Chapter 6
Ways of Seeing the Future

The relation between what we see and what we know is never settled. Each evening we see the sun set. We know that the earth is turning away from it. Yet the knowledge, the explanation, never quite fits the sight.
John Berger: "Ways of Seeing"—1972

Abstract This chapter examines how the way we see things is affected by what we know or what we believe. Initially how we look at the past (history) before examining different types of futures is reviewed. The differences between forecasting and foresight principles are identified and how the use of the disciplines influences strategic planning. The "futures cone" is introduced as a tool to help identify the different forms and interpretations of the future along with a discussion of the role of science fiction when looking at outlier scenarios. Of the two terms, we shall see that "foresight" is a more meaningful concept when applied to uncertainty and this relationship is demonstrated when allied with the uncertainty profile template. The chapter ends with a more detailed description of one particular method, causal layered analysis (CLA) which is particularly suited in helping to contextualise the future.

Keywords History · Futures · Forecasting · Foresight · Strategic foresight · Market intelligence · Science fiction · Causal layered analysis

6.1 Introduction

The way we see things is affected by what we know or what we believe.

Four basic approaches when exploring how we look into the future are explored. Of course, looking into the future also means we have to look at the past so as to identify what factors in this past—our history—help in a better understanding of the future. The *first two* elements, "history" and "futures", operate at a broad generic level without reference to any specific methodological approach, whereas *the second set of elements* "forecasting" and "foresight" can be represented by a range of specific methodological approaches. Again, there is often some confusion between

B. Garvey et al., *Uncertainty Deconstructed*, Science, Technology and Innovation Studies, https://doi.org/10.1007/978-3-031-08007-4_6

"forecasting" and the less used term "foresight". Of the two terms, we shall see that the latter term "foresight" is a more useful concept when combined with the issue of uncertainty. What we are trying to do in this chapter then is to take the reader from a broad understanding of how we see time and the future through to an introduction of the type of methodological approaches one can use to improve the quality of decision-making and which allows us to better develop insights into how we can frame the future for decision-making purposes. The chapter ends with a more detailed description of one particular method, causal layered analysis which is particularly suited to helping us contextualise the future.

6.2 History

Be under no illusion, forecasting and foresight analysis are difficult disciplines to grasp when seeking to differentiate them.

Risk and uncertainty are central to forecasting and prediction although in far too many instances practitioners confuse the two terms. But as has been highlighted in Chap. 2, it's not that difficult—"risk" you can quantify, "uncertainty" you cannot—but both can be modelled.

A number of strategists have come to accept that we can only analyse the past and that, even in the present, information is not immediately available. Analysis of the future is impossible as it is unknowable; we do not have access to "facts" which have not yet happened. Moreover, the future is never exactly like the past as there are always new and unforeseen events, which cannot be predicted beforehand and that further increase future uncertainty—and based on our current mind-sets.

The integration of historical data into how we determine the future should not mean we should blindly accept what has happened in the past as being totally factual either. Indeed, it has been an overriding area of concern that all too often too much credence has been given to the accuracy, if not veracity of past events and their derived "facts". Historians often seek recourse to only using the "facts". But what really is "a fact"?

There are countless incidences of facts being found out not to be so in later time periods and where the subject concerned is open to renewed scrutiny in the light of new evidence. Much of the information being evaluated cannot be defined as located at one discrete point but rather as a range of possibilities around that point—and with it less certainty. This is important to bear in mind when using historical time series data as a basis for prediction. Previous small-scale events which might not appear on any radar can manifest themselves within any time horizon as they may be a result of sensitive dependence on initial (i.e., the past) conditions. Acting upon the "wrong" short-term forecast can seriously damage your long-term decision-making health.

This short-term "myopia" occurs due to many of the stakeholders still being able to influence not only the *interpretation* of recent past events but of subjectively *influencing* how their motives and actions are recorded and interpreted in relation to events in the "foreseeable" future. And then there is access to hidden data. Very

often the historical time frame upon which these stakeholders make their forecast is too short, and thus does not embrace enough information as to the range of possible events which could impact their forecast, or through ignorance and/or hubris they believe that in the short term they themselves can influence events. It is a frame of mind that is too commonly prevalent within quadrant 3 of the uncertainty profile matrix—the "unknown-known". The previous chapter on the evidence base covered much of the issues relating to our understanding of history.

6.3 Futures

"Futures" exercises generally begin with all the participants relating their memories of the recent past to generate alternative futures, albeit that people have very different versions (or experiences) of history. Short-term "endemic myopia" occurs as many stakeholders are still able to influence not only the interpretation of recent past events but subjectively influence how their motives and actions are interpreted in relation to the "foreseeable" future. If historical distortion can occur in the short term, then planning and the forecasts upon which it is based can be as error-prone as long-term forecasts and predictions and where small differences to initial steering conditions can make large differences to final outcomes.

