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Methodological Reflections on the Schooling for Tomorrow Toolbox: Matching Tools with Tasks – Initial thoughts on the theoretical insights arising from the SfT R&D process

By Riel Miller [♦]

Broad socio-economic changes are propelling the development of futures thinking. Schooling for Tomorrow (SfT) is part of this wave of innovation. Over the last few years, in close collaboration with colleagues at the OECD and with the “inner core” governments¹, the CERI SfT project has been developing new tools for policy makers to use in their work. This is a fairly traditional research and development (R&D) task. As is the experimental method that is being used to conduct this R&D. SfT is putting futures thinking to practical use in order to see how it works, where and in what ways it needs to be elaborated and to explore further innovations.

One of the primary aims of the SfT Forum in Toronto (June 6-8, 2004) is to report on why and how the experiments were conducted. A further goal is to begin to respond to the more theoretical questions: what is the generic nature of the tools and of the toolbox? Have the SfT experiments revealed general rules regarding the attributes and uses of the tools? How might the SfT tools be positioned with respect to other approaches to futures thinking? Does this exercise in “applied futures thinking” for schools reveal any principles that might be used by decision makers in other sectors, both public and private?

Some tentative theoretical insights based on the SfT experiments

At the outset SfT did not provide a general definition of “futures thinking” nor of the criteria used to define the “tools” (such as scenarios) that were intended to make up the “toolbox”. In part this reflected the lack of consensus in the field of future studies regarding these basic issues. And, in part the decision to avoid an explicit ex-ante theoretical framework reflected the view that the experimental nature of the project was an effective way to arrive at such insights. Now, based on SfT’s practical experiences, a few working definitions seem to be emerging. These are not meant to be definitive. The aim is to launch a discussion that should eventually provide greater clarity regarding what the tools and toolbox are and are not.

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¹ Ontario, Netherlands, New Zealand, United Kingdom and starting in 2004 Australia.

1. The general aim of “futures thinking” is to infuse temporality into decision making (in all appropriate areas, from the home and board room to the street and parliament).

There are many ways to achieve this goal and much depends on both the nature of the decision and of the decision maker.

In general, decisions fall into one of two categories – those that are made with an understanding, even if very vague, of the goal and those where the goal is unknown. The nature of the decisions relevant to SfT are of the latter sort. Indeed SfT is meant to be a way of improving the capacity to define goals, which by definition means at least temporarily leaving the specification of future outcomes to be determined.

This choice has important implications for the kinds of futures thinking that are relevant to SfT. On the one hand, by making the definition of the goal its aim SfT excludes certain types of futures thinking, in particular: contingency or emergency planning (disaster or hostage taking is defined), predictive modeling (extrapolation of the present) and implementation planning (how to get from A to B when B has already been chosen as an objective). On the other hand futures thinking techniques that explore possibilities in new and imaginative ways come to the forefront. In particular scenario building with the aim of constructing stories about the future play a central role in getting people to reassess existing goals and invent new ones.

In the terminology of future studies SfT is about “futuresight” not “foresight”. The aim is to explore the possible rather than plan the predictable. Imagination is central and hence the emphasis is on techniques that spark people’s imaginations.

2. The main tool for exploring the possible is the scenario – a story that provides a coherent narrative about the future.

3. Different types of scenarios are the product of distinct processes and generally serve different ends.

See the scenario matrix in Annex 1.

4. Rigorous imagining of possible futures requires rigorous methods.

Distinguishing the possible and probable is one method for pushing the imaginable beyond what is considered likely. (See chart in Annex 1)

5. SfT’s future thinking tools have an immediate impact on decision making because they call into question people’s perceptions of the choices they face in the here and now.

Scenarios have an impact because what is considered doable is shaped by what is imaginable. For instance, when thinking about change across long periods of time it is important to try to include the changes in capacities and expectations that drive and are driven by change. Thus, what was conceivable (what we can imagine as being possible) when schools first became compulsory and what is conceivable in 2020 could be very different. More prosaically, what is deemed “realistic change” changes.

This is important because it sets the parameters around the field of choice. Zygmunt Bauman discusses the impact of what is considered given or the range of what is possible as follows:

“The assumption of the ‘givenness’ of the boundary is, however, itself a major, perhaps the decisive factor which makes the ‘conditions’ what they are: a no-choice matter. ‘Conditions’ limit people’s choices by exempting themselves from the ends-and-means game of life actions on the ground of their declared and accepted immunity from human choices. As W.I. Thomas put it – something that people assume to be true tends to become true as a consequence (more precisely, as a cumulative consequence of their actions). When people say that ‘there is no alternative to X’, X moves from the territory of action to that of action’s conditions.”²

By definition what has not yet been imagined as possible, meaning a situation that is excluded because it is deemed not to be ‘realistic’, is a crucial part of defining what is given and hence what is not actionable. For policy makers, the people trying to decide how to get from the situation we are in today to the situation we want to be in tomorrow, this boundary is fundamental. In large part it is a boundary viewed as outside the reach of policy makers. This is why so many changes are consigned to the heap of unachievable dreams or punted-off to the vain hope that one day a hero or charismatic leader will arrive who is capable of changing “people’s mindsets”. Usually what this means is changing the ‘common sense’ notions of what is given, what is possible.

² Bauman, Zygmunt, *The Individualized Society*, Polity, 2001, p. 7.

Annex 1 Towards matching scenarios and tasks

Scenarios are usually composite stories constructed through discussion - which means that the stories emerge from fairly specific contexts - like people who participate in international meetings of officials of education ministries or head teachers in the UK. Constructing good scenarios – meaning ones that can be effective for the selected task and for the target audience(s) – requires a careful and recursive process that balances the provocation needed to stimulate the imagination with the comfort level necessary for someone to actually tell their story out loud (not always that easy).

The process is recursive because it usually requires many tellings (different views and voices) to refine a story down to the point where it effectively communicates to its intended audience. Not that it is always feasible to anticipate exactly what will click with a specific audience, but it is important to take into account a few key aspects like: point-of-view (who is telling the story and at what level of abstraction/detachment e.g. 1st person verses 3rd), language (jargon, tech talk, etc.), and jolt factor (meaning what is their sense of continuity/discontinuity – how temporally aware are they as well as how and how far to push outside the comfort zone).

SfT has primarily worked with three types of stories: descriptive, preference and possibility. It is premature to slot the scenario types with tasks and/or audiences in anything but a preliminary way, but to get the ball rolling here are a few initial observations (see Table 1 and Diagram 1 below).

Descriptive scenarios are basically a mixture of extrapolated trends, often more in the past than the future. These trend based scenarios are most effective at initiating a discussion that situates the present. This is an exercise which helps to create a comparative framework that allows people to place themselves or their institution with respect to alternatives (either imaginative pastiches of different mixtures of trends or stylised versions of what it is like "elsewhere", say Scandinavia or the US or Japan). In this type of scenario process preferences are often left implicit and the actual stories are a bit muddy when it comes to the question: do I like this scenario.

Which is where preference based scenarios come in - as a way of clarifying what people want. Sometimes this turns into a rather utopian exercise, along the lines of everything is the best in the best of all possible worlds versus the opposite (this is regularly done by distinguishing a scenario where budgets are high and everyone is happy with services/life from a scenario where budgets are low and everyone is unhappy with much strife, etc.). There are other preference scenarios that tell a values versus trends story (such as, the trend towards the big bad market comes into conflict with the trend towards egalitarian solidarity - then you get three scenarios - what I call "the good, the bad and the ugly" – in the first solidarity triumphs, in the second the market triumphs, and in the third - the realistic one that everyone views as most likely – it is a toss-up muddling markets and solidarity in different measures and different ways depending on which country we're talking about). These preference scenarios are helpful for making values more explicit and evoking a sense of shared vision as people mix descriptive trends and preferences to create what I call composite scenarios.

