

Interview with Thomas Homer-Dixon, conducted by Ted Rutland of the webzine "Uncommon Good" in late 2001.

Uncommon Good: In your book, you explain how our ability to solve problems depends on producing enough ingenuity to meet our requirement for it. Broadly speaking, what causes the requirement for ingenuity to vary?

Thomas Homer-Dixon: I think the principal factors boosting the requirement for ingenuity are rapid population growth, increasing consumption of resources per capita, and the increasing power of technologies – better technologies – to move materials, energy, and especially information. What we've managed to do with those three trends is to create networks that have more nodes in them, create a denser set of connections among those nodes than ever before, and push more materials, energy, and especially information at faster rates along those connections than ever before.

The French sociologist, Emile Durkheim, used the concept of dynamic density. He said that the dynamic density of human societies is increasing inexorably. It's basically the same idea: that we're increasing the number of nodes in our networks, the density of the connections among those nodes, and the intensity of activity along those connections.

One of the results has been a qualitative change in the nature of many of our systems. We've crossed what some people refer to as the complexity threshold. Those systems are behaving in fundamentally new qualitative ways – whether they are technological systems, economic systems, political systems, or our relationship with our natural ecology.

Complex systems tend to have a number of characteristics that makes them difficult to manage: they have feedback loops, they have synergistic relationships among their elements, and they have time lags between intervention in the system and the corresponding change in its behaviour. Most importantly, they have non-linearities: they often change their behaviour in quite dramatic and sudden ways with only a small perturbation.

All of that means you need a lot more ingenuity to

manage those systems. You need increasingly sophisticated solutions provided at an increasingly fast rate to cope with the vagaries of these systems, or to manage these systems in one way or another.

UG: And what causes the supply of ingenuity to vary?

THD: There are a whole range of factors that determine whether we can actually supply the solutions that we require. I think of it as an ingenuity supply chain. First, there is the human brain. Its evolution – and the characteristics derived from its evolutionary heritage going back three million years – determine whether it is well-suited to meet the kinds of problems we face today. And in many cases, I think it isn't well-suited.

After brains, I talk about science and technology, and whether we can rely on the institutions of science and technology to solve our problems when and where we need them solved. Is necessity the mother of scientific and technological invention? If you look at history, it turns out that, no, it's not always the mother of invention. It's not always the case that we can come up with a scientific or technological solution to our problems.

Then, I look at markets. Markets are important as a social institution because they provide – or may not provide – the incentives for innovation. Markets set the price signals that will determine whether our creative people innovate to solve the problems we have. Often markets don't work very well and don't provide the right price signals, so you get a sub-optimal supply of ingenuity.

Finally, I talk about political institutions and whether our political institutions or processes of governance allow us to collectively solve our problems. I suggest that, in many cases, they are failing. In large part this is because there are powerful vested interests – which are becoming increasingly powerful, given the nature of our political evolution – that can block solutions to our problems.

Now, politics and markets shouldn't really be thought of as being at the end of the supply chain because there are feedback loops that influence other elements. Politics can influence markets, obviously. They can influence the environment for scientific institutions. They can also – as people working in the developing world point out to me all the time – influence the

healthcare that determines whether, for instance, children develop cognitively; whether they have sufficient nutrition to develop the full range of mental capabilities by the time they grow up. So the elements in the ingenuity supply chain are actually very intimately connected back and forth with each other.

UG: Is there a difference between the ingenuity gaps faced by the North and those faced by the South?

THD: I think there is. I think the basic model applies in both cases, but that you would highlight different problems in the North than in the South. The principal issue in rich countries is how communications technologies are affecting the political system, I think. Info glut – and the empowerment of narrow special interest groups by communication technologies through blast e-mailing, blast faxing, scientific polling techniques – have developed within an institutional context that evolved in the eighteenth to nineteenth century when people traveled, at most, at the speed of horseback and when almost all the information they received was conveyed via mouth, spoken word.

