Chapter 6

Conclusion: Bridges

"Every civilization carries the seeds of its own destruction, and the same cycle shows in them all. The Republic is born, flourishes, decays into plutocracy, and is captured by the shoemaker whom the mercenaries and millionaires make into a king. The people invent their oppressors, and the oppressors serve the function for which they are invented."

(Mark Twain, *Eruption*)

1. Overview

The above quote by Mark Twain perfectly summarizes the cyclic nature of human organizations, as they perpetually form and disintegrate. In this manner they reflect the underlying processes of cohesion we have attempted to describe and explain. Change and revolution are pervasive forces in both the human and physical realms. Often stated, yet less often understood. We have a deep psychological desire to make simple and predictable mental models of the world. Mark Twain, (real name Samuel Langhorne Clemens), had no such illusions, as he well understood the revolutionary nature of life. This chapter aims to summarize the key themes of the book, and also to inject a little revolutionary thought into the increasingly dull and politically correct worlds of academia and politics.

In writing this text I sought to avoid another concatenation of interesting ideas from the field of Complex Systems. There is an excess of texts in this area, each offering a slightly different slant on self-organization, fractals and power laws; or some equally fascinating aspect of complex adaptive systems. The aim was to develop the perspective that emergent cohesive order, is an intrinsic process within human society. In this, I am following concepts laid out in earlier work by Stuart Kaufmann and many others. Hopefully by using a single overarching theme, i.e. cohesion, we have captured one of the

fundamental threads, which run through the domain of complex systems. It is not a novel theory, merely a position from which to categorize, and conceptualize the diverse processes at work. Such an effect may be best defined as one of *consilience,* i.e. a binding together, or unity, of knowledge.

"The greatest enterprise of the mind has always been and always will be the attempted linkage of the sciences and humanities. The ongoing fragmentation of knowledge and resulting chaos in philosophy are not reflections of the real world but artifacts of scholarship."

(Wilson*, Consilience*, 1998, p.8)

Should you be so inclined to put this book down and browse another in your wandering through the shelves, I heartily recommend you buy Wilson's text; it is by far the best book on popular science written in the past forty years. (Ideally buy both!) First though, let's return to the original questions posed in the first chapter.

The first question we addressed was, why do any complex social structures form at all? From the discussion in chapter 2 we saw that a number of physical conditions determine the degree of cohesion and integrity in complex systems. Firstly, this includes the topology of the internal networks of the system, as this influences the resilience of the network under attack or degradation. Second, the weighting of the network edges is important, in terms of weak versus strong ties. The third aspect is the point that complex adaptive systems need diversity and the capacity to adapt, in order to sustain a cohesive structure.

The attribute of structural stability is also an intrinsic aspect of self-organizing complex systems. Although, it is often problematic to determine the actual boundaries of any real complex system, as we saw in chapter 5; as in the case of large commercial organizations. Of course there must also be an energy flow through the system in order for it to sustain itself. Using this model, a city is a classic complex adaptive system. It has a large number of interacting agents, each of which is adaptive. There is a complex physical infrastructure and multiple communication pathways within and to/from the system. The city as a whole displays adaptive and resilient properties, and it evolves over time. We are only just beginning to understand the degree of complexity within such a system. Hence researchers in the field of complexity prefer to focus on relatively simple organizational structures, such as ant hills. It is quite apt that one of the most inspirational scientists of the past fifty years,

Edward Wilson, wrote the definitive text on the humble Ant, and also the brilliant compositional work on socio-cultural evolution, *Consilience*. Wilson's definition of consilience as a fusion process in complex systems is one we will invoke within the chapter. Later we will consider the evolution of major cities, and how they may remain cohesive in the face of significant future perturbations.

The second set of questions we posed was: what makes stable social structures? and: can we increase the degree of social cohesion? These are far more difficult questions, but represented the original motivation for writing this text. In chapter 3 we discussed some of the key topics that impact the question of social stability and cohesion. The truth is this requires a full spectrum approach from psychology, sociology, economics and politics, through to applied physics. A number of texts have attempted to address the first part of the query, i.e. what social forces engender stable societies. However, the second aspect, can we therefore engineer societies with greater cohesion, has received far less attention from a scientific perspective. It does however remain a constant source of political machinations in many states. In most western countries a constant diatribe is heard from politicians of all parties, lamenting the demise of social capital; (they usually label it by some other term e.g. 'Back to Basics', but what they really mean is social capital. See chapter three for a definition.) A plethora of socio-political theories have been expounded on how social cohesion may be restored. But they typically lack any scientific basis or framework.

The study of social structure and the norms that compose cultures, is one starting point for a framework that may be amenable to intelligent discussion, and one that is sufficiently free from cultural bias and political misrepresentation. The economist Beinhocker in his synopsis on the origin of wealth, looks at how a 'norm' based analysis, can offer insights into improving the economic prosperity of states. These norms are broadly categorized as follows:

- Norms related to individual behaviour: E.g. those supporting strong work ethics, and individual accountability.
- Norms related to cooperative behaviour: e.g. the belief that life is a non-zero sum game and that cooperation pays.

It also includes norms for reciprocity and fairness, and the sanctioning of free-riders. (Interestingly Beinhocker makes the point that societies that are

weak in these norms also tend to be in a state of low mutual trust, which as we discussed will tend to reinforce poor reciprocity and cooperation; thus completing a negative cycle.)

A third category is norms that are related to innovation: this is reinforced by belief systems that tend to rational rather than superstitious views of the world. In particular, a culture needs to be able to tolerate heresy and experimentation. The final requirement, being a positive attitude towards risk-taking and entrepreneurship. The UK is an interesting case in point in this regard. As a culture we strongly encourage the mad inventor and the right to be different or eccentric. Yet we fail to applaud those who take economic risks, or even those who actually achieve commercial success. Numerous attempts to inculcate the latter mind-set have been fostered by successive British governments with limited success. A final category of norms is how a society views time: some cultures have a fixation on history, over the present, which results in multiple problems, such as a low work ethic. Conversely societies that focus on the future, tend to invest and save more, and value work as a cultural expression. (This is one of the strengths of US culture; it tends to be future-focused.)

Beinhocker makes the case that these are not moral judgments, for or against any particular set of norms, but rather suggests that economic success is predicated by the relative orientation of a culture across the set of norms. Societies can choose whether that is the only metric they wish to live by. At this point I must disagree with his conclusion. Firstly, an individual living within a particular culture that scores poorly by the economic yardstick of norm 'quality', is seriously disadvantaged by them. They also have minimal choice over which norm set they would prefer to live by. Cultures that score poorly on this scale tend to be oppressive. Second, Beinhocker argues himself for society's ability to evolve new and thus improved norms by selecting new fitness functions. At the end of the day we collectively make moral judgments on the value of a particular norm to the future well being of society. Of course this is a difficult task within a state, or single cultural boundary, and does become a moral minefield when we try applying such judgments to the norms of other communities. This issue is further complicated by the problem that we need to maintain a diversity of cultural norms; as this makes the global collective more resilient and keeps future options open. Looking back at chapter three and the examples of empire building, the most extensive frequently made efforts to accommodate a diversity of cultural norms. At least

for some periods of their history. (The peak of the Islamic age in Andalucía, is one example of an harmonious and multicultural, yet imperial era.)

Another question is what constitutes a useful cultural norm? It is increasingly argued that the western obsession with work, and economic growth, are in fact a fundamental problem, due to the resulting environmental and climatic impact. In contrast to those cultures that seek a stable and harmonious relationship with their environment. A culturally loaded question then, is does increased economic prosperity automatically result in greater group cohesion? The answer is far from simple. In western states, such as the United Kingdom, post-war economic growth from 1945 to the present has been at the expense of the fragmentation of family structures, a widening wealth gap, and a deep-seated sense of lost common cultural values. However, there is clearly a lower threshold of economic activity, below which the stress of survival causes poor social cohesion; as witnessed in many sub-Saharan states. The remainder of this chapter reviews each of the major themes of the book, and aims to articulate some of the future patterns now emerging, as technology and history collide.

2. Building Bridges

The bridge metaphor has been used across the chapters, as an embodiment of the cohesion theme, and as a conceptual framework. Hopefully this has been of some value in binding the strands of the text together. In this section we return to the bridge viewpoint and some related examples that reinforce this point. It is interesting to note that early bridges have frequently been the geographical seed of many major cities; London, Paris, New York, Rome, Boston. These have all emerged around the oldest fording points of the coastal, or inland river systems that supported and attracted human settlement in the first place. Cities have emerged like growing crystals around the bridges that bound together the earliest settlements.

They have also frequently been the focal points of the greatest conflicts, as people have fought bitter struggles to gain control of key bridges. The modern examples of Arnhem and the Rhine bridges serve as cases in point. And more recently, in the invasion of Iraq, the fiercest fighting occurred on the Tigris at the key road bridges. It is probably the case that throughout recorded history more people have died in conflict on, or around bridges, than any other type of physical structure. (Particularly, if we include the draw-bridges of

castles and forts.) They are also of course a favourite location for people to jump from, as a means of committing suicide. In chapter 5 we looked at the economic impact of some classic bridges. As in the case of the Golden Gate bridge; a graceful expression of architecture and engineering excellence, that functions as a vital link in the region's economic and social integration.

