common goal. Ultimately, it is not about creating *my* vision, but about creating a *shared* vision.

Visioning a desirable future is the first step in creating a powerful strategy to achieve a particular purpose. ⓒBY-SA

Usage
- At the beginning of the process (project initiation).
- Corporate culture.
- Strategic planning.
- Project design.

Strengths
- Useful guide for future work and priorities.
- Inspires, engages and enables most people.
- Excellent for generating ideas, encouraging interaction and agreeing common vision, values, processes and goals.

Challenges
- Requires solid communication and continued strong leadership from the outset.
- Must be lived, shared, stretching but achievable and ethical.

Examples
- Visioning Change and Alternative Futures[5] [envisioning the future of agriculture]
- Imaginal Visioning and Prophetic Foresight[6] [40 year history and development of imaginal visioning methods]
- Tonga foresightXchange[7] [participatory national visioning]

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[5] Siwa Msangi, 'Visioning Change and Alternative Futures: Foresight as a research and planning tool," *Development* 56, no. 4 (September 2013): 491-499. Accessed from http://doi.org/10.1057/dev.2014.51 on 20 October 2014.
[6] Oliver Markley, 'Imaginal Visioning for Prophetic Foresight,' expanded preprint of *Journal of Futures Studies* article, March 2014. Accessed from http://www.imaginalvisioning.com/wp-content/uploads/2010/08/Imaginal-Visioning-for-Prophetic-Foresight-Preprint-V2.1.pdf on 20 October 2014.
[7] UNDP GCPSE, '2014 Tonga foresgithXchange Public Report,' 10 November 2014. Accessed from https://undp.unteamworks.org/node/464916 on 2 June 2015.

Forecasting

Forecasting is a process of making statements about events whose actual outcomes (typically) have not yet been observed. Forecasts are generally derived based on historical data.

Forecasts are generally derived based on historical data. ©PD-USGov-Military-Navy

Usage
- Forecasts are universally used across all PEST (Political, Economic, Social and Technological analysis) subjects to forecast and predict outcomes by all manner of individuals and organisations.

Strengths
- Quick and easy to do at basic level.
- Can be taught and learned.
- Can be peer reviewed.
- Facilitates strategy and policy-making.
- Can create challenge to existing paradigms and resource constraints.

Challenges
- The forecaster ignores related fields.
- New technical approaches supersede the forecasters' assumptions.
- Assumptions and likelihoods can/will be wrong.
- Can be complex and require training or facilitation.
- Forecasts can be taken as gospel by untrained people.
- Can be very time consuming.

Examples

- Forecasting, growth management and public policy decision making[8] [Series 8 forecast methodology, San Diego]

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[8] Jeff Tayman, "Forecasting, growth management and public policy decision making," *Population Research and Policy Review 15*, no. 5-6 (December 1996): 491-508. Accessed from http://www.doi.org/10.1007/BF00125867 on 21 October 2014.

Backcasting

Defines a desirable future and then works backwards to identify major events and decision that generated the future, to allow organisations to consider what actions, policies and programs are needed today that will connect the future to the present. Backcasting reminds participants that the future is not linear, and can have many alternative outcomes depending on decisions made and the impact of external events on an organisation.

Usage
- At the beginning of the process (project initiation).
- Planning.
- Resource management.

Strengths
- Avoids extrapolating present conditions.
- Quick & agile.
- Accessible and engaging.
- Lightweight.
- Creative.

Challenges
- Assumes the desirable future will occur.
- May need constant updating.
- Can be resource intensive and time consuming.
- No defined, conceptual framework.
- Best for skilled practitioners.

Examples
- Visioning and Backcasting for UK Transport Policy[9] [case study and methodology review]
- Project Göteborg 2050[10] [case study of backcasting sustainable Swedish city]
- Retrofit 2050[11] [backcasting urban-scale retrofitting of UK cities]

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[9] David Bannister and Robin Hickman, "Looking over the Horizon: Visioning and Backcasting for UK Transport Policy," paper for Department for Transport – New Horizons Research Programme 2004/05. Accessed from http://vibat.org/vibat_uk/pdf/vibatuk_method_issues.pdf on 10 October 2014.

[10] Aumnad Phdungsilp, "Futures studies' backcasting method used for strategic sustainable city planning," *Futures* 43 (2011): 707–714. Accessed from http://www.cgee.org.br/atividades/redirKori/7894 on 20 October 2014.

[11] Malcolm Eames, "Scenario Foresight and the Retrofit 2050 – Backcasting Process," Retrofit 2050 website. Accessed from http://www.retrofit2050.org.uk/sites/default/files/resources/ScenarioForesight.pdf on 20 October 2014.

Roadmapping

Roadmapping is an important tool for collaborative planning and coordination for corporations as well as for entire industries. It is a specific technique for technology planning, which fits within a more general set of planning activities. A roadmap is the document that is generated by the process. It identifies (for a set of product needs) the critical system requirements, the product and process performance targets, and the technology alternatives and milestones for meeting those targets. In effect, a technology roadmap identifies alternate technology "roads" for meeting certain performance objectives.
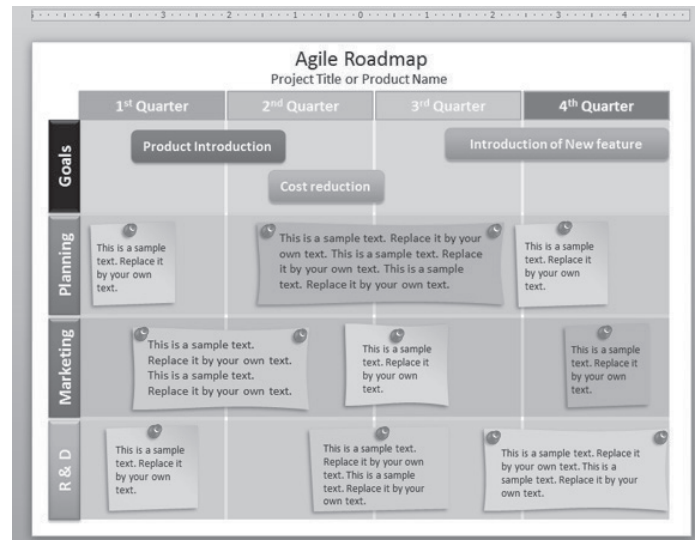
A technology roadmap identifies alternate technology "roads" for meeting certain performance objectives. Image source: http://www.melauspartners.com/technology-roadmap-template-excel-

Usage
- Can help develop a consensus about a set of needs and the technologies required to satisfy those needs.
- Provides a mechanism to help experts forecast technology developments in targeted areas.
- Can provide a framework to help plan and coordinate technology developments both within a company or an entire industry.

Strengths
- Provides information to make better technology investment decisions.
- Determines the technology alternatives that can satisfy critical product needs.
- Helps clarify alternatives in complex situations.
- Identifies critical product needs that will drive technology selection and development decisions.
- Generate and implement a plan to develop and deploy appropriate technology alternatives.
- Complex maps can be developed that can be updated in real-time.

Challenges
- Resource, time and cost hungry.
- May not consider other emerging forces impinging on the roadmap.
- Participants must know the process of roadmapping.

Examples
- FOR-LEARN Technology Roadmapping overview [detailed overview]
- Developing and Implementing Roadmaps: A reference guide[12] ['how to' guide]
- Australian Public Service Mobile Roadmap[13] [whole-of-government approach to build consistent national strategy for mobile technology]
- Implementing Energy Services Sector Technology Roadmap in US[14] [case study]

Agent-based Modelling (ABM)

ABM software simulates complex systems, particularly the interactions between autonomous agents along predefined rules. The interactions reveal emergent patterns across the system that might not be obvious when studying agents or interactions in isolation.

Usage
- Analyse situations that involve the interaction of multiple 'behavioural' or 'human' entities.
- Capture social networks and contacts between people.

Strengths
- Simulates the effects of individual actions on a system as a whole.
- Uncovers a range of likely outcomes.
- Rules of interaction can be improved.

Challenges
- Limited by the granularity and accuracy of its programmed rules.

Examples
- Agent-based models for economic policy design[15]
- Insights for climate change policy[16]

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[12] Irene J. Petrick, "Developing and Implementing Roadmaps – A Reference Guide," white paper from Penn State College of Information Sciences and Technology. Accessed from http://sopheon.wpengine.netdna-cdn.com/wp-content/uploads/WhitePaper-Petrick-RoadmappingReferenceGuide.pdf on 14 October 2014.

[13] Australian Government Information Management Office, *Australian Public Service Mobile Roadmap: Adopting mobile technology across government* (Commonwealth of Australia, June 2013). Accessed from http://www.finance.gov.au/files/2013/06/APS-Mobile-Roadmap.pdf on 14 October 2014.

[14] Tugrul U. Daim and Terry Oliver, "Implementing technology roadmap process in the energy services sector: A case study of a government agency," *Technological Forecasting and Social Change* 75 (2008) 687-720. Accessed from http://www.cgee.org.br/atividades/redirKori/4571 on 15 October 2014.

[15] Frank Westerhoff and Reiner Franke, 'Agent-based models for economic policy design: two illustrative examples,' BERG Working Paper Series, no. 88, November 2012. Accessed from http://www2.econ.iastate.edu/tesfatsi/ABMForEconPolicyDesign.WesterhoffFranke2012.pdf on 2 June 2015.

