



demographics new diasporas

In a time of rapid migration, diasporas are maps of the flows of wealth, goods, and meaning

Over the next decade, new kinds of migration—across physical and digital borders alike—will create new kinds of diasporas. These dispersed populations with shared roots will perhaps be the real emerging economies of the 21st century. And at the core of these new economies will be a commodity that will be measured, managed, and traded as vigorously as any raw material, any manufactured good or essential service. That commodity is identity, and platforms for identity creation and management will be the engines that power these new emerging economies.



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Beyond geography: a virtual uprootedness

Following in the footsteps of anthropologist Arjun Appadurai, we already know to look at emerging diasporas not so much in terms of their geo-cultural origins but in terms of their various overlapping “scapes” of experience: mediascapes, technoscapes, and worksapes for example. These scapes give rise to the multi-layered identities that define today’s diasporas—and make it impossible to talk simply about the Indian diaspora or the North African diaspora, for example.

At the same time, we see that even these scapes are built on the shifting sands of virtual platforms, from the massively multiplayer games that Chinese youth may inhabit as they travel to work hundreds of miles from home to the online self-help groups that provide “citizenship” services to diverse ethnic migrant workers from Latin America. As these platforms evolve, diasporas migrate across them. So today’s diasporas are as likely to be uprooted from their virtual home spaces as from their geographical landscapes.

Beyond numbers: local minorities, global majorities

In addition, new media have given diasporas a global voice that is perhaps out of proportion to their local numbers. As Appadurai points out, even though their numbers may be small in any given region, members of new diasporas feel themselves increasingly to be part of a global majority. This new global identity empowers them to act on the global stage, to define themselves as equal

to states in negotiating rights—whether local or global, economic or geographic. They may even define themselves as outside these traditional legal systems.

Such distortions of size and influence are likely to grow in the future as diasporas emerge from new global phenomena. For example, global climate change will create a host of new diasporas: disasters like hurricane Katrina or more permanent flooding (as forecast for Bangladesh) will spur forced migrations of local populations who see themselves as victims of global, not local disasters. Local food shortages will be seen as a collapse of a global food web, turning local famine-driven migrations into global political phenomena.

Beyond citizenship: identity as commodity

These new diasporas are, in effect, the new political economies of 21st century. But unlike citizens of nation-states, the new diasporas won’t share a stable geo-cultural identity. Rather they will craft their identities, day to day, from a combination of shifting physical and virtual environments. This instability will be the source of both wealth creation and social disruption.

Identity will become a commodity that can be constructed and deconstructed, and moved from one context to another as needed. Identity creation and management will become both the basic daily activity of individual members of the diaspora and the critical economic enterprise that binds diasporas together as a whole. The tools and platforms for this enterprise will be the infrastructure that drives economic growth.



economic isLAMic inFLUence

In a world of capital instability, Islamic finance is emerging as a key zone of global innovation

At the heart of this innovation is the reform of Islamic finance. In a world coping with the after-effects of risky banking practices and development strategies that, in many cases, have burdened nations with inescapable debt, Islamic finance offers alternatives for managing risk and debt. In this world, new Islamic financial products are providing a way for Muslims to engage with the global financial sector—they are also emerging as both an alternative model of capitalism and a central requirement for global capitalism.



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isLAMic FinAnce: DiFFUision oF innoVATion

Aspects of Islamic law limit the ability of devout Muslims to engage with conventional banks and banking practices. Prohibitions on interest restrict their use of everything from mortgages to credit cards, while broader restraints limit the amount of debt they can assume.

As oil money has flooded the Islamic world and as globally mobile Muslims have sought to establish lives in non-Muslim countries, Islamic legal scholars have begun working with financial experts and banks to develop new instruments that are *shariah*-compliant—that is, that conform to the strictures of Islamic law

At the same time, Western banks are opening so-called Islamic banking windows that recognize the requirements of Islamic law. These windows are a way to service the growing Islamic diaspora—recipients of growing oil wealth—as well as enter predominantly Muslim markets. The combination of innovation within the Islamic banking sector and the assertion of Islamic identities in both the West and the broader Islamic world is leading to the growth of new urban hot spots of Islamic finance, from London to Kuala Lumpur.

isLAMic PRoHiBiTions: BUFFeR AGAiNsT RiSk?

The world of banking has been destabilized by several decades of increasingly risky investment practices, culminating in the current subprime mortgage crisis. In the face of this risk, many are asking whether Islamic financial instruments provide a buffer against risk, since they theoretically limit the burden of debt to one-third of a company's liabilities and prohibit "making money from money"—that is, interest. Investors, insurers, and borrowers alike are looking to these

instruments as an alternative way to manage risk.

In reality, many of the innovations in Islamic finance may simply be "shell games," as some people have called the efforts to repackage existing products to make them look as though they conform. The near-term performance of the Islamic stock exchange and *sukuk* bonds will be measures of the capacity of Islamic finance to provide alternatives that are truly less risky.

