

Changing Cultural Values and the Transition to Sustainability

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Abstract

This paper examines how change in cultural values could contribute to achieving sustainability and explores the timing of a possible transition. Global modeling of unsustainability points to a need for both technological changes and a shift in social priorities to make the socio-economic system sustainable. The technological changes are well understood in broad terms and could be achieved with existing know-how. The critical requirement is the social and political will for implementation, but until recently only a minority of the population in the global North had adopted the new cultural values this requires. However, social survey data indicates that in many affluent nations close to 50 percent of the population have now adopted post-materialist values. Modeling this cultural shift as a substitution phenomenon shows the values of modernity being rapidly replaced by the values of transmodernity and suggests an important turning point in progress towards sustainability. The potential of this shift in values for shaping different future scenarios of the transition to global sustainability is discussed.

Keywords: Sustainability, unsustainability, values, cultural shift, transition, World Values Survey, Cultural Creatives, s-curves, Fischer-Pry transform, transmodernity, scenarios

Introduction

The concept of sustainability is intrinsically concerned with the future. In essence, it is a recognition that our global civilization is unsustainable in its present form and must change significantly to survive in the long term. Our present industrial growth trajectory is rapidly approaching overall systemic limits and possible collapse. The likely consequence would be a drastic reduction in the level of human population and technological sophistication worldwide, leaving a degraded biosphere for the survivors. Sustainability is therefore a call to action, to transform our complex human society so that it can continue to develop without collapsing.

The future-oriented focus of sustainability therefore has two aspects, predictive and normative. The predictive aspect is the assertion that the present worldwide socio-economic system is in danger of failure, and the normative aspect is that as a global society we should anticipate this failure and make significant systemic changes to avoid it.

Detailed awareness of the future systemic challenge facing industrial society can be dated back to the Club of Rome/MIT *Limits to Growth* study published in 1972, and updated twice since that time, most recently in 2004 (Meadows, 2004). This study, vindicated so far by developments in the intervening three decades, correctly anticipated a rise in world population to 6 billion by 2000, up from 3.9 billion in 1972, and a 67% increase in global food production which compares well with the actual rise of 63% (Meadows, 2004). Unfortunately, it also pointed to a system-wide collapse early in the 21st century (beginning around 2015) if policies remained the same and the pattern of growth continued unchanged.

The *Limits to Growth* work was based on a computer model of global growth, which the MIT team called World3. They made multiple runs with the World3 model to discover how a collapse could be avoided, introducing significant changes in both technology and social behaviour. They discovered that collapse could be delayed by either one of these changes on its own. But it could only be prevented when both technological and behavioural change happened together. In the model runs with combined change, population and resource consumption peak at a high level early in the 21st century and then level off.

This set of modeling outcomes stands as a reasonably good summary of our collective thinking about the future time path of unsustainability, and its possible resolution, sustainability. Surprisingly, given its strong future dimension, concern about unsustainability did not initially emerge from the field of futures research, but from the perspective of environmental science. Prior to this, mainstream futures research was focused on the cornucopian potential of technology and human ingenuity and adjusted relatively slowly to the emerging consensus that unsustainability is indeed an overarching future concern.

To some extent this is a matter of time horizon. After all, assuming we can get through the unsustainability bottleneck, in the long run it may well turn out that cornucopian optimism is justified. However, as the case for optimism cannot be proved in advance, our pragmatic concern as a society must be the challenge immediately in front of us.

What then can we learn by looking at sustainability from a futures research perspective? If sustainability depends on two types of normative response happening at the same time, we can usefully explore the feasibility and timing of these. That is, if we need green, eco-efficient technology, and a significant shift in cultural values happening together, in advance of a serious crisis, how likely is it that these will happen, and when?

Finding an answer involves taking a closer look at the two prospective changes: green technology and a transformed cultural outlook.

The Changes Needed to Achieve Sustainability

The aim of green technology is to reduce the ecological footprint of industrial society. It is needed because conventional growth is leading to exponentially accelerating resource consumption, ecological damage and pollution.

Our present industrial economy extracts raw materials from nature, turns them into products with transient economic value, and later dumps almost the entire flow of materials back into the natural environment as waste and pollution. This was workable when the scale of activity was small in comparison with nature, but as industry continues to grow rapidly and approaches the same scale of operation as the entire biosphere, it is quickly becoming a major problem. Nevertheless, in principle, new "green" technologies and infrastructure can be developed that will deal with these challenges.

Resource depletion could be addressed by developing closed-loop manufacturing systems, with very high levels of recycling of all materials. Fossil fuel depletion could be offset by developing ambient energy systems with very high efficiencies on the demand side. Pollution and persistent toxification of soil and atmosphere could be mitigated by designing technology that eliminates emissions and waste or at least reduces them to a minimal level, and toxic pollution could be avoided by eliminating any dissipative use of substances that biological systems cannot tolerate (Tibbs, 1992).

Decline in food and water supplies could be avoided by developing a regenerative approach to agriculture that recycles nutrients and avoids runoff, minimizes the use of water, builds soil quality, and uses natural methods to manage pests, to ensure a sustainable supply of nutritious, uncontaminated food.