Social Bridges

As we discussed in chapter two, an important aspect of the study of social networks is that some individuals act as social 'bridges'. Research has highlighted the 'weak ties' argument, by showing the value in how different parts of multiple social networks are bridged, (Burt, 1992). Hence, strategic advantage may be enjoyed by individuals with ties into multiple networks, which are largely separated from one another. This fits nicely with the bridge theme.

"The Strength of Weak Ties. More novel information flows to individuals through weak than through strong ties. Because our close friends tend to move in the same circles that we do, the information they receive overlaps considerably with what we already know. Acquaintances, by contrast, know people that we do not, and thus receive more novel information. This outcome arises in part because our acquaintances are typically less similar to us than close friends, and in part because they spend less time with us. Moving in different circles from ours, they connect us to a wider world. They may therefore be better sources when we need to go beyond what our own group knows, as in finding a new job or obtaining a scarce service. This is so even though close friends may be more interested than acquaintances in helping us; social structure can dominate motivation. This is one aspect of what I have called "the strength of weak ties."
(Granovetter, 1973)

A recent study at the Said Business School in Oxford using large databases of mobile phone data, has illuminated in detail the nature of social ties, and the impact different strength ties have on social structure and information flow.

"Here we examine the communication patterns of millions of mobile phone users, allowing us to simultaneously study the local and the global structure of a society-wide communication network. We observe a coupling between interaction strengths and the network's local structure, with the

counterintuitive consequence that social networks are robust to the removal of the strong ties, but fall apart following a phase transition if the weak ties are removed. We show that this coupling significantly slows the diffusion process, resulting in dynamic trapping of information in communities…"

(Onnela *et al*, 2007)

Studies of this kind are particularly illuminating in their ability to help visualize the human and information flows across cities. The availability of large-scale communication and computing networks, now offers a precise and accurate means of measuring social interactions as never before. This represents a revolution in the social and political sciences; the full consequences of which are yet to be realized. (The security and privacy implications of the fine-grained monitoring of peoples phone calls and location, are also proving to be a social challenge!) As we discussed in chapter two on digital networks, the relative strength of connections also has a significant impact on the cohesion of information networks. There are also virtual bridging edges and sub-networks that bind large-scale information networks together. This may be stretching the bridge metaphor too far, but for want of a better alternative we can run with it. Also the web itself is an overlay network that is shaped by the economic, social and cultural forces that act out upon it. So it is hardly surprising to find similar power laws and bridging structures, to those prevailing in the social network domain.

The greatest expression of a physical bridge is a title that has many contenders; such as the Golden Gate Bridge, or London Tower Bridge. However, my personal favourite is the recently completed Millau Bridge in southern France that spans the River Tarn. This has to be the ultimate example of art, architecture and engineering in a bridge form. In a delightful way, it is a totally over the top and exuberant structure, (nearly a full 1000 feet tall), to achieve a purpose that could have been realized with a far simpler and classical suspension format. Of course its parent was a British architect, Sir Norman Foster. Equally true is that, unfortunately Britain would never have actually built such a grandiose thing. It required the merging of the best norms from British and French culture to achieve this particular vision.

Cultural Bridges – Religions

And an old priest said, Speak to us of Religion

And he said:

Have I spoken this day of aught else?

Is not religion all deeds and all reflection,

And that which is neither deed nor reflection, but a wonder and a surprise ever springing in the soul, even while the hands hew the stone or tend the loom?

(Kahlil Gibran, *The Prophet*)

An interesting concept we initially explored in chapter three, was to consider the role played by the world's major faiths over the past two millennia, in acting as bridges between disparate cultures. In this sense, religions have arguably made a positive impact in increasing trade, cultural exchange and the flow of innovation. Of course this has frequently been accompanied by violent friction between the cultures involved, and we can't escape the often negative dimensions of religious expansionism. In the later section on revolutions and cultural clashes we will return to this theme.

A recent article in The Times offered a fascinating and provocative piece on the value of faith in economic development within Africa. The author Matthew Parris, an avowed atheist, concluded that the single most influential and lasting impact on social development across Africa is still the impact of Christianity; through missionary and associated activities. It is an entirely subjective conclusion, but one based on a childhood spent in Malawi and his many subsequent travels across the continent. He expresses it best as follows:

"Christianity, post-Reformation and post-Luther, with its teaching of a direct, personal, two-way link between the individual and God, unmediated by the collective, and unsubordinate to any other human being, smashes straight through the philosophical/spiritual framework I've just described. It offers something to hold on to too those anxious to cast off a crushing tribal groupthink. That is why and how it liberates."

Even more profound, and in keeping with the mantra raised throughout this text, is the statement that: *"Those who want Africa to walk tall amid 21st century global competition must not kid themselves that providing the material means or even the knowhow that accompanies what we call development will make the change. A whole belief system must first be supplanted."*

(*The Times*, p.17, 27/12/2008.)

This is a crucial conceptual shift that applies globally, not just in rural Africa, i.e. the root of all economic development and social stability, are the

belief systems that live in people's hearts and minds. Returning to the powerful influence of norms, it is the author's contention that these arise as a side-effect of practiced beliefs. However, this is not to be confused with a simple liturgy for the value of western mono-theism. For example, the cohesion of societies, across the Orient, from India to Japan, has been sustained for millennia by the belief systems expressed within Buddhism, Hinduism, Taoism and Confucianism. What appears to be of pivotal value, is the ability of strong belief systems to foster healthy norms; which in turn inculcate personal values, social responsibility, and a sense of connection to the wider society. These are precisely the attributes that are lacking within some cultures, and that have been seriously eroded within many developed western states.

On this topic, an illuminating report was produced in the summer of 2008, by the Von Hugel Institute in Cambridge, (*Moral but no Compass*), which revealed the depth of concern among UK Christian groups; in that government ministers fail to understand the Church's broad role in providing social services. It rightly pointed out that institutions established and operated by the Church of England, and many other religious orders, have for centuries provided vital social services, from hospitals, to schools and welfare to the poor. These efforts, the report states, have been marginalized by increasingly secular governments, which have assimilated control of all such roles under the mantle of the state. I suspect the concerns raised in this report will go unheeded, as the issues will simply appear too diffused and difficult to integrate into government policies.

Science and Faith

This topic is a perennial matter for debate, and the God versus Evolution discussion bubbles on endlessly. However, there have been a number of noted publications of late that have raised the temperature. (We touched on this topic in chapter three and will expand here.) Richard Dawkins work "The God Delusion" stands out as a rigorous defence of the pro-reason and anti-faith alliance. While, one of the best countering texts is *Darwin's Angel*, by John Cornwell. He actually conveys a high regard for Dawkins writing, and has referred to him as *"one of the most brilliant living natural historians"*. Yet, Cornwell finds the God Delusion harmful in its failure to tackle the problem of extremism and wrong on many important issues. In this book, Cornwell adopts the persona of the Guardian Angel of Charles Darwin, who is now looking

after Richard Dawkins. He pens a letter to Dawkins in 21 short chapters. One nice example of which is the section on "Is God Supernatural?" where Cornwall argues with Dawkins's apparent image of God as, "A Great Big Science Professor in the Sky", which is not what most theists believe in. Similarly the idea that believers are encouraged not to understand the Trinity is refuted by the many books in Divinity Faculties trying to achieve precisely this. It is certainly a worthy text to study for a reasoned perspective on the question of science vs. religion.

A strong case for the harmony of reason and faith can also be found in the work of Polkinghorne. He describes his view of the world as Critical Realism and believes strongly that there is One World, with science and religion both addressing aspects of the same reality. He suggests that the simple mechanistic explanations of the world, which have continued from Laplace to Dawkins, should be replaced by an appreciation that most of nature is cloud-like, rather than clock-like. On the matter of evolution he raises a key point that is increasingly supported by the systems level view of biology, (Noble, 2008):

"…the fact that we share 98.4% of our DNA with chimpanzees shows the fallacy of genetic reductionism, rather than proving that we are only apes who are slightly different. After all I share 99.9% of my DNA with J. S. Bach, but that fact carries no implication of a close correspondence between our musical abilities".

(Polkinghorne, 2005)

In addition he makes some strong arguments for the rationality of religious faith. In particular, he does not claim that God's existence, or not, can be demonstrated via logic, but simply that theism makes more sense of the world, and of human experience, than pure atheism.

"The intelligibility of the universe: One would anticipate that evolutionary selection would produce hominid minds apt for coping with everyday experience, but that these minds should also be able to understand the subatomic world and general relativity goes far beyond anything of relevance to survival fitness. The mystery deepens when one recognises the proven fruitfulness of mathematical beauty as a guide to successful theory choice."

(Polkinghorne, *From Physicist to Priest*, p.107)

In the UK the dialogue brewed up in 2008, with a number of high profile figures wading in for a series of public debates. One of the classics took place

in the Guardian newspaper, where the philosopher Daniel Dennett took on Robert Winston, the British fertility guru. This particular debate really is a must read, but can be summarized by the following quotes:

"True, you don't have to be religious to be crazy, but it helps. Indeed if you are religious, you don't have to be crazy in the medically certifiable sense in order to do massively crazy things." (Dennett).

To be fair Dennett does also correctly argue that:

"This imperviousness to reason is, I think, the property that we should most fear in religion." Quite so, when any religion advocates blind faith at the expense of reason, then we are all better off without such. However, as Winston then brilliantly articulates,

"Religion is built into human consciousness and there is plentiful evidence of it being a cohesive force…In reality, both religion and science are expressions of man's uncertainty. Perhaps the paradox is that certainty, whether it be in science or religion, is dangerous. The danger of Dennett's relatively gentle brand of certainty is that it increases polarization in our society. With inflexible positions on both sides, certainty surely is the biggest threat to rationality, and to science."