To recapitulate: Descriptive scenarios are useful for getting people to see that they work/live in history and to locate (triangulate) where they are at this particular point in time. Preference scenarios are useful for getting people to see that they share certain hopes, likes, dislikes and that these are related to where they are in time (history). Both of these exercises are generally empowering - giving people a sense of perspective and reminding them of the potential for change (moving beyond current conflicts, zero-sum games, going over or around the wall instead of through it, etc.). As empowerment techniques these processes are useful for pumping leaders up and for manifesting leadership. But both suffer from two major drawbacks that limit the utility of the stories.

1) The first problem is one of narrowness or lack of imagination. This is obviously not an absolute condition in the sense that trends and preferences can be taken fairly "far out", becoming highly imaginative. However both conceptually and in terms of the process these types of stories usually remain circumscribed by rather first blush perceptions of what are "THE trends". This is often compounded by a terrible temptation to fall prey to what I call the "hubris of the now" syndrome – which runs along the following lines: "I am alive now so it seems to me that everything is more difficult (or easier), faster (or slower), bigger (or smaller) than it was back in the old days." This view is not at all constructive because it fails to put trends in historic perspective.

Trend based scenarios also narrow down the range of possibilities when the trends are not examined in terms of theories of change and hypotheses regarding causality but rather on the basis of available data (numbers don't lie, if you can count it it must be true). Which is why so many scenarios start with projections of demographics, economic growth, etc. No doubt the psychic certainty of numbers is reassuring, but too often this turns into the old story of the person who searches under the streetlight for the keys they lost in the park because it is night and the park is dark while under the streetlight it is bright and searching is easier. There are other, more technical (econometric/statistical) issues related to why trend based models restrict what can be imagined about the long-run future, but I'll leave that for now. At the moment I just want to touch on two other reasons why I think that trend/preference scenarios tend to lack imagination.

a) First starting with given trends and preferences rooted in the past/present it becomes harder to take into account the compound, multi-dimensional nature of change. In technical terms this is because the world is non-ergodic, or using other terms, change alters what is possible – meaning, a literate population can do things that were very difficult to imagine when the population was illiterate. Put another way, although it seems blindingly obvious, the options open to a child are not the same as those of an adult – over time not only what a person can do (capacity), but what they want to do (can imagine/desire) changes. So when it comes to thinking about the long-run future it seems fair to argue that our preferences could change and that the current configuration of apparently obvious determining trends, that are widely expected to give rise to equally evident options (e.g. social versus market), might not even be the trends that matter.

b) The second source of an "imagination deficit" when using trend and preference scenarios arises from the failure to apply systematic methods to discovering/imagining possible futures. Being imaginative is not always easy and

there a few tried and true techniques for being creative. More often than not the challenge of being imaginative falls foul of the views: i) why bother we've already got our expectations it is just a question of drawing them out, and ii) as per point (a) just above, even if an effort is made to "push the envelope" it remains anchored to a starting point based on current evaluations of probability and/or expressions of desirability. So, for the most part, the question of how to push our imaginations rigorously is not addressed, although from time to time there are mechanistic forays that extrapolate trends or desires to usually obviously untenable extremes.

2) The second major limitation of most trend and preference based scenarios is a lack of analytical precision. This problem arises for a number of reasons.

First, because the trends and preferences are usually taken as fairly self-evident, even if considerable effort is made to quantify, categorise and mix the different elements of each story, the theoretical models of change (i.e. of causal inter-action) are often not well developed. (It is worth noting that econometric/statistical modelling can go to the other extreme – well specified theory that has very little to do with the functioning of the real world. But this too is another topic). Because the causal mechanisms are not well specified it becomes difficult to extract stories that are meaningful in terms of policy choices.

Second, without clear specification of variables and causal relations, and pushed by the richness of people's experiences of trends and preferences, the scenarios frequently become unwieldy due to too much detail, too many nuances, too many different stories. Mixing and matching different trends and preferences, often without any sense of calibration, or scale of differential impact, leads to dozens of different stories. With a multitude of ambiguously different scenarios it becomes difficult to extract analytical or policy conclusions, or even to conduct a clear discussion of options.

Third, most trend and preference scenarios are not constructed with criteria for choosing a particular set of stories. Lacking developed theories of change and charged with an overabundance of descriptive detail, it becomes quite difficult not only to extract analytically distinguishable stories but more crucially from a policy perspective to justify any particular selection of stories from amongst the vast possible range. Ex-post, i.e. once the stories have been developed, policy makers can try to discern where the policy levers might be and how policy choices might make a difference, but then they ask – legitimately so – what makes one scenario more relevant for policy planning than another? Why spend time thinking about the policy dimensions of a scenario versus the other policy development techniques like problem solving or comparative analysis.

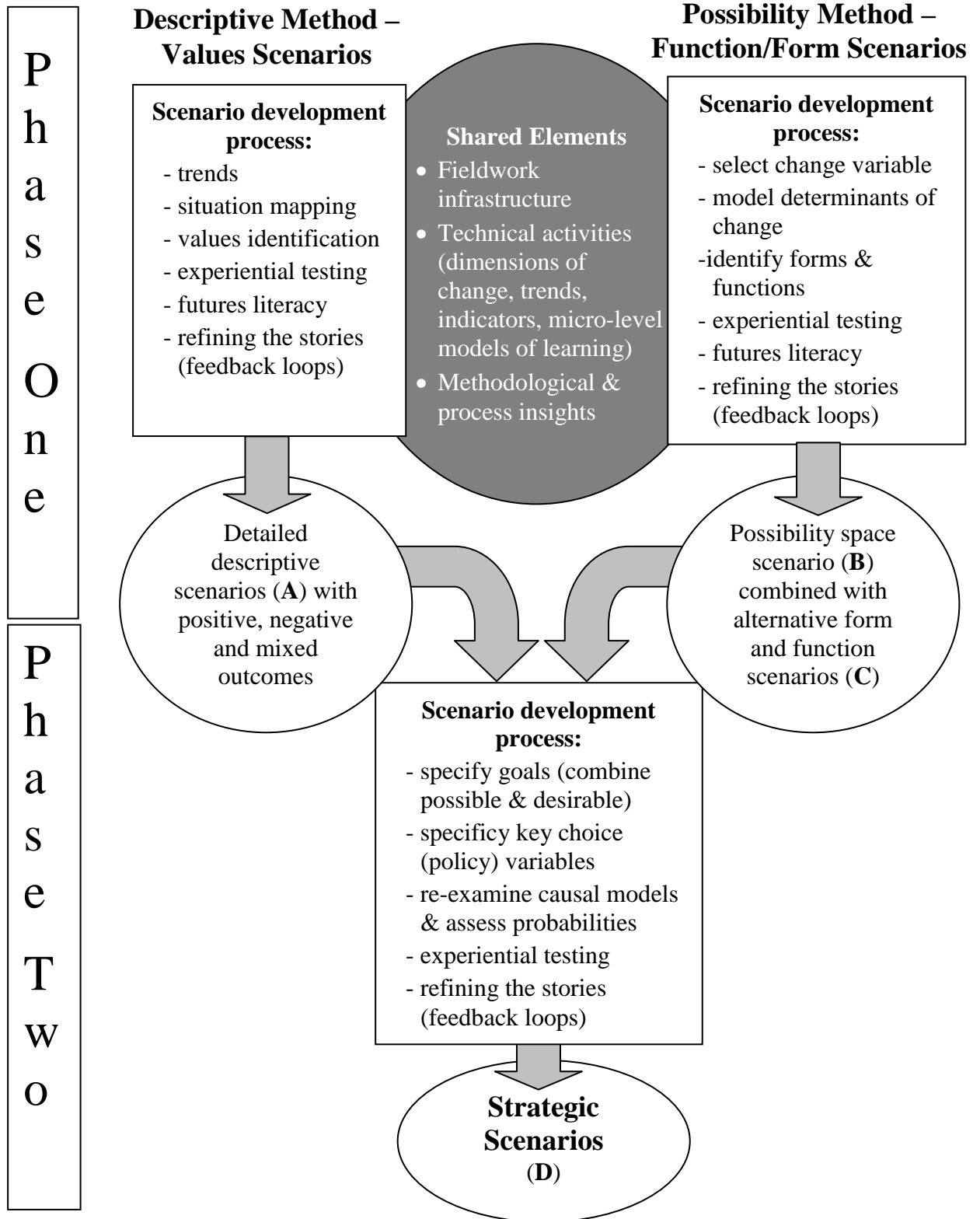
In other words from the perspective of policy making it becomes difficult to justify using scenarios because of a lack of analytical handholds. Traditionally policy makers have justified using scenarios because it was a form of prediction. The results of sophisticated models offer a high, or at least calibrated probability that the story generated by the model will "come true". But this is not the kind of storytelling being addressed here in the context of how to think about long-run change. So, the question becomes, is there a way to develop scenarios that meet the following two criteria: they expand the range of imaginable possibilities and they improve analytical clarity of