BeYo nD BAnKinG: A neWeTHics oF DeVeLoPmenT

The influence of Islamic finance may well spread beyond the worlds of banking and insurance:

- The role of Islamic businesswomen may grow as more of these women take higher positions in new business domains and as Islamic scholars challenge the dominant norms, interpreted from the Quran, the Hadith, and Islamic history, regarding the role of women in general—and specifically in finance.
- A broader strategy of addressing issues of financial ethics may emerge as diverse groups—both secular and religious—grapple with what might be described as a "new moral order."
- Experimentation with alternative models of economic development may avoid some of the shortcomings of current development practices as they create new property arrangements, customary law, and financial institutions by drawing upon the resources of religion.

This interaction between Islamic women's roles, alternative financial ethics, and Islamic financial innovation may be the source of significant economic surprises over the next decade.



POLITICS OPEN-SOURCE WARFARE

Over the next decade, new model armies will use network-based strategies to disrupt social, economic, and political systems and wage meme warfare.

The responses are likely to fall into two camps: Many systems and states will experience autoimmune responses, in which repeated efforts at restoration cripple the systems they seek to protect. More successful, platforms for resilience will focus on system innovations that enable flexibility and a capacity to absorb disruption.



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FOURTH-GENERATION WAR: OPEN INNOVATION AND SUPER-EMPOWERMENT

The past decades have seen the rise of what analysts now recognize as “Fourth-Generation warfare” (following line-and-column state warfare, reconquer/attrition warfare, and maneuver warfare). Fourth-Generation warfare (4GW) builds on the increasing strength of collaborative networks, the globalization of culture, and the widespread availability of digital technologies. The result is heavily networked, decentralized, highly adaptive military actors, often without loyalty to a particular state and particularly troublesome to traditional state militaries. Think guerilla warfare 2.0.

In this model of decentralized power and ubiquitous communication the individuals can rapidly gather resources, coordinate with other small units, modify or improvise strategies, and take action without lengthy consultation of military leaders. Tactics and techniques spread virally and are rapidly prototyped in a manner similar to open source innovation. Such actions are extremely difficult to anticipate and prepare for—almost every response is immediately obsolete. This is *superempowerment*—the ability of relatively small groups to inflict damage disproportionate to their size.

CONSEQUENCES: SYSTEMIC FAILURE

This isn't a crude argument that such forces are “stronger” than conventional militaries. In a stand-up fight against a modern army, the guerillas will likely lose. However, in an insurgency, where stand-up fights can be avoided, the modern army may find winning nearly impossible. But even talking about winning and losing in this context is simplistic. Networked insurgencies are best at

forcing costly stalemates, relying on tactics such as provocative meme warfare and the disruption of the core physical and moral infrastructure supporting modern society.

Most often, traditional institutions facing an open-source conflict respond with measures that end up either weakening their own ability to withstand attacks or actually strengthening the opposing insurgency. Such responses are akin to an autoimmune disorder, a system failure in which defensive efforts actually damage the body's health. These responses may even trigger a feedback condition, where the self-inflicted damage leads to further autoimmune reactions.

EFFECTIVE STRATEGIES: PLATFORMS FOR RESILIENCE

Traditional institutions can, however, take advantage of the same drivers that enable the new insurgencies. And in fact, many argue that *resilience*—supported by flexible, transparent social and technological networks—can minimize the threat from open-source warfare by *absorbing* attacks rather than *resisting* them. Resilience focuses on system responsiveness and the management of consequences.

Ultimately, this story is not just about warfare. It will play out over the next decade across a variety of institutions and industries. The ongoing friction between conventional models and emergent, networked phenomena reveals a deeper strategy: in a complex, disruptive environment, stability is more likely to arise from flexibility than from rigidity. In an environment without significant disruptive pressure, it's easy to confate stability and stasis—but under pressure of new model armies, stability and stasis may be antithetical.

POLITICS OPEN-SOURCE WARFARE

- Private armed forces
- New defense industries
- Semi-autonomous robot armies
- Super-empowered individuals

new Diasporas: Activist Diasporas

NEW MODEL ARMIES
A new set of military actors—private and without state support—will pursue diverse goals and ideologies

- Metaverse "training"
- Swarm war
- Impoverished explosive devices (IEDs)
- Army of one

new Diasporas: Virtual Diasporas

NETWORK STRATEGIES
Networking tools and platforms provide the same "amplification" effects for small groups of warriors as for other small groups

enABLEd! new Modes of sensing

- Culture jamming
- Hactivism
- Subvertising

MEME WARFARE
Meme warfare escalates the disruption of the "soft infrastructure" in a battle for hearts and minds

- Hollow communities
- Feral cities
- Genocide
- Collapse of freedoms
- Environmental collapse

AUTO-IMMUNE SOCIETY
The encounter between hierarchical institutions and networks results in "allergic" responses that undermine social and economic functions

Cultural dislocation
Decline of hegemony
Amplified expression
Resource instability

new Commons: infrastructure Commons

- Open-source intelligence
- Open-source civil planning and models
- Social cities
- Resilience-based insurance

superhero organizations: open Leadership



SYSTEM DISRUPTION
System disruptions proliferate as new model armies create gaps in the infrastructure for power grabbing and profit

- Secessionist movements
- Energy infrastructure attacks
- Climate change as a weapon
- Information network disruptions

enABLEd! new strategies for Development

PLATFORMS FOR RESILIENCE
Open platforms and cooperative systems shift the focus of strategy from achieving stability to building capacity to respond

ubiquitous computing
technologies of cooperation
Light weight infrastructures



The future of the oceans will take shape at the boundary between two catalysts

the ongoing impacts of human activities and our growing ability to manage environmental systems. Even as some celebrate a possible new golden age of oceanography, others see the oceans as a battleground for new international disputes over efforts to alter the oceanic environment. At the heart of these disputes may be the rise of a new blue economy: even as a catastrophic collapse of ocean systems looms, we see in the oceans new potential for abundant renewable energy.