(Robert Winston*, The Guardian,* p.14, 22-4-08)

In truth, the aim of all such debates should be to build a bridge between the two camps. This is what the whole of humanity desperately requires. We cannot, and must not, race into the coming century without such a reconciliation in place. The raw secular science, as espoused by Dawkins and Dennett, takes no account of the Promethean power that is being unleashed on humanity. The nano-bio-computing dream will become an Orwellian nightmare, if we fail to build a new foundation of ethical and moral values. The roots of which, must necessarily, stem from the heritage of the world's great religions. Returning to the words of Wilson, who while formally rejecting his Christian church, still pays homage to the values faith provides:

"Still, I had no desire to purge religious feelings. They were bred in me: they suffused the wellsprings of my creative life. I also retained a small measure of common sense. To wit, people must belong to a tribe; they yearn to have a purpose larger than themselves. We are obliged by the deepest drives of the human spirit to make ourselves more than animated dust…Perhaps science is a continuation on new and better-tested ground to attain the same end. If so, then in that sense science is religion liberated and writ large."

(Wilson, 1998, p.7)

The truth is we now need a new shared set of beliefs. For example, Beinhocker advocates the need for a shared platform or "common layer", i.e. a bridge across cultures within a multi-cultural state such as the UK. Many political and social commentators have picked up on this theme. Unfortunately, no one appears to have the faintest idea what such a common set of beliefs should look like, or where it might arise from, or who has responsibility to make it happen, or how, etc. Basically this is the challenge of the 21st century; we stand or fall on this battle for a common cultural nexus.

"Science faces in ethics and religion its most interesting and possibly humbling challenge, while religion must somehow find the way to incorporate the discoveries of science in order to retain credibility. Religion will possess strength to the extent that it codifies and puts into enduring, poetic form the highest values of humanity consistent with empirical knowledge."

(Wilson, p.290, 1998)

Ok, that's all a bit deep and contentious, so in order to inject a constructive dimension to this search, let's begin with one of the practical social process, which can catalyze positive cultural interactions, i.e. trust.

3. Trustworthiness

This point was expounded at length in chapter 3 and in the commercial examples in chapter 5, where the pivotal role of trust was demonstrated. The hypothesis, as advocated, is that trust is the central pillar of the many bridges that bind society together. It is ubiquitous in all functioning organizations and institutions. Whenever and wherever it is eroded, then systemic failures of the associated social organization is inevitable. (As an exercise for the reader, pick up any newspaper from late 2008, or early 2009, and count the instances of the word trust.) As an example, one UK building society, the Nationwide, just placed a large national press advertizement, with the following strap-line: *"Honest. Open. Trustworthy…More trusted than any other bank or building society"*. In a world riven with economic scandal and moral laxity, trust has become the new 'gold standard'. It is now worth cold hard cash.

Trust is fundamentally the critical factor in generating social or organizational cohesion. Specifically, the degree of trust that exists between the agents in a system is what counts. It really is a lubricant that permits the

smooth transaction of trade and public services, (Putnam, 1993.) In situations of low trust, conflict becomes possible, and the cost of all transactions is greatly increased. In states of high trust the inverse is the case. A recent article makes the point clear:

"Today's financial crisis is, at heart, a crisis of trust. A few years ago, banks knew how badly they managed their own risks, how aggressively they had priced their own assets, and how much their own bonuses depended on these aggressive valuations. "If we are acting so irresponsibly, think how much more irresponsibly other banks must be acting," they thought. Thus, when repricing started, projections of social norms indicated that the repricing and credit terms should be more negative than market norms indicated. The banks failed to trust each other."

(Mainelli, 2009)

It is pertinent to consider that the antithesis of trust is corruption. In many states the failure to build a high-trust society, inevitably leads to the endemic practice of corruption and bribes. The human cost of this process is immense, and has received insufficient academic study in economic circles. One individual example from Kenya is the following episode:

"Each morning Wambui Kamau boards a matatu taxi bus to get to the city centre. This morning, like every other, it is flagged down at a police checkpoint, where the driver hands an officer 100 shillings. At lunchtime, Wambui heads to the Minsitry of Immigration to pick up a new passport. It miraculously surfaces when she offers the clerk 100 shillings. Heading home, the matatu is stopped at the same checkpoint and another bribe paid."

(The Times p.26, 18-2-09)

One World Bank survey ranked corruption, as the single greatest impediment to economic development and prosperity. It can reduce a countries growth rate by up to 1% a year. The total value involved is staggering; by one estimate the total amount in bribes paid worldwide is in excess of 1 trillion US dollars, according to the World Bank Institute. (Based on 2001-02 economic data.) Fukuyama also addressed this issue in his work on: *Institution formation, State-Building: Governance and World Order in the 21*st *Century*, (Fukuyama, 2005.)

Figure 6.1 illustrates the remarkable correlation between the level of trust between individuals within a state, and its economic prosperity: as measured by GNP per capita. (However, this nice data set hides some significant

variations in the measurement of GNP/capita. The data for the Nordic states in particular displays a wide statistical deviation; hence the graphed value, for these states, was averaged over the available data sources.) (This figure may be directly compared with similar findings by Harrison and Huntington (2000); based on 1995 GNP/capita and trust survey data.)

The data presented in figure 6.1 is not just a snapshot of the correlation between trust and economic performance; it is of far more importance than that. What we also can infer is the likely future economic state of the listed countries. For example, outlier data points such as Vietnam, Indonesia and China, have relatively high trust scores. And as we witness they are moving up the GNP scale, as they undergo rapid economic development.
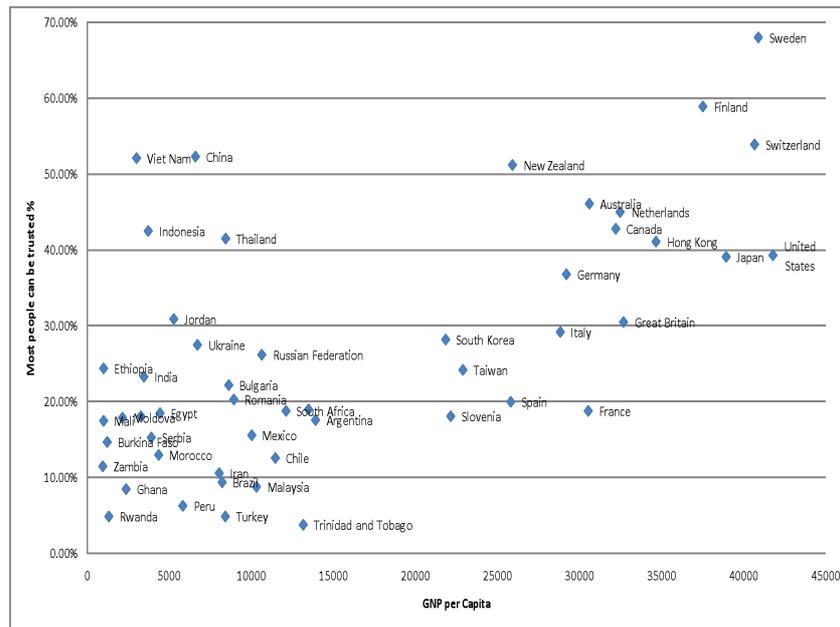

Figure 6.1 Relationship between Trust and Economic Performance, GNP per capita from World Bank estimates of purchasing power parity, in 2005 US dollars. The trust values are from interview survey data at: http://www.worldvaluessurvey.org/. (Based on the question: can most people be trusted?)

In contrast the US has a relatively low trust score compared to its premier economic status. As Robert Putnam famously argued in *Bowling Alone*, this is

likely a consequence of the US living off the social capital invested by previous generations, and the falling trust score indicates an imminent decline in the economic fortunes of the US. I would strongly agree with this conclusion. (For example, California is currently issuing IOUs as its deficits soar.) An even starker example from the figure, however, is the data from France; with the lowest trust score of the developed nations on the chart. France is gripped in a deep economic malaise as successive governments fail to implement overdue economic reforms to liberalize the market and enable a more mobile workforce. This is amplified by the poor trust score, which is exemplified in the recurring riots in French metropolitan areas, as disenfranchised Islamic and ethnic cultural groups protest their exclusion from main-stream economic activity. Unless there is a genuine infusion of effort into restoring France's social capital and cultural integration, the future prosperity of that country is in serious jeopardy.

The third dimension of figure 6.1 is the obvious religious divisions between high and low trust regimes. The qualitative differences between traditionally Protestant, and Confucian, high-trust communities on the one hand, and other cultural groups is striking. Clearly each faith has its unique cultural norms and these impact on the ability of people to form bonds of trust and reciprocity with others in society. A finer grained analysis is required however. In the case of Protestantism since its historical separation from Catholicism, and the following three centuries of conflict, it has inculcated many of the norms that have been identified as promoting economic activity and high levels of trust. More specifically where it has factionated into sects, these have often been a reaction to a perceived corruption of such core values by the church hierarchy; and hence led to the forming of groups where such values became even more reinforced. Examples of note being the Quakers, Methodists, Presbyterians and Mormons. All of these groups have demonstrated long histories of high reciprocity, trustworthiness and hence economic growth.

