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## Scenarios for 2040

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This text concludes the scenario exercise, although you are invited to comment and we may develop a series of "implications" papers, depending on public interest. We offer courses in how to generate and apply scenarios, or how to build this tool into a wider set of mechanisms for generating insight. Please [make contact](#) if this would be useful to your organisation. There is a [press release](#) available, and you can see the overall workings [here](#), or via the menu which is given on the left.

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The discussion section is where we post interesting comments and observations. Please feel free to make contact if you have something which you wish to add. You can do this by using the link given on the left. All comments are edited, and it is our decision whether to post them or not.

## Introduction

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These scenarios have been extremely difficult to develop. There are several reasons why this is so. The next thirty years seem likely to overturn so many established patterns of power. It will roughly treble the level of economic activity. Scientific insight will be multiplied by much more, and generate tools and capabilities of enormous power. The period will, however, offer unprecedented challenges. It will begin to overturn three centuries of political dominance by the current established powers, and of ways of thinking about politics. These and other factors make the period alien to us in a way that, as seen from the perspective of 1980, 2010 was not. Consequently, it is hard to prioritise the issues which the scenarios should highlight.

The team's ideas have evolved very considerably during the year that it took us to generate these scenarios. We have published position papers as the process went forward, and the

comments that are appended to these are so useful that many are cross referenced from this document. There have been a large number of focused workshops, scattered around the world, that also contributed their ideas to this activity. Around half a million people have spent some time reading and commenting on the web publications, and a proportion of them have contributed their thoughts. It has not been possible to publish all of these, but we would like to thank all of you who made the effort to do this.

Equally, we would like to thank the scenario team. We had intended to publish a list of participants, but it turned out that too many individuals were unable to identify themselves for commercial and other reasons, and so this was not to be. All of you have done fine work, and we can be justly proud of the outcome.

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## The issues which these scenarios address

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The universe of possible concerns is, of course, immense. We were not to be guided by an initial *problematique*, however, and the issues to which we have given prominence have emerged naturally from the process.

There are, perhaps, three fundamental questions which we believe that we have addressed:

**Will the international community address what we have called "systems issues"**, and if so how will they do this? By this, we mean all of those concerns that arise when hitherto isolated populations and commercial systems come into intimate contact with each other: issues connected with security, law and policing, with environmental and resource balances, with public health and related issues.

**What does a development path look like for the poor nations as we move towards 2040?** Is there a viable pathway, given the many obstacles that the systems issues present?

The overused word "sustainability" has rather passive connotations: essentially, that we meet our future by doing more with less, existing on a declining pathway as our marginal improvements contribute less and less. We ask, therefore, **how can we transcend this pathway**, and so blossom into something new? What will the most capable communities be doing when they undertake commerce, government or individual daily life in 2040?

There is a fourth issue, which is less easy to summarise. This is connected with how we should think about the political blocks of 2040. This is a complex issue, which is best handled in the summary that follows.

## Summary and précis

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The analysis can be summarised as follows. In the [section "Two wedges, three populations and three flows"](#), we bring together much of the preceding analysis. The wedges refer to blocks in a trajectory of socio-economic development in which all populations, including the current industrial world, are set. They break the world's populations into three, and may impose insuperable blocks to populations trapped below them.

In the even of such blocks existing, the scenarios anticipate political difficulties in the international arena, and we show that this will make the "wedge dynamics" worse than they need to be.

To make sense of this, we need to characterise both the wedges and the populations, and give readers a sense of the flows that are being interrupted by them. We begin with the populations.

### Populations:

The first section introduces the notion of the *narrative*. This is a term used to describe human affiliation – "where do I belong?" – and everyday guidance: "How is a person like me supposed to behave?" For periods in history, and more universally for several hundred years, narratives have been understood to be essentially identical to nationhood. The question then becomes "how is a French, Egyptian or Canadian person to deal with this or that situation?"

National boundaries are weakening, and can expect to be superimposed over a range of nested

institutions that grow in number and importance as the century progresses. Supra-national alliances and agencies will acquire greater significance as 'systems issues' – a term to which we return in a moment – become more demanding. Consequently, we have asked ourselves both about the scale at which narratives will develop – "where do I belong?" – and whether there are discernible or predictable narratives that span the world.

We find that there are four such narratives, which we characterise and set in their proper place in the development process. These populations are seldom totally separated by geography, and often substantially overlap. Each scenario will have them present in it, in various proportions and intensities.

Setting this aside for the moment, we turn to another feature of development. This is the capacity of institutions to cope with complexity and to support ever-more capable industry with physical infrastructure, the supply of an educated work force and the like. It is well known that development is closely related to institutional capacity and richness. It is also clear that economic returns to industry closely follow the complexity of the activities that they undertake – earnings, for example, correlate strongly with the complexity of the tasks that are being undertaken.

We extend this analysis to intangible institutions. Examples of this include legal predictability and the absence of corruption, economic volatility. Tight correlation can be shown between the wealth of nations and their possession of high quality intangible infrastructure.

Knowledge will increase very significantly as we progress towards 2040. We assess the impact of this, and find that – quite aside from new industries that it may generate – it will also add greatly to productivity. However, the use of knowledge is shown to be extremely localised, in what have been called clusters. We assess what is entailed in such clusters, and relate it to the intangible infrastructure already discussed.

We link this set of thoughts with that of the localised narrative that we have already discussed. Capable networks of people form in predictable ways, and have equally predictable properties. One of these is a very specific narrative, which we term the Post-Globalisation style. Despite its name, it is extremely tightly focused, both geographically, socially and by topic.

We develop this concept further, asking what the developments in information technology may be able to do for expert, tightly focused networks that operate with a high degree to trust, exclusivity and focus. The answer is a great deal, which we explore under the notion of *collective intelligence*.

There are two consequences of such developments. First, everyone everywhere who is involved in a collectively intelligent network will find their individual capabilities creatively subsumed into the collective. Appliances – which may reach great levels of sophistication – provide continual contextual advice, coaching and connectivity to others who are working on the same project. Second, the same technologies, applied to civil society, essentially eliminate crime, provide children with safe adventure and endless factual and social education, stimulate innovation and largely replace conventional politics with something very different. This entire structure constitutes the mature Post-Globalisation narrative.

### The wedges:

Earlier, we discussed the two "wedges" that block the development trajectory. We have, perhaps paradoxically, discussed the second of these before we have characterised the first. The second wedge is made up by the ability (and willingness) of populations to move to the Post-Globalisation narrative style. Its timing is relatively predictable, but it is uncertain whether the technology will be able to deliver. If it is not feasible, the world becomes trapped in an end game of trying to employ efficiency gains to live with declining resources, high resource costs, environmental degradation and a hair-triggered world that is prone to descend into volatility and, potentially, extreme violence.

This state is the Consumer-lite narrative, in which rigidly controlled societies walk a tight rope to no very clear destination. It is an end game, but for the aspirant billions, the closest that they will come to full blooded consumerism to while they aspire.

The Consumer-lite narrative is a convenient introduction to the first wedge. This may present itself all at once or gradually, early or relatively late in the period. It is the cluster of what we have called "systems issues", the consequence of having nine billion people ever-more closely connected together, settling in enormous conurbations that lack the most basic services, and of the declining supplies of cheap resources and the limits of pollution sinks. We discuss these issues in some detail, offering a number of back-up papers available as links.

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Systems issues have a number of scenario-related consequences. International institutions need to grow in order to manage international problems, from security to economic volatility, pollution to intellectual property. Each of these entail the cession of power from the nation to the collective. If the international environment does not predispose the powerful nations to do this, then the systems issues will be handled poorly. Many issues – such as the minimisation of energy demand – require titanic sums to be invested in poor nations, which do not have a good record of long-term stability. A 'difficult' world will make this unlikely to happen. Finally, as resources become scarce – and particularly if foresighted investment has not been made – prices will become both high and volatile. Poor countries will find it hard to develop unless they are resource exporters. If they are resource exporters, they will most likely become tied either to bilateral deals with the rich world or captured by another of the three narratives.

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We introduce this narrative last. We have already met the Consumer-lite and Post-Globalisation narratives. Now we introduce the Poor-Populist narrative. This is in fact two narratives that elide into each other, depending on circumstances. The "Populism" element entails a tendency to reject the mechanisms of modernisation – such as institutional change, secular rationalisms and so forth – and a focus on either geographical or ethnic nationalism. It tends to define itself by what it is not, erecting barriers and often feeling persecuted.

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The "Poor" element is much more heterogeneous, but enthusiastically seeking material well being, health, self- and family advancement; and also access to the developed world and its glamour. In adversity, there is a tendency for the Populist element to extend its reach, and in periods of tranquility, the Poor flavour to expand.

The flows:

We began with the section called "Two wedges, three flows and three populations". If the world is foresighted, and if the first (systems) wedge is slow to manifest itself, then a relatively large number of people will attain the Consumer-lite narrative. A second population will exist below the developing wedge, however, and even in the most optimistic scenario, half of the world's population remain very poor. This is the scenario that we have called "*Yesterday's Future*". Billions become the new global middle class, subject to tight discipline from the states and the network of controls that they have imposed on the world.

The world may not be foresighted, however, and it is entirely credible that it will return to rapid growth whilst making few forward dispositions. Systems issues will arrive that much more quickly, and the world will anyway be accident prone. Crises mount, and powerful nations reach out to force solutions upon the rest of the world. Whilst this is accepted for a while, the Poor-Populist populations slip increasingly into the 'Populist' mode. International affairs slip into a state that does not reward statesmanship or trust, and the powerful form a nucleus that seeks to guard what it has. It build bilateral deals with resource suppliers, but cannot stop the gradual drift into the expectation of generally aggressive relationships. None of this solves the systems issues, which rise to an intensity that demand a change of pace. This comes late in the 2020s, however, when much damage has been done. The transition to Consumer-lite becomes less and less easy to bring about.

The final scenario of the three is called "*Waking Up*". It grows from *Yesterday's Future* and is based on the extraordinary feats that the Post-Globalisation narrative can achieve. These ramify into commerce and industry, government and local governance, the means to address systems issues and the general deployment of knowledge and insight wherever it is needed.

As this is a new set of concepts for many readers – the style does not yet fully exist, and its supporting infrastructure is a decade away - we suggest that you refer [directly](#) to the scenario for more information.

## The main areas of analysis

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This section summarises the key building blocks from which the scenarios are constructed. They are derived from the working documents that were discussed above. You can find these available to you on the web if you click the link to "Scenarios for 2040" using the menu to the left.

The sections can be read in any order, However, the basic flow runs as follows:

- How do people(s) think about identity?
- How does identity map onto geography. How does the nation state and its traditional patterns of politics be affected by changes in this?

- How to think about capability in 2040: which societies are capable or what? We address this through the concepts of tangible and intangible infrastructure.
- What are the rival political narratives in 2040?
- What can we say about economic growth, and how does this affect the relative weights of potential political blocks?
- What are the systems challenges that have to be faced? What happens if the world is in no fit state to address them?

This is then synthesised in a section that sees the future in terms of a natural progression that is blocked by two "wedges". The first of these is related to systems issues and the economics of resource scarcity. The second represents capabilities which the leading groups (and locations) will possess, but which may be insuperably difficult for others to attain. This divides the world into three flows (the scenarios) and three populations, as discussed above.

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Finally, a separate major section leads into the scenarios, and into a space for discussion. Your comments are welcomed. Please note that the papers that led up to this synthesis contain extensive analysis - of, for example, technology - that is not treated directly in this text. The menu on the left offers both the means to feed back your comments and access to these papers - see "Scenarios for 2040".

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## Patterns of political evolution

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**Abstract:** *Societies acquire complex "narratives" that offer their members guidance on conduct, values and expectations. Narratives have, until recently, tended to be anchored in the nation and its history. Massive changes in wealth and insight are beginning to skew the narrative towards a many levels of aggregation, from the very local to the transnational. Political voices will follow. The section shows that there are three or four major narrative blocks that are likely to emerge. Later sections attempt to typify these.*

Scenarios can over-simplify issues, often as a result of trying to make complex issues accessible. They tend to talk about the whole world being in this or that state. We have not done this. Rather, we believe that most geographically-delimited population – such as a nation, but also supranational blocks – will contain parallel social trends that will be replicated elsewhere. In today's world, for example, China and India contain both an economic dynamic which will make them wealthy, and also over half of the very poor people on the planet. These, and groups that are distinguished in other ways, live largely in parallel to each other, following their own rules and pursuing their version of a realistic future.

In the same way, each of the three scenarios contain elements of the other two. It is the proportion that makes the difference. However, the communications of 2040 mean that these populations will be extremely interconnected, both in practical ways and in respect of culture, politics and ideology.

A "narrative" is the term used to describe the way that a group of people see themselves as members of that group. A strong narrative answers questions about how a person is expected to behave, about what constitutes virtuous conduct and how this or that situation ought to be thought about. It encapsulates both group values and the features which set the bound to the group. It is deeply rooted in history, changes slowly and is often defended fiercely from erosion. Narratives can be extremely helpful when they match a situation and deeply damaging when they prescribe inappropriate responses, as is frequently the case with narratives that have become outdated. Adaptation to new circumstances therefore involves a painful process of shedding former certainties and finding new ones.

It is often the case that a single geographical population can contain several narratives, which tends to be a recipe for social strife. The collapse of Yugoslavia into warring ethnic groups is an example of such a crisis. Such disputes are hard to settle because the combatants do not agree on what an answer would look like. They have distinct values, distinct narratives about social conduct, power and even dress codes.

Populations always contain the less radical sub-narratives, in which a minority or dissenting view permeates parts of a society. Age, social class and religion are examples of populations in which such sub-narratives flow. How a man is expected to deal with an affront from another varies considerably depending on whose expectations form the basis for judgment, for example: a US working class teenager living in Detroit will see this quite differently from a 60 year old professional based in rural Massachusetts.

Nations have, for the most part, learned to live with sub-narratives and to manage the change of the core narrative. Such a population is most largely influenced by its national narrative – of how Americans talk about being Americans, Swedes about being Scandinavian or the Arab world about being the heart of Islam. To observers, however, it is clear that such systems of management are breaking down. Sub-narratives are becoming stronger, changing more quickly and, increasingly, are becoming ever-more strongly influenced by peer sub-narratives elsewhere. Youth - or at least, affluent youth - listens to its peers, globally. Mass media and popular culture interact with ubiquitous communications to make this an industry target as well as a social trend.

Tomorrow's populations are, therefore, less likely to accept a single, geographically-focused narrative than they are to switch between, or even mix, mix several narratives that happen to suit the occasion. People can switch from being a concerned environmentalist a caring parent without noting any discontinuity. The one set of attitudes may abhor a heavy, fuel-intensive car; whilst the other may mandates it on the grounds of family safety. Or the individual may snap into a narrative that revolves around personal status, and buy a vehicle that is neither notably safe nor economical. In other words, values are labile and not pinned by a wider narrative about the nation.

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We see this as a normal part of life. This was not at all the case a generation earlier. A professional person then dressed to match and convey an identity that implied rank and which confer status. They made only minor concessions to different social situations when, for example, attending a children's party.

Contemporary narratives are labile, and may be strongly "fractal" – "I am a Swede, a gay Swede, a middle-aged female Christian gay Swede with a talent for ice dancing". The important point is that a century ago, this person was first and foremost a Swede, and as all Swedes were nominally Christian, probably that, too. Today, she may choose to put the "gay" narrative before nationhood in at least some issues, and the narrative of international feminism before that. The strength and durability of the narrative choice defines a set of political forces in wider affairs.

Communications will continue to improve at a sharply accelerating rate, in ways which we discuss below. The result will be to throw many disparate narratives together, and sowing the seeds of new ones. Existing national narratives will also be challenged by very fast economic, technical and social change. "Who we are, and how things work around here" cannot remain a constant. It is not at all clear that whatever narrative stability that emerges from this will be primarily based around the nation state. The average individual is likely to continue reach for "people who are like me", but they may not find these primarily in the same geographical locale. They will look for matches by educational status, general social and ethnic background, wealth and age as much as by nationality. Extremely plural populations - such as the cosmopolitan capital cities of the industrial world are likely to feel less and less solidarity with the hinterland that relies on them for economic support.

It is probably best to think of narrative - identity - and solidarity as being multi-layered, much as we shall it is likely that governance will be multi-layered. These layers overlap each other to some degree, but probably sprawl into other narratives and systems of order. In microcosm, one's working identities - corporate, departmental, business unit - are different, but they only marginally overlap other layers in one's life, such as adult friends - relations - immediate family - children's friends. One behaves differently, has a different range of choices and and usually even dresses differently when dealing with these structures.

Nevertheless, most people have roughly common sets of values and behaviour that range across these domains of experience. Equally, the world in prospect will experience one or more dominant global narratives. These narratives will be held by groups of people who have deeply different outlooks, values and expectations. Such groups are not necessarily separated into nations. Indeed, unless many nations in some way merge politically, these increasingly united voices will be transnational. As we have noted, it is likely that some countries will have two or more global narratives acting within them, much as modernizers and traditionalists bring very different world views into conflict within many nations today.

There can be a dominant global narrative, perhaps opposed by less powerful groups, or there can be a clash between equally powerful – or anyway, mutually significant – groups. As we shall see, the existence of major blocks that oppose each other has a dire consequence on the next thirty years.

Societies pass through reasonably predictable social phases during the process of economic development and industrialisation. Naturally, the economy changes. The institutions alter. Societies undergo a more subtle change, however, which is that they alter their values. That is,

what is agreed to constitute an answer to a dispute alters as development proceeds.

As an example of this, agrarian societies rely upon a traditional, slow moving consensus. Disputes are settled by reference to precedent and authority. Early industrialisation usually smashes these certainties. They are replaced by a mixture of two replacement set of values: ideology and consumerism. Ideologies, including religious certainties, can offer to replace this lost certainty. Equally, the universal desire for self-betterment and the improvement of life for dependents tend to move people towards a phase of material values and consumerism. Values become predicated on self-improvement, affluence and status.

phases in social and economic development

Figure 1

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The figure shows this process as a pink trajectory. Ultimately, those who enter the consumerist values phase move into a more complex state, during which values focus on more complex goals. (More on this [here](#).)

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The figure combines three sets of events. Institutional evolution is shown on the vertical axis. (The terms in the upper reaches will be discussed in the next section.) Strictly economic development is shown on the horizontal axis. This tends to track rather than lead institutional development, doing so with a lag. It is, of course, subject to many hazards that throw it off course.

The narrative values follow the pink trajectory, often with strongly contested politics in the zone near the root of the two branches. The horizontal branch can capture societies. Various forms of totalitarian ideology may try to stop the clock: "Back to Virtue! "Back to the Old Ways!" Equally, however, what is politely termed "rent seeking" may arrest development, particularly in resource rich countries.