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oceanic collapse: ActionSAndconSequences

We've long known that oceans are fragile, but the last few years have brought a harsher knowledge: the ocean environment is already close to catastrophic collapse. Overuse, pollution, and large-scale changes to ocean chemistry and temperature threaten the survival of many species and put at risk many ecosystem services that humans have come to depend on. The drivers are manifold: population growth and unsustainable development; international competition and instability; and above all, global warming.

The littoral "interface" zone—the coastline—is home to some of the greatest stresses. Nitrogen runoff from overuse of fertilizer in agriculture has sterilized large stretches of coastal waters. Oil spills remain a recurring problem. And the destruction of coastal mangroves and wetlands is eliminating a critical layer of protection from hurricane and tsunami impacts.

A more direct threat to human society comes from the rapid decline of fish populations. Already, key species such as blue fin tuna, swordfish, and salmon face near-total collapse. The causes? Ever more efficient fishing technologies as well as changes in ocean chemistry.

ocean management: transparent waterS

At the same time, new tools could enable humans to make far more careful use of ocean resources. In fact, some consider this a new "golden age of oceanography," arising from a rapidly improving understanding of ocean biology and physics. This new oceanography has been driven by cutting-edge technologies such as underwater autonomous

vehicles, sophisticated models, and distributed sensor arrays. Such tools may even allow the intentional manipulation of ocean systems as a means of combating climate change.

oceanic engineering: climate scientist

Such manipulation is known as geo-engineering, and among its proponents are those who would solve climate change with costly and controversial plans, such as fertilizing the ocean with iron particles to encourage algal growth and thereby remove carbon dioxide from the atmosphere.

At the same time, the oceans may provide some of the most abundant and reliable sources of renewable non-carbon energy. Ocean power technologies, including both "hydrokinetic" and thermal conversion systems, could easily meet current and projected energy demands—and suffer from fewer intermittency and location problems than wind and solar systems.

The massive scale and complexity of oceanic geo-engineering enterprises raise many questions. They are, by definition, uncontrollable experiments. Yet the accelerating pace of climate disruption may make such proposals irresistible, while the demands for food and energy of a growing population will almost certainly focus speculation on this new blue economy.

It's clear that oceans present humans with engineering options on an unprecedented scale. It's also clear that the future of the oceans is the future of the planet—and ultimately, of human civilization itself.

environment the blue economy



- Extinction of major fish species
- "Fish print" impact model
- Internet markets for ID'd & certified fisheries
- NGO-certified sustainable fisheries
- "Retro" fishing methods
- Bio-tailored local policies



projectcross.com

end OF FISHING

Climate change and overfishing threaten viability of global fisheries

Global Climate Change



Food Webs: Bottomup regulation

- Hydrokinetic energy
- Ocean thermal energy conversion
- Much deeper oil drilling

the new Sea Power

In the face of fossil fuel woes, the ocean promises significant renewable energy options

- Disputes over:
- Oil access
 - Pollution disasters
 - North pole
 - Fisheries

the blue commons

The ocean, like the atmosphere, is recast as a global ecosystem service—with commons-based solutions

- Ocean science information commons



Food Webs: extreme Planning



oceanatlas.org

Go I Den o ceAno Gr APHy

High-resolution data drives real-time 3-D ocean modelling

- EOS satellite data
- Low-cost sensor-based data
- Improved global models
- Amateur scientists & NGOs
- Mapping of new ocean species



Source: Woods Hole Oceanographic Institution

bAt tle AGAI nSt Glo bAl WAr mInG

As the ocean's capacity to counter climate change declines, extreme geoengineering measures enter the debate

- Signs of failure:
- Acidification
 - Reduced carbon uptake
 - Methane clathrates

Initiatives:

- Ocean fertilization
- Sea water pumps
- Thermal pumps
- Ocean-to-atmosphere pumps

the littoral converGence

Urbanization, industrialization, and climate change converges at the littoral zone—the tidal area where ocean meets land

- Measurement of coastal ecosystems services
- Human coastal migration
- Eco-management for disasters
- New materials for littoral zones

unsustainable Development

Population Growth

sea Level Architecture
GLO BAL CLIMAT e ChAnGe

wavehub.co.uk

Sensing & Modelling

Price of Oil

Rise of eco-management

Bottomup Cr is is response



super heroes: Collaborative sensemaking



Food Webs: technof x



Global climate change, unsustainable development, and industrial waste are all disrupting local food webs—and threatening the global web.