[16] Thomas Berger, 'Agent-based Modelling of Climate Adaptation and Mitigation Options in Agriculture,' *Journal of Agricultural Economics* 65, no. 2 (June 2014): 323-348. Accessed from http://doi.org/10.1111/1477-9552.12045 on 2 June 2015.

Management by discovery

A style of management based on continual reframing and adaptation of the problem-solving process. It is well suited to complex and unpredictable environments, or to solve wicked problems, where details about goals and objectives are likely to emerge only during the course of a project. In fact, the goals and objectives themselves are likely to shift as a result of actions taken.

Usage
- When managers have to start projects or programmes even with goals that are somewhat vague.
- To learn more about the goals even as they are being pursued.

Strengths
- Can modify the goals along the way, making discoveries rather than rigidly clinging to the initial objectives.
- More likely to achieve an acceptable outcome.
- Gain insights about the goals by struggling, learning and adapting.

Challenges
- Organisations that have rigid structures view changing directions as vacillating.
- Redirection can create confusion and commitment-loss.
- Reduced predictability and coordination as the staff are unclear about what to do next and do not understand the process.
- Funding authorities often require clear and unwavering goals.

Windtunnelling

Windtunnelling is a relatively new method similar to backcasting that helps to test how future changes might affect the ability to deliver a particular project or set of strategic objectives. By inviting participants to imagine how they would meet their objectives in different scenarios, windtunnelling helps them identify critical planning points where strategy needs to be flexible and adaptable and what policies may need to be strengthened. Windtunnelling is viewed as a good public sector technique for policy testing, which leads to continual scrutiny of decisions.
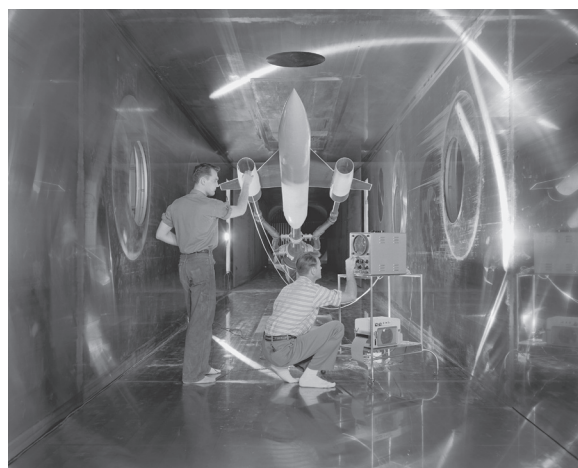
Windtunneling tests policies against the future. © NASA/GRC

Usage

- Usually most effective when used in conjunction with scenarios.
- Best applied when a policy of strategy has been developed but before deployment or during a review of a policy or strategy.

Examples:
- Political options to deal with violence in Jerusalem[17]

Strategic options analysed against scenarios

Scenario	Fortress Nirvana (Pro-poor, secure)	Another brick in the wall (Elite, secure)	Midnight in the garden (Pro-poor, insecure)	Four horsemen (Elite, insecure)
Option				
I. Funding broker	✓	✗	✗	✗
2. Technical Assistance	✗	✓	✓	✓
3. Advocacy	✓	✓	✗	✓
4. Corporate Social Responsibility	✓	✓	✓	✓
5. Think & Do tank	✓	✓	✓	✓
6. Partnership broker	✗	✓	✓	✓
7. Sector/Thematic specialisation	✓	✓	✓	✓
8. Maximise income	✗	✗	✗	✗
9. Whatever communities want	✓	✗	✗	✗
I0. Emergencies	✓	✓	✗	✗

  ▢ Robust   ▢ Significant   ▢ Important but risky

  ✓ Works   ✗ Does not work

Source: UK Government Foresight Horizon Scanning Centre, 'Scenario planning,' guidance note (2009), p. 17.

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[17] Peter Rüegg, "Political options tested in a virtual wind tunnel," ETH Zurich website, 11 July 2013. Accessed from http://www.ethlife.ethz.ch/archive_articles/130711_jerusalem_modell_per/index_EN on 21 October 2014.

Stress-testing

Stress-testing helps decisions makers asses policy robustness by identifying weaknesses or flaws in existing policies and potential breaking or failure points along possible policy trajectories. Existing thresholds of failure are tested for robustness by applying policies to worst case scenarios.

Usage
- Risk identification and control.

Strengths
- Detect vulnerabilities such as unidentified risk concentrations or potential interactions between types of risk that could threaten the viability of the institution or policy.
- Identify severe events, including series of compounding events, or changes in conditions that could adversely impact the institution or policy.

Challenges
- By itself, stress testing cannot address all risk management weaknesses; best as part of a comprehensive approach.
- Uses historical statistical relationships to assess risk. I.e., assumes that risk is driven by a known and constant statistical process, and that historical relationships constitute a good basis for forecasting the development of future risks.

Examples
- Red teaming[18]
- Sensitivity analysis[19]
- Premortem[20]
- Windtunneling (see entry on *windtunneling*)

Testing on the treadmill (cc)*RIA Novosti archive, image # 555 848 / Vitaliy Arutjunov / CC-BY-SA 3.0*

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[18] Red Team Journal, 'New to red teaming? Start here…' Red Team Journal website, 28 May 2013. Accessed from http://redteamjournal.com/2013/05/new-to-red-teaming-start-here/ on 2 June 2015.
[19] MathWorks, 'What is Sensitivity Analysis?' *mathworks* website, n.d. Accessed from http://www.mathworks.com/help/sldo/ug/what-is-sensitivity-analysis.html on 2 June 2015.
[20] Oliver Serrat, 'The Premortem Technique,' ADB Knowledge Solutions, March 2013. Accessed from http://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1218&context=intl on 2 June 2015.

Environmental / Horizon Scanning

Environmental or horizon scanning is a systematic stock-take of the current environment. ⓒ *BY OfficialUSNavyPage/ https://www.flickr.com/photos/usnavy/5915800949/*

Environmental or Horizon Scanning is the art of systematically exploring the external environment to (1) better understand the nature and pace of change in that environment, and (2) identify potential opportunities, challenges, and likely future developments relevant to your organisation. Environmental Scanning is *not* about making predictions but about exploring new, strange and weird ideas, as well as persistent challenges and trends today.

For governments, scanning helps ensure that policies are resilient to different future environments. The increasing availability of large amounts of open data, including from massive online surveys and consultations, social networking platforms or crowd-sourcing tools, is also changing the way traditional environmental scanning or ground-sensing can be conducted.

STEEP analysis is a useful framework to apply in scanning work that considers the **Social**, **Technological**, **Economic**, **Ecological/Environmental**, and **Political** domains. Other domains to consider include **Legal**, **Ethics** and **Demographic** (STEEPLED) or **Regulatory** factors (STEER)

Usage
- At all stages of policy planning.
- Desk-based exercise.
- Detecting important economic, social, cultural, environmental, health, scientific, technological, and political trends, situations, and events.
- Identifying the potential opportunities and threats for the organisation implied by these trends, situations, and events.
- Determining an accurate understanding of an organisation's strengths and limitations.
- Providing a basis for analysis of future programme investments.

Strengths
- Better, faster anticipatory warning.
- Improves preparation time.
- Research repository.
- Enhances innovation and risk management.

Challenges
- Resource and effort intensive.
- Not a panacea to spot all emerging change in time.
- No hard and fast rules to lead to a "correct" interpretation of information.

Examples
- Introduction to horizon scanning in the public sector[21] ['how to' guide]

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[21] Kate Delany, *A Practical Guide: Introduction to horizon scanning in the public sector* (Upwey, VIC: John Robinson Consulting Services, 30 June 2014). Accessed from
https://innovation.govspace.gov.au/files/2014/08/PublicSectorInnovationToolkitHorizonScanningModule2014.pdf on 9 October 2014.

- Crafting Africa's Futures: National Long Term Perspective Studies[22] [review of the African Futures/NLTPS methodology for scanning]
- UK Government Horizon Scanning Programme Team[23] [responsibilities and membership in a whole-of-government model]
- Foresight Africa Series[24] [annual regional scanning report]
- Patterns of Potential Human Progress[25] [annual thematic scanning report]
- My World 2015 survey[26] [massive online voting initiative to sense citizens' priorities]
- Futurescaper[27] [an online tool for strategic conversations]

Text mining

Text mining large amounts of raw data can help with identification of patterns or breakthrough occurrences. ©BY-SA kmoney56/https://www.flickr.com/photos/kmoney/442531562/

Text mining identifies patterns and breakthrough occurrences in large amounts of raw data and information gathered from internal or external sources. The goal is to discover previously unknown information to the researcher. Text mining tasks include text categorisation, text clustering, concept/entity extraction, production of granular taxonomies, sentiment analysis, document summaries, and entity relation modelling (i.e., learning relations between named entities). Text-mining requires the use of specialised software.

Usage
- Key tool in Horizon Scanning content analysis where it is used to determine early warning of weak signals, emerging issues and wild-cards.
- Intelligence assessments.
- Basis for creating S-curves, trend extrapolations and growth modelling.

Strengths
- Can process large quantities of information and develop indicators of change.
- Increasingly can interpret meaning.
- Suitable for both unstructured and structured data.

Challenges
- Only yields a partial though highly relevant piece of the answer.
- May miss important sources or important keywords, people and organisations.
- Requires additional expert opinion.
- Complexity.

