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Humanity 3000: a comparative analysis of methodological approaches to forecasting the long-term

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Abstract

Purpose – Based on a report to the non-profit organization, *The Foundation for the Future*, this article aims to review methodological approaches to forecasting the long-term future.

Design/methodology/approach – This is not an analysis of the particular content of the next 500 or 1,000 years but a comparative analysis of methodologies and epistemological approaches best utilized in long-range foresight work. It involves an analysis of multiple methods to understand long-range foresight; literature review; and critical theory.

Findings – Methodologies that forecast the long-term future are likely to be more rewarding – in terms of quality, insight, and validity – if they are eclectic and layered, go back in time as far as they go in the future, that contextualize critical factors and long-term projections through a nuanced reading of macrohistory, and focus on epistemic change, the ruptures that reorder how we know the world.

Research limitations/implications – The article provides frameworks to study the long-range future. It gives advice on how best to design research projects that are focused on the long-term. Limitations include: no quantitative studies were used and the approach while epistemologically sensitive remains bounded by Western frameworks of knowledge.

Practical implications – The article provides methodological and epistemological guidance as to the best methods for long range foresight. It overviews strengths and weaknesses of various approaches.

Originality/value – This is the only research project to analyze methodological aspects of 500-1,000 year forecasting. It includes conventional technocratic views of the future as well as Indic and feminist perspectives. It is among the few studies to link macrohistory and epistemic analysis to study the long-term.

Keywords *Macrohistory, Long-range foresight, Causal layered analysis, Post-structuralism, Sarkar's social cycle, Pitirim Sorokin's pendulum, Forward planning, Forecasting*

Paper type *Conceptual paper*

Introduction

Based on a report to the Foundation for the Future and their Humanity 3000 project, this article maps methodological and epistemological approaches to forecasting the long-term future.

Six methodological approaches are offered, with the strengths and weaknesses of each approach discussed. In addition, four approaches to foresight – ranging from long-range forecasting being impossible to the macrohistorical combined with epistemic analysis – are analyzed.

1. Methodological positions to long range forecasting/foresight

To better understand approaches to forecasting the long-term future we overview the main methodological positions articulating their weaknesses and strengths (Table I).

Table 1 Methodological approaches to forecasting the long-term future

<i>Methodological approach</i>	<i>Strength</i>	<i>Weakness</i>
1.1 Methodology as accurate	Empirical and based on experts and real scientific discoveries. Rigorous	Novelty is lost as the empirical is based on current understandings. Dominant paradigm is not challenged
1.2 Methodology as identifying critical factors	Focused approach on critical factors as estimated by leading thinkers	The future is discounted as emerging issues and weak signals are often left out of the discussion
1.3 Methodology qua post-structuralism	By questioning the epistemic context, different assumptions and alternatives can emerge. Biases are acknowledged	No resolution is possible since objectivity is continuously challenged
1.4 Methodology as eclectic	Using multiple approaches better explains normal and extreme variation	Relative efficacy in explaining variation is difficult to judge and different methods may be capturing dramatically different epistemic frames
1.5 Methodology as layered	Multiple approaches are acknowledged but layered as shallow and deep	Precision is lost even while insights are gained. Relative explanatory value of different levels is difficult if not problematic to judge
1.6 Methodology as history	Problematic nature of the future is better understood and greater insights are possible by understanding the deep past	The past is often a poor guide to the future

1.1 Methodology as accurate

In the first position, accuracy is best developed by understanding the current state of science and technology, and using this assessment to map future trajectories. Based on present reality, future possibilities can be explored. This is the empiricist perspective, wherein a good method is largely about the value neutrality of the observer. Worldview (personal, cultural or institutional) biases must be factored out as these inappropriately color our understanding of current reality and thus thicken the fog of the future. Current biases increase as we move to the long-term.

Most important are accurate statements of current achievements in science, their likely trajectories and then limited speculation on what these trajectories mean for the long-term future. The best example of this type of work is Michio Kaku's *Visions: How Science Will Revolutionize the Twenty-First Century and Beyond* (Kaku, 1998).

However, given that at question is the future, where there are no empirical facts, the future remains problematic to forecast even if the present is understood accurately. Uncertainties abound and trajectories can go in dramatically different directions. For example in a BBC news report evolutionary theorist Oliver Curry (BBC News, 2006) argues that given the class differences present today (access to high-tech medicine, access to new technologies, better health) we can easily see that within the very long-term two groups may emerge.

The descendants of the genetic upper class would be tall, slim, healthy, attractive, intelligent, and creative [...] [while the] underclass would have evolved into dim-witted, ugly [...] creatures. Moreover, our ability to be genetically choosy, sexual selection will lead to even more genetic inequality in 10,000 years.

Thus, based on the current data – access to medical and genetic technologies – humanity's genetic future could bifurcate. However, what Curry does not account for is that his forecast becomes a policy warning that could in itself lead to far more health equity.

Yet the strength of this approach is that extrapolations are based on real scientific discoveries as assessed by scientists and technologists and not by generalists or laypersons. Since foresight begins with a fact basis, there is less room for error or

meandering. Even though the future is uncertain, the fact basis of the present allows for more structured trajectories.

Writes Kaku: "Predictions about the future made by professional scientists tend to be based much more substantially on the realities of scientific knowledge than those made by social critics [as the former] shape and create it" (Kaku, 1998, p. 5). This does not mean, however, that disruptions are impossible. As Kaku confesses:

[...] there undoubtedly will be some astonishing surprises, twists of fate and embarrassing gaps ... but by focusing on the interrelations between the three great scientific revolutions [biomolecular, computer and quantum], and by consulting with the scientists who are actively bringing about this revolution and examining their discoveries, it is my hope that we can see the direction of science in the future with considerable insight and accuracy (Kaku, 1998, p. 6).