This also touches on a question raised by Beinhocker on what should be the criteria of social success? Certainly, not mere cash flow. Many Islamic states are struggling with the issue of equitable wealth distribution, specifically in the oil rich regions of the Middle East. However, on a recent four week stay in Dubai, one thing became immediately apparent, it felt safe. Wandering along the sea front in the late evening with my family was a relaxing experience. Few major western cities can claim the same social benefit. In

contrast within the economically prosperous UK, there is little sense of security within its crime ridden metropolitan areas. As for wandering around most US cities at night, I have only ever done so in small provincial Santa Fe in New Mexico, and once in New York, when I was much younger and very naïve. An orthodox faith, such as Islam can therefore create a very ordered social structure that leads to a positive environment for all, with cohesive extended families. Hence, apart from trust there are clearly other social metrics that determine how successful a particular region or community may be judged; the level of perceived fear being a prime example.

It is a personal belief of the author that individual faith is the root and mainstay for the development of trust, and hence social capital. Attempts by well meaning, but secular policy makers in all states, or cultures, are doomed to failure. This is very apparent in the UK where initiative after initiative to reform the economically deprived inner cities has failed. You can ask people to change, and fiddle with welfare programmes for eternity, but unless people have internalized a value system that creates positive norms of behaviour, then you are simply wasting time. The only mechanism that has achieved such personal transformation throughout history, has been the transmission and assimilation of a belief system. Of course people have a fixation on whose god is the truth, which has always been a childish and fruitless argument. As mentioned previously, that is precisely why we need a whole new level of interfaith dialogue. (A great set of mini-essays appeared in the New Scientist, by a set of vanguard thinkers on the limits and power of reason, as a means of understanding the universe. The best of which is the article by Keith Tyson, an artist, in which he wrote:

"This makes me feel nostalgic for the days when there was no differentiation between being a natural historian or an artist-theologian. The lives of Newton or da Vinci seem much richer. The specification and reductionism of knowledge has given us many technological advancements, but I feel that we've lost a holistic synthesis. That's not a cerebral question, it's an emotional one." (New Scientist, 26-7-08, p.41)

4. Revolutions and the Nature of Change

"Revolutions always come around again. That's why they're called revolutions."

(Terry Pratchett, *Night Watch)*

16

This section reviews the kinds of change society is experiencing and the challenges to cohesion over the next fifty years. In chapter 1 we briefly covered the qualitative kinds of change possible in complex adaptive systems. These included some weird techno babble such as punctuated equilibria, and the ever ubiquitous phase transition effect. Such is the nature of growth, disruption, and reconstruction in complex systems. Ok, but what does it all mean, you ask. So let's try to ground it in some non-technical examples.

Clashes of Everything

A frequently debated topic is the '*Clash of Civilizations*' proposed by Samuel Huntington (Huntingdon, 1996.) This infamous thesis advocates that the near future of mankind will be defined by an ongoing conflict, both cultural and physical, between the major world cultures. Many have rightly argued that this is an overly simplistic stance, which glosses over important details in the composition and philosophy of most cultures. For example, Edward Said in an essay entitled, '*The Clash of Ignorance*' (Said, 2001), argues quite correctly, that Huntington's categorization of the world's fixed 'civilizations', completely ignores the dynamic interdependency and interactions between cultures. This is spot on, as what we define as a specific 'culture', is in reality a nebulous mixed bag of social norms, beliefs, politics, and historical baggage. Any culture is the epitome of a nonlinear complex adaptive system. It is certainly not a Newtonian billiard ball, with precisely calculable trajectories. Of course, it's simply easier to formulate policy, if one can label them as such.

Nevertheless, since the 9/11 attacks in New York, Huntington's argument has become a motif for the interaction between the USA and the Islamic world. This is hopefully a temporary state of affairs, as the stance is not constructive, nor conducive to social cohesion at any scale. More specifically, it represents an old-world zero-sum game mentality, where for one party to win someone else must loose. All cultures have something of value to contribute, and likewise all cultures have deeply entrenched negative 'norms' of behaviour, or belief, that must be addressed and adapted.

Clash of Culture - Orient and Occident

One of the most hotly debated clashes of this age is the strident emergence of China onto the world stage. Napoleon is famously quoted as

saying *"When the sleeping dragon awakes, he will shake the world."* The Chinese model of surging economic development at over 8% annual growth, while retaining a one party political game, is certainly shaping much thought in Asian policy circles. There is unfortunately a disquieting murmur in American politics that the world can only have one superpower. This reflects the mindset of the cold war and the futile view of the world it engendered. The US will have to face the new reality of Sino-Asian dominance in many facets of global policy shaping. The Western powers would do well to consider their historical roles in China's recent history, and the blood that was spilt enforcing Western hegemony, (e.g. the Opium wars, Boxer Rebellion, etc.). The fact is the world is now a single economic and manufacturing enterprise. China can't grow without foreign markets and the west has no real inclination to reestablish its manufacturing base again. It is telling indeed, that the current US secretary of State Mrs Clinton, dashed to China in her first outing, in order to enkindle the economic activity, so urgently required by the two powers. The Chinese are also less than thrilled at the Trillions of US Treasury bills they currently hold, whose value looks a little precarious. Joint US Sino economic development is clearly a win-win game.

The future is ever deeper and stronger partnerships between the orient and occident, if we both wish for peaceful coexistence. The bleak alternative is best portrayed in a semi-mythical Russian proverb that was common in the 1990's; as Russia underwent vast economic and social perturbation: *"The optimists are learning English, the pessimists are learning Chinese and the realists are learning Kalashnikov."*

For China, what must happen is the same cultural process that occurred during the 1970s' and 1980s', in which Japan ceased to be perceived by the west as an economic threat, and simply migrated to its current role as an integral component of the worlds markets, and global economic structure. All growth curves are really S curves, and every developing state will reach a plateau of output and economic maturity. For some reason policy makers and military strategists fear systems/cultures in the growth part of the curve. Invariably such fear is misplaced. Of course a foreign power that holds several trillion dollars in US currency reserves requires circumspection and careful diplomacy on the part of the US. However, as mentioned in chapter 5, the pressure created by the engines of change i.e. China and India, also necessitates a revolution in the educational systems of many western states; in order to sustain economic competitiveness.

18

A fascinating article on the current economic woes of Japan appeared in the New York Times, on Japan's Crisis of the Mind, by Mararu Tamamoto. Discussing the current collapse in Japan's vast economic machinery, Masaru identifies the fundamental problem as being psychological in nature, rather than a function of poor policies, or finance. Referring to its historical progression since the Second World War, he reflects on what happened since the 1970's:

"So what happened once we caught up? Over the past two decades, the answer has largely been paralysis. Japan's ability to imitate outside models was mistaken for progress. But if progress is defined by pursuing a vision of a desirable future, then the Japanese never progressed. What we had was a concept of order and placement, which is essentially stasis…If we want to survive as a nation, we must shed our deeply rooted resistance to immigration. Contrary to widespread prejudices in favor of keeping Japan "pure," we desperately need to dilute our blood. Our aging nation will need millions of university-educated middle-class immigrants with high productivity, people who will put down roots and raise families, whose pride and success will be the affirmation of new Japanese values."

(New York Times,2-3-2009)

It is interesting to recall from chapter 5, that the very emblem of Japanese technical prowess, the Sony corporation, was held up as a paradigm of an organization with vision and pride in its early years. What this quote reflects is that any organization, whether commercial or cultural, needs to continuously regenerate its vision, and infuse renewed values into itself, in order to avoid stagnation. In Japan's case the missing vital ingredient, as the quote implies, is diversity. It remains a 'pure' monoculture, which is never a healthy condition.

Multiculturalism

In the UK since the London tube bomb attacks on 7th July 2005, many political and media commentators have lambasted the policy of multiculturalism, on the basis that it has fueled the isolation of Muslim communities and other minority groups. This is a simplistic response to what is a complex problem. We need to look at the cultural norms outlined in the previous section to see why some cultures have successfully migrated across national boundaries (e.g. the Chinese and Hindus into the UK), while others have formed isolated communities cut-off from the main-stream of their host

culture. The point is not to compare cultures, but rather to see how education, communication and collective realization across communities can lead to a more positive social outcome for all. All cultures, whether in the majority or minority, need to face some hard facts about what their aspirations are, and how they can adapt to the process of community cohesion. I just avoided using the term community integration, as it has overtones of assimilation, but it is a valid expression of what needs to be done. This issue is not going to be resolved today or tomorrow. More conflict is probably a safe bet, hence greater efforts by everyone is a requisite, if a stable and cohesive future is to be created for all communities.

In this particular regard the USA is arguably doing a better job than much of Europe. A nice example was a report in the Economist, in an article entitled '*An age of transformation*'. The article highlights the amazing cultural transformation that has swept across the US suburbs. One example of which is a suburb called Willingboro:

"FIFTEEN miles east of Philadelphia, Willingboro's Grand Marketplace is a chaotic place. Merchants hawk Christian T-shirts, Amish quilts, Chinese food, massages and Afrocentric literature. Salsa music blasts from a CD stall. Most of the shoppers are black; the shopkeepers are a variegated mix of blacks, Latinos, Asians, Arabs and whites, including Pennsylvania Dutch farmers in traditional garb. Welcome to bland, homogenous suburbia."

However, it is a strained and multi-faceted process,

"Weak government is a particular problem because, as suburbs become less homogenous, they are also losing some of their cohesiveness. A big complaint in Willingboro is that neighbours are less sociable than they used to be. Levitt's ideal of self-contained neighbourhoods is largely forgotten: most of the pools have closed, and children may no longer attend their local school. Jim Gray, a longtime resident, complains it is ever harder to rustle up volunteers for civic events. On the other hand, the same could be said of almost anywhere in America. Willingboro has managed to arrange about a dozen events to celebrate its 50th birthday."

