

HOPES AND VISIONS FOR THE 21ST CENTURY

EXECUTIVE SUMMARIES

I. GLOBAL FUTURES

FDI as Determinant of Regional Development: Mapping India's Success

by Joan Foltz

The globalization of financial institutions and liberalization of market economies create a mechanism through which foreign direct investment (FDI) increasingly influences governmental policies intended to boost regional development. Critical to evaluating India's or any other emerging country's rate of development and probability of sustainability is the identification of trends in three key areas: policy changes, FDI inflows, and industrial centers. Mapping the type and direction of investments in relation to those key areas can reinforce forecasts of an emerging region's economic potential.

The complexity of tracking all the influential factors of regional development is only escalating with the interconnectivity of the world system. However, successful policy reforms will attract FDI that creates capital formation, improves productivity and promotes cross-regional development. Mapping FDI highlights the thrusts of development, which can be applied to enrich foresight and support prognosis of a regional development prospect.

Creating Sustainable Strategies for Brazil's Hinterland: Forecasting Small Business Growth Opportunities

by James Terence Coulter Wright and Renata Giovinazzo Spers

The Central Western region of Brazil has experienced rapid economic growth during the last two decades, particularly in Goiás, a landlocked state in the Brazilian hinterland dominated by savannah-type vegetation. An analysis of the business potential of the most significant Local Production Systems (LPS) of the region was performed in three rounds of research, utilizing the Delphi technique, and involving 126 specialists. The results obtained show that besides the traditional large scale agricultural and mining projects, which have played a major part in recent growth, there are other high potential Local Production Systems, such as those involving the garment industry, small scale agribusiness, tourism, and pharmaceuti-

cals. A large number of diverse opportunities were identified for the sustainable development of small businesses in the region, and the analysis of each LPS brought indications of how these could be improved to become more competitive and contribute the local development.

Partnership for Development of Haiti

by Pavel Nováček, Peter Mederly, Pierre C. Armand, and Irena Skácelová

The purpose of this study is to formulate a future-oriented vision of development for Haiti, the poorest country in Western Hemisphere. SWOT analysis, development indicators, and alternative scenarios have been used as the principle methods. Construction of the Quality and Sustainability of Life Index and normative proposals for future-oriented development represent the principle findings. The study can be used by governmental institutions in Haiti, as well as by international donor agencies and nongovernmental development organizations. According to our knowledge, other future-oriented studies have not been done for Haiti. The construction of the Quality and Sustainability of Life Index for Haiti is methodologically original.

Future Geopolitics

by Peter H. Mettler

Past geopolitics, a notion formerly defined by global players as worldwide economic, political and military activities, is no longer sustainable nor are many other notions such as “Development,” “World Bank,” or “Security,” etc.

Future geopolitics should now take into account the survival of the human species (or even of all life) on our planet, the finiteness of our planet, global ecology, global justice, global commons, global security, optimal participation of the greatest possible number, consent instead of contest, basic changes in reproduction patterns and lifestyles, etc., in short: approaches that are sustainable!

Mankind must be aware of some basic facts: the world has never been moving faster, has never had a more powerful but inward-looking hegemon, has never invested as much in scientific and technological developments while the socio-economic imbalances are growing to extremes, has never staged a more serious arms race and military buildup while risking ecological suicide. And the world's

financial system is living to large extents only on itself (as do other subsystems like transnational economic conglomerates or mafia and terrorist structures).

Redefinitions do not often propose remedies. All proposals have to be based on dynamic scenarios for 2040 to 2070. Consequently, we first have to undergo the task of stock-taking (of analyses from, e.g., Asia, China, India, Japan, Latin America, the Muslim world, or Russia) and understand that we can only try to design “geopolitical” scenarios thereafter. And we have to understand that it would be best if we could do that in equal-footing collaboration with colleagues from around the world.

Hubs and Nodes or: How I Learned to Stop Worrying and Love Globalization

by Richard Seline and Yali Friedman

The emergence of globally linked value chains and global marketplaces has done more than just impact the economics of large and small companies; it is also changing the career dynamics of individual employees and influencing the communities in which they live. This paper provides a framework upon which to model the impact of globalization and investigates some of the specific impacts on workers and communities.