The weakness in this approach is that since the discourse created is framed in the paradigm of the time (the epistemic knowledge boundaries that constitute what is knowable and comprehensible), novel approaches could be lost. For example, Kaku argues that because of globalization and cultural intermingling, human evolution will now cease. While this certainly makes sense within current notions of Darwinian evolution, alternative perspectives as developed by David Loye (2004), Elisabet Sahtouris (2000), Fred Polak (1973), Rupert Sheldrake (1981) or P.R Sarkar (1988) (all to some extent focused on post-Darwinian positions where the image of the future or directed evolution co-exists with natural selection) offer us scientific avenues that may lead to new avenues of discovery. Moreover, by focusing on experts in one area, without interaction with experts in another, large packages of possible knowledge are not delved into. Other significant revolutions outside the current paradigm or outside the current trajectory that are based on nanotechnology, biomedical and artificial intelligence are lost sight of. Rigor thus has its price as the paradigm is not challenged.

1.2 Methodology as identifying current factors

Somewhat broader than the focus on science and technology is the "current factors" approach as this includes other drivers as well – climate change, demographic shifts and even cultural beliefs. The concern is not forecasting or visioning but an identification of the key issues necessary to bring about a rational discussion of the long-term future. This approach has been best developed by the Foundation for the Future and their Humanity 3000 project (Velamoor and Heydon, 2000; Velamoor, 2003). Among the issues they focus on include: climate change, future energy requirements, demographic shifts, water shortages, revolutions in genomics and human intelligence. These are derived by asking three crucial questions (Foundation for the Future, 2005):

1. what are the three most significant trends of the past decade;
2. what are the implications of these trends for the future of humanity, for the short and long-term; and
3. will humanity successfully manage these implications?

This approach is suspicious of other forecasting approaches since the long-term is too distant for either valid, accurate or precise forecasts (and especially not forecasts that fit all three criteria). More important is to identify the current drivers of change and through scientific change move humanity from survival to thrival, to manage change wisely.

The strength of this approach is that it avoids often fanciful and fruitless discussions as to what will happen (how can and do we know, how to judge, under which criteria) and focuses directly on what issues are most important to leading thinkers from a variety of fields, including Futures Studies. The weakness of this approach is that the future is discounted. By focusing on current issue and trends, weak signals and emerging issues – what Elina Hiltunen calls Future Signs (Hiltunen, 2011, 2008) – are left out of the discussion. Moreover, the hidden assumption that the present will proceed to an unproblematic future is not contested. The problem of the framing power of the current episteme – what counts as knowledge and how it is ordered – is unchallenged.

1.3 Methodology qua post-structuralism

Far more challenging is the post-structural approach. Methodology, in this approach, is considered to be complicit in creating the data; that is, reality is constituted by the lenses we use. This position does not argue that social reality is *maya* or ontological illusion (as per the classical Indian Vedic position) but that epistemology is complicit in ontology. This is the post-structural perspective. The ways we know the world are as important if not more so than the “nature” of the world itself.

The strength of this approach is that it forces a foundational examination of the methodology in use. The data delivered are understood to be partly constituted by the methodology used. Thus the future offered is seen with more suspicion than in the strict scientific empiricist perspective. A dialogue of epistemology and ontology can then ensue leading to clarity about fundamental assumptions. The future constructed can thus be based on different assumptions. Authentic probabilistic and alternative futures (with more variation than scenarios) can result.

The purpose of long-range forecasting is to bring out these hidden assumptions as to how the world is ordered. Perspectives on increasing population can be deconstructed, leading to an awareness of our views on people – for example, will increased reproduction by poorer classes (as children are their pension plans) lead a world where collective IQ is diminished? Or is the real issue underpopulation and the continuation of an economic system that is labor dependent? What informs our views on the futures of population becomes a critical question? Why have we selected population as a salient variable as well becomes considered leading to other nominations of how we categorize who we are (as communities, as Gaia, for example).

The post-structural approach seeks to examine the core assumptions we have as we engage in long-range foresight. The utility is in understanding our politics of knowledge, rather than in gaining valid information on the year 3000.

A potential weakness is that discussion will enter a virtual stasis with no resolution possible, since each “objective” position is contextualized by episteme or the particular knower. Intelligibility is not transparent as with the empirical but opaque, framed by language. No future or forecasting per se is objectively possible since one is always engaged in a process of deconstruction challenging the knowledge context of the forecast. Forecasts then tell us far less about the future that will or may happen but more about the person that is forecasting – their biases, their linguistic frames.

1.4 Eclectic methodology

While post-structuralism challenges the foundations of long-range foresight, one way forward is to engage in an eclectic mix of approaches: the empirical, interpretive and critical with accompanying methods such as Delphi, trend analysis, emerging issues analysis, scenarios and visioning. Multiple methods are used since each method can only capture a part of social reality. Through the use of multiple methods, forecasting and forecaster bias is to some extent factored out. A mix of approaches and methods better explains the variation.