Now, you have hyper-empowered citizens who can travel to the other side of the world in a day if they want, and have gigabytes of information available to them. Our institutions are not well-adapted for that. What's happened is that we have the capacity for small groups to mobilize themselves very effectively and bring policy reform to a halt. You get this kind of electronic gridlock developing around issues that seems to be very characteristic of developed countries because of the information infrastructure they have.

In the developing world, that's not where you put your focus because they don't have the information infrastructure. I would put my focus in the developing world on things like childhood nutrition. In India, for instance, half of the country's children are malnourished. They are cognitively stunted. Now, how are they going to participate in the information intensive twenty-first century economy? This is hundreds of millions of people, potentially, that will be disadvantaged automatically because of the very basic problem that they have not received adequate childhood nutrition.

In the scientific institutions, you have brain drain in many developing countries. In general, there is a loss of human capital. In an increasingly technologically complex world, those countries have an absence of adequately skilled people. And often when they are trained, they decide to live in the North. The North basically cream-skims most of the truly creative, talent-

ed, and well-trained people that are available to the South. (Quite understandably, of course. As individuals, they want to raise their families in the place where they are most safe and have the best quality of life.) But the problem for the South is that they are chronically under-supplied with the talent they need to run their societies. In every domain. Not just in scientific institutions, but in corporations, in government agencies, in civil services, in judiciaries and police systems. And laboratories are under-funded because there isn't the capital available.

Market failures, in general, tend to be a lot worse in the developing world. They're all over the place, even in rich societies. But in the developing world, markets are really under-developed. They are often permeated by corruption. The laws aren't clear – contract laws aren't clear, property rights aren't clear, court systems don't work very well, so contracts can't be enforced. And this relates to the human capital issue. So ultimately you're not getting anywhere near the right incentives to generate the solutions we need.

So I would put my emphasis on things like that, rather than on the hyper-technology political blockages that develop in rich countries which I think is one of our principal problems.

UG: How has the ingenuity gap been affected by recent advances in communication technologies and the now ubiquitous sources of news, data, and factoids that seem to characterize the so-called "information age"?

THD: I think communication technologies are very much a double-edged sword. They produce many advantages and benefits to our society, but I don't believe we've even begun to recognize the disadvantages. There are these political consequences I've mentioned; the fact that information technologies disproportionately empower already empowered groups. There has been this assumption that these technologies empower groups that had previously been voiceless. Sure, they have access to the Internet. Sure, they might be able to build web sites and things like that. And sure, they have in some sense gained some kind of power. But overall, I think what they do is ultimately provide more power to already powerful groups who have access to the capital they need to use these communications technologies to their advantage.

At best, I think what you're getting, in many circumstances, is a kind of gridlock. If the powerful groups don't dominate the political system through these technologies then you're getting a kind of electronic cacophony because everyone is pushing as much

information as possible.

And what are some of the consequences of that? In terms of the public discourse, I think we have less and less time to devote to any particular issue of critical importance. We have to spread our attention across such a range of things now, there's so much information, that we have less and less time to devote to anything. And there's practical evidence of that all around us.

The shrinking soundbyte on television, of course, is one thing we are familiar with. But what really struck me was the change in the length of opinion articles, cover stories, and major research articles. Time magazine cover stories have decreased 40% in length in the last 30 years. Scientific America research articles have decreased 40% in length. New York Times opinion articles, op-eds, have decreased 25% in length. A standard NYT op-ed is now is 570-580 words. Now what can you say about our increasingly complex world in 580 words?

Here we have a situation where we require greater subtlety and greater complexity of thought because of the problems we're facing. And yet our critical outlets for discussion are providing less and less opportunity and space for that complexity of thought. So things are moving in exactly the opposite direction to what they should be moving. And I think that's a serious problem.

These technologies are also sold as empowering the disempowered. But, really, what is happening is they're empowering the already empowered. They may be empowering the disempowered, but they're empowering the already empowered even more, increasing the gap. So the people at the bottom are saying, we've got all these fun tools, we can reach all these people. But, really, what's going on is this meta-level exercise – you can see this in globalization process – that continues almost inexorable because it's such a reinforcement of power at the top.

