

Deepening Futures with System Structure

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An important motive for futures work is to anticipate change and be ready for it. In strategic management the robustness of a strategy is often estimated in terms of strategic fit; that is the degree to which the shape of the organization is congruent with and mutually supportive of its environment. If the environment changes then we lose fit and the organization starts to fail. A good analogy is the adaptation of a species to particular climatic conditions. When these change the organisms may lose the ability to thrive. For this reason, we seek to understand predicted or possible changes in the environment so that we know how to adapt. 'The strategist, wanting to position his or her company to cope best with its industry environment or to influence that environment in the company's favour, must learn what makes the environment tick.' (Porter, 1998) But the challenge in anticipatory strategy is 'what will make the future environment tick?'

The problem is, then, that we cannot know in sufficient depth the nature of the future environments represented, say, by a set of scenarios. There may be four anticipated future worlds that we can imagine. We can consider the impact of each of these on our current organization, but we can then be left with the inevitable question 'so what?' One of the reasons this happens is that we cannot picture the nature and structure of these future worlds anything like as well as we can research and picture today. In the present and recent past we understand much through experience as well as information but we have no experience of the future!

This chapter is about two perspectives on how we can see more deeply into the deeper structure of alternative futures and into the nature of discontinuous change over time. Both these aspects, if aided by some additional conceptual tools, offer scope for improving our ability to anticipate what might be needed for strategic fit in the future.

How can we improve our capacity to imagine into the unknown and picture that which has not yet happened? One answer lies in recognising that in much of our picturing of both the present and the future we do not understand the deeper structure that is actually causing things to be the way they are. Even our very ideas of cause and effect can obscure what may be going on because of non-linear, complex and emergent properties. Working with scenarios and other methods may trigger strategic insight in individuals but this is inductive and tacit. This makes it difficult to share. If there are conceptual tools available that help that level of insight to be articulated, then a further layer of value can be harvested from the strategic conversation.

One of the characteristics of insight is its relationship to action. When something is seen deeply and clearly it moves us to act. This might be to switch resource application or to initiate new ideas or contingency plans. In strategy development, perhaps one of the greatest values of a well structured scenario set is its stimulus to seek and generate a wider field of options. This way of thinking is very different from linear methods such as net present value.

In the absence of certainty people often find it hard to invest effort in generating options for scenarios that, after all, only *might* happen. However, if the kind of thinking developed in real options theory is applied more generally as a conceptual tool, then for each possible scenario in a set we need to take positions. Flexibility has strategic value. This is where deeper insight comes in. By working on the deeper structure of scenarios as described later in the chapter, stronger insight increases the motivation to generate options. In this way the quality of understanding of the world of business has a direct impact on the quality of actions in the world of management. Similarly, if we can understand better the big transitions where one world replaces another, and see it coming before others do, we have energised and informed entrepreneurial action.

This chapter is about some of the ways that explicit methods can be used to help articulate strategic insights into the future. Two approaches will be described. The first is in the field of scenario planning and introduces a way of using systems thinking to augment and capture insights provoked by a scenario narrative. This is the causal loop method. The second is a different way of relating to the future in the present, based on structural insight rather than calendar time. This is the three horizons method.

Both methods will be illustrated by the way they were applied in a recent UK Government Foresight study of the next 50 years of intelligent infrastructure.

The Cognitive Task of Distinguishing One Scenario from Another

The essence of scenario thinking is the ability to entertain, mentally and emotionally, more than one 'reality'. Cognitive science calls this 'memory of the future' in which we visualise some, as yet, non-existent possible future situation. With this mental image we can see what we can learn about the likelihood of our intentions and plans working out. It is a simulation or rehearsal in the mind. So for effective thinking with scenarios, each scenario of a set needs to be 'loaded up' into the mind and visualised clearly. Holding this visualisation in mind, experiments can be made to see 'what would happen if?' Without practice, this is quite hard. Of course, movie makers, dramatists and novelists do this but they are usually exploring only one scenario or story line at a time. In scenario thinking we must do this with at least two different but parallel stories neither of which is our current reality.

A great strength of the scenario method is the way that multiple and interconnected uncertainties can be elegantly reduced to a small set of narratives that summarise possible future resolutions of those uncertainties. From the analytical perspective, the larger the complex of uncertainties, the more scenarios we need to encompass that complexity. However, in practice, there are cognitive limitations. This has led to different schools of thought as to how many such scenarios are needed in a working set.