Economists use the term 'rent' to denote a natural and inalienable advantage, such as having a majority share of a market, a desirable property in a city centre or a well-sited port. Officials and elites attempt to capture rents from the majority of the population, and Figure 1 uses the phases "quasi-democratisation" and "institutional hardening" to describe the procedures necessary to stop this from happening. Countries which suddenly become rich through natural resources do not, on the whole, enter into these phases. Rather, existing elites capture these rents. The society does not then develop its institutions, although it may appear to develop economically as money is poured into physical projects, such as urban growth. Both forces – rent seeking and totalitarianism – usually combine in durable ways, linked by official truths and ideological policing.

There will be around 9 billion people alive in 2040. Subsequent sections suggest the groups into which they will fall and the attitudes that they will show. However, around 4 billion will exist below the junction, around a billion in the horizontal branch and the remaining three billion will be above it. These constitute the new global middle class. They have a strong narrative, which revolves around the pursuit of self betterment and in which success is measured by growth in consumption. A tiny number of people will have entered the space labeled "complex goals", but their number belies their influence and potential.

Where there are differing voices, there is the potential for discord. The blocks that we have just discussed each have a dominant narrative, and that narrative has little in common with the views of others. The Cold War saw the powers contending around two dissonant narratives. After the fall of the Soviet Union, a single model has acquired pretensions to universality: rule by representative democracy, general transparency in resource allocation and dispute settlement, evidence-based rationalism and the expectation of empathy on the part of the powerful; that is, "human rights". This view may dominate the communications of the industrial world, but it is by no means universally accepted, and is resisted by groups who do not like it. It is not the natural narrative for two or three of the four block that have just been discussed, insofar as the attitudes of the global middle class in not particularly libertarian, transparent or set upon human rights.

## Government and the nation state in 2040

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**Abstract:** *The nation state and its associated political structures have been key players for several hundred years. This sections considers how this may shift in the next thirty years. It concludes that there are a number of forces which will weaken this form of decision taking,*

*fragmenting it into collaborative layers and expert themes. Whether this style becomes universal depends very much on the scenario backdrop.*

Figure 1 noted that "national awareness" was a part of development. Nations are a relatively new concept. Prior to the European peace of Westphalia, most territories were possessions of specific rulers, and the people who lived in these arbitrary chunks of geography had as many rights as these rulers were prepared to cede, and the established religion to permit. Rulers waged wars of conquest because capturing fields and workers was an entirely practical means of increasing power and influence.

This universal model of territorial ownership mutated into something quite different in Europe, doing so in a quiet transformation at least as profound as the industrial revolution that followed it. States and rulers were tools through which the productive could go about their business. The essential middle classes proved to be ungovernable without consent, as at least two kings found out by losing their heads. What emerged from this was oligarchy, in which a small cadre of "king's men" were opposed by an equally small elite of the prosperous. Sprawling autocracies found it impossible to modernise their economies whilst also retaining their incoherent geography and antique institutions. Focus around geography, local interest and historical identity defined new borders, not least as the age of revolution kneaded and reformed the old autocracies.

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Democracy was not, at this stage, a favoured mechanism of government. Until the mid-Nineteenth century, popular politics and engagement was disparaged as "mere democracy" in all but a handful of nations. Natural elites were there to control the mob. No European country had universal suffrage a hundred years ago, and only New Zealand, Vanuatu and South Australia beyond that. France introduced male suffrage in 1848, but women came to vote only in 1944, for example. Women gained the vote in the US in 1920. The concept of free peoples, or the rights of these to self-determination, are as new as those of democracy.

Equally, it is clear that even today it is still not universally accepted that government exists to serve the people, rather than the other way around. (China, for example, is run to satisfy the goals of the Chinese Communist party, not the citizens of China; however, it is their ideology that the two are identical. Much the same comfortable interpretation is true of many theocratic states.) Where the state is there to serve, however, it is almost never the free views of the people which set policy. Instead, a political class interposes itself, and imposes a set of views which are as much connected with the electoral process as with effective government.

The Enlightenment view of government was that it should be minimalist. There should be liberty under the law, where everything that is not explicitly prohibited is permissible. A similar modern view is that freedom should be curtailed only when individual liberties encroach on the liberties of others. There are tasks which only the state can do, such as the provision of law, of some physical infrastructure, of civil and military security, the management of external affairs and economic stability. For this, it needs proper finances, good governance and various executive agencies. This "minimalist" model costs around 25% of gross product, up from 10% a hundred years ago, when this was generally the full ambition of the state.

In 2010, however, the state spends nearly half gross product in virtually all of the industrialised states. This has occurred through what the military call "mission creep", whereby the initial clear remit is allowed to blur itself by taking on every problem that presents itself. The dynamics of the electoral process has had a great affect upon this. A seventeenth century commentator remarked of democracy that "*few states will long survive the recognition that electors can vote themselves subsidies from the public purse.*"

Equally, two world wars hugely extended state power. The Cold War also forced the more reluctant democracies to take on much of the rhetoric of socialism, and with it the sprawl of government as it took responsibility for everything - social, economic, public, private, civil and military, education and science, health and industrial relations; brooking no competition from religion or individualism, ruthlessly pursuing a narrow view of social perfectibility. More recently, states have begun to see themselves as economic competitors, and therefore to take on the mission of managing a response so as to maximise the national competitive position.

Why, however, do states need to do more than the necessary tasks that only they can perform? Would market forces not lead people to educate their children and keep themselves healthy? There are two "deep" issue behind this, both of which have great importance to the scenarios.

The **first** of these is connected to political ideology - that is, to an attempt to peddle a sub-narrative in rivalry to one or more others. That is, the political classes are not elected to administer the bare minimum, but to fulfil an ideological remit. So

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universal is this model that we do not often notice how far it has drifted from the minimalist requirement on government. Central to ideology (and to electoral success) has been income redistribution. Seen crudely, the political accommodation allows the majority to take from the wealthy minority, to do so without compensation and to do so on the arbitrary basis that they happen to share a common piece of geography. Poor Africans or Bangladeshis cannot do this, whilst relatively affluent American or Swedish "poor" can do so. Seen less crudely, the Swedish or American affluent are purchasing social peace from their society.

As the world loses its regional identities, as a global middle class that is by no means accustomed to these accommodations expands, and as wealth generation concentrates on small urban islands, it is by no means clear that this consensus will survive.

The **second** issue is that rationality and market forces have two unfortunate affects. First, poor people tend to be caught in a cycle of disadvantage when faced with even a uniform market. Simply, they have to buy less, or less well, than people with more resource. Second, people do not behave rationally. They do not save against old age or possible unemployment. They borrow sums that they cannot possibly pay back. Some few children are neglected by their parents and are not given health care or sent to school.

Politicians feel it their job to set these things to rights, caring for the careless, the hapless and the poor. For historical, ideological or electoral reasons, the response has usually been to reach for universal solutions: to offer a state-managed health service, rather than to pay the private sector health bills of disadvantaged people. The consequence has been that extremely complex, costly and probably inefficient structures have arisen, both in the state and parasitic upon state systems, such as the US health insurance HMO complex, which greatly outspend the once notorious "military industrial complex". Practically, such things are a spending ratchet, in that once put in place they cannot be reversed without electoral fury. Demographics make it extremely unlikely that such systems will be affordable during the next 20 years, however, and retrenchment will be inevitable across the industrial world. At the same time, the closer coupling of the rich and poor worlds – around everything from trade to environmental accords – means that these poor will also be making demands on the rich. There will be ample political forces designed to win this. At issue is how they may act.

Industrial countries have representative democracy, which should better be called "intermediated democracy". That is, people once sat their representative on a horse, told them what they were to seek, and sent them off to deal independently with central government. This has been replaced, as we have already noted, with a political class. This group are professional – they make their living this way – and have professionalised winning: getting bills passed by gaining the required voted by whatever means, and winning elections by saying whatever needs to be said.

Political parties exist for the convenience of the political classes, rather than to reflect any practical realities of the complex societies. Few of these have a single strong dimension (such as rich or poor) that defines the entire political debate. One can agree on one topic and disagree on another. However, political brands offer huge advantages to politicians, from a career structure to economies of scale. Parties can manage the details of legislative success - such as trading favours to get a particular vote - in ways which individuals acting alone could not.

Darwinian processes assure the future of political parties. However, their brands are not and cannot be true alternative national narratives. People recognise the vacuity that underlies their messages of celebrity, gloss and faked differences as they all appeal to the middle ground, and try to offend nobody with a vote. They do this with the practice that comes from an environment that constantly cascades advertising upon us. Insofar as politics continue to revolve around national legislatures, political parties will continue to be with us. However, as we shall see, the multi-layered, networked nature of the future of the industrial states may well make considerable practical inroads into this.

Political parties and politicians operate in a constructed, artificial world that is as contrived as a medieval tournament. Inside of their closed world, however, politicians speak and act in ways that are quite unlike their public face. They see the public, for the most part, as something that needs 'things to be done to it for its own good', but which, like a reluctant child, has to be managed. Ideas are simplified, and debate is purged of analysis in favour of narrative hooks, phrases which people feel that they vaguely understand such as "social justice", "saving the planet" or the fine-sounding wars on terror, drugs, cancer.

When asked about 'social justice' by pollsters, for example, few people agree on what it means, but indicate that it sounds heartless to be against it. This permits sloppy debate. Competing narrative hooks – social justice, liberty or competitiveness - serve in place of completed thoughts. They also act as trump cards, for if a politician can force debate into terms which are predicated on "social justice", then whatever answer emerges from debate has an answer to this rather than to other concerns.

Virtually every nation now rates its trust in politicians below that of almost any other profession. The trend has been downward since the mid-1970s in most countries, accelerating in direct proportion to the "professionalisation" of politics, its electoral machinery and its mass marketing. Industrial societies are exposed to continual advertising, and therefore discount advocacy. Deference to authority has, in general, never been lower. Whole industries exist to deconstruct what politicians have said and done. The public have acquired the tendency not merely to question what is said, but to arrive at theories as to why it was said. Interpretations range from conspiracy theories, internal rivalries to professional estimates as to how a political brand is migrating, and what the new sales message will be.

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Set against this, new technologies, new attitudes and new wealth have created a more direct democracy. This started with non-governmental entities, many essentially issue-focused political parties, and has generalised to a much more complex system. Almost any topic will have an interest group, several forums, alert feeds and much more. Vast virtual communities exist around surprisingly esoteric issues. This, of itself, is no more than chatter. However, the remoter issues feed into more mainstream topics as they mature and have something of general relevance to say.

An example will make this clear. National newspapers are bombarded with facts, information which they are not staffed to manage. However, journalists have often been following a story for some time, and a crucial fact will trigger a disproportionate response. They will ring specialist journals, interest groups and their colleagues. Often, quite unconnected groups get brought together for the first time. An invisible pyramid of confirmation forms under the story, which acquires critical mass and goes forward.

There are, perhaps, three major implications of this.

- The wave of state expansion has reached its limits and perhaps gone past them. It is not feasible for governments to continue to collect more than half of all value added in tax. The implications of doing this for wealth generation are well-understood. The rest of the world will be even more attractive as a base for operations 20 years from now than it is today, when competitive pressures from it is already powerful. State and private debt levels are such that many industrial world governments will have to retrench for at least a decade. The demographic transition across the wealthy world, Russia and China imply a major shift in state provision. This can be accommodated only by relying much more targeted interventions, dropping generic measures and social engineering, and making use of the enormous actual and predictive data that they have accumulated on their individual citizens. The welfare machinery will also become more pro-active, for example avoiding illness rather than curing disease.
- Policy generation will move out of the hands of machine politicians and will be progressively more influenced by expert sources. One of these will be expert networks, discussed above and expanded in the next section. It is important to note that these networks will be drawn from a global middle class, and unlikely to exactly reflect the humanist, genteel opinions that have governed Western political debate for the past few generations. Indian attitudes to their poor are not those of Europe, let alone their views of poor Africans. One can expect a harder set of views to predominate.
- The second set of expert influences come from the huge number of parallel agencies that each state has to maintain in order to solve problems and administer solutions. These issues are increasingly common to all similar nations, so these agencies have much to gain from each other's experience and insight. Many social and economic concerns that we currently regard as "soft" issues will become more and more understood and so open to technocratic management. As this happens, so the agencies which manage these will become more like each other and less beholden to their respective governments. (Central banks are a contemporary example of the early stages of this.) By 2040, these agencies can be expected to be highly inter-dependent for insight and personnel, and broadly independent of idiosyncratic intervention by individual national governments. They can also be expected to be authoritarian – or at least solidly authoritative - in the way that characterises people who know themselves to be right, and can prove that they are right, and who enjoy telling you this.

Wealth generation will be increasing focused on urban centres, and on specialised areas within these. In addition, a great deal of virtual and remote working will develop. Some of this is tied to geography – see the next section – but much of the more routine activity, open to detailed specification, can be farmed out dynamically to the lowest bidder at a given level of quality. The implication for individual nations is that, first, their middle skill people will be exposed to competition from automation and low wage areas as never before; and second, that they must cherish the elites and clusters of excellence that they have managed to nurture. Such people are extremely mobile, and such centres equally volatile. High taxation is precisely such a disturbing influence. It follows that political realism will have to halt the transfer of wealth and that high skill societies will become less equal, both across boundaries of skill and those of geography. An Austrian expert system psychiatrist will feel stronger solidarity with his peers in Australia than he will with a welfare claimant in the Tyrol. If the claimants vote themselves more of her pay packet, she will go somewhere else, work in such a way as to pay tax elsewhere, or move.

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Some of this is scenario-dependent, but most of it is not. The geographical nation state will remain with us, but its nature will change and its power will be circumscribed, rather than diminished. Its choices will be potent, because the tools will be powerful, but the range within which those choices can be exercised will become ever smaller.

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There is a useful "second take" on this issue. If we were inventing national boundaries for the first time, there would probably be two primary things which we would take into account.

- The first of these is human affiliation: with what do we feel a part, in what do we feel at home? Where is our narrative focused and rooted?
- Second, we would have to ask ourselves what were the natural economic structures that conferred lasting competitive advantage?

Figure 2 uses these two issues as the axes for a chart. The vertical axis suggests the scale at which commercial and political events tend to be expressed and managed: for example, at the level of major cities. The next section discusses how clusters of knowledge and what is called intangible infrastructure – issues such as trust within an industry – tend to be geographically circumscribed. National institutions, too, serve to differentiate the ability of countries to compete.

The horizontal axis considers the natural scale of emotional affiliation, from the networks of people whom we know personally to abstract activities that are connected more with states of mind and ways of thinking than with concrete communities.

**Innate geographical scale**

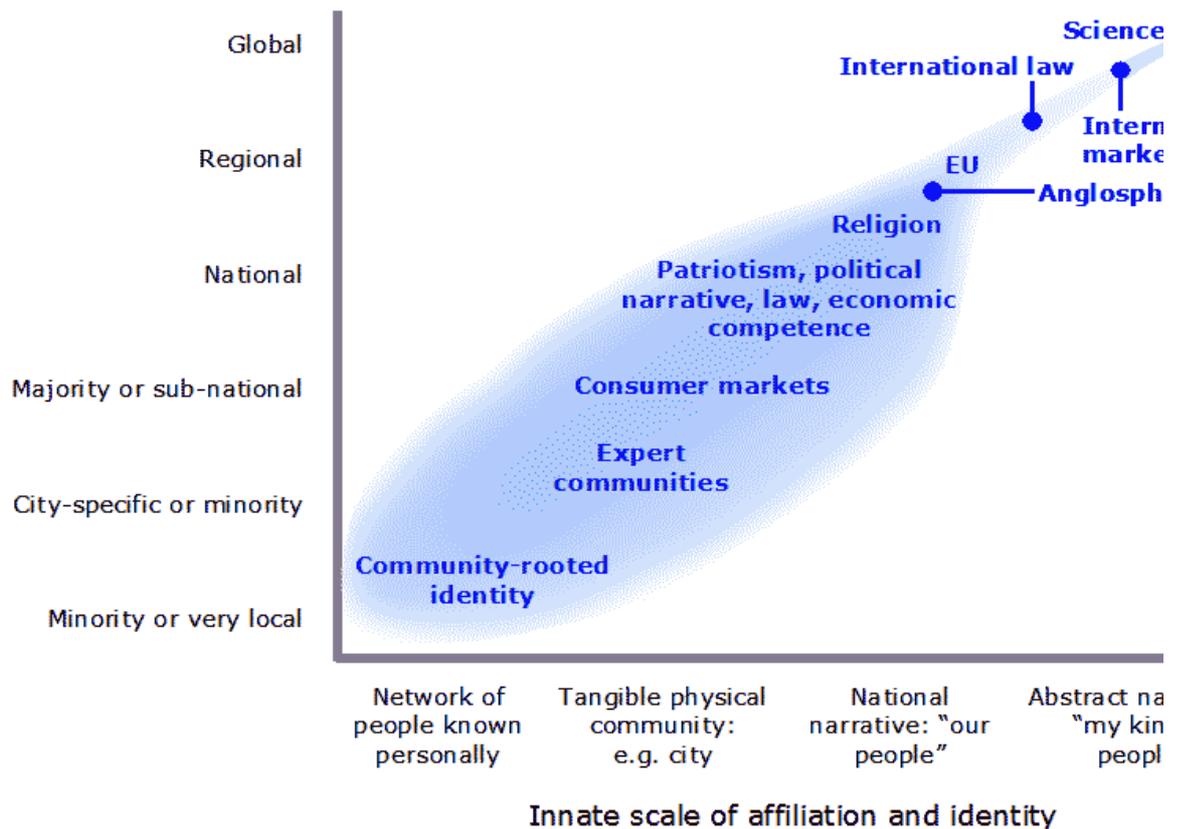


Figure 2

(The Anglosphere are those populations which speak English, and which have rather distinctive views as compared to other industrial countries.)

The shaded blue area shows the space in which both of these things fit together. Examples are marked in blue. Religion, for example, is seldom truly international but is also often more extensive than merely than national, yet it is also strongly is connected to narratives that prescribe the behaviour patterns of "our sort of people".

Sub-national regions and cities need to play to their competitive strengths. They fit themselves to international benchmarks of excellence. This makes them more like their international competitors and less like the remainder of their nation. This is innate in specialisation: a region which is trying to encourage the wealthy elderly to move there will tend to spend more on hospitals and less on schools. A tourist haven will not encourage heavy industry.

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This sets an agenda that local populations may not like, or which they may relish. There are three responses that can be made. A population can react against events, for example rejecting increased industrialisation in their region. Alternatively, they can simply accept formless, multifaceted change, much as happened in the cities of the industrial world throughout the last century. Third, they can actively shape their future, defining what identity they want and the economic means by which to get it. The last of these is clearly the most potent response to a very competitive world, and only cultural forces and the inertia of history stand against it.

Some regions – and in particular, some cities – have already begun to follow this last strategy. The importance of knowledge centres and intangible infrastructure – the subject of the next section – suggest strongly that this trend will continue. The implication is that a map of power, value added and prosperity will look less and less like a traditional political map. It will not have neat boundaries where one set of influences stop and another set begin. Rather, there will be much overlap, huge concentration in certain areas and a great deal that is "delocalised", assigned to no one place. Seen in section, there will be ever-stronger integrating layers that contain and cut across many sub-layers. This is not the traditional pyramid of transnational alliance, nation, region, city; but something far more complex.