I think all of us, at various times, look around and say, we've created a crazy world. There's something fundamentally absurd about the world we're creating for ourselves. Now, this a problem that is characteristic, really, of rich countries. The poor countries, in most places in the developing world, there is information deficit. So that's an important distinction to make. Poor countries may have ingenuity gaps for other reasons, but it's not because of info glut.

UG: The empowerment of already powerful groups by communications technologies seems to parallel other

trends occurring in the global economy. In your book, you predicted that there would be "more attempts to attack the symbols of wealth and power in our rich societies – attacks by aggrieved people with newly acquired knowledge about the technologies of violence." Without excusing in any way the terrible atrocities of September 11th, do you think that increasing economic inequality is related to these attacks?

THD: I get a lot of flack right now for talking about the root causes of terrorism. But there are some empirical realities when you go out and look at the world. The societies with the greatest economic inequality tend to exhibit the greatest amount of violence. Economic inequality is correlated with violence – civil violence of all kinds. It can be revolution, civil war, guerrilla warfare, ethnic clashes, insurgency, crime or riots in the street, but violence. Sometimes it may spill across borders and manifest itself as terrorism.

We are creating on this planet a highly-unequal socio-economic system. It was already unequal. It is becoming more unequal. The gulf between the richest and poorest people on the planet has probably doubled in the last thirty or forty years, according to standard UN statistics. The 3-4 richest people on the planet control as much wealth as the poorest 40%.

People question whether these trends are really occurring, but one of the easiest ways to think about it is the capacity of single, wealthy individuals to command human labour. Somebody like Bill Gates can now command more human labour than any person in human history, given the wealth he has. So the trends are pretty decisive. If you look at income trends within our societies, in the United States, the bottom four-fifths of families have earned roughly constant real income since 1960. The top fifth of U.S. families have seen a roughly 50% increase in their real income during this period. The top 5% of families have seen almost a 100% increase in their real income in that period of time. These are concrete statistics.

So within our societies and around the world, we're seeing increasing economic inequality. Now, we can stick our heads in the sand and say, either it's not happening or it doesn't matter. But we're wrong. It is happening. And it does matter if we care about things like violence and the quality of life for our children and our children's children. The political and social stability of our global society is threatened by this trend.

Now, some people might say that these weren't the sources of the particular set of events of September 11th. I think you could make a strong argument that

poverty and economic inequality was at least part of the background to what happened on September 11th. But even independent of that, you can say with assurance that in the future, if the economic trends continue around the planet, we are going to see more violence, some of which will manifest itself as terrorism and it will be directed at those who appear to be winning in this race.

So, yes, the relationship between economic trends – and powerful groups who are taking advantage of those economic trends – and violence is a real one and we should be concerned about it.

UG: Will we have the ingenuity to solve this problem?

THD: It's funny, at the end of the book, I suggest that some of the most fundamental issues here are issues of value and spirituality. Until we address certain issues of value and spirituality, we won't be motivated to solve some of these problems.

I'm really concerned about the kind of triumphalism that has developed in the West over the last decade or so. This sense that we are the end of the evolution of human history. We won. Adopt our economic model, our political model, and our model of scientific institutions, and that will pave the road to the new utopia. That is profoundly misguided. There is imprudence in that, and I think it can get us into a lot of trouble.

To the extent that we believe that we have all the answers, to the extent that we are convinced that we understand everything and that we've got it all figured out, we are sure to make mistakes. Because we aren't being self-critical, we aren't listening to outside voices or outside pressures, we aren't paying attention and we have become increasingly self-absorbed, we are sure to make mistakes.

So what are the sort of spiritual and value issues here? We're not going to have the ingenuity to solve our problems unless we start adopting a greater degree of humility and prudence within our lives. To stop, to listen, to think carefully about where we're going, to listen to other people, to pay attention to the signals around us that might suggest that things are going awry – environmental signals, social signals of various kinds.