The two states that govern how we might start to construct a forecast or a prediction, the past and the future, each require analysts and decision-makers to make different assumptions about what approaches, and how information sources, should be used, including checking thoroughly the evidence base. These various sets of information sources challenge the futures analyst and forecaster to ascertain how accurate the forecast or projection can be. This involves not just quantifying future projections but qualifying them as well. Forecasters and futures analysts must also ascertain the veracity of any historical data that may be used as a basis for the projection. As highlighted in the previous chapter on the evidence base, too often numerical data used as input, especially when sourced externally, is treated as "gospel". The limits of accuracy will also be challenged by acknowledging what can be quantified and what cannot—and by understanding the difference between risk and uncertainty.

A considerable body of work on futures has been published by Australia-based academic Joseph Voros, and much of the content in this section is based upon his research.

Voros (2001) proposes *three "laws" of futures*.

The future is not predetermined *"At the most fundamental level of nature, the physical processes of the universe are inherently indeterminate (the Heisenberg Uncertainty Principle). Therefore, there is no, and cannot be, any single predetermined future; rather there are considered to be infinitely many potential alternative futures."* This is a prime consideration as better practice looks not at a single future scenario, but at alternative, often diverse, ones.

The future is not predictable *"Even if the future were predetermined, we could never collect enough information about it to an arbitrary degree of accuracy to construct a complete model of how it would develop. At some point, the errors introduced by not having infinitely-precise information would cause the model to deviate from "reality "(whatever that is). And because the future is not predetermined, predictability is doubly impossible; we are therefore able, and forced, to make choices among the many potential alternative futures."* (Voros, 2001)

Future outcomes can be influenced by our choices in the present *"Even though we can't determine which future of an infinite possible variety will eventuate, nevertheless we can influence, by the shape of the future, which does eventuate by the choices we make regarding our actions (or inaction) in the present (inaction is also a choice). These choices have consequences and so they need to be made as wisely as we know how."* (Voros, 2001)

Having introduced the concept of alternative futures, how might these alternative and potential futures be characterised.

6.3.1 Types of Potential Futures

Back in 1978 Canadian futurist Norman Henchey (1978) offered up an earlier classification of types of futures, namely:

1. Possible futures—representing what may happen, including events with a very low probability of occurrence, but which cause major changes.
2. Plausible futures—one that could happen as a natural consequence of what we know today.
3. Probable futures—represents what will likely happen and are usually futures derived from forecasts.
4. Preferred futures—what we want to happen often described as normative forecasting. These are imposed futures that did not exist until the start of the foresight exercise. started. Can be overly subjective due to bias preference.
5. Alternative futures—are futures that are probabilistically invisible and remain invisible after the foresight exercise. Close to being "unknown-unknowns" but not quite as there can be outlier signals which go unobserved.

We shall be expanding Henchey's initial classification later in the chapter when addressing the concept of foresight in more detail. But let us examine the roles of forecasting itself and the difference between forecasting and foresight.

6.3.2 *The Prediction Challenge: Forecasting or Foresight, and Where Does Strategic Planning Fit in?*

A number of issues arise when working with traditional short-term planning and forecasting processes, and include:

- The cumbersome nature of the annual planning cycle
- Processes not being sufficiently adaptive to the demands of rapidly changing environments
- Forcing the fit of fragmented and insufficient data into probabilistic distributions
- How fixed periodic planning cycles can inhibit adapting to short-term threats
- The lack of flexibility in traditional decision-making mechanisms when refinement is required
- Insufficient scenario planning integration
- The tendency for "knee-jerk" reactions without reference to the underlying causes of greater than expected variances, in turn exposing the organisation to the effects of unintended consequences

An alternative combination of methods and processes is proposed, so that plans can be developed, modified, and iterated faster, help speed up analytical feedback, allow for greater emphasis on both qualitative and quantitative frameworks, and examine recent time series data from both contextual and strategic standpoints—leading to more dynamic and plausible outcomes.

On the basis that "weak signals" will only manifest themselves, in terms of situational impact, at some time in the future (albeit that they may already exist, but unidentified, in the present), their very "fuzziness" challenges us to differentiate between the type of methodology to draw them out. Padbury (2019) points out that the discipline to identify weak signals resides within the foresight domain rather than that of forecasting, stating:

> Foresight is often confused with forecasting. **Forecasting does** try to predict the future. It takes data from the past and extrapolates it into the future using a variety of tools, from statistics to simulations. Forecasting helps users understand the present and the most likely future (often with upper and lower limits). However, at a time when the underlying systems are changing in fundamental ways, users of forecasting should take care to confirm that the supporting assumptions are still accurate.