Managing such structures is a complex issue. Currently, the nation is sovereign and this extends power in both directions, down to its regions, and up to whatever alliances it may have formed. As power is ceded to these structures, however, so the primacy of the nation becomes diminished. The seat of power becomes less clear: nations hold big sticks, but relatively few problems can be solved with a big stick.

One area in Figure 2 needs further development. It refers to "expert communities". Two points need to be brought about this.

**First**, there is a tight connection between the exploitation of knowledge and geography. (See [here](#) for a review in more depth.) Investment in knowledge returns around 25% real indirect terms, but a much large value when broader, social benefits are costed. A new medicine will earn its developer 25% real on the investment, but will generate figures nearer 50-75% for the society as a whole, due to the beneficial affects of a healthier work force, less care and so on.

However, it transpires that knowledge translates into economic activity in an extremely geographically focused manner. Work in Europe suggest that a focus of knowledge has negligible impact much beyond 300 km. Similar figures have been derived for the US and Japan. Further, what causes talent to cluster is down to three things: the presence of peers, the existence of job opportunities in exciting industries, and a generally attractive, tolerant and entertaining ambience.

**Second**, therefore, we should note that networks of able people have very defined characteristics. They know a great deal about the other players: their track record, their abilities and, partly as a consequence, their innate trustworthiness. People who work well in networks have a specific set of social skills. They avoid creating friction, and excel at the summary that calms debate. They speak when they have something to say. They build on what has gone before. They show intuitive understanding of the innate qualities of the project at hand, such as its maturity and degree of general acceptance, and alter their behaviour and expectations accordingly.

Networks of this sort carefully filter the people who they allow to be a part of them. Often a single individual will be a member of a large number of such networks, and

so carry ideas and knowledge between them. The section which discusses intangible infrastructure, below, gives references to further analysis of these networks. They are, however, the fount of ideas and innovation. They usually capture the best talent, and amplify it, something discussed in the section on collective intelligence. We will return to the importance of these networks several times, ultimately in the scenario *Waking Up*.

The directly political impact of these structures is of growing importance. Whilst many are rooted in a single nation, more and more link internationally, generally around interests that are suited to text-based discussion. That will, of course, soon change. Their views are expert and respected by similar groups, and they are both the source of comment and the benchmark against which ideas and rumours are judged. It is clear that as the technology - and relevant work styles - develop, so such networks will expand in importance. Their impact on policy, on the general political narrative and on commerce should not be underestimated.

In summary, there are four forces at work that will tend to erode national sovereignty.

- Systems issues and scale affects demand trans-national responses. Integration beyond the national level cedes power to the relevant agencies.
- Nation-level agencies converge rapidly with their peers on best practice, creating parallel but essentially identical structures that emulate each other and are not easily deflected by the policy decisions of any one state.
- Expert networks are both crucial to economic success, internationalist in outlook and linkage and powerful influences on policy.
- The correct scale at which to differentiate a skill base in order to specialise around an industry is seldom national, and increasingly sub-regional. Specialisation and cultural identity may clash or may converge. Either way, national identity is diluted or made secondary.

Added to all of this, the major cities are converging, whilst simultaneously becoming less like their own hinterland: New York is more like London than it is like 'middle America'. The consequence of this is a diminution of national sovereignty. What replaces it is the formation of a number of layers of integration and organisation. The extent that these are able to be installed in order to meet what we will call "systems challenges" - the issues of global governance - that sets the terms for the scenarios.

## Institutions and intangible infrastructure

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**Abstract:** *Institutional strength is a key component of early social and economic development. In addition, extremely local patterns of trust, network membership, access to knowledge and specialisation have profound impacts on new possibilities for the already industrialised world. This is referred to as intangible infrastructure. It tends to be extremely localised, both in physical space and in terms of social interactions. The linkage to the discussion of networks and collective intelligence is developed.*

Tangible infrastructure refers to the range of capabilities (and reliable services) to which one can reach when solving a problem or simply living life. Some are positive - such as a technical skill or a customer base - whilst others are noted by their absence, such as safety on the streets or public hygiene. Societies which access a large range of these capabilities can address complex issues - such as handling high technologies, or managing very complex situations and projects - and societies which do not have these cannot do so. Incomes earned in complex industries are directly and strongly correlated with the earnings of those industries and their workers. They can do things which others cannot and so, through scarcity, they tend to earn large returns.

Intangible infrastructure, by contrast, tends to revolve around trust and predictability, and the level friction involved in doing business and living a private life. It ranges from a tranquil macroeconomic environment to open business practices in which honesty and trust is the general rule, from the existence of a clear path to self-improvement to the tradition of secure and stable family life. As such, it has a strong connection with both the national narrative and the inner practices of professions, individual companies and industrial clusters.

Tangible infrastructure tends to work positively when it exists. Some roads may be better than others, but they are all better for transport than is uncleared forest. Intangible infrastructure, by contrast, can be enormously helpful or a huge hindrance. Businesses with embedded bureaucracies that veto change and stop all initiatives are probably worse placed than

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companies with no orderly processes; but dynamic organisations with clear values that honour innovation and encourage strategic thought are plainly better than either.

Poor intangible infrastructure can poison otherwise adequate institutions, as corruption prevents a police force from operating as it should, or paralyses the workings of the law. Examples of excellence will, however, propel politics, policing or commerce into realms of endeavour that they would not previously have thought possible.

Figure 1 showed the process of development. Poor tangible infrastructure characterises the early stages of development. Much the same is true of its intangible infrastructure, but this tends to persist longer and take greater effort to "get right". Figure 3 is reproduced from a Credit Suisse assessment, suggesting that nations with poor intangible infrastructure do not get rich; or, perhaps, that one does not get rich until this is in place.

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#### Intangible infrastructure

Figure 3

This view is reinforced by the inset, which shows data for the EU, comparing the general level of trust in a society with perceptions of sound government. Poor government – and poor management by government – reduce the level of trust. Societies with low levels of trust do not save so much, do not start ventures, do not suspend judgment about experiments by others. Their discount rates are high and they want a quick pay off from any investment. Fundamentally, it is harder to run a business, managing issues such as corruption eat into management time and contracts cannot be relied upon. Such societies grow slowly.

These issues are discussed in more depth [here](#), and the specific impact of knowledge and networks of on economic performance is discussed [here](#). Intangible infrastructure is further developed [here](#).

One particular form of intangible infrastructure is that of knowledge, held in heads rather than libraries and actively put to use. Knowledge has enormous economic significance. Investment in knowledge is known to have a very large effect on the growth of overall productivity. This is in turn amplified by concentrations of insight, the so called "cluster" effect, whereby industries which are co-located tend to thrive in ways which isolated companies do not. The metrics of knowledge are, of course, hard to make robust, but repeated estimates suggest that a doubling of the level of knowledge in a region implies that its productivity will grow by two and a half times over ten years than would otherwise be the case.

Applied to what we know about useful knowledge growth – which has run at a global around 14% per annum over the past 30 years - our overall knowledge base should have supported a sixty-fold increase in efficiency (factor productivity) by 2040. That means that we could do the same things with only one sixtieth of the inputs, or do proportionately more of completely new things using the same level of inputs. This is not without significance to the "systems" issues that will be discussed in a subsequent section. However, the regions that will achieve this sort of improvement are those with the relevant intangible infrastructure including, of course, the knowledge and the people and organisations that are able to make use of that knowledge.

Studies do indeed show that areas with strong intangible infrastructure deliver innovation, attract high-skill industries and the people who work in them, creating a virtuous circle. Such clusters are often confined to restricted geography: to a district in a city, in many cases. They tend to combine existing high general incomes, concentrations of talent, social values that value diversity and experiment, which offer jobs with a challenging flavour, including high technology. They combine this with all of the underpinnings that permit complex things to be done, contracts to be relied upon and the sense of a predictable and buoyant economic and social backdrop. Once again, groups which deny change and enforce normative values are unlikely to thrive in this environment. As we shall see in a subsequent section, networks tend to embody both the values of effective intangible infrastructure and the filtration that concentrates the very able where they are most needed.

Regions with narratives which reject these values, and regions which are unable to provide the relevant infrastructure will not take part in these developments. Indeed, the exploitation of the truly astounding scientific and technological potential that lies ahead of us will be scattered in niches around the world. These niches will be in a position to exploit the truly radical innovations which will emerge in information technology, such that their collective capacity to think as a group may be amplified many times beyond that of a collection of individuals. We shall discuss this issue further, below, under Collective Intelligence, below..

## Rival political narratives in 2040

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**Abstract:** *This section develops a socio-political typology. This is used to develop four narrative blocks, and to estimate how these will react to forces upon them. It also develops a diagram (Figure 4) that is referred to repeatedly in subsequent sections.*

As we have seen, social, political and economic development depends strongly on the establishment of both intangible and formal infrastructure. Factor inputs and productivity gains – the immediate causes of economic growth – then tend to follow. Particular styles of operation – values, behaviours – permit very complex things to be done. Repressive and over-structured systems tend to do the opposite.

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Equally, we have seen that half of the world's population is set on a trip that will take it towards consumerism, achieving this in a form best described as consumerism-lite. The environmental and economic constraints on mass consumption will require extreme efficiency. They effectively mandate a move towards the consumption of relatively intangible goods and services. All of this requires continual and massive state intervention in production, consumption and waste management.

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The other half may not be able to afford the costs of expensive resources, may be entangled in ideologies and otherwise hampered in economic development. There is, as we have seen with the two branch model of development (Figure 1), considerable potential for alienation between the inhabitants of these two branches. (There is much more on this and on flocking behaviour, narrative formation and similar topics [here](#).)

These two thoughts – consensus around the global narrative, or lack of it; that existence of effective tangible and intangible institutions – can be combined, to give Figure 4.

societal complexity and the consensus narrative

Figure 4

"Urban clusters of trust- and reputation-based networks" are the consequences of the work styles that were in previous sections. The term refers to a new, heavily IT-mediated mechanisms that we foresee, taken together with the social factors that fit people to work within them.

"Inter-operational state agencies" have also been discussed, under the changing nation state. They are bodies which are set up by national governments in order to solve problems that are increasingly common across nations. As noted, these will come to have a body of experience and authority that will set tight bounds to policy, and will be authoritative in their own right.

Analysis [elsewhere](#) expands on the consequences of this figure. What follows is a brief summary. The analysis develops a typology of six narratives, ways of looking at the world that are common across the planet. Narratives have already been explained as the sense of identity, values and rules that an individual has towards their community or polity. They should not be confused with personality types. Those who hold strongly to a narrative are often psychologically predisposed to do so, but this is not necessarily the case.

Social groups will, of course, contain a wide range of opinion. Generally, any two nations contain roughly the same spread of views and psychological types. Any difference that is found between the centres of weight of these between countries is generally much less than the spread of views within either state. There is no biological or innate psychological reason why the French espouse a set of values and ways of thinking about their society that is very different from, for example, those of middle America.

We have, however, already met the concept of the narrative. This refers to the overall consensus way of thinking about values, social mechanisms and institutions that characterise a given social group. Naturally, there are Frenchmen who are more resonant with middle America than a hamburger. There are doubtless people in Wisconsin who relish French values. Less anecdotally, distinct sets of attitudes can be measured in all societies, but these are usually suppressed in public debate in favour of the consensus narrative. These are termed "sub-narratives", and they frequently surface in situations in which the society as a whole is de-emphasised: in commerce, for example, or where social classes segregate. Sub-narratives may dissent from the national narrative, but which are largely suppressed by it. Unlike personality types, however, sub-narratives do tend to cluster, varying chiefly with class,

wealth and education.

We have extracted six sub-narratives, which are listed on Figures 4 and 5. Their nature should, for the most part, be self-explanatory.

The narrative "Structured Concern" is very close to the Cosmopolitan political form that we have just discussed. Its adherents are excellent communicators, strongly motivated, generally well-educated and affluent. They has disproportionate influence.

"Populist Ultras" are the heartland, the activists of Populist politics, often defining themselves against what they are not – modern, secular, technophile - or who they hate, blame or fear.

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six subnarratives and the development continuum

Figure 5

The figure recapitulates Figure 1, of course, but places the sub-narratives near their centre of influence. The clustering is, however, a major simplification of reality. There are, for example, many adherents to the "Troubled, Anxious" sub-narrative who live in rich countries; and only a minority of the people living in states in the 'lower branch' of the figure are Rejectionist Ultras. By contrast, contemporary America abounds with Rejectionist Ultras – survivalists, conspiracy theorists, religious oddities and other elements, some marginal and others capable of major electoral impact.

Our analysis has identified three very general political styles which are likely to be strongly represented in the period after 2025. Their nature is set by the problems that need to be solved, and the likely political dynamics of the times. The styles are:

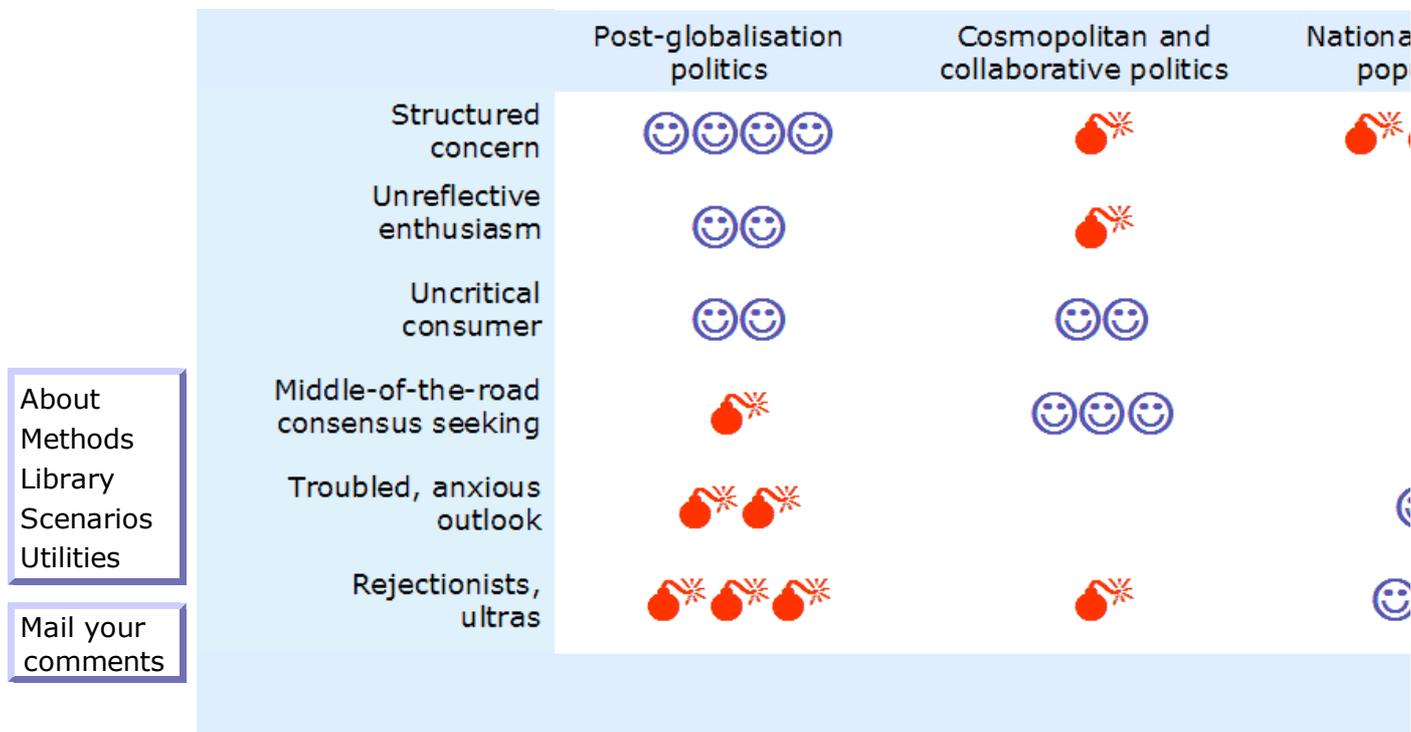
- Post-globalisation politics, where the issues are connected with international relations, the management of system-related issues such as public health and other means to manage the increasingly cramped planet and its peoples. This style is led less by national or formal institutions than by activists, by bottom-up and often inchoate demands, by commerce that anticipates its future and its relationships with its customers. Another very important actor are the inter-operational state agencies, which have just been discussed and which, through their universality and evidence-based professionalism, set narrow bounds for political manoeuvre.
- Cosmopolitan and collaborative politics, a style pursued chiefly by national institutions. This is far from parochial, but it thinks primarily in terms of partisan and national advantage. In difficult times, this form of rational pragmatism is the best that can be expected from the world's political institutions.
- Populist politics that focuses on ideology and blame, national advantage and a sense of victim-hood. This style is so clearly with us today that it needs no further exploration.

The battle between the three political styles is waged in terms of which of the sub-narratives predominate. That is, a country can as easily become a consumerist, middle or the road sort of place as it can slip into the Populist mode. What makes the difference is recent history, activism, the media and a host of other factors which influence how people see the issues and talk about events.

Figure 6 contrasts the sub-narratives with the three political styles. Smiling faces suggest a common interest, whilst fizzing bombs denote opposition; the more, the stronger the impact.

The Post Globalisation style is very strongly supported by one sub-narrative, and has weak, fair-weather friends in two others. It is opposed by three sub-narratives, strongly by one of them.

Cosmopolitan politics is liked by the comfortable middle of the road, consumerist sub-narratives and only weakly rejected. It is the standard, default style that most industrial nations (and large commercial organisations) have deployed for the past 50 years.



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Figure 6

Populist politics is intensely rejected by the Structured Concern sub-narrative, and much favoured by four other groups. The middle sub-narratives can slip from Cosmopolitan to Populist politics very easily, essentially when the "troubled" aspect is played up.

How many people are likely to adhere to these sub-narratives? Clearly, anyone can feel themselves a cosmopolitan internationalist at breakfast and a convinced nationalist by dinner time. That is the nature of rival sub-narratives – they capture one in contradictory rationales, each of which can make complexly opposed views feel completely reasonable.

approximate share of sub-narratives of the global population

Figure 7

Making many assumptions we have, however, generated the data shown as Figure 7. A great deal is packed onto this figure, so an explanation is in order. The outer wheel shows the relative population size of the six sub-narratives. They are coloured in concordance with Figure 4, with brown and ochre signifying one end of the implied scale, and green-to-blue the other. It is immediately clear that the huge majority follow the consumer-consensus-anxious continuum, leaving the activists a distinct minority.

All things being equal, most of the world will tend towards a Cosmopolitan-Consumerist future. This is signified by the bright green inner circle, which shows the extent of the supporter base for this style.

The much smaller blue inner loop shows the active support for the Post-Globalisation style. This implies that any such initiative cannot be global, but will grow from a small heartland where the appropriate kinds of people gather and debate.