thinking about the future? (For an initial answer see Annexes 2 and 3 on possibility space methods).

Table 1 – SfT Scenario Typology

Type of Scenario	Method	Process	Strengths	Weaknesses	Outcome
Type A Descriptive values based scenarios (explore expectations & values to encourage dialogue & build leadership)	Experiential - expectational	Trend & value analysis, facilitated testing with constituencies, refinement of dimensions & scenario indicators	Rich detail, distinct normative scenarios, accessible narratives, encourages zero-plus dialogue, clarifies current context, builds leadership	Does not use rigorous casual models, scenarios not equivalently desirable	Situating present and identifying values, encouraging temporal and choice awareness
Type B Possibility Space Scenarios (explore the possible, foster radical & rigorous imagination)	Causal models – construct possibility spaces	Model testing, delphi, focus group symposia, facilitated testing with constituencies	Rigorous imagination, variables tailored to task, strong model driven analytical base	Simplified, single value set, non-obvious outcomes, highly contingent, limited number of variables	Imagining a radically different future in an analytically clear fashion
Type C Form and Function Scenarios (explore alternative paths to similar outcome)	Disaggregate organisational forms & roles within a scenario (e.g. B)	Analysis of forms & functions, facilitated testing with constituencies	Highly policy driven, abstracts from current configuration of institutions & functions, very open	Disconnected from probability & desirability, arbitrary selection of form & function variables	Exposing alternative means to similar goal, allows reintroduction of values regarding means not ends
Type D Strategic Scenarios (making choices to change the odds – questioning current policy assumptions, finding cross-sector synergy)	Combine desirable (A) with possible (B) to explore how options (C) relate to strategic (probability altering) policy choices (D)	Construction of composite scenarios, sensitivity analysis, testing with constituencies	Sets a single multi-dimensional scenario for testing alternative paths to the same goal, hones in on strategic choice, value equivalent scenarios can be compared	Less descriptive (not as storylike), robustness depends on quality of prior steps, is not about the future nor planning so may seem unrelated to urgent business	Focuses decision making on the changes today that might lead to a different future, helps equip for spontaneity, responsibility & fuller use of information

Diagram 1
Different Types of Scenarios and the Production Processes



Annex 2

Where Schools Might Fit in a Future Learning Society

(extract from doc published in November 2003 by IARTV, Melbourne, Australia)

What is Futures Studies?

Compared to well established academic disciplines, like economics, FS lacks a coherent and widely accepted foundation. Most economists generally agree, after some two centuries of heated debate, that economics is the study of the allocation of scarce resources. Micro-economics, macro-economics, public-economics and all of the short-run, long-run, econometric and anecdotal analyses produced by economists tie back to the root question – how do we allocate scarce resources?

Of course economics was not born full grown. Nor at the outset was there much consensus regarding the fundamental analytical problem that connected all of the far-flung issues and theories that now fall under the rubric of economics. Adam Smith, arguably the founder of economics as a discipline, studied and taught moral philosophy and “belles lettres”. But over time, economics evolved into an academic discipline, driven by the development of markets and industry, the shift to generalized wage labor and the rise of highly complex and diversified systems for allocating resources. Economics grew as a field to address the analytical challenges posed by the increasing intricacy and ever growing variety of actually functioning markets.

In a similar fashion the emergence of Futures Studies is tied up with the growing complexity, diversity and freedom (or indeterminacy) that characterize today’s answers to what I am calling the root question: how might we reproduce daily life in the future?³ FS is being pulled, and to a certain extent helping to propel, an explosion in the plausible (although this does not mean either probable or desirable) permutations in the ways in which everyday life is reproduced. Or, looked at in terms of how we live daily life: the plot thickens because each morning when we wake up the question – what do I do now?⁴ – is becoming more open. It is this possibility, of a

³ Douglass C. North in an article concerning the question of what researchers have to say about the issue of sustainability begins by asking, “What are the limits to our understanding of the world around us?” He then goes on to say that gaining this understanding depends largely on addressing uncertainty and that there are three kinds of uncertainty: uncertainty due to insufficient information and knowledge; uncertainty due to the fact that the world is non-ergodic – i.e. is undergoing continuous change; and uncertainty arising from the lack of adequate theories of continuous change. On this last item he notes: “... to make our lives even more difficult, all the theory that we have in economics, at least all of the theory that is well developed, is *static* theory. Whether one looks to neoclassical price theory or its derivatives, it is all a static body of theory. However, all of the important issues with which we are interested here concern a dynamic world, one of continuous change.” And later he emphasises: “... we are stymied without a dynamic theory of change”. See: North, Douglass C., “Dealing with the non-ergodic world: Institutional economics, property rights and the global environment,” Duke Environmental Law and Policy Forum, Fall 1999, Vol. X, No. 1, pp 1-12. <http://www.law.duke.edu/shell/cite.pl?10+Duke+Envtl.+L.+&+Pol'y+F.+1>

⁴ Contrary to some perceptions that this question negates the collective or poses a growing opposition between the private and the public, just the opposite is suggested. As the individual poses the questions “what do I do” and “who am I” it increases the relevance of the collective. Humans are social creatures and given the way we have developed in terms of social organisation we are continuing to live inter-dependently – this inter-dependence is not going away and may, in a number of ways, be moving

future with greater freedom that calls for the development of more systematic and refined tools for thinking about the future.

What distinguishes FS from other disciplines is its pre-occupation with how we create the future everyday and on this basis to analyse the prospects for change – be it one day or a century from now. This approach to thinking about the future contrasts markedly with more traditional and familiar modes like mystical prophecy, grand ideologically inspired utopias and mechanistic predictive models. Not that horoscopes, messianic visions or efforts at building the perfect model will disappear. The yearning for predictive certainty responds to other needs. Those who are certain that human history will end with the coming of the messiah or decide what clothes to wear because Jupiter is aligned with Mars are certainly thinking about the future. But they are seeking the opposite of what Future Studies is about.