Foresight's function is to prepare strategies and shape policies that are robust enough across a number of plausible futures, particularly where the underlying systems are evolving (often asymmetrically). Thus, when surprises occur they can be highly disruptive to the incumbent system. In effect, it can be said foresight is a form of "strategic options analysis".

Earlier, Ansoff (1975), in a similar vein, saw the difference between strategic planning and strategic issue analysis stating that strategic *planning* has been used *"to convert environmental information about strategic discontinuities into concrete action plans*" but had had little success in dealing with surprises. He identified that

a major reason was that *"strategic planning is overly demanding for input information"*.

He identifies that when a potential surprise originates simple extrapolation will not suffice, leading to *"discontinuous departures from past growth trends or, at least, sharp changes in the curvature of past growth curves"*. This is part of the nature of uncertainty and that *"planners can have longer range forecasts from the forecasters, but they must be willing to put up with content that becomes increasingly vague as the time horizon is extended"*. This in turn would appear to confirm that under such circumstances qualitative assumptions are of more interest and relevance than quantitative ones. The lack of data is itself a challenge to the efficacy of developing quantitative assumptions when high levels of uncertainty and complexity prevail.

Central to his argument is that: *"there is an apparent paradox: if the firm waits until information is adequate for strategic planning, it will be increasingly surprised by crises; if it accepts vague information, the content will not be specific enough for thorough strategic planning"*. This sentiment is close to that of Voigt's highlighted in the section on weak signals earlier.

The premise here is that it is reasonable to expect that historical knowledge and data can help identify future threats and/or opportunities as they arise from familiar prior experience. However, when the threat or opportunity is discontinuous (or disruptive in modern parlance), then in the early stages, the nature, impact, and possible responses are unclear. Frequently it is not even clear whether the discontinuity (disruption) will develop into a threat or an opportunity and fits neatly into quadrant 3 of the uncertainty profile matrix.

6.3.3 What Is Strategic Foresight?

Strategic foresight (sometimes also used interchangeably with, for instance, "futures studies" or "futures research") is a discipline by which organisations gather and process information about their future operating environment (such as trends and developments shaping the organisation's political, economic, social, technological, legal, and environmental context). Strategic foresight is relatively new to businesses and public organisations. Consequently, the terminology that is used to describe the activity of making sense of the future opportunities and threats has not cemented itself quite yet.

The purpose of the foresight activity is to ensure informed decision-making that is based on carefully analysed views on the alternative future scenarios.

6.3.4 From Market Intelligence to Foresight

Better known and more established than foresight activity is its "sister discipline" market or competitive intelligence (MI or CI, respectively). To make the distinction clear between traditional market and competitive intelligence activities and foresight, we'll need to look at the time horizon and the analysis methods used. Strategic foresight looks into the future with a minimum time horizon of 2–3 years with the maximum range extending much further beyond that. Many developments that will greatly shape people's behaviour in 5 years' time can be anticipated, and alternative evolutionary paths of the demanded products and services can be mapped. This is also where specific foresight-related methodologies such as horizon scanning, backcasting, or the Delphi method come into play.

Finnish foresight specialists Kuosa and Stucki (2020) expand upon the concept of "futures intelligence". Whilst they state that such forms of intelligence will largely depend on the organisation's specific needs and context, they do identify a number of common themes, namely:

- *Early warning*: alerting the organisation about threats and opportunities
- *Informing and future-proofing decisions, plans, and strategies*: ensuring that no important future changes are overlooked when future success is at stake
- *Thought leadership*: communicating informed views about future yields benefits
- *Innovation*: understanding or creating future market needs
- *Risk analysis*: understanding potential and emerging risk related to the plans, strategies, and objectives

6.3.5 Benefits of Systematically Organised Foresight Activity

Foresight activity is seen to be critical for organisations for two main reasons:

1. *The current pace of change* in technologies, business models, the overall environment, and society at large is so rapid that organisations need to pull together and spend time on making sense of the developments and plan their operations accordingly.
2. There's no shortage of future-related information. However, so much of the information is unstructured and comes from a variety of sources that merely *bringing order and structure to the chaos can add value*. When analysis work is done with professional methods of a structured knowledge base, the odds of successful outcomes for the organisation are greatly improved.

However, foresight leaders still often find it challenging to clearly communicate the hard and soft benefits that the investment in an organisational foresight capability is expected to yield, especially at times when budgets are tight and where extrapolations based on traditional forecasting approaches tend to override the more holistic approach of foresight-based methods.

