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Global Megacrisis: A Survey of Four Scenarios on a Pessimism-Optimism Axis

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Abstract

This symposium addresses the multiple threats of climate change, energy shortages, globalization, financial instability, and other critical issues we call the Global Megacrisis. A trend analysis is presented outlining these trends as well as other trends that may alleviate the Megacrisis. Results of a survey show that respondents estimate there is a 60% probability the world will either suffer a major Decline to Disaster or Muddling Down to severe problems. Responses from 13 invited scholars are included, as well as summary statements by the authors and the editor.

Keywords: Global Megacrisis, climate change, energy shortages, financial crisis

The horrendous March 2011 triple whammy in Japan–huge earthquake, tsunami, and nuclear reactor crisis–was a wild card development beyond anyone's imagination. Similarly, the 2008 financial crisis and near economic meltdown was equally beyond anyone's anticipations, as were the BP Gulf of Mexico oil spill in 2010 and a variety of extreme weather events worldwide in 2010/2011. Were these developments merely anomalous events, or indicators that things *may* be taking a negative turn for humanity–a deceleration or sharp reversal of centuries of progress?

The September 2010 Special Issue of *Scientific American* focused on "The End" – the chance that the world will suffer a major catastrophe due to killer pandemics, runaway global warming, environmental decay, nuclear war, and/or some form of "digital crisis." A final section called "Restart" suggested that bioengineering, infinite information, neuroscience, transition to non-carbon fuels, sequencing the human genome, and organic farming could form "a new beginning."

When *Scientific American* recognizes these dire possibilities, you can be quite sure that what we call the "Global Megacrisis" has moved beyond the fringes of Hollywood entertainment into mainstream thought. But it is wishful oversimplification to think that the catastrophic end or near-end of civilization will be followed by a "restart" based on advanced technology. And, by focusing only on extreme events, attention is drawn away from more complex scenarios that may well be more likely. We could face long-term overall decline despite many positive changes, or overall progress despite major bumps in the road. As the Millennium Project's *2010 State of the Future* aptly states, the world is in a "great race between increasingly complex problems and the ways to improve the prospects for civilization...(and) technology is not enough." (Glenn, Gordon, & Florescu, 2010)

The unfolding Megacrisis cuts across all sectors in an era of multiple transformations. The Iraq war demonstrated the limits of military power, and the Great Recession highlighted the limits of poorly regulated free markets. With the foundations of the old global order shaken badly, the threat of growing climate change, looming food and energy price escalation, huge government deficits, terrorism, and a host of wild cards now form a complex interplay of destructive forces that are straining old systems to the breaking point. These multiple threats now appear as interlocking elements of a failing global order that looks like a train wreck in slow motion. If it had not been bad mortgages and arcane derivatives, some other flaw in these complex systems could have caused roughly the same type of global failure. And more failures seem all too likely in our Anthropocene age of "wicked complexity" that we don't understand. (Allenby & Sarewitz, 2011).

To provide a broader sense of the Megacrisis, Box 1 titled "Perspectives on the Global Megacrisis" offers a summary of the problem as seen by a variety of prominent futurists and other writers. Because information can be overwhelming, Box 2 focuses on prominent data and central trends that more precisely define the Megacrisis.

Box 1

OTHER PERSPECTIVES ON THE GLOBAL MEGACRISIS

It is important to realize that there is no shared language on the general global condition, what we call "megacrisis" while others forego a label or use another name. Nor is there any shared approach. Some writers use a balanced perspective that looks at both pessimistic or optimistic indicators, but most decidedly take one side or the other. Here is a sampling of both general overviews and one-sided views.

Perhaps the best starting point is the "State of the Future Index" in the annual Millennium Project report, **2010 State of the Future**, assembled by Jerome C. Glenn, Theodore J. Gordon, and Elizabeth Florescu. (2010) The Index reviews 30 trends to provide a "report card for humanity," divided into four categories: Where We Are Winning (improved literacy rate, more Internet users, improved life expectancy, etc.), Where We Are Losing (CO2 emissions, unemployment, voting, corruption levels, terrorist attack casualties, etc.), Where There Is Little Change

(R&D spending, HIV prevalence), and Where There Is Uncertainty (forest area, debt service as percent of GNP, infectious diseases, etc.) It is problematic, however, as to how the trends are weighted, and whether the 30 indicators cover all essential developments.

A recent report prepared by the Rockefeller Foundation, along with Peter Schwartz and the Global Business Network, parallels somewhat the four single-axis scenarios presented here. **Scenarios for the Future of Technology and International Development** (2010) provides four scenarios for the next decade or so in a 2x2 matrix along two axes: strong vs. weak political/economic alignment, and low vs. high adaptive capacity. The RF/GBN scenarios are "*Hack Attack*" (an unstable and shock-prone world, with weak governments, thriving criminality, and dangerous technologies), "*Lock Step*" (tighter top-down government control after the 2012 pandemic, with limited innovation and growing citizen pushback), "*Smart Scramble*" (an economically depressed world, with local makeshift solutions and "good enough" technology addressing a growing set of problems), and "*Clever Together*" (a world of highly coordinated and successful strategies addressing global issues, e.g. smart cities and vastly improved solar power).