(The Economist, p.33, 31-5-08)

The process in the US is further complicated by the trend to migrate to neighbourhoods that are a close cultural match to peoples own beliefs and ideology. This has been highlighted in a recent book by Bill Bishop. Bishop argues that it is not just the process of migration into segregated cultural zones

that is polarizing individuals views, but also the impact of modern media that enables people to easily filter out opinions that they find disagreeable, e.g. via Internet blogs and channel preferences in a multi-channel age. Bishop makes the strong assertion that this is 'tearing' America apart. But at least for the present, the deep multi-cultural tolerance and inclusivity that has shaped American history is still a dominant force that overrides the cultural zoning that is occurring in some sectors of US society. Whether that cohesive legacy will continue to operate as the dominant social process is another question. If we compare this effect across states there are significant differences, for example in the UK there is less internal migration than the US on average, but there remains a persistent North to South movement, as people move to the more economically prosperous South East regions. This has also led to some distinct cultural segregation; especially in the major urban conurbations of London, or Bristol.

It is interesting to compare this effect to the work in Epstein and Axtell's work on artificial societies, in which one common result is that a simulated agent society can spontaneously exhibit segregation into culturally isolated groups, merely by the process of agents choosing neighbourhoods based on cultural 'tags'. (See chapter 3 for a more detailed discussion on this topic.) So the universal challenge is blending cultures in a heterogeneous mix, whilst retaining and building social cohesion. It is a skill that the US has manifestly and dexterously accomplished throughout its history. *E pluribus unum*, once more.

Digerati & Technorati - (Clash of Education)

The author of Brave New World, Aldus Huxley, was profoundly astute in his predictions; in the western world, if one is pessimistic, we now have a society of educated Alphas and drugged Deltas. A new polarization of the traditional three tier class system has occurred, into those with, and those without education. The educated have access to the full economic benefits of a global online society. While those who are failed by their respective educational system, are condemned to a life of ignorance, state welfare or burger flipping. I am particularly thinking of the UK in this regard, where this process is acutely apparent, but it is mirrored on a global scale in many industrialized nations. What is important is that this process cuts across cultures, faiths, and prior class backgrounds. Education is increasingly a fundamental currency in the management of society. In the new world order a

quality education is life itself. (It is another debate entirely as to what constitutes a 'quality' education. It is not necessarily an expensive or private one. Of greater significance I feel, is the cultural and moral ethos it transmits to the young, i.e. what is the value system being instilled.)

This is not an issue in many of the rising BRIC countries, as they have a long standing and deeply ingrained belief in the value of education. (I have worked as a teacher in China and as a Lecturer in the UK.) Hence poverty per se is not a barrier to education, as is often falsely held to be the case in the west. What matters is whether your family and peers promote the value of education. (To be sure however, poverty makes the process a damn sight harder. My Chinese students had to sit in classrooms over the winter at temperatures of minus 15 degrees C, as the city Hefei at that time, had no resources to heat public buildings.)

My solution to this problem would be to implement the following policy in those states where the process is defective, (e.g. the UK):

a. Give teachers absolute authority in the classroom. I mean a return to good old fashioned Victorian values.
b. Make parents sign a social contract, agreeing to support the educational process, where the rights of both parties are clearly defined.
c. Higher education must be funded via a graduate tax scheme, where each year in higher education increases your future base tax rate by some percentage value. No tuition fees or loans. Higher education is a right in a modern society, but you pay via future taxable income.
d. Reward excellence, good teachers get good pay, and more importantly respect.
e. Punish failure, bad teachers get fired. (If you wish to restore a sense of balance, have the students they failed beat them with canes!)

That's it, quite simple and it will work. Of course the liberal voices will denounce my right wing agenda, and that's their democratic right. (In truth, the authors political views are in general pretty liberal, but not on education policy.) An excellent example of what I mean is the KIPP schools programme in the US, where education is a values driven process; http://www.kipp.org/. I strongly recommend a visit to their web site.

Clash of Party Politics

In order to reach a more ordered and cohesive society, existing western political systems, and the party focused model must be restructured. Given the deeply entrenched nature of western party politics, however, I suspect a radical phase transition will be necessary to realize such a new paradigm of political expression. Political commentators have frequently concluded that North American unity was established only following the process of a bitter civil war that engulfed the early US. Or that modern European unity was forged out of the First and Second world wars. More recently, as Russia emerged from the Soviet bloc era during the 1990's, we all watched with baited breath as tanks shelled the Russian White House. Fortunately, the situation stabilized, although that game may be about to begin again, as economic tensions once more deeply polarize Russian politics. If we at least recognized the nature of such transitional periods within human systems, then our institutions ought to be better equipped to handle the resulting social shockwaves.

Following the analysis by Surowiecki, it is clear that our present political models lack diversity in both leadership and the range of options available to the voting public. Of course this state of affairs is a product of people's desire for a small number of simple choices. Of course we do have some diversity in the operational process of government, via all-party committees, as commonly used in most EU states and the US. Unfortunately, the conclusions of these committees is generally ignored, no matter how wise and erudite the findings. Power remains in the hands of the executive who perceive the world through party filters, the ballot box threat and media pressure. (Using Surowiecki's model, the political aggregation mechanism is basically broken. In like manner, were the failings of the US intelligence agencies pre and post 9/11; who used distributed and semi-autonomous processes to aid the intelligence process, but lacked an information aggregation process.)

A more insidious problem is the current erosion of the democratic checks and balances resulting from the war on terror in the US and UK. The systematic undermining of the classic checks and balances model within both Parliament and Congress is a real and present danger to our common democracies. Some argue it is an inevitable consequence of the Clash of Civilizations, which is logical, but glosses over the societal changes taking place within the states concerned. They have been struggling since the 1950's with the transformation into pluralistic and rapidly changing societies. (A fiery account of the war on democracy raging within the US at present can be found

at the following site, http://words-of-power.blogspot.com/. The site is maintained by a superbly able and eclectic friend of mine, Richard Power. Some of it though is very hard in-the-face discussion, so be prepared.) The following quote makes the best case against the prevailing arguments for the war on terror:

"Out of unity comes security. I don't think you can impose security from on top. Just look at Yugoslavia. For years it seemed as if everything was quiescent...So I think we want to put unity first. Out of real unity--which can only be based on understanding and mutual respect--will come the kind of security that we really want.."

(Aung San Suu Kyi)

If we establish the norms that best lead to a cohesive and united society, such a collective will be intrinsically resilient. Clearly this overlaps with the issues raised in the clash of faiths section. Without a meaningful and sincere interfaith dialogue then no modern state can achieve such a harmonious and integrated society. This is patently a non trivial exercise and might need a few centuries work! In the short term it requires politicians to place such dialogue at the top of the agenda. Constant and broad ranging societal efforts will be needed to design and engineer the social bridges needed between the major faiths, and across cultural divides in general. Ultimately, failure in this Endeavour means war, to be blunt. Since the current cost estimate for the Iraq conflict alone stands at $700 billion, (or $4 trillion depending on how creative your accounting is), this seems to be a rather expensive way to resolve our differences.

Clash of Economics

A number of excellent texts have been produced in recent years, which define and explain the new age of complexity economics; (as detailed in chapter 5.) The point of this section is not to repeat their findings, but to examine what the impact is on the topic of social cohesion. First just to restate the essence of the subject, our traditional economic models are based on a Newtonian world view that is linear in cause and effect. In stark contrast the new complexity based model, views the economy as a non-equilibrium system and accounts for the non-linear and semi-rational behaviour of the human actors. Regarding human rationality, it is quite clear that few economists have ever been to a real auction or market. I have frequently witnessed in UK

auction houses, buyers paying more for second-hand goods than the goods would cost new in the high street. Real human beings are not rational, trust me. Instead Economists have redefined human behaviour to fit the kind of mathematical model they have the ability to solve and model. (A little bit like the early astronomers who attempted to fit the orbits of the planets to circular models, as these were neater to imagine, and fitted their theological and earth-centric view of the cosmos. A parallel Copernican revolution is now just beginning within the stale world of Economics.)

From a societal perspective, the problem is most central banks and treasuries don't appear to have read these wonderful new economic textbooks! In the UK it is certainly the case that classical linear economic and control theory is still being applied by the bank of England to manage the economy. This failure of economic practice, is a criminal state of affairs, as such a failure of basic knowledge is causing widespread economic hardship. It would be excusable for a developing state to lack awareness of contemporary economic theory, but it is difficult to perceive why most western states are failing in this regard. The failure of the economic sphere to embrace, or even acknowledge, the presence of the well-founded approach of complexity economics is therefore having a significant negative impact on the cohesion of many societies. We can only hope that as awareness spreads, then the necessary paradigm shift will take place in the corridors of power. To be fair even when such a process has occurred it will be difficult for chancellors and chief economists to explain to the wider public that there is no longer a magic lever they can pull, (i.e. interest rates), that will make life better. Indeed given the importance of beliefs within the new economic model, it is paradoxical that the mass of economic players do still need a leader figure to give just such a simple message.