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[22] UNDP African Future Programme, *Crafting Africa's Futures: National Long Term Perspective Studies* (Africa: UNDP, 2009). Accessed from http://www.foresightfordevelopment.org/sobipro/55/491-crafting-africas-futures-national-long-term-perspective-studies on 9 October 2014.

[23] UK Government, 'Horizon Scanning Programme Team,' UK government website. Accessed from https://www.gov.uk/government/groups/horizon-scanning-programme-team on 9 October 2014.

[24] Brookings, 'Foresight Africa,' Brookings Africa Growth Initiative website. Accessed from http://www.brookings.edu/about/projects/africa-growth/foresight-africa-series on 9 October 2014.

[25] Frederick S. Pardee Institute for International Futures, *Patterns of Potential Human Progress* series, University of Denver. Accessed from http://pardee.du.edu/patterns-potential-human-progress on 13 October 2014.

[26] UN, 'My World 2015' survey. Accessed from http://vote.myworld2015.org/ on 22 December 2014.

[27] Futurescaper website, accessed from http://www.futurescaper.com/ on 22 December 2014.

- Costs of access to subscriber databases and journals can be extraordinarily high though increasing transparency is significantly reducing the time it takes for ideas and discoveries to appear in the free press.
- Requires trained, analytical people.

Examples
- Text mining: The state of the art and challenges[28] [review of approach and survey of products]
- Text mining healthcare policy in the UK[29] [comparison of government consultation results and text mining results]

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[28] Ah-Hwee Tan, 'Text Mining: The state of the art and challenges,' in proceedings, PAKDD Workshop on Knowledge discovery from Advanced Databases (KDAD'99), pp. 71-76, Beijing, April 1999. Accessed from http://www.ntu.edu.sg/home/asahtan/papers/tm_pakdd99.pdf on 9 October 2014.

[29] Bicquelet, Aude and Albert Weale, "Coping with the Cornucopia: Can Text Mining Help Handle the Data Deluge in Public Policy Analysis?," *Policy & Internet* 3, no. 4 (2011): article 5. Accessed from http://doi.org/10.2202/1944-2866.1096 on 9 October 2014.

Wild cards and weak signals

Wild Cards are low-probability but high-impact events that seem too incredible or unlikely to happen, for example September 11, the recent Global Financial Crisis or SARS. Considering the extreme impacts of a Wild Card may lead to the discovery of new opportunities and risks and the establishment of simple early warning systems of their potential arrival.

Weak Signals are advanced, noisy and socially situated indicators of change in trends and systems. They constitute raw informational material for enabling anticipatory action. Wild cards may or may not be announced by weak signals. In policy processes, weak signals can anticipate the agenda setting or when "the policy window" of an issue might open.

The object of this exercise is not to predict a Wild Card but to use the learning from the exercise to strengthen an organisation's ability to withstand or exploit similar shocks.

Wild card exercises and weak signal detection can strengthen an organisation's ability to withstand or exploit similar shocks or potential black swans. ©BY-SA

Often, simple strategic and tactical changes made to the organisation's contingency plans deliver sufficient spin-off benefit to make this analysis worthwhile.

Usage
- Innovation.
- Threat assessment.
- Scenario planning.
- Contingency planning.
- Modelling.

Strengths
- Help individuals and teams use extreme thinking to think the unthinkable about the world they inhabit.
- Learn lessons in how to adapt to be more resilient to future shock.
- Creative disruption through innovation.
- Reduces potential blind-spots.
- Spots potential discontinuities early.
- Questions trend exploration techniques.

Challenges
- May create a perception of questionable value among stakeholders.
- Limited monitoring available.

Examples
- Wild cards, weak signals and organisational improvisation[30] [action guidelines]
- Preparing for Wild Cards[31] [organisational wild cards management case studies]

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[30] Sandro Mendonc, Miguel Pina e Cunha, Jari Kaivo-oja and Frank Ruff, "Wild cards, weak signals and organisational improvisation" *Futures* 36 (2004): 201-218. Accessed from http://www.cgee.org.br/atividades/redirKori/204 on 15 October 2014.
[31] Sandro Mendonça, Miguel Pina e Cunha, Frank Ruff, Jari Kaivo-oja, 'Venturing into the Wilderness: Preparing for Wild Cards in the Civil Aircraft and Asset-Management Industries,' *Long Range Planning* 42, no. 1 (February 2009): 23–41. Accessed from http://doi.org/10.1016/j.lrp.2008.11.001 on 20 October 2014.

Scenario planning / building

Scenario planning is one of the most well-known and most cited technique for thinking about the future. Scenarios are stories (or narratives) set in the future that explore how the world would change if certain trends were to strengthen or diminish, or various events were to occur. Scenario planning does not attempt to predict what will happen, but through a formal process identifies a limited set of *examples* of possible futures that provide a valuable point of reference when evaluating current strategies or formulating new ones. This method questions assumptions about the future and creates confidence to act in a world of uncertainty.

Usage
- Explore uncertainties.
- Test for limits.
- Order alternative futures.
- Identify emerging risks and opportunities.
- Improve future assumptions.
- Derive better planning information and knowledge.
- Provide an outside-in challenge.
- Act as a forum against conventional inside-out orthodoxy.
- A way to dream in a safe environment.
- As an approach to derive fresh vision and/or current or new strategy development.
- Sensitivity and risk assessments and comparative testing of projects, portfolios and organisations.
- Rehearse the future.
- Informs both personal and organisational choices.

Strengths
- Does not describe just one future, but several realisable or desirable futures that are placed side by side (multiple futures).
- Superior to many other methods where number of factors to be considered and the degree of uncertainty are high.
- Appropriate way to recognise weak signals, technological discontinuities or disruptive events and include them into long-term planning.
- Stimulates strategic thinking, creativity, communication and organisational agility.
- Makes organisation better prepared to handle new situations as they arise and promotes pro-active leadership initiatives.
- Allows an organisation to become proactive, working specifically to create their desired future, rather than sitting by and passively waiting for whatever the world delivers.

Challenges
- Can be construed as the 'official future' by non-experts.
- May lack credibility as being too far-fetched, subjective or meaningless.
- People may not be able to suspend their disbelief.
- Time consuming.
- Complex.
- Can be expensive.
- Subject to 'scope creep' if not well managed.

Examples
- Scenario Planning practice and guidance note[32] ['how to' guide]

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[32] UK Government Foresight Horizon Scanning Centre, 'Scenario planning,' guidance note (2009). Accessed from http://www.eisf.eu/resources/library/foresight_scenario_planning.pdf on 13 October 2014.

- http://www.eisf.eu/resources/library/foresight_scenario_planning.pdf
- A Tool for Strategic Thinking[33] [systematic methodology drawn from practice]
- Shaping India's Future[34] [citizen engaged government scenario planning]
- Brazilian Democracy: Civil Society 2023[35] [consultative scenarios]
- Mont Fleur Scenarios[36] [transformative scenario planning]; see also video on adaptive versus generative scenarios[37]
- La Pointeuse (The Designator)[38] [small-group collaborative scenario development]
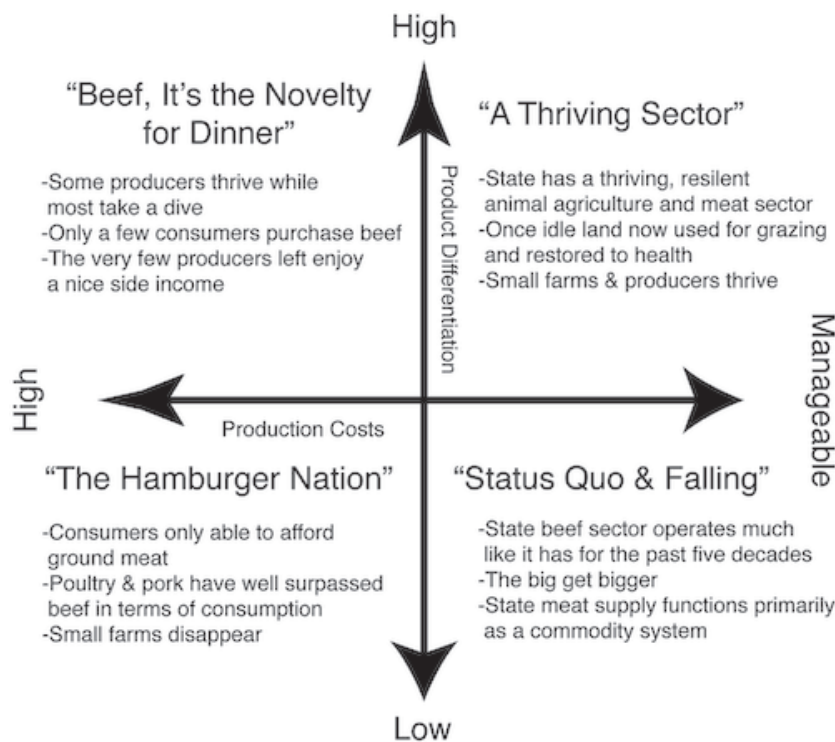
Source: http://www.joe.org/joe/2012june/images/tt8_fig2.png

[33] Paul J. H. Schoemaker, "Scenario Planning: A Tool for Strategic Thinking," *MITSloan Management Review* (15 January 1995). Accessed from http://sloanreview.mit.edu/article/scenario-planning-a-tool-for-strategic-thinking/ on 13 October 2014.