Finally, the loop which is shaded red shows the potential supporter base for the Populist-Nationalist style. Whilst this is far larger than the blue loop, it is nowhere nearly as extensive as the green loop. Nevertheless, it could still influence the lives of a large number of people.

The world's poor seldom feel themselves to be a part of a political movement. The urban poor may belong to labour movements, which are in turn affiliated to political parties. The rural poor define themselves in terms of ethnicity and religion. Nationalism exists where there is an external threat, or where the state education systems – and military service – instill this. Religion plays many different roles - from an annealing social force to the focus of agitation against rival narratives or class enemies, such as land owners or other ethnicities.

Religion has the potential to hybridise with the Populist-Nationalist style, but it is far from pre-ordained that it will do so. The core of religious belief is likely to have difficult period ahead of it, both as our knowledge of the physical and cognitive universes grows, and as the

strongly-developed secular-humanist morality attempts to expand towards universality.

Is it likely that the poor populations of the world will find common cause? Awareness of social differences are already acute, due to mass media, to physical mobility and to education. The emotions which this generates can be harnessed in many ways. Activists seek to channel this into political change, whilst the mainstream try to harness this energy into economic activity and direct self-betterment. It is clear that when the path to self-improvement is blocked, then the tendency to listen to the activists will increase.

The outcome of this has been a plethora of movements, rather than a single political ideology. Transnational movements – from Communism through the Catholic theology of liberation to the various flavours of revolutionary Islam – have been trying to instill a unity of ideas for several generations, without obvious success. Perhaps due to the psychology of those who run such movements, schism is more common than unification. Poor populations tend to see politicians less as representatives than as points of contact with power, people from whom they can seek favours in return for personal loyalty.

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Poor countries exist along a continuum of those which can organise themselves into a politically-coherent and stable entity – and so attract what it takes to grow – and those which decline into corruption and chronic malfunction. The latter group would be the natural home to a common political cause, but are chaotic and therefore difficult to mobilise. Success requires rapid results, in the sense that supporters gain immediate and tangible benefits. It is hard to see what these might be for, to take an example, the poor of India or China. Rather, the mainstream political process is likely to take measures to benefit the poor and so avoid disruption, gain an educated work force and in other ways turn a social burden into a benefit.

All of this is predicated on a rational, open and prosperous world. In the event that economic progress stalls for a long period, markets close and options become tight, then disaffection will surely follow. It is very unlikely, however, to form itself into a common political movement with a single leadership, agreed strategy and common resources. The drive to that or that interpretation of Islam, class-purging Leftist politics, aggressive labour organisation, rejections of modernity such as "Maoism" and Sendero-Andinismo and the hundred other such movements have little to offer each other.

By contrast, alliances of formal political leadership in the pursuit of a common agenda may well have more traction. Precisely how this traction will apply itself is yet to show itself: a phosphate or minerals cartel? Compliance with environmental regulations? However, as the systems issues become more acute – see below – so compliance with the necessary global regulation becomes ever-more important. The poor world's billions will then have something with which to bargain, demanding a market rate for ecological compliance, respect for intellectual property, crime and terror management and the other thousand pinpricks that they are able to deliver to the rich world.

**Review:** We have identified three (or perhaps four) global narratives. One of these, **Post-Globalisation**, has yet to be fully characterised. We will hear more about it as we explore networks and the concept of collective intelligence. The next three are clear features of our current world. We have just discussed poverty, and concluded that it has less one narrative than a plethora of poorly organised and only vaguely-thought through concepts. This is not to say that such a perspective cannot be found, and it is the populist-rejectionist narrative that can support it. For working purposes, therefore, we are going to elide these as '**Poor-Populist**' for most of what follows.

The Cosmopolitan-Consumerist style is also problematic, not for what it is today – the aspiration of a very large number of people – but for its practicality. A subsequent section reviews the systems challenges that face the world. It is extremely difficult to see how the world's population can get rich, and impossible that they can do so by recapitulating the pathway made the the first wave of industrialisation. Consumption must be mitigated if imports are to be affordable, quite aside from the environmental and issues of supply security and economic stability.

We have called the resulting narrative **Consumer-lite**. The name implies that the Cosmopolitan-Consumerist narrative cannot extend to the entire global middle class, and these will find their satisfaction in a more service oriented, resource efficient form that will eventually feed back tot he old rich world. The style is discussed in more detail in the section titled "Two wedge, three flows and three populations.

This has been a complex section. The scenarios must play themselves out against three or four

dominant political and social narratives, one diffuse, three likely to be well-defined. The dynamics between these narratives has been made clear, as have their probable relative scale. The following table may help to put these into perspective.

	The Poor-Populist narrative		Consumer-lite narrative	Post-globalisation narrative
	Poor groups	Rejectionist groups		
Relationship between the citizen and the state	Political life is run for and by elites, which typically work to minimise social and maximise economic change. Less representatives than temporary rulers.	The state is all embracing and citizens are subservient to the state and its interests. Often in conflict on ethnic or ideological grounds; culture of blame.	Citizenship defines entitlement and rights; but it carries few obligations beyond strict law. Politics of the centre make long term issues hard to address	The state is so accomplished in delivery, and so in thrall to best practice, that it can be ignored. Attention shifts to membership of e.g. networks and other interests
Perceive key role of government	Delivery of basic services, ability to secure inward investment and aid. Bargain with rich world over compliance with e.g. environmental regulation	Articulation of the national narrative, setting direction, defending against "the others"; fount of authority	Management of the necessary overheads; marginal shifts in overall resource balances; law enactment	A coalition of largely separate, expert processes to carry out public duties; a nexus to formalise law
Political machinery	Weak institutions, lying under various political formalisms	Authoritarian, populist politics, appealing to national verities	Party-based representative democracy. Like nations tend to form complex political hierarchies	Emergent expert policy definition, coalitions aimed to circumvent political stalemates
Representative populations	Large rural populations, plus sprawling unplanned urban growth. Small cosmopolitan elites and strong class system	Usually primarily urban, educated in the manner prescribed by the prevailing narrative. Access to information is highly restricted, behaviour is mandated by narrative.	Urban-focused nations. Very normative institutions that are designed to manage the environmental end game, security in a crowded world and a very complex commerce.	Intensely and continually educated, articulate and almost entirely urban population, based around attractive clusters of competence, otherwise affiliated only to excellence.
Numbers	~5 bn in 2040	~1 bn	~2.7 bn	~0.3 bn
Power	Modest	Disruptive	High	Indirect, high
Outlook on 2040	Desperately seeking industrialisation but set against rising import costs.	Primary producers insulated; rest either turn inwards or have to make a radical leap.	Gradual evolution towards a protracted consumer-lite end game.	Opening horizons based on new capabilities, technologies, roles and goals.

Table 1: four important populations and political alignments for 2040

The review section notes that we needed to characterise the Post-Globalisation narrative. In order to do this, we need to introduce some new concepts, which we address in the section which follows.

### Networks and collective intelligence.

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**Abstract:** *Collective Intelligence is the term applied to groups of people who are able to behave in a highly orchestrated manner, exactly complementing each others' activities. Information technology will make firms and other organisations display this characteristic to an extraordinary degree. This and other forms of contextual awareness imply radical changes*

*to how groups think, perform politics, compete, entertain and educate themselves. This is one of the deep roots of the Post-Globalisation narrative style.*

A [working paper](#) reviewed the extraordinary technical progress that we can expect by 2040. (The economic implications of this are discussed below.) An area of considerable interest is that of how groups of people can be caused to work together more effectively, and the natural extension of this to the society as a whole. The concept of collective intelligence is reviewed in detail [here](#) and what follows is a summary of this.

Metcalf's Law states that the value of a network rises with a power of the number of people who are connected by it. Superficially powerful, Metcalfe's law fails because it does not distinguish useful from obfuscating, irritating or ignorant contributions. These tend to rise more rapidly than useful connections, diluting any gains.

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Effective networks have a number of characteristics. They tend to manage their membership against peer reputation. If a contributor is viewed in a positive light their input is noted, and if their reputation is low, they are filtered out. The maintenance of reputation is very important, therefore, and contributors strive to be helpful and in other ways display excellence. Those inside such a network are trusted, given slack and space, perhaps resources; and those who are not members do not even perceive the network in action.

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It is common experience that some working groups attain a level of mutual support where whole is indeed much greater than the sum of the parts. Such groups show what is termed collective intelligence, abbreviated to CI.

There are two broad kinds of CI. Type 1 CI occurs in tightly defined circumstances, where everyone knows their roles and goals. Type 2 CI is far more rare, and useful in that can transcend current barriers to thought or action. It occurs where people are undertaking loose, apparently unstructured discussions about "what might be", and suddenly create something new and useful, an outcome that none of them could have generated when working alone. Today, Type 1 CI is the goals – seldom attained – of corporate information technology. Type 2 CI occurs through social process which we do not understand, always in small groups that are working together in trust networks, as described above. Generally, Type 1 systems cause organisations to become more and more like each other, grinding the last costs out of virtually identical technical systems. They are necessary for survival, but do not create anything new. Type 2 CI breaks the paradigm, and sets the owner of the insight into a new trajectory.

Gartner consulting defined Collective Intelligence as "an approach to developing intellectual content, such as code and documents, through individuals working together with no centralised authority." (2005) The last three words are crucial: this is not directed labour, but a purposeful churning of ideas. There is authority, but it is the authority of the group, or of the system that supports the group. To date, four sets of insight about this structure have been developed:

### 1: Successful insight requires a complex foundation

For anyone to be illuminated, three conditions have to be true. You need to know what your problem is. elements of a solution to the problem have to exist: resources, technology, contacts. There must be an intellectual and operational means of connecting the two. If any one of these is missing, CI will not exist.

### 2: Organisational problem ownership is usually collective

It is the group that has to note the existence of a problem if the group is going to solve it. For this to happen, these people need to be talking together in a structured way about the overall situation in which they find themselves: how the operating environment "works" and is changing, what the groups want as an outcome, what seems achievable, what seems to be at fault. That seldom happens of itself, and the complex foundation also consists of building these thoughts into a dynamic, changing but also intimately shared way of talking and thinking.

Any one group will almost always misidentify the problem to be solved. As a result it has to circle around the issue quite a lot, which takes time, trust, forbearance.

### 3: Filtration is value added

Metcalf's Law works if you have good filters in place. That is, the value of a network increases faster than the number of participants if and only if the input from those individuals is subject to distillation at an even greater pace. This is the network

version of productivity growth. Filtration is achieved by proper process architecture (see 4., below) and the self-censorship that is generated through having clarity of purpose, and the desire to maintain a reputation for being useful.

That has two consequences. CI occurs when those involved understand the problem. It occurs when the group are exclusive, in the sense of bringing in people who have useful things to say.

#### 4: Process architecture is crucial

Activities need to be undertaken in the right order, summarised and passed on to the next phase. This needs to be managed, not as a linear sequence of events but rather an understanding that one aspect is more or less settled and that it is time to move on to something else. This requires a generally-understood etiquette - a change of gear, altered social norms, a shift in what is open to challenge - when one element is settled so that the group can move on or re-focus.

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We have covered this in some detail because it is important to understand what is involved in generating CI. It has to be organised, and that takes disciplines and skills which currently happen only by accident. If, however, CI could be the default condition for not merely organisations and government but for all of society, then the outcome would be truly revolutionary.

We have already discussed the importance of intangible infrastructure, and the social framework that supports clusters of capability. We have noted the enormous potential contribution to economic growth (and the efficiency that both underpins this, and which is also required in order for economies to operate in a world of nine billion people.) The interaction of intangible and other forms of infrastructure with CI is self-evident. Clusters of capability that have access to both will do spectacularly well. These may be focused around geography or, as information technology improves, around less a less tangible focus, such as a commercial network or cultural attractor.

Swift, purposeful innovation will continue to lie at the heart of commercial success, but the pace of change is bound to accelerate. We have seen how expert networks assemble themselves around problems and distil information about them. The consequences of that may be a self-assembling, vastly competent, perpetually active structure. Industries within such a structure harness the capabilities of all involved into a purposeful, continual revolution. (More [here](#).) How might this be brought about?

Technology is central to a solution, but so too are environments that enable the required social skills. We discuss the issue of "intangible infrastructure" in the next section. Here, we focus on technology.

It is clear that Type 1 CI will be wholly automated by 2040, in almost all contexts. Information structures will "understand" the drivers of the operating environment, note changes and shift their behaviour accordingly. (That means two kinds of change: noting the consumers eat more lettuce in warm weather, noting that the forecast is warm and so increasing orders; and also noting that consumers used to do this, but now prefer more complex salads; and so ordering something different when warmth is predicted.) The first of these is largely routine in large scale retailing in 2010, and the second is virtually certain for 2040. The consequences are that skill levels for the employable will need to rise.

It is likely that IT will be able to go much further than this. We shall probably know the basis for biological cognition, and be able to emulate this in IT systems. Such systems may be slow to train, but once capable, can be multiplied very quickly. These will start from systems such as the legal advisor, able to give contextual advice on demand, and thus putting human lawyers out of business. (As former draughtsmen now manage complex CAD systems, so employable professionals, soldiers and others will give general guidance to systems that might other wise get stuck in local optima, or fail to display judgment of sufficient breadth.)

However, systems of this sort are probably basic elements of much more complicated structures. Your telephone-replacement may be able to recognise your social and legal situation as you move about, and throw up minimalist prompts that you should consider this or that; suggest alternative course of action, coach poor performance and point to options that you might not recognise for yourself. Omnipresent surveillance of physical and financial, social and educational transactions allow systems to detect emerging problems, thwart crime and promote positive outcomes by managing a myriad of micro-interventions. Applied to a company, the IT system will be continually coaching, connecting, rendering in summary and guidelines what has been achieved to date: in fact, fulfilling all of the infrastructural

requirements for CI, as already discussed. People can concentrate on delivering what they do best.

This may sound utopian – or alarming – and clearly, many issues have to be resolved before such a structured omniscience can be allowed to take root. However, it will not arrive complete, but grow out from instances and nodes where it confers immense commercial and other advantages. If your neighbourhood could be kept perfectly safe and stimulating for children, why would people not want it? A company that refuses to use the best technology today is quickly penalised; and that will be as true in the future. If CI works, it will be used, perhaps not under that name, perhaps not seen as a single thing, but as an emerging and unstoppable trend.

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A major consideration is, however, the fate of those regions and communities which will not or cannot take on this capability. Their capacities will be weak, and they will quickly fall behind. This is likely to happen in any scenario in which the capable communities of the world find themselves opposed and threatened by other groups, such as those holding to the Rejectionist narrative discussed earlier. Technology transfer would be stalled, investment would be curtailed. The balance between the Poor-Populist and Consumer-lite narratives deeply affects their prospects for development.

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## The outlook for economic growth

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**Abstract:** Assessments of economic growth prospects are set against the sub-populations that were developed in the previous section. The modifying consequences of knowledge and demographics are developed for these.

It is important to calibrate the scenarios against reasonable numerical projections. Happily, colleagues in the OECD have made such projections, published in OECD working paper ECO/WKP (2009)4, but modified to give us 2010 and 2040 figures for GDP. There have been sensitivities done around a central forecast, and these do not show large perturbations for the period (+ 0.5% - 0.8%).

Growth proceeds at an overall average of around 4½%, making the world economy about three and three quarters as big as it is today. The economic model concentrates on factor flows and factor productivity. That is, taking the example of human factor flows, the analysis asks what numbers of people and of what educational quality will be available to each of the parts of the world so examined.

It does not address the issues of the previous section – the impact of additional knowledge on factor productivity, or the affect of new work styles, learning and guidance systems and the like. It may, therefore, under-estimate the overall growth that is achieved, and over-estimate the contribution from the industrialising countries. Equally, it does not take account of rising commodity prices, a near-certainty for the period. These will serve to slow growth overall, shift resources to certain regions – such as the energy rich Middle East – and constrain the growth of energy importing poor nations. Consumerism-lite (discussed above) will mitigate the impact of this on the richer nations.

These caveats aside, the approach shows that growth is uneven, as displayed in Figure 5.

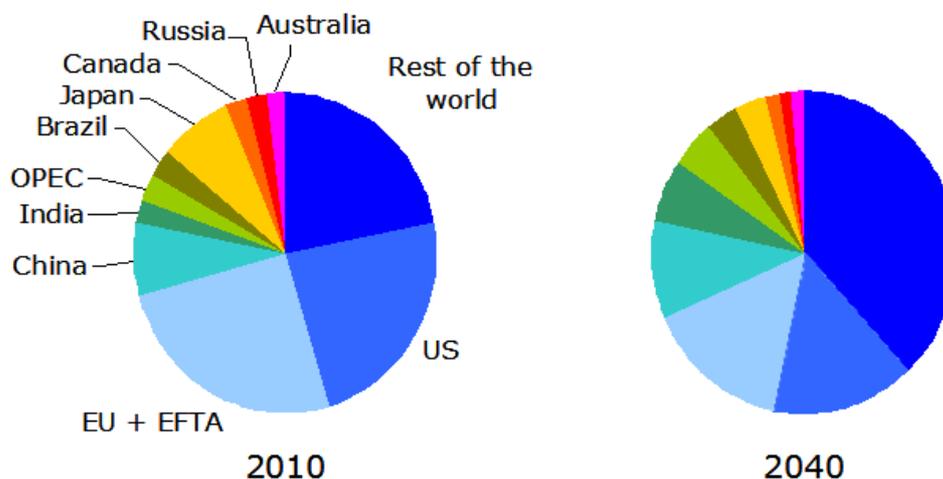


Figure 8

The share of world output attributable to the European Union and the United States falls. China grows, but – because its factor productivity growth peaked in 1995, and because its population is aging and not particularly well-educated – it does not fulfil the fairly wild prophesies made on its behalf by some commentators. Brazil is also a bit-player. India expands greatly – the strongest relative performance in the entire assessment – but does so from a smaller base. Japan and Russia contract in relative terms, and neither show much absolute growth, chiefly for demographic reasons. However, energy producers such as Russia expand their share slightly, an assessment that may understate reality for the reasons already discussed.

The greatest relative expansion is, however, in the "rest of the world". We have already discussed the many pressures on this group, many of which the OECD economic model does not address. This group comprise slightly less than half the world's population today, but their numbers double to be five to six of the nine billion people living in 2040. They are subject to the competing claims of the Consumer-lite and Poor-Populist narratives. Which of these dominate is a strong element in the scenarios.

Our final assessment of economic consequences of the interaction between the three narratives and the three scenarios are addressed at the foot of this paper, [here](#).

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### Systems issues: managing the commons

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**Abstract:** *The international arena has weak institutions, which will have to be strengthened if the many systems challenges are to be met. This section explores some of more important of these system challenges.*

We began with the three issues that the scenarios have to address, one of which we called "systems issues". As the human population expands in numbers and economic weight, and as hitherto separate cultural and political clusters bump up against each other, so problems have been and will continue to be generated. All of these are connected with the creation of systems of management.