For many years, for example, Shell has taken the view that to have more than two scenarios is too confusing. Clearly this is the minimum set, since, for scenario method to be meaningful, there has to be an overarching uncertainty that leads to at least two distinct possible outcomes. Recently Shell (2005) has experimented with three scenarios based on a 'trilemma'. Four scenarios sets are popular because of the cognitive scaffolding provided by two orthogonal axes. Some more analytical approaches have gone as far as eight or sixteen scenarios in a set, but these really do cease to be useful in strategic conversation for executives. However, just two

scenarios in a set may risk oversimplifying the real complexity, and so fail to stretch our capacity to anticipate possible futures.

Good scenario practice typically makes holding multiple scenarios in mind without confusion somewhat easier by means of several devices. They include:

- Narrative – telling a verbal story of how we got from today to that future situation
- Descriptive – portraying the future situation by reviewing what would be seen and heard by someone residing in that future time and place
- Illustrative graphics – taking key parameters of interest and displaying them as, for example, bar charts of values consistent with that scenario
- Evocative images – these may be ‘pockets of the future in the present’ or imaginative illustrations
- Causal logics – showing how different combinations of drivers result in the scenario’s state of affairs
- Dilemmas – indicating how different scenarios tend to stabilise around a particular resolution point between polarised forces or values

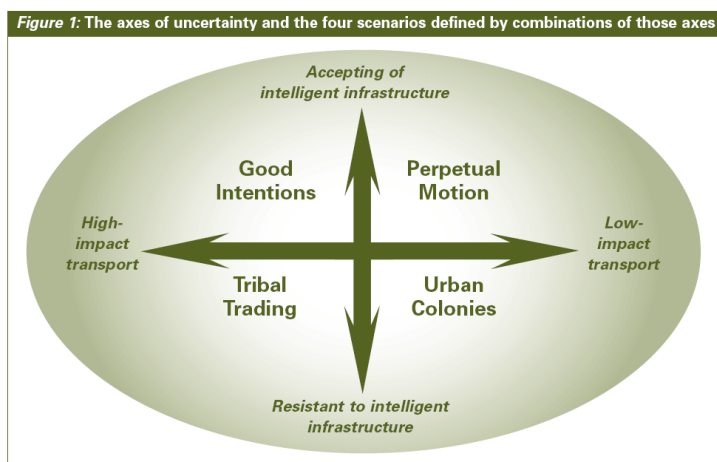
All of these are helpful but in scenario impact exercises, such as wind tunnelling, it is noticeable that mental exhaustion soon sets in and the content of different scenarios gets muddled. This loses the clarity of impact, reduces the scope for generating distinct options and loses the significance of the original uncertainties which led to the scenario set in the first place. This point will be illustrated with reference to a number of ways of framing scenario sets.

Framing Scenario Sets

In the four-box approach to creating a set of scenarios, uncertainties are grouped according to their mutual connectedness and how far their outcomes tend to get lined up with each other (like the domino effect). Two main groups then produce two contrasting outcomes which imply a complex of the factors which have been grouped. These are then used to form orthogonal axes defining four combinations of overall outcome which represent the scenario set. An example of this way of distinguishing scenarios in a set is shown in the diagram below taken from the Foresight project on Intelligent Infrastructure (2006).

The vertical axis is between acceptance and resistance and the horizontal axis between high and low impact transport. Taken to their extremes, the four combinations lead to very different futures represented by the four titles. However, under the

pressure of thinking through multiple scenarios, people easily slip into blurring the distinctions between the scenarios. All scenarios contain similar elements derived



from the fundamental driving forces and common predetermined elements. The differences often show up as different colourings of those elements. This reduces the impact of the 'wind tunnelling' and hence the value generated through the exercise. Over-simplification loses both plausibility and requisite variety.

However, when it comes to testing (wind tunnelling) a given policy initiative of strategic direction in each of the scenarios, it can be hard to make the 'what if?' question stick at the level of shaping real decisions and ideas. This is one of the reasons for the slow uptake of scenario thinking by executives; they have mental habits that cause them to

- a) want one single predictive scenario
- b) be difficult to convince of the value of thinking in more than one reality
- c) be disinclined to think through the impact implications of 'unbelievable' scenarios