Future Visions

This section has two questions to address; first will the immediate future be socially cohesive? Second, if so, in what forms, and to what extent? Attempting to answer the first part has been the quest of this book, and the conclusion I believe, is that we will achieve a higher degree of social unity in the near future. Answering the second part is a little more difficult. The question of what form will such a cohesive society take, and over what fraction of humanity, has a number of facets. Lets attempt to tease apart some

of these elements; in the certainty that futurology is part science, part voodoo and part astrology.

Visions of Order

Firstly, there is the perpetual fear that it will arise through some imposed cultural homogeneity. This is a reasonable and valid concern given the horrors of the 20th century. (I have personally visited the Auswitchz camp in Poland and my sub-conscious still blocks out even the memories of that passing visit.) Orwell's fears of the rise of Fascism were very well founded. The future is still menaced by the clouds of political extremism of left and right, or even the centre 'middle-way'. Commentators in the US are rightly worried that Fascism may sprout in North America and will arrive, 'wrapped in the flag and carrying a cross'. This was exactly the portentous vision, (written way back in 1964) of the iconoclastic Sci-Fi author Robert Heinlein in his book *Revolt in 2100*. In that book he vividly portrays an America that has been consumed with a far right Christian orthodoxy that uses Orwellian tactics to suppress the population. I would strongly recommend any readers living in the US to read a copy of this novel. It may help prevent it coming true, as the current signs are not good.

A parallel fear is the current obsession with Islamic extremism and the perceived threat to Western interests. This issue requires some balanced reasoning on all sides. For the West, the need for dialogue and greater cultural awareness and understanding should be the order of the day. There needs to be a wider acceptance that our oil dependence is causing enormous social tensions within the Middle East. In addition, a failure to address the Palestinian issue is also a cause for deep seated resentment, and a pervasive sense of injustice in the region. However, looking at the future visions we are addressing here, there must also be a broader movement within Islamic communities to embrace change and create a future focused mind-set. This needs to be illuminated by the vastly expanded interfaith dialogue we discussed earlier. The rapid social and economic development of some Gulf States has clearly demonstrated how Islamic states can flourish and maintain their religious and cultural identity, while accepting increasing social diversity.

As a race we can no longer afford the consequences of this religious-cultural divide. Europe made some of its most significant progress when it was stimulated by the infusion of Islamic knowledge and culture, via Spain from

26

the 9th to the 14th centuries. For example, Cordoba and Toledo in the 10th century were the world centers for academic knowledge, and the development of new crafts, in ceramics, textiles, and metalwork.

Globalization Again

Another common fear is that globalization will bring bland cultural homogeneity, via the Starbucks and MacDonald's process. We touched on this in chapter 5, but skirted the social consequences. Globalization is inevitable, and is an inseparable function of the global communication links we discussed in chapter 4. As the world shrinks everyone experiences the same commercial offerings and markets converge. To be frank this is inescapable, but need not mean the loss of cultural diversity. What it means is that cultures will need to evolve far more rapidly than ever in order to adapt. Interestingly, since the late 1990s there has been a grass roots rejection of the homogenized offerings of the multi-nationals, and a desire to engage directly with alternative and diverse cultural products. Once in Beijing, I recall sitting in a MacDonald's, munching a burger, right on the corner of Tiananmen Square in 1993. This has since been bulldozed, as the Chinese felt it was a deep cultural affront; (and more importantly was far too valuable a plot to sell burgers from.) The striking arguments within the Cluetrain Manifesto represent the key point, that in the global village people really want a voice again. The conversation between trade and craft is returning as the global network links makers and consumers.

This topic links us back to the question of education. Where people have knowledge they can make wise choices. Also where positive cultural norms have been inculcated, people may forgo short term personal gain in order to benefit alien people living in distant lands. We are all too fond of cheap goods from Chinese and Asian sweat shops. I lament how few western shoppers pause, even for a second, to consider how it is possible for them to purchase a cotton T shirt for $2. Constant social pressure is required to raise awareness and explain the costs of our actions. Many positive examples of this exist, such as the Fair Trade movement for coffee, chocolate and tea. One excellent example is the Divine chocolate company, (www.divinechocolate.com). It started life in 1998, and brought fair-trade chocolate to the UK market, with a direct share of profits returning to the Ghana farmers co-operative that produces it. This was not an easy achievement as the chocolate market is a global corporate business with intense competition between the big producers. It required close cooperation between the Ghanaian co-operative managers and

farmers and the foreign fair trade company, Twin Trading, to make it work. What is even more amazing was the goal they set, of not just selling chocolate direct, but realizing that their beans were some of the best in the world, they decided to aim for the premium market. This required real consultation and cooperation between the co-operative stakeholders, who clearly had vision and determination, to be fused with the experience and marketing skills of the parent company.

It is interesting to reflect back on the origins of globalization as we now understand it. It really began long before the 20th century, or even the 19th. It might best be dated to the early 17th century, when the awakening British Empire was harvesting the world for coffee, tea, tobacco, silk and all manner of goods. As expressed in Niall Ferguson's epic text on Empire:

"Taken together, the new drugs gave English Society an almighty hit: the Empire, it might be said, was built on a huge sugar, caffeine and nicotine rush – a rush nearly everyone could experience."

(Ferguson, p.15)

Referring to the political consequences that shadowed this commercial explosion in trade on a global scale, not seen since the days of the Roman Empire, he continues:

"Today we call the spread of this process globalization, by which we mean the integration of the world as a single market. But in one important respect seventeenth-century globalization was different. Getting the bullion out to India and the goods home again, even the transmission of orders to buy and sell, meant round trips of some twelve thousand miles, every mile made hazardous by the chance of storms, shipwrecks and pirates.

The biggest threat of all, however, came not from ships flying the Jolly Roger. It came from other Europeans who were trying to do exactly the same thing. Asia was about to become the scene of a ruthless battle for market share. This was to be globalization with gunboats." (ibid, p.17)

It is remarkable that international shipping from Asia to the west is still the subject of pirates out of the horn of Africa today, in the ungoverned waters there. At least the gunboats have gone, and instead new international mega-corporates battle it out on the trading floors of markets from New York to Shanghai. No less ruthless though.

Mega Cities

Another facet is where will the homogenized masses live? The simple answer is already apparent in the giant sprawling mega cities we now see: e.g. Mexico City, Tokyo, Shanghai, or Sao Paulo. First let's look at the historical rise of such vast urban conurbations. To my mind the first modern depiction of a mega city is the dystopian vision painted in Fritz Lang's 1926 film 'Metropolis'. In this film the city is a huge technology dominated social hive, in which deprived human workers slave to support an all-powerful corporate elite. (A bit like present day London, but with a working transport infrastructure.) Unsurprisingly, Lang's techno-future vision attracted the keen interest of the Nazi elite of the time in his home country, which prompted the visionary Lang to pack his bags and relocate to the New World.

Let's ask some basic questions about the mega city phenomena. First why do they arise and second are they in fact a dominant expression of human social cohesion? Taking the first question, the process really got started around the middle years of the 20th century. The combination of mass transport systems, communication networks and the pressure to find work, have all acted to drive ever increasing numbers into the urban centers that form the heart of these mega cities. What is interesting is that they fall into two clear categories with some common features. The first type is exemplified by Tokyo with approximately 13 million people, or 35 million if we consider the Greater Tokyo region; (it's difficult to count them as they don't stand still long enough!) Seriously, the issue of where to define the boundaries of a mega-city is a complex problem, and often the subject of political interference, for financial/economic reasons. In the Tokyo case it has an extensive central business district (CBD) and a huge urban hinterland that surrounds it. This extended urban region, however, is relatively prosperous with an average annual GDP of $1200 billion dollars; (based on a report by PricewaterhouseCoopers from 2007.) The second category is typified by Mexico City with 22 million inhabitants. Here we see a similar high-rise shiny CBD, with a GDP around $315 billion. However, now the vast hinterland is fractured into small zones of relative economic wealth, and much larger regions of extreme poverty. Similarly, the share of urban population in Brazil increased from 58 to 80 percent between 1970 and 2000, a huge increase. In terms of which ranks the largest, the prize as ever goes to China, with the Yangtze River Delta Metropolitan Area, (incorporating Shanghai, Hangzhou,

Nanjing, Ningbo, and Suzhou). This has a combined population of ~ 88 million. This is clearly stretching what we mean by the word city.

Regarding the second question, i.e. are such cities the natural evolutionary product of human gregariousness and the action of commerce, we may draw divergent conclusions. On the one hand they are clearly still growing and will dominate cultural and economic development in the 21st century. The trend is manifestly towards ever larger super-conurbations that span entire regions. On the other hand, they pose significant challenges in terms of sustaining the resource base they require and the environmental impact they have at a global scale. (One example is Beijing, which is currently engaged in a vast programme of water diversion via the South-to-North Water Transfer Project. This is planned to tap the Yangtze River and its tributaries by 2010 and will supply northern China, whose urban growth has depleted many rivers and aquifers.) The over exploitation of the worlds fossil water reserves, in most developing states is a tragedy in the making, and one which needs urgent action to avoid disaster.

An alternative conclusion is that the ability to interact and trade in cyber space will greatly reduce the need to centralize economic activity. And the ability to socialize online will further reduce the human need to congregate in the same physical space. Hence the future may witness a reversal of the urbanization process, as many choose to live in smaller village/town structured settlements. In the USA this process is already apparent to some degree, as vast numbers flow into the suburbs and exurbs; far from the CBD and core urban zones. I suspect the future, as usual, will be a complex mixture of both processes. In states with high GDP/capita levels and well developed national infrastructures, many are migrating to the rural or small town settlements. However, in developing states with extensive rural poverty, the pressure on city growth is inexorable and is going to demand some highly creative resourcing within the mega cities.