I mean, September 11th was a very good example of not paying attention to what's going on in the rest of the world and watching it blow up in our face. We might not have been directly responsible for the kind of social dislocation that led to the rise of that terrorist

group. But we sure weren't paying attention. We disengaged from that part of the world. We weren't paying attention to what was going on. The public wasn't in an uproar, saying, do something about Afghanistan because it's dangerous for us.

So to the extent that we're arrogant and we're self-absorbed, and pumped up on our own ability, we aren't going to be able to deliver the ingenuity we need to solve these problems. In a sense, those are spiritual issues because they relate to what we see as our relationship between ourselves and other peoples on the planet, and between ourselves and the cosmos in general.

If there are deeper value and spiritual issues – issues about who we are, what we can do, what the good life is, where we should be going with our societies, where is the boundary between our society and the rest of the world, to what extent do we consider other people to be part of our community – the problem we face is that there's no place to talk about these deeper value and spiritual issues in our societies or globally. Where do we do that? There are no institutions to do that.

One of the principal ingenuity needs we have is to create a set of institutions within which we can consider these larger meta-issues, values, spirituality, the direction of our society, what brings meaning into our lives, what are the fundamental principles of justice that govern relationships among ourselves and outside species. Where do those things get discussed? The only place where you discuss those issues, potentially, is within religious communities. But religious communities tell you what to think, for the most part. They don't open up a space to think, they give you answers pre-formed, pre-cooked.

If there were one set of institutional arrangements that I think would be more important than anything else it would be a space for democratic, pluralistic discussion of some basic issues of where we're going and what the point of it all is. And yet nobody is really talking in those terms. That's something that's not in the book, but it's come to me by thinking about it, given a lot of the questions I've had from people over the last year or so.

UG: It seems, at times, that we are aware of problems, but don't seek to address them. At other times, we see the problem, develop solutions, but simply don't implement them. Why does this happen, and how is it accounted for in your framework?

THD: In many cases – more so in the case of social

problems, rather than technical ones – we’ve got good ideas out there on how to solve our problems, but they aren’t implemented because they would involve changes in social relations or institutions that would substantially affect the power and wealth of powerful groups within our societies.

One of the reasons humans tend to be reactive, as opposed to proactive, about things is that we have to wait for problems to become really bad so vested interests can’t argue their way out of solving them anymore. The problems have to get so bad that the argument for making a change is decisive and final. And at that point the vested interests are just swept out of the way. Up to that point, if there is any uncertainty about the situation, the vested interests will exploit that uncertainty to say we should wait, or we shouldn’t do it, or we should do something else. This is why, ultimately, we are so reactive; why we always work towards supply-side solutions, as opposed to being ahead of the game by trying to work on the requirements side.

So it seems to me that the principal reason why a lot of good ideas aren’t implemented is that they would harm groups that benefit from the status quo. And there is a certain advantage to this, which is an argument Edmund Burk made a couple of centuries ago. There is an advantage to a certain conservatism in social evolution, an incremental approach that respects the rich traditions and histories of any given institution in society, as well as the power relations within the society. If you want to bring everyone along, there has to be a legitimacy to the change, and the people who need to be involved in providing moral support to this change are the people who have tremendous influence in the society.

Unfortunately, we’re evolving into a world in which that kind of incrementalism, that kind of muddling through, is increasingly inappropriate. Because things are changing too fast. And we can get ourselves into a situation in which there can be a dramatic non-linearity, a sharp sudden shift in the climate or the economy, or the breakout of a new disease. We should have prevented that circumstance from happening perhaps a decade before, but by the time it happens and you get that shift, it’s too late to do anything about it because the whole system has flipped to a new equilibrium. The science of muddling through, as they say, assumes a fairly static external environment. And unfortunately, the kind of environment we’ve created for ourselves isn’t static anymore. It’s changing all the time, it’s very dynamic.

So the power of these vested interests that prevent us from making radical adaptations is a bigger problem than it used to be in the past. They insist on incrementalism at the most, but we can’t afford incrementalism anymore.