We already have one universal systems management tool, which is the market place. We allocate scarce resources to where they are best used in generating a surplus. This system has its limits: it is prone to instabilities, it does not think particularly broadly and it discounts the future over the present. It is rational as the people who make it up, which is to say, not very rational, but it has the virtue of needing limited management and maintenance, and being a natural structure around which people instinctively cluster.

It is, however, probably not enough to manage global affairs. There are around five broad but separate things that need to be brought under control if our future is to be stable. The approximate timing of the onset and dominance of these factors can be seen [here](#).

### Resource supplies

We have noted that the 2040 economy will of the order of be 3-4 times larger than it is today. That implies that extraordinary efforts would have to be made to reduce the growth in demand for minerals, food, energy, water and a host of other natural resources. That is to say, consumption will have to become much more efficient than it is today.

Left to its own devices, the economic system would achieve this through the price mechanism. If the demand for copper, for example, quadrupled, then prices would become extremely high. That would quickly choke back the demand for copper, and stimulate its supply and recycling. However, the price would be paid by a direct diminution of economic growth, and through reaction to inflationary pressures. The usually resource-inefficient poor economies would be particularly affected. They would have to divert wealth from internal consumption to exports in order to pay for more expensive imports. Poor countries are generally set on building their infrastructure, and this takes raw materials. This would have to be slowed, whilst the infrastructure rich nations are less affected. (Only a small proportion of world Aluminium supply is "primary", as the remaining approximately 50 million tonnes used every year comes from recycling. However, it is the rich nations which have the base from which to undertake this, mining old buildings and machinery. New construction in China and India have largely accounted for the net primary demand.)

There are, therefore, two aspects of this to consider. First, how can efficiency improvements

be driven in advance of price signals. Second, in order to avert supply crises and price spikes, how can investment be stimulated, also in advance of price signals? This last is particularly important in regards to energy production.

There is no simple answer to this. It is, however, immediately clear what will stop such developments. A lack of clarity on the part of government about what needs to be done. Instability in the international arena. A lack of confidence in the viability of the poor economies. These factors are linked to each other, and poison the potential for anticipatory investment.

Stability lies at the heart of a successful response. The sums involved are immense – the IEA [estimates](#) that investment around US\$33 trillion will be needed to meet energy demand in 2030 and also to meet emission targets, as discussed below. Such quantities of money are not invested as a gesture of good will. Investors need to expect a return, and that return is based on expectations of political and economic stability. If these are not found, then the investment will not happen, or will happen in erratic spikes, confined to particular parts of the world. For example, if Russia became suddenly unable or unwilling to supply Europe's gas needs, then European countries would be likely to embark on extremely expensive programs for energy autonomy. Investment would focus on projects that did not yield as much as rational global investment, and the economy would slow.

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We return to the issue of stability at the end of this section. Efficiency has been mentioned, and it is a critical feature, Cars need to use less fuel, houses need to keep to the right temperature with the minimum of energy use. There are three tools that drive resource productivity: technology, predictable price signals and equally foreseeable regulatory mandate. Companies will invest in technology if the other two factors are in place: essentially, if the business model for doing so is clear. People will buy these products if they have to, and if it pays them to do so. They will change their habits if the new way of acting is better for them than the old one. For example, the green lobby urges the use of public transport. People will only do this *en masse* when doing so is more rewarding than using other alternatives. Price signals help, but so does a modern system that takes account of what is involved in making a particular kind of journey. Shopping is not at all the same as commuting, and bundling them together as "transport" is unhelpful.

All of this pertains chiefly to the wealthy world. Poor countries buy third hand cars, install obsolete plants and connect up their urban networks with carbon-belching thirty year old trucks and buses. As these grow, they need to reinvest using peak technologies. There are two problems with this. First, the initial cost of these is very high, although the lifetime cost is far lower. Internal investors usually face expensive capital, which requires them to take the lowest front-end cost option. External investors have the discount rates which allow this to be taken into account provided that the nation itself remains stable.

Second, high end technologies will, increasingly, embody intellectual property that can be stolen, or used for dangerous ends. In a tranquil world in which these things are managed, this will not matter. However, the blocks on technology transfer from the US to half of the current world give a pointer to what can happen when the world is not tranquil. The next decades will see exception level of competition, where commercial secrets and technologies make the difference between national success and failure. Attitudes to technology transfer will, therefore, be important and extremely volatile.

The major commons – the oceans, fresh water supplies, good agricultural land – are over-exploited or already in short supply. Energy and minerals are extremely concentrated in terms of geography, often in regimes for which the future appears unstable. Phosphates are derived in bulk from only a few countries, as are technology-critical minerals such as Lithium and Cobalt. The down-side of a period of instability will affect everyone on the planet. It will lead to a phase of bilateral deals, short term advantage seeking and other activities which exacerbate instability. We will come to the consequences of this when we discuss the scenarios in detail.

### Pollutant sinks

Everyone is aware of the concerns about pollution. Many developing cities have foul air, dirty water and garbage on the streets. Industrial countries emit around 100,000 novel chemicals into the environment. Large economies emit combustion products- carbon, sulphur and nitrogen oxides, each of which has its affect on the natural world. Our knowledge about the past instability of ocean currents and therefore of global climate makes us sensitive to the possibility that some combination of these may push us into a period of volatility.

There is more on these issues to be found [here](#).

Most of the issues are tractable to policy, but point to much more costly solutions to problems that we currently solve in polluting ways. However, the cleanliness of the air and water in the main cities of the industrial world shows what can be achieved. London's air was lethal even fifty years ago, and the Thames river was an open sewer. As with the previous section, the issue is one of clarity and will.

The key issues are exactly the same as those covered under resource issues. Efficiency can actually save money, but most solutions will come at a net cost. Offshore wind costs very much more than onshore gas-fired power generation, for example, under any foreseeable gas price scenario. One can shift the economic balance by taxing carbon emissions – with all manner of justification – but the net affect is a cost to the economy which will slow its potential growth. Policy makers tend to try to hide these issues from the electorate, and succeed thereby in alienating both them and commercial solution-providers, who always have a clear ear for a fudged issue.

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Those mandating solutions needs to be clear as to what they are trying to achieve, therefore, and how much they are prepared to divert to these usually costly solutions. They need to take a view that will span many administrations, as all such projects have extremely long life cycles. They need to avoid being over-specific. That is, to mandate a particular technology is to block the development of other, better capabilities. Energy and resource-intensive commerce will spend much to the next three decades arbitrating anticipated an actual regulations so as to make a profit. If these lack clarity, or change with every wind, then nothing will get done.

There is an additional dynamic, which is the need for international accords around these issues. Great attention is paid to carbon-related issues by the media. That is proper. However, the reality will be very much more detailed than this. Nations which do not abide by regulations that generate costs for their industries will operate at a profit. However obvious this may sound, it becomes extremely complex when the issues ripple down the supply chain. An ultra-efficient motor may use aluminium smelted with electricity generated in a fifty year old coal-fired plant that uses high sulphur coal. None of that is evident in the product. Thus, if all major suppliers of resource-intensive goods do not abide by the rules, all that happens is that the pollution is shifted rather than abated. To enforce this, supply chains have to be inspected, certified, policed, just as food supply chains will have to be managed in order to prevent mass poisoning by terrorists.

The implications are that these systems will need systems managers. International institutions are in their infancy as compared to national bodies of law. International commerce is, however, in advanced adolescence, and the mismatch between the two is increasing.

## Biodiversity management

There are no seas which do not have declining fisheries, and some have been exploited to extinction: the Californian anchovy, for example. Habitat destruction advances with agriculture and urbanisation, and ultimately with human population and its access to metal tools. A century ago, humans had an area approximately the size of Australia under cultivation across the planet. The best guess is that we shall have a region of green wilderness only the size of Australia left in 2030, and that dissected into parks and reserves, remnant forests, strips and patches. Those who visit East Asia will note how extremely quickly the European biofuels directive led to the mass felling of forest for palm oil plantations. Similar connectivity will exist in the future as nations strive to accommodate themselves to the resource and pollution issues just discussed.

We do not, in truth, know how much biodiversity "matters", in the sense of having a concrete impact on our well-being. Aesthetics aside, and ignoring views that nature is sacred, and needs to be respected, the evidence is mixed. Complex communities do seem to be more resilient and effective than simple ones, but the distinction is not at all clear. Gross pollution does lead to run-away over-simplification, as with lake eutrophication by fertilizers, an issue that has destroyed countless fisheries in China. Integrated pest management rather than an insecticidal blitz on pests seems to yield better results.

The chief message of "organic" farming methods is that they can achieve broadly the same cost-benefit combination as high input farming. As inputs are likely to be costly in future, and as biotechnology will release an extraordinary new potential in farming, such approaches do seem to point the way ahead. Nevertheless, doctrinaire or quasi-religious prescriptions will have to yield to technological pragmatism, but with the technology wrapped in the genes of the pant rather than emerging from a spray nozzle or fertiliser spinner.

Ultimately biodiversity is something on which individual populations will have to take a

decision. The consequences of this are not at all clear as this affects the global community. Some issues – such as fishery management – are plainly in need of a radical change in international law. Others, such as forest management, are essentially parochial.

Much is made of the world's forests as lungs, or carbon sinks. They are neither, being in exact carbon and oxygen equilibrium. Factually, the amount of carbon locked up in a forest and the field of sugar cane that replaces it are roughly similar. If one wants to conserve forests, one has to find other reasons, and the chief amongst those is aesthetic and precautionary. Unhappily, such thoughts appeal more to people who do not have to toil in the insect-ridden heat of real forests, and the political pressure is applied in the wrong place.

### International predictability

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We have noted the importance of predictability to the process of adaptation to new global conditions. However, predictability is not limited to state policy. Few forecast the sequence of financial bubbles that (we hope) ended in the 2007 crash. Information was hidden, and analysis was hopelessly skewed in favour of optimism. It was to no politician's advantage to stop the party. Central banks saw their role as managing inflation, not worrying about over-gearing. No financial trader would go bear in a rising market until the very crest of the bubble was in sight. The Asian crisis that began the bubble chain was based on utterly false official statistics about reserves, debt, foreign exchange exposure.

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Predictability management cannot, therefore, rely upon the primary actors. There need to be independent international institutions that collect data, collate this and understand the implications of what they see. It is surprising that the IMF has not taken more of this upon itself. Existing institutions are well-suited to these tasks, but have so far failed to take the political risk of raising the alarm, or perhaps installing the mechanisms needed to detect and – above all, publicise – potential bubbles and over-ebullient economies. Ideally, such bodies would have a direct sanction upon – for example – central banks when such conditions are detected.

### Security and order

We noted in the first section that Kings could conquer terrain and with it, the productiveness of the land and the people on it. Wars of invasion are still possible amongst primary producers, but not in respect of the advanced economies. A captured New York would no longer be able to deliver what it does today.

Equally, nuclear weapons – and the stalemated chess game that is the modern battlespace – make great power conflicts extremely difficult to envisage. Trade and mutual advantage win over any gains from hostility. Outright aggression is profitless, and in fact causes enormous damage to the aggressor. Commentators note the possibility of a Chinese-Russian conflict over Siberian energy, or a stand-off between the US and China. The same comments were made about Japan during its brief time in the sun: it is conceivable, but the motivation of the aggressor are hard to fathom. It is far cheaper from China to buy the gas with exports of manufactured goods than it is to arm and then to conquer, hold and operate the gas fields against a nuclear power. It is cheaper in strict economic, and cheaper in the less tangible costs to its external relations, trade, standing in the world, long term future.

The bloody Twentieth century killed around 220 million people in conflict. About 20 million died in national conflicts and civil wars. The rest were killed by states attacking their own citizens: Hitler, Mao, Pol Pot. The chief security dangers that lie ahead are deeply rooted in weak institutions, notions of statehood that diminish the individual to a tool and transcendentalist views of religion.

Stability lies beyond the grasp of any one government or even a global consortium of governments. However, much can be done to make it more probable. Good fences make good neighbours, and firm rules of conduct remove a great deal of ambiguity. Rules that are followed grudgingly, and evaded where possible, lead to friction and armouring. Clarity leads to openness and trust.

Clarity will be needed as the world becomes more complex, the number of actors increases and voices become more articulate. There are several ways in which clarity will need to be brought to bear.

- As noted in the previous section, financial obscurantism has caused a succession of bubbles and collapses. Armed forces are now more open than they have probably ever been, exchanging officers in training courses and sharing ideas. This is a good

thing, and is beginning to influence the intelligence world. Shared information and interpretation greatly extends the scope of analysis, and prevents in-house obsessions and unspeakable truths from coming to dominance. (One hesitates to mention the Western intelligence failures around the fall of the Soviet empire, when every indicator was down, and every intelligence briefing pointed in the other direction. Group think, vested interests in careers and other dynamics allowed a decade of ultimately costly denial.)

- Deadly technologies will become increasingly accessible. People able to exploit them will exist in most industrialising countries. The control of technology diffusion – and the tracking of those able to make use of them – becomes a central issue.
- The industrial powers are able to do "More with less" because each part of the economy rests upon enormously complex underpinnings. A rose flower can be cut in Kenya in a morning and be available, cellophane wrapped, in a supermarket anywhere in Europe a day later. Complexity is, however, a vulnerability. Small interventions can cause enormous ramifications, examples of which it is not appropriate to put on the web.

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Aggression comes in three flavours. There are wars of conquest. There are wars designed to crush or punish, and there are wars of ideology, aimed to change the values and nature of the opposition.

As we have seen, wars of conquest are confined to issues that can be captured whole and exploited without cost. Saddam Hussein appears to have seen the invasion of Kuwait in such a light. Rational, large scale wars of this sort are hard to envisage. Small scale banditry – and their descent into criminality, as with large scale drug cultivation – are commonplace.

Violence that is aimed to manage and or punish an enemy is widespread. The interventions in Iraq, Afghanistan and elsewhere are industrial world incursions of this sort. At a lesser level, conflicts such as the Serbia-plays-the-rest wars of the Balkans have been of the same flavour. It is unlikely that these will go away. They will, however, be confined to regions where government is weak.

Ideological conflict is dangerous because it knows no limits. Even criminality weighs benefits against costs, risk against return. The suicide bomber makes no such calculation, or considers a putative Heavenly reward as a risk free proposition. Eschatological conflict – aimed to change human nature, to erase backsliding and sin – claimed hundreds of thousands of lives in the 1990s insurgency in Algeria. Villages were massacred for being intoxicated by Western values, symbolised by their possessing a television set.

The world does not lack ideologies. A current example that leads to conflict is the movement to re-establish an Islamic Caliphate – the notion of bringing the Arab, Middle Eastern or all Islamic lands under a common form of governance, This forms the backbone of many insurgency movements, and is aimed chiefly at the current governments of those countries, and only incidentally at the outside world.

Conflicts can be lessened by understanding their origins and managing these towards political settlements. This is easily said and much less easily done, but it is the accepted thrust of international diplomacy. Open debate amongst focused minds, the exchange of information and the presumption of rationality all make conflict more controllable. Military and dual use technologies, and the vulnerabilities of complex and fragile systems, make that control all the more desirable.

One can take this analysis a step further. Is there a practical solution available? Is this open to local solutions, or do all of the main powers have to collaborate? Does the backdrop suggest that any one power should collaborate or play to win?

Clear solution available?	Local or global issues?	Collaborate or play to win?	Outcome
Yes	Regional	Collaborate	Regional political accommodation
Yes	Regional	Play to win	Competitive scramble
Yes	Global	Collaborate	Largely global accords
Yes	Global	Play to win	Global block formation
No	Regional	Collaborate	Regional political accommodation
No	Regional	Play to win	Intra-regional aggression
No	Global	Collaborate	Muddle through

No                      Global                      Play to win                      Aggressive ideology; blocks

Table 2

This gives a complex pattern of relations, as sketched in the table. The inevitably difficult elements are marked in pink. They are combinations which require a global solution, but which either lack clear or economically viable solutions, or which pitch the agents into a scramble for advantage.

The essence of these difficult issues is that the dynamic of cooperation is absent. Powers collaborate with those with which they have most in common: rich with rich, resource providers with their peers. Power balances itself, and the powerless tend to lose. Von Bismarck was said to have "created a graveyard, and called it peace". If by 'solution' one means 'stability' - more or less temporary - then a balance of power delivers a solution.

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A world in which collaboration pays and conflict does not is extraordinarily desirable, not least as we head for a world population that we can barely expect to feed. Tranquility tends to be self-reinforcing. However, a world that is riven by divisions, in which adequate investment has not been made in everything from energy to health, is a world in which collaboration may be in short supply. It may pay the rational mind to grab what it can, in advance of foreseen scarcities.

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Systems issues stretch from environmental management to military security, from pro-active investment in energy and other resources to the spread of agricultural biotechnology. Factors which help and hinder these issues largely come down to the predisposing background situation - whether it pays to cooperate or not - and to a clarity about what needs to be done. As we shall see, the pace at which these issues present themselves also has much to say to the outcome.

### Two wedges, three populations and three paths

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Scenarios are generally developed against what are called "archetypes", simple ways of thinking that distinguish key uncertainties about the future.

In the crudest terms imaginable, the world can fall into anarchic chaos, it can offer a genteel version of the consumerist dream against a backdrop of ever-tightening limits, or it can break through this to something completely different. As we have noted in several sections of the preceding analysis, however, it is not the world that finds these options but rather sub-groups within it. Figure 4 gave us a feel for what these groups might look like. Our scenarios are not so much three worlds, therefore, as blends of these three populations, much as today's world blends the industrialised, industrialising and primary producer worlds. Any one of these can, of course, be endlessly sub-divided - post. The aim is to find a useful way of talking about the issues.

We suggest that there are three streams - scenarios - that head into the future, carrying various mixtures of these populations. The streams are separated from each other by two "wedges".

### The wedges and the paths

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Figure 6 repeats the development stages that we have already met, but substitutes time on the horizontal axis. World population climbs from over six to around nine billion, and the composition of it changes in the way shown by the coloured areas. (Only a few of the development stages are shown, for clarity.)

However, two wedges get in the way of this process. Distorting the natural process of industrialisation, we find the many, crucial systems issues that we have already discussed. These may arrive early or late, together or separately, intensely or in the form of a warning.

The second, higher wedge is labelled "capabilities". This refers to the issues of intangible infrastructure, the limits to networks of trust and the related issues that lead to collective intelligence being widely available.