Most of FS, I will come to the exception in a minute, focuses on exposing how the future cannot be predicted because it is contingent on choices we make starting now. The aim of FS is to evoke a much wider and deeper set of possible futures, in this sense entirely unlike the predictive traditions that depend very heavily on either almost complete continuity or entirely exogenous events like an apocalypse. To use a term that a few Nobel Laureate economists like to bandy about, FS embraces the non-ergodic while the predictive traditions rely very heavily on the world being ergodic or predictably constant.⁵

There is one part of Future Studies that is interested in short-term predication, usually based on the use of empirical models. These studies look at situations where the inertia of the immediate past can be reasonably expected to restrict the degree of possible change. Thus there is a limited capacity to predict with accuracy what might happen in a few days or months. However, futurists are interested in these efforts for different reasons than the specialists who produce them such as economists who try to forecast economic growth or stock trends, meteorologists who are concerned with tomorrow's weather or political scientists who talk to journalists about the probable outcome of an upcoming election.

For futurists short-run predictive models are important because they provide insights into the specific variables (forces) that reproduce daily life – or that slice of daily life that the forecaster is interested in. Done properly a forecast offers a better understanding of the causal factors that change daily life, of the way the different variables interact and crucially to what extent (how far) the past is a good basis for looking into the future. But then, when forecasting bumps into the limits of its

towards greater complexity. The reproduction of everyday life is simultaneously individual and collective. Although the increasing number of options that seem to be available or “aspirable” certainly calls into question the old, rigid reproduction of daily life based on the imposition of order, rules, indoctrination by the central or hierarchical authority. In this sense the public, as imposer of set patterns of reproduction, does appear to be declining.

⁵ To use a term from economics, FS embraces the non-ergodic while the predictive traditions rely very heavily on the world being ergodic or predictably constant. Also note that this has powerful implications for methodology and the viability of “controlled experiments” where the results of one researchers experiment can be repeated by another for verification. In a non-ergodic world the underlying conditions are expected to change in such a way that there is no basis for repeating the same experiment. See: North, op. cit..

effective range, which in most cases is measured in days or months not years, it provides a clear signal that efforts at prediction must give way to an exploration of what might be possible, before jumping into assessments of what and why particular outcomes are more or less probable.

Thus the distinctiveness of Future Studies, where it adds value when compared to other social science disciplines like economics or sociology, is in providing a rigorous approach to the plausibility of different configurations for the reproduction of daily life in the future.⁶ This is a task which bears many similarities to those of the historian who seeks to understand the key factors that altered (or not) daily life in the past, be it the decisions of kings, the outcome of wars or the composition of peasant meals.⁷ Neither the historian nor the futurist have direct access to the reality they are analyzing. Both futurists and historians seek clues in the present and the past in order to substantiate their analyses of why and how life did or might unfold. All analysts of how daily life is reproduced, past, present and future, must use methods and theories that can take into account multiple layers of complex interaction and causality.⁸

Like the academic discipline of History, FS is a polyvalent and neutral “social science” – not in the sense of pretending that an analysis can be value free or entirely objective, but in the sense that it is a collection of methods, theories and findings that provides an analytical tool for people that hold different beliefs and goals.⁹ There are,

⁶ Not all futurists share this view. However, it seems difficult to me for any discipline to claim a markedly superior capacity to determine probability and desirability. The former is profoundly multi-disciplinary and is more the outcome of team efforts. The latter is contingent on values – over which no one group has a particular monopoly. Where futurists can make a difference is in refining and advancing the analysis of the full-set of possibilities within in which the sub-sets of the probable and desirable can be found.

⁷ “Just as from the infinite ocean of facts ... the historian ... selects those which are significant for his purpose, so from the multiplicity of sequences of cause and effect he extracts those which are historically significant; and the standard of historical significance is his ability to fit them into his pattern of rational explanation and interpretation.” From: Carr, E. H., *History, ...* Quoted in Hawthorn, Geoffrey, *Plausible Worlds: Possibility and Understanding in history and the social sciences*, Cambridge University Press, 1991, p. 8.

⁸ “In history and the social sciences, possibilities increase under explanation for one or other, and usually both, of two reasons. The first is that in so far as our explanations impute what we call causes, the clearer it becomes how contingent most of these causes and their conditions are. ... (second) (m)any explanations in History and the social sciences ... turn not on causal connections between states of affairs that are beyond human control, but on the relevant agents’ own practical reasonings. Practical reasonings are not pre-determined by nature ... they are conditional, subjective hypotheticals, a matter of counterfactual judgement.” In Hawthorn, op. cit., pp 14-15.

⁹ A few good entry points into the field: Dator, Jim, *Advancing Futures*, Prager, 2002; Glenn, Jerome C. and Theodore C. Gordon, Eds. *Futures Research Methodology, V2*, United Nations University (www.acunu.org); Godet, Michel, *Manuel de Prospective Strategique*, Dunod, 2001; Keenan, Michael, Dan Abbott, Fabiana Scapolo, and Mario Zappacosta, *Mapping Foresight Competence in Europe: The Eurofore Pilot Project*, IPTS, June 2003; Ogilvy, James A., *Creating Better Futures: Scenario Planning as a Tool for a Better Tomorrow*, Oxford University Press, 2002; Ringland, Gill, *Scenarios in Public Policy*, John Wiley & Sons, 2002; Slaughter, Richard, *Integral Futures - A New Model For Futures Enquiry and Practice*; van der Heijden, Kees, *The Sixth Sense: Accelerating Organizational Learning with Scenarios*, John Wiley & Sons, 2002; also worth looking at are: Michael Marien’s “Future Survey” or journals like *Futuribles* edited by Huges de Jouvenel.

of course, some important contrasts. Indeed, the work of a futurist may be tested one day by the arrival of tomorrow, while the historian must be forever content with the traces of the past that are more or less buried under the weight of time that has elapsed. Historians can consult the historical record to show definitively that a treaty was signed while futurists must use their imaginations to map what might be the global agreement of tomorrow. But in the end, both are map makers – trying to extract and sketch the essential features that may explain how life was or will be lived.¹⁰

Five shared axioms are essential for both fields. First, whether looking to the past or the future, as the analysis moves farther away from the present uncertainty increases across a number of dimensions. Clearly the accuracy with which we can account for the reproduction of a particular aspect of daily life diminishes. In part because the quality of the raw data declines and in part because the number of potential sources or causes that might account for change (or stasis) are, in most circumstances, bound to grow. Time allows for the relaxing of constraints as adaptation, innovation and forgetfulness alter what may have seemed like the fixtures that assured (or destabilized) the sustainable reproduction of daily life. An example of this kind of shift is the transition from rural/agricultural life to an urban/industrial one. That said, duration does not, a priori, tell us anything about either the scale or pace of change. As we know from the past, there have been long periods when little in people's daily lives changed and other, relatively short-periods when almost everything was transformed.

Thus the second joint axiom is that when looking to the past or the future the scale and pace of change need to be evaluated in both absolute and relative terms. We all know that change from a very low base can be quite small in absolute terms but huge relative to the starting point. And vice versa when the starting point is already large, creating a big absolute change but small in relative terms. A good example of this is the projected population changes for India, which despite a rather rapid and unexpected drop in fertility, starts from a base of over 1 billion. As a result despite a slower growth rate India's total population in 2050 could be 500 million higher than in 2000 – overtaking China.¹¹ The same applies to speed. If you are already going 100 miles per hour in a car then the increase to 120 is significant in absolute terms but small relative to the initial acceleration to 100.