Typical outcomes of systematic foresight activities in an organisation include:

- Increased organisational awareness of future trends and phenomena that are relevant for the organisation's future success
- Holistic and contextualised mapping of key future developments ("foresight radar"): Making sense of the otherwise random themes in the context of one's own organisation and mapping the developments into a logically structured picture
- Early warnings: Continuous horizon scanning to alert the organisation about opportunities and threats that are relevant in the organisation's context
- Future-proof plans and decisions: Future-oriented deep dives into specific topics to ensure strategic plans and investment decisions are aligned with future changes
- Thought leadership: Having educated views of the future developments puts the organisation in a natural thought leader's position. This is useful in marketing but also in leading insightful discussions with customers and other interest groups

Never before has the pace of change been this rapid on so many fronts in parallel: in technology, business models, ecological environment, and entire societies. As will be expanded upon in Chaps. 9 and 10, the challenge of new threats, and indeed, opportunities, is aggravated by the behavioural reactions of organisations and the individuals and groups within organisations to these threats—it being a daunting prospect to accept that the old methods are no longer offering sufficient support to decision-makers. A joint Cass Business School/Airmic study (2011), "Roads to Ruin—A Study of Major Risk" Events, highlighted that the increasing interconnectivity of today's world weakens decision-makers' ability to identify weak signals or even develop the willingness to identify such signals and is all part of the behavioural barriers facing organisations.

6.3.6 *So How Can the Differences Between Forecasting vs Foresight Be Summarised?*

- Forecasting does try to predict the future. It takes data from the past and extrapolates it into the future using a variety of tools, from statistics to simulations. However, at a time when the underlying systems are changing in fundamental ways, users of forecasting should take care to confirm that the supporting assumptions are still accurate.
- Foresight's function is to prepare strategies and shape policies that are robust enough across a number of plausible futures, particularly where the underlying systems are evolving (often asymmetrically). Thus, when surprises occur they can be highly disruptive to the incumbent system. Here foresight carries out the function of "strategic options analysis".
- The premise here is that it is reasonable to expect that historical knowledge and data can help identify future threats and/or opportunities as they arise from

familiar prior experience. However, when the threat or opportunity is discontinuous (or disruptive in modern parlance), then in the early stages, the nature, impact, and possible responses are unclear. Frequently, it is not even clear whether the discontinuity (disruption)) will develop into a threat or an opportunity.

Foresight can be considered as being a part of strategic thinking, and helps to reveal an expanded range of perceptions of the strategic options that might be available.

A Note on Scenarios

In Chaps. 7 and 8, we shall be discussing the role of scenarios when addressing uncertainty in more detail. However, as a taster it will be useful to discuss in outline the role of scenarios in the overall foresight process. *Scenarios* are descriptions of alternative development paths. They are either plots in the form of narratives or quantitative forecasts in the form of curves. They are not predictions of the future but help to explore what could happen and how to prepare for various contingencies. Voros identifies scenarios as being key to foresight work but that creating scenarios should come *"at the end of a careful and detailed process of wide information gathering, careful analysis and critical interpretation . . .. . . and that scenarios are a valuable part of foresight work—they are just not the only part—and need to be seen within the context of an on-going, long-term, "closed-loop "organisational foresight process. With this understanding of their place in foresight work, they are a useful tool for generating shared forward views, helping to align strategic action across an organisation on its journey into the future."*

As will be presented shortly foresight concepts such as the "futures cone" act as useful devices in helping to visualise, generate, select, and position scenarios.

6.4 Foresight: Challenging Uncertainty So We Can Move from the "Unknown-Known" Quadrant (3) to the "Known-Unknown" Quadrant (2)

6.4.1 Alternative Outcomes and the Futures Cone: An Aid to Foresight

Moving on from Henchey's earlier work (see above reference), Voros (2001) identifies seven types of alternative futures or outcomes. He calls these "subjective judgements" about the future that are based on the present moment adding that every future is a potential future, "including those we cannot even imagine", the unknown-unknown. He identifies these categories as follows:

- *Potential*—everything beyond the present moment is a potential future. This comes from the assumption that the future is undetermined and "open" not inevitable or "fixed".