Thus, we can begin with Kaku’s focus on expert opinions based on scientific fact. We can then move to current drivers – population, new digital technologies, globalization, and the contradictions between global problems and national/local borders, that is, the issue of global governance. From here we can interpret what these scientific facts and drivers mean to different groups of people. Through meanings, we expand our database, more perspectives become included. Research moves from collecting expert opinion to engaging in participatory action learning workshops with individuals who may or may not have expertise in the future. Finally we can challenge the core assumptions underneath the entire foresight exercise. For example, why focus on genomics instead of on meditation; why focus on an expanding population instead of the rights of women in the year 3000? We can also contest our notions of what is known and knowable from different civilizational perspectives, for example, the linear modernist view of life followed by death contrasted with the Buddhist and Hindu view of reincarnation.

The strength of eclecticism is that different perspectives are brought in and a higher quality forecast is possible. Current attempts at forecasting the future through crowdsourcing are an example of this. Writes, Director of DARPA (Defense Advanced Research Projects Agency), Regina Dugan – who has used peer to peer social networks in crowdsourcing science – “Innovation benefits when the number and diversity of people goes up” (Easton, 2012). Elina Hiltunen (2011) argues that crowdsourcing can be especially useful in collecting weak signals and future information since the wisdom of the crowd can be superior to that of the individual.

After expanding the meanings and perspectives used to forecast the long-range, we can then ask the critical post-structural questions: what is missing in the analysis, what is not being said? This can then serve to bring in emerging issues and outliers, to challenge the frames of reference, to ask questions differently – to disturb.

The weakness in this eclectic approach is determining the relative efficacy in explaining variation by each particular method. Moreover, it may be that different methods capture dramatically different dimensions of reality – that is, the variations explained are at different epistemic levels. Thus, a simple system may move to a more complex system – multiple drivers with multiple models of causation – or a more complicated unintelligible system.

1.5 Layered methodology

In this fifth approach, layering can potentially lead to the highest quality of foresight. Layers are important in that there are multiple dimensions to social reality operating at different epistemological levels. Some of these levels are shallow, and some are deep. Instead of focusing on truth or falsehood, shallowness and depth become the main descriptors. Perhaps the best example of this is the classical work by Oswald Spengler (Spengler, 1962; Galtung and Inayatullah, 1997). More recent is the Causal Layered Analysis theory and methodology (Inayatullah *et al.*, 1995; Inayatullah, 2004).

The main strength of the layered methodological approach is that qualitatively different levels of reality are addressed, and each level is considered significant to the task of foresight. For example, exploring the long term possibilities of quality and safety medicine, we can ask whether safety will come about through medical training for doctors? Or will quality and safety result from changes in the medical system (hospital redesign, the use of information and communication technologies to more accurately share information between doctors and pharmacists) and developments in neuro-genomics-nano technologies? Or will quality and safety be enhanced through a transformation of the Western medical model with the addition of complementary medicine, with its focus on patient, first. And: will changes in the long run be so dramatic that quality and safety are no longer appropriate categories – or are they foundational irrespective of advances in medical technology or a cultural shift to a more spiritual culture. Finally, moving to the deepest layered level, in the long term the most important change is the narrative switch from “the expert” as right to “patients taking charge of their health.” While many long-term forecasts of future medicine focus on new medical technologies, a layered approach brings in multiple perspectives (individual change, systemic change, worldview change and narrative change).

The weakness is in the precision of determining what data (meaning, worldview, myth) is at which layer or the relative explanatory contribution to each level and methodology.

1.6 Methodology as history

In this last perspective, the future itself cannot be accurately known, but we can gain insight into the future by understanding the past. Thus, instead of forecasting, it is more productive to, if we seek to understand the year 3000, return to the year 1000. By seeing the future and the present through the conditions of the year 1000, for example, we can better appreciate the problematic nature of understanding the very long-term. In the European context, exemplary is: Robert Lacey and Danny Danziger, *The Year 1000* (Lacey and Danziger, 1999). For example, the extent of gender equity in Europe today would have been unimaginable from the year 1000. Paradoxically, this strength is also a weakness as the past is often a poor guide to the future.

2. Approaches to the long-term future

While the previous section focused on methodologies and the long-term future, this section conducts a literature review of long-term foresight approaches, specifically focused on the year 3000. There are generally three current approaches to the long-term future – here focused on the 1000 year future – and a fourth emerging approach, the epistemic (Table II).

2.1 In the first approach, the year 3000 is unimaginable

Indeed, prediction is not only considered impossible but an arrogant mistake. One need only go back a 1,000 years to see that things turned out very differently than anticipated at the time. The economic rise of Europe was far less likely than that of China or India. The long-term future cannot be anticipated. Indeed, underlying this perspective is that the future itself cannot be known. The patterns discovered can be explained by researcher bias, and even using scenarios merely contours the unknown instead of illuminating the known.

2.2 In the second approach, the Year 3000 is generally predictable

One needs courage (as well as rigorous training) and an understanding that change has a long shadow, that traces of change follow patterns. Within this overall category of predictability (generally, certainly not precisely), there are three types of traces.

2.2.1 Trace 1: reality has not changed. Graham Molitor, the long-term forecaster par excellence, in his speech “millennial perspectives” essentially argues that there is nothing new under the sun, reality has not changed:

Taxes that plague us today, date back to 3000 BC. Codification of written laws that grow longer and more complex with each passing day. [This can be plotted back to 21000 BC]. Price regulation to 1300 BC. Illegal parking (chariots, carts) to 45 BC. Free food for the poor to 58 BC. Smoke abatement laws to 1273 AD. Air pollution controls to 1280 AD. Asbestos worker “lung sickness” to 79 AD. State control of education to 500 BC. Teacher licensing to 362 AD. Systematized civil service to 221 BC. Competitive written civil service exams to 200 BC. Divorce laws to 1800 BC. Prostitution controls to 1950 BC. Compensation for bodily injuries to 2100 BC (Molitor, 1998, p. 664).

