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The Automation of Thought
Information Technology Holds the Key to Global Maturity [1]

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I lead a small research team that forecasts the evolution of technology and its massive impacts that are changing the world. Our major effort is the TechCast Project, an intelligent website that pools the knowledge of 100 experts around the globe to forecast breakthroughs in all fields (www.TechCast.org). I think of it as an "online research system," a scientific version of Wikipedia, social networks, blogs, and endless other participative Web 2.0.sites that are raising global awareness dramatically.

The TechCast Project Maps the Technology Revolution

The TechCast Project has produced the most comprehensive forecast data ever assembled covering the entire span of technological innovation. It maps the "Technology Revolution" that is accelerating today as an explosion of ever more sophisticated information systems creates unprecedented gains in knowledge, producing breakthroughs everywhere. Our forecasts show that we can now realistically envision renewable energy replacing oil, medical control over the genetic process of life, computer power becoming cheap and infinite, mobile communications at lightening speeds, robots serving as helpers and caregivers, and much more to come.

My recent book, ***Technology's Promise,[2]*** draws on the work of the TechCast project to sketch out the risks and opportunities posed by the Technology Revolution, as well as the impact on social institutions, intelligence and consciousness, and other pivotal issues of our time. A key point is that relentless progress is driving the creative transformation of business and society, the entire world, and even what it means to be human. Our most striking conclusion is that globalization will almost inevitably lead to a "global crisis of maturity" about 2020 to 2030.

Global Crisis of Maturity

Technology is creating a world that is largely industrialized but that also poses unprecedented risks in energy, the environment, weapons of mass destruction (WMD), and other threats that require sophisticated responses unimaginable by present standards. For instance, globalization is causing World GDP to double by 2020 and quadruple by 2030, producing commensurate increases in ecological damage, energy shortages, and climate change. In global power politics, the system of Mutually Assured Destruction (MAD) that successfully restrained the USA and USSR from unleashing their nuclear

arsenals is unlikely to hold up with a dozen or so nations going nuclear. And seemingly no end can be found to the corrosive destruction of terrorism.

This megacrisis seems insurmountable because the present world is not sustainable, and knowledgeable people know that a unified global system is needed to avert disaster. President Bill Clinton noted "there is no world system," and the late Admiral Arthur Cebrowski, who pioneered the US military's Office of Force Transformation, said "We have to recognize that a major transformation is inevitable." [3]

The Automation of Human Thought

The solution lies in understanding that the Technology Revolution also holds the key to resolving the crisis of maturity. At about 2020, the very time when the planet is likely to teeter between calamity and salvation, our forecasts suggest that routine human thought should be automated by far more sophisticated IT networks, a second generation of more powerful computers, smart robots that think and talk, and artificial intelligence that approaches human skills. I recently bought a GPS navigation system to guide me on a twisting adventure through California recently, and I am happy to report that the problem of getting from point A to point B has been solved.

As even better machine intelligence takes over common mental tasks, we will move up another level on the evolutionary hierarchy to address the global challenges that now seem overwhelming. Just as farm labor was automated 100 years ago, then factory work, and recently services, now IT is automating routine knowledge work.

Beyond Knowledge – Consciousness is the Next Great Frontier

It's impossible to fully grasp the reality of a different era, but based on our projections, the Information Age should mature about 2020, leading to an era **beyond knowledge.** Something like a "global consciousness" is likely to emerge, focusing on higher level understanding, productive compromise, and on working out together the tough existential choices needed to survive. It might be called a "Global Era," "Unified World," "Global Community," etc. Whatever the terms, the fact is that strategic planning, dialogue, collaborative problem-solving, diplomacy, conflict resolution, ceremonies, mediation, prayer, and other yet unknown "technologies of consciousness" may offer the next logical step in this evolutionary process. [4] Here's how General Petraeus was able to gain the support of 70,000 Sunni leaders in Iraq: "We cannot kill our way to victory. Tribal engagement and local reconciliation work." [5]

Likewise, averting an ecological calamity will require agreement among nations to curb climate change, to collaborate on developing advanced energy technologies, and become responsible stewards of nature – heroic challenges requiring existential courage and enlightened self-interest beyond what is normally possible. Experiences with North Korea, Iraq, and Iran show that containing nuclear proliferation and terrorism cannot be achieved with military force alone but requires collaboration to bring radical states into the modern world where conflict is transcended.