One example of the pressures resulting from unchecked population growth is the current civil conflict within Pakistan. Most commentators focus exclusively on the tribal and religious dimensions of the conflict. Occasionally, a reporter will discuss the chronic economic problems and the state of underdevelopment in the Swat valley and Northern regions of the country. However, very few have made the simple inference that since 1951 the population of Pakistan has increased fivefold. When combined with a low literacy rate of ~ 50%, it is not surprising that civil conflict has broken out.

This point is made clear by Wilson in *Consilience*, where he gives the example of Rwanda and the genocide there. Once again, all commentators focused on the tribal nature of the process, which is true, but as Wilson points out the country also experienced massive population growth in the preceding forty years. With an eightfold reduction in the area of arable land available per family unit. When faced with chronic shortfalls in food and resources, the normal conflict resolution mechanisms of a culture will start to fail.

The positive way of viewing such population driven conflicts is that people actually don't wish to fight, or engage in warfare. The innate drive of most human beings is to seek a peaceful coexistence, which is a dynamically stable state when the local population matches the resource capacity of the area. Deep social unrest is invariably a reflection of imposed resource contention, either as a result of excess population, or some external factor, (such as famine, inter-state war, or colonial activity); that is overriding the normal processes of trade and civil negotiation. Given the predicted pressures on key resources over the next fifty years, we must raise the debate on population control once again. It is not a new topic and in the 1970s was a dominant issue, leading to many apocalyptic reports on the imminent crash of civilization; (such as the Club of Rome reports). The projected outcomes failed to materialize, as the technology revolution in agricultural production and transport enabled the population growth to be absorbed at the global scale. Local famines plagued Africa, but these were seen as local aberrations, due to wars or climatic shifts. Unfortunately, the projections of extreme resource contention and social unrest were correct, just wrong on the date. The green revolution through the 1970-80s simply shifted the curve to the right over time by thirty years. Some voices are now calling for a new green revolution to feed the nine billion souls on the planet that will exist soon. This is certainly a requirement, but it must be in parallel with a major drive to reduce the population levels in most states.

Clash of Ages

Of course nothing is ever so simple. The preceding section argued strongly for a reduction in the global human population, however, there is another dimension we need to address. Many commentators rightly point out that the world's population is rapidly aging. In both developed and emerging countries the percentage of retired and elderly people is on a steep curve upwards. For now the percentage of the world's population over 60 is ~ 11%,

but by 2050 it will have risen to double that i.e. 22%. Even worse the mix in the developed world will be closer to 33% over 60. Based on current state welfare models, this is simply an economic disaster in the making.

One simplistic argument is therefore to encourage people to have more children, so that the ratio of working age adults to retired folk stays balanced. Indeed, some EU states such as France have adopted this strategy with generous childcare benefits and encouragements for mothers to mix a career with having children. Yet this approach retains all of the problems we discussed earlier, and stresses the social and physical networks we depend upon. A smarter philosophy is to accept that this demographic shift is a natural process and reshape our cultural practices to accommodate the grey wave.

Firstly, we need a new economic model that accurately calculates the economic value generated by the elderly. Most of those aged 60-75 are actually engaged in part-time work, voluntary and charity efforts, or most importantly helping with childcare. This relieves the state of a huge economic cost. The state can help the situation by pushing forward legislation banning age-discrimination, and encouraging flexible working schemes via tax incentives. The majority of people really do not wish to switch off at 65 and watch televison, they would rather remain employed and active, but in a flexible manner. To be sure, the age shift will increase the support and health care costs incurred by the state and society. However, by enabling the majority to remain economically active the burden could be managed.

The real problem in most western states is people's failure to take responsibility for their own state of health. The above model only works, if a majority of the elderly has a sufficient level of fitness to do part-time work (paid or voluntary). The real demographic threat is not aging, but deteriorating standards of fitness, due to obesity and associated life-style diseases. For example, Japan has had a high percentage of elderly citizens for many years, but many of them are physically active due to the balanced low fat diet they consume. Hence the problem is manageable. (China faces a real problem, though for a different reason, its one-child policy now means that a single child will have two parents and up to four grandparents to care for.) In contrast the UK and USA are already experiencing severe strains on the healthcare and elderly support systems; precisely because a large percentage of the population are obese. If policy makers in the West truly fear the future, now would be a good time to get serious about forcing healthy food on people. Of course this presumes everyone can afford good quality food, or possess sufficient

32

education to distinguish healthy products on supermarket shelves. The question of future resources leads us onto the next topic of climate change and technology impact.

5. Visions of Ice and Snow

The titanic problems we face in managing the environment, global climate change and resource distribution will stress society for many decades. To answer this question, of resources and distribution, we need to consider the major forces likely to shape society. In summary, I think these boil down to the parallel impact of climate change and technology in overdrive.

Climate

The first of these is climate change. My personal interpretation of the reports on climate change over the next 30 years, are that the most pessimistic predictions will be accurate. (Sorry, bad news.) I have no political bias on this topic, and have traveled widely enough to observe the signs in many countries. The Greenland ice cap is melting rapidly at the fastest predicted rate; this alone will likely disrupt the North Atlantic Gulf Stream and cause seismic shifts in the weather patterns of Northern Europe. On a global scale we will see extreme climate forces affecting many coastal regions in particular. Since this is where the majority of the mega-cities are located, this will require some really creative planning. Either the affected populations will need relocating inland to new metropolitan zones, or the existing infrastructures will need vast flooding defences; which are technically possible as the Dutch have demonstrated over centuries. (Although, they did have substantial economic resources and a small, but profitable empire).

The more important aspect, however, is the impact on global food supply, which will be severely disrupted. As one example, the 2007 drought in Australia decimated the countries cereal production. Intense competition for staple foods and commodity resources will drive new and aggressive regional alliances. The double-digit inflation in global food and commodity prices from 2005 to 2008 is the first harbinger of the trends to come. The 2008/09 economic storm has only temporarily suppressed this process. Some of the mega-cities as a consequence of climate and resource pressure are therefore likely to fail; in the same sense that we have failed states now. The lamentable conditions in New Orleans post-Katrina are a case in point. Where even within

a Super Power, there is insufficient political will to rescue a major city. What was most amazing about the whole Katrina episode was seeing which US organization was first on the scene with food and assistance. Just as an exercise, guess who it was: the US Coastguard? the Marines? the Navy? Nope. Based on media reports at the time, the most immediate and effective response was by the Salvation Army. A charity run Christian group, with no fanfare, or grandiose media posturing; they simply called in their volunteers, packed supplies and went to help. Demonstrating once again the power of faith to truly motivate individuals in times of need.

A parallel development will therefore be an explosive growth in the impoverished shanty regions that surround such cities. Lacking in the most basic services, the likelihood of access to good educational provision seems remote, thus isolating these communities from the future networked service economy. However, human ingenuity thrives under pressure and current examples illustrate how such communities can rapidly improvise and develop. For example, in Bangladesh the establishment of a Grameen style phone banking network in 2007 quickly attracted over 15 million customers.

On a positive note, in many countries there is a drive to use wind power on a micro scale to supply energy to individual homes and local buildings. One problem slowing the development of this technology is the intermittent nature of wind power, which makes small wind turbines an unreliable power source. The standard approach is to store the power in large batteries, or to deliver any surplus back into the local grid. A better alternative is to analyse what the major uses of energy are in any home; specifically the provision of hot water and heating. If the electrical energy from a domestic wind turbine was used to heat the water in a well insulated hot water tank, then the water would act as a low cost, (and green), energy store. I am not aware of any current systems that utilize this method, which is a shame. (Email me if you know of any.)

Technological Advances

The master of the cyber punk genre, William Gibson has famously said *"the future is here already, it's just not evenly distributed."* This strikes a strong resonance within me, as my life-time has spanned the information age, and I have been fortunate enough to participate in exciting research work in Robotics and IT. My travels across China also make this quote stand in relief, as you can travel from cities pushing the envelope of 21st century design and

34

living, to a countryside trailing a 100 years in the past, where indoor sanitation is rare, (trust me I know). I suspect, and fear, that this state of affairs will continue into the next century as well.

So what technological developments will shape the distribution of future wealth? Well the simplest visions of most futurologists, envisages that portable ubiquitous computer power will be virtually free, with high bandwidth communication links to the net. Most likely, paid for by advertizing, and occasionally by state subsidies. Nicholas Negroponte and his one laptop per child, is one example of this process, and has great potential to revolutionize life in the poorest regions. Further advances in nano-technology mean that such devices will also be universally available. Being an eternal optimist I like to believe that such universal communications access will primarily lead to new flourishing economic models and cooperative norms, which will enrich vast numbers of people. The real revolution however, lies in the potential to enable remote learning and education provision across broad swathes of the poorer regions.

An alternative future dystopia is famously portrayed in Stephenson's *Snow Crash*, where 'burbclavs' and mind viruses are one future scenario, and where multi-culturalism is taken to an extreme conclusion. In most novels in this genre the future is bleak, as the masses are unable to utilize the global network for personal economic advantage. But rather act as consumer fodder for the mega global corporates that rule the new earth. (The Snow Crash hero "Hero Protagnist" sits in his impoverished container home, jacked into the net via fibre optics and a super computer, but he is still living in squalor.) Personally, I don't think this will entirely be the case as the second key enabler will be online micro payments. Using these it becomes possible for someone in a shanty town to sell some local service, or knowledge, for tiny amounts of cash, but to a global market. (This was touched upon in chapter 5, on the power of current mobile phones in Africa to transmit digital cash vouchers.) This could enable a global digital Grameen banking mechanism, which could have profound and positive results for developing states.