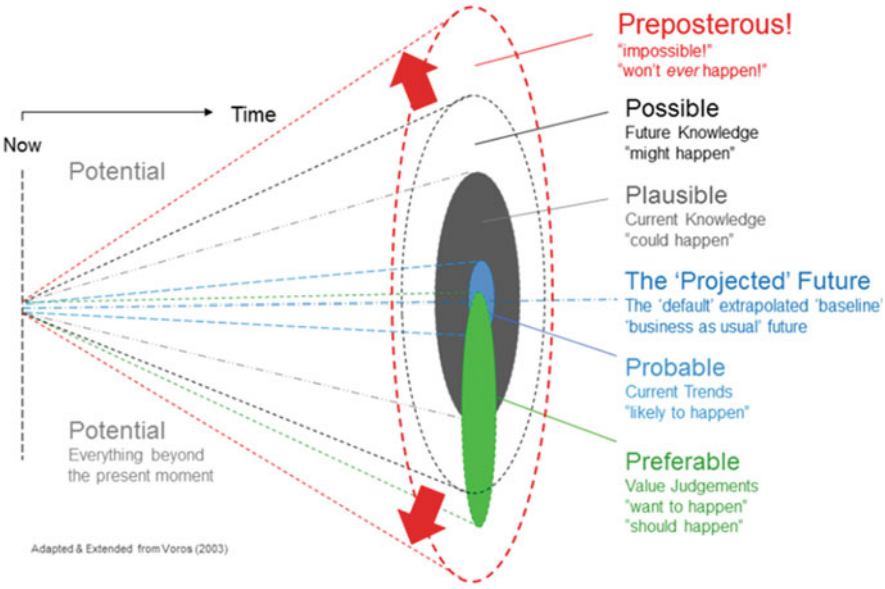


Fig. 6.1 Futures cone (after Voros, 2017)

- *Preposterous*—these are the futures we judge to be "ridiculous", "impossible", or that will "never" happen.
- *Possible*—these are those futures that we think "might" happen, based on some future knowledge we do not yet possess, but which we might possess someday (e.g. warp drive).
- *Plausible*—those we think "could" happen based on our current understanding of how the world works (physical laws, social processes, etc.).
- *Probable*—those we think are "likely to" happen, usually based on (in many cases, quantitative) current trends.
- *Preferable*—those we think "should" or "ought to" happen: normative value judgements as opposed to the mostly cognitive, above. There is also of course the associated converse class—the un-preferred futures—(e.g. global climate change scenarios come to mind).
- *Projected*—the (singular) default, business as usual, "baseline", extrapolated "continuation of the past through the present" future. This single future could also be considered as being "the most probable" of the probable futures.

He also mentions an eighth category *"predicted"*—as a specific singular future that someone claims "will" happen (or at least with a very high probability of occurring). Whilst Voros's list is comprehensive it does mix the more objective versus subjective descriptions—such that "preposterous" or preferable (as well as undesirable) should be seen as being more subjective. Voros illustrates the various future outcomes using the oft deployed "futures cone" (Voros, 2017), in the Fig. 6.1, above.

Voros (2017) also introduces *wildcards to the set*—by definition low probability/high impact *events* (which he refers to as being similar to "mini-scenarios)". *"Since they are considered 'low probability' (i.e., outside the Probable zone), any member of any class of future outside the range of probable futures could be considered by definition a wildcard"*. He does qualify this statement by saying such usage is not common as the tendency is to seek out "high impact" events.

Marchau et al. (2019), editors of a publication about decision-making under deep uncertainty (see Chap. 3 for an earlier reference to this team's work and Chap. 13), state that complete certainty, also known as complete determinism, is—almost never attainable—but acts as a limiting characteristic at one end of the spectrum. The editorial team also identify various levels of uncertainty, namely:

Level 1 uncertainty—there is a clear enough future usually related to short-term decisions and where historical data (which of course may not always be accurate) can be used as predictors for the future. (Services are predictable, e.g. mail delivery.) One could call these low-level uncertainties).

Level 2 uncertainties probabilistically "where there are a few alternative futures that can be predicted well enough".

Level 3 uncertainties relate to situations with a few plausible futures but where probabilities cannot be assigned. Nonetheless "the future can be predicted well enough to identify policies in a few specific plausible future worlds"—classic scenario methods can be deployed here.

Level 4 uncertainty represents the deepest (most radical?) form of uncertainty. Here Marchau et al. make a distinction between those situations which contain many plausible future and situations which we acknowledge that we don't know (aka black swans).

Finally, we have *"total ignorance"* which is the other extreme from determinism. Marchau et al. include this state as it acts as a limiting characteristic at the opposite end of the uncertainty spectrum.

Marchau's schema below presents in graphic form the concerns confronting decision-makers confronted by high level (or as they say "deep") uncertainty and can be used alongside the futures cone to broaden one's understanding of how foresight terminology can be classified.

As a framework it offers a useful yet simple perspective about evolutionary levels of uncertainty, the variants of which can be introduced as to allow for different forms of outcome that scenarios can investigate: See Fig. 6.2 below.