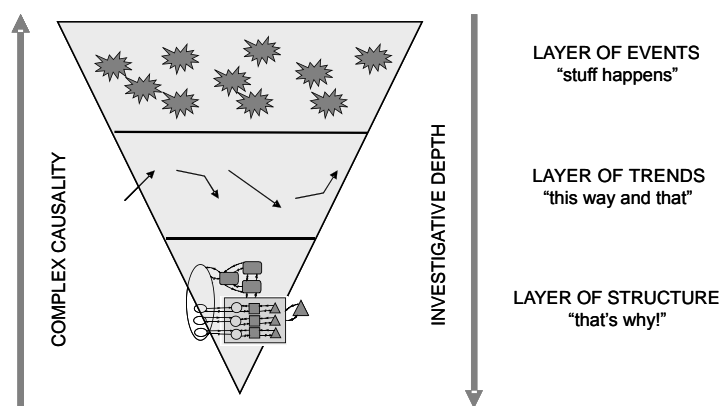
The cognitive challenge in a typical scenario impact workshop is to assimilate the four scenarios, then to single them out one at a time and imagine the fate of a possible strategy or policy in that future world. Then, that image must be dropped and another one taken up without confusion. And so on. Mental overload and the tendency for memory to 'stick' from one stage to the next makes some degree of blurring inevitable. There is a strong tendency for the mind to get drawn to the centre of the four-box diagram where 'it is all the same'. Clearly, one role of a facilitator must be to remind people when they have inadvertently jumped scenarios.

Working with Deeper Structure

Perhaps the narrative version of a scenario that tells the story over time, and shows how each scenario unfolds differently into its distinct future, is the most powerful cognitive stabiliser, aided by suitably evocative titles. However, there need to be additional ways to bring out the distinctions. Techniques have been developed to this end: to differentiate between scenarios at a deeper structural level and even to enable basic modelling of behaviour over time. This approach is based on a particular technique from systems thinking called *causal loops*.

A useful framework for understanding the role of systems thinking in scenarios is a triangle of deep structure. Generally we are aware of events taking place and this awareness is in the present (the first layer of events). Fig. 2

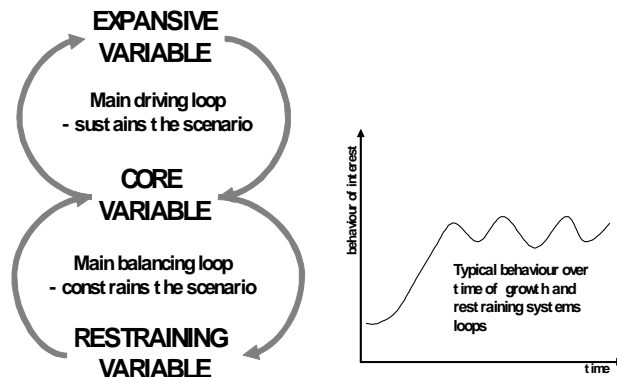
We may see them coming, but we are often taken by surprise. If we delve more deeply into what is going on we identify trends (the second layer) and these give us some degree of



anticipation. However, trends can be deceptive, in that there can be trend breaks and discontinuities. We are too easily trapped in assumptions of linear change and so also miss the implications of exponential change or cyclical behaviour. The third layer is structure, where we gain some understanding of non-linear causation. At this level we discover a key principle that *structure drives behaviour*. A key aspect of that structure is that effects can be causes, that feedback determines the behaviour of systems more than strongly than linear change.

The proposition relating this framework to the scenario differentiation question is that any scenario, to be plausible, will have a basic archetypal structure that sustains its dynamic while it lasts. To keep the application of this idea at the technically simplest level we apply two types of causal loop in combination. One is called a *reinforcing loop* and the other a *balancing loop*.