[34] India Government Planning Commission, "Scenarios: Shaping India's Future," July 2013. Accessed from http://planningcommission.gov.in/reports/genrep/rep_sce2307.pdf on 13 October 2014.

[35] Sociedade Civil 2030 scenarios website. Accessed from http://sociedadecivil2023.org.br/english/ on 13 October 2014.

[36] Adam Kahane, "Transformative Scenario Planning: Working Together to Change the Future," *Stanford Social Innovation Review* website, 20 November 2013. Accessed from http://www.ssireview.org/articles/entry/transformative_scenario_planning_working_together_to_change_the_future on 10 October 2014.

[37] Adam Kahane, "Transformative Scenario Planning," presentation at Creative Innovation 2012, Melbourne, Australia, 28-30 November 2012. Accessed from https://www.youtube.com/watch?v=k_yCO0SW1Uc#t=43 on 10 October 2014.

[38] Re-acteur Public, 'Exploring the public administration of tomorrow,' reacteurpublic website, n.d. Accessed from http://reacteurpublic.fr/en/realisations/levaluation-engagee/ on 2 June 2015.

Trend impact analysis

Trend impact analysis is a forecasting which examines the cause, nature, potential impact, likelihood and speed of arrival of an emerging issue of change. Some trends are relatively predictable like global population growth but most trend extrapolations deteriorate over time the further out the projection goes. TIA seeks to look at the envelope of possibilities that deviate from the expected norm.

Usage
- Forecasting.
- Contingency planning.
- Policy option analysis.
- Impact analysis.
- Strategic planning.
- Scenario planning.

Strengths
- Simple.
- Cost effective.
- Forces consideration of non-linear trend extrapolation.
- Offers sensitivity analysis.

Challenges
- Incomplete variables.
- Relies on judgment.

Examples
- European future fruit consumption[39] [review of TIA process]
- Arrival of Automated Translation Technology[40] [inc. TIA by World Future Society]

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[39] W. H. G. J. Hennen, nd J. Benninga, "Application of Trend Impact Analysis for Predicting Future Fruit Consumption," *Journal of Horticultural Science & Biotechnology* (2009) ISAFRUIT Special Issue 18–21. Accessed from http://www.jhortscib.com/isafruit/isa_pp018_021.pdf on 20 October 2014.
[40] Sam Lehman-Wilzig, "Babbling Our Way to a New Babel: Erasing the Language Barriers," *The Futurist* (May-June 2001): 16-23. Accessed from http://profslw.com/wp-content/uploads/academic/babbling.pdf on 21 October 2014.

Drivers analysis

Drivers are underlying issues or trends that share a common theme and will "drive" future change. High-level drivers include issues such as globalisation, demographic change and technology. Horizon scanning is often the largest source for the identification of drivers, which can then inform an overall outcome, such as a scenario. The technique of driver analysis determines which of the drivers are most critical for consideration for a given topic.

Usage
- This approach is also useful as an imaginative but work-focused team-building exercise, enabling teams to check and challenge key assumptions as well as to share ideas and experiences beyond their specific post's portfolio.

Strengths
- Can discover weak signals of potentially disruptive drivers.

Challenges
- Initial analysis will result in a large number of potential drivers, typically be over one hundred.
- Analysis of drivers depends on the purpose of the work.

Examples
- Overview of drivers analysis[41]
- Patterns of Potential Human Progress[42] [includes analysis of change drivers]

[41] SAMI Consulting, 'Drivers Analysis,' SAMI Consulting website. Accessed from http://www.samiconsulting.co.uk/training/drivers.html on 10 October 2014.

[42] Pardee Centre, *Patterns of Potential Human Progress* series. Accessed from http://pardee.du.edu/patterns-potential-human-progress on 10 October 2014.

Futures Wheel

A futures wheel is a graphical visualisation of direct and indirect future consequences of a change or development. Futures Wheels can also be used in decision making (to choose between options) and in change management (to identify the consequences of change). The tool is especially useful during the brainstorming stage of Impact Analysis.

Usage
- Organise thoughts about a future development or issue.
- A series of wheels can be constructed to consider different aspects of the issue.

Strengths
- Structure possible impacts.
- Visualise interrelationships.
- Aids brainstorming.
- Multiple future conscious perspectives possible.
- Quick and easy to do.

Challenges
- Pre-cursor only to employment of other foresight methods.

Examples
- MindTools Futures Wheel overview[43]

Source: http://www2.gsu.edu/~mstnrhx/wheel.gif

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[43] MindTools, "The Futures Wheel – Identifying Future Consequences of a Change," MindTools website. Accessed from http://www.mindtools.com/pages/article/futures-wheel.htm on 21 October 2014.

Relevance Trees

A "relevance tree" is an analytic technique that subdivides a broad topic into increasingly smaller subtopics. The output is a pictorial representation with a hierarchical structure that shows how a given topic can be subdivided into increasingly finer levels of detail.

Usage
- Can be used to study a goal or objective, as in morphological analysis.
- Can be used to select a specific research project from a more general set of goals, as in network analysis.
- Similar to concept maps.
- Network displays sequentially identify chains of cause-effect (or other) relationships.

Strengths
- Ensures that a given problem or issue is broken into comprehensive detail.
- Important connections among the elements considered are presented in both current and potential situations.
- Aid in both historical analysis and in forecasting.
- May show new combinations in insightful ways.

Challenges
- Requires critical judgments which if in error may weaken the outcome.

Examples
- Relevance tree and morphological analysis overview[44]
- Analysis of automobile/energy policy alternatives[45]
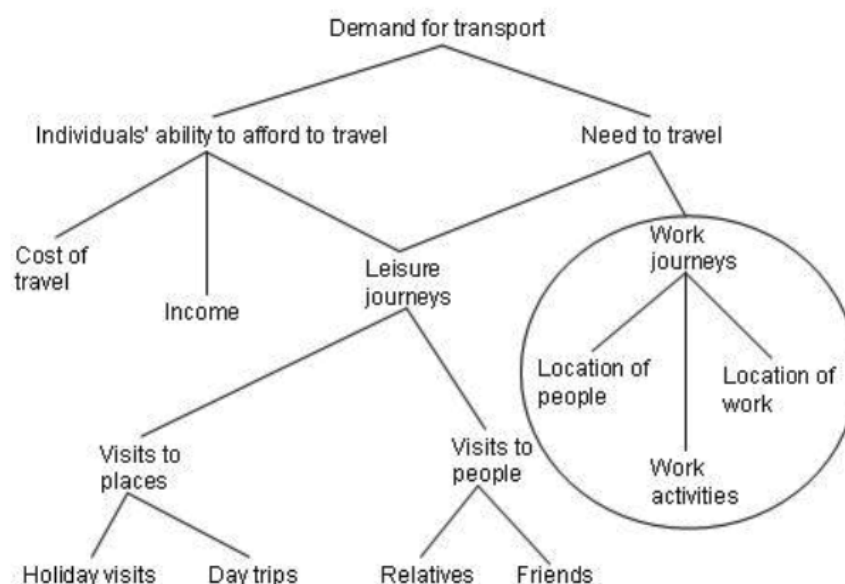
Source: http://www.emeraldgrouppublishing.com/learning/study_skills/img/tree.jpg

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[44] The Futures Group International, "Relevance Tree And Morphological Analysis," in AC/UNU Millennium Project's *Futures Research Methodology – V2.0.*. Accessed from http://www.cgee.org.br/atividades/redirKori/3309 on 21 October 2014.
[45] Office of Technology Assessment, "Overview of Policy Alternatives," in *Changes in the Future Use and Characteristics of the Automobile Transportation System—Volume II Technical Report* (Washington, DC: Congress of the United States, 1979). Accessed from https://www.princeton.edu/~ota/disk3/1979/7919/791906.PDF on 21 October 2014.

Morphological analysis

Morphological analysis is a complementary technique, often used in conjunction with a relevance tree, that is used to identify new product opportunities. This technique involves mapping options to obtain an overall perspective of possible solutions. This type of analysis explores all the possible solutions to a multi-dimensional, non-quantified, complex, usually 'wicked', problem.

Usage
  ▪ Can be used in diverse fields including policy analysis and futures studies for scenario planning purposes plus new product development.

Strengths
  ▪ Opens new possibilities beyond traditional thinking.
  ▪ Non-quantified method for investigating problem complexes, which cannot be treated by formal mathematical methods, causal modelling and simulation.
  ▪ Unclear parameter definitions and incomplete ranges of conditions are quickly identified.
  ▪ Can accommodate multiple alternative perspectives rather than prescribe single solutions.
  ▪ Functions through group interaction and iteration rather than back office calculations.
  ▪ Generates ownership of the problem formulation.
  ▪ Facilitates a graphical (visual) representation for the systematic, group exploration of a solution space.
  ▪ Focuses on relationships between discrete alternatives rather than continuous variables.

Challenges
  ▪ Can be overly structured.
  ▪ Complex and time consuming.