6.4.2 The Role of Science Fiction

Tuomo Kuosa (2012), a Finnish strategic foresight and futures specialist, also deploys the futures cone model, using three main classes of futures—the probable, plausible, and the possible with the probable being shown to manifest itself within a shorter time frame and the possible within a longer one. However, he develops the

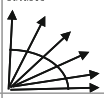
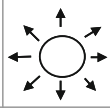
	Complete determinism	Level 1	Level 2	Level 3	Level 4 (deep uncertainty)		Total ignorance
					Level 4a	Level 4b	
Context (X)		A clear enough future 	Alternate futures (with probabilities) 	A few plausible futures 	Many plausible futures 	Unknown future 	
System model (R)		A single (deterministic) system model	A single (stochastic) system model	A few alternative system models	Many alternative system models	Unknown system model; know we don't know	
System outcomes (O)		A point estimate for each outcome	A confidence interval for each outcome	A limited range of outcomes	A wide range of outcomes	Unknown outcomes; know we don't know	
Weights (W)		A single set of weights	Several sets of weights, with a probability attached to each set	A limited range weights	A wide range of weights	Unknown weights; know we don't know	

Fig. 6.2 Progressive transition of levels of uncertainty (Marchau et al., 2019)

basic cone by introducing two other identifiable components—wild cards (also known as outliers)—as per Voros, and *science fiction.* Wild cards when used in conjunction with the "not desirable" and "preferable" conditional categories generate two further scenario outcomes—highly unlikely dystopias and highly unlikely utopias, respectively. Kuosa presents four variants of science fiction:

- Possible "as we know the technology already exists"
- Possible in science fiction (e.g. warp drive)
- Possible in science fiction but not according to our current knowledge
- Possible at least in imagination and therefore theory

Science fiction allows for scenarios that reflect fringe possibilities or "out of the box narratives" and its introduction within the overall foresight discipline is presented in a separate box within this chapter shortly.

The introduction of science fiction (SF) in future scenarios is an interesting feature. Much of the average SF literature has concentrated on purely technological aspects of the future. The best SF will highlight a much broader spectrum of scenarios such as changes and their implications in the spheres of social, cultural, environmental, political, economic, ethical, or scientific advances as well as human–technology interactions.

One key advantage of including SF based narratives in scenario development is that it frees the writer from the strait-jacket of academic rigour when exploring new, often bizarre horizons. Where the future is subject to high levels of uncertainty and complexity, no one has hegemony over what will and what could happen.

It is important in scenario development to encourage thinking about the "unthinkable"—not just dystopian but utopian—although as identified above, much of SF reflects the concerns of the author in the age in which they are written. Some of the "prophecies" or visions come true—even if eventually—some not (or at least not yet). It is remiss of scenario developers to allow themselves to be constrained by the strait-jacket of conformity to linear projections.

A Note on Science Fiction

Ota and Maki-Teeri (2021) state that SF:

> ...provides out-of-the-box and visionary narratives that may become self-realising predictions and prove useful when generating new concepts, schemes, products, and services.

In addition, they observe that SF prototyping in the form of an imaginative narrative based explicitly on science fact allows foresight practitioners to explore a wide range of scenarios and can majorly influence technological innovation and scientific research. SF is also a useful vehicle to introduce weak signal, wild card, and outlier phenomenon into scenario narratives and where such narratives are wonderfully exploratory.

A number of high tech corporates have already introduced SF as part of their innovation strategy processes, such as Apple, Google and Microsoft.

A recent book by Ethan Siegel called *Star Trek Treknology—the Science of Star Trek from Tricorders to Warp Drive* (2017) takes an amusing look at the various advanced technologies in the Star Trek series and the likelihood of them being realised. This approach fits nicely into Kuosa's categories *possible in science fiction, or possible in science fiction but not according to our current knowledge*—"It's life Jim, but not as we know it."

Other literary examples of how SF may reflect the future, both utopian and dystopian, include George Orwell's *1984*, its precursor Yevgeny Zamyatin's 1921 *We*, Arthur Koestler's *Ghost in the Machine*, Huxley's *Brave New World*, and the visionary works of Arthur C Clark and Isaac Azimov and more recently Neal Stephenson's *Snow Crash*. Nor should we forget the impacts of social breakdown following unexpected events such as *Day of the Triffids* and *The Kraken Wakes* by John Wyndham, *The Road* by Cormac McCarthy, and more recently John Lanchester's *The Wall* and climate change issues addressed specifically in the novels of Kim Stanley Robinson—*New York 2140* and the more recent *The Ministry for the Future* and *The Every* by Dave Eggers.

Much of science fiction projects current social and environmental concerns. Climate change and its impact in the relatively near future provides the background of two books cited above by Kim Stanley Robinson. *New York 2140* (which has become a Venice like metropolis) addresses the issue of climate impacted by rising sea levels) whilst his 2020 publication *Ministry for the Future* explores mankind's reaction to global warming (set within a shorter time horizon of around 30 years) introducing the concept of a crypto-type currency called a "carbon coin" as a means of encouraging society to reduce its carbon usage. Importantly, he also addresses the cognitive barriers to bringing about change when the problem is seen as distant or is currently not affecting them—a major challenge for climate change policy-makers. In one section (p. 349), he highlights that following a heat wave in the southern USA (a major one had already happened in India killing thousands)

> —although in the months that followed, peoples biases emerged. It was the South where it happened. It was mostly poor people, in particular poor people of colour. It couldn't happen in the North. It couldn't happen to prosperous white people. ....