Ian Johnson, Secretary-General of the Club of Rome, recently warned that "Our world is headed into a Perfect Storm of an interconnected financial, ecological, and social crisis." (Johnson, 2011). Lester R. Brown of the Earth Policy Institute uses the same metaphor in **World on the Edge: How to Prevent Environmental and Economic Collapse** (2011), stating that "ecological and economic deficits are now shaping not only our future, but our present...the 'perfect storm' or the 'ultimate recession' could come at any time. It will likely be triggered by an unprecedented harvest shortfall, one caused by a combination of crop-withering heat waves and emerging water shortages as aquifers are depleted. Such a grain shortfall could drive food prices off the top of the chart." In **The Great Disruption: Why the Climate Crisis Will Bring On the End of Shopping and the Birth of a New World** (2011), Paul Gilding, a faculty member of the Cambridge University Program for Sustainability Leadership, sees loss, suffering, and conflict in the coming decades as our "planetary overdraft is paid," but compassion, innovation, resilience, and adaptability will win out.

John L. Petersen, founder of The Arlington Institute, focuses on a wide range of converging global trends, breakdowns, and breakthroughs in **A Vision for 2012: Planning for Extraordinary Change** (2008), concluding with possibilities after a massive catastrophe ranging from a failed global system to a new world of global cooperation and harmony with nature. His brief version, "A New End, A New Beginning," is in **Innovation and Creativity in a Complex World** (World Future Society, 2009 conference volume). Another and still broader view of world-scale systems crisis and civic collapse by the 2020s, followed by "our maturity as a species," is provided by Duane Elgin in **The Living Universe** (2009). The Special Issue of *Scientific American* on "The End" (Sept 2010) has many bits and pieces of endings and beginnings, but no attempt to bring them together in any coherent whole. Similarly, the Special Issue of *Foreign Affairs* on

"The World Ahead" (Nov-Dec 2010) has some 15 articles on such topics as U.S. power, other pivotal powers, the energy revolution, religion on the rise, the digital disruption, etc., but only a skimpy attempt to bring together the "long list of simmering conflicts, unsettling trends, and mounting global problems."

A broad and distinctively upbeat view is provided by Ronald G. Havelock in **Acceleration: The Forces Driving Human Progress** (2011), who takes a long historical view, favors the ideas of Julian Simon and Michael Zey, scoffs at the 1972 *Limits to Growth* study and Paul Ehrlich's 1968 "population bomb" polemic, and ignores Lester Brown and hundreds of other environmentalists and climatologists. A much narrower upbeat view by urbanist Richard Florida, **The Great Reset: How New Ways of Living and Working Drive Post-Crash Prosperity** (2010), hopes for economic recovery.

This is countered with grim views of **The Biggest Wake-Up Call in History** by Richard Slaughter (2010), who views "a planetary emergency," and **Dystopia: What Is to Be Done?** by Canadian sociologist Gary Potter (2010), who sees capitalist-driven disaster already afflicting at least one billion people and coming soon for the rest of us. **Collapse: How Societies Choose to Fail or Succeed**, by UCLA geography professor Jared Diamond (2005), was a best-seller for more than six months and is still relevant. **Our Final Century: The 50/50 Threat to Humanity's Survival**, by UK Royal Astronomer and Cambridge professor Martin Rees (2003) covers a broad range of science/technology risks and is also still very relevant.

Severe climate change scenarios in particular deserve our attention. **Climatic Cataclysm: The Foreign Policy and National Security Implications of Climate Change**, edited by Kurt M. Campbell of the Center for a New American Security (2008) offers three plausible scenarios of *Expected Climate Change* by 2040, *Severe Climate Change* by 2040, and *Catastrophic Climate Change* in the 2040-2100 period, as average global temperatures rise to 5.6oC. In a more popular style, former US Assistant Secretary of Energy Joseph J. Romm provides three scenarios in **Hell and High Water** (2007), on developments in three periods: 2000-2025, 2025-2050, and 2050-2100 (when sea level rise of 20-80 feet will be "all but unstoppable" if current trends continue). A longer-term view of our world in 2050, 2100, and 2300 is enabled by University of Washington geologist Peter D. Ward in **The Flooded Earth: Our Future in a World without Ice Caps** (2010), arguing that sea level rise will happen no matter what we do. More specifically, in **The Fate of Greenland**, four leading climatologists look at the melting of Greenland ice, worry about the possibility of abrupt climate change as in Greenland's past, and warn that "If the Greenland ice sheet melts, sea level would rise 7 meters worldwide." (Conkling et al, 2011)

Our previous contributions to thinking about the Megacrisis are **Democracy in the 21st Century** by Michael Marien (2008), on problems of democracy and today's ill-informed citizens, and **Technology's Promise** by William E. Halal (2008), on TechCast forecasts of technology revolutions in the next few decades.

BOX 2

Trend Analysis of the Megacrisis

Because the Megacrisis is complex, this analysis focuses on prominent data supporting central trends that hope to define it more clearly. The "Driving Trends" and "Resolving Trends" below highlight the stark global challenge of transforming economies, technologies, politics, and lifestyles – or face the likelihood of environmental and economic collapse, along with attendant problems of rampant crime, conflict, war, and the possible loss of civilization.