Global Prospects

by Jerome C. Glenn

This chapter is a distillation of global futures research by the Millennium Project over the past 10 years, via its 29 nodes around the world, which have involved over 2,000 futurists, business planners, scholars, and decision makers. It charts the global strategic landscape for sustainable development from technological innovations to governance. Special attention is given the future prospects for 15 Global Challenges, the State of the Future Index, and reflections on the global prospects for humanity in general drawn from the annual State of the Future report. It is what the educated person should know about the future.

Building Organizations and Leadership: Knowledge Transfers in Competitive Environments

by James R. Calvin

This article seeks to describe some of the driving forces, restraining forces, and points or places of equilibrium and dis-equilibrium where the building of organizations within national cultures involves knowledge transfer in the midst of globalization. The Niall Ferguson view of globalization refers to “flows and migration” that are natural in a climate and this involves labor resources as well as human biology. Thomas L. Friedman suggests that current globalization trends connect to the migration of people, culture, and knowledge and that its meaning, influence, and business, government, and system practices correspond to differing conditions in the world. Furthermore, Geert Hofstede’s clear argument and well-founded notion is “that culture is always a collective phenomenon, because it is at least partly shared with people who live or lived in the same social environment, which is where it is learned.”

The Three Triangles of Transformation

by Rick Smyre

For the first time in human history, our survival depends on how we deal with the implications of accelerating change and increasing complexity. As a result, new ideas and principles aligned with an increasingly complex, interconnected and fast-paced society need to be identified, understood, and applied, especially by leaders in local communities.

Community transformation challenges underlying assumptions of traditional thinking and action in communities and looks to seed new capacities to deal with the challenges of future trends not a part of traditional thinking and planning. The skills, concepts, and methods associated with community transformation are very different from those of community development.

The work and experience of the Center for Communities of the Future over the last decade have shown that, for community transformation to be able to occur, there are “three triangles” of factors that need to be understood and applied: (1) Factors for Personal Transformation: (a) future context, (b) asking appropriate questions, (c) collaboration; (2) Groups, Networks, and Connecting Nodes: (a) networks and webs, (b) connections, (c) access points; and (3) Seeding Capacities, Parallel Processes, and Continuous Innovation. True

transformation is difficult. It needs networks of transformed individuals for group or organizational transformation to emerge. And it takes interlocking networks of individuals and groups who are involved with transformational thinking and action, using parallel processes for community transformation to occur.

II. TECHNOLOGY FUTURES

Technological Prospective as a Driver for Innovation in High-Complexity Products

by Denis L. Balaguer, Rodrigo C. Silva, Marcos A. de M. Brito, and Henrique Alves

An innovation, as stated by evolutionary economics, is characterized by the conjunction of an invention and a commercial application. So, in order to manage the innovation rationally, it is mandatory to understand the future environment of both sides: technology and market. But innovations involving high-complexity products—like aircraft, defense systems, and automobiles—deal with extra dimensions. First, these kinds of products don't incorporate single technologies, but an assemblage of systems and subsystems. This implies that it's not possible to study the future of a chosen technology. It is necessary to understand the future product as a concept product, which carries this complex assembly of technologies to the market. Second, when dealing with such complex products, and the long cycles and technological maturity issues associated with them, it may be dangerous to choose a single set of future market assumptions. To avoid this, it may be necessary to develop a prospective study that brings to parallel future worlds a whole set of market drivers that feed the product concepts, and then, by extension, the technologies. This paper presents a technological prospective method to deal with all these dimensions of the future for the innovation of high-complexity products.

The “Tech-Knowledge” Tsunami: Accelerating Scientific and Technological Change and Its Impact on the United States

by Grant T. Hammond

Scientific and technological change is accelerating at an exponential rate. When this reality is placed in the context of globalization and expansion of the Internet, it means that there are far more people

with access to far more knowledge, for good or ill, than ever before. The rate of scientific and technological change in myriad technologies, but particularly information technology, directed energy, biotechnology, and nanotechnology, is creating a “tech-knowledgey” tsunami. The United States has based its national security on qualitative technological superiority. But that qualitative technological superiority is eroding. Investments in education, science and technology are increasingly important for the survival and prosperity of the country.

To Be Digital or Not To Be? That Is the Question

by Jan Amkreutz

It is now 2057. We are at the center of a singularity the world has not seen since the emergence of life on earth: not a technological singularity, but a singularity of reality itself. The new reality is digital, and has replaced the images our brains have used for thousands of years to understand and navigate the physical world. In this paper, we look back 50 years to the beginning of the 21st century and find out what happened when atoms and bits became twins, and the world changed, forever, from the bottom up.