¹⁰ Unfortunately for the historian the existence of artifacts and historical records does not offer any definitive theory of why or how these traces of the past got there or fit together in a particular way. The historical record can, however, be effective at limiting the number of reasonable hypotheses (see Axiom 4). But the same is true for the future, which is limited in a variety of ways by the past. That said, in many cases the sources for limiting the degrees of freedom will differ. In many cases historians can track detailed records far into the past with considerable reliability. While futurists are more preoccupied with the seeds of tomorrow scattered in the overwhelming detail of the present. However, the challenge of developing convincing analyses of how daily life was or will be reproduced remains the same.

¹¹ The United Nations Estimates World Population Prospects 1950-2050 (The 2002 Revision), February 2003, shows that in the medium variant India's rate of population growth falls from an average of around 2% in the latter half of the 20th Century to under 1% on average for the first half of the 21st Century. However the total growth is close to 500 million.

A third common axiom, that is often more difficult to keep in mind despite its importance, is that over time (backwards or forwards) many of the metrics and benchmarks we use to assess change also change. An obvious illustration is, once again in the realm of transportation. Not so long ago the metric for speed was not miles or kilometers per hour but the speed of a horse measured in furlongs – 1/8 of a mile. When it comes to benchmarks, the old Model T Ford was considered dangerous at over 45 mph. Today most cars are safe at much higher speeds. Judging speed today using the metrics and benchmarks of the equestrian or Model T eras obviously makes no sense.

Fourth, and even trickier to detect and apply to an analysis of societal change in the past or future, are the more subjective, capacity related shifts. The relevance and calibration of different measures and perceptions of events in daily life are shaped by a whole range of factors like the degree of literacy, the extent to which values are shared within the community and the ease of access to information. But even if we are aware of these factors it is still difficult to make comparisons over time. For instance, does the widespread fear of nuclear war in the 1960s offer a point of comparison for people's fear of genetically modified organisms in the first decade of the 21st century?

There is a fifth, crucial axiom that makes it practical to bring the abstract potential for infinite variation down to a manageable range. In order to reduce the “degrees of freedom” in interpreting the past or imagining the future we turn to the facts and reasonable assumptions that restrict what is possible. First an assumption has to be made about the first axiom regarding uncertainty. It is possible that the premise from the film *The Matrix* is true. Meaning that we are all living in a simulated reality projected by a computer. I think most historians can safely ignore this possibility as they go about their work of analyzing the past. Similarly it is true that aliens could land on Earth tomorrow or we could be hit by an extinction scale meteor and all efforts to imagine future possibilities would be rendered moot and null. Futurists, particularly those interested in policy issues, do not need to devote too much attention to this kind of uncertainty since even though such exogenous events might happen, at this point there is nothing much to say about the day after.

As for axioms two, three and four, absolute, relative and qualitative change are all constrained, often in different ways, but nevertheless limited by key attributes of the physical, social and intellectual world. For instance the average height and life-span of the human population may change, even rapidly, but within fairly important limits. You do not expect the average to be under a meter one hundred years ago nor three meters twenty years from now. Similarly in the realm of social organization, be it economic, political or sociological, we assume (sometimes in culturally myopic or “hubris of the now” ways) that the range of options is relatively limited. Looking at societal change over the next 30 years it is probable that politics will be bounded on the range from despotism to democracy, economics from plan to market and social identity from undifferentiated to differentiated, with the long-run trend in all fields towards the latter ends of the spectrum. Without being entirely ergodic, the strand of time that most historians and futurists usually consider exhibits a degree of continuity that makes meaningful analysis possible.

However, the proposition that the “degrees of freedom” of possible changes are within a manageable range for the purposes of in-depth analysis does not resolve in

any way which particular methods or theories historians or futurists should use for such an analysis. Here the choices remain very wide, with historians and futurists mostly going their separate ways. Futurists do not spend much time on archaeological research, much as historians are not particularly interested in scenario building. But all researchers must, when it comes time to undertake a specific research project, make choices regarding the methods and theories they will use.

Futurists have a well established tool kit for developing scenarios, examining trends and polling expert opinion.¹² The products of these analyses are used for a variety of purposes from simply adding to the stock of knowledge to helping make action oriented strategic decisions. However, as is to be expected in a field that is still young and evolving rapidly, innovations and debates about basic methods and goals still reign. The next section offers an example of one technique for thinking about options in the future or, to put it slightly differently, developing “possibility maps”.

Annex 3

Future of the Tertiary Sector

(extract from the document produced for the Tokyo seminar Dec. 2003)

Part 1 – Thinking about the future

People think about the future all the time. In the morning when they wake-up and start planning the day ahead. At the dinner table when they discuss where to go on vacation or which university the children should attend or what will happen to the stock market. Most of these reflections are short-term, a few hours, days or months. Such conversations naturally mix together what people hope for with a wide range of expectations – from the probable to the improbable. Degrees of probability are handled more carefully by professional forecasters trying to predict tomorrow’s weather or next year’s economic growth. Professionals tend to focus on getting to the highest probability prediction that available data and models can provide. They generally steer away from considering the broader, less predictive question of what might be possible as well as the more normative question of what is desirable.

But the search for greater predictive accuracy involves certain trade-offs. On the one hand there is a risk of adopting forecasting methods and models that depend too heavily on what happened in the past. Yesterday’s parameters may do a good job at tracking past events but experience shows that this approach consistently misses major inflection points and transformative changes. On the other hand a preoccupation with what is likely to happen tends to obscure things that may be unlikely but still possible and potentially more desirable. At best the safety of extrapolation ignores what is not predictable; at worst it lulls us into a false sense of having exhausted the available options. Thereby narrowing the set of available choices. This, in turn, can impair strategic decision making because it limits the capacity to imagine non-predictable avenues for reaching desirable futures.

¹² For instance: Godet, Michel, *Manuel de Prospective Strategique*, Dunod, 2001; Ogilvy, James A., *Creating Better Futures: Scenario Planning as a Tool for a Better Tomorrow*, Oxford University Press, 2002.

Scenarios

Scenarios or stories about distinct futures have the potential to overcome some of the pitfalls of predictive approaches.¹³ What scenarios lose in terms of calibrated probabilistic accuracy can be made up for by a greater openness to initially unlikely but nevertheless possible outcomes. This is why scenarios have often been used as a tool for strategic thinking.¹⁴ Scenarios are also well suited to helping decision-makers think about institutional change, particularly when qualitative variables make it difficult to use other methods for analysing the future. However, scenarios face a number of drawbacks, in particular how to imagine and then select a few distinctive and pertinent stories about the long-term future from among the thousands that are possible.

There are two familiar methods for solving the problem of how to choose scenarios. The first takes an initial starting point, for instance population or economic output, and then develops scenarios on the basis of a range of growth rates – low, medium and high. This method can be called the baby-bear, momma-bear and papa-bear approach (Bear for short). The second approach focuses more on preferences and implicit expectations in order to sketch scenarios that capture what people consider to be: the most desirable, the least desirable and the muddling through but most likely. This method can be dubbed the good, the bad and the ugly approach (GBU for short).

Both of these methods have the virtue of selecting stories that are readily accessible since the factors that determine the main characteristics of each scenario are usually quite familiar or easy to grasp. So, for instance, we are well acquainted with Bear scenarios for universities that are distinguished by differences in enrolment growth rates – low (baby-bear), medium (momma-bear) and high (papa-bear). Or GBU scenarios that are distinguished by the preferences of people whose values, for instance, lead them to consider the “good” scenario to be one where universities are exclusively citadels of a pure search for knowledge, the “bad” scenario to be one where universities are exclusively driven by the commercial imperatives of funders from the private sector, and a muddling through or “ugly” scenario, usually seen as the most likely, that combines both pure and commercial options.