Also listed are some key wild cards that could be involved in the Megacrisis. For instance, nuclear attacks or volcanic eruptions could exacerbate the impacts of global warming. Vice Versa, global warming could trigger wild cards, like a runaway pandemic. Although wild cards are usually random events that are ever present, many are increasingly caused by humans, such as the BP oil spill. There are endless wild cards with a 2% probability or less, and "not-so-wild" cards with a 10% to 30% probability – more likely than a "black swan." Most wild cards are not very relevant to the analysis, however, because they are inherently rare and they could happen anytime. In contrast, the Global Megacrisis is a particular evolutionary transition with its unique challenges, and the trends below are interwoven into a Gordian Knot of entangled relationships.

We present this as a tentative outline that will be improved with your help. See www.TechCast.org for references (and references available on request). Please email your proposed additions, needed changes, and other thoughts to Halal@gwu.edu and mmarien@twcny.rr.com For more perspectives and details, see the bibliography in Box 1 and the provocative questions this study raises in Box 3.

Trends Driving the Megacrisis

- **Scientific Forecasts for Climate Change Are Grim**. The world has seen a 1 degree F temperature rise thus far, but an additional 4-6 degree rise is likely even if all proposed actions are taken, and the increase could be 10 degrees or more over the next few decades if carbon emissions keep growing. 2010 marked the hottest year and decade on record. The projected sea level rise was 16 inches in 2007, but the scientific estimate is now about 3-6 feet by 2100 (*New York Times*, 13 Nov 2010). If the Greenland ice sheet melts, which is quite possible (perhaps within decades), sea level would rise by 24 feet, with another 16 foot rise if the West Antarctic ice sheet melts (Conkling et al, 2011).
- **Dangerous Environmental Impacts Are Likely**. Climate change would almost certainly produce more extreme weather patterns (heat waves, hurricanes, drought, etc.), environmental pollution, and energy shortages. It could destroy a quarter of all animal species, the greatest extinction since the dinosaurs. A hotter climate is likely to spread dengue, malaria, asthma, allergies, and other disease more easily. A team of scientists cautioned

"Climate change is the biggest health threat of the 21st century." (*Discover*, December 2010). [Also see *Changing Planet, Changing Health: How the Climate Crisis Threatens Our Health* by Paul R. Epstein of Harvard Medical School and Dan Ferber of *Science magazine* (2011).]

- **Methane a Growing New Threat**. One important indicator to watch is greatly increased methane releases from thawing tundra and melting methane clathrates on the coastal ocean floor, now thought to be 3 times earlier estimates. Methane has 23 times the global warming impact of CO2, so it could pose another possibly even greater threat that could appear quickly. (*The Washington Post* 9/25/09)
- **Reducing CO_2 is Costly**. The science indicates greenhouse gases should be reduced by 60% from 1980 levels to avoid severe climate change. This would cost roughly $20 trillion, or about 1-3 % of global GDP, if done soon–but would be far more costly if done later. (Stern, 2007)
- **Industrialization Growing Rapidly**. The problem is even more daunting because most developing nations are likely to industrialize, along with growth in [developed] nations. The number of people, living at industrial age levels will spurt from 1-2 billion in 2011 to 4-5 billion by 2030 or so, increasing all these threats by a factor of 3-4 over the long-term. (IMF, 2011)
- **Little Political Will**. There is as yet no global agreement on taxing carbon or other policies that would decrease carbon emissions significantly. The US, with the largest economy is the world, has no serious plan because the nation is in political gridlock and likely to remain so for the next 2 years, at least. China, India, and the US are planning to build a total of 850 coal-fired plants, adding 5 times as much CO_2 as present treaties intend to reduce, although clean coal may help. After attending the Cancun conference on climate, Alden Meyer of the Union of Concerned Scientists, said: "The big issues are still unaddressed." (*Washington Post*, December 12, 2010)
- **Increasing Water Scarcity**. Nearly 1 billion people lack clean water and 2.6 billion lack good sanitation. Water tables are falling on all continents, and by 2025 the World Bank estimates that half of the world could face water scarcity due to climate change, population growth, and increasing demand for water. Unless major changes occur, global water shortages are likely to causing mass migrations, higher food costs, malnutrition and conflicts (Glenn et al., 2010. Also see the important new report on water security (World Economic Forum, 2011).]
- **Recession Likely for Years**. The Great Recession that began in 2008 is often compared to the Great Depression of 1930 which lasted until 1940. The International Monetary Fund forecasts growth for the next two years at slightly above 2% in developed nations, although it should remain at 8% in the developing world. The Recession is being exacerbated by rising costs of health care, [rising food and energy] costs, retirement of aging popula-

tions, and other negative trends. That was before Japan's earthquake/tsunami/nuke mega-disaster in March 2011. Some economists think unemployment rates of 8-9% are not unlikely for several years, much like Japan's "lost decade." (IMF, 2011)