Valuable "ecosystem services" that are freely provided by nature – such as clean air and water, and a stable climate – could be protected by preserving ecosystems and biodiversity, and by developing infrastructure that has minimal impact on the biosphere.

All this and more could be done using our existing level of technological know-how, and is well documented (Brown, 2008). It might require a good deal of new and innovative engineering, but it does not require any fundamental breakthroughs. If there are breakthroughs, they might make the task easier, but they are not essential. Moreover, we have had the basic know-how for several decades, at least since the 1970s.

However, in spite of having the necessary technological capability and plenty of warnings about the dangers of not applying it, the striking fact is that we have made very little progress towards deploying green technology in the last 30 or 40 years.

This is also true of the behavioural changes needed to achieve sustainability. The 2004 edition of the *Limits to Growth* study explored two specific changes. The first was a voluntary worldwide reduction of family size to two children (or one child per person), and the other was a target for industrial output per person for everyone that would be no more than 10 percent above the world average level in 2000.

These and other related changes would not require any fundamentally new knowledge, but they would of course require a very significant shift in social priorities – though mostly for those living in rich countries. As long as the industrial output per person in poorer countries continues to rise towards the present world average there is

every chance that fertility rates will fall just as they have in rich countries going through the demographic transition (the process of increased affluence leading to reduced fertility). The real challenge will be for those in rich countries to scale back their expectation of a persistently larger than average share of world industrial output, and to support policies that would increase the share for those in poorer countries. The new economic thinking required – amounting to a fundamental realignment of economic priorities – has been developed in detail over the last 20 years under the rubric of ecological economics (Daly & Farley, 2004).

The exact shape of a future sustainable society and economy will be the outcome of emergent processes and so remains intrinsically uncertain. The creation of detailed scenarios of sustainable futures requires critical constraints and systemic interactions to be explored, a level of detail that is beyond the scope of this paper. For example, a key determinant of future conditions will be whether high-intensity low-carbon low-cost energy sources are available.

However, we do know in principle what needs to be achieved on the economic, technological and social fronts, but we have not been willing or able to give these changes a high enough priority. Short-termism, economic doubts, vested interests, inappropriate subsidies and taxes, inadequate legislation, conflict, greed, corruption, and many other distractions have outweighed far-sightedness and enlightened self-interest.

Changing the current technological and economic system would require very significant political will, which would require a new social constituency to support and drive the changes. Given that the technical changes themselves are feasible – at least in principle – any future prospect of achieving sustainability appears to depend primarily on the widespread emergence of a new set of social priorities as an enabler.

Is there any hope of this? Will we as a species become wise enough in time to avert disaster? Is there any evidence that our culture might be moving in this direction? Surprisingly, perhaps there is.

The Changing Context of Cultural Values

The potential for a new cultural outlook is best understood in terms of the changing global socio-economic context.

The basic demographic source of change is the increase in human numbers. In the ten years from 1999 to 2009 the global population grew from 6 billion to 6.8 billion, and is generally expected to continue rising (but more slowly) until the middle of the 21st century.

Rapid population growth reflects the worldwide spread and success of modernization and industrialization. This has led to an unprecedented improvement in the material conditions of life of hundreds of millions of people, with great increases in income, life expectancy, health, education and wellbeing (Goklany, 2007).

A key characteristic of modernity in the 250 years since the industrial revolution began has been seemingly endless expansion on every front, as seen in the rise of science and technology, the growth of industry and trade, and the global population explosion. Indeed, expansion is one of the principal dynamics of modernity.

In nature, every growth process has a culmination, and this may prove to be true of modernity too. At the beginning of the modern era the entire globe represented the basic geographic space for expansion. As modernity reaches a global level of operation, instead of globalization being the next stage of growth for modernity, it may turn out to be its limiting point and a threshold of transformation. Global scale as the threshold of transformation for modernity can be seen in many contexts. Nuclear weapons can cause global destruction and so render the modern concept of war between nations self-defeating. Global use of fossil fuels and other physical resources is causing global environmental change, thus undermining the benefits of their use. A strategy of rich modern countries exploiting resources in distant poor countries begins to fail when industrialization reaches global scale.

The difficulty in thinking about an end to the modern era is that it has been characterized as embodying everything that is new. How then can there be something new that is not modern, when modern means new by definition? In the words of sociologist Martin Albrow: "If something is represented as the essence of the new, the expanding, the rational and the forward looking and then is given no future, it is scarcely surprising if the alternatives are looked on as at best a let-down, at worst a catastrophe" (Albrow, 1996, p.105). The modern era has done such a good job of claiming and assimilating every new intellectual perspective – even postmodernism – that it is hard to find a vantage point to begin thinking about why modernity might be ending and what it might mean.

Modernity is reaching limits because of its own success. One of the tenets of modernity is that it can overcome limits, but now it is encountering self-limiting reversals of effectiveness. It does not have an enemy or a nemesis – in some ways it has completed its task and in other ways it simply has a natural reach. Its success in bringing material affluence to billions of people (even though other billions still live in poverty) is inspiring many people to think beyond the boundaries of material success. Rising affluence itself is the springboard for a transformation of personal outlook. It is here, in these new ways of thinking, that we can find the seeds of the cultural form beyond modernity.