Predator-prey cycles are being decoupled as insects emerge out-of-sync with bird migrations. In the United Kingdom, mothers' milk is contaminated with 40 times the acceptable amounts of industrial chemicals. The colony collapse disorder of bees foreshadows the long-term effects of, among other things, introducing non-native, highly competitive species into the landscape. Over the next century, these cascading disruptions will restructure the human food landscape—but the next 10 years will lay the groundwork.



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CULTIVATED OR WILD: "IT'S ALL GARDENING NOW"

While environmental scientists record the rapid extinction of species, the food industry enjoys a sense of immunity to what's happening in the wild. Yet the boundary between wild and cultivated is breaking down, as feedback from industrial agriculture—for example, the carbon production of the meat industry—feeds the cycles of climate change that disrupt the timing of predator-prey cycles.

Mainstream environmental science still embraces a strong "hands-off" ethic when it comes to wilderness food webs. Yet an "interventionist" perspective is gaining adherents. Noting that human influence is now ubiquitous, ecologists like Daniel Janzen argue that we need to become "gardeners" of wild ecologies. And this gardening is likely to look very different from today's agro-industrial practices.

SHORT-TERM RESPONSES: BOTTOM-UP INNOVATION

Meanwhile, worries about food webs are driving innovation in human food management at a distinctly local level, using bottom-up processes. In Japan, 20% of the population belongs to food cooperatives. They form short and flexible local supply chains and demand ecologically friendly production methods; they reject packaging as advertising; and they foster community connections between and within producers and consumers. In China, experimental bottom-up cooperatives are testing domestic fair trade practices that provide an alternative to national and international organic certifications, which have very low credibility there. In the United States, artists and activists are claiming farming as a creative act, cultivating urban food systems, and fostering a new appreciation for farming and food production.

Many of these innovations are values-driven. They emerge from shared perspectives of the relationship between environment, health care, and our diets. Drawing on rich information and communication networks, they cast a wide net—building alternative infrastructures for food production and distribution while attending to both global and local impacts. While locally focused, they are not isolationist. Rather they are building a more layered, flexible, and responsive system for human food production.

LONG-TERM STRATEGY: ECOLOGICAL INTERVENTIONS

In the long term, the threats to the global food web will most likely require a coordinated international response, drawing on the science of ecosystem management. This response is likely to engage many of today's top-down institutions: governments, transnational organizations, corporations, universities, and NGOs, who will all shoulder responsibility for protection of the various fragile systems—whether for reasons of altruism, power, or profit.

The food-web ecosystem crosses industry silos and geopolitical boundaries, and management strategies will demand collaboration, adaptation, and flexibility. It will need to integrate not only emerging bottom-up food infrastructures but also various bio-tinkering efforts—bio-engineered agriculture, genetically modified animals, even developments in lab-grown meat. Meanwhile, many international bodies will explore methods of "biosphere backup," preparing for catastrophes ranging from food-web collapse to massive species extinction. These all form a dynamic ecosystem of strategies for addressing the challenges posed by an unsustainable food web and threats of disruption.

SUSTAINABILITY FOOD WEBS

Per Vasive
ecomonitoring:
Bottomup
eco-regulation



ECOSYSTEM MANAGEMENT

The complexity & scale of food issues drives ecosystem-based management to the fore

- Bio-regional planning and regulation
- Revised insurance rules for development
- Food web modeling tools
- Watershed management

TECHNOFIX

Biotechnology comes to the rescue to offer a range of sustainable—but sometimes controversial—solutions

- Post-Bovine animal engineering
- NERICA rice
- Inkjet-cultured meat
- Self-protecting plants

EXTREME PLANNING

A number of governments and institutions begin planning for the worst—anticipating catastrophe

- Seed vaults
- Frozen zoos
- Disaster recovery in-a-box

Pen-sour-Ce
WAR-FAR-e
system
Disruption



SMART LOCALISM

Smart networking practices, food tracking technologies, and concerns about eco-impacts of food drive a flexible localism

- Local diets
- Food transparency
- Organic patriotism
- Agritourism
- Water rights issues
- Vertical farming

new Diasporas:
Activist
Diasporas

enABLeD!
new
Development
strategies



www.notalacornfield.com

COOPERATIVE INNOVATION

A DIY ethic plus collaborative technologies support evolution of food value chains—over food supply chains

- Food production and distribution coops
- Food value chains
- Community supported agriculture
- Networked "victory gardens"

super heroes:
Beta systems

DESIGNS FOR SUSTAINABILITY

New standards and practices drive innovation in agriculture, retail, and consumption—especially in urban contexts

- Re-wilding involvement
- Food footprinting
- LEEDS standards
- Green retail
- Domestic fair trade
- Buffalo commons
- Native farming

Blue economy:
end of fishing

Cascading food web collapse

Biotechnology/Genetic engineering

Convergence of eco-science

Sensors and models

Participatory something
Light-weight Manufacturing

failure of urban planning
Green health

Integrated infrastructure responsibility



www.seedvault.no



INNOVATION ENABLED!

In a world where people with disabilities have been marginalized—

where products, places, and services have been less than accessible to people who didn't fit the mainstream definition of normal—the next decade may deliver a big surprise.

In a marketplace where new product development for disabilities has been seen as a niche undertaking at best, the disability space is now emerging as a major hot zone of innovation.