Complicated scenarios mix and match a variety of trends (Bear) and preferences (GBU) to produce multiple and multifaceted stories about the future. Like scenarios that combine extrapolation of low, medium and high growth rates in both enrolment and technological change with a selection of specific values that privilege monastic or commercial traditions. This kind of approach easily generates a twelve scenario matrix as per below.

¹³ For good discussions of scenario methods, primarily from a private sector perspective see: Godet, Michel, *Creating Futures: Scenario Planning as a Strategic Management Tool*, Economica, 2001; Ogilvy, James A., *Creating Better Futures: Scenario Planning as a Tool for a Better Tomorrow*, Oxford University Press, 2002.

¹⁴ Strategic in the sense of choosing where to go. The strategic choices involve the selection of overarching, sometimes long-run, goals. And strategic choices are the ones that make a significant difference in the direction of travel, towards or away from strategic goals.

Matrix 1: Mixing Bear and GBU Scenarios

GBU:	Commercially driven		Knowledge quest driven	
Bear:	Low rate of technological change	High rate of technological change	Low rate of technological change	High rate of technological change
Low enrolment	<i>Scenario 1</i>	<i>Scenario 2</i>	<i>Scenario 3</i>	<i>Scenario 4</i>
Medium enrolment	<i>Scenario 5</i>	<i>Scenario 6</i>	<i>Scenario 7</i>	<i>Scenario 8</i>
High enrolment	<i>Scenario 9</i>	<i>Scenario 10</i>	<i>Scenario 11</i>	<i>Scenario 12</i>

Obviously more variables can be added such as Bear scenarios regarding rates of globalisation or GBU scenarios that reflect different preferences for elite versus mass universities, exclusionary versus inclusionary, etc. This approach multiplies the number of potential scenarios. It is also possible to merge scenarios by, for example, putting scenarios one and three above together to imagine a dual system that combines commercially and knowledge driven institutions all faced with low enrolment and low technological change.

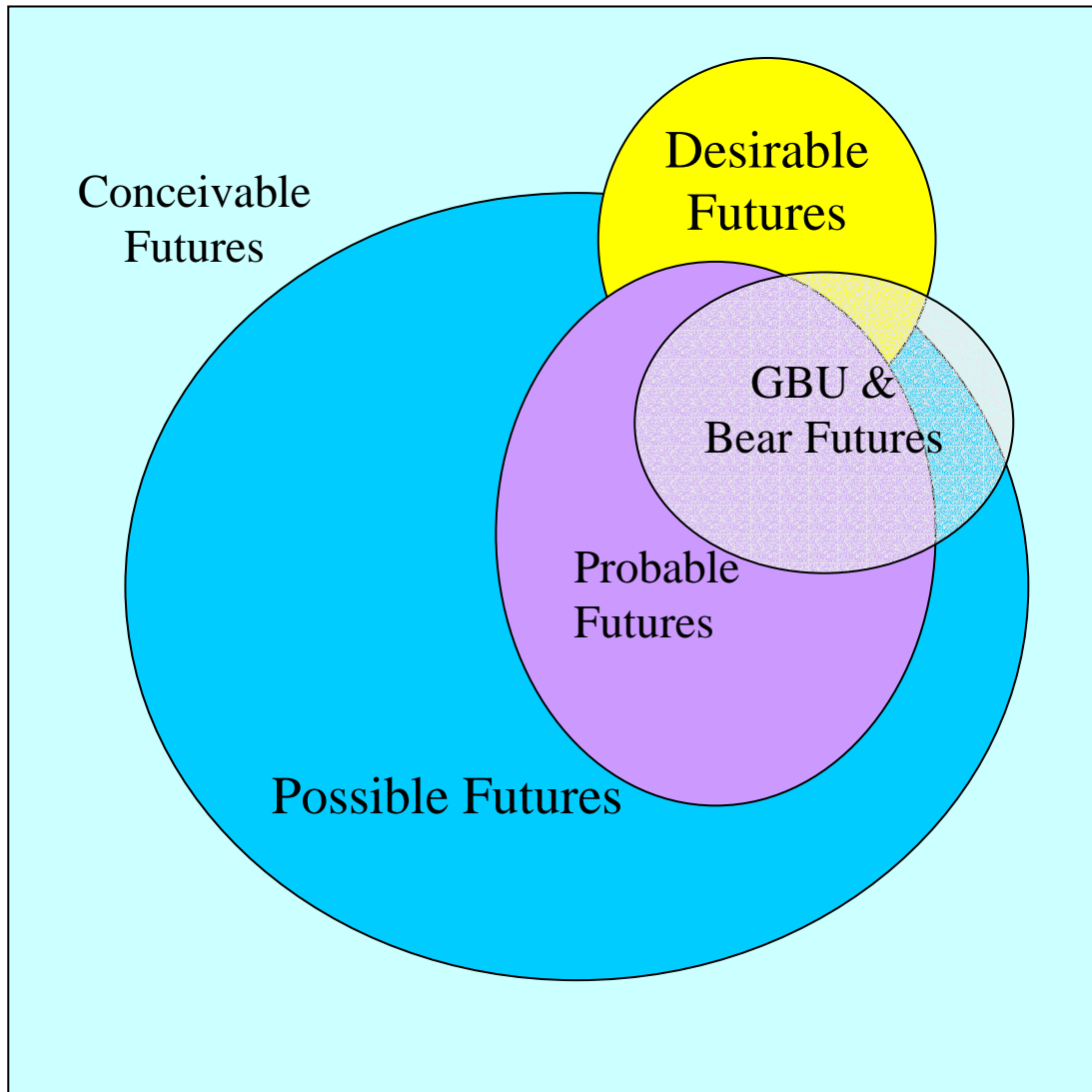
Taking either of the two familiar approaches – the Bear or GBU – to constructing scenarios has the crucial virtue of generating stories that are easily accessible and comprehensible. These scenarios are rooted in expectations and values that are usually considered self-evident. More complicated mix and match scenarios trade-off some ease of access in favour of a bigger menu of possible outcomes. However, even complicated scenarios are generally built up from the options provided by Bear and/or GBU methods. As a result the exploration of what is possible, as distinct from what is considered probable or desirable, usually remains incomplete.

Possibility Spaces

Partial coverage of the full set of possible futures is inevitable, we can not imagine every feasible outcome. Diagram 1 one illustrates this challenge. Obviously the largest set consists of what is possible. Within the set of possibilities are all probable futures and some of the desirable ones (since desirability is in the eye of the beholder this set contains both good and bad scenarios – depends on your point of view). There are certainly a few desirable futures that do not fall within the realm of the possible. As for GBU scenarios they stay within the set of desirable/undesirable possibilities. And Bear scenarios, being growth rate based extrapolations, although not necessarily linear, may wander across the possible, desirable and impossible.

The problem illustrated by Diagram 1 is that Bear and GBU scenarios do not necessarily cover the full range of pertinent possibilities. The question then is: are there methods that can improve our exploration of the strategically relevant range of possible futures?