As material affluence rises it does not produce a continuous increase in life expectancy or even subjective well-being and happiness. Most of the gain in these comes from just the first \$10,000 or so of increased annual income from a subsistence level. As incomes rise beyond \$10,000 a year, life expectancy and well-being level out and stay almost flat as incomes continue to rise (Wilkinson & Pickett, 2009).

This can be explained in terms of Abraham Maslow's well-known hierarchy of needs (Maslow, 1954). He argued that when people's incomes rise and their basic needs are met, they begin to feel their survival is secure and their priorities shift from basic to higher-level needs. They progress through a succession of levels of need until eventually they become more interested in—or more free to pursue—personal development and what Maslow called self-actualization.

In the early 1980s, Jonas Salk, the developer of the first polio vaccine, described how development might change social values on a large scale (Salk, 1981). As a biologist, he noted that global population growth was following an S-shaped curve (discussed in more detail later) and proposed that the social values prevailing during the

first half of the S-curve would be replaced by very different values during the second half. The attitudes and behaviours in what he called Epoch A, the initial growth phase, would be characterized by competition, independence and power. In contrast, the attitudes and behaviours in what he called Epoch B, the phase of decelerating population growth, would be characterized by collaboration, interdependence and consensus.

As large but stabilizing populations in industrialized countries experience sustained material security over many decades their values might therefore be expected to shift, according to Salk's description, from an emphasis on quantity, death control and overcoming external constraints, to an emphasis on quality, birth control and self-restraint. At the same time, their priorities might shift from purely material and socially-related concerns, towards self-actualization. The experience of being born into a world of material affluence might open the way for entire generations to question whether there is more to life, particularly if—ironically—they were also confronted with mounting evidence of environmental and other undesirable side-effects of economic growth.

Empirical Evidence of Changing Values

Social research suggests that this is exactly what has been happening over the last 20 to 30 years. Among the early indicators was a study published in 1981 comparing national samples of "psychologically normal" American adults taken in 1957 and in 1976 (Bryant & Veroff, 1982). The aim was to understand changes in the way Americans subjectively experienced life.

By 1976, adults, particularly younger adults, had become much more uncertain about their futures. They were shifting from a social and cultural basis for wellbeing to a basis in personal adaptations to the world. Society was becoming more affluent and complex and life choices were no longer a given. People were focusing on the self and looking for opportunities for self-expression and self-direction. They had become much more psychological in their thinking about themselves and their lives.

A decade or so later, another social researcher reported a related cultural shift in industrial society. In 1990, University of Michigan political scientist Ronald Inglehart published a 20-year, 24-nation study of the evolution of values in the late twentieth century (Inglehart, 1990). He reported a shift to what he called "post-materialist" values as a result of the economic and physical security prevailing since World War II. Newly emerging values included the right to individual voice and influence, both politically and within organizations, and an emphasis on self-actualization and issues related to quality of life.

The first survey (World Values Survey, 1981-2008) of 1981 and 1982 was one of the components in Inglehart's 1990 study and covered 25 countries. In 1997 it was expanded to include 43 societies, representing 70 percent of the world's population. The data confirmed the shift to post-materialism and Inglehart proposed a new framework he called "postmodernization." He suggested that modernization had helped society move from poverty to economic security, and that this success had led to a shift in "what people want out of life." In postmodernity, as he used the term, people valued autonomy and diversity over authority, hierarchy, and conformity. According to

Inglehart, "postmodern values bring declining confidence in religious, political, and even scientific authority; they also bring a growing mass desire for participation and self-expression....Today, the spiritual emphasis among mass publics is turning from security to significance: from a search for reassurance in the face of existential insecurity to a search for the significance of life" (Inglehart, 1997, pp.327-328).

Inglehart found these values among the more highly educated, more articulate generations that grew up with affluence and choice in the late twentieth century. The new values were expressed most strongly in Western Europe and the United States, with a cross-national consistency that Inglehart described as remarkable. Although less advanced, a similar shift was observed in the 1990-1993 World Values Survey data for Eastern Europe, East Asia and Africa, suggesting that the shift in values is by no means limited to the rich countries of the global North and West (Inglehart, 1997).

In 2000, Paul Ray and Sherry Ruth Anderson drew attention to this shift in values in their book *The Cultural Creatives* (Ray & Anderson, 2000). Drawing on their analysis of survey data from the United States, they described a largely hidden but steadily growing subculture that had risen to more than a quarter of OECD country adult populations. They called members of this group "Cultural Creatives" – because they were in effect creating a new culture – and said that they remain hidden because they tend to see themselves as isolated individuals whose personal values differ from the mainstream.

Ray and Anderson described this subculture, consisting at the time of about 50 million people in the United States and about 80–90 million people in Western Europe, as having key values that include: strong concerns about ecological sustainability and saving the planet; strong concerns about women's issues and civil liberties; a deep commitment to personal growth (including both psychological and spiritual dimensions); an insistence on "authenticity" (essentially the "walking your talk" principle of the civil rights movement); and a sense of outrage about the disregard by big business of these same issues.