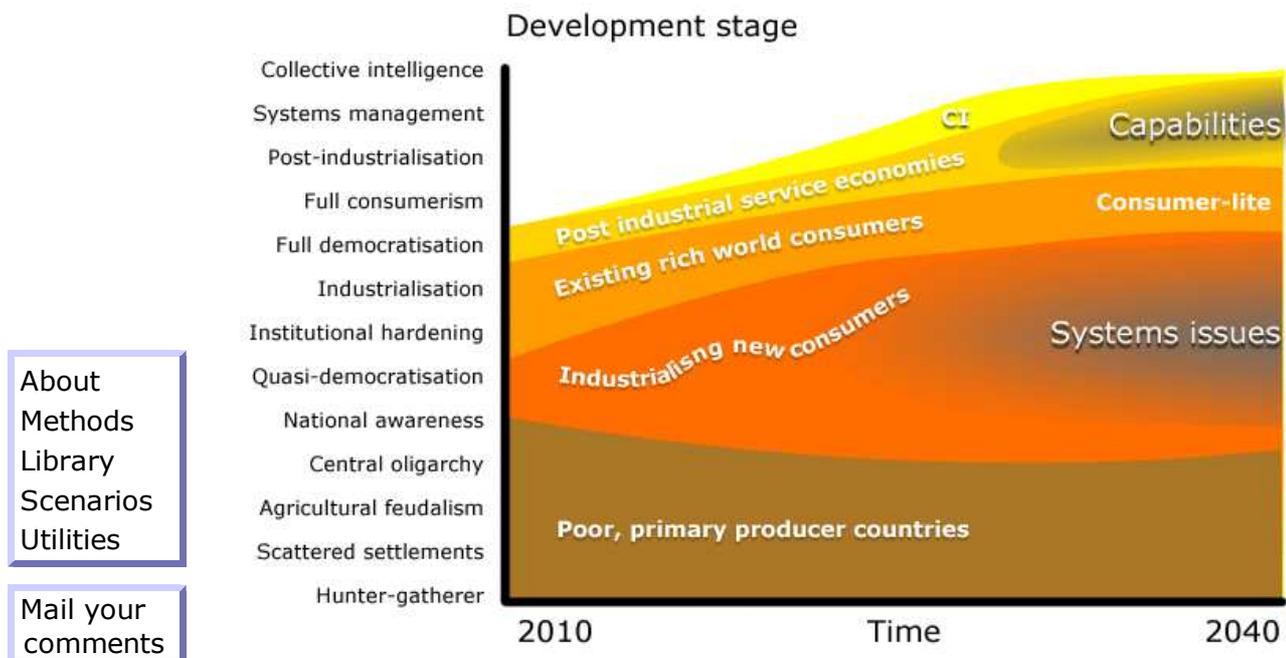


Figure 9

The result seems to stream the populations into three. Those able to surmount the challenges presented by the systems issues achieve a status which is labelled "consumer-lite". The nature of this has already been discussed. It is an end game, neither socially nor economically sustainable. Those who get into this state will be frantic to migrate out of it, or face a protracted twilight.

Where they aspire to go is the space above the upper wedge. As noted, the ability to operate in this area is highly circumscribed, but the extremely attractive consequences of operating in this way make it as desirable an aspiration as industrialisation appears today to the middle income countries.

Those which cannot surmount the basic requirements of the lower 'systems' wedge are presented with a greater and greater hurdle to leap, as the systems wedge becomes wider. Essentially, the development process has added hurdles, amongst them greater costs, intense competition and internal pressures on resources, the environment and the political system

### The populations

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The populations in these three streams are not merely rich, middle income and poor, but more or less confined into three ways of seeing the world. Figure 10 combines Figures 3 and 5, with the "wedges" being symbolised by traffic stop signs.

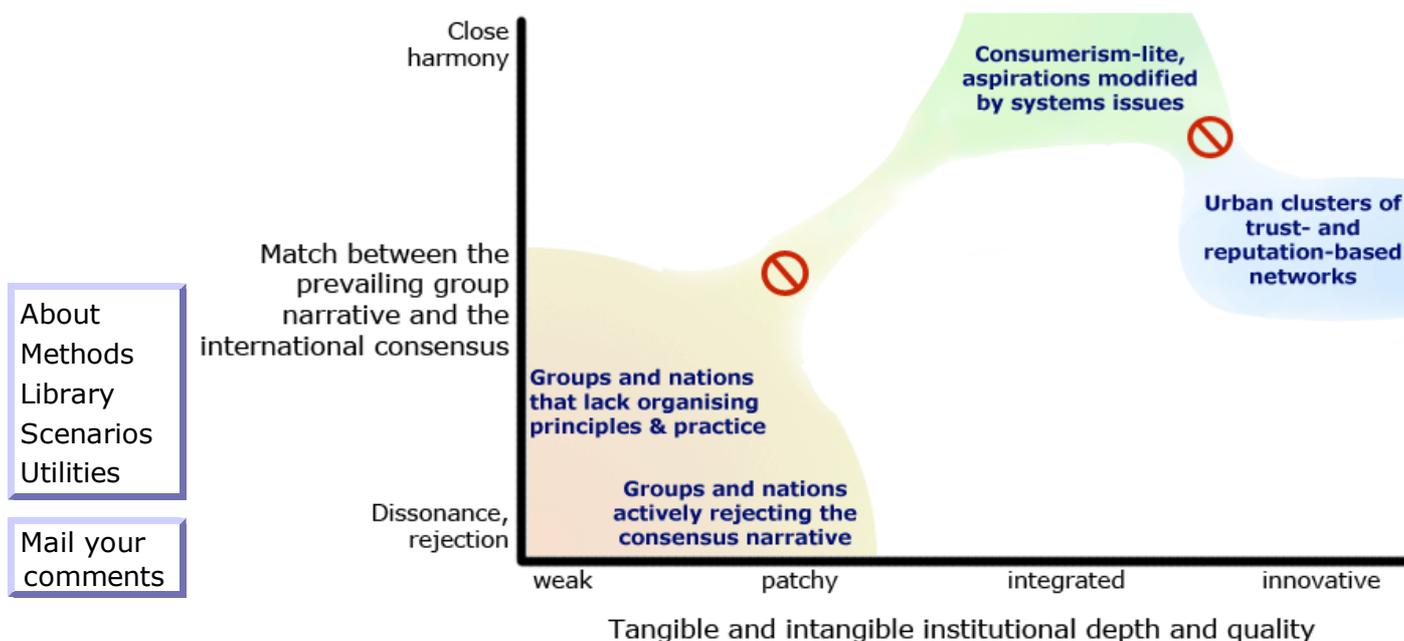


Figure 10

The notable change from Figure 4 is the essential elimination of a space for industrialising populations, which occurs for all of the reasons so far discussed.

However, the strength of the stop signs depends very strongly on prevailing conditions. As we have seen, the potential for polarisation is very strong. If this develops, then the paths will be strongly blocked. That leads to the likelihood of further polarisation in a cycle of feedback. Three strong mechanisms that carry this feedback:

Rejection of the "Consumer-lite" narrative as a destination by a large or loud section of the poor world means, inevitably, that they will not be inclined to make the necessary institutional changes that encourage industrialisation. They will not be attractive to inward investment.

Mutual suspicion means that the required international institutions will not be installed, and a concerted attempt to manage energy and resource supply-demand balances will not be undertaken. That implies both volatility and high prices for fundamental resources. Poor agrarian nations will be particularly vulnerable to this.

Instability means that inward investment to poor nations will be reduced. Technology transfer will be reduced, and intellectual property will also be closely guarded in a world where its protection is not managed properly.

What happens to nations which are trying for economic development under these difficult conditions? Some will drift under the influence of Rejectionist narratives. Some will make themselves sufficiently attractive that they do attract the inward investment of cash, capabilities and management support. The outcome is a temporary, probably beneficent period as the client of a greater power. It may be, however, that yet others simply find a way to be content with themselves. It is remarkable that all measures of social content within nations tend to rise sharply to around an income per capita of several thousand dollars, and then plateau. Much the same is true of individuals: poverty is misery, but an adequate and above all predictable income seems to transfer the focus to other issues. One could see a true "alternative lifestyle" emerging amongst such populations, particularly in a relatively tranquil world.

## The scenarios

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This section describes the scenarios, and leads into a "pointers" section, in which early warning signals are explored.

## Review and introduction

We began by laying out the issues that these scenarios needed to address. There were three of these:

- Can the very poor nations expect to develop in ways that essentially recapitulate the emergence of the current industrial world? If not, then what happens to them?
- Are the many systems issues which we face essentially show stoppers, or are we able to manage and circumvent them? If so, what kind of world does this suggest? What happens if we are not able to do so, or if a significant fraction of the world's population are excluded, or exclude themselves?
- What is the shape of true sustainability, in the sense that humanity – or at least some of it – is able to transcend these limits and soar towards new challenges? Can we catch a glimpse of what might be involved, and if so, then how general a situation might this prove? What is the situation of those who cannot make this transition, for whom the future must be an protracted end game, in which limits are fought but not overcome?

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The notion of there being "two wedges and three (or four) populations" gives us a strong sense of what is involved. The systems wedge – coming with economic disruption, enormous investment needs and possibly political upheaval – breaks the world's populations into those which can surmount its challenges, and those which cannot. An early arrival of such a wedge is likely to prove much more difficult to surmount. The existence of economic volatility, poor performance, widespread rejectionists or populist politics may also inhibit anticipatory actions and thwart early responses,

What is it like "on top of the wedge"? It is the regimented environment of the Consumer-lite narrative. Economic and regulatory pressures enforce extreme efficiency, Some resource-intensive goods and pastimes are priced out of consideration. International regulation mandates what can and cannot be done in the name of economic activity. Consumer-lite is the closest that the world's billions can come to the consumerist model to which most appear to aspire.

The economic environment will be fast moving, prone to instability, and also prone to political as well as economic logic. Competition will be exceptionally fierce, and all rational players will invest heavily in the knowledge and skills that are needed to maintain their relative capacities. As new billions crowd into this political and economic space, so the regulatory end game will become more intense, resource prices will creep up or shoot up, and there will be ever-less room for economic, social and political manoeuvre.

In what form might transcendence arrive, presenting a path out of this trap? If we could write a prescription today, then the problem would be solved. It must have three elements to it.

**First**, it entails the greater supply of knowledge and the very much better use that is made of it. People, whether as individuals or as organisations, become better at thinking and have more things to think about.

**Second**, the create-consumer narrative that has driven industrialisation has to be supplemented with "better ways of being". We cannot have any real idea of what these are, although they are almost certainly connected with a genuine eschatology, a change in the nature of what it is to be human. How might that come about? Perhaps by directly operating on what it is to be human – something well within the technology of the time – but far more likely, with changing the way in which groups socialise, interact and empathise with each other.

**Third**, this style has to have the potential to reach out to – ultimately – all of humanity, but certainly to encompass the "consumer-lite" billions within the span of a few decades after 2040. We have guessed (above) at a participating population of 250 million or so in 2040, but this would need to be multiplied by twenty-fold to encompass the middle classes of 2060. This sounds extreme, but recall the pace at which other popular movements – urbanisation, consumerism – advanced when the conditions were right.

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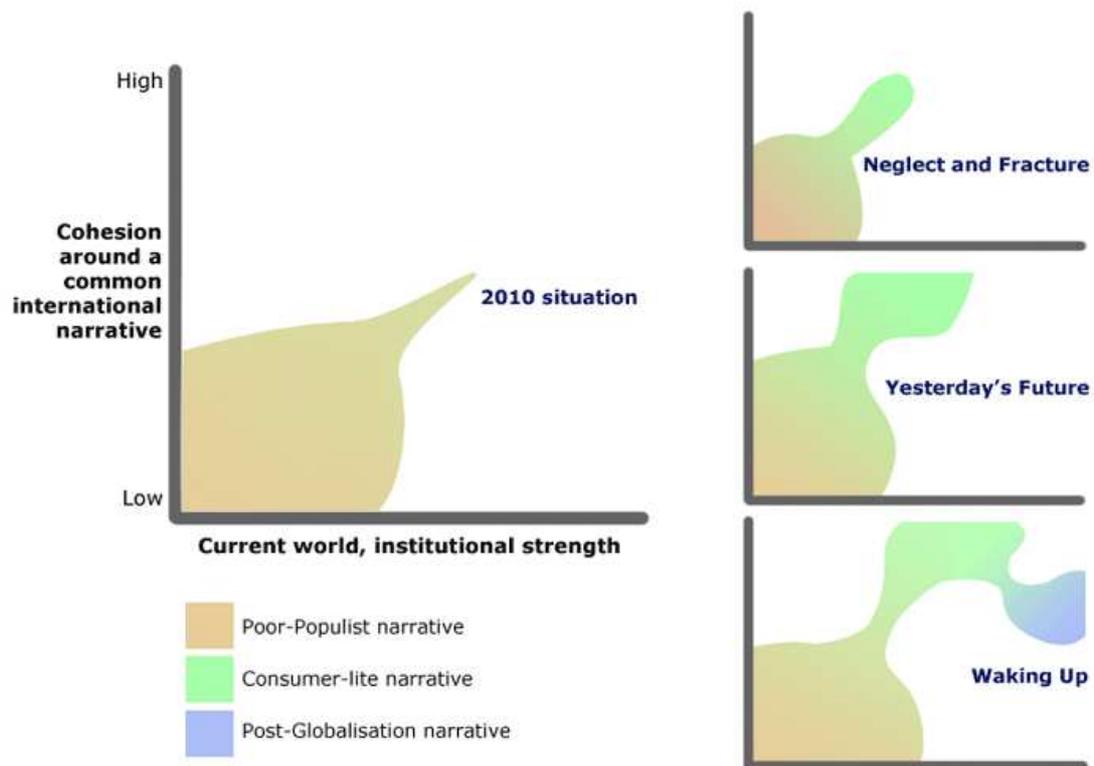


Figure 11

Figure 11 is, of course, derived from Figures 4 and 10. For those readers who have come directly to the scenarios, however, a word of explanation may be helpful.

The chart shows the disposition of world populations under four snapshots. The present shown on the left and the situation in 2040 on the right. The character of these population is colour coded, and a key is inset in the figure. The colours refer to the three global narratives that are discussed in the preamble.

The axes are identical to those of Figure 10, and are explained in depth under Figure 4. The present situation is shown on the left, and future states are shown on the right of Figure 11. For example, the contorted, stop-sign laden world of Figure 10 is reproduced in the lower right, now called "Waking Up". The other two scenarios – *Neglect and Fracture*, *Yesterday's Future* – are also shown on the right of the diagram. They show the state of the world's populations in 2040.

The scenarios offer pathways into these states. We hope that you enjoy reading them, but also that you find practical thoughts which you can take from them and apply.

### ***Neglect and Fracture***

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The ten years after 2010 sees slow growth in the industrial world. The economy of China slows somewhat, both after a period of overheating, and as the first premonitions of demographic change affect its work force. It also sees marked wage inflation amongst skilled workers, and urban-rural divide increases. Otherwise, the world seems relatively tranquil, energy and mineral prices are relatively stable and economic development amongst the poorer nations continues at around 5% per annum.



Figure 12

The various military interventions around the world wind down to a tolerable level of dissent, without much resolution and as a moral defeat for the industrial powers. The governments of the industrial world turn their attention to fiscal gaps, skill supply to industry and coping with

demographic change.

The period up to 2007 was marked by a growing consensus around geopolitics. International law was to be respected and developed. A particular socioeconomic style was seen to lead to stability, wealth and security. The wealthy world was, as a result, both trustworthy and a safe haven. Its views were to be respected and, with local modifications, broadly accepted. If it chose to urge environmental regulation, demand economic transparency and balanced books, a respect for market economics and open politics, then these were things with which it was wise to comply.

The economic crisis and the consequent slow-down dispelled this certainty. Foreign policy failures, and the inability of the great powers to sort out the political problems of poor nations through the imposition of force, also dispelled confidence. The international narrative falters, and there is no one dominant way of discussing or addressing problems. The poor nations may show adequate growth, but their politics become more idiosyncratic and their governance less open. Adequate growth encourages inward investment, but this tends to be towards short-term projects. Governments are less inclined to open their doors to radical ideas, and very much less inclined to invite investment in "heart land" resources such as energy and minerals.

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In this environment, the systems issues are not much addressed. The industrial world is not feeling either rich or expansive. The rest of the world is not inclined to be told what to do. Energy and other raw material supply capacity drifts towards demand. Few measures have been put in place to encourage efficiency, at least beyond the industrial world.

Figure 6 showed us two "wedges" that we would face at some time in the future. The world's populations had a limited time to surmount the first of these, the arrival of undeniable systems issues. Unhappily, these arrive quickly and in force. It becomes clear that economic coordination – already weak after the recoil from open markets and coordinated actions – is acutely needed. Low investment and growth amongst the less efficient nations causes supply price spikes in energy and other resources. Some parts of the world become very wealthy, whilst others are precipitated into poverty.

For the past decade, virtually all of the population growth in the poor countries has been absorbed into cities. As these crises mount, the lack of resilience of these cities becomes apparent. Nations that have become net importers of energy and food find it hard to supply what is needed.. They seek ever-growing loans, which the much-regulated banks find it increasingly hard to extend. Equally, the neglect of basic infrastructure during the growth of these cities – transport, public health – becomes acute. Localised pollution and infectious disease claim increasingly large numbers of lives. Episodes of epidemic disease spread internationally, causing panic if not great mortality.

It is plain that "the system" is in gross need of a system of management. There are many vocal groups which point to the many short comings of the international system. Little has been done about pollution management, the custodianship of the seas and a thousand other issues.

Unhappily, there is no source of consensus as to how to address these issues. All potential negotiating groups see their interest threatened in very complex ways. Some perceive a shift in global power, from the old powers to the new nations which need to deliver compliance. They seek huge sums, doing so through a plethora of negotiating bodies and agencies.

Acute issues are, therefore, addressed on a case by case basis, often without much analysis and on a basis of antagonism. The powerful nations are quickly convinced that they need a common face. They set out an agenda, complete with prescriptions and processes to be followed.

This is carried out in the spirit of open, analytical enquiry: "a scientific investigation into the problems that we all face." It is not, however, received in the same spirit. The rich world has lost much of its legitimacy since 2010, and the rest of the world is not inclined to listen with respect. Special interests, affronted national pride and disconnected verbiage fly back and forth.

Far too much is being attempted far too quickly. At the same time, the issues are evidently acute. An issue – perhaps a very major attack using terror, an epidemic, perhaps a first sign of real climate change such as the shift in a major ocean current – makes this clear. The powerful nations have had enough of irresolvable negotiation. With a coalition of the willing, they begin to impose the required measures, using all modes of action to project power. These range from grand economic levers – tariffs on non-compliant countries or industries, for example – to

highly personalised interventions, using all of the tools of covert intelligence.

So long as the issue remains at the front of everyone's mind, the coalition lasts. However, the transfers of resource which are involved are an invitation to poor governance to enrich itself, and the underlying resentment begins to re-establish itself as the length of the period of intervention becomes clear.

The brief period of unity – and impotent bystanders – descends into mistrust and recrimination. Political blocks begin to form amongst the uncommitted, those acting and those acted upon. Such is the scale of the various issues that begin to surface that it is clear to all but the most committed internationalist that it is better to play for local or national advantage than to play the global statesman. It is, therefore, hard to generate the necessary accords, technology transfer and general coordination that a response needs. Adjustment is limited to a core group of countries, or several cores which approach the issues in different ways.