A Grassroots Solution to the Futurist’s Dilemma

by Tyler A. Kokjohn

Our future is clear—we will grapple with ever more information of an increasingly technical nature. That information will be created and disseminated by specialists with a steadily shrinking range of expertise. We are now confronting the futurist’s dilemma—deducing the importance of discoveries whose implications may not be completely clear, even to the scientists who made them. One solution to the dilemma is to continue developing the means for futurists to develop as a full-fledged community that fosters continuous interaction and information exchange to develop both new ideas and new members.

III. ENVIRONMENTAL FUTURES

Thinking About the Arctic’s Future—Scenarios for 2040

by Lawson W. Brigham

The Arctic is undergoing an extraordinary transformation early in

the 21st century. A rapid rate of recent climate change has been observed throughout the region, and the impacts of these environmental changes pose significant challenges to all Arctic citizens, particularly to the eight Arctic states. Greater marine and air access and increased pressure for natural resource exploration and development in the Arctic may link the entire region more closely to the global economy. Four plausible scenarios for 2040—Globalized Frontier, Adaptive Frontier, Fortress Frontier, and Equitable Frontier—have been created to explore the very different, alternative futures facing this formerly remote region of the planet.

What the Future Holds for World Energy and Climate Change

by Gioietta Kuo

The world's demand for electricity will rise by 70% between 2000 and 2030. By 2030, 40% of electricity will come from coal, while renewable and nuclear energy will contribute 25%, and 75% of electricity will still be generated by fossil fuels. How do we respond to this energy and climate change crisis? What we do will determine not only the future of our civilization but indeed the survival of humankind on this planet. We analyze the way we burn fossil fuels—oil, gas, and coal—followed by an in-depth review of alternative fuels which do not emit CO₂—wind, solar, hydro, geothermal, tidal, waves, biomass, and nuclear energy.

The world is facing a major crisis in energy. While renewable energy will contribute its share into the national grid, we do not have a satisfactory solution for a large steady-base-load generator for the grid itself, unless we go all out for nuclear.

The choice comes down to nuclear or coal. “How does CO₂ influence global warming?” Just by using the forecast for world CO₂ emission and climate sensitivity from computer simulation codes, we can predict and provide some basic understanding of the gross features of climate change. Finally, our salvation lies in the only option that is immediately available to us—energy efficiency and conservation. This can start at the individual level, but it requires a global commitment from all the citizens of the world.

Networks of Possible Futures: A Modeling and Critique of

Florida's Megatrends

by Raymond L. Johnson

In *Florida's Megatrends* (2002), Colburn and deHaven Smith

offer a wide-ranging exploration of demographic changes and their ramifications that are likely to reshape the state during the early 21st century. A network model was constructed to map the causal links among some 100 of their predictions, integrating them into a single, cohesive theory about Florida's future. Structural analysis revealed that one prediction—the massive influx of retired baby boomers anticipated by 2010—was most influential in determining how the network was organized. It belonged to most of the thematic clusters, and led to five significant consequences for Florida's politics and economy. The centrality of this prediction gauged its importance in the authors' thinking, but also made the cohesiveness of the network vulnerable to its disconfirmation. A rival prediction that postulates a shortfall in the number of boomers who choose a Florida retirement foresees a major trend reversal with end-results very different from what *Florida Megatrends* envisioned.

Transition to a Sustainable World: Converting the Energy and Environment Mess into an Opportunity

by William E. Halal

Results of the TechCast forecasting system concerning energy and environment are drawn on to outline the likely transition to a sustainable world. Forecasts of Alternative Energy, Aquaculture, Distributed Power, Genetically Modified Organisms, Global Warming, Green Business, Organic Farming, Precision Farming, and Recycling suggest that the conversion to sustainability should occur over the next two decades. A highlight is likely to occur about 2020 as alternative energy sources reach the critical 30% adoption level. Despite the alarms and concerns that surround this controversial issue, therefore, we conclude the path out of this mess is well-defined and could easily be directed into a great opportunity.