Examples
  ▪ Futures Studies using Morphological Analysis[46]

Geographic priority	Functional priorities	Size and cramming	New construction	Maintenance	General philosophy
Metropoles	All socio-tech. functions	Large, not crammed	With new construction	More frequent maintenance	All get same shelter quality
Cities + 50,000	Tech support systems	Large & crammed	Compensation	Current levels	All take same risk
Suburbs and countryside	Humanitarian aims	Small, not crammed	New only for defence build up	No maintenance	Priority: Key personnel
No geo-priority	Residential	Small & crammed			Priority: Needy

Source: http://www.swemorph.com/graphics/shelter4.png

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[46] Tom Ritchey, "Futures Studies using Morphological Analysis," adapted from an article for the *Millennium Project: Futures Research Methodology Series, Version 3.0* (2009). Accessed from http://www.swemorph.com/pdf/futures.pdf on 14 October 2014.

Heuristics

One of the basic lessons of cognitive psychology is that people use simple mental shortcuts, known as heuristics, to manage complexity and uncertainty. Heuristics refers to experience-based techniques for problem solving, learning, and discovery that find a solution which is not guaranteed to be optimal, but good enough for a given set of goals. A heuristic is an algorithm that is able to produce an acceptable solution to a problem in many scenarios using experimental and especially trial-and-error methods.
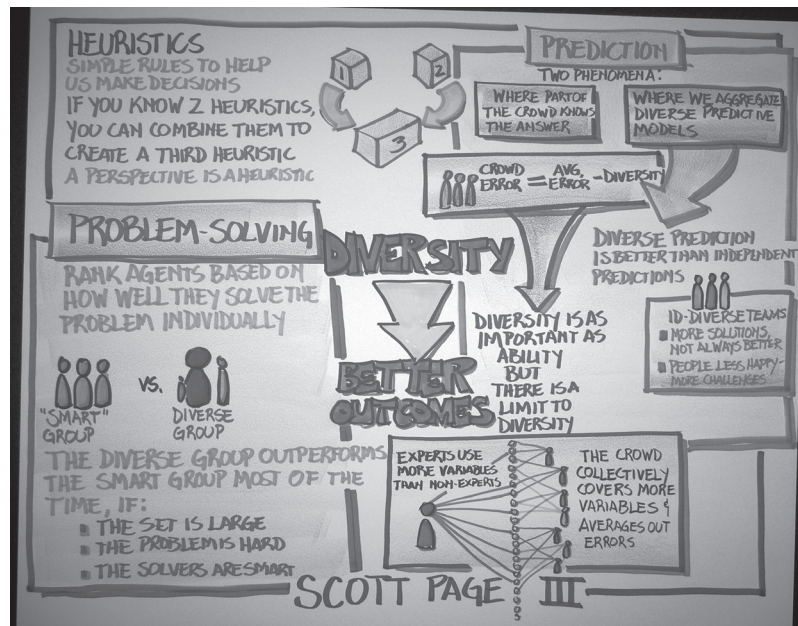
Heuristics refers to experience-based techniques for problem solving, learning, and discovery. (cc)*BY- Steve Jurvetson/ https://www.flickr.com/photos/jurvetson/49191352/*

Usage
- Heuristics are typically used when there is no known method to find an optimal solution, under the given constraints, which is very common in wide range of real world problems and implementations.

Strengths
- Heuristic algorithms may be the only way to get good solutions in a reasonable amount of time.

Challenges
- Performance is never guaranteed.
- Complex and requiring significant expertise.

Examples
- Role of Statistical Heuristics in Public Policy[47] [theoretical overview]
- Selling Heuristics[48] [heuristics in public policy]

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[47] Gregory G. Brunk, 'The Role of Statistical Heuristics in Public Policy Analysis,' *Cato Journal* 9, no. 1 (Spring/Summer 1989). Accessed from http://object.cato.org/sites/cato.org/files/serials/files/cato-journal/1989/5/cj9n1-8.pdf on 21 October 2014.
[48] Jeffrey J. Rachlinski, 'Selling Heuristics,' *Alabama Law Review* 64, no. 2 (2012): 389-415. Accessed form http://www.law.ua.edu/pubs/lrarticles/Volume%2064/Issue%202/5%20Rachlinski%20389%20-%20415%20Final%20CROPPED.pdf on 21 October 2014.

Technology Sequence Analysis

Technology Sequence Analysis (TSA) is similar to PERT (Project Evaluation and Review Technique) and is a probabilistic method of estimating when future events might occur. TSA links intermediate technology steps into a network of cause and effect links. These links are assigned probabilities (PERT uses 'duration') to define the likely probable date of a technology's arrival. Technology sequence analysis has been trademarked by The Futures Group.

Usage
- Used in quantitative estimation of when a technology could become available and in exploring associated policy questions.

Strengths
- Can handle many intermediate links.
- Useful for connecting analysis of separate but related technological developments sharing common elements.
- Establishes the key critical probability path and uncertainty associated with delivery of the end-technology.
- Allows simulation of different probabilities, connections of intermediate links and varying durations.
- Helps reduce risk and better ascertains the associated costs of delivery of the end-technology.
- Lays out a clear path and alternative routes for investment decisions.

Challenges
- Time.
- Complexity.
- Cost.
- Expertise and training required.
- Usually needs sophisticated software.
- Experts required.

Examples
- TSA overview and how to guide[49]

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[49] Theodore J. Gordon, "Technology Sequence Analysis," in AC/UNU Millennium Project's *Futures Research Methodology – V2.0.* Accessed from http://www.cgee.org.br/atividades/redirKori/3308 on 21 October 2014.

TRIZ (Theory of Inventive Problem Solving)

TRIZ is a methodology, tool set, knowledge base, and model-based technology for generating innovative ideas and solutions for problem solving. It is intended for application in problem formulation, system analysis, failure analysis, and patterns of system evolution. It can be used in many foresight projects such as technology forecasting, advanced SWOT and patent analysis.
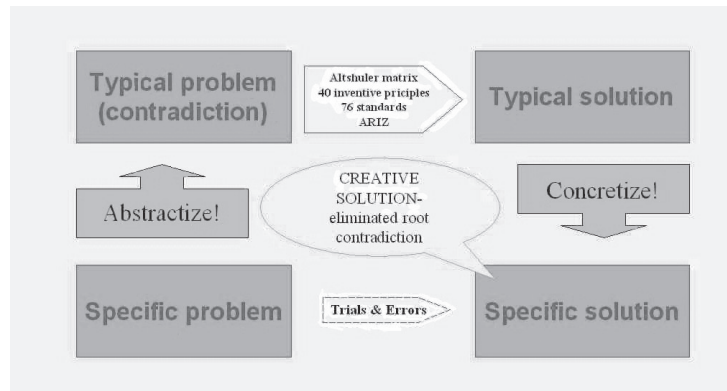
TRIZ is a methodology, tool set, knowledge base, and model-based technology for generating ideas and solving problems. ©BY-SA AndriuZ

Usage
- Tools and methods for use in problem formulation.
- System analysis.
- Failure analysis.
- Patterns of system evolution.
- Solving manufacturing problems.
- Creating new products.

Strengths
- Known and unknown types of problems can be solved.
- Algorithmic approach to the invention of new systems, and the refinement of old systems.
- As experience grows, solutions for a class of know types of problems increase and exhibit a structure.

Challenges
- Complex.
- Time consuming.
- Requires training and/or facilitation.

Examples
- MindTools TRIZ Overview[50]
- Taiwan Flood Policy[51] [case study]
- Managing Crime Perception in Malaysia[52] [case study]
- TRIZ in a Public Transportation Agency[53] [review of TRIZ application]

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[50] MindTools, "TRIZ – A Powerful Methodology for Creative Problem Solving," MindTools website. Accessed from http://www.mindtools.com/pages/article/newCT_92.htm on 21 October 2014.

[51] Jui-Chin Jiang and Paul Sun, 'Solving Policy Networks Problems by Using TRIZ System Innovative Thinking through 40 Innovation Principles: A Case Study of Taiwan Flood Policy,' paper prepared for the 11th Asia Pacific Industrial Engineering and Management Systems Conference, Meleka, Malaysia 7-10 December 2010. Accessed from http://apiems.net/archive/apiems2010/pdf/SS/233.pdf on 21 October 2014.

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Engaged Foresight

Delphi Method

The Delphi Method is a technique to structure group communication processes to deal with complex issues. It involves expert survey responses in a series of iterative learning rounds. Delphi first establishes the group's initial view, presents instant feedback on differing opinions, and goal seeks an agreed position in the final round. Contributors to the group analysis do not have to meet in person and can see the results as they, and their colleagues, add their views in real time. At the beginning, the organiser(s) formulate questions about the future and present these to contributors. Contributors respond by adding their rankings and comments. The organisers then modify the anonymous comments received to formulate better questions. The process is run again, in a series of rounds, until a consensus answer is arrived at.

The word "Delphi" refers to the Oracle of Delphi, a site in Greek mythology where prophecies were passed on. © Heidelberg University Library/ http://digi.ub.uni-heidelberg.de/diglit/bwpr1846/0016

Usage
- Consensus building.
- Avoiding group think.
- Generating ideas.
- Forecasting future issues.

Strengths
- Fast consensus.
- Virtual participation.
- Handles single or multiple questions.

Challenges
- Based on traditional concept of 'expertise'.
- Paradigm shifts can be problematic.
- Participant expertise may reduce result.
- Cross-impact not considered.
- Team leaders can bias the result.
- Disagreements may not be properly resolved.