Diagram 1 – Locating Bear and GBU Scenarios
in Terms of Possible, Probable and Desirable Futures

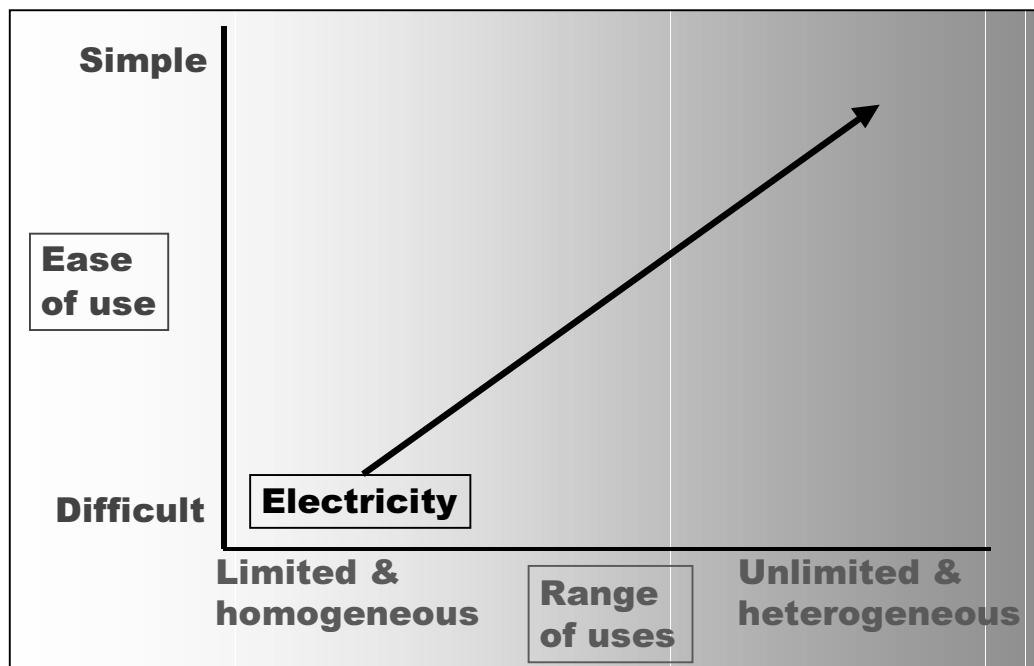


One way to begin to tackle the challenge of exploring possibilities more rigorously is to pose the problem independently of either the Bear or GBU methods. The “possibility space” approach elaborated below offers one way of generating a larger set of possible futures for consideration in scenario building. This is a three step method for building scenarios. The first step is to determine or define the key attribute (variable A) of the scenario’s subject. The second step is to sketch a space, perhaps multidimensional, using the primary determinants of change (a, b, c) in variable A. And the third step is to identify distinct scenarios within the possibility space.

Diagram 2 illustrates this approach with an example of technological possibilities – specifically the pervasiveness of electricity. The three steps for arriving at this possibility space are as follows:

Step 1. The subject of the scenario is technology pervasiveness (variable A) – which is defined in terms of how widely a particular technology is diffused. When a technology is first invented or commercialised it is possible that it will not be picked up at all. Alternatively it might become very widely diffused, entering all aspects of life – from the workplace to the home.

Diagram 2 – Possibility Space Illustration – Pervasiveness of Electricity¹⁵



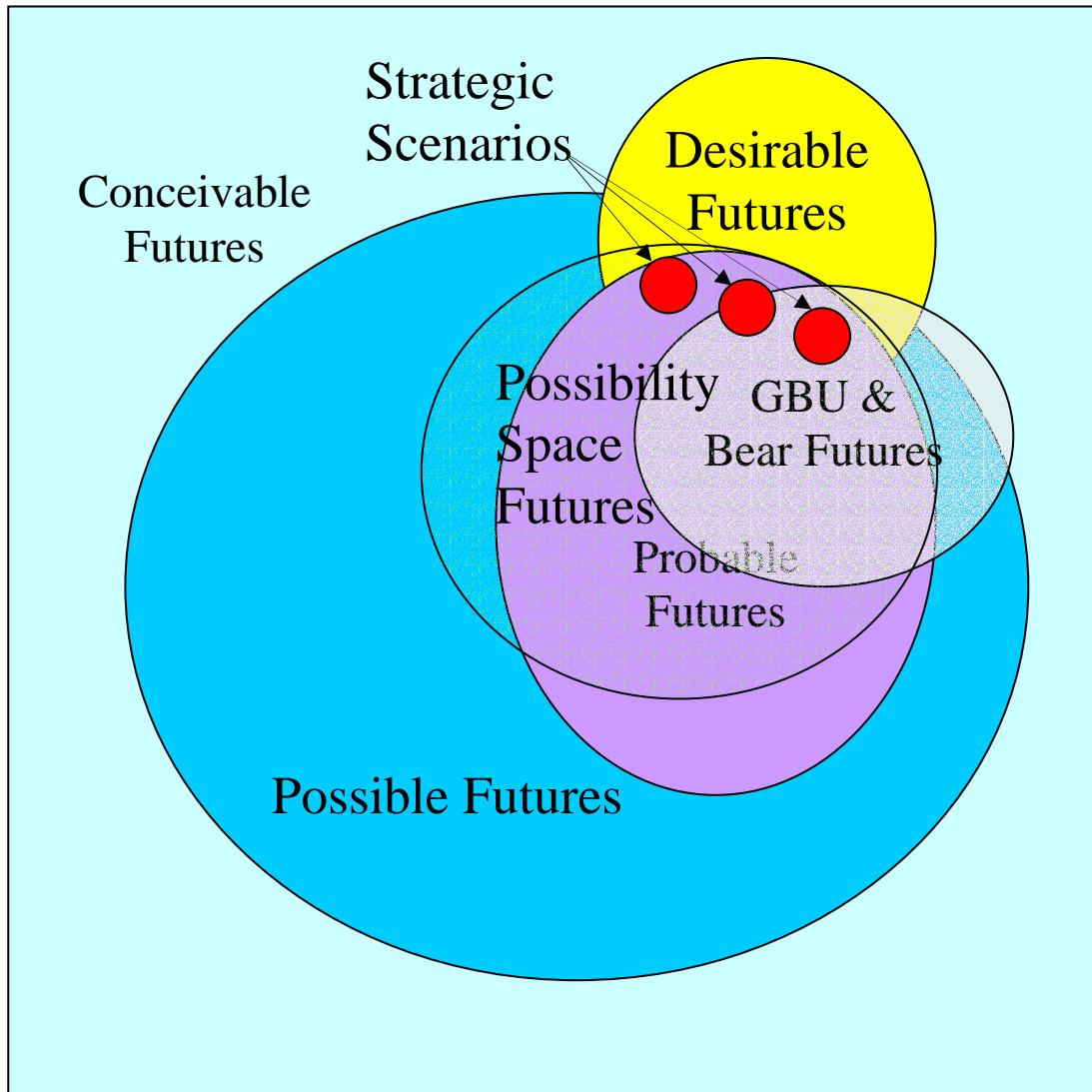
Step 2. Two of the key determinants of the extent of a technology’s pervasiveness are how easy it is to use (a) and how many uses to which it can be put (b). So, as Diagram 2 illustrates a technology like electricity, as it becomes easier to use and is applied to more and more different uses, moves from the lower left quadrant of the possibility space to the upper right.

Step 3. Different scenarios can be developed by considering different points in the possibility space. Of course we know what happened to electricity but we do not know what is going to happen to many more recent technological breakthroughs. Will information technology really succeed in becoming like electricity – so easy to use and ambient that we do not even know the name of the operating system anymore?

Many people think so, but that is not the point here. Rather the aim is to illustrate how this possibility space method opens up a wider set of possibilities for constructing scenarios. Diagram 3 tries to illustrate the relationships. The possibility space simply creates an alternative range of options from which to construct strategic scenarios. Once again, this is due to an approach that allows the possibility space to explore the future relatively independently of initial views regarding probability and desirability. However, crucially, the point is to then work from the wider set of possibilities to back towards futures which are deemed more likely and preferred. This is what accounts for the overlapping of the trend (Bear), preferred (GBU), possibility and strategic futures depicted in Diagram 3.