IV. BUSINESS FUTURES

Leading Complex Teams: A Model for the Future

by Pam Jones and Viki Holton

Teams are becoming increasingly complex, as the realities of globalization and virtual working take hold, and these are trends that will increase in the future. While the word complexity is now a common feature in the management vocabulary, there is some con-

fusion about what it means for the teams that we lead. For example, PWC's annual global survey of CEOs in 2006 found that three out of four chief executives believe the level of complexity in their organization is higher than it was three years ago, and reducing such complexity is a priority for eight out of ten of them. This paper reports the findings of a research project that focused on the impact of eight elements of complexity on teams in organizations. The results showed that a number of factors impacted on the performance levels of the teams, all of which could impact the way teams are established and managed in the future. The paper offers a model of leadership styles, highlighting those styles more appropriate for the management of teams in the future, and concludes by outlining the factors required for success in leading complex teams consisting of leadership competencies and style, communication excellence, developing positive relationships, and team maturity and shared responsibility.

Using Future Trends and Vision to Create a Better Corporate Future

by Romulo Werran Gayoso

Corporate futurists and professional forecasters are dealing with ever-increasing levels of uncertainty both in the business and macro-economic environments. This is most true in the high-tech sector, where ever-increasing market segmentation is having a major impact. Social sciences use appreciative inquiry as a tool to bring the social construction of reality into the business world in order to reveal opportunities amidst chaos. The objective of this paper is to show how appreciative inquiry can be applied to strategic planning and future studies to help corporate management envision and execute strategies that lead to a better future.

The Current Leadership Crisis and Thoughts on Solutions

by Jim Morris

Why is it so hard for businesses to find—and keep—good leaders? Why do so many promotions or succession plans fail? Are we actually producing fewer qualified future leaders, even as we spend billions of dollars annually on leadership acquisition and development? Somehow, we've come to believe that, if we spend enough money on training, prospective leaders will be more prepared, able, and likely to lead and succeed. Not so.

Through years of research and study, we have determined that

there are five universal requirements of leaders. We call them *The Five Insights of Enduring Leaders*. We need leaders who embrace and embody them to begin solving the world's pressing problems *now*. This happens when people see themselves as part of the larger system of humanity and connected to all things. Doing well by doing good is a growing trend, and the results are paying off. But there is still a gap between what we need and what we do.

Ultimately, the solution to the world's most important and compelling problems isn't science. It's people.

V. HEALTH FUTURES

The Future of Nanomedicine

by Raj Bawa

New paradigms are shrinking our world and a technological revolution in medicine is unfolding. Nanomedicine, a newly emerging interdisciplinary field and part of the high risk, high payoff global nanotechnology phenomenon, has yet to fully establish itself, although there are a few nanomedicine products on the market and many more potential applications under consideration. While commercial nanomedicine is at a nascent stage of development and the full potential of nanomedicine is years or decades away, make no mistake that recent advances in nanotechnology-related drug delivery, diagnosis, and drug development are beginning to alter the landscape of medicine. On the path to that goal, significant technological advances across multiple scientific areas of nanomedicine will continue to be proposed, validated, patented, and commercialized. Drug delivery is one sector of nanomedicine that is already producing significant results. For example, site-specific targeted drug delivery systems, with their potential to address unmet medical needs (made possible by the availability of unique nanomaterial delivery platforms like dendrimers, nanoshells, nanoparticles, nanoliposomes, etc.) and personalized medicine (a result of advances in pharmacogenetics and pharmacogenomics) are on the horizon. Other more futuristic targeted drug delivery approaches involve "nanofactories," where biological molecules found *in vivo* can be converted into active biotherapeutics in response to a localized medical condition.

Scared Sick: How the Threat of Pandemics Will Change Our Lives

by Susan R. Whitfield

The threat of potential pandemics provides an opportunity to use strategic foresight and future-study tools to analyze both the actual effects of a frightening potential event and also the effects of the perception of the threat and attempts to prevent or mitigate the future effects. Futurists are perplexed with the challenge of forecasting a potentially dismal future, providing a warning, but then risking professional credibility when their warning is ignored or when the event is effectively mitigated.

Two scenarios, named Cassandra and Jonah, are utilized to analyze a projected threatening event that has an uncertain time frame for emergence. Cassandra forecasts are based on the assumption that warnings have been ignored and that the full impact of the event occurs. Jonah forecasts are based on the assumption that warnings are being heeded and that preparation and mitigation efforts themselves drive change.

VI. EDUCATIONAL FUTURES

Images of a Sustainable Primary School

by Rowena Morrow

This piece explores the development of a facilitated workshop for primary school children around sustainability and the children's images of a preferred school environment. A rationale for the workshop is outlined, and design principles and methodologies are discussed, as are the approaches taken to interact with an audience of concrete operational thinkers. The pilot school for this workshop is used as an example.