Nanotechnology

This is a specific technology domain that demands a separate discussion piece. It is a well worn cliché, but if you are not scared, or at least deeply concerned by this technology you really should be. I don't believe the worst

case 'Grey Goo' scenario is a threat, or the hunter-killer drones in Michael Crichton's frankly awful novel 'Prey', are going to materialize any time soon. However, the potential for economic and social disruption by the imminent arrival of advanced nanotechnology manufacturing systems is of the utmost concern. On the economic front, imagine the ability to setup a supercomputer assembly plant in your garage. Or militarily, the ability for a terrorist group to create an entire air force of autonomous micro scale planes with potent weapon systems on board. In the personal space the threat to privacy will be extreme as video sensors shrink to dust like proportions. The fundamental issues though, stem from the impact on basic manufacturing. This is already apparent in the ICT sector. As alluded to earlier, the reduction in costs of computing power will have immense social consequences. As an example in 1994 I purchased memory chips for £30 per megabyte. By 2009 I just ordered 2 gigabytes of memory for a laptop for the sum of £15. It doesn't sound so big a deal, but work it backwards, that means in 1994 the same amount of memory would have cost £60,000! Push the same trend forward for computing power and storage, and we get virtually free supercomputers. These can either drive immersive 3D games, or design new biological weapons. Of course that's true today, but the scale, speed, and complexity of the process will be several orders of magnitude greater.

Looking at the longer term, in the seminal text by Eric Drexler (Drexler, 1990), the argument that nanotech will revolutionize human affairs is fundamentally an accurate one. Some of the technical hurdles are glossed over slightly; specifically the issues of power supply and heat dissipation and the serious AI challenges. But as a vision of what may be technically feasible it is brilliant. Drexler's dream of some global agreement and policies for controlling advanced nano-technology, however, are simply unrealistic and quite naive. In this regard Gibson and Stephenson are the better guides to the near future. Nano-technology will be used globally by all cultures for good and evil. We cannot push these genii back in the bottle; the die was set from the publication of Richard Feynman's paper in 1959, (*There's Plenty of Room at the Bottom*.) This is one of the primary reasons why we must resolve our differences now. In the immediate future everyone's neighbour will have access to awesome technology, and unfortunately our moral evolution has yet to catch up. (Go read Neil Stephenson's other major work '*Diamond Age*' if you really wish to know what such a future holds. The concept of global tribal/cultural identities, bound together by cyber links is an especially powerful metaphor.) For an up-to-date reference on the technical issues

surrounding advanced nanotechnology, the work by Richard Jones (Jones, 2004), is a useful introduction. Jones makes the point that as computing devices shrink they will be embedded in every form of manufactured goods. The current RFID tags we now see in high-value goods and clothes are one example. Imagine these as small as dust, and with the computing power of a present day laptop.

Summary

I am currently looking out of my home office window on a sunny day, after weeks of torrential rain in the UK. Across the road is a familiar sight, an old wooden telegraph pole festooned with brown ceramic insulator pots and copper wires reaching out to the local homes. What strikes me is that a Victorian engineer would be quite comfortable with such physical technology. And yet it carries a virtual world of hyper-dimensional information, at light speed, that would stun a mind from even a few generations ago. I suspect the future will hold equally bizarre juxtapositions of old and new technologies. The problem is that this aspect will be compounded by the educational divisions mentioned earlier, such that the digitally excluded, while living in the same timeframe, will simply be unaware of the flow of services and technological power around them. Of course this is an age old Sci-fi theme from Metropolis to Blade Runner. Such visions of the possible are what science fiction is all about, and represent its real value to society. On a more upbeat note, Star Trek is the classic example of a future with an ever expanding integration of diverse alien cultures into a cooperative whole. It is hopefully a reflection of where we may trend to as a single species. (As the true visionary Gene Rodenberry clearly intended.)

The original questions we have attempted to address have been: what makes stable social structures and can we increase the degree of social cohesion? The title of the book presupposes that society is the dynamic product of countless interwoven cohesive forces. This final chapter has attempted to summarize the key issues that underscore this hypothesis, and expounded on the challenges facing our immediate collective future. One of the challenges has been avoiding use of the term 'unity', as this has quite negative connotations for many. Yet unity is precisely the degree of coherent social organization we need to emerge in the near future. Not uniformity, but a consilient, yet diverse federated networking of social norms that enhances all human cultures. (One aspect of the problem that has not been addressed in the
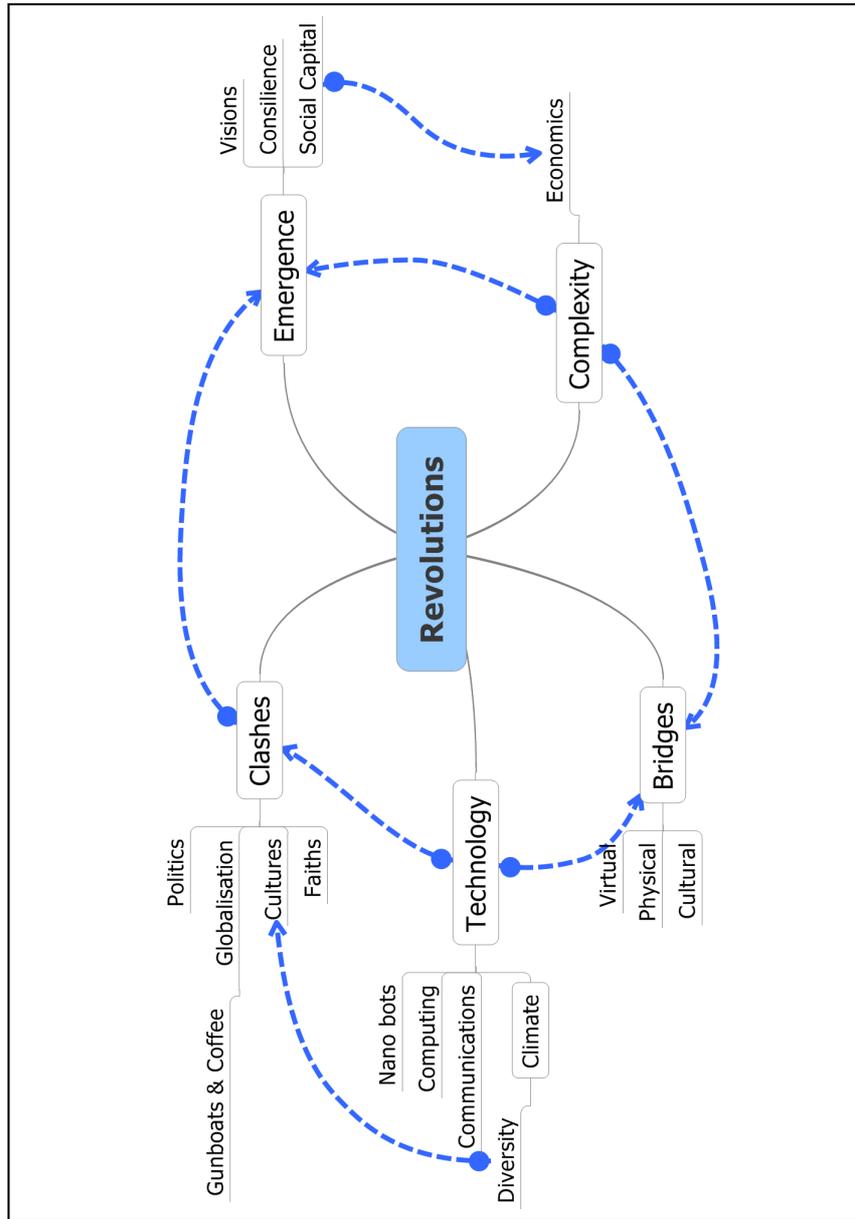
text, however, is the impact of gender on the processes of social cohesion. The role of women in this regard is a major topic and could easily fill another book. This is a planned future project.)

One of my family's most treasured possessions is a small bed quilt that was hand made by a dear friend of ours, as a present for our first daughter. It is a simple square mosaic of many different brightly coloured fabrics stitched together. For me, it is the perfect expression of the value inherent in the merging and blending of disparate patterns, and more importantly cultures. One final question of course, must be has the cohesion theme proved useful in understanding the topics addressed? Well you the reader must decide that, but social cohesion is a critical issue that must be addressed in a frank and open manner across all cultures, if we are to survive.

I feel humanity has a glorious future just within its grasp. In the blink of an eye, by evolutionary or even historical time-scales, we can achieve an age of peace and global cooperation. Not wishful dreaming, merely simple extrapolation from the major trends in recent history, and the forces inherent in the technological revolution at work. Of course there are some minor issues like global warming, food supply and poverty, etc. I sincerely believe we will overcome these issues, and build a global politically federated, yet culturally diverse society. The evidence from all of the fields considered in this text suggests that given a sufficient degree of communication, then the co-operative assembly of such a meta-system is inevitable. More importantly, however, is the motivating belief behind this book, which is that when human beings cooperate in a positive spirit, then anything is possible. Only a united and socially cohesive world is going to take us to the stars and beyond.

"The Earth is but one country and mankind its citizens"
Baha'u'llah

38

Mind map for chapter six.