Ray describes values as being the deepest and slowest-changing indicators that can be measured with surveys, in contrast with attitudes and opinions, which change more quickly and therefore tend to be more newsworthy. He defines values as "people's most important life priorities, the bases for what they actually do, what they want to accomplish, and how they want to be" (Ray, 2008, p.1). Values, when correctly identified, are he says excellent predictors of behaviour and choices, including such things as how people "will vote, the symbolically important products and services they will buy (food, houses, cars, vacations), how they want to live, and what kind of future they want for themselves and for their children" (Ray, 2008, p.3). In his research he found that the most predictive values were not related to individual differences but cultural differences. And the cultural differences that now matter in globalised society are no longer related to national and ethnic subcultures, but the degree of acceptance of the values of modernity, and the extent to which people are moving beyond them as the Cultural Creatives are doing.

According to Ray's analysis, the Cultural Creatives are at or a little above the U.S. national average for all demographic categories except one. They hardly differ from the national profile for age, education, ethnicity, income, occupation, race, region, and

religion. This alone makes them hard to distinguish from the population at large. But there is one category in which they do differ: a majority of them are women. Overall they are 60 percent women, and in what Ray called the "core group" of Cultural Creatives they are 67 percent women, a ratio of two women to each man. As Ray puts it, many aspects of the Cultural Creatives phenomenon "reflect women's concerns going public for the first time in Western history" (Ray, 2002, p.46).

As a group, the Cultural Creatives arise from a slow convergence of all the new social movements since the 1960s. Ray says there is a 40–80 percent overlap in the constituencies of any pair of social movements for which data is available, and the overlap is occupied by the Cultural Creatives. They have been going from movement to movement, acting as the continuity between them and gradually synthesizing the values of all the movements into a common worldview. According to Ray and Anderson the personal journey of self-education by which Cultural Creatives emerge takes about 10 years (Ray, 2002). During this time nascent Cultural Creatives read a large number of books, attend workshops, and get actively involved in the various new social movements.

Ray lists 20-odd kinds of new social movements, ranging from civil rights and social justice; peace; women's concerns (extending to eco- and spiritual feminism); environmental and ecology; planetary (including anti-globalization); alternative health care; organic food and natural products; and personal growth and new spirituality. Typically, individual Cultural Creatives care intensely about at least six of these movements, and have a history of being involved in many more of them over a period of years. On average, the rest of the culture cares about none to two of these social movements.

Ray and Anderson identify two other subcultures in addition to the Cultural Creatives; the "Moderns" and the "Traditionals". They characterize the three groups as having distinctly different beliefs and preferred cognitive styles. The Traditionals are concerned to fend off a bad, complex, ill-understood world. They believe they should maintain customary and familiar patterns of life and uphold conservative versions of their particular religious traditions. They tend to see things in simple categories and think in terms of black and white, good and evil. "They are largely in reaction against the culture of today's world, usually from a rural, small town or religiously conservative stance" (Ray, 2008).

The Moderns prefer to focus attention tightly on what succeeds, ignoring side effects. They like to apply linear analysis and avoid distractions. They want to make or have a lot of money, be up to date, and value economic and technological progress. It seems obvious to them that the body is like a machine, that organizations are like machines, and that big institutions know best. They think that efficiency and speed are top priorities, that compartmentalizing your life works, and they like to stay on top of things and be in control.

In contrast, the Cultural Creatives are synthesizers, absorbing information from a wide range of sources. They like to think in terms of the whole system, and regard as being valid subjective personal experiences that suggest there is more to reality than a purely physical universe. They are concerned about future generations and the fate of the planet, and want to do business with responsible corporations. They believe that

mind, body and spirit need to be unified, they see the planet as a living being and humanity as one people. They are moderate users of technology and they like to buy and create high quality natural food, meaningful art, and authentic cultural products.

Ray says there is an active flow between the three groups as Traditionals become Moderns, and Moderns become Cultural Creatives. He believes that in 1960, the Moderns and Traditionals each comprised about half the U.S. population. The Traditionals have been losing ground since then (in spite of the numbers claimed to bolster certain political positions), and the number of Moderns held steady (only beginning to fall in the last ten years), because Moderns were gaining members from the Traditionals and losing members to the Cultural Creatives at about the same rate.

This continuous flow of people to the Moderns' worldview and then to the emerging Cultural Creatives' worldview is consistent with the idea that modernization lifts people from poverty to economic security, and then leads to a shift in what they want from life.

Characterizing the Extent and Timing of a Transition to Sustainability

From the perspective of this paper, this shift in cultural values is significant because it may supply the precondition for sustainability. A values shift in itself does not mean that sustainability is accomplished, because that requires both technological and social change, as described earlier. Instead, if the new values become dominant they could provide the societal motivation and political will to enable the systemic and infrastructural changes needed for a transition to sustainability.

If a new cultural worldview is indeed emerging, this raises the question of whether it could become the dominant cultural perspective in the future, because this will determine if sustainability is likely to be achieved. Related to this is the question of how fast the new worldview is growing, and hence when dominance and the transition to sustainability might happen. Answering these questions requires identifying an appropriate conceptual model for the process of change and some data to quantify it.