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If there was one single problem – such as an epidemic – this reaction would be unlikely. However, when a host of issues present themselves – from energy supply to pollution management, from security systems to the means of handling bubbles, swindles and the other drivers of economic instability – then resolution will be slow. Huge sums are likely to be involved, some of which will go to very unstable or hostile states. The rich will have to invest, make free transfers and curtail their liberties, all with no security that they will gain any benefit from doing so. This is not a situation that predisposes any major block to cooperation.

By 2030, the "wedge" is, however, firmly in place. There are economic-environmental no-go areas that stand in the way of development for the poor nations. Political differences accentuate this. The terms of trade for the poor nations have worsened, and there are barriers such as tariffs that block the sale of goods that do not comply with international standards. Resource rich nations have enjoyed surges of prosperity during the period of price spikes, and face both a wide range of suitors and some international odium for having closed their resources to development.

Above the wedge, the belated movement towards resource security, extreme efficiency and the installation of a host of procedures and regulatory limits is under way. Commerce has its freedoms tightly constrained, and competition is managed in order to allow this to happen. Individual freedoms – to travel, for example – are curtailed almost as in a period of war. The state tends to rationalise matters wherever resources are scarce: health prevention rather than cure for example, with penalties for those who do not assist in the management of their own health.

This phase slackens as the period of confrontation fades into the past. The divisions remain, however, as an impediment to progress. Work – slow, laborious work – begins to mend the broken fences of the previous decade. Many systems issues are only tackled in a serious way after 2035. Indeed, as discussed at the foot of the next scenario, it may be that we will need a period of Neglect and Failure before we can enter the very organised – some would say, regimented – world of *Yesterday's Future*.

### ***Yesterday's Future***

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Growth after 2010 is quick to pick up. The industrial countries carry a debt burden that is purged across the decade, at the cost of about a half percent per annum off their economic growth. However, the general buoyancy tends to compensate for this. Demographic impacts are also limited by a mixture of medical advances, the ability and willingness of the old to carry on working, and considerable improvements in efficiency as both states and companies assess the demands of the future.



Figure 13

Indeed, looking forward becomes a general pastime. It is clear that the world has to change its ways very considerably if it is to surmount the many systems challenges that lie ahead. The single prescription, the lowest common denominator that seems to fit all contingencies, is efficiency. Everyone and everything has to become sharply more efficient.

Efficiency needs to be coupled to systems awareness, however. That is, as nations become concerned about resource supplies, they have three options open to them. Countries may try to lock in supply through bilateral deals with suppliers. These are hard to sustain when the terms of trade change, making one party the loser.

A second, more permanent solution is for individual countries to limit their innate demand, which is partly achieved under the banner of efficiency. There are limits to this, because the fast economic growth in the industrialising countries outweigh the savings of any one nation. Left alone, prices will rise for everyone. Such a policy is plainly inadequate unless it is extended to near-universality.

Policy therefore strives to minimise demand in general, something which can only be done in collaboration amongst the powerful and the active acquiescence of the poor nations. Central to such measures is a radical overhaul of the energy and other resource systems of poor nations. Obsolete coal fired electricity plants are replaced with more efficient systems, for example. Urban planning and renewal use minimalist, high technology solutions that cut resource demand.

This is assisted by new developments, triggered by a clear policy direction and the creation of certain markets. Near-magic materials appear, in which behaviours are embedded, much as the flexure of a bird's wing is intrinsic to its mechanical form. Common cellulose, for example, is able to cross link into materials that have the strength of metals and the stress resistance of collagen, such that what appears to be a sheet of paper can support the weight and vibration of a car motor. Goods are made specifically to deconstruct easily into their constituent parts, so that "waste refineries" are widely used to separate used goods into feed streams, ready for re-use.

The third option is also collaborative, at least insofar as a concert of the powerful is required before effective action can be taken. This is to expand overall resource supply in advance of price signals.

This is fraught with difficulties. Resource rich countries may prefer shortage and high prices to a predictable income based on lower prices. They may not want their resources opened to international investment. They may see the possession of resources as a guarantee of political weight.

In both the second and third option, the sums of money that are involved are extremely large. They are beyond the practical, political grasp of government consortia and certainly beyond the savings of most of the countries in which the investment must be made. The investments will need to come from private savings, and the technology will need to be derived from companies at the front end of the relevant technologies.

This implies that there are two major issues to solve if this is to happen. First, the investment must be possible, and appear safe and attractive to the investors. This implies that legal and political predictability must balance the enormous sums that are involved.

Second, the resource-rich countries must feel comfortable with such intervention in their internal affairs. This cannot occur until the style in which such investments are made also changes. That is, the model of foreign finance that funds multi-national companies to operate in effective isolation from the host country's domestic political agenda largely disappears. It derives from a former age, and is supplanted by a new form.

This new form is much more that of the managing contractor, a service entity that provides funding as a part of its work. Such entities may arise from the professionalisation of state agencies, such as oil companies and mining enterprises, but is also the form into which many resource-focused multinationals transform themselves. They work for the host government, not for shareholders; and capital is raised in a host of ways, from traditional bonds to the innovative possibilities. However, host governments have long understood that predictability equated to cheap capital. They work to stabilise their economies and their political systems. They receive considerable external help in doing this.

These measures are designed to minimise systems crises: bubbles, security surprises, price spikes, ecological impacts and the like. Paradoxically, however, in minimising such impacts they also mute the very signals that drive change. Policy tries to compensate for this, both through directly mandated measures – standards, bans or tariffs on non-compliant goods, supply chain audits – but also through price signals. Carbon taxes are an example that can be extended indefinitely. By 2025, for example, India earns huge sums from carbon fixation. It uses low-technology wind-driven stamp mills to powder the basalt of the Deccan traps. As this contains huge amounts of elements such as Calcium, which act to fix carbon dioxide as

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carbonates, this earns the local people considerable sums. The spoil goes to make new fields, incidentally making the activity open to exact external scrutiny from space.

Other natural resources are also similarly monetised, from the sea to the wilderness. Ocean fishing licenses are hugely costly. Water is an increasing issue for many countries, and its use is priced. The major use for water remains agriculture. There is, however, increased stress in its efficient use, by using drip irrigation, for example, and through the use of drought tolerant and water efficient varieties. What to do with saline water run-off remains a major issue. Ion-flow desalination takes off, enabling sunny desert nations to irrigate huge swathes of land. The Sahara may turn green, but at the expense of further salting the Mediterranean.

Not all of the systems issues relate to the balancing of supply and demand. Economic instability management requires international accords on data declaration, banking standards and central bank governance. Standards on a vast range of issues – human migration, public health, intellectual property, security oversight, the use of water and its pollution, air and maritime pollution and so on and so on – all need to be put into place and taken into law. Their implementation needs to be measured and managed. Considerable national sovereignty is necessarily transferred to international agencies, which are in their turn professionalised and made accountable. Much is learned from the history of the formation of the European Union, where many such difficulties were encountered.

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The result is, in 2030, a very different world from that of 2010. An unstoppable force – the ambition to live the good life – has met an unmovable object, the carrying capacity of the planet and the basic economics of food and raw material production. The complexity inherent in managing the transition that is implied by this collision forces radical simplification. The established a viable pathway to a state in which a significant fraction of the world's population can enjoy what we have termed a "consumer-lite" society. That is, they are well housed and safe in their beds, well-fed and employed, entertained and healthy, and their children are educated to their potential.

They do not have the choices open to someone living in a wealthy country in 2000, and their lives are considerably regimented. They do not have the freedom to travel internationally at whim, motorised transport is chiefly public and the range of goods that they can buy is restricted by the very many standards that it and its manufacturing processes have to meet. Their health is managed, and they are expected to play an active role in its maintenance. People who do not comply are, at the very least, sanctioned with fines, the withdrawal of services or in other ways. For example, privileges – such as the right to travel – are earned, and these can be docked following such sanctions. The sovereign is the community, standards are egalitarian, and people are expected to conform with this: "We can all get by if we are all careful."

This is not a world in which to be poorly educated. It is inevitable that like will be paid in line with like, wherever they live in the world. It will only be possible to maintain wage disparities in anything but the most local service job, and that if immigration is tightly constrained. Less able people will be idle, or subsidised at work if that is a national political choice. Managing the people that the world economy really does not need in order to function will be a global issue. Handling the transition to demographic decline in the currently young world – see Figure 14 for examples – will exacerbate this.

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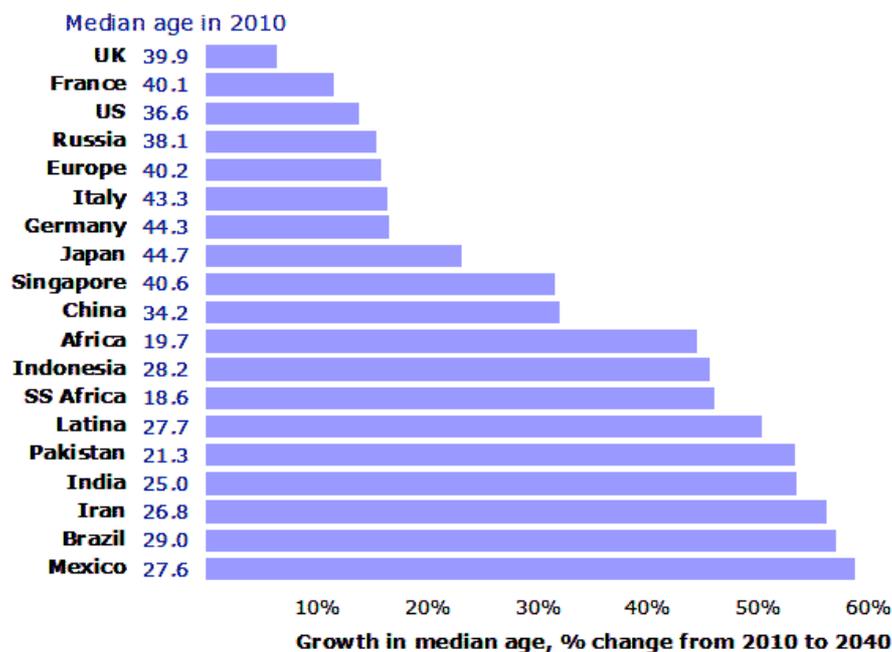


Figure 14

This is a bleak picture, but nevertheless an attractive one to someone otherwise doomed to live in a third world slum. The rich world retains some of its individualism. Nevertheless, state agencies are fervently pursuing best practice wherever its is found in the world. Increasingly, evidence-based policy would supplant judgment and "hard" social science dictate the proper balances to be struck. Individualism survives where it does not challenge this. If – for example – a family's child rearing practices do not transgress these norms, then they will feel free to pursue their instincts. However, a step beyond the prescribed limits will bring about enforcement of these norms.

Efficiency can save money. However, attaining it at the very least demands the diversion of expenditure. The International Energy Agency, in its 2009 forward look at 2030, [estimated](#) that energy-related investment would require an additional USD32 trillion over historical trends in order to achieve carbon dioxide stabilisation at 450ppm, the Copenhagen target. Much of this expenditure would need to be made in the poor countries, where investment does not always repay its investor. Roughly the same number of people would be without commercial energy services at the end of the period as are without it in 2010.

Energy is, however, only a proxy for the immense quantities that need to be spent in building social and tangible infrastructure. Without doubt, most of this will ultimately pay for itself, but it will take dedication and collective will to bring it about. Fortunately, *Yesterday's Future* is a world in which both of these factors are adequately in evidence. In addition, the "wedge" of systems issues is relatively slow to develop, in part due to the efforts being made to avoid them. Paths to development are open for longer, and confrontation is minimised.

*Yesterday's Future* is, however, an end game. It is clear in the 2030 that every last drop of efficiency has been squeezed out of the system, and that even with collaboration, nine billion people cannot climb onto the wagon and hope that it remains stable. Every effort is bent to push the period when standards begin to slip back a few years. However, even with the formidable technology of the times, and with the much larger economy, the sheer complexity of the structure seems to slip between the fingers of government. Its complexity is its vulnerability, and a thin tissue of accommodations and good faith lie between society and sharp decline. This is a situation in which ever-present scrutiny of the citizen is extended in every direction, for malign intent can cause huge damage, mistakes can do the same and even unanticipated surges in demand or traffic can throw out the finely balanced systems of the time. *Yesterday's Future* feels geriatric, maintained in a careful hothouse in the hope that a new, unexpected door will open.

At the beginning of this section, we indicated that these scenarios were not exclusive of each other. Readers will immediately think of groups and nations for which *Yesterday's Future* is an intolerable intrusion. They may believe that the required negotiations would prove impossible. This is probably indeed the case. However, failure prescribes Neglect and Failure. Some of the world will exist in this scenario in almost any conceivable future. It does not, however, have to be the entire world.

We may need to pass through a major episode of Neglect and Failure before a significant part of the world moves towards *Yesterday's Future*. That is a judgment that you, the reader, must make. However, as already noted, *Yesterday's Future* is itself a dead end, from which escape is possible only if new horizons open themselves. This is what the next scenario examines.

## Waking Up

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The full flowering of *Waking Up* occurs late in the period – at least after 2025. The early path into *Waking Up* is similar to that into *Yesterday's Future*. The distinguishing feature of the early *Waking Up* scenario is, however, the near-ubiquitous success of expert networks in those locations which have the social and other structures to support these. These are recognised to lie at the root of technology adoption, of innovation and of commercial adaptation to enormous potential and extremely fast change.



Figure 15

Networks of this sort dominate politics, and virtually every aspect of daily life, from personal and family security to social relations. Anyone and everyone who lives in such an environment is immersed in an ocean made up not so much of data – although that is plentifully available – but of increasingly contextually-aware, intelligent interpretation.

This is not to say that networks somehow replace or supplant society. Rather, societies generate fertile niches, some of them industries, some of them companies, some activities such as science or medicine, all deeply rooted in a geographical context such as a city and a firm set of institutions. These support, nurture and propagate ways of behaving that are found to be vastly productive. That they happen to look like networks is fortuitous.

These structures generate copious quantities of wealth and enormously accelerate the growth of factor productivity. *Yesterday's Future* is a scenario that is led by consumption, limited by resource availability but fulfilling existing consumer dreams. *Waking Up* invents new dreams, new ways of existing and living which consumers have not and cannot discover for themselves.

Cliques and networks often inter-connect much more effectively than does the general world. That is because their members share education and insight, values and management talent. Individuals often belong to several networks and information flows across these bridges. The fertile niches are also nested, in the sense that more general connectivity encloses the more dense specialist frameworks.

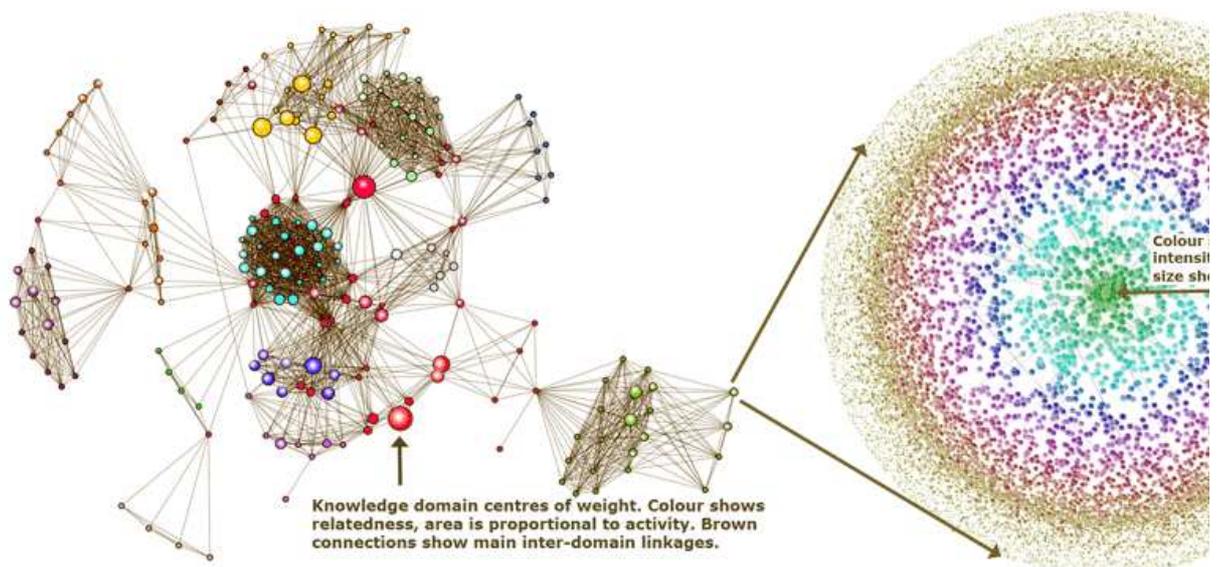


Figure 16

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As 2030 approaches, these networks become less the passive conduit for conversations and instead become agents in their own right. They begin to act, purposefully and to a degree in a way that is independent of their individual participants. One can see the early stages of this today: Internet structures which suggest who you might want to link with, discussions you might wish to enter, products that match your personal preferences. However, by 2030, information technology has gained much broader contextual understanding. It monitors conversations and understands them, it is able to prompt, suggest and guide in ways which go well beyond individual abilities. Corporate structures have the organisation's purpose and values explicit within them, and they are expected increasingly to manage procedures, discussions and the use of knowledge. Done badly, this can be catastrophic, done well and it confers superhuman powers on mere mortals. Such systems are expected one day to think largely for themselves, but at this stage they need human intermediation. Nevertheless, they alter commercial structures beyond recognition, building in a relentless creativity, consistence and goal-directedness. Their direction can be altered by rationality, new information and by group processes, but they cannot be discouraged and they never give up. Collective intelligence will never willingly step down to atomistic, ill-informed guesswork.

There two capabilities – universal trust-within-infrastructure and truly smart communications media – have a profound affect on the societies which are their hosts. They radically change and democratise politics, giving voice to the able and the thoughtful, rather than to the loud, the eminent or the machine politician. They make membership and reputation the scarce resource within the society, not conventional factors such as capital. Such assets become tradable and fungible, with networks focusing on their capability and brand as their core value and brand. Issues such as the ownership of networks and of their product become of critical importance.

There is an additional affect at play. Of their essential nature, knowledge networks ramify into domains that stretch beyond their primary activities: they tend naturally to holism, to the incorporation of every consideration that might be relevant. They are natural systems thinkers, and it is the systems of the world that need attention. Here, at last, is an open, expert mechanism that couples directly into the politics of the powerful, through which systems issues can be tabled, debated by a wide range of expertise, each element of which is assisted in its deliberations by mechanisms that guide process, test content and précis and filter rhetoric.

All of this is elite. It occurs in those locations and social groups which have created and maintained the required tangible and intangible infrastructure. Its early adopters include commerce, science, the military and intelligence services. Its application lags somewhat within state administration. These are closed domains in which it is relatively easy to create and maintain the necessary conditions. However, the style spreads quickly to general society where the relevant conditions are also met or created.