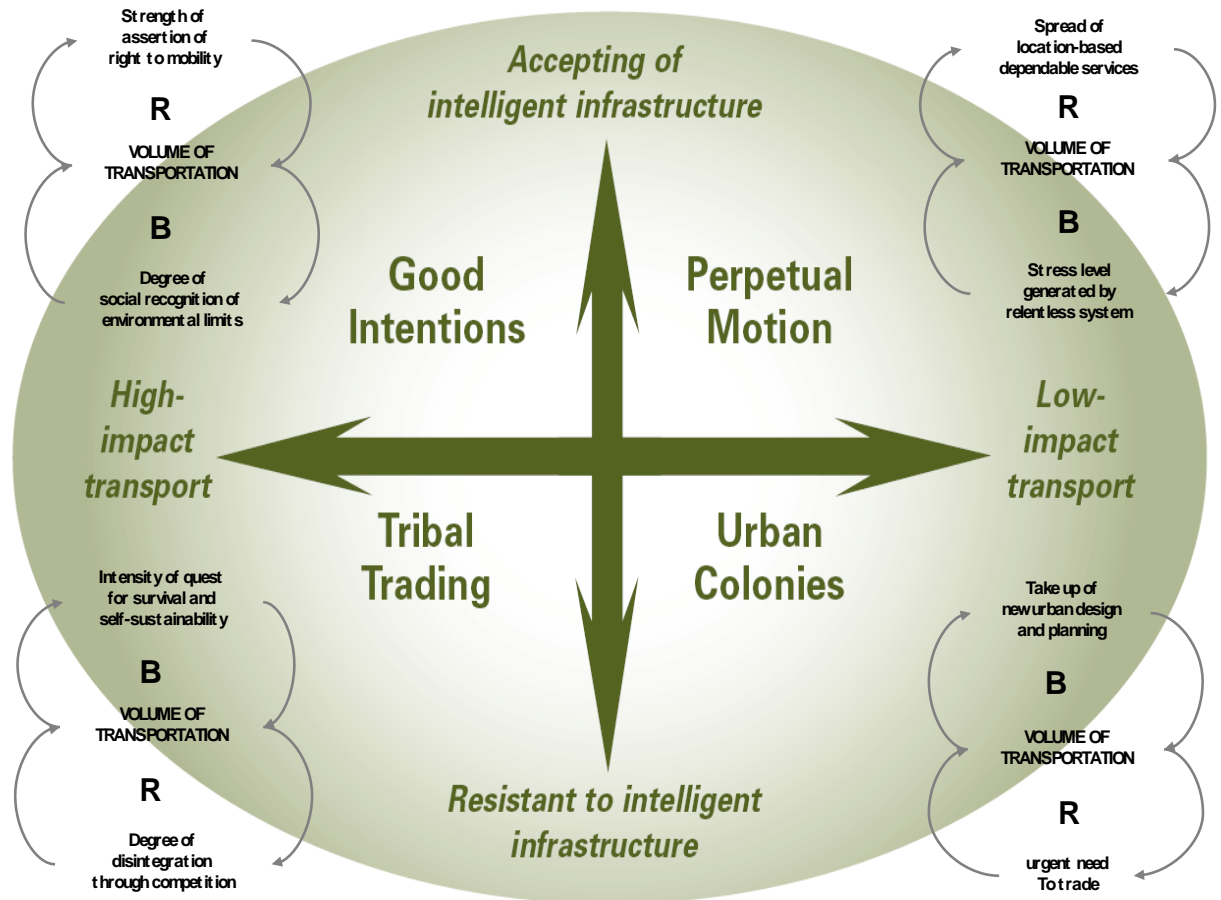
A reinforcing loop is composed of a variable that positively drives another variable, which in turn feeds back and increases the original variable. An example is the application of interest to a principal sum of money, which in turn increases the principal, which in turn increases the accumulated interest, and so on. A balancing loop is composed of a variable that positively drives another variable but, in contrast to the previous loop, it inhibits or reduces the original variable. This has a dampening effect on the reinforcing loop. An example would be: accumulating a sum of money leads to spending that then diminishes the original sum. The feedback often has a delay factor which complicates the behaviour, often leading to an oscillating behaviour, called 'managing cash flow'.



The two loops combined represent a structure which is not very complex but can explain quite complex behaviour, such as the relationship between predators and prey in an ecosystem. The double loop is a structure that endures at any moment of time. However, it is also a structure which drives behaviour as explained in Figure 4. A key variable in the overall scenario arena is reinforced to grow in a particular way in a given scenario. Equally, since it will not grow for ever to infinity, it is restrained in a particular way. There will be limits to growth. However, the nature of these loops and their surrounding conditions will be quite different in the different scenarios. If they are not, this calls into question the strength of the scenarios.

Now the basic procedure for applying this technique to deeper structure can be explained. The first assumption is that, should the conditions come to pass for that scenario to predominate, it will have a distinctive and enduring underlying structure. Of course, any scenario will have a life span, but for its lifetime this structure persists. Since the scenario is emerging from the present (which is not the scenario itself but must contain the potential for it) there must be growth into that state of affairs: this is the fundamental growth loop. However, this growth will not be unopposed, and will come to some sort of equilibrium position for the duration of the scenario. This may be fairly steady or it may oscillate. The greater the delay in feedback, the more likely oscillation becomes. Thus the behaviour of the double loop structure can give the intuitive insights of the scenario narrative a rational support based on basic systems theory. It creates a dynamic hypothesis for each scenario.

In the next diagram, the four different double loops that characterise each scenario are shown.



Notice that in the top two scenarios the dynamic indicates an increase in the volume of transportation, whereas in the lower two the volume is tending to reduce. This is determined by which loop is reinforcing. Each scenario is a dynamic battle between the two loops.