It's obvious that global consciousness seems foolhardy in a world that celebrates today's culture of capitalism, power politics, money, glamour, consumerism, and "me." The 2008 financial crisis, however, is widely understood to mark an end to that era, and the outpouring of support around the world for the Obama presidency signals the possibility of global unity.

Beneath the surface, deep rivers of fresh thought are bubbling up. Professional pollster John Zogby has analyzed his data over the past 20 years to conclude "My surveying shows that we are in the midst of a fundamental reorientation of the American character… Away from wanton consumption and

toward a new global citizenry in an age of limited resources." It is especially noteworthy that young people lead in embracing this global view, despite our common image of disheveled youngsters oblivious to all but their cell-phones and iPods. Zogby finds that young adults 18 to 29 years old constitute the "First Globals." This "digital generation" accepts all races, sexual orientations, national cultures, and other differences equally, and they are intent on living sustainable lives in a unified world. [6]

Other prescient voices are advocating global unity. Strobe Talcott, former U.S. Ambassador to the UN, Deputy Secretary of State, and now President of the Brookings Institution, thinks global governance is coming: "Individual states will increasingly see it in their interest to form an international system." And the recent report of the Millennium Project notes: "Ours is the first generation with the means for many to know the world as a whole … and seek to improve global systems… This does not mean world government; it means world governance." [7] The philosophical work of Ken Wilbur based on the spiral dynamics framework also bears out this same transition to maturity, and science defines a unified world as a Type 1 Civilization. [8]

Today's emerging global order seems to possess a life cycle all its own that is unfolding rapidly, provoking a series of mental shifts to address this crisis. The obstacles are enormous, but it is precisely because so many people are so deeply concerned that a change in consciousness is underway. We have accepted women in power, transformed planned economies into free markets, and begun to protect the environment. The tough challenge of shaping global consciousness lies ahead.

The Life Cycle of Evolution

This transition can be best grasped by seeing that technological evolution comprises a natural life cycle of the entire planet, much like the life cycle of any organism, although infinitely larger. [9] Things look especially bleak today because that's the normal situation facing any system struggling through maturity – a teenager, a nation, or an entire civilization. Whether it is a teen shedding the baggage of youth to become a responsible adult or a civilization struggling with a global crisis of maturity, the challenge is much the same – grow up or perish.

A great example of the energizing effect of this crisis is highlighted by the recent revival of General Motors. After losing its dominance of auto markets steadily over the past 30 years to Toyota, GM engineers rallied around the goal of introducing the world's first plug-in hybrid car with advanced lithium-ion batteries. The company has its best people working around the clock free of the normal GM bureaucracy under the slogan "failure is not an option." GM could still fail, obviously, but Maryann Keller, a long-time analyst of the company, thinks it's "a generational change."

Historic transitions on this scale are hard to grasp because they lead to a more sophisticated way of life that has never existed before. Understanding the evolutionary forces at work helps us see that the world is undergoing a natural process of maturity, with global intelligence and awareness increasing dramatically. Our great challenge now is to recognize that today's cumbersome institutions, religious dogmas, heated emotions, partisan ideologies, and other commonly outmoded forms of thought and consciousness itself will have to be confronted and resolved.