Essentially, this means that there is a certain timelessness to that which is significant; these issues touch deeper structural (the role of government regulation *vis á vis* the individual) concerns. This does not mean that there has not been nor will be dramatic technological change, but that foundational issues remain the same. For example, communication is still about expression to self/other irrespective if done through language, type, digitally or as Molitor argues, ESP (from 2500-3000). Or, while the internet is different from traditional modes of communication, communication still remains defining.

Table II Epistemological approaches to the long-term future

<i>Epistemological approaches</i>	<i>Core assumptions</i>	<i>Patterns and their discovery</i>
2.1 The Year 3000 is not imaginable	Accuracy of forecasting is impossible	Patterns discovered can be explained by researcher bias
2.2 The Year 3000 can be forecasted because	Change has a long shadow, there are traces of change.	Patterns are discovered by astute observation, relevant data and an analysis of history
2.21 History leaves recognizable traces		
2.22 Historical data and readings give us evidence	These traces follow patterns: there is nothing new under the sun, going back to the Year 1000 and deep patterns of macrohistorical change	
2.23 Macrohistory and macrohistorians provide us with patterns		
2.3 The Year 3000 can be better understood through a map of epistemes	Insight can be gained from focusing on how we know, and the changing boundaries of knowledge	Patterns discovered are explained by understanding possible epistemic ruptures
2.4 The Year 3000 can be understood through merging epistemes with macrohistory	Insight can be gained from understanding the changing nature of knowledge boundaries and macrohistory	Patterns discovered are explained through epistemic shifts and macrohistory

A further example of the unchanging meaning of communication irrespective of the technology is offered by Morton Kaplan and Robert Selle in their article, "The emergence of a global society." In China in 1000 AD, write Kaplan and Selle (1998):

For the emperor to communicate effectively with government representatives in the empire's outlying areas, an elaborate web of roads, bridges and canals had been developed. An empire wide system of courier stations was set up, each with fresh horses and relay riders (Kaplan and Selle, 1998, p. 18).

2.2.2 Trace 2: historical readings. The second type of trace is focused on insight developed through a reading of history. Historical readings, by going back a 1,000 years, hope to give us insight into our present and the long-term future.

Write Morton Kaplan and Robert Selle:

If an educated person of any culture in the year 1000 had received a miraculous vision of the world in the year 2000, he might as well have said: You cannot get there from here. So much of what we take for granted would have been beyond his wildest imagination, let alone his comprehension (Kaplan and Selle, 1998, p. 13).

This does not mean looking back into the past has no utility. Precisely the opposite, as it gives us a context to appreciate the fantastic nature of human evolution, past and future.

Three issues are relevant here:

1. the future is unimaginable because of the compounded rate of change;
2. the categories which we use to make sense of the world will have changed so much that the future is incomprehensible; and
3. the categories are fine but the trajectory is incorrect.

As Kaplan and Selle write: "At the start of the millennium, there was nothing to suggest that Europe would play this role. It was backward in relation to Chinese and Arabic Culture, and its future was in no way preordained" (Kaplan and Selle, 1998, p. 18). And, "Based on the data, all bets would have been on China and India, or the Arabic Islamic world. While the life expectancy in England was in the 30s, many youths in China could expect to live until 60" (Kaplan and Selle, 1998, p. 18). A civil service, education, paper money, gun powder and numerous other inventions placed China ahead of other civilizations.

However, while this is true at the superficial level, at a macrohistorical level, we need not be surprised at the rise of Europe. For example, using Galtung's perspective of seeing the West as a civilization that undergoes expansion/contraction cycles (ego/alter-ego), then the year 1000 merely represented the contraction period (Galtung and Inayatullah, 1997). It was only natural that 500 years later, the rise of the West and capitalism would usher in a new era. Chinese civilization has been far more internal, and Indian, concerned primarily with the nature of the self. The battle then was between Islam and Christendom, with the Christian Crusades setting the tone for the millennium.

Thus, at one level, it was inconceivable at year 1000 that by the year 2000, the West would be in supreme ascendancy and others following. At another level, if one can uncover general keys to how and why civilizations rise and fall; expand and contract, then the long-term future is no longer impossible to forecast. Of course, precision is impossible, but general patterns and frameworks are possible.

2.2.3 Trace 3: macrohistory. The third type of trace is macro: that there are grand historical patterns. This approach uses data and insight to make claims that there are patterns to history. These patterns or grand waves can be used to rethink history but more so to chart the future, and to ultimately transform today.

A number of macrohistorians are critical here. To begin with, Indian historian P.R. Sarkar argues that history moves through four distinct patterns (Sarkar, 1967). These are based on our psycho-social sensibilities. The first is the worker, concerned with survival, dominated by the environment. The second is the warrior, concerned with dominating the environment, with expansion and conquest. The third is the intellectual, concerned with

using the intellect to dominate the environment. The third develops from the second and the second from the first. They are evolutionary developments in terms of types of people as well as phases of human history. The age of workers gives way to the age of warriors, which gives way to the age of intellectuals. Or simply put in European history, from the pre-civilization to the era of empires to the feudal era. However, as intellectuals do not excel at managing the economy, a fourth type develops, the merchant. They seek power through the other three classes. However, while they expand the economy, they exploit the other classes. This leads to a workers' revolt and the cycle starts again. Each particular era can take a few hundred years. Current human social evolution generally is in the last phase of the merchant era.