In his 1982 book *The Turning Point*, Fritjof Capra (Capra, 1982) put forward the idea of a future turning point, or crossover, between a new rising value system and an older waning value system. In this farsighted account, Capra depicted the "rising culture" and the "declining culture" as approaching a point in the future when their numbers would be equal, after which point the rising culture would become dominant.

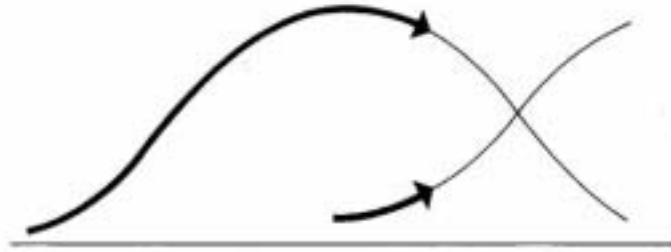


Figure 1. "Schematic depiction of the rising and declining cultures in the current process of cultural transformation." Source: Fritjof Capra, 1982

Capra described the process in these terms: "During the process of decline and disintegration the dominant social institutions are still imposing their outdated views but are gradually disintegrating, while the new creative minorities face the new challenges with ingenuity and rising confidence....The social movements of the 1960s and 1970s represent the rising culture, which is now ready for passage to the solar age [characterised by the use of solar energy]. While the transformation is taking place, the declining culture refuses to change, clinging ever more rigidly to its outdated ideas; nor will the dominant social institutions hand over their leading roles to the new cultural forces. But they will eventually go on to decline and disintegrate while the rising culture will continue to rise, and will eventually assume its leading role" (Capra, 1982, p.466).

Capra's schematic diagram of two intersecting curves provides a useful conceptual model for the dynamic of a transition between old and new cultural values, with a convergence and crossover as both reach 50 percent of the population. However, to use this conceptual model to plot past data and forecast future growth, a more mathematically precise definition of the curves is required.

Capra's depiction of the rising culture shows it as an S-shaped curve. The S-curve or logistic growth curve pattern is found in widely different phenomena, such as biological populations, the growth of individual organisms, and even in the growth of new technologies. Growth starts slowly, then picks up speed until it reaches the half-way point, when it begins to slow, flattening out as it approaches completion or 100 percent saturation. Mathematically, the growth rate at any stage of a logistic curve is proportional to the fraction of growth achieved multiplied by the fraction remaining.

Capra's overall schematic closely resembles a formal model of substitution based on S-curves in which the growth of a replacement population follows a logistic growth curve or S-curve, while the old population follows a mirror-image descending S-curve. This is the Fisher-Pry substitution model of technological change (Fisher & Pry, 1971-1972), which can be used to predict how long a new technology will take to replace an older technology. This forecasting technique is based on the observation that the growth pattern of new technologies closely approximates a logistic curve, as do other substitution processes where a new population entirely replaces an older one in a continuous dynamic.

A convenient mathematical property of the S-curve, and central to the Fisher-Pry model, is that the fraction of growth achieved divided by the fraction remaining (at successive times) is an exponentially rising value. If this value is plotted against a logarithmic vertical axis (percentage of growth) and a linear horizontal axis (time) it forms a straight line, a conversion known as the Fisher-Pry transform (as in the lower half of Figure 2). This is useful, as it means that once the first few data points of an S-curve are known, a log-linear straight-line projection can show how long it will take for a given percentage of future growth to be reached.

The growth of the new cultural values appears to be consistent with the S-curve model of growth and substitution. Both Inglehart and Ray have reported that the numbers of post-materialists and Cultural Creatives respectively have been rising steadily over the past few decades, while the numbers of materialists and Moderns has been falling. The Fisher-Pry model therefore offers a way to forecast the process of cultural substitution, subject to the availability of appropriate data.

When Inglehart was writing in the late 1980s (Inglehart, 1990), he compared both American and Western European data collected from 1970 to 1980, and observed a marked shift to post-materialism during that time. In 1970, materialists outnumbered post-materialists by 4:1, but by 1988 the ratio was only 4:3.

Writing in 1997, he (Inglehart, 1997) compared time-series data for 21 countries in which values surveys were administered in 1980, 1981, and 1990. He found a shift to post-materialism in 18 of the 21 countries, with a double-digit shift in North America, most of Europe, and Japan.

In 2008, he reported that in the five European countries where data is available for the entire period from 1970 to 2006, plus the US, there had been "a substantial net shift toward post-materialist values" (Inglehart, 2008, p.136) and that taking these countries as a whole, by 2006 post-materialists had become more numerous than materialists.

Inglehart's analysis of post-materialism indicates that the richer countries may already have reached a cultural turning point. Unfortunately the measures and scales he uses in reporting the World Values Survey data cannot be applied directly in the Fisher-Pry substitution model. Ray, however, reports his analysis as percentages of the adult population – for Traditionals, Moderns and Cultural Creatives – and these percentages can be used in the model.

Ray believes that the Cultural Creatives have been growing in numbers continuously for the past 40 years. In the process they have grown from his estimate of less than four percent of the population in 1960 (Ray, 2008), to 24 percent in 1995 (Ray, 1996), 27 percent in 1999 (Ray, 1992), and to almost 45 percent by 2008 (Ray, 2008) (see Table 1).