A Coming Move to the Center

Political systems are beginning to address these higher-level concerns. The past generation advanced the conservative views of Reagan and Thatcher, releasing the creative destruction of entrepreneurship and free markets from the iron grip of the welfare state. That era has ended with the decline of Republican power in the US today, and now the political pendulum seems to be swinging toward a center that unites conservative ideals of free markets with liberal ideals of community. It may

seem optimistic, but I envision that the following generation will see a booming rise in collaboration to synthesize economic and political systems into a coherent whole.

This can also be seen in the transformation of social institutions for a knowledge-based world. Hierarchies are slowly dispersing into "self-organizing systems" able to manage complexity by harnessing the knowledge of ordinary people. And the old focus on profit is yielding to a "corporate community" of collaborative partnerships with employees, clients, and the public. These two major trends represent a union of the Western ideals of free enterprise and democracy, offering the possibility of resolving the political impasse between right and left that grips the U.S. and much of the world.

The Most Likely Outcome
These conclusions are not optimistic or speculative but conservative estimates based on empirical evidence. Economic projections make it clear that the world must mature if it is to survive, and the TechCast data presents an entirely plausible path forward. In fact, our forecasts describe the most likely outcome rather than mere possibilities.

The crisis of maturity may not prove catastrophic if acted on in time, but a major turning point is inevitable as the multiple threats of world-wide industrialization, energy shortages, climate change, environment collapse, nuclear holocaust, spreading terrorism, global conflict, and other unknown crises reach critical levels about 2020 to 2030.

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[1] Portions of this paper are adapted from articles appearing in *Technology Analysis and Strategic Management* and *The Futurist*

[2] Halal, Technology's Promise: Expert Knowledge on the Transformation of Business and Society (London: Palgrave Macmillan, 2008)

[3] Arthur K. Cebrowski, "Seven Secrets of Transformation," in Halal (ed.), *Institutional Change,* a special issue of *On the Horizon* (2005) Vol. 13, No. 1.

[4] See *Technology's Promise*, Op. Cit., Ch. 10

[5] "Our Man in Baghdad," *Washington Post* (Sept 4, 2008)

[6] John Zogby, *The Way We'll Be: A Zogby Report on the Transformation of the American Dream* (NY: Random House, 2008)

[7] Strobe Talbott, *The Great Experiment* (NY: Simon & Schuster, 2008). 2008 State of the Future (Washington, DC, Millennium Project, 2008)

[8] Ken Wilber, *A Theory of Everything* (Boston: Shambala, 2001)

[9] Halal, "The Life Cycle of Evolution: A Macro-Technological Analysis of Civilization's Progress,*" Journal of Future Studies* (August 2004) Vol. 9, No. 1, pp. 59-74

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scientific fields. In addition, he co-founded the Institute for Knowledge & Innovation as a collaborative effort between the GW School of Business and the School of Engineering. Bill studied engineering, economics, and the social sciences at Purdue and Berkeley. Previously, he was a major in the US Air Force, an aerospace engineer on the Apollo Program, and a Silicon Valley business manager. Macmillan's Encyclopedia of the Future *ranked him among "The World's 100 Most Influential Futurists," together with H.G. Wells, Arthur C. Clarke, Alvin Toffler, and Daniel Bell.*

POINTS FOR THE CLASSROOM *(send comments to forum@futuretakes.org):*

o *Halal foresees an era beyond knowledge. In what ways will the Information Age impact various professions that are presently based on extensive specialized knowledge? In turn, how will this impact education and training for these professions?*

o *Halal discusses present and projected social changes in terms of natural lifecycles and a process of maturity. Furthermore, he characterizes the anticipated "move to the center" in terms of the political pendulum. In a separate article (this issue), Iyanatullah discusses social and governance changes within Pakistan, also in terms of a pendulum, and one might argue that his "verge of this future" comment suggests an evolutionary or maturing process, perhaps in this case including a temporarily missed opportunity. During the forthcoming years, will social change be best characterized more as cyclical or more as linear progression (or regression), and why? Which social changes be regarded as part of a society's or a civilization's maturing process, and on what basis?*