Thus for Sarkar, what is likely to emerge is a global workers' revolution (or evolution) followed by a centralized world government structure. This will likely last a few hundred years from which a new world intellectual order (a science and technology revolution or a cultural-spiritual revolution) will emerge. By the year 3000, we are likely to be where we are today, in the midst of the end of the merchant era. However, while cyclical, each era of course does not go back to the previous, there are changes in culture and in science and technology. What does remain the same is the overall framework, the episteme. Thus, merely using linear forecasts to consider the future would be simplistic. The type of science and technology, the type of exploration – and the level and duration of both – change during the episteme, depending on which psycho-social sensibility is on top. These are evolutionary structures and are difficult to change.

However, Sarkar does believe that the cycle can be speeded up dramatically through proper ethical global leadership, through individuals integrating these various archetypes (reclaiming worker/service, warrior/protector, intellectual/thought innovator and merchant/value creator). This done, the positives associated with each new era (capitalism first leading to innovation and new wealth but over time degenerating with ever higher inequities in wealth) can be accentuated and the negatives (for example in the intellectuals era, new theories of the universe leading to inner and outer understanding quickly degenerating into theories with no practical results). The cycle can become a progressive spiral.

Again, what is most important here is that trajectories do not go forever continued unabated; there are asymptotes, which then lead to bifurcation, to changes in what is possible. Thus, linear forecasts or assessing current critical factors will only accentuate the present. They are unable to point to system transformations. The nature and type of system transformations can be understood from the macrohistory in question (in this case Sarkar's). This differs from Molitor's (1998) in that while Molitor focuses on foundational issues; Sarkar sees these as changing, and yet, similar to Molitor, there is a cyclical return (perhaps not to taxation in the year 3000 Merchant Era but some other type of economic redistribution). As well insight from history is used to change the future.

Pitirim Sorokin is equally instructive when thinking of the long-term future. He bases his macrohistory on the simple question: what is the nature of reality? (Sorokin, 1957, p. 24). This is answered as:

- only the body/material world is real;
- only the mind/ideational world is real;
- both are real; and
- this question cannot be answered, as reality is unknowable.

The first response results in the sensate or materialistic civilization; the second in ideational civilization; the third in an integrated civilization; and the fourth response creates dissent but no collective culture is possible. Sorokin finds historical evidence for all three types of civilization. But what is most important is that no system can stay static, since as it expands, it ignores other aspects of what it means to be human. Thus, very real limits are reached and the pendulum shifts to another type of civilization.

As we are currently in the last days of the sensate civilization, we can well imagine the next 500 years being either an integrated civilization (technology driven not just on manipulating genes and computers but also on technologies of consciousness) focused on developing a global ethics. But this – and this is crucial – is not likely to remain either. The integrated mind-body/science-ethics civilization is likely to move as well to an extreme, most likely an ideational era (the intellectual's system – according to Sarkar). From this, perhaps early in the third millennium, there will be return to the sensate system.

Thus from Pitirim Sorokin, we understand that the current sensate era with its focus on materialistic technology and empirical science is only one-way to organize the world. We are likely to endure a pendulum shift to either an integrated society (mind and body are real) or an ideational (religious, mind is real) society. These shifts, while difficult to ascribe time to, could take 500 or so years. Thus, strangely enough, the year 3000 could look very much like the present in that we are likely to move to an integrated society. The main point with the Sorokin model is that the trajectory or critical factor model does not take into account potential pendulum shifts.

Any long-term approach needs to question who will be doing the future questioning. From feminist scholar Riane Eisler, the future is created through a gender dialectic, the contradictions between patriarchy and androgyny (Eisler, 1996). For her, the key feature of the year 3000 is likely to be gender partnership since she argues that history is phase like, moving from matriarchy to patriarchy and finally to a balanced civilization. Thus, gender cannot be factored out, as with traditional scientific perspectives. Rather, gender reveals and creates a new future; not only should forecasts of the future be gender based (that is, to say we need only holistic human forecasts, ignores real crucial differences that actually are useful in better understanding the future).

Finally, taking a cosmic approach to the future is the work of Nikolai Kardashev (1964). He develops his macrohistory and macrofutures from the Laws of Thermodynamics and utilization of energy. For him, there are only three energy possibilities:

1. planet;
2. star; and
3. galaxy.

Each energy system creates a different type of civilization. There are three types (1, 2 and 3) with Earth representing Type 0, a civilization attempting to make its way toward Type 1.

- A factor of ten billion separates each civilization, taking up to 200 years to achieve Type 1, 1000 for Type 2 (at three-to-five yearly growth rate) and 10,000 years to achieve Type 3.
- Type 1 Civilization has mastered all forms of terrestrial energy. It can modify planetary weather patterns. The energy needs are so grand that national, religious, sectarian struggles have disappeared or there has been planetary destruction.
- Type 2 Civilization has mastered stellar energy. The energy needs are so grand that they must use the sun to drive their machines (giant spheres, spaceships to channel solar energy to Earth). Growth is managed through the exploration and colonization of nearby star systems.
- Type 3 Civilization obtains energy by harnessing collections of star systems throughout the galaxy. They have already exhausted the energy of their own star. Nothing can destroy this civilization.

The relevance to the future is the dangers humanity currently faces. For Kardashev, the real danger is in moving from Type 0 to Type 1. The likely scenario is nuclear or ecological destruction. Most likely, our galaxy is strewn with failed civilizations.

The utility in this formulation is that it is logically derived from the laws of physics, it provides us with a clear trajectory, and there are clear choices to be made. Either humanity solves its social problems – nation-states, the great divide caused by capitalism, religious dogmas – and moves forward creating a planetary civilization, or it self-destructs.