Translating Systems Models Back To Narratives

These four distinct causal loop models become key anchor points to reinforce the distinction between the scenarios. However, this all taking place against a much more complex set of drivers and uncertainties. So the core model can now be elaborated with secondary loops, some of which augment the growth loop, and some, the balancing loop. For example, in the scenario *Perpetual Motion*, the upper reinforcing loop, 'spread of location-based dependable services', is likely to be further reinforced by a combination of increasing demand and increasing adoption of technology. However, the balancing loop of 'stress level generated by relentless system' is also strengthened by factors like the take-up of alternatives to travel, such as virtual working, that reduce the travel stress. (For more complete examples of this see Curry et al, 2006)

Once we have developed a more complex elaboration of the core model, it is possible to return to the narrative form to help visualise the implications of the deeper structure. The technique is often referred to as 'vignettes', that is small stories around

particular aspects of the scenario that also bring to life the dynamic. These short stories fill in illustrations of the big story of the scenario. One example shown in the box is taken from the same *Perpetual Motion* scenario.

A Family Get-together

Andrew was looking forward to the family reunion. He had spent many hours juggling with the integrated travel system to find the easiest and cheapest way to get his two sons and his five grandchildren together for 24 hours.

They were coming from Southampton and Glasgow to near Nottingham using the latest fashion, the 'family meeting caravanserai'. These were located at different hubs in the country designed on the lines of a hi-tech village with actual and virtual gathering rooms and accommodation. They were specifically designed to make use of the new intelligent modal integration which had evolved over the past 20 years to exploit the breakthrough in low-cost transport energy.

He remembered his own childhood, when it had been difficult and expensive to meet up for family events because of the high cost of fuel and the fragmentation of travel systems. His two sons, however, were plotting to persuade him that the twice-a-year get-togethers be reduced to one, and instead to install the new 'home virtual meeting' system so that they could schedule impromptu exchanges. Then they wouldn't need to be tied up helping him to play with his grandchildren. It was proving hard to persuade him that a virtual hug was as good as a real one.

His response was to try to persuade them to spend the money on one of the new hydrogen-powered cabervans that he could plug into the automated motorway network and drive safely to see them despite his age.

The negotiation is still proceeding!

The application of systems thinking to scenario insights is not a linear process. It is a re-iterative interplay between the background material, the structure, such as drivers and axes, the world view perspective, the angle of interest in the scenarios and the system thinking methods themselves. When shared between scenario builders and decision-makers, this search for the dominant loop in each scenario strengthens their feeling that this world is plausible: it might well happen. This, in turn, energises the search for real options that exploit entrepreneurial opportunities, in the sense that the mind becomes primed to pick up the signals that a given scenario is coming about. It also helps increase the resilience of the strategic thinking, and awareness of the full range of underlying uncertainties and their implications.

The Deeper Structure of Time Span

The second main approach to deepening our understanding using system concepts starts by looking at discontinuous changes over time and how they come about. This can happen on many different scales from one civilisation displacing another, to changes of political system, to one technology overtaking another. When such changes take place there are a number of features to bear in mind.

- A sudden discontinuity has usually been incubating, unnoticed by most, for some time.
- The dominant system sustains a prevailing mindset that makes it difficult to notice the emerging signs of change.

- Developments which trigger discontinuity are themselves uncertain; for example there are many unsuccessful innovations in a field parallel with a successful one.
- Because of the dominant loops described in the previous section, the dynamics of change are pretty messy and non-linear.
- When a change of phase is imminent, it may take only small events to precipitate the change.

We can explore this with an analogy. Imagine you have bought a house that has a large but overgrown garden. The garden used to be laid out formally but has been neglected for many years and has grown wild. The trees have grown up and there is dense undergrowth. What you have acquired is a well developed eco-system in balance with its broader environment, but it is not the one that you want. You have in your mind's eye a vision of an area of meadow surrounded by trees, with a rich variety of wild flowers, and you set about clearing the brambles and smaller undergrowth, digging up the weeds, sowing the wild flower seeds, creating conditions for new incoming species. This is hard work, and the weeds have been there a long time. Despite your efforts in the first year the weeds just grow back and swamp all your new seeds – in fact many of them benefit from the extra light they get as you clear the undergrowth. This little ecosystem is quite resilient, and is not going to be changed easily. You keep going, year after year clearing small patches of weeds, protecting niches for the wildflowers, and gradually shifting the balance of the whole system, until eventually you get to a point where the meadow has become the new dominant system.

In this little example we see some basic ideas about change. First, as we have discussed in the previous section, there is the idea that you can characterise a whole state of affairs with a dominant loop, and that this state emerges through some growth logic from a previous state of affairs. The garden has moved from a formal cultivated state, to a wild one, and now we are taking it to a new relationship with its environment where we are trying to align natural meadow ecology with its broader setting. In important ways this high level description is more helpful than a discussion of individual plants – their ability to survive and thrive is a property of the overall system.

