

Thematic Research Highlights

May 2007

Climate Change

Pandemics

Real Needs at
the Base of
the Economic
Pyramid

Real Needs
at the Peak of
the Economic
Pyramid

Water

Demographics



For additional copies of this report, please contact:

Generation Investment Management LLP
4 Cork Street
W1S 3LG
U.K.

Main: +44 (0) 207 534 4700
Fax: +44 (0) 207 534 4701

info@generationim.com

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1 | Introduction

Purpose: This paper is intended to help promote sustainability in the capital markets. Generation is pleased to contribute selected highlights from its long term thematic research to the public domain. Over the past year, Generation has conducted primary research into several global themes which we believe may have material implications for business and investment. We hope by sharing this document that we can promote the inclusion of sustainability research into equity analysis more broadly. While this is the first time Generation has published a piece like this, we hope to share future work as we continue to analyze the impact of drivers of global change on business.

About Generation

Generation is an independent, private, employee-owned partnership established in April 2004. The firm is dedicated to the principles of long-term investing, integrated sustainability research, and client alignment. Based in London and Washington, DC, Generation manages investments for institutions and select individuals.

Investment Philosophy

Investment results for long-only equity strategies are maximized by taking a long-term investment horizon because a majority of a company's value is determined by its long-run performance. Sustainability issues can impact a company's ability to generate returns and therefore must be fully integrated with rigorous fundamental equity analysis to achieve optimal long-term investment results. We buy high quality businesses and management teams whose securities are sufficiently attractively priced to deliver excess returns over the long-term. A concentrated approach allows maximum leverage of an intense research effort as investments will be entered into only when very high levels of conviction exist.

Through this approach, we aim to achieve superior returns by developing a more complete view of a company's long-run potential than the market. By seeking companies focused on long-term value creation, we hope to invest in companies that are part of the solution to global challenges.

Sustainability Research Focus

Our sustainability research focuses on long-term environmental, social and governance challenges that can materially impact a company's ability to sustain profitability and deliver returns to shareholders. Climate change, pandemics/real needs, poverty, demographics, water, lobbying and corporate governance are examples of sustainability themes which have the potential to impact (both positively and negatively) the long-term operating context for business. By breaking down the complexity of such issues and integrating this research systematically into our investment process, Generation can gain insight on companies where an issue is a material risk and/or opportunity.

Outline of this Document

To date, Generation has completed 25 Industry Roadmaps and monitors eight themes in depth. This paper provides the highlights of 5 themes which we have written on: Climate Change, Pandemics, Real Needs at the Base and at the Peak of the Economic Pyramid, Water, and Demographics. We have broken down each theme into five sections to summarize the white paper highlights:

- I. **Context:** Presents a concise description of the issue, supporting data, likely trends, Generation's position on the issue, and sample investment ideas;
- II. **Implications for Business:** Discusses key implications for markets, companies, and investors;
- III. **Frameworks:** Describes frameworks we've developed to generate insight into the Business Quality and Management Quality of a firm;
- IV. **Sector Insights:** Summarizes sector specific risks and opportunities arising from these global trends;
- V. **Further Aspects:** Shares broader thoughts on the role and responsibility of business and investing in light of these challenges.

Our thematic work is continuously evolving and we welcome your comments and questions. Please feel free to contact us.

2 | Climate Change: Investment Implications of a Systems View

September, 2005

I. Context

Synopsis: The complete white paper summarizes the most recent science of climate change, the regulatory developments in climate policy and carbon markets, and the attitude shifts that are occurring among consumers, leading businesses and investors. In addition, a “systems view” of climate change reveals the interrelation of several sustainability issues, which broadens the set and complexity of second-order risks and opportunities for investors. This improves our lines of inquiry and provides a fresh lens on BQ and MQ.

Background: Today there is broad international scientific consensus on climate change and its link to human activity. Climatic developments over the past six months—such as the devastation of Hurricanes Katrina and Rita, the discovery that the Greenland ice sheet is melting at twice the anticipated rate, and confirmation of 2005 as the hottest year on record—have shown that the pace of climate change is accelerating and with it the risks of severe climate disruption. Indeed, climate change has crept up the corporate agenda to become one of the most important factors affecting the long-term operating environment for business. Increasingly, investors are beginning to price this into their investment decisions and allocate capital to companies that are fully integrating climate change considerations into their strategies, cultures and operations as a means of risk management, cost cutting and revenue maximization.

Conclusions: Climate change is an urgent challenge that affects long-term corporate profitability, and therefore must be systematically integrated into investment analysis. The pace of climate change is accelerating and will have material effects on equity markets in the short, medium, and long term.