Examples
- Latin America and Caribbean ICT Regional Policy Delphi[54] [case study]
- Japan Science and Technology Foresight[55] [ongoing Delphi study since 1971]
- State of the Future Index real-time Delphi study on Korea[56]

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[53] Michelle A. Skrupskis and Steven F. Ungvari, 'Management Response to Inventive Thinking – (TRIZ) In a Public Transportation Agency,' *The TRIZ Journal*, 19 May 2000. Accessed from http://www.triz-journal.com/management-response-inventive-thinking-triz-public-transportation-agency/ on 21 October 2014.

[54] Martin Hilbert, Ian Miles & Julia Othmer, "Foresight tools for participative policy-making in inter-governmental processes in developing countries: Lessons learned from the eLAC Policy Priorities Delphi," *Technological Forecasting and Social Change* 76, no. 7 (2009): 880–896. Accessed from http://www.martinhilbert.net/Hilbert_etal.eLACdelphi.pdf on 14 October 2014.

[55] National Institute of Science and Technology Policy (NISTEP), "Science and Technology Foresight and Science and Technology Trends," NISTEP website. Accessed from http://www.nistep.go.jp/en/?page_id=56#target01 on 10 October 2014.

[56] 'SOFI Variables and Developments for Korea.' Real Time Delphi Questionaire website. Accessed from http://www.realtimedelphi.com/STUDIES/korea/KSOFIA.php on 20 October 2014.

Cross-impact analysis

Cross-impact analysis (CIA) is a family of techniques often thought of as an extension of the Delphi technique. CIA is an analytical approach for consistently estimating the probabilities of a set of events. Like its name entails, it involves identifying and evaluating the impact of trends or events upon each other using a matrix format.
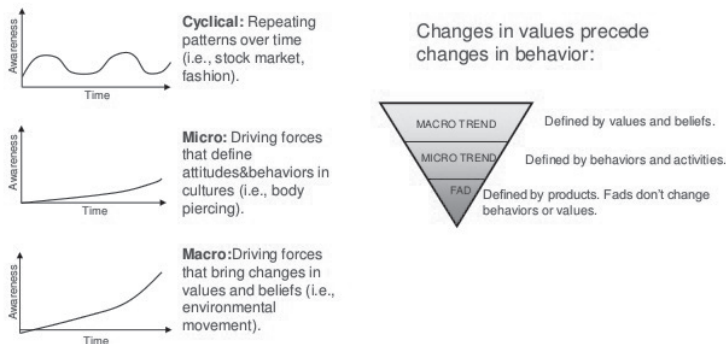
Left: CIA is an analytical approach for consistently estimating the probabilities of a set of events.

Image source:
http://image.slidesharecdn.com/building
valuethroughbrandingfoodnutrition-
130712133316-phpapp02/95/building-
value-through-branding-food-nutrition-
10-638.jpg?cb=1373654047

Usage
- Commonly used as part of an expert-opinion study.
- Can be considered part of the Delphi technique.
- Exploring a hypothesis and finding points of agreement and divergence.
- Targets audiences comprising experts from industry, academia, research and government.

Strengths
- Limited skills required.
- Forces attention of the respondents.
- Estimates dependency and interdependency between issues.
- Increases knowledge of the respondents and clarifies views.

Challenges
- Can be time-consuming if several iterations required or matrix is very large.
- Limited pair-wise nature of the method.
- May not reflect reality.
- May not yield sufficiently consistent respondent response.
- Relies on experts input.

Examples
- FOR-LEARN Cross-impact analysis overview[57]

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[57] JRC European Commission, 'Cross-Impact Analysis,' FOR-LEARN website, n.d. Accessed from http://forlearn.jrc.ec.europa.eu/guide/2_design/meth_cross-impact-analysis.htm on 20 October 2014.

Expert panel

Uses a pre-determined group of experts and renowned people from outside the organisation (sometimes anonymously) to give feedback on issues.

Usage
- Qualitative input and feedback on issues.
- Quantitative feedback on issues.
- The method has manifold applications wherever expert opinion is required.

Strengths
- Fast feedback.
- Wide perspective on issues.
- Convergent and divergent thinking.
- Good for evidence building.
- May uncover potential innovations or unforeseen risks.
- Improves output quality of final reports.

Challenges
- Based on traditional concept of 'expertise'.
- Experts can be wrong and miss weak signals that affect their current knowledge.
- A different group of experts or larger population may offer different advice.
- More costly, time consuming and resource hungry than some other methods.

Examples
- FOR-LEARN expert panel overview[58]
- Drugs Foresight 2020[59] [methodological review and outcomes]
- European Crop Protection in 2030[60] [foresight study under guidance of expert panel]

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[58] JRC European Commission, 'Expert Panels,' FOR-LEARN website, n.d. Accessed from http://forlearn.jrc.ec.europa.eu/guide/4_methodology/meth_expert-panel.htm on 20 October 2014.
[59] Tomi Lintonen, Anne Konu, Sanna Rönkä and Elina Kotovirta, 'Drugs foresight 2020: a Delphi expert panel study,' *Substance Abuse Treatment, Prevention, and Policy* 9, no. 1 (2014): 18. Accessed from http://doi.org/10.1186/1747-597X-9-18 on 20 October 2014.
[60] ENDURE, *European Crop Protection in 2030*, ENDURE's foresight study funded by European Commission. Accessed from http://www.endure-network.eu/content/download/5736/44220/file/ENDURE%20Foresight%20Study.pdf on 20 October 2014.

Modelling, simulation and gaming

Modelling, simulation and gaming are techniques to help decision makers see the effects of policies in advance. Modelling, simulation and gaming has grown in influence as computerisation of the structure and rules allows complex systems dealing with many variables to be presented dynamically and graphically. As computer gaming technology becomes more sophisticated and monitoring devices become ever more ubiquitous we can expect these foresight methods to become ever more pervasive and exciting to use. For instance, virtual worlds too are very large simulations hosting smaller simulations and these are growing in power exponentially.
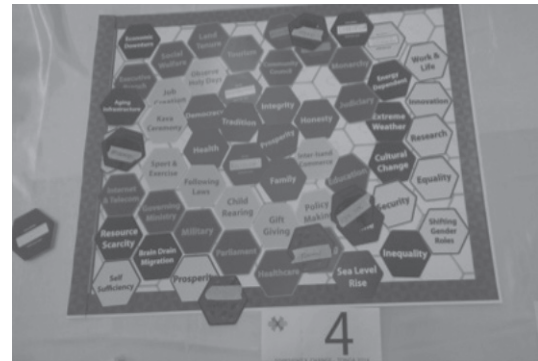
The foresight eXplorer deck. A context specific game developed to encourage and facilitate stakeholder dialogue about Tonga's 'Big Ocean Prosperity' futures.

Usage
- Entertainment
- Design
- Planning
- Education
- Research
- Negotiating

Strengths
- Unleashes creativity in participants
- Helps describe the behaviour of complex systems in a safe and dynamic environment.
- Are driven by the pre-defined structure of the design and the chosen set of rules applied to each iteration.

Challenges
- Understanding the rules and their limitations is key to obtaining useful results that emulate the real world.
- Unless a simple model, costs time and resources are likely to be very high.

Examples
- DIAGNOST, Dutch **policy game** for elderly healthcare[61]
- RAND's social **policy game** on drug abuse[62]
- The SUDAN GAME **policy making prototype**[63]
- UrbanSim project – urban **modelling** for transportation investment[64] [case study]
- **Synthetic modelling** and economic **policy simulation**[65] [Shenzhen case study]

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[61] Gerton Heyne, Jac L. Geurts, and Juliette Vermass, "DIAGNOST: a microworld in the healthcare for elderly people," conference proceedings of The 12th International Conference of the System Dynamics Society, 1994, Stirling, Scotland. Accessed from http://www.systemdynamics.org/conferences/1994/proceed/papers_vol_1/heyne058.pdf on 3 October 2014.

[62] James P. Kahan, Peter W. Greenwood, C. Peter Rydell, William Schwabe, Barbara R. Williams, 'Can Gaming of Social Policy Issues Help Translate Good Intentions into Change?' RAND Issue Paper IP-122-DPRC (1993). Accessed from http://www.rand.org/content/dam/rand/pubs/issue_papers/2006/IP122.pdf on 1 October 2014.

[63] Peter Landwehr, Marc Spraragen, Balki Ranganathan, Kathleen M. Carley, and Michael Zyda, 'Games, Social Simulations, and Data—Integration for Policy Decisions: The SUDAN Game,' *Simulation & Gaming*, advance online publication (September 2012): 1-27. Accessed from http://www.cs.cmu.edu/~plandweh/pdfs/GandS_SUDANgame.pdf on 3 October 2014.

[64] Alan Borning, Paul Waddell, and Ruth Förster, 'UrbanSim: Using Simulation to Inform Public Deliberation and Decision-Making,' *Digital Government*, Integrated Series In Information Systems Volume 17 (2008) pp. 439-464. Accessed from https://homes.cs.washington.edu/~borning/papers/borning-urbansim-case-study-2006.pdf on 21 October 2014.

Narrative inquiry

A Story-teller reciting from the "Arabian Nights." ©TIMEA

A sense-making process based on stories and narratives provided by participants through interviews that help analysts identify key patterns, weak signals and key perspectives. It is is based firmly in the premise that, as human beings, we come to understand and give meaning to our lives through story. Narrative inquirers strive to attend to the ways in which a story is constructed, for whom and why, as well as the cultural discourses that it draws upon.