The main point of Karadshev's approach is that the long-term future is created both by the foundational physical world and the social challenges humanity faces. How it resolves these challenges will define the future.

By giving us patterns to understand the future, trajectories and critical factors have context in our understandings.

2.3 Epistemic

While in the first approach, the long-term is unpredictable, and in the second, general parameters are possible because of historical traces, in this third approach, understanding the trajectory of the future is based on understanding the epistemic context; that is, the lenses in which the future is based, may differ from the present. Technology, social revolution, or the practices of a charismatic leader creates a new episteme that then shapes the nature of scientific and social enterprise. By recreating and reordering reality, the new episteme creates a new type of rationality. This then suggests that the long-term future is unimaginable since we cannot *a priori* know what the new episteme will be like. However, through an epistemologically sensitive macrohistory, one could forecast the future of epistemes. In this approach, relevant is not the nature of technology in the future or demographic shifts but knowledge epochs. They frame what constitutes technology or demography. For example, the European medieval era was dramatically different in terms of the questions asked and technologies used (religious based) from the modern (science based). In today's world, when we focus on medieval science the questions appear absurd. For example, in Pakistan in the late 1980s there was a scientific conference that developed a research agenda with questions such as: What is the distance of earth from heaven and hell; and can angels be used to power spacecraft to Mars (*Wall Street Journal*, 1988)? These appear absurd to the modern person, as the frame of reference dramatically differs.

2.4 Epistemic macrohistory

A fourth possible emergent approach combines epistemologically sensitive macrohistory with the trace theory of the future. This would mean combining the macrohistorical work of Sarkar, Sorokin, and Eisler, for example, with the trajectories in computing, life science, space exploration, as provided by Molitor, Kaku and others. This means patterns reaching asymptotes, leading to bifurcation, with then a whole new set of concerns (for example, moving from exploring outer space to civilization focused on inventing virtual worlds or spiritual worlds).

It would also mean speculation as to how epistemes might change given current scientific developments as well as non-scientific developments (that is, epistemes are not necessarily rational orderings of knowledge).

3. Conclusion and summary of key findings

The main methodological findings of this research are:

- values become increasingly important as we move from the short to the long-term;
- the long-term raises tensions between continuity and discontinuity;
- methodology exists in a policy action context;
- what one sees is based on where one stands;
- the nature of the future is based on how one sees the present, as desired or undesired;
- forecasts are linked to one's social biography and status;
- critical factors tend to fall into the dichotomies of growth versus distribution and extensive versus intensive;
- epistemes are outside of our knowing efforts;
- multi-methodological frameworks are required; and
- the most rewarding framework is likely to be a complex combination of eclectic, interactive, macrohistorical and epistemic.

3.1 Statements about the long term became more value based moving from the probable to the preferred

As statements about the future move from the short-term to the long-term futures, values play a far more important role in the forecast or analysis of the critical factors. This is more complex than the obvious statement that as we move to the distant past and distant future our data becomes murkier. That is, data is less available. What is relevant – and is the corollary of lack of data – is that the data available is far more open to interpretation. With no or little knowledge base for the long-term future developed, individual (explicit and implicit) values toward science, philosophy, religion play a far more important role.

Thus, as we move to the long-term future, the probable (or possible and plausible) tends to give way to the preferred.

However, insofar as those considering the long-term future use the language of science, that is, objectivity, these values are covered up. They are done so in a variety of ways.

- The future is so far away, nothing meaningful can be said.
- The future is so far away; all statements are best guesses.
- The future is so far away, we need to use as the basis of our forecasts leading edge or emerging technologies, theories of change, images of the future and marginal perspectives – generally seeds of change that are currently available or intelligible.

However, with no solid empirical or knowledge base to rely on, behind these statements is the issue of values or paradigms.

This does not mean that methodological inquiry into the future is impossible. Rather, methodological inquiry into the long-term future is best served by:

- Acknowledging the implicit or unconscious roles of values in considering the long-term future (probable scenarios, likely trajectories, and critical factors).
- Research or conferencing or seminars that focus first on the preferred future.

In this way, values are explicitly teased out. They are acknowledged. This done, a more scientific (that is, replicable by others, rigorous, logical and based on an explicit epistemological framework) view of the long-term future can emerge. Thus, we should not abandon research into the long term; rather, by acknowledging the role of values, paradoxically, research can become more scientific. The result can be a range of scenarios and factors that honestly and authentically are derived from a range of explicit value positions about the nature of inquiry and the totality of reality.

3.2 Continuity versus discontinuity

The second methodological issue that emerges is tension between continuity versus discontinuity. That is, are certain methodologies more prone to forecast novelty while others more prone to conclude, *plus ça change, plus c'est la même chose*. Thus for example Jib Fowles (1996) in "The future of the internet: forecasting by analogy," as well as Peter Hartcher (1999), "Internet is another 'boom and bust' speculative" argue that new technologies tend to follow old patterns such that a "time-traveling Victorian arriving in the late twentieth century would no doubt be unimpressed by the internet [...] they had one of their own (in the telegraph)" (Fowles, 1996, p. 9). In this sense, the year 3000 will not be any different at a depth level. There might be new technologies but as Hartcher argues, the human psyche will remain the same. For Fowles as well, patterns of invention, development, diffusion and then eventually normalcy form a possible pattern for the Internet. Might then genetic engineering, nano-technology, space travel and other inventions as well follow similar patterns?