Why? A combination of new technologies, new development platforms, and a new quest for ways to become better-than-normal is enabling people with disabilities to become co-innovators, co-producers, and co-marketers of an enhanced future for everyone.



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INNOVATION PUSH: ENABLED COLLABORATION

Over the past decade, advances in materials, sensor systems, and pharmaceuticals have pushed disabilities solutions beyond crutches and therapies into the realm of *enhancements*. Rather than simply restoring lost functionality, disabilities interventions now seek to extend abilities beyond what has been lost or “missing.” Enhancement and extension create new possibilities for everyone, and people with disabilities are defining themselves as the lead users of these enhancements—the first markets.

But they are not simply lead users; they're also becoming lead innovators. They're collaborating in networks to create open-source prosthetics. They're leveraging new rapid prototyping tools and today's flourishing do-it-yourself spirit to create custom solutions that embed intelligence and sensory technology in unexpected new materials. And even when they themselves are not the lead innovators, they're using collaborative tools to find each other, forming networks that amplify their voices and aggregate their power as a lucrative market.

INNOVATION PULL: FAST FOLLOWERS

At the same time, the markets for adaptive solutions and human enhancement are growing. Of the estimated 54 million people living with disabilities in the United States, only 8 to 10 million self-identify as such. The rest are what we can think of as fast followers in the world of technology adoption: once the solution is out there, they will pull it into the mainstream. And once it's in the mainstream, even people without a disability champion the innovation—like stroller-pushing parents who take advantage of

curb cuts designed to make sidewalks wheelchair-accessible.

But the pull forces go beyond new markets that want the advantage of proven utility. In a so-called experience economy, new adaptations and extensions developed for people with disabilities provide new ways for others to experience the world as well. Markets of all ages—from young people looking for a competitive edge to aging boomers hoping to maintain peak performance—are primed for better-than-normal solutions. Where once they sought convenience, performance, and aesthetic innovation in their environment, they are now seeking those same improvements in their bodies and minds.

INNOVATIVE WORLDVIEWS: THE END OF NORMAL

If disabilities and their adaptations are both seen as sources of innovation, people may move through their days taking on disabilities or enhancements as needed—to provide strategic advantage or to experience the world in new ways. Alternative cognitive and sensory experiences may drive new ways of learning: emulating the brilliant perceptual capacities of a person with autism or using blind adaptations to transform visual data into music, for example, may stand side-by-side with simulations and games as both learning strategies and new forms of entertainment. In fact, turning off “normal” functionality that gets in the way of thinking and performing innovatively—using adaptations pioneered by and for people with disabilities—may ultimately signal the end of the very concept of normal.

INNOVATION ENABLED!

- Functionality over normality
- X-people lifestyles
- Assistive feedback



Sources: Dr. Robert Galley, University of Miami, OSSUR in New York Times, May 16, 2007



superhero organizations: transliteracy

new Diasporas: Virtual Diasporas

new Commons: Learning Commons



- Open-source design platforms
- DIY manufacturing
- Inclusive design
- Open virtual worlds and games

- Alertness drugs
- Text-to-speech synthesizers
- Talking browsers



NEW STANDARDS OF PERFORMANCE

Disabilities become superabilities through better-than-normal enhancements—that can only be achieved through enhancement.

- Neural interfaces
- Haptic interfaces
- Customized sensory products
- Trans-sensory civic spaces
- Trans-sensory art

Open-source Warfare: Platforms for resilience

NEW MODES OF SENSING

A second wave of sensor technology creates a trans-sensory world—with technological synesthesia providing new, multilayered experiences of the world

- Long-tail marketing
- Aging boomer market
- Experience economy

NEW COGNITIVE HORIZONS

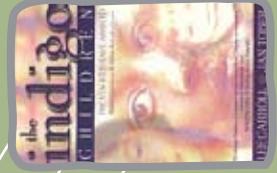
Neuro research, cognitive enhancements and new measures of intelligence broaden the spectrum of cognitive experiences

neuro-futures: Memory enhancements

COLLABORATIVE DEVELOPMENT

People with disabilities, working collaboratively with open-source systems, become lead innovators as well as lead users

experience economy
Abundant Computing
extended self



NEW PATHS TO ADOPTION

People with disabilities are lead users—but the experience economy leverages fast followers looking for new experiences

new Diasporas: Biometric Diasporas

Biocitizens
Long-tail economics
Design for self-Customization



work superhero organizations

Work processes have been transformed by faster, better network communication, an increasingly heterogeneous workforce, and new markets for talent and services in developing economies. Businesses have sped up their operations and squeezed inefficiencies out of their supply chains. But no organization has yet figured out how to create true competitive advantage by using new tools and networks to supercharge its workforce—to take advantage of the emerging superhero skills in young digital natives. The next ten years will see the emergence of the first such superhero organizations.



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human production: the new givens

The workplace of the future exists in a new techno-social world defined by four key innovations:

- Social networks are now explicit. All the “friending” in social networks has laid the tracks for high-performance communication and collaboration.
- Information can take any form and arrives in a torrent. Some people thrive in the info-frehose. They can use a wide range of media to capture and express emerging realities.
- Work happens in real time. Instant prototyping is the norm, involving real customers, not just a few colleagues. Information finds its way to the right hands quickly and turns into actions right away. No delays, just constant adaptation and course correction.
- Openness creates leverage. Collaboration among employees and with outside stakeholders improves when they share information openly. Credibility, trust, and long-term memory all get a boost.