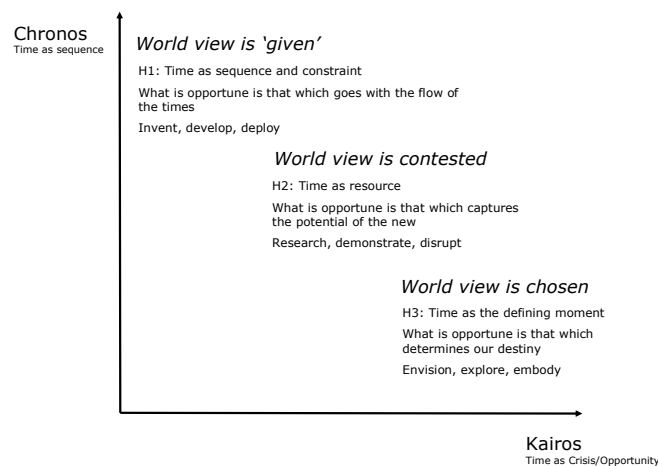
Secondly, we see very clearly the role of a human activity system in the outcome. As was discussed in the *Overview* to this book, we can think of societal systems as stable patterns of behaviour that in a sense 'lock-in' – they are the ways that as a society we have settled on getting something done so that we can each play our individual part. By saying they are locked in, we are intending to stress how hard it is to shift them: all the species that are currently thriving have an interest in the system and will do their best to keep going; we have to change the whole system to get rid of the weeds. In the example we see that in each stage of the garden a pattern has become established and is being maintained by the natural system and its human gardeners. As in our daily lives, systems that are not sustained by activity will quickly fall into disuse and 'go wild'. The garden's three stages show a shifting balance between the activity system and its broader environment: in the first the formal garden has to be maintained with strong defences against the wild stage which it defaults to when the activity stops; in our new garden we try to align the system more with its environment, creating a wild garden with less need for maintenance. We can imagine having created the new design by using the Ramirez and van der Heijden 'staging' approach (Chapter x) in which we explored the boundary between the garden and its surrounding environment to find a way to appropriate its setting to create supporting dynamics, such as surrounding meadows.

As well as seeing how each state is a distinct pattern of activity, this simple example also illustrates something important about the dynamics of change from one dominant state to another. In order to get our new desired state going we have to work very hard against the current system in order to shift the pattern of natural dynamics in favour of our new meadow and away from the dominant weeds. There is a stage when it is only the work of nurturing and protecting the new that allows it to grow and become the new system.

These types of system modelling of change have been widely explored by many writers, especially those interested in how new technological regimes come about. For example, Moore's model of technology markets draws attention to a 'chasm' that occurs between the initial efforts to introduce new technology to the market and its adoption by a market niche that enables it to start growing (Moore, 1999). This is like the step from defending a patch of the garden against the weeds to finally establishing a self-sustaining meadow.

Notice in these descriptions that there is a linear version of time and there is the qualitative shift to a new pattern of things. This distinction is made in the Greek notions of Chronos and Kairos. Chronos is the view of time as sequence, duration, the passage of time. Kairos is the view of time as the moment of opportunity, as in 'seize the day'. Kairos implies a qualitative shift or meaningful moment. The implication for scenario thinking here is that if we concentrate simply on chronology and timelines of events we may miss the important structural changes that affect strategic fit. On the other hand, if we simply concentrate on significant images of the future we fail to see how we could possibly get there from here, so there is no basis for crafting strategy through time.

In the diagram below three regions are plotted placing Chronos and Kairos as a fundamental dilemma of time. The labels H1, H2, H3 refer to three horizons of time that create a 'timescape' (Selin, 2006) which will now be described as three different orientations to the future: these relate to the kinds of actions people take and the bets they place on future outcomes.



Horizon One (H1) thinking is that which governs the continuation and extension of the current societal systems that define our culture – artefacts, behaviours, laws, institutions, and so on. Since these have certain ways of dealing with questions, issues and problems, any emerging challenge or constraint is framed according to their capabilities and possibilities. The most efficient way to handle new

problems or potentialities is to extend the old – never underestimate the power of the existing system to reach further than it has before. The Horizon in question is as far as we can see, and we form plans within the scope of our ability to see and plan. Time is viewed as sequence and duration, since it is the frame within which we act in understood ways to carry out plans and procedures and meet societal commitments. Much effort goes into ensuring that outcomes are as expected, that uncertainty is eliminated or managed, that commitments are met.