There are two issues here. First, that forecasting the development of new technologies is possible. Second, the impacts of new technologies are in themselves not novel. Thus, for example, Graham Molitor can conclude that disjunctive theories of the future are merely

erroneous research. We can thus divide methodologies into those that engender novel forecasts and those that search for patterns, and thus, see the novel as the old.

However, such a division is not so simple. While we would expect quantitative forecasts to generally be the least sensitive toward foundational transformation, this is not necessarily the case. For example, quantitative forecasts of population generally show increasing population with a low-middle forecast of 9-10 billion in the next 50 years or so. High-end forecasts, such as those in the 1970s by Herman Kahn, veer closer to the 20 billion. However, while the main assumption of *ceteris paribus* is not at first blush challenged, what can result from such forecasts is not merely continued growth, but rather asymptotes leading to foundational transformation. For example, world population declining rapidly because of environmental crisis or a world returning to thirteenth century feudalism (thousands of nations with some minor regional groupings). Quantitative forecasts while starting off from a point of continuity can show dramatic discontinuities.

3.3 Policy and action context of the methodology

In this sense, of more importance is not so much the methodology but what one does with the methodology. That is, is one searching for discontinuities or continuities? If one chooses to take UN data which, for example, suggests that it would take another 900 or so years before there was gender equality globally, one could take this trend at face value or explore how lack of equality could lead to heightened movements to change this structural condition. One could take as well developments in genetics and create scenarios where gender is no longer given but human-made; from continuity to discontinuity.

Thus, again, not the forecast *per se* but what meanings are given to it and by what, and the possibilities one explores with the methodology. Thus: not the methodology *per se*, but how it is used, and the lenses one uses to explore the future. This relates to the next issue.

3.4 How and where one stands determines what one sees

The type of future one forecasts or the factors one chooses to analyze are foundationally determined by how one sees the shape of space-time-person. Historical methodologies that focus on epistemes – that knowledge and reality is influenced through the ideas of the time which define reality – focus on transformations in basic assumptions of reality, since reality is considered to be socially and politically constructed. Thus linear forecasts of the future, for example – that the most critical factors are successive waves of genetic, nano and space technology – are typical of a methodological framework that posits that foundational assumptions of the present will not change (except insofar as technology changes them).

Alternatively, a macrohistorical epistemic approach that seeks waves or cycles would forecast as probable futures the development of technologies based on levels or layers of consciousness. Thus an epistemic or macrohistorical approach would focus not on the technology *per se* but posit that we may be moving from a sensate era to an ideational or integrated era where body-mind and matter-consciousness is the basis for scientific and knowledge development. Thus, with a phase change in the nature of civilization, the questions asked, the technologies developed change. Thus, merely forecasting patterns in technological development without noting transformations in episteme is severely misleading since the entire way the human project is constructed can dramatically change.

Tony Judge refers to this when he writes that: “what is considered factual now will not necessarily be considered factual in the future. And the future [...] is liable to judge the levels of intelligence and stupidity within humanity quite differently from way in which facts are interpreted today” (e-mail, 29 August 2000, fff-h3000@bridgemeida.net).

Alternatively, there is the linear perspective. In this, science is progressive, moving closer to truth and ideational eras are part of the past and not the future. The present then is the fulfillment of history, with science and technology providing the vehicle for transformation.

Thus, a methodological approach in which space-time is seen as linear leads to one type of forecast. A methodological approach, which considers space-time as episteme based (and

thus possibly cyclical or pendulum based) yields an entirely different range of critical factors.

Finally, a perspective in which the person (in terms of values) is to be factored out leads to futures far more concerned with objective reality (again, issues of science and technology and institutional change), while one that presupposes that the person needs to be increasingly factored in leads to issues of ethics, personal transformation and evolutionary consciousness change as far more critical.

Again, the methodological point is that what one starts out with, one ends up. Said in other words: How and where one stands determines what and how one sees. However, even this point must be seen in cautionary terms. One methodological perspective is that this point is a problem and to be rooted out of good science; another is that this is a positive insight to be used and embedded in forecasts of the future.

The issue then, once again, is the methodological context. However, and this is crucial, a layered methodological approach could be inclusive of the continuity of forecasts as well as the discontinuities of epistemes.

3.5 The future one forecasts is based on how one sees the present

The type of future one sees is determined by what values one ascribes to the present. This finding follows from the above. If one believes the present, however defined, is fair and positive, then the future one sees tends to continue that thrust. One looks for evidence in the future to reaffirm that. Negative scenarios are articulated only to highlight the reverse: that unless we are careful, all that is good will end.

Alternatively, if one believes the present is bad, unjust, intolerable, then futures tend to focus on the transformation of the present and the creation of a new society in which injustice is undone. Or, linear forecasts are developed such that there is no foundational change, thus, highlighting the opposite, that change is needed.

3.6 Forecasts are linked to one's social biography and status

The forecasts one develops and the critical factors that are explored tend to be those that privilege or mirror one's own standing in the world. Thus, if one comes from a particular ethnic, gender, wealth background then genetics or hard work are the types of attributes one believes will be crucial in the future. Genetics thus becomes a structural force for explaining how to increase more of one's own.

Alternatively, if one comes from a less privileged background then issues of social structure, politics, alternative value systems become far important. Genetic or other factors that do not allow change (such as *karma* even) are either considered less important or as factors to be resisted.

Class is not a spurious variable.