Narrative inquiry can be supplemented with **sentiment analysis**, which aims to determine the attitude of a storyteller. Sentiment analysis is common practice in the private sector to track an understand perceptions of an organisation or brand.

Usage
- A powerful tool in the transfer, or sharing, of knowledge.

Strengths
- Captures the emotion of the moment described.
- Renders the described event active rather than passive.
- Narratives are infused with the latent meaning being communicated by the teller.
- Provides social context to allow better interpretation of project dynamics and tensions.

Challenges
- Retrospective in nature.
- Blurring of interpretive boundaries between the analyst and the research participant.
- Data coding is difficult as the analyst is encouraged to consider what is in the data set and also what is not, such as missing characters or alternative viewpoints.

Examples
- Narrative inquiry as a qualitative methodology[66]

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[65] Zhi Yang, Wei Zeng, Hongtao Zhou, Lingru Cai, Guangyong Liu, and Qi Fei, 'Synthetic Modeling and Policy Simulation of Regional Economic System: A Case Study,' *Advances in Neural Networks – ISNN 2009*, Lecture Notes in Computer Science Volume 5553 (2009) pp. 1122-1129. Accessed from http://doi.org/10.1007/978-3-642-01513-7_124 on 21 October 2014.

[66] Clandinin, D. J., and Huber, J., 'Narrative inquiry,' in B. McGaw, E. Baker, & P. P. Peterson (Eds.), *International encyclopedia of education* (3rd ed.) (New York, NY: Elsevier, 2010). Accessed from http://www.mofet.macam.ac.il/amitim/iun/CollaborativeResearch/Documents/NarrativeInquiry.pdf on 2 June 2015.

Causal Layered Analysis

Causal Layered Analysis, or CLA for short, is an exercise in deconstructing stakeholder narratives surrounding an issue or strategic option about the future. CLA identifies the driving forces and worldviews underpinning diverse perspectives about the future and what it means to different groups through discussion and deconstruction of conventional thinking. Based on that, CLA is able to produce a shared view of possible future outcomes that can break existing paradigms of thinking and operating. It is particularly useful when different groups hold different perspectives on the future of an organisation and what strategy should be used.

Causal Layered Analysis identifies the driving forces and worldviews underpinning diverse perspectives about the future through discussion and deconstruction of conventional thinking. © User:Colin / Wikimedia Commons / CC-BY-SA-3.0

Usage
- Uncover why things are not working today and develop potential and shared solutions.
- Question conventional future thinking.
- Develop shared organisational strategy.
- Explore issues from qualitative perspectives to strengthen understanding of the issue.
- Facilitate multi-cultural dialogue and understanding.
- Gain a better understanding of one's own worldview and ways of making sense of the world.
- Develop different sorts of products and services and revised policies.

Strengths
- Collaborative and appealing to wide range of participants.
- Integrative with other foresight methods.
- Supports the development of powerful and richer future scenarios.
- Useful check that constructed scenarios are robust across diverse perspectives.
- Develops shared visions of a preferred organisational future.
- Potential for issue transformation.
- Links short, medium and long-term strategic thinking.

Challenges
- Requires participants to be willing to share their perspectives and challenge their assumptions about how the organisation operates.
- Needs to be connected with other foresight methods to generate future scenarios.
- May constrain action through 'analysis/paralysis'.

Examples
- Overview of methodology[67] [by Sohail Inayatullah, method creator]
- Malaysian Universities in Transformation[68] [review of CLA process]
- CLA for sustainable Australian agriculture policy[69] [methodology overview]
- Theory, historical context, and case studies[70] [introduction chapter to CLA reader]

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[67] Sohail Inayatullah, 'Causal Layered Analysis: Unveiling and Transforming the Future,' in AC/UNU Millennium Project's *Futures Research Methodology – V2.0*. Accessed from www.cgee.org.br/atividades/redirKori/3323 on 21 October 2014.
[68] Sohail Inayatullah, 'Malaysian Universities in Transformation,' *Journal of Futures Studies* 17, no. 2 (December 2012): 111-124. Accessed from http://www.jfs.tku.edu.tw/17-2/R01.pdf on 20 October 2014.
[69] Brian J. Bishop, Peta L. Dzidic and Lauren J. Breen, 'Multiple-level Analysis as a Tool for Policy: An Example of the Use of Contextualism and Causal Layered Analysis,' *Global Journal of Community Psychology Practice* 4, no. 2 (June 2013). Accessed from http://www.gjcpp.org/pdfs/bishop-v4i2-20130619.pdf on 20 October 2014.
[70] Sohail Inayatullah, 'Causal Layered Analysis: Theory, historical context, and case studies,' in Sohail Inayatullah (ed.), *The Causal Layered Analysis (CLA) Reader Theory and Case Studies of an Integrative and Transformative Methodology* (Taipei: Tamkang

Appreciative Inquiry

Appreciative Inquiry (AI) is a process of change that focuses and builds on the positive things that are working. It is the cooperative, coevolutionary search fort the best in people, their organisations and communities, and the world around them. It involves systemic discovery of what gives "life" to an organisation or community when it is most effective an most capable in economic, ecological, and human terms.
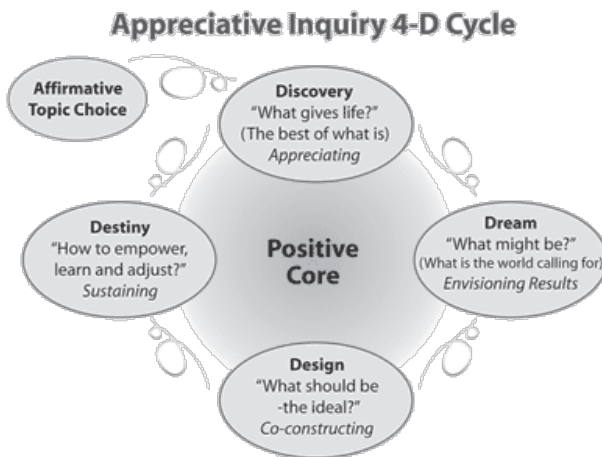
AI assumes that every organisation of community has many "untapped and rich accounts of the positive" - what people talk about as past, present and future capacities - the positive core. AI links the knowledge and energy of this core directly to an organisation or community's change agenda, and changes never thought possible are suddenly and democratically mobilised.

Appreciative inquiry is a process of change that focuses and builds on the positive things that are working. © BY-SA *Dreamfish/ https://www.flickr.com/photos/dreamfish/499932920/*

Usage
- Useful intervention when a group becomes stuck, unable to make a decision or take action, and needs creative ways out.
- An AI summit

Strengths
- Releases positive energy among participants, thus building trust and sense of inclusive, shared spirit.
- May lead to increased creativity, resilience and integration in thinking.
- Positive focus leads to easier acceptance of change process.
- Tends to produce high energy around change effort.
- Utilises disciplined, thoughtful set of methods that can be learnt and used.
- Works with existing strengths, inviting participants to build on what is already present in the group.

Challenges
- Implementation of change can be weak, i.e., change efforts from the dreams and visions could lose momentum.

Examples
- Detailed description of AI[71]
- UK Healthcare and social service[72] [application of AI in UK public services]
- Appreciative Inquiry and Public Dialogue [73] [using AI for sustainable community development]

University Press, 2004), pp. 8-49. Accessed from http://www.meta-future.org/uploads/7/7/3/2/7732993/causal_layered_analysis_intro_chapter.pdf on 21 October 2014.
[71] Edwin C. Thomas, "Appreciative Inquiry: A Positive Approach to Change," *Public Policy and Practice*, Institute for Public Service and Policy Research. Accessed from http://www.ipspr.sc.edu/ejournal/ejournal0611/appreciative%20inquiry.pdf on 16 April 2015.
[72] Compiled by Anne Radford, "Positive Change in Health and Social Services in the UK: Examples of Strength-based Approaches to Change and Transformation." Accessed from https://appreciativeinquiry.case.edu/uploads/AiPH&SSExamplesFebruary2004.doc on 16 April 2015.

Future Search

Future Search is a 3-day task-focused planning meeting that enables people to cooperate in complex situations, including those of high conflict and uncertainty, and which helps people transform their capability for action very quickly. It brings together people from all walks of life into the same conversation—those with resources, expertise, formal authority and need—to discover common ground through dialogue. Concrete action plans are made after people share stories about the past, present and desired future.

Future Search enables people to cooperate and act quickly in complex situations, including those of high conflict and uncertainty. 🅭BY Casey

Usage
- Useful for finding common ground and achieving shared vision and committed action from diverse stakeholders.

Strengths
- Helps people collaborate despite differences of culture, class, gender, age, race, ethnicity, language, and education.
- Large groups able to manage their own planning with little active facilitation after given simple guidelines
- Focusing on a shared future provides more incentive for action than listing problems or conflicts

Challenges
- Only really effective when the right people are in the room.
- Upper limit for participation in the fixed format Future Search is around 70 people.
- Useful as a starting point, but customised conference design is recommended.

Examples
- Application in USA government departments/agencies[74]
- Application for community development by regions[75]

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[73] Muriel A. Finegold, Bea Mah Holland, and Tony Lingham, "Appreciative Inquiry and Public Dialogue: An Approach to Community Change," *Public Organization Review* 2, no. 3 (Septemebr 2002): 235-252. Accessed from http://link.springer.com/article/10.1023/A%3A1020292413486 on 16 April 2015.