People adept at working with these innovations will outperform their peers: they will decide faster, act faster, and mobilize more people around shared, constantly improving resources.

organizational capacity: the new competencies

Today's organizations are structured around the core competencies of the past 50 years: communications, sales, logistics, and project and people management. As superheroes enter the workforce, some organizations will reshape themselves into superhero organizations built around a set of core organizational capacities. *Open leadership* will leverage multiple capitals to mobilize diverse stakeholders across organizational

boundaries. *Sociability* will mobilize groups and networks to create ad hoc organizational structures for innovations. *Collective sensemaking* will combine skills such as pattern finding and big-picture synthesis with group facilitation and collaborative creation of persuasive artifacts. *Transliteracy* will bring the distinctive affordances of new media to the creation of shared contexts and concepts that mobilize action. And *beta building* will develop platforms to create offerings that are never finished but always evolving in a public, collaborative space.

In this organizational environment, training moves beyond the walls of the organization and into networks of peer-to-peer learners. Social networks perform the sorting function—building affiliations of people that leverage different sets of superhero skills. These are the guilds of the future, loosely structured around different styles of collective sensemaking, sociability, transliteracy, beta building, and open leadership. The online trails that people leave as they navigate these networks become their long-lasting resume.

counter trend: the kryptonumerite scenario

These superhero organizations celebrate human skills and capacities. But some of the same new capacities—pervasive monitoring and visualization, harvesting of open information sources, and social network tracking—could take a different form. We might think of this as the kryptonumerite scenario in which automation of these processes leads to deskilling of professionals and increasingly inflexible systems for everything from education and health to financial and security services. Like Superman's kryptonite, these systems could undermine the powers of tomorrow's superhero workforce and ultimately create a less robust economy.

work superhero organizations



- Microblogging
- DIY collaboratives



Beta Building

An emphasis on transparency and collaborative open development means everything is always in beta—including organizational processes



trans-literacy

Cross-platform literacies emerge as a core competency—combining traditional literacies and new media

- Digital video
- Webcasting and podcasting
- Social networking
- Visual literacies
- Blogging & photosharing

PerVasive Media
Digital natives
P2P Models
Abundant Computing
simulation
filtering tools

collective sensemaking

Teams and networks use bottom-up tools to discover patterns in large complex systems—and trigger faster responses



- Collective filtering
- Social software simulations



- Location management
- Attention management
- Presence management
- Identity management
- Social filtering

socialBility

Ad hoc organizational structures emerge as large groups and extended networks self-organize to focus attention on pressing issues and tasks



open leadership

Open leadership leverages open systems to tap the vision and capabilities of diverse stakeholders inside and outside multiple organizations



krypto-numerite

In the organizational equivalent of kryptonite, misuse of automated quantification and visualization undermine organizational flexibility

- Mortgage/credit rules
- Evidence-based medicine
- Standards-based education reform

Abundant Computing
simulation

P2P Models
Digital natives



Long heralded as the next wave in computing, pervasive computing is finally becoming a reality. Soon, it will be possible to instrument our world with sensors, actuators, and processors, and information processing will be integrated into nearly all objects and environments. Over the next decade, this technology may find its premiere application in helping us cope with environmental challenges—pervasive computing may become pervasive eco-monitoring. But the balance sheet for the planet may not be entirely favorable: the environmental costs of the technology could themselves outweigh the benefits.



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THE REALLY BIG PICTURE: MAKING THE VISIBLE INVISIBLE

Pervasive computing promises a lightweight approach to building a sustainability infrastructure—a pervasive eco-monitoring network that shows what's really happening in large complex ecological systems, in real time. Indeed, pervasive computing could make detailed information about resource and energy usage visible, from the scale of households to cities and even continents. It could proactively guide more efficient uses of those resources and provide both officials and individuals with information about local pollution, energy waste, or health threats. Most importantly, these systems will deliver immediate feedback about the short- and long-term consequences of actions taken in the present.

Massively large-scale environmental sensing projects are already underway. The National Ecological Observatory Network (NEON) is laying the groundwork for distributed sensor monitoring of ecological systems at the continental scale. MIT's Media Lab is pursuing "wikicity" projects that combine data feeds from local utilities and services to provide real-time maps of major metropolitan areas. Meanwhile, tools like Australia's CSIRO Catchment Modeling Toolkit provide open-source modules for modeling the use of water. Such tools also be critical not only in policy, but also in the development of economic innovations tied to sustainability: "triple bottom line" accounting, the creation of carbon trading markets, and the cost/benefit assessment of new environmental service programs.