3.7 Growth versus distribution, extensive versus intensive development

Critical factors expressed tend fall into two foundational categories. The first is concerned with growth, either economic or technological – with finding ways to enhance excellence. This is either through new genetic or artificial technologies or even through space travel. It is essentially “extensive evolution” to use Laszlo's (2004) terminology. The second is concerned with distribution, issues of access to genetic enhancement, technology, justice and fairness. This may be explained by the modern struggle between capitalism and socialism or it may be more foundational, part of our evolutionary struggle.

Related to this is the issue of which is the most critical factor. Again, the variable appears to be dichotomous, favoring either technology or human contact (encounters with the other). The classic division between the sciences and the humanities may explain this, or it may be more foundational, again as part of our evolutionary nature.

Transforming the present to a preferred future again takes two directions. The first is institutional change, rewriting the rules that govern society, either through new and better

laws, or through consciousness change: that is, a change of heart, of values, of perception, of paradigm.

If we create a map, then clearly growth, technology and institutional governance express one side of the critical factors affecting the future of humanity and distribution; communication with the other and change in consciousness express the other.

3.8 Epistemes are outside our knowing efforts

Perspectives on the future are overwhelmingly influenced by current events, trends, paradigms and epistemes that organize or support them.

While with some effort one can know one's framework of knowing, generally, the episteme operates outside of our knowing borders – the tongue cannot taste itself. In long-range forecasting this becomes especially perilous as initial errors are compounded. Thus, either the forecasts or factors entertained are banal, or they will be totally off the mark. Scenario development is one way of contouring the unknown. An example of this is Jerry Glenn's (2000) report, "Scenarios on the Year 3000." However, scenarios, as Glenn's suggests, can be misleading (that is, they are generally single driver-led, focused on genetic and nano-technology, missing other crucial variables, including consciousness technologies, and futures from the non-west). By appearing to engage in alternatives, diversity is lost, authentic alternatives are not explored. The hidden and not-so-hidden assumptions behind each probable future need to be unearthed.

3.9 Multi-methodological frameworks are required

Given the issues raised above, it is clear that determining critical factors and projecting trajectories must be done in the context of a range of methodologies. No single methodology is adequate. By using limited methods, one risks not being able move research or dialogue beyond official superficial positions. Thus, forecasts will remain based on the present, as parochial. They will not contest the paradigm within which the expert/participant enters the discourse.

However, a multi-methodological framework risks being fragmented, especially in as arduous a task as forecasting the nature of humanity in the year 3000. Methodologies that are not complex or layered will tend to miss these opposites, or see them as irreconcilable, instead of as two sides of the same coin or piece of paper.

In this sense, a methodological approach needs to be:

- historical so that patterns of continuity and discontinuity are apparent; and
- layered, so that assumptions and values can be teased out.

At the same time, as suggested earlier, methodologies such as quantitative analysis remain useful in that they have the seeds of unexpected results. Thus, of great utility are methodologies that have seeds for their own transformation within them.

In this sense we can make a preliminary divide of hard and soft methodologies. Soft methodologies, such as epistemic/macrohistorical analysis, may paradoxically be less useful since by allowing layers of analysis, they do not result in specific forecasts. By being open to many perspectives, they may not necessarily lead to novel results. By being closed, hard methodologies may lead to unexpected findings.

3.10 Eclectic, interactive, macrohistory and epistemic research

The most rewarding forecasting approach is likely to be one that is an eclectic, interactive, mix of long-term forecasts and that is contextualised by macrohistorical factors in the overall framework of epistemic transformations (Table III). This then is a multiple layered approach. In itself each approach is lacking but, taken together, they form a powerful forecasting approach. But to begin this task, it would be necessary to be historical. That is, understanding the future can often best begin by understanding the past. Thus, if we desire to understand the world in the year 3000, it is perhaps best to analyze contending descriptions of the year 1000. It is crucial that these be contending descriptions. That is, just

Table III Summary of findings

1. Values become increasingly important as we move from the short to the long-term. The probable tends to give way to the preferred
2. The long-term raises tensions between continuity and discontinuity. Certain methods forecast novelty while others assert that *plus ça change, plus c'est la même chose*
3. Methodology exists in a policy context. As important as to how we do what we do, is what we do with our results
4. What one sees is based on where one stands. The type of forecasts one selects is based on our views on the nature of space and time
5. The nature of the future is how one sees the present – as desired or undesired
6. Forecasts are linked to one's social biography and status
7. Critical factors tend to fall into the dichotomies of growth versus distribution and extensive versus intensive
8. Generally, epistemes are outside of our knowing efforts, thus far more than scenarios are required
9. Multi-methodological frameworks are required. No single methodology is adequate
10. The most rewarding framework is likely to be a complex combination of eclectic, interactive, macrohistorical and epistemic. This approach is historical with contending descriptions of reality and multiple levels of analysis

as the future must be understood from a variety of perspectives (Sorokin's typologies, for example), the past as well must be examined from more than one civilizational or methodological perspective. By returning a thousand years, a sense of the how far away a thousand years can be is likely to emerge. As well, by going back a thousand years, an understanding that at a deep level, whether the Molitor detail of taxation or the Sarkar macrohistorical pattern, *tout ça change, tout c'est la même chose*.

A long-term futures approach, while daunting and perhaps fanciful, can be rewarding. By mapping out the various methodological and epistemological approaches to foresight, insights can be gained as to which approach is the most appropriate.

To reemphasize: methodologies that forecast the long-term future are likely to more rewarding – in terms of quality, insight, and validity – if:

- they are eclectic and layered;
- go back in time as far as they go into the future; and
- contextualize critical factors and long-term projections by macrohistory and epistemes.

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