- **Institutional Failures Could Grow Severe**. The 2008 near-collapse of the world's financial system highlighted structural failures in business, government, and other institutions. An IBM study of 1500 CEOs noted: "the world's leaders think their enterprises are not equipped to cope with complexity in the global environment." (*Global CEO Study*, IBM, 2010; "May the Best Theory Win," *Newsweek*, Feb 1, 2010). Nobel economist Joseph Stiglitz wrote "The financial collapse may be to markets what the Berlin Wall was to Communism." (Stiglitz, 2010)
- **Cyber-Insecurity**. Computer hacking is growing commensurate with the boom in global e-commerce. US military networks, nuclear facilities, banks, air traffic systems, and electrical grids are under constant attack. The US Naval War College was shut down for 2 weeks. Annual cost is estimated at $1 trillion. The threat is so great that one expert suggested it's time to install "cyberwar hot lines" – like the special phones the USA and USSR used to avoid nuclear Armageddon. (Cetron & Davies, 2009)
- **Weapons of Mass Destruction**. The old status quo of Mutually Assured Destruction may have worked for two superpowers, but it is no longer viable with some 9 contending nuclear powers, and more are likely, possibly including terrorist [groups]. Bioweapons are also probable. Between 1993 and the end of 2009, the Illicit Trafficking Database recorded 1,784 nuclear trafficking incidents. (International Atomic Energy Agency, 2011)
- **Organized Crime Continues to Grow Worldwide**. The total annual income of organized crime is estimated at $3 trillion, twice the military budgets of the entire world combined. The World Bank also estimates $1 trillion is paid in bribes each year. (Glenn et al., 2010)

Trends Resolving the Megacrisis

- **The World Is Accelerating Use of Alternative Energy**. By 2020, the EU expects renewables to reach 22%, Britain expects to reach 35%, Sweden 50%, and China 16%. The US is likely to derive 20% of its energy from alternatives by 2020 and 30% by 2030. Former U.S. President Bill Clinton thinks alternative energy could prove a boon for both developing and developed nations alike. (U.S. DOE.com; TechCast.org). Hazel Henderson's "Green Transition Scoreboard" (www.ethicalmarkets.com) calculates over $2 trillion invested worldwide (2007-2010) to accelerate green energy and buildings, on track to reach $10 trillion in investments by 2020.
- **The Technology Revolution Introduces New Powers**. Information Technology (IT), Artificial Intelligence (AI), robotics, biogenetics, and other revolutionary fields increasingly offer more powerful forms of com-

munication, amass knowledge, form intelligent decision systems, and generally improve progress. TechCast studies show a burst of innovation starting about 2015, which coincides with the beginning of the next projected 35 year upcycle. (www.TechCast.org/Critical)

- **Forces of Social Change**. The rise of women into positions of power, citizen revolts in the Middle East, the Millennial generation modeling the first "global citizens," and other movements are introducing fresh perspectives and energy.
- **Countries and Urban Areas "Going Green."** Many are following the Green Growth Strategy urged by the Organization for Economic Co-operation and Development to develop "a stronger, cleaner, and fairer world economy." Cities acting on their own are important, especially in the US where national policy is lacking. (OECD, 2011)

Some Wild (and "Not-so-Wild") Cards

- Global pandemic kills tens of millions
- Nuclear weapon(s) exploded
- Israel attacks Iran's nuclear capability
- Internet crippled for months by cyberwar or cyberterror
- Huge volcanic explosion cuts food production by half
- Clear discovery of extraterrestrial intelligence
- Cheap and widely available life extension techniques
- "Big One" earthquake in California
- Nuclear power plant failure puts industry on hold [we listed this in 2010; it is now happening to some degree due to the March 2011 Fukushima disaster.]
- Synthetic biology creates many new life forms
- Cloning of humans
- Stadium-size asteroid hits earth [very unlikely, but widely considered]

The authors gratefully acknowledge contributions to this analysis by Jerome Glenn, Director of the UN Millennium Project, and Mike MacCracken, Chief Scientist of The Climate Institute.

Warnings of the "Global Problematique" (Peccei, 1969) have been issued for decades by the Club of Rome, and many others have pointed to serious crises and destabilizing transitions. Suddenly, many of the concerns we were forewarned of are at hand. The future is arriving finally – and with a vengeance. The analysis below will show there is a palpable and widespread fear that our present world is unsustainable, that we can't get our act together, and that events could spin out of control. Scientists are convinced that a 60% reduction in carbon dioxide emissions is needed to stave off ruinous climate change, but that looks so unrealistic that many are girding to withstand a significant rise in sea levels, scorching heat, withering droughts, and even

more severe weather patterns. Policy analyses are now underway in major capitals to [experiment with geo-engineering] the planet's climate as a last ditch effort to stave off [or mitigate] disaster.

With these financial and ecological crises threatening the world, the two of us engaged in a spirited e-mail discussion, published in the June-July issue of *World Future Review* (pp29-34). We then published a survey on www.TechCast.org to encourage discussion and to learn what others think. The survey summarized our differing views, and asked TechCast experts and visitors to evaluate the severity of the Global Megacrisis and the probability of four alternative scenarios. We invite you to go to www.TechCast.org/Hot Issues to take the survey, or you can e-mail answers and lengthier comments to halal@gwu.edu and mmarien@twcny.rr.com.

This article sketches four scenarios below, presents preliminary results, and concludes with analyses by each of us. We explain why one of us is guardedly optimistic, while the other is largely pessimistic, yet hoping to be proven wrong.

Four Scenarios, One Axis

Scenarios are an excellent way to bring together a lot of information, to suggest what is possible and desirable, and to stimulate out-of-the-box thinking. Many futurists favor a 2x2 matrix of four alternative scenarios that highlights developments along two axes. While these approaches have certain advantages, there are many axes to consider. We think it is equally useful, perhaps more so, to sketch four scenarios along a single axis running from "Pessimistic" to "Optimistic." This allows us to focus on the question of progress, or total net outcomes for individual societies and the world as a whole in a period of widespread crisis.