Table 1.
Percentages of the adult U.S. population (Sources: Ray, 1996, 2002, & 2008)

Year	Cultural Creatives	Moderns	Traditionals	Total
1995	24.0%	47.0%	29.0%	100%
1999	27.0%	48.0%	25.0%	100%
2008	44.9%	39.7%	15.4%	100%

Note: The values shown in Table 1 have been assembled from three unpublished texts by Ray that are accessible on the Internet (Ray, 1996, 2002, 2008). The 1995 percentage for Cultural Creatives comprises two sub-categories, the Core Cultural Creatives and the Green Cultural Creatives (Ray, 1996). The numbers for 1999 have been taken as being the middle of the ranges reported (Ray, 2002, p.5). The 2008 percentage for Cultural Creatives comprises three sub-categories, Core Cultural Creatives, Green Cultural Creatives, and Transitionals, an additional more peripheral group (Ray, 2008, p.9).

Ray's original analysis is based on the findings of a number of different surveys in the United States. The qualitative descriptions of the three subcultures were developed from regular consumer surveys by American LIVES Inc., starting in 1987 (Ray, 1996). The percentages for 1995, 1999 and 2008 respectively were derived from the Integral Culture Survey sponsored by the Fetzer Institute and the Institute of Noetic Sciences, January 1995 (Ray, 1996b); the Sustainability Survey sponsored by the Environmental Protection Agency and the President's Council on Sustainable Development, January 1999 (Ray, 2000); and the Taylor Nelson Sofres (TNS) American Cultural Creatives Survey of 2008 (Ray, 2008).

With so few data points any inference will be statistically weak, but if the data is simply taken at face value some speculative exploration is possible. The Fisher-Pry model can be used to get an approximate sense of the rate of values substitution. The S-curve for the growth of Cultural Creatives (shown in Figure 2) was plotted using Loglet-Lab software (Rockefeller University, 2006), an application for calculating the Fisher-Pry transform. The Cultural Creatives data from Table 1 was used for this calculation, and a few iterations of the model to find a 1960 value that leaves the curve unchanged suggests that it would have been close to two percent, which refines Ray's estimate of less than four percent.

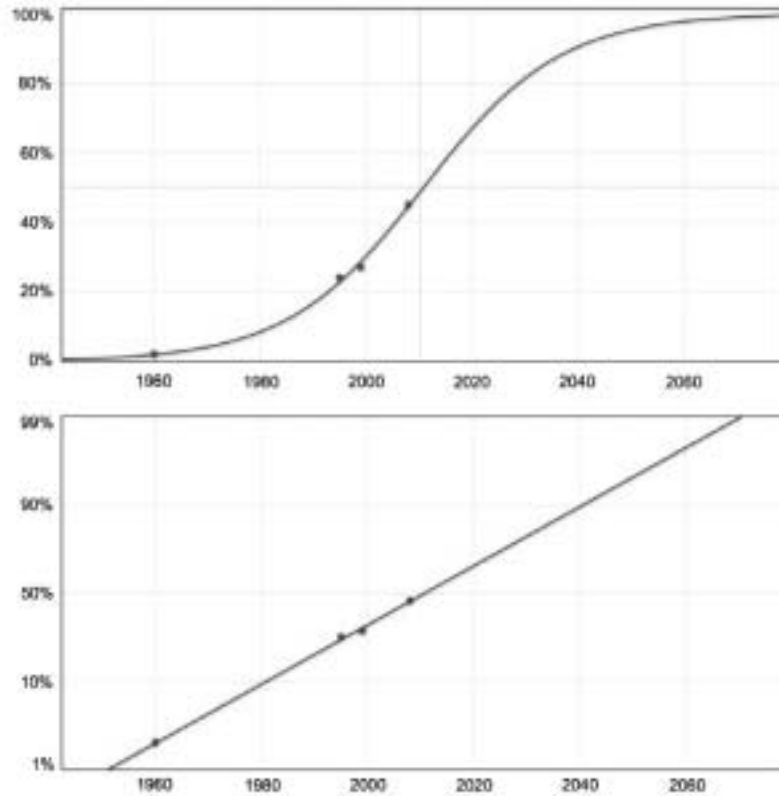


Figure 2. Growth of cultural creative values in the United States
 Note: The logistic parameters applied in Figure 2 were (a) growth rate 50, 100; (k) carrying capacity 90, 100; (b) midpoint 1990, 2030.

The data points for the Traditionals, the Moderns, and the two combined were then overlaid on the Cultural Creatives S-curve (Figure 3), resulting in three crossover points. The descending S-curve for the combination of Traditionals and Moderns is obviously a mirror image of the rising S-curve for Cultural Creatives, and suggests a crossover (A) in 2011. This is predictive in the sense that if the 2008 TNS survey were to be conducted again next year, the expected result would be 50 percent Cultural Creatives. This suggests that we are now at, or close to, the point of crossover postulated by Fritjof Capra.