H1 mindset puts us very firmly in the present reality, extending our current system out towards the future as far as we can see, expecting, as with the real horizon, that as we move ahead our opportunity continues to expand. It is the manner of thinking that regards the current way of doing things as entirely appropriate to emerging conditions as long as we keep extending and developing it. The dominant loop is already visible, and we anticipate the continued allocation of resources to its extension in ways that we understand. For example, in the IIS case, a Horizon One model is to assume that we go on building roads and manufacturing cars for the developing world's population in the way we have for the developed world. A lot of the world's innovation happens within Horizon One as we build smaller, cheaper, faster etc products. Implicit in such systems is a broadly understood notion of what 'better' means. These are the systems that are 'locked in'.

Horizon Two (H2) thinking looks both ways and is inherently ambiguous. The changing circumstances present us with constraints and new opportunities. Should we meet them with old systems or new? What does this choice mean? Are we on a slippery slope? Do we want to be seen as more of the old, or a break with the past and a harbinger of the new? And who gets to decide? Does our legitimacy come from the old world view or the new? We can see our path ahead, because we are using the potential of the present, though we do not know whether we will win or lose our chosen contest. Roadmaps are much desired to help us narrow our choices and recruit others to our expedition. Evidence is available and carefully scrutinised for every clue it can give us.

The H2 mindset is an orientation to the future that is fundamentally entrepreneurial. It looks at all the potentials for change and seeks to harness them to introduce something new to the world that will grow and thrive. Such new offerings will in some important sense change the dominant loop by introducing a new system elements that in turn configure other system actors to lock in a new pattern which dislocates the H1 momentum. Such change is often characterised as 'disruptive' innovation, to mean that it disrupts the pattern of value creation enjoyed by the incumbents in the current dominant system. We call it Horizon Two to bring out that it lies beyond the first horizon, and so before it emerges it is only visible to those who participate in the H2 mindset.

Horizon Three (H3) thinking views the present moment in the light of meaning and destiny. An alternative pattern or paradigm is espoused as a set of principles, a vision of a different world or an alternate reality. Time is the opportunity to take a stance and make a step, however small and insignificant, in the current world dominated by H1 and H2. Deep uncertainty is faced, and a choice is made with the resources to hand, in the knowledge that the choice is existential. We choose a way and let it define the steps. The time of fulfilment is both now and the extended future, events are left to unfold interpreted from the standpoint and values we have chosen. In this way H3 selects those innovations of H2 that support its principles and reject those which are seen as bolstering H1. These are considered to have been 'captured'. Great leaders are known for their kairos moments which take whole societies down paths to peace or war, prosperity or peril, and individuals face them

as their lives unfold in their life-changing decisions. Equally, grass roots changes in H3 may gradually grow until they reach a tipping point and become the next ecology. Horizon 3 exists as possibilities brought forth by values and beliefs that we feel have a better fit with the future. They are a commitment to a destination over the horizon of the known, guided by a compass rather than a map: 'In order to discover new continents you must have the courage to lose sight of the land'. You can prepare for the expedition, but you cannot possibly have a roadmap.

The H3 mindset is seeing beyond our current systems, motivated by vision, values and beliefs. If a Horizon Two entrepreneurial mindset is concerned with anticipating and capturing changing values, then Horizon Three is concerned with driving such changes. The H3 orientation is one that looks at the values that underpin the dominant loop; and takes the stance that they should be different, and that a change is the precondition for a desired new dominant loop. Thus the organic food movement promotes an outlook on how food should be grown that is fundamentally different from the dominant model of the last few decades. Another example would be the Transhumanist movement that is promoting the possibilities of human enhancement made possible by emerging technologies, and taking up the discussion of values that permit or deny this.