> This was yet another manifestation of racism and contempt for the South, yes, but also of a universal cognitive disability, in that people had a very hard time imagining that catastrophe could happen to them, until it did. So, until the climate was actually killing them, people had a tendency to deny it could happen. To other, yes, to them, no. This was cognitive error that, like most cognitive errors, kept happening even when you knew of its existence and prevalence.

Science fiction, when applied to scenarios, has a close relative in "thinking about the unthinkable". Chapter 2 has already highlighted the potential "reality" of unthinkable events. As we have seen in the uncertainty profile matrix presented in Chap. 2 "unthinkables" should not automatically be confined to quadrant 4—unknown-unknowns. Unfortunately, a mind-set which equates unthinkable with "preposterous" risks at some time in the future (tomorrow or the next millennium or longer—to being unnecessarily surprised and having to fall back on protestations that such events are black swan events, when they are not)—can only lead to the likelihood of future dystopias!

6.5 Methods, Tools, and Techniques (MTTs)

The most accessible and frequently used template for assisting foresight work is the futures cone, shown in Fig. 6.1 above—and apart from Voros's version a number of variants are also used. However, for a more in-depth analysis there is one method that seems to encapsulate a fuller time horizon when exploring the future—causal layered analysis (or CLA)—as it attempts to "layer" both the past and the future, offering a more in-depth appreciation of the dynamics which make up the foresight discipline.

6.5.1 Causal Layered Analysis

Causal layered analysis (CLA) was developed by the Australia-based futurist Sohail Inayatullah in the 1980s as a way of integrating different futures perspectives and is less concerned with predicting a particular future and more with opening up the present and past to create alternative futures.

Inayatullah's own interpretation is thus:

> CLA broadens our understanding of issues by creating deeper scenarios. We can explore deep myths and new litanies based on the points of view of different stakeholders and then see how they construct problems and solutions.
>
> CLA is used for implementing new strategies to address issues. Does the new strategy ensure systemic changes (incentives and fines)? Does it lead to worldview-cultural change? Is there a new metaphor, a narrative for the new strategy? And, most importantly, does the new vision have a new litany, a new way to ensure that the strategies reinforce the new future and are not chained to the past?

> CLA thus can be used to deepen our understanding of strategy. Mapping reality from the viewpoint of multiple stakeholders enables us to develop more-robust scenarios. It helps us to understand current reality, and, by giving us a tool to dig deeper and more broadly, it allows us to create an alternative future that is robust in its implementation.

In practice, the method is not yet widely known, certainly outside of the southern hemisphere. Although there is a developing literature, it warrants entering the mainstream of foresight methods (Curry & Schultz, 2009). Using the same approach as in Chap. 3 where we deployed Jonathan Rosenheads' own words to describe robustness analysis we shall use the same format by allowing Inayatullah to speak straight from "the horse's mouth" as it were. The following text is taken from a paper produced by Sohail Inayatullah where he defines CLA.

CLA is based on the assumption that the way in which one frames a problem changes the policy solution and the actors responsible for creating transformation.

*The **first level is the problem itself defined as the "litany"** or the official public description of the issue—quantitative trends, problems, often exaggerated, often used for political purposes—(e.g. overpopulation) usually presented by the news media. Events, issues, and trends are not connected and appear discontinuous. The result is often either a feeling of helplessness (what can I do?) or apathy (nothing can be done!) or projected action (why don't they do something about it?). This is the conventional level of futures research which can readily create a politics of fear. This is the futurist as fearmonger who warns: "the end is near". However, by believing in the prophecy and acting appropriately, the end can be averted. The litany level is the most visible and obvious, requiring little analytic capabilities. It is believed, rarely questioned.*

*The **second level is concerned with causes in the form of social science analysis based on short-term historical facts**. These are represented by social causes, including economic, cultural, political and historical factors (e.g. rising birthrates, lack of family planning). Interpretation is given to quantitative data. This type of analysis is usually articulated by policy institutes and published as editorial pieces in newspapers or in not-quite academic journals. If one is fortunate then the precipitating action is sometimes analysed (e.g. population growth and advances in medicine/health). This level excels at technical explanations as well as academic analysis. The role of the state and other actors and interests is often explored at this level. The data is often questioned; however, the language of questioning does not contest the paradigm in which the issue is framed. It remains obedient to it.*