THE VIEW FROM THE GROUND: CITIZEN MONITORS

Pervasive eco-monitoring is not all top down, however. From mobile phones with pollution monitors to visualizations of environmental sensor data,

pervasive computing promises to engage the public in a more personal bottom-up environmental science. Mobile sensors could help citizens measure directly how urban pollution impacts key personal health measures in real time—as well as documenting patterns of urban health. Instrumented trashcans could yield household insights into a family's role in the ecological lifecycle of products—and profile waste patterns at the neighborhood, city, or even regional level. The challenge will come from reconciling these new "freedoms of environmental information" with the uses of that information. Who owns it? Who has access to it? And how does it feed policy, regulation, even law enforcement?

THE FINAL TALLY: THE PARADOX OF SMALL

Pervasive computing works for eco-monitoring because it's small, distributed, and—well—pervasive. But therein lies a paradox: as small as networked sensors are, their own ecological footprint is potentially very large. The smaller a device, the more resources and energy are required in its manufacture. And pervasive computing requires lots and lots of these devices. Their waste is rife with lead, mercury, and other toxins, while their rapid obsolescence wreaks havoc on the landfill.

Fortunately, the computer industry has stepped up its commitment to green manufacturing and recycling. At the same time, new technologies promise more closed-loop components, for example, eliminating the need for batteries in small devices by scavenging power through photovoltaics or even the kinetic motion of the devices themselves. The key will be to ensure that the paradox of the small does not become a big barrier to pervasive computing's potential but rather an opportunity to further drive the greening of the tech industry.



METHODOLOGY NEURO-FUTURES

As a species we face challenges today that are vastly different from those we evolved to deal with—scale, complexity, and the speed of change all challenge us to think in new ways about the future

Over the last decade, scientists, especially neuroscientists, have created a detailed picture of just how we think about the future. It seems we have a unique neurophysiology for this task. But as we face a more complex future, this neurophysiology may actually work against us—and also point to new tools for forecasting and planning.



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FUTURE AND PAST: CONNECTIONS IN THE BRAIN

Past and future appear to be intricately linked in the human brain. Scientists have found that children simultaneously develop the ability to recall the past, imagine what they might do in the future, and distinguish both from the present. People with severe amnesia have difficulty imagining themselves in the future: a patient is “unable to imagine specific events in his personal future ... despite no loss in general imagery abilities.”

Neuroscientists watching the brain in real-time with fMRI have found a physical basis for connections between past and future: subjects thinking about past and future events activate similar specific portions of the brain. Even at a basic neurological level, human pasts and futures are connected.

FEATURES & BUGS: THE FUTURE IS IN BETA

It turns out that the ability to think about the future is still in beta. Humans make predictable, systematic errors when thinking about the future, and these errors can sabotage our efforts to make good choices and follow through on good decisions. For example:

- Large complex problems: Our sensitivity to small, highly visible problems makes us less able to handle large, more abstract problems. In one study, people who were asked how much they would pay in increased taxes to save 2,000 birds, 20,000 birds, or 200,000 birds from oil spills answered \$80, \$78, and \$88, respectively: this “scope insensitivity” exists because it’s difficult for people to imagine such large numbers.

- State changes: We also have trouble planning for futures that involve states radically different from our own—constructing grocery lists after a large meal, for example, or planning for lean times when business is good.
- Multiple options: The way problems and options are presented affect how we respond to them. For example, lottery players who choose their own winning numbers spend more than those who play randomly assigned numbers. Even though, statistically, the odds aren’t improved, the feeling of control encourages bigger bets.