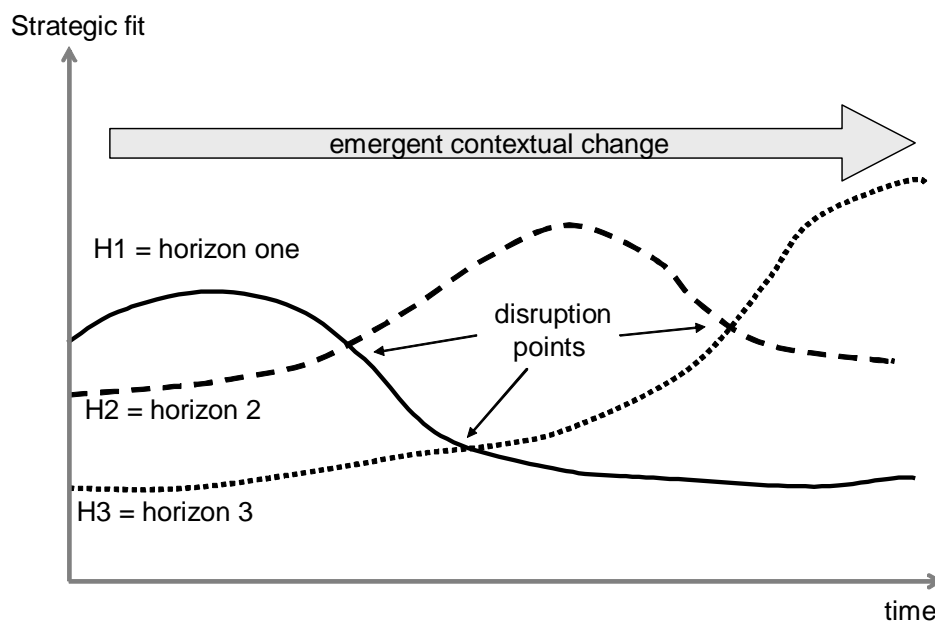
Horizon Three is in some senses 'outside' time as understood in the first two horizons. An H2 entrepreneurial orientation is bound to the flow of events, attempting to capture momentum and appropriate resources to a new opportunity; it is possible to be too early as well as too late with such initiatives. In contrast, if you are committed to organic agriculture you will look for ways to pursue it with whatever resources can be found, challenging the current dynamics regardless of timeliness, with the intention that sooner or later the values will start to drive broader adoption. Pursuit of values or vision is a way of bringing the future into the present; it is a commitment of resources that asserts the possibility of a new system and seeks to bring together the activities that realise it. While the same can be said of any entrepreneurial activity, what we intend to bring out is that H3 is about the world view that prevails broadly in society and determines what sort of value systems will survive and thrive.

This distinction between H2 and H3 orientations to change can bring out different types of dynamics and ambiguities in the structure of change. In particular it becomes possible to see that many H2 possibilities lie in an ambiguous state between the first and third horizons. For example, returning to the IIS case, all major cities are facing increasing problems of traffic congestion and one solution is to introduce congestion charging as has been done in London. The London authorities are dealing with the emerging limits of their H1 system with an H2 innovation. However, with an eye on the longer term issues of carbon emissions and sustainability, electric zero-emission vehicles are exempt from the charge. This may seem straightforward until you think about the surrounding value system. Suppose that I use the exemption in order to switch from using public transport to driving into London, or perhaps to switch cars and live further away and drive in at the same cost. Neither of these changes in behaviour is desirable from the longer term perspective of shifting to sustainable patterns of behaviour. This can be seen as a failure to think through the H3 dynamics; the new technology is being captured by the H1 value system instead of creating a shift to H3 values.

Relating this back to scenario practice as discussed in the Introduction to this part of the book, we can see that H2 dynamics will tend to be dominated by 'hard' systems, that are amenable to rationalistic analysis because in a sense they are forces 'out there' that we are attempting to see and understand. In contrast, H3

dynamics are 'soft' and are to do with the stories we tell ourselves about the journey we are on, the meanings we are making, and the worlds we might want. So as scenarists we will look to intentional communities, science fiction, and fringe activities of all sorts to see the pockets of the future where new values are being put forward and experimented with. The evidence of the future in H3 is that someone sees the possibility and is promoting it.

The following diagram gives a visual representation of the three horizon framework.



This timescape approach was used in the very early stages of scenario building for the 50 year Intelligent Infrastructure project as a way to enable a diverse set of experts from different disciplines to share mainstream, innovative and 'off the wall' thoughts without the inhibition of having to compile it into a homogenous category of 'the future'. It enabled different orientations of mind to be legitimised in relation to each other, and gave the scenario-building team a head start in exploring the complex set of components to take into account in the scenario building. It also served as the basis of a Technology Forward Look that could break out of the usual restrictions on technology road maps. (Sharpe and Hodgson, 2006)

Conclusion

This chapter has explored the use of system concepts to help reach deeper insights in our scenarios of the future. We have put forward two key ideas. The first is that by searching for a 'dominant loop' in an imagined future it is possible to bring out and contrast the essential dynamics of our scenarios. The second is that, by considering the evolution of the future as three different orientations to the present, we can reach a richer understanding of the dynamics of change.

We believe that these tools can help the decision-maker to see when they are at what we call an 'entrepreneurial moment' – an opportunity to act with strategic intent because they understand the flow of events; they have reached a deep confidence in their own ability to act in a way that is in tune with the unfolding logic.

Such methods may appear at first sight to be rather technical. They are certainly founded on a great deal of research and intellectual effort by a wide variety of workers. The art or craft of application is to find the simple but profound forms that resonate rapidly with the tacit knowledge of both the scenario creators and the decision-making community that needs to anticipate the changes.

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