It shows itself in education and the pursuit of knowledge, in communications, interpretation and in entertainment. People rely more and more on on-the-spot delivery of specialist expertise that are based on expert systems and triggered by contextual understanding of the current situation in which the individual is set. The blend of these generates an informed state that can be called "life navigation".

The style invades virtual reality, appears in purely social formats and makes itself felt in areas such as activism, specialist interests and religion. An individual might spend time in a consensus reality that mirrored their religious beliefs about the afterlife, for example, meeting others of like mind and together working for the construction of Heaven. However, structures that have the magic of trust, embedded in the required intangible infrastructure, are able to achieve things which less free environments can deliver.

By the mid-2030s, this style is increasingly and universally dominant in the capable regions, and strongly present in structures that span the rest of the world. These conduits manage a wide range of issues that require complex, structured insight, from banking to trade flows, intelligence to science. Such conduits are extremely secure and are highly organised, offering islands of order in less capable regions. Like electricity, local interests hitch themselves in to the feed, adopting the required standards and safeguards. Most of the world is still living in or aspiring to *Yesterday's Future*, but this is a *Yesterday's Future* that has had its political heart renewed. It is able to offer intense, fulfilling non-material attractions to the capable.

One of the great winners from this style is science; and beyond this, its application to commercial and other useful ends. The reason is clear: science is the most international of human activities, and highly responsive to group debate, critique and endless re-evaluation. It is also intensely responsive to resource flows: the number and quality of the practitioners,

their interactions, cash and related inputs.

The vague connections between deep research and practical applications is made clearer by mass participation, and resources become more targeted to potentially practical insight. Corporations, states and others mine this information flow more or less automatically, and translate it into products, policy, potential very quickly. As has been discussed earlier, the 2010 rate of return to expenditure on science runs at around 35% real when measured directly, and nearer 70% when consequential social issues are taken into account.

In the 2030s, the flow of knowledge is much augmented, and the application of it greatly enhanced. The consequences are a greater creation of value: essentially, the factor productivity of knowledge creation is enhanced.

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One additional consequence is the flow of human capital. There are three arms to this.

**First**, medical capabilities are remarkably improved: people are born healthy and remain so. Their raw cognitive capacities are improved in a number of ways, most of them connected with an understanding of how the brain works and how a given individual is therefore best treated.

**Second**, education is continual and expert: everyone has a virtual coach and counselor that advises, educates, helps an individual to socialise, progress a career, anticipate new technologies and generally keep sharp and socially-acceptable.

**Third**, the environment of the developing child alters beyond recognition.

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This last has already been discussed in a [supporting paper](#). Just as adults have a virtual mentor, so children are continually 'managed' by virtual systems that keep them safe, perpetually challenged by novelty, educated in formal skills in context-sensitive ways and socialised in ways that suit the individual and the society. An example may help to visualise this:

John wandered off through the park shrubberies, bored with the game. He pinged his Mother's friend-net and found that she was still immersed in her work-game. Worrying that she might not have eaten or slept, he pushed the house into carer mode, and left them to get along together.

His mentor picked up his mood and suggested three possibilities: some boys were designing a fireworks display – but they were all older than him, and this would take tact to manage them – but there was also a music event three miles away that would cost some money to get to and to get in; or he could perhaps make some money by delivering a meal to an old man, who he had served on previous occasions and who was a bit over-friendly, but easily manageable without getting to serious warnings. That would pay for the music festival! But he first had to find the place where the food was being prepared by a volunteer, which meant reading road signs, which meant a reading class; so...

All of this depends on John's parents trusting the mentoring system, and on the environment being physically safe, from vehicles, predators, bad influences. John's parents' trust would need to extend to the values and boundaries that they had built into it, and on the state to validate these and to check that John was getting a complete exposure to the influences that he needed. In other words, the structure would need a great deal of infrastructure, work, maintenance and oversight, all of which costs resource and adds to the value of the society.

The nucleus of *Waking Up* has influence far beyond its strict economic and demographic weight. It embodies a habit of thought which permeates successful organisations, and the policy levels of strong countries. Plainly, there are groups who regard some of these developments with anything between distaste – "giving up their rights as parents!" – to outright horror: "Their machines are a blasphemy!" These groups are present in all and any scenario, clustered around the ochre regions in Figure 7.

Security is also an omnipresent issue in any scenario. The period after 2020 offers a huge array of tools to those who bent on causing harm. Some of these tools are so accessible, and so harmful, that they cannot be permitted at any cost. The consequence is that surveillance is omnipresent: of flows of money, of movements of people, of communications and personal behaviour. In *Neglect & Failure*, this is not undertaken in a spirit of cooperation, and state-mediated as a part of the defence effort. In both *Yesterday's Future* and *Waking Up*, a huge number of organisations and entities collect and exchange data about every aspect of life.

In *Waking Up* in particular, young individuals exist within an invisible cocoon of scrutiny and behaviour modelling. Their mentor systems know what they are going to say before they say

it. Adults are equally exposed and nearly as scrutable to general systems, and probably even better known to dedicated structures such as company Mother-nets. (One far beyond the Intranet, to those who wonder what that means.)

Projection of power in this world consists of getting people to do what you want by presenting them with a path that is immediately attractive and which leads them all in different ways to the generic solution that you require. This entails knowing each individual and their circumstances in exact detail. It is no more than what used to constitute well-head village politics, but writ large and without the occasional beatings. Of course, to do this, you need to have something to offer and this is why the rich world remains the fount of power. Its commerce is tightly entwined with its security, insofar as the two both collect information, and it is commerce that can offer network access, jobs and other good things.

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The approach to 2040 is marked by a rapid transformation of the *Yesterday's Future* part of the world to modes of operation that are increasingly similar to the *Waking Up* centres. It is the only way to compete effectively, people find much of it deeply attractive, and the style seems the only modality that offers the project heroism that transcends the trap of *Yesterday's Future*. It takes *Waking Up* to put sunlight-collecting satellites in the Lagrange points, and beam power to equatorial collection towers. It takes *Waking Up* systems to crack the mysteries of physics and open the way to utterly new technologies. It takes the restless, watchful optimisation of *Waking Up* to keep the world balanced on the knife point of peace and stability.

### Afterword: a review

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The scenarios were introduced with the idea of the two "wedges", three populations and three flows. The figure hints at these. We have used the same colour scheme as all previous figures: brown suggesting the industrialising or pre-industrial populations, green those attaining consumer-lite status, and the blue populations which have passed the second wedge, and entered the discontinuity associated with the core of *Waking Up*. The three columns refer to the scenarios, of course, with time running from left to right.

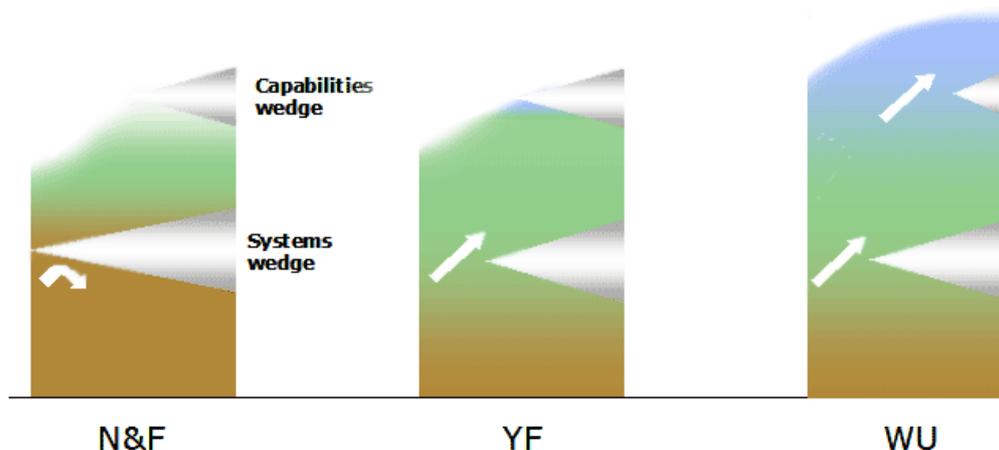


Figure 17

*Neglect and Fracture* is shown on the left. Although it never acquires a significant population that live by the *Waking Up* paradigm, it has mixed populations which, as we have seen, do not get along well together. In the centre, the systems wedge arrives slowly, and many more migrate up to the consumer-lite status, the core of this scenario. There is a hint of the *Waking Up* style evident at the end of the period.

On the right, we see *Waking Up*. Here, both wedges are late to arrive, or a minimal hurdle for those fitted to adopt the working style, and so a considerable number migrate to the region shown in blue. (These numbers are greatly exaggerated in the diagram, of course: perhaps a few hundred million of a nine billion world population are fully immersed in this style by 2040.) The rest of the world is in the consumer-lite style, or slowly developing, probably along unconventional tracks. The *Waking Up* style presents interesting alternatives to consumer-lite for developing countries.

The underlying purpose of this figure is to emphasise that none of these scenarios are "global", in the sense of suggesting global homogeneity. Two or three quite different rationales will exist

at the same time, affecting the narratives of the different areas. These populations may well not agree upon much and, as we have seen, a world without collaboration is a world more or less preordained to difficulties.

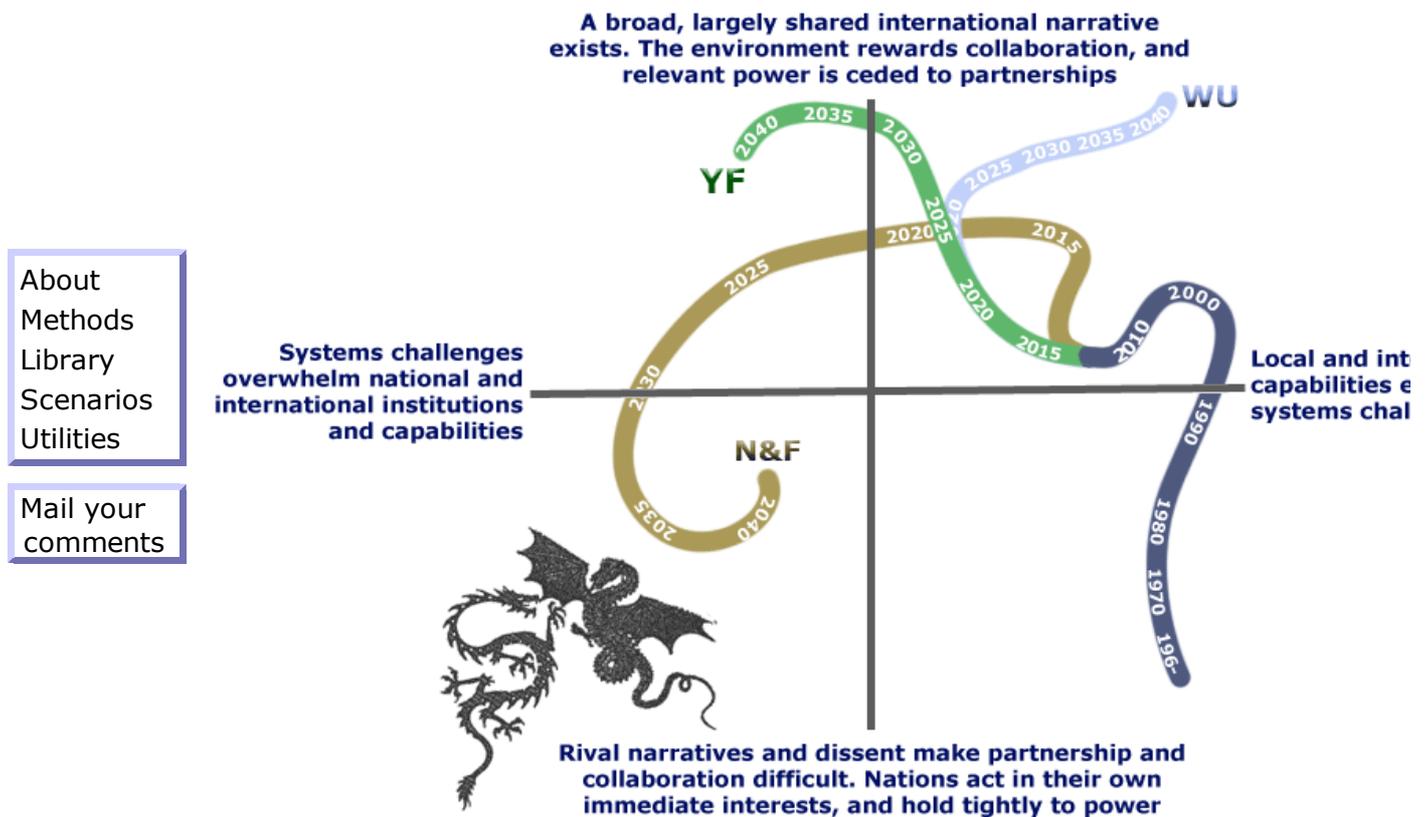


Figure 18

This is shown in Figure 18, which shows how the scenarios evolve in a space defined by two important variables. The horizontal axis asks whether systems challenges – of the sort that have already been discussed repeatedly – exceed the capacity of existing institutions and machinery to cope. On the right, then-contemporary systems are capable of managing these challenges but, on the left, they are not.

The vertical axis measures the degree to which geopolitics reward or penalise collaboration. At the bottom, the world is split between different ways of seeing events, and the dissonance in these narratives make it hard to collaborate. Indeed, the best strategy is to grab what you can, tie in your friends and armour yourself against the rest. At the top of the axis, the tone is unified: there is a clear perception of problems and their solutions. These may be painful, but they are acknowledged and addressed in common terms.

The dark blue track shows past history. The climb out of the cold war – and away from dissenting economic and social models – dominates the trajectory. Dates are marked in white along it. The swerve to the right between 1990 marks the end of the cold war, the seeming "end of history" and cohesion around a common model. The system crisis of 2007-09 changed this view, and the world is less ruled by a common model – and more aware of issues to be addressed – than it was in 2000.

The three scenarios branch away from this. *Neglect and Fracture* (N&F) briefly reverts to former certainties. It is confronted by a rising tide of systems issues, to which it reacts with a common resolve that quickly breaks into dissent and aggressive political positioning. In the later years, it begins to converge on a common approach to the issues, but it is, by then, very late to take action on so many fronts, and from so unpromising a platform.

*Yesterday's Future* exists in the happy combination of anticipated issues and the relatively slow arrival of these. The early phase is marked by increasing consensus, but the end game – consumer-lite life for many billions – comes with an inevitable tension between institutions and systems limits. As 2040 approaches, the happy consensus is beginning to break. As mentioned above, how long the world can walk this knife edge is open to question. The eventual meeting of N&F and YF is suggested by the convergence of their two trajectories.

*Waking Up* (WU) branches away from YF somewhere in the 2020s. It is initially less universally applauded than is YF. In part, this is because WU is less comprehensible to those not involved

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in it than is YF. Equally, much of the world finds WU alarming and a degree repugnant. ("Machines that think they are alive! Meddling with the human spirit! Blasphemy!") In the period after 2030, however, the attraction of WU is obvious: its pathway to commercial success, its permeation of popular culture and entertainment, the evident superiority of the thoughts and technologies that it generates. As Figure 11 shows, not more than a small fraction of the world live or work in activities that are purely WU in tone, but few in the YF world are not touched by them, and their abilities permeate the poor world. Nevertheless, in the 2040 of even WU, around a billion people still lack basic services, such as energy, fresh water and drainage, regular work and safe, clean housing.

We have not added an elaborate quantification to this work, in part because these are usually useful only when there is a clear problem to be solved - energy demand in Europe, for example. Equally, the world of WU is so strange to us - and the range of events so wide in N&F - that a quantification would beg more questions than it answers. We have, however, made a few estimates that may be helpful.

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The table shows the numbers of people who live one of the three dominant narratives in each of the three scenarios. The column on the left shows the estimated current values, as discussed in a previous section.

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	Today	Waking Up	Yesterday's Future	Neglect & Fracture
Post-Globalisation	0%	10	3	1
Consumer-lite	26	30	30	23
Poor-Populist	74	60	67	77

Table 3

Population growth in the poor countries means that the numbers falling into the Poor-Populist narrative remains high, actually rising in N&F. Only WU makes significant inroads into this number. The proportion involved in the Consumer-lite archetype also remains fairly stable, falling in N&F and being the same in both WU and YF. Their attitude and behaviour is very different in these two situations, of course, and the people and locations that are engaged change.

These rather modest changes belie the very considerable economic differences between the three scenarios. As noted in the section on economics, median economic output (here taken to equate to YF) is around three and three quarters times current value added.

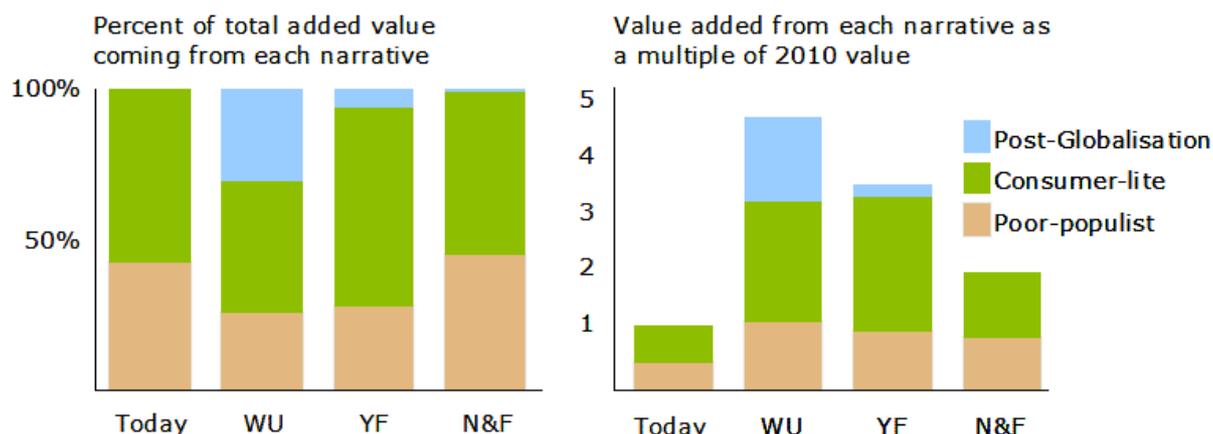


Figure 19

The Figure shows the absolute levels of output relative to 2010, broken by the contribution due to the three narrative styles. These are shown as percent contributions on the left of the Figure. The colour code follows that used in previous figures.

Population numbers are not that indicative of economic and political weight, therefore, and the extreme affect of the Post-Globalisation style in WU is very clear, even though the numbers involved are around 10% of the world population. As noted earlier, the Consumer-lite populations are broadly similar between the YF and WU scenarios, although many are migrating to the Post-Globalisation narrative in WU, whereas YF is "stuck" and playing an end game.

## Discussion

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You are invited to contribute your thoughts. Please use the menu bar on the left to send us a comment. In view of the length of this section, we have established a second page to hold these: [here](#).

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