UG: How can this dynamic be changed so that we implement the solutions we develop regardless of how they affect the vested interests? Can change be mobilized by citizens, or does it come from elsewhere?

THD: The problem is – and you can see that in the anti-globalization movement – to the extent that we try to use these new tools to change the power imbalance, the most we can usually hope to accomplish is this kind of electronic cacophony. It’s very difficult to actually achieve real, concrete change.

My view is that, first of all, we need to adopt a set of new concepts to understand the nature of our world. A view of the world as a tightly-interlinked set of unstable systems – ecological, economic, and political. A set of concepts that gets us out of this box of economic thinking that seems to dominate everything, where human beings are reduced to walking appetites, where the core concepts are consumption, production, investment, and savings. And a set of concepts that emphasizes our real nature as beings, which is our nature as problem solvers. We are pragmatic problem-solvers. That would allow us to think in a much more encompassing and flexible way about the situations we face.

So we have to develop a new set of concepts that will allow us to take advantage of non-linearities when they come along – surprises, sharp breaks in the system. We saw one on September 11th. There will be others. Some of them will be good, some of them will be bad. To the extent that we are intellectually prepared with new ways of looking at the world, then we will be able to see opportunities that arise in those moments of crisis. They say that the Chinese character for crisis represents both danger and opportunity. I think we need to take advantage of those moments of danger and opportunity, we need to be ready for that. If we’re locked into the current ways of thinking, we’re not going to be. Because the discourse is so narrow.

And that’s what I tried to do in The Ingenuity Gap. I tried to explore new ways of thinking about things so that we can take advantage of those moments of opportunity when they arise. We don’t know what they’re going to be, but there will be lots of surprises because we’re creating systems that are just prone to surprise. The thing that is most predictable about the

future is that it will be full of surprises. We shouldn't be surprised by surprise. So let's be ready for it. Because the one thing about these non-linear shifts is that the vested interests won't be ready either. So that's an opportunity where you can shift the power balance. I'm thinking in almost a strategic way, as if this is a power balance on the battlefield. And a surprise or crisis creates a new balance, a new terrain. The terrain has changed since September 11th, and it's going to change again. And we need to be ready to take advantage of that.

Now this is all sort of meta-theoretical. From a practical point of view, trying to get away from an economic paradigm to a paradigm that focuses on human beings as pragmatic problems solvers, as adaptive creatures, that are facing an increasingly dynamic, complex world. What is it that makes us adapt well? What are the things that we can improve within ourselves that makes us adapt well? Then you start dropping out all kinds of suggestions. We should be encouraging within our universities inter-disciplinary education. Because the problems that we face are fundamentally inter-disciplinary. We should be educating our children to create novel solutions to problems, drawing on ideas from lots of different places. We should be encouraging a lot of experimentation and risk-taking in developing solutions to problems. There's a whole body of literature on complex, adaptive systems that talks about how these systems respond to dynamic environments. One of the key things is that it's not a hierarchical process. Split up your problem-solving agents or groups, and you let them take risks. The key idea here, and this is something we don't do very well, is we have to be tolerant of failure. We have to encourage creative failure. I've talked to civil servants about this. They say they're confronting a decision-making environment unlike anything they've ever confronted before. And I say, well, a top-down, hierarchical, decision-making process, solution generating process is not going to work. The only thing that can work is to divide your bureaucracy into a series of competing groups that are trying to compete to solve a problem. Do it iteratively over time. Learn from each other as to which is the best solution. And that way you're going to be able to find something ultimately much more creative. But the only way you can do that is to be prepared to take risks. But the Canadian public, and the public in general, doesn't want our civil servants to take risks. They don't want to see any failures or boondoggles. So there's this tremendous pressure towards hierarchical conservative decision-making.

So there are practical things we can do to make our-

selves more adaptive in this environment if we're thinking with a different set of concepts.

We're at a unique point in human history right now. This next century will be make it or break it for us and I don't believe that anything has been decided yet. Anything is possible. And that makes it an exciting time to be alive for people who like to think about these types of things.

UG: And they should.

THD: Yes, they should.