DECLINE TO DISASTER. The world fails to react, with disastrous consequences. Indecision reigns due to too many choices, too many entrenched interest groups, and too few resources to make needed changes. Huge government deficits persist, leading to failures of public services and an inability to make crucial transition investments in energy, education, and infrastructure. Governments are also unable to reform financial systems, curb global warming, reduce military spending, or conquer deficits, while most corporations remain focused on short-term profit. Technological advances are shelved, delayed, controversial, or fail to help. Global warming accelerates with huge releases of methane added to CO2, resulting in more extreme weather events, massive migrations and crop losses. The world sinks into economic depression, crippling energy shortages, collapse of large ecological systems, much destruction of life, local and regional wars, terrorism, crime, and far more corruption. Worldwide pandemics, nuclear attacks, bioterrorism, cyber-attacks, and/or crashes of the Internet may add to the decline. Many parts of the world suffer the loss of functioning civilization, producing disasters for most people in most societies.

MUDDLING DOWN. Half-way, inadequate actions seem to create the paradox of a high-tech dark age. Political stalemates, lack of resources, and ignorance about the complexity of our problems result in only modest changes in financial systems, governance, energy, and education. The promise of new technologies is only partly met, while pollution and population pressures continue, as world population passes 7

billion in late 2011. Global warming and extreme weather increase. Recovery from the Great Recession is slow and uneven, and the number of failed states rises. Local wars and terrorist attacks increase. Despite claims of progress by political and corporate leaders, high unemployment persists and the quality of life declines for most people. These strains on the capacity of the planet to support global industrialization lead to more people living in poverty and despair, and often reacting violently. In the U.S., the Tea Party movement gains momentum, blocking action to promote sustainability in the name of lower taxes and government spending, freedom from regulation, and the wisdom of the 200-year-old pre-industrial era Constitution.

MUDDLING UP. Governments and corporations act slowly, but increasing knowledge and mounting threats spur generally successful efforts. Far more sophisticated IT and AI provide more powerful technical capabilities, a wider understanding of the problems, and an appreciation of the fundamental need to promote sustainability. The sense of urgency builds as problems increase, so public attitudes shift enough to favor needed changes, and reasonably good leadership is able to provide guidance. There are relatively minor disasters along the way, but little that is catastrophic for an entire region or the planet. A rudimentary but functioning global order emerges to manage this advanced society in time to avert widespread disaster, albeit with an increasing level of the normal problems in any large and rapidly evolving social system.

RISE TO MATURITY. The transition to a new global order is made smoothly and quickly. There is a rapidly growing realization that the Earth is a precious living system requiring human care. Governments and corporations react wisely and with determination, and they are supported by the majority of people. The world surpasses the UN Millennium Development Goals of halving poverty by 2015, and many nations approach current definitions of sustainability. Tea Party anger in the U.S. is channeled into addressing serious problems. Energy shortages, climate change, and global conflict are largely avoided, and the transition to low-cost and low-carbon society is nearly completed. The media, schools, and colleges offer intelligent guidance, and in-depth debates illuminate crucial issues to find common ground, while dismissing many ill-informed assumptions. The world enters global maturity rather easily and unscathed, with a widespread emphasis on what works, what lowers costs that are fully considered, and what is truly in the public interest.

Early Survey Results

As of January, 2011, our exploratory survey has been completed by 60 responders and more replies are coming in. It's not a scientifically random sample, but these are smart and thoughtful people. Here's the percentage responding to the initial question, "How severe is the potential threat posed by the Global Megacrisis?"

Table 1. *Severity of the potential threat*

Severity	Respondents (%)
Catastrophic (Decline to Disaster): Could be the end of civilization for many if not all.	**22%**
Severe (Muddling Down): Threatens major declines in central aspects of life.	**60**
Bad (Muddling Up): Serious challenges likely to be met in time.	**13**
Overblown (Rise to Maturity): Exaggerated problems that technology and markets will handle.	**4**
Don't Know: Too murky and can't even make a guess.	**2**

We also asked respondents to estimate the probability for each of the four scenarios along the "pessimism-optimism axis." This question frames the issue differently, but produces roughly the same general results - a 60% probability for the two most pessimistic scenarios, compared to a 40% probability for the two most optimistic., and nearly two-thirds of respondents viewing the less extreme middle scenarios as more likely.

Table 2. *Probability of four scenarios*

Scenario	Probability (%)
Decline to Disaster: World fails to react. More global warming, widespread energy and water shortages, economic depression, conflict, etc. Loss of civilization in many parts of the globe.	**25%**
Muddling Down: World reacts partially, but problems continues to outdistance policies and technologies, ecological damage continues, increased poverty and conflict	**35**
Muddling Up: World reacts out of need and the help of IT/AI. Policies and technologies gain on problems. Disaster avoided but some disorder and disappointment	**28**
Rise to Maturity: Ideal transition to a humane and responsible global order	**12**

The rough timetable for these four scenarios was estimated as follows. Note that the Muddling Down scenario is thought to occur earlier than the others; indeed, some think it has already begun. Here are the mean dates among our responders:

Table 3. *Mean arrival of four scenarios*

Scenario	Year
Decline to Disaster	**2029**
Muddling Down	**2023**
Muddling Up	**2027**
Rise to Maturity	**2033**

The heavy distribution of probabilities at the pessimistic end of this range is sobering. Here's how some experts expressed the dangers:

- "A great study. Well posed and valid. The crisis is real. Outcome is uncertain."
- "We're stuck with quite a bit of global warming just due to the excess CO_2 already in the atmosphere."