Diagram 3 – Strategic Scenarios and Possibility Space Futures

¹⁵ Miller, Riel and Bentley, Tom, Unique Creation, National College for School Leadership, 2003, p. 9.



The task is still imagining the future – projecting forward into time. What possibility spaces do is make it easier to be imaginative. It is one way of being systematic and explicit about the hypothetical “what if”. Model builders and forecasters also explore this type of question, only their efforts focus at prediction work within the constraints of what is practically quantifiable.¹⁶ Possibility space analysis applies much of the

¹⁶ The rules of good econometrics stipulate that a clear theoretical model should be developed before any empirical testing. But it is not the empirical testing that makes standard modeling less appropriate to thinking about possibilities. Rather it is simply that the objective is usually to find a model that provides a good “fit” with past data and on that basis offer probabilistic predictions about the future. Rarely is the aim to explore potential, particularly non-predictable or “non-ergodic” change. On the other hand the explicit goal here is not to forecast but to fill out the range of scenarios based on a more exhaustive analysis of what may be possible. Hence the lack of quantification rooted in past phenomena – at least initially – is a virtue. Particularly since using a quantifiable forecasting model to produce scenarios is really just a more complex Bear type approach – one where the parameters are tweaked in ways that mix baby-bear, momma-bear and papa-bear rates of change. Modeling can help analyse which variables matter and, once the possibilities have been rigorously explored, modeling can be an important tool for deepening the analysis of the factors that might influence rates and directions of change (for instance see the “radar chart” in Unique Creation, p. 21 which points the way towards quantifying a possibility space scenario for the learning society).

same methodology to the challenge of expanding the set of possibilities used in the development of scenarios. The next step, as Diagram 3 illustrates, is to use the stories that emerge from this more open ended tool to develop scenarios that reconnect with the probable and desirable. The strategic scenarios in Diagram 3 are entirely within the overlapping spaces carved out by what is deemed possible, probable and desirable. And, as is also evident from Diagram 3, roughly one and a half of the strategic scenarios cover the same territory as GBU and Bear scenarios, but one and a half do not. This is the value added of using a possibility space approach.

**Extracting Scenarios from Possibilities –
A Functionalist Approach**

Having enlarged the set of available possible futures for consideration when developing scenarios the next challenge is to select particular scenarios from the vast space of possibilities. The question is how? Of course there are still the Bear and GBU approaches that could be applied immediately to the broader set of possibilities. These extrapolation or preference based perspectives can be used to make a selection from within the larger possibility space, either by taking the starting point and rates of change as givens or by imposing a specific set of values for differentiating end-points.

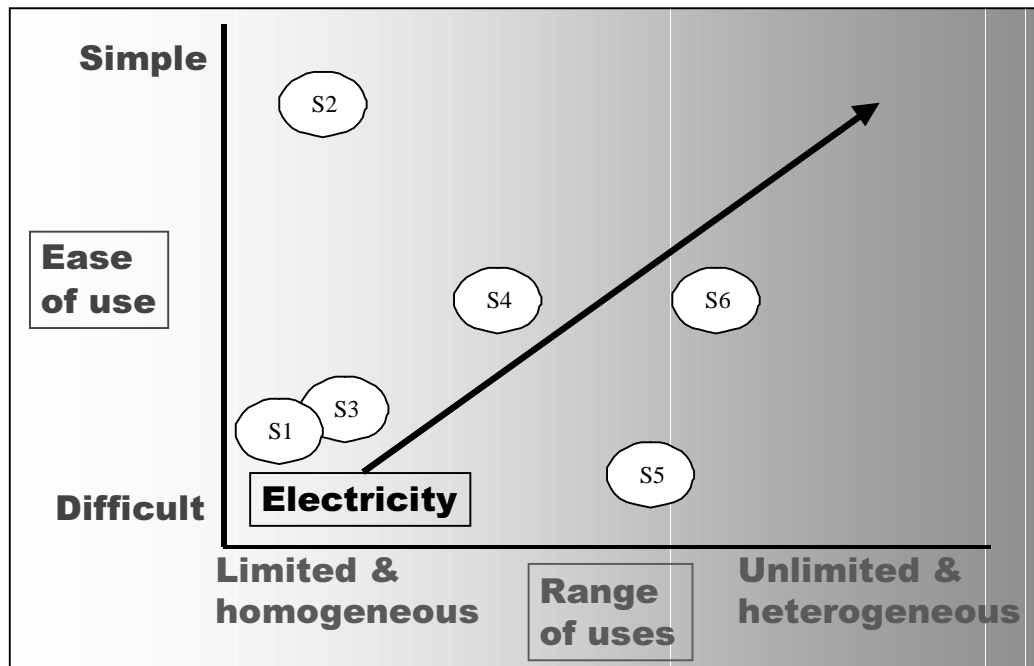
However, it may be worthwhile to put off for a little longer consideration of probabilities and preferences and continue for one more step with the neutrality of the possibility space methodology by focusing in an abstract manner on the functions and/or organisational attributes of the scenarios’ subject. For example, continuing with the case of electricity, imagine that it is a technology that has not yet traced its path across time. Now, for the sake of illustration, here are three hypothetical functions and two basic organisational patterns that can be used to develop scenarios. The three imaginary functions of electrical power are as: weapon – tool of war; local replacement for steam and water power in factories; and autonomous source of power for all kinds of consumer products. The two organisational attributes are centralised and decentralised generation of electrical power. This imaginary counter-factual “what-if” of the future of electricity generates six scenarios as per the following functional/organisational matrix:

Matrix 2: Example of Electricity Use Scenarios – Function and Organisation

	Organisation	
Function	Centralised Generation	Decentralised Generation
Weapon	Scenario 1	Scenario 2
Industrial Power	Scenario 3	Scenario 4
Consumer Power	Scenario 5	Scenario 6

Diagram 4 shows how the six scenarios mapped onto the possibility space already sketched in Diagram 2. Taking this next step underscores the contingency or dependency of the scenario’s subject – the pervasiveness of electricity (variable A) – on changes in the underlying determinants of change (ease-of-use (a) and range of uses (b)). Specifying the location of a particular scenario within the possibility space is then determined by how that scenario relates to variables (a) and (b).

Diagram 4: Examples of Functional Technology Scenarios



Continuing with the pervasiveness of electricity as an illustration, Diagram 4 shows scenarios S2, S4 and S6 mapped higher on the scale of ease-of-use. On the perfunctory grounds that decentralised generation implies that technical barriers to use have been reduced. While scenarios S4, S5 and S6 are deemed to exhibit a wider range of uses. Again without developing a real case, because as a decentralised tool for industry (S4) and a general tool for consumers (S5, S6), electricity is bound to be used in many different ways. In S1, where electricity is held exclusively by the military as a specialised weapon dependent on the centralised generation of power there would be little need to develop ease-of-use, while the range of uses is very narrow. Hence S1 is in the lower left of the possibility space.

Of course we know that electricity did not follow any of these scenarios because it diffused across all three functions together and, despite the recent appearance of simpler and more efficient techniques for decentralised power generation, the ease-of-use problem was largely solved through centralised provision of electric current. Nor can any of these scenarios be considered strategic in the sense suggested by Diagram 3. No effort has been made to reconnect scenarios S1-S6 with probabilities and preferences in order to expose desired goals and likely means for getting to them. But the point here is not to develop counter-factual scenarios about a specific technology.