The Education Piece of a Possible Future

by Berenice D. Bleedorn

The possible future of education may be as serious a challenge as the future of science and technology in the art of forecasting. The argument here is for increased attention of futurists to the fields of science/technology and of human sciences and human behavior, for a vision of possible educational change. With radical changes in world affairs, effective leadership is in need of more complex, inte-

grative habits of thought. The specific teaching of higher order thinking in public school programming is essential for the visualizing of educational futures. Continually improving the learning experience is dependent upon the ability to think creatively and critically, systematically and globally, about the future.

VII. FUTURES METHODOLOGY

Visions: Vital but Treat with Care

by Graham May

Visions of preferred futures are vital in creating change, but they raise many issues. Different individuals and groups may share preferences at a general level, but have differing opinions about the detail. Preferred futures may also play a greater role in encouraging conflict than is usually realized. The paper examines some of the issues raised by differing visions and suggests some ways in which they may be evaluated.

Living as if Futures Matter

by Bruce Tonn

We know what problems threaten humanity and we know what must be done to solve the problems. We even have a large number of policy instruments to help change our behavior to become more futures-oriented. Yet, we seem ever farther away from being able to confront and solve serious problems such as global warming, species extinction, nuclear proliferation, and pandemics. This paper argues that technical fixes are not sufficient for us to meet our obligations to future generations and sustain life on earth into the distant future. What is needed is fundamental social change. An ambitious program to help us live as if futures matter is proposed. The program has five features: universal responsibility, universal belongingness, socio-diversity, universal involvement and the noosphere, and extending human life-spans.

VIII. TRANSPORTATION FUTURES

Thoughts on the Future of Transportation

by Mark A. Safford

The efficient, affordable, and rapid movement of people and goods from origin to destination is necessary to support many aspects of modern life; yet often it seems little thought is given to this topic until something breaks down. This paper is written for those interested in thinking comprehensively about transportation, the role it plays in our life, and how this role may both change and be changed by the future. It discusses demographic and economic trends, energy, the environment, markets, technologies, and key issues to consider regarding the future of transportation.

Air Travel: A.D.2020

by Jay Herson

Air travel continues to be a problem for both passengers and airlines. Passengers face increased security, uncomfortable seating, impractical connections, lost luggage, etc. Airlines face serious financial problems, unfriendly mergers and union confrontations, fierce competition, etc. This paper creates a forecast of air travel in 2020 by projecting trends that already exist and considers market drivers as well as globalization and technological advances to provide a normative scenario. Passengers in 2020 are expected to have more “just in time” flight arrangements on “right-sized” jets, and aircraft will use satellite rather than ground navigation and more synthetic fuels than today. Baggage transport will be separate from passenger flights. Airport security will be much more efficient than today, and there will be increased competition among international carriers. The social, technological, environmental, economic, and political effects of these changes are examined.

IX. RELIGIOUS FUTURES

The Threat of Nuclear Terrorism and the Abrahamic Religions

by Thomas R. McFaul

The gravest challenge confronting humanity’s future is the threat of nuclear terrorism. The Abrahamic religions of Judaism, Christianity, and Islam will determine whether this nightmare scenario be-

comes a future reality. Through 500 years of global conquest, colonialism enabled Christianity to surpass Islam as the world's largest religion. In 1948, the United Nations created the state of Israel in the Palestinian homeland.

At the start of the 21st century, continuing global expansion by Christians, ongoing struggles by Jews to preserve the state of Israel, and Muslim efforts to regain lost ground have combined to confront the growing global village with a potentially worst-case scenario of nuclear terrorism. While the future remains developmentally open, three trends have begun to direct humanity away from the nuclear nightmare: (1) the world has gone on the offensive against terrorism, (2) religions are building bridges of cooperation, and (3) humanity is learning to live together more peacefully amidst 21st century pluralism.

Mitigating a Biblical Impact Event

by Craig S. Marxsen

Christian writers contend that the Bible's Book of Revelation forewarns of a catastrophic cosmic impact. The end of the 20th century unveiled the mystery of what happened when an asteroid evidently ended the reign of the dinosaurs. Revelation contains numerous passages that seemingly correspond literally to details of the collision about 65 million years ago. Post mid-19th century scientific aversion to Judeo-Christian catastrophism today diminishes efforts to prepare for a future impact threat while exaggerating reactions to fear of global warming instead. However, shifting emphasis from restraining growth to space launch strategies instead could deal effectively with both threats at once.