- "We have already crossed over 3 of the 9 global boundaries - the other 6 are under threat."
- "I think muddling down has already begun."
- "Challenging. Complex. Sleep-robbing."

Many identify the problem as chronic failures in governance, leadership, and culture that could be corrected:

- "Present trends, cultures, structures and leadership all point down."
- "Immature governance systems and political lag seem drivers of crisis."
- "Humanity is long on skill (IT/AI) but short on wisdom (ability to govern and decide wisely)."
- "After initial chaos, we shall learn, grow and mature."
- "Our species has a proven capacity to survive, usually by muddling up."

Box 3

Further Questions on the Global Megacrisis

All good studies raise further questions, and the following thoughts are offered to help us think about what remains to be understood.

How Can We Define It?

At the personal level, it is a Megacrisis to lose one's home, job, and/or spouse. At the community level, a city or state with high unemployment or a natural disaster is in a Megacrisis. In a broader sense, a Megacrisis is more than a "catastrophe" but a natural turning point in social evolution, so it can be a threat or an opportunity. As defined by the trend analysis in Box 2, for instance, the Global Megacrisis is a constellation of climate change, ecological collapse, economic depression, nuclear threats, and/or high impact wild cards that threaten civilization. If addressed well, it could also lead to an advanced stage of development based on knowledge, high technology, and global community.

How Can We Anticipate It?

Trends like those in Box 2 suggest that we are moving toward a Megacrisis, but there are many other indicators to consider. If Iran demonstrates a nuclear bomb, as many fear, this would heighten the chances of war, which could destabilize the Middle East and ignite a Megacrisis. Many would argue that failed nations are already in megacrisis, and states and nations like California, Greece, Ireland, and others are also arguably in such a condition. At the global level, the Megacrisis ultimately depends on measures of sustainability, survival, and transformation. There are always contending perspectives, but polite avoidance of the question to forestall painful changes or to think "it can't happen here" enhances the prospects of catastrophe.

What Will Happen When the Megacrisis Arrives?

If the Megacrisis clearly arrives, what happens next? What comes during and after the Megacrisis? Could it be the beginning of "The End" – complete extinction, or major decline in civilization for decades or centuries? Or, as Ervin Laszlo and others have pointed out, a "breakdown" could lead to a "breakthrough," a shift in global consciousness or other badly needed changes. The transition could also be rapid or slow, a clear upturn or downturn, or mixed paths as in our Muddling Up and Muddling Down scenarios.

Technological change seems to drive the Global Megacrisis. What is likely "beyond knowledge" when IT and AI automate routine human thought? How will the ecological system be managed sustainably, or not? What institutional systems are needed to guide the political, cultural, and spiritual life of this different world?

Halal's Analysis: The World is Entering an Advanced Stage of Evolution

The most striking conclusion is that there is widespread fear over the enormity of the problems and great doubt over humanity's ability to adapt. Confusion, institutional gridlock, failures of leadership, inability to cooperate, and other higher-order problems pose enormous obstacles. There is a serious chance we will suffer the "loss of civilization" or "a high-tech dark age."

Although the obstacles are massive, it is not wishful thinking to see that historic forces are likely to alter this situation in ways that may surprise us, much like the collapse of Communism. Green technologies, the next economic upcycle starting about 2015, and profound social changes (women in power, values of Millennials, etc.) are likely to help convert today's despair into hope and transformation. The catalytic power that global media played in the 2011 "Mid-East Revolution" suggests the enormous potential that could be unleashed for change. For those who are around in 2020, I'm pretty sure the Megacrisis will be largely resolved and life will continue to go on fairly well. That's why I rate the four scenarios as follows: Decline to Disaster – 10%, Muddling Down – 25%, Muddling Up – 60%, Rise to Maturity – 5 %.

The forces involved are so historic and powerful that a long-term evolutionary perspective is necessary to understand what is taking place. Our work at the TechCast Project (www.TechCast.org) shows that the Global Megacrisis is the inevitable result of high-tech globalization that is causing what we call a "global crisis of maturity." This is a critical growth phase in the life cycle of the planet, marked by unprecedented transition points in climate control, environment, energy, economic systems, and all other facets of an emerging global order. We also think that the relentless advance of information technology (IT) is driving a resolution. IT causes a transition to an advanced stage of civilization powered by powerful new technologies, interrelated global systems, adaptive social institutions, mounting knowledge and intelligence, and global consciousness.

By combining our 70 forecasts of technology breakthroughs, we are able to produce "macro-forecasts" that suggest the Muddling Up scenario is likely in about 10 years +/- 3 years. Worldwide e-commerce is likely to take off in about 5 years to form a rudimentary version of the "global brain" futurists have long anticipated. About 2020 or so, we are likely to see 2nd-generation computing (optical, nano, bio, and quantum) and artificial intelligence (AI) good enough to automate routine knowledge. Ray Kurzweil's extrapolation of computer power offers strong support (Kurzweil, 2005), as well as the TechCast data.