*The **third deeper level adopts a worldview concerned with structure and the discourse analysis that supports and legitimates it**—examples include population growth and civilisational perspectives of family; lack of women's power; lack of social security; the population/consumption debate. The task is to find deeper social, linguistic, cultural structures that are actor-invariant (not dependent on who are the actors). Discerning deeper assumptions behind the issue is crucial here as are efforts to revise the problem. At this stage, one can explore how different discourses (the economic, the religious, the cultural, for example) do more than cause or mediate the issue but constitute it and how the discourse we use to understand is complicit in our framing of the issue. Based on the varied discourses, discrete*

alternative scenarios can be derived here. For example, a scenario of the future of population based on religious perspectives of population ("go forth and multiply") versus cultural scenario focused on how women's groups imagine construct birthing and childraising as well as their roles in patriarchy and the world division of labor. These scenarios add a horizontal dimension to our layered analysis. The foundations for how the litany has been presented and the variables used to understand the litany are questioned at this level.

The ***fourth layer of analysis is at the level of metaphor or myth****. These are the deep stories, the collective archetypes, the unconscious, of often emotive, dimensions of the problem, or the paradox (e.g. seeing population as non-statistical, as community, or seeing people as creative resources). This level provides a gut/emotional level experience to the worldview under inquiry. The language used is less specific, more concerned with evoking visual images, with touching the heart instead of reading the head. This is the root level of questioning; however, questioning itself finds its limits since the frame of questioning must enter other frameworks of understanding—the mythical, for example.*

CLA thus goes beyond conventional framing of issues. It is argued that normal academic analysis tends to stay at the second layer (causes) with occasional forays into the third (worldview), with little reference to the fourth layer (myth and metaphor). CLA does not treat the different levels in hierarchical terms but treat each level equally. This is seen to increase its flexibility and analytical richness.

Different scenarios can be developed at each level. Litany type scenarios reflect current popular trends and thinking; social level (cause analysis) scenarios are more policy oriented, with worldview scenarios tending to capture basic differences. Myth/metaphor type scenarios articulate these differences through a more cultural reference base (poem, story, image).

Inayatullah also proposes that problem-solving actors are different at each level so that *"at the litany level it is usually others—the government or corporations. At the social level, it is often some partnership between different groups. At the worldview level, it is people or voluntary associations, and at the myth/metaphor it is leaders or artists"*.

A major observation is *"that coming to the CLA process from other scenario-building approaches, it was sometimes necessary to remind oneself during the analysis phase of the layers that one is deepening one's understanding of a current existing view of the future, and that the scenario development process (and the development of alternative futures) does not begin until after the worldview and/or metaphor layers have been first constructed and then inflected to disrupt the prevailing view"*.

6.5.2 Summary of Benefits and Disadvantages of CLA

Finally, Inayatullah provides a useful summary of the benefits and disadvantages of the method as well as a guide to using the process itself, thus:

Uses of the Method

- Questions conventional future thinking
- Uncovers why things are not working today and develops potential and shared solutions
- Explores issues from qualitative perspectives to strengthen understanding of the issue
- Develops shared organisational strategy
- Facilitates multicultural dialogue and understanding
- Gains a better understanding of one's own worldview and ways of making sense of the world
- Develops different sorts of products and services and revised policies

Benefits

- Expands the range and richness of scenarios
- Collaborative and appealing to a 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

Disadvantages

- Needs a clearly expressed question to be prepared
- Requires participants to be willing to share their perspectives and challenge their assumptions about how the organisation operates
- Requires acceptance of the basic CLA theory by the participants
- Needs to be connected with other foresight methods to generate future scenarios
- May constrain action through "analysis/paralysis"
- May reduce individual creativity
- Needs time and patience
- Requires experienced facilitator

The method process extracted from Inayatullah's own notes is provided in Appendix 2.

For readers who wish to delve in depth into the CLA method I would suggest that they read

The Causal Layered Analysis (CLA) Reader

Theory and Case Studies of an Integrative and Transformative Methodology

Edited by Sohail Inayatullah—Published by Tamkang University Press Graduate Institute of Futures Studies, Taipei, Taiwan 251 2004. (Document can be downloaded from the web as a Pdf).

Summary

Can you see a developing theme here? All of these more "way out" ideas have actually been thought about—they are not "unknown-unknowns". They tend to be shovelled into either quadrants 4 or 3 in the risk/uncertainty matrix, when in fact there is no reason why they shouldn't reside in quadrant 2 (known-unknowns). As has been said earlier—"if we can think it—it can happen". The prime reasons for treating them as Q3 and 4 issues is largely down to a variety of cognitive barriers in individuals, organisations, and broader culture. Chapters 9 and 10, covering behavioural factors—the impact of human influences, address these concerns in depth.

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