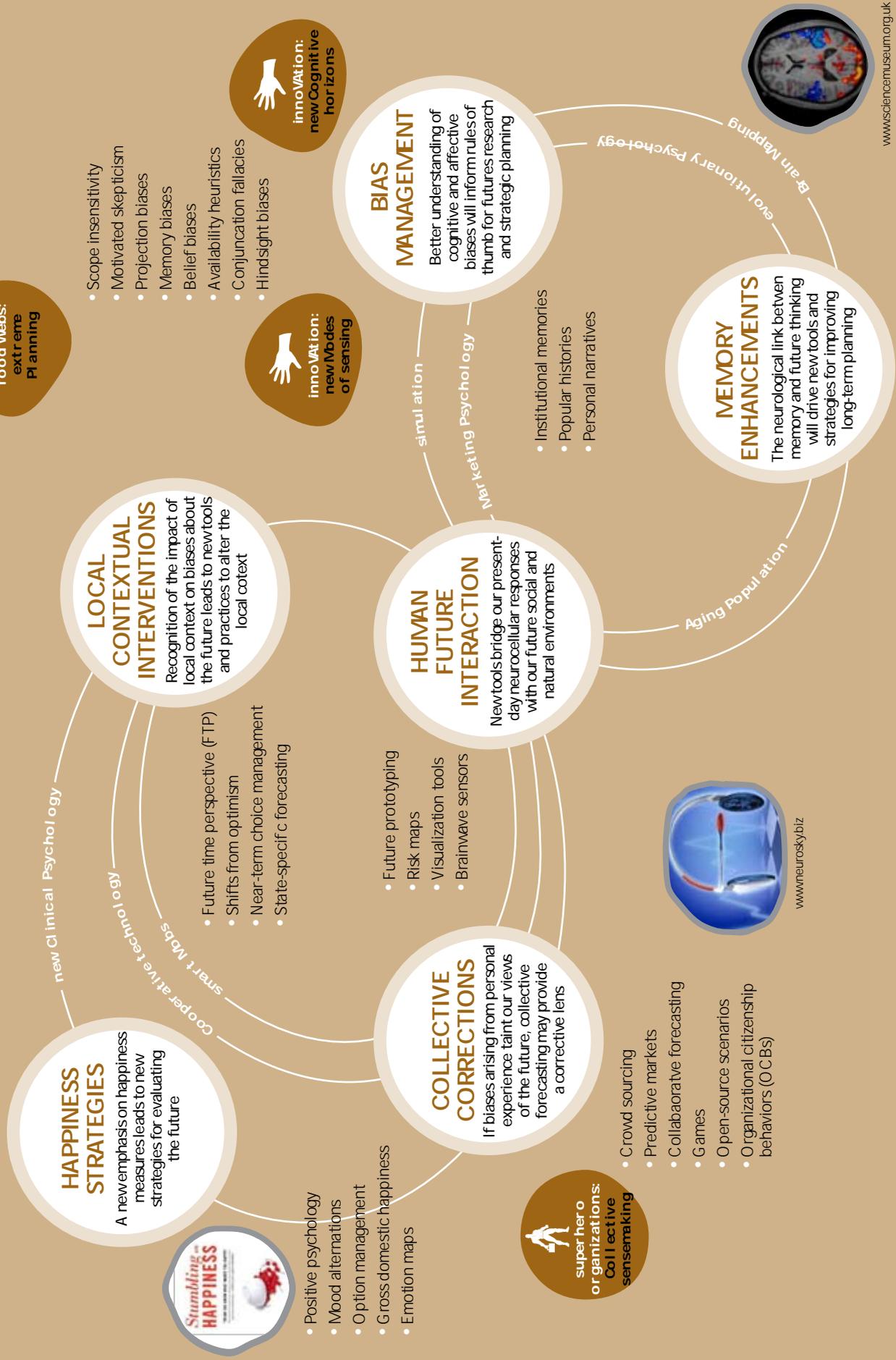
TOOLS AND AUGMENTATIONS: HACKING FUTURES THINKING

Psychological insights have informed the invention of methods, tools, and strategies for managing various forms of futures bias. For example, collective forecasting—crowdsourcing, prediction markets, collaborative gaming—can help adjust for personal bias. Recognizing the influence of emotional states on futures thinking could lead to a new emphasis on monitoring and manipulating moods. Finally, various visualization tools and immersion strategies can help people vividly imagine futures that might seem too abstract, impersonal, or otherwise unimaginable.

Given the magnitude of challenges we face today, we need to develop a new synergy between tools and futures thinking. And over the next decade, our new view of the brain will likely help us develop these technologies—probably a mix of information technologies, mind-enhancing drugs, and software—that can improve our future-readiness by augmenting our native physiology and rewiring our psychology.

METHODOLOGY

NEURO-FUTURES



Culture new Commons

- Social lending
- Money pooling facilitators
- Micropledging
- Trust-based donations
- Micro-lending
- Solari investment circles

Islamic inf uences: new Develop ment ethics

super her o or gani zati ons: open Leader ship

money Commons

Financial regulation and limited investment instruments drive new P2P investment strategies

- Bottom-up aggregation of treatment options
- Childhood health as a commons
- Workplace health commons
- Donation-based health care
- Health and wellness mobs

Activmobs
Sharing services in health for self-organization

- Social solutions commons
- Technology supported town meetings
- Electronic polling software
- Electronic decision making
- Open government databases

the openhouse network

- Wireless mesh networks
- Net metering + local power generation
- Open spectrum
- Open internet
- Bicycle and car sharing

falling Cities

food Webs: Cooperative innovation

Locative tools

Policy Commons

Innovations in governance experiment with commons-based approaches to policy and decision making

inFrAsTruCTure Commons

Peer-to-peer structures combine with new and old technologies to provide infrastructure that is neither a public good nor a private utility

urbAn Commons

Layering information, media, and networks on the built environment creates new collectively maintained urban civic spaces

heAlth Commons

As private health care costs soar, people take health into their collective hands



Source: sbiomatics.net/maphm

- Green maps
- Urban pulse maps
- Community currencies
- Local purchasing rewards
- Stigmergy and artist communities

PerVAiVe econoMitoring: Bot to map eco-r egul at ion

PerVAiVe econoMitoring: Bot to map eco-r egul at ion

bio Commons

In response to patenting of basic components of life, biocommons emerge as shared repositories of bio-information

- Open-source pharma
- Ethnobotanical databases
- Genetic genealogy databases
- Benefit sharing

OpenID

identity Commons

Freeing personal virtual identities from private websites, identity commons balance control and openness

- Social graphing
- Freesouls movement
- Open ID protocols
- Persistent avatars

new Diaspor as: Virtual Diaspor as

leaRning Commons

As public education fails to meet the global need for a literate citizenry, learning commons generate sustainable resources and processes

- Open source curricula
- Media mashups and multiplayer games
- Learning technology commons
- Open academic journals
- Social bookmarking
- Open databases and wikis

dabble

Genetic P rilling

instituti onal fail ure

social Media

encl osure of public resources

patientslikeme

Growth of Private Wealth

falling Cities