[74] Future Search Network, "Applications in Government," Future Search website. Accessed from https://futuresearch.net/method/applications/sectors-20129.cfm on24 April 2015.

[75] Future Search Network, "Applications in Government," Future Search website. Accessed from https://futuresearch.net/method/applications/world.cfm on 24 April 2015.

Search Conference

Search Conference is a participative planning method that enables people to create a plan for the most desirable future of their community or organisation—a plan they take responsibility for carrying out themselves. In a Search Conference, people (citizens, community leaders, managers, workers) become a planning community. Together they create a plan for the future, based on shared human ideals, that they can live for and work to implement. The Search Conference makes it possible for any kind of system, whether community or workplace, to thrive in the face of uncertain, turbulent times.

Search Conference is a participative planning method that enables people to create a plan for the most desirable future of their community or organisation.
© ilpregio

Usage
- Strategic planning and the basis of policy making.
- Creation of new systems to manage emergent or neglected issues.
- Rationalisation of major conflict within a strategic planning context, and finding common ground on difficult social conflicts.
- Useful for setting new policy directions, and strategies in any sector, public or private.
- Developing or reforming communities, organisations, or industries.

Strengths
- Generates consensus and shared values by bringing together people with diverse, often conflicting, perspectives concerning complex social issues.
- Accumulates trust, which strengthens and deepens interpersonal relations, increasing the probability of mutual learning and network building.
- Encourages open communication and discussion among people by restoring the human process of speaking and hearing, the oral culture known to older (or ancient) peoples.
- Develops creative and achievable strategies.
- Produces collaborative and participative approaches.
- Develops commitment to strategies formulated.
- Combines formulation and implementation.
- Achieves completion of a task in two or three days (and sometimes evenings) that would take months if left to specialised analysts and experts.

Challenges
- Focus is on learning, not teaching.
- Conflict and differences are acknowledged, but not directly dealt with.
- Can be logistically challenging.
- Can be time consuming (2-3 days).

Examples
- Search Conference method in detail[76]
- Public Sector Search Conference, Australia[77] [vocational education and training]

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[76] Robert Rehm and Nancy Cebula, "The Search Conference Method for Participative Planning," January 1996. Accessed from http://www.elementsuk.com/libraryofarticles/searchconference.pdf on 24 April 2015.
[77] Maire Sheehan, Emerging trends in public sector training, AVETRA 1998 conference. Accessed from http://vital.new.voced.edu.au/vital/access/services/Download/ngv:30041/SOURCE2 on 24 April 2015.

Whole Scale Change

Whole-Scale™ works well to facilitate all kinds of change processes, including strategic planning, organisation design, mergers and acquisitions, quality management, reengineering, training, diversity and culture change in organisations with a particularly challenging, changing environment that aim for quick and sustainable results. Organisations most likely to consider a Whole-Scale™ intervention are those (1) that want to engage everyone or nearly everyone in creating their organisations processes and structures and (2) those with a sense of urgency brought on by a challenging and quickly changing environment. Whole-Scale™ processes effectively facilitate rapid, system wide change under many different circumstances, and in a wide variety of countries, cultures and organisations.
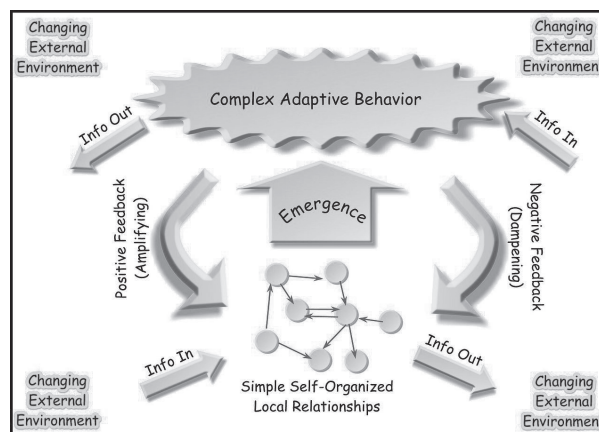
Whole-Scale is useful for particularly challenging, changing environments that aim for quick and sustainable results. (cc) *BY-SA Central Intelligence Agency*

Usage
- Strategic alignment as one brain (all seeing the same things) and one heart (all committed to achieving the same preferred future)
- Intentionally designed and fully owned processes, skills, information, and guiding principles
- A new culture with the behaviors everyone desires to achieve common purpose

Strengths
- Clarifying and connecting multiple current realities
- Uniting multiple yearnings around a common picture of the future
- Reaching agreement on the action plans that move them toward that future
- Building the processes, structures and relationships that keep the organisation moving forward
- Aligning the organisation leaders and employees so that they can implement the changes together

Weaknesses
- Only really effective when the right people are in the room.
- Implementation of change can be weak, i.e., change efforts from the dreams and visions could lose momentum.

Examples
- Analysis of Whole-Scale-Change method[78]

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[78] Michael J. Arena, "Changing the way we change," Organization Development Journal 20, no. 2 (Summer 2002): 33-47. Accessed from http://dannemillertyson.com/wp-content/uploads/2012/04/Changing-the-Way-We-Change.pdf on 24 April 2015.

Conference Model

The Conference Model was the original methodology to engage large numbers of people in system-wide change through a series of integrated conferences and "walkthrus." Based on Socio-Technical Theory, search theory, and experiential/creative methods, the model consists of three elements: a series of integrated conferences, the walkthru process, and simple commitments.

Conference model engages large numbers of people in system-wide change through a series of integrated conferences and "walkthrus." (cc)*BY-SA JamieBrown2011*

The Conference Model creates an open exchange of information, increased understanding of the system under consideration, new agreements and actions, and enhanced relationships among participants. It is also useful for involving internal and external stakeholders in the redesign of processes and organisations. Conference Model applications include redesigning processes, creating organisational futures, developing new organisational cultures, integrating organisational units/processes, creating self-directed work teams, improving union/management cooperation, and creating organisational alignment with new strategic directions.

Usage
- Organisation redesign.
- Quick and permanent change.

Strengths
- A fast and highly participative method.
- Involves a critical mass of internal employees and/or external stakeholders.
- People think systemically.
- People think about whom to include when addressing issues.
- Information and decision-making are shared.

Challenges
- Process involves 4 conferences (3-days each) on vision, technology, customer and design, held 1 month apart.
- Separate implementation steps to put plans to action following the conferences.

Examples
- Healthy African American Families[79] [community engagement/change project]

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[79] Loretta Jones and Barry E. Collins, "Participation in Action: The Healthy African American Families Community Conference Model," *Ethn Dis.* 2010 Winter; 20(1 0 2): S2–15-20. Accessed from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3791219/ on 24 April 2015.

Real Time Strategic Change

Real Time Strategic Change is a large group intervention method whose primary aim is the design and implementation of "whole system" change. Developed at the Ford Motor Company, RTSC is a highly structured and organised two to three day event that consists of a sequence of small and large group activities previously determined by a design team. Events are grounded in giving participants a common database of information from which to work. Participants mostly work in mixed stakeholder groups of six to eight people. RTSC is not just an event, but the beginning of a process that leads to a fundamental system-wide change in the way the organisation works.

Usage
- When time is of the essence.
- Where the issues are complex but the purpose of the intervention is clear.
- To develop and implement change.
- When a lot of people need new competencies.
- To deal with mergers and reorganisations.
- With the introduction of new technology.

Strengths
- Highly flexible format.
- Composition of design team is representative of, and mirrors, stakeholder groups.
- Benefits can be reaped from stakeholder involvement and ownership.
- Real work occurs during the event.

Challenges
- Current reality is key driver, not what is supposed to happen.
- Requires committed and involved leadership.
- Requires whole system to be in the room, at least once in the process.

Examples
- Ann Arbor Transit Authority[80]

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[80] Jake Jacobs, "Real time strategic change: How to create your preferred future faster and more sustainably," Temenos weblog, 1 August 2014. Accessed from http://stiatemenos.com/real-time-strategic-change-how-to-create-your-preferred-future-faster-and-more-sustainably/ on 24 April 2015.

ABOUT THIS PUBLICATION

Foresight: The Manual represents UNDP's third wave of interest in foresight and futures that began in the 1980s and was revisited in the 1990s. This time, leveraging on opportunities presented by recent advancements in technology and the potential of big data to contribute to changing perspectives about development. UNDP's particular interest in participatory foresight also coincides with increasingly widespread attention and focus on greater citizen engagement in policymaking and democratic governance.

In the current global context, UNDP hopes to seize the opportunities foresight presents to:

- Help developing countries build resilience and capacities for preventive rather than post-facto action;

- Adapt to the changing demands of its clients and partners who increasingly seek futures-based scenarios and pathways of planning and intervention; and

- Strengthen its "global public good" value by positioning itself to offer foresight solutions.

This manual features a selection of methods and techniques suited for framing development or policy discussions, but there are many methods and techniques available that are considered part of foresight and futures analysis. These span the gamut from long-term processes and quantitative data collection/ analysis to participatory workshops and qualitative assessment of narratives. Some methods included here have been widely tested, others less so; some are already practiced in many government departments and others are unheard of. It is worth remembering, however, that futures analysis is not a panacea.

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