As AI automates routine knowledge (GPS navigation systems, speech recognition, robotics, etc.), attention is moving beyond knowledge to focus on values, beliefs, ideology, vision, and other higher levels of thought out of sheer necessity. This constitutes the next logical phase in the progression of society from agriculture, to manufacturing, to services, to knowledge, and now to consciousness itself.

The central role of IT/AI is a game changer because it shifts the relationship between humans and machines in profound ways. Contrary to the assertion that AI will surpass people, AI liberates us from mental drudgery and releases the unique human capability for higher consciousness – at the very time that the world faces unprecedented challenges. As this study suggests, a wider acceptance of the dangers of climate change, the political will to enact solutions, a transformed global order, and other major shifts in global consciousness are essential if we hope to avert disaster.

This imperative to produce a mature social order is hardly a coincidence but rather the playing out of historic forces as IT spreads to form a central nervous system for an emerging global order we don't yet understand. Sure, there will be lots of information overload, confusion, and crazy behavior because the world is struggling to take responsibility for its future or suffer enormous consequences. But Pollster John Zogby's data show a "fundamental reorientation of the American character: away from wanton consumption and toward a new global citizenry in an age of limited resources." (2008)

Concerted action could resolve the Megacrisis anytime, but events are likely to culminate about 2020 when we expect IT/AI to mature and the threats to reach intolerable levels as global GDP almost doubles. The situation looks bleak, but that's always true before a major turning point. Rising consciousness can be seen even now in the way the economic crisis has provoked a widespread awareness of the need to transform business and government institutions, stabilize the world's financial system, promote renewable energy, and halt climate change.

It's not possible to know much about this coming "Age of Consciousness/Global Awareness/etc." any more than we would have guessed that the Information Age would have us staring into PCs half of the day. I suspect we will use what I call "technologies of consciousness" (virtual reality, simulations, strategic planning, collaboration, conflict resolution, meditation and prayer, and even neuro-tech brain enhancements) to see us through the crisis of maturity (see Chapter 9 of *Technology's Promise*; Halal, 2008)

I also think the key tool in this arsenal lies in the little used power of collaborative problem-solving. In a knowledge society, collaboration creates new solutions that can benefit all parties, yet this is not well-recognized. Maybe this Halal-Marien collabora-

tive effort can serve as a small example.

When we started working on this project, I thought many times that we could not go on because our views were so strikingly at odds. We were dealing with a tough issue, of course, but the problem was exacerbated because both of us are typical Americans with strong opinions. By examining our differences in the light of compromise, we made important breakthroughs that allowed us to move ahead. Unwittingly, this also demonstrated that collaboration is a powerful approach to problem-solving. It may possibly be the single best way to resolve the Megacrisis.

But what if people don't want to cooperate, you may ask? Ah! That's where technologies of consciousness come in. You can find a new study on this at the same URL www.TechCast.org, where you can also take the Megacrisis Survey.

Marien's Analysis: Infoglut, Ignorance, Indecision, and Inadequacy

We agree on a Global Megacrisis, as the world struggles through The Great Recession and its painful aftermath, caused by failure of foresight to heed many early-warning Cassandras, and of effective regulatory oversight. We also agree than an IT/AI explosion is under way, as well as other technology revolutions ahead, as nicely summarized by Bill's TechCast project. Will IT/AI make things better? It is indeed "a game changer," but it will change many games–for good and ill. Will IT/AI bring convergence of thinking about important global issues and move attention to "higher levels of consciousness"? Or is it just as likely to cause further infoglut and fragmentation, degraded consciousness, indecision, and half-baked inadequate action? Based on the first decade or so of the Internet and vastly expanded information abundance of all sorts, I see no reason for unfettered optimism, such as Halal's Chapter 9 on a likely "Age of Consciousness" c. 2020-2030, which is simply wishful thinking. (Halal, 2008)

Updating my early background in macro-systems thinking, I recently published an essay sub-titled "Our Era of Mal-Adaptive, Non-Adaptive, and Semi-Adaptive Systems" (Marien, 2009), which provoked this exchange. Unlike the conventional wisdom of "complex adaptive systems" borrowed from the world of natural sciences, I argued that our increasingly complex social systems are adapting in the wrong direction, not adapting at all, or only partly adapting, which could well result in the paradox of "improvement and growing inadequacy." As a consequence, and in light of the 2010 U.S. midterm elections favoring reality-challenged conservatives, I rate the four scenarios as Decline to Disaster – 20%, Muddling Down – 60%, Muddling Up – 20%, and Rise to Maturity – 0%.

Certainly there is more consciousness about global issues and some actions are being taken to improve global governance. There is growing awareness of global warming and the need to accelerate the energy transition. The "greening" of individuals, communities, businesses, and governments is underway in many places, and there is a veritable gold rush to develop a wide variety of new renewable energy technologies (e.g., Exxon Mobil's recent claimed investment of $600 million to produce liquid fuels from algae). And yet the latest assessments of climate experts are far more dire than the official 2007 IPCC report–thus, "improvement and growing inadequacy"

seems likely. As for Halal's claim that AI "liberates us," the new freedom from certain kinds of tasks may allow a privileged few of "us" to rise to higher levels or consciousness, but many if not most of "us" may face unemployment or downgraded jobs, accelerating the socio-economic inequality that has been increasing in recent decades. For example, see "Armies of Expensive Lawyers, Replaced by Cheaper Software" (Markoff, 2011) describing automation of higher-level jobs in the legal profession, due to "e-discovery" software that analyzes documents in a fraction of the time for a fraction of the cost.