Figure 3 also suggests that the crossover point (B) between the Moderns and the Cultural Creatives was in approximately 2006, and the crossover point (C) between the Traditionals and Cultural Creatives was in approximately 1998. (Clearly, little claim for precision can be made here, but the three intersection points rely mainly on interpolation rather than extrapolation and are in any case close to the points that would be indicated by a simple graphical display of the available data.)

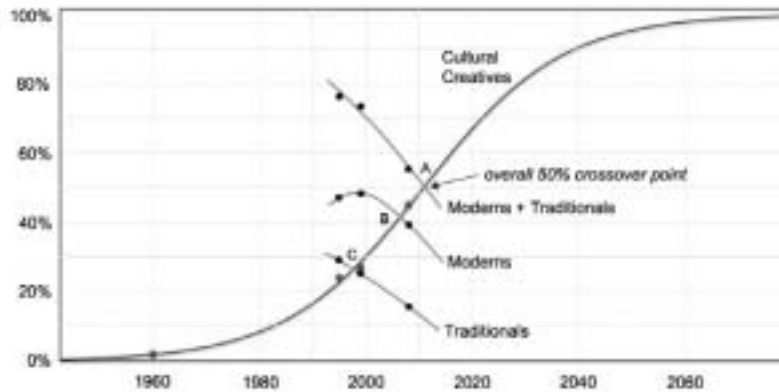


Figure 3. Turning points between values in the United States

The possibility that the overall crossover is on the point of happening in the US, and has already happened for the subcultures taken separately, is broadly corroborated by other research. Inglehart's work, based on five survey rounds conducted internationally between 1981 and 2008, indicates that a crossover between materialists and post-materialists had occurred by 2006 in several of the richer countries.

A further reference point was provided by a BBC Magazines survey in the UK in 2005 (BBC, 2005). It found that 20 million, or 56%, of adults between the ages of 25-70 are dynamic, socially-engaged "hidden influencers" looking for alternative solutions to everything. They are motivated by quality of life rather than quantity of things, want to better themselves, make environmentalism mainstream and protest against injustice, and insist on values and ideals such as trust and integrity. These results broadly align with the findings of Inglehart and Ray, and indicate that a crossover may have occurred in the UK before 2005.

It therefore appears from the available data that the cultural turning point has been or is now being reached in most of the richer countries, with most of the rest approaching crossover during the next few years (inferring from Inglehart's 1990's data). In pragmatic terms, the crossover will be less a mathematically precise moment in time and more a zone extending over several years as the subcultures converge. The significant point is that we have now entered that zone.

Discussion

The simplicity of Capra's schematic (Figure 1) is perhaps a little misleading in that it suggests a simple transfer of power and leadership from the declining to the rising culture at the moment of crossover. As he pointed out, however, the declining culture is likely to resist relinquishing its dominance, which may account for the heightened levels of political tension in the United States during the first decade of the 21st century. So, rather than a smooth transition, a period of turbulence may be a more reasonable expectation. This would resemble the bursts of chaotic behaviour observed in systems on the threshold of bifurcation – spontaneous shifts to new patterns of order.

The most significant change to be expected soon after the crossover may be a rapid shift in the cultural story relayed by the mass media. Up to the point of crossover, the culture of modernity naturally dominates public discourse, but after the crossover, the now majority rising culture may suddenly make its presence felt as if out of nowhere.

The Cultural Creatives S-curve shown in Figure 2 represents a cultural frontier in time. It is the boundary (in this case for the United States) between the era of modernity and the era that will follow it. The next era does not yet have a name, though a convenient placeholder might be "transmodernity" – signifying simply that this is the era we find ourselves in when we have moved *through* (trans-) modernity to the stage beyond it (see the perspective of Figure 4 below). It is too early to characterize as it lies in the future, but the optimistic outlook would be that the transmodern era will be the era of sustainability.

The frontier of transmodernity was preceded some decades earlier by another frontier – the transition from traditional agrarian culture to modernity. The exact shape and timing of the frontier of modernity is a matter of conjecture, though a notional curve may be posited by linking Paul Ray's estimated value of 50 percent Traditionals in 1960 with the cluster of surveyed values for Traditionals (Table 1). This would imply a slower onset rate roughly comparable to the slope of world population growth from the late 19th Century, which seems a reasonable proxy as rapid population growth coincided with the spread of modern values.

With the caveat that this is an admittedly speculative thought experiment, the notional frontier of modernity and the frontier of transmodernity are both presented together as Fisher-Pry transforms in Figure 4. Since this is based on Ray's U.S. data and estimates, it shows the picture for the United States. The picture for the world as a whole would be similar, but by inference from Inglehart's overall findings the frontier of transmodernity would be delayed some years behind the United States.

The position of Europe is harder to gauge, as Ray's findings suggest that there are roughly as many Cultural Creatives in the United States as in Europe and Japan, while Inglehart's data indicates that Europe is more post-materialist than the United States. This may well reflect differences in methodology and emphasis between the two sets of data. Inglehart's data makes distinctions along two dimensions: Traditional versus Secular-rational values, and Survival versus Self-expression values, with post-materialists having high Secular-rational and Self-expression scores (Inglehart and Welzel, 2005, p.64). Cultural Creatives may not map directly onto this framework, as they may be equally high on Self-expression, but lower on Secular-rational values, having to some degree rejected secularism for spirituality. Equally, the Inglehart data may simply be showing that Europe is more secular than the United States. On balance, therefore, the frontier of transmodernity shown in Figure 4 is probably a reasonable approximation for Europe and Japan as well as the United States.