The biggest blindspot in the IT/AI vision has to do with governance. In the "Rise to Maturity" scenario, governments and corporations do the right thing--and are supported by the public. Even in the more likely "Muddling Up" scenario, increasing knowledge supposedly leads to wider understanding and public attitudes shift to favor the needed changes. Desirable, of course, but very unlikely in our chaotic new information environment of tweets, twitters, trivia, soundbites, floods of e-mails, superficiality, commercialism, and ever more fragmentation. Huge deficits, run up by many governments, are leading to draconian cuts in essential services and inattention to decaying or inadequate infrastructure, while fueling hyper-reactionary fears that we are headed toward near-term fiscal ruin, evil socialism, and unwelcome centralized global government. As my GlobalForesightBooks.org website makes abundantly clear, in identifying more than a thousand futures-relevant books published each year, our so-called "knowledge society" is poorly organized for public learning about complex problems.

Despite the hyper-abundance of information, there is no evidence that the American public is better informed about current affairs than in the past, in what James Bovard calls our "Attention Deficit Democracy." (2006) Newspapers and magazines are closing down or shrinking their coverage of national and global issues. Financially-stressed schools and colleges are still deficient in civic education, let alone serious futures education, and socio-economic inequalities continue to grow. We may still see some shift to enlightened views that promote sustainability and well-being, but, more likely than not, much too little too late. And it may well be offset by reality-challenged backlash encouraged by selfish plutocrats who seek to roll back taxes and reasonable regulation.

As for the prospects of "collaborative problem-solving," Halal is once again much too optimistic. Our tiny micro-example of collaboration does not suggest a likely way to better global futures for three reasons. First, we are in full agreement about an unfolding Megacrisis; our disagreement has to do with the likelihood of progress in the next decade or so. Even here we are not that polarized: we both agree that Decline to Disaster is possible (WH 10%; MM 20%), more so than Rise to Maturity (WH 5%; MM 0%). Our biggest disagreement is in the middle scenarios, where Halal sees Muddling Up as most likely (WH 60%; MM 20%), while I see Muddling Down as probable (WH 25%; MM 60%). The beauty of this scenario exercise is that it pushes away the simplistic extremes and encourages focus on the more probable and sophisticated "muddling" scenarios in the middle.

The second reason to question the collaboration ideal is that our cooperation is between two observers of a similar age, income, and educational level who both iden-

tify to some degree with being a "futurist." Collaboration even between two people of far different ages, socio-economic status, and cultural and educational backgrounds would be far more difficult. Illustrative of this problem is the political polarization in America at state and federal levels, where Republicans and Democrats scarcely even talk to each other any more, due to a variety of reasons, thus leading to gridlock/indecision. Sharp ideological divisions are not as apparent at the global level, but national self-interest will inhibit much if any cooperation, as astutely described by Ian Bremmer and Nouriel Roubini in "A G-Zero World: The New Economic Club Will Produce Conflict, Not Cooperation." (2011) The authors argue that the expanded group of G-20 leading economies "has gone from a would-be concert of nations to a cacophony of competing voices," and there is now no single country or bloc of countries with the political will or economic leverage to drive a truly international agenda.

Finally, even if we didn't have a "G-Zero world" and nations could arrive at some sort of post-Washington consensus, few if any global problems will be "solved" once and for all. Think just a moment about climate change, unemployment and underemployment, migration, terrorism, pollution, corruption, fraud, the arms trade, illegal and counterfeit drugs, growing inequality, invasive species and more–these problems won't be solved, but alleviated at best. This of course raises a dilemma for politicians, who promise to "solve" problems and would risk electoral defeat if aiming merely for problem reduction. These wicked problems aren't solved, of course, and often not even dented, which makes the electorate even more distrustful of their leaders. At the least, would-be advisors can try to soften this dilemma.

My "Four I's" worldview (Infoglut, Ignorance, Indecision, Inadequacy) is not "doom and gloom," but the synthesis of many hundreds of well-informed recent books on environmental issues, governance, economics, IT impacts, and education. The evidence is there to ponder at GlobalForesightBooks.org; denial of our growing Infoglut problem keeps us from addressing it and alleviating our Ignorance about multiple views of complex problems that too often lead to Indecision or Inadequate decisions.

I hope we can return to a largely undisputed path of evolutionary progress, as widely believed several decades ago, but it will require a major re-structuring of industrial-era knowledge and education/learning, especially adult/voter learning, and serious consideration of scholarly ethics and purposes, and the quality of public discourse. Technologies of consciousness, alone, won't come close to what we need.

Your Turn

In sum, we have presented results on four scenarios and our differing arguments for optimism and pessimism. Now it's your turn to respond to our survey, provide feedback, and encourage others to do the same. Have we missed any important factors? Is there a better way to see the Megacrisis? Are we overstating the situation, or understating it? How could it be resolved? Thanks for participating.

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