The overall perspective provided by Figure 4 is that modernity itself can be seen as a relatively brief pulse or wave of global economic and technological expansion, followed by a post-expansionary form of socio-economic organization.

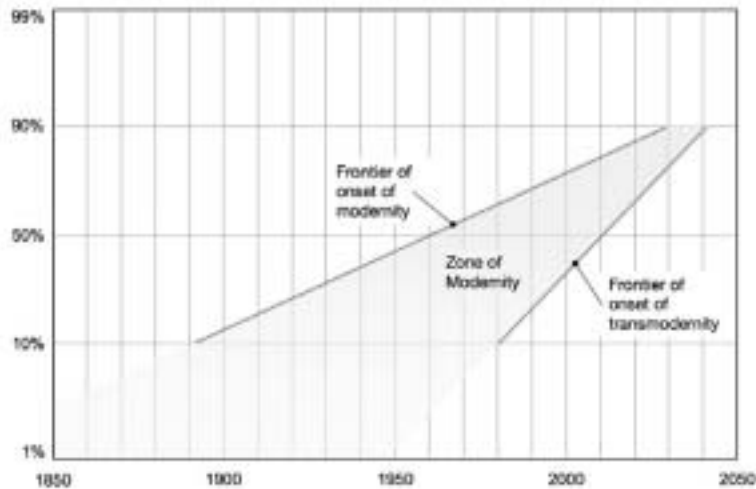


Figure 4. Modernity as a historically brief pulse between substitution frontiers

This constitutes a conceptually clear and calibrated (in terms of timing and onset rate) model of the transition to sustainability, a model that suggests we have now reached the end of the gestation stage of sustainability and are about to see the deployment stage begin.

Conclusion

This paper has presented evidence that over the last few decades cultural values have been changing and that this process has now reached the stage where the new values are about to become dominant. Once dominant they can be expected to create a strong social and political constituency for change, starting with a rethink of the technological and economic aims and assumptions underlying our current system. This in turn would lead to changes at the level of organization and infrastructure necessary to achieve sustainability.

This reasoning is consistent with the viewpoint of this paper that sustainability is not an either-or proposition. It is not either a matter of technological advance alone, or a matter of social change alone. Technology is not in some sense "pure", but always exists as part of an intricately interwoven socio-technical system (Trist, 1993). The socio-technical system of modernity is unsustainable, and for it to become sustainable both the social and technological aspects must change in tandem. If technology simply "advances" without a change in the social aspect it is likely to be more powerful but just as, or even more, unsustainable (Tibbs, 2000). Achieving sustainability must be a process of social change leading to a recasting of technology – a new design intention drawing on today's capability but redirecting it.

The S-curve turning point model is therefore intrinsically optimistic, because it suggests that the necessary cultural shift is observable, has been building for 40 years, and has now reached the threshold for triggering real systemic change.

This conclusion – that there is a significant basis for optimism – echoes Paul Hawken's message in *Blessed Unrest: How the Largest Movement in the World Came into Being and Why No One Saw It Coming* (Hawken, 2007). He reports that an unprecedented and truly global progressive movement has been emerging, largely unnoticed, in parallel with the shift in values described in this paper. He calls it a "story without apologies of what is going *right* on this planet," and justifies his argument empirically by cataloguing over a million non-profit civil society groups around the world dedicated to environmental issues, social justice and indigenous rights.

The basic optimism of the turning point model can be interpreted simply as implying that the social conditions now exist for conscious voluntary change. Alternatively, but possibly more realistically, it can be interpreted as marking the start of a process of positive socio-economic adaptation as the institutions of modernity increasingly lose relevance.

The voluntary change scenario would involve the populations of rich countries deliberately scaling back their consumption of world industrial output, bringing it down towards the world average, while also supporting policies that would increase the share for those in poorer countries. This would allow the industrial output per person in poorer countries to rise to the present world average, pulling the world population through the demographic transition – with fertility falling as affluence rises.

In an alternative scenario, much the same outcome could be forced by circumstances. A chronic economic and energy crisis, with its main impact in the rich world, might mean that consumption in the global North falls, while consumption in the BRICs and global South continues to increase. The transmodern cultural majority in the global North might then take the lead in adapting creatively to the reduced consumption, establishing a new cultural pattern that is emulated across the global South, stabilising global consumption at an intermediate level.

Either way, being able to put a timescale to the turning point model provides valuable insight into the timing and probability of an overall transition to sustainability. This is one benefit of looking at the sustainability issue through the lens of futures research.

This insight is capable of making a positive contribution to our collective worldview. Pessimism about the state of the world and its apparent trajectory towards disaster is so widespread that being able to see a positive way ahead has considerable value. The turning point model provides the basis for an encouraging scenario of a new culture in the ascendant, ushering in an economy based on clean green technology and improving social equity. This is a genuinely positive future outlook which – though not inevitable nor to be achieved without difficulties – does present a plausible and timely case for hope.

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