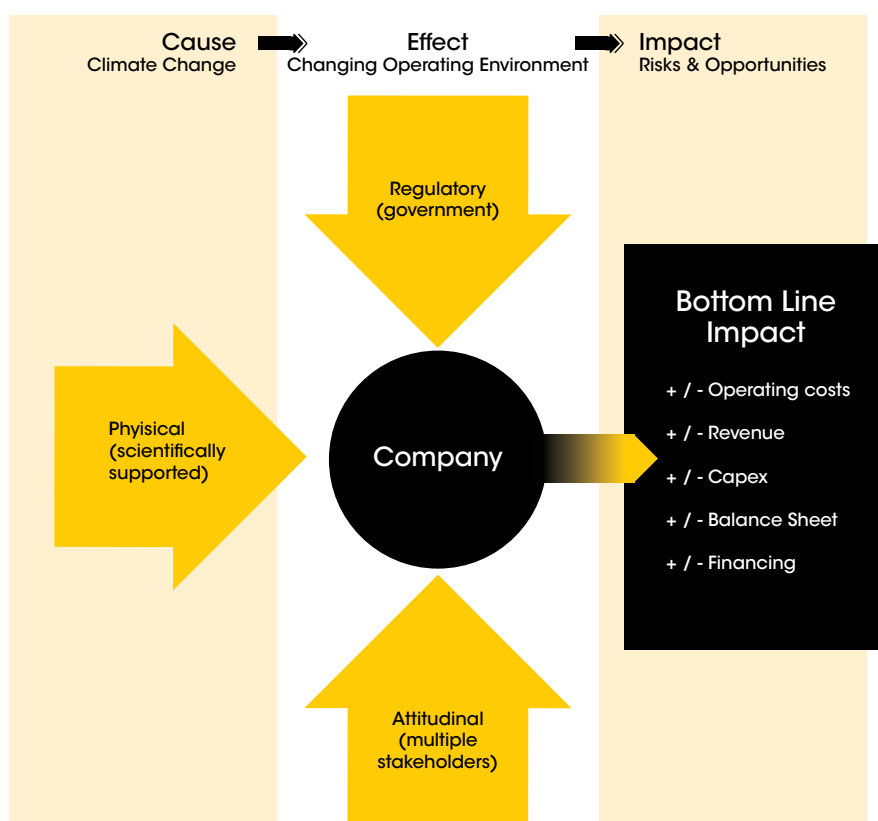
Sample Investment Ideas:

- › **Industrial Sector:** clean energy infrastructure, process optimization, demand-side efficiency, biofuels, renewable energy (geothermal, solar, wind, wave), carbon sequestration, hybrid vehicles, clean fossil fuels, industrial gases, carbon trading, ecosystem remediation, adaptation infrastructure, water scarcity (desalination), urbanization, green architecture, sustainable mobility.
- › **Financials Sector:** climate risk management across products, sustainable real estate investing, expertise in carbon markets, project finance for ecosystem restoration and regeneration.
- › **Consumer Sector:** water intensity of operations, changing agricultural patterns, energy efficient appliances and household goods.
- › **Healthcare Sector:** disease migration, impact of natural disasters on healthcare budgets.
- › **Telecom, Technology & Software Sector:** distributed energy systems, software for efficient building design, smart metering, and grid technologies.

II. Implications For Business

Businesses face uncertainties in three dimensions – 1) the scale, pace, and nature of physical climate change, 2) regulatory landscape developments, and 3) global attitude shifts. To systematically examine company impact, Generation has developed the following approach:

Framework for Assessing Climate Change Impact



Within these areas, company activities can be seen as managing the downside risks and seeking new markets/opportunities:

- › **Physical Impacts:** Includes physical damage to assets, to markets and to labor supply, reduced productive capability of assets, and increased physical liabilities
- › **Regulatory Developments:** Includes local, national, international and supranational policies, taxes, carbon trading developments, and associated litigation
- › **Attitudinal Shifts:** Includes media attention, reputational exposure, consumer and political will resulting from concern for energy security, and consumer willingness to internalize external costs.

2 | Climate Change

Given the uncertainty of future physical events and the long lead time for regulations to have a material impact on business, the most fruitful investment insight may come from understanding how individual attitudes and behaviours are changing in response to climate awareness and concerns over energy security, especially as political and media attention to the issue grows.

Macroeconomic Impacts: In addition to above impacts, abatement and adaptation costs from climate change can have a range of impacts on global GDP growth. Abatement calculates costs from reducing carbon emissions activity, while adaptation focuses on building more resistant and resilient infrastructure to withstand a rapidly changing climate. Either approach alone will lead to a partial solution. Adaptation alone may lead to long-term slower economic growth, because it will inflict climate change penalties on many nations that simply cannot adapt, and national budgets may be diverted away from other causes. Mitigation alone might not be sufficient given the feedback loops that are already accelerating climate change. In the debate on the appropriate response to climate change, adaptation and abatement must go hand in hand.

Systems Level Impacts: The complexity of climate change requires a systems-based approach to assess the full spectrum of risks and opportunities for companies. Climate change is a fulcrum issue which reveals several other sustainability issues. By looking at the web of relationships and patterns between climate change and other sustainability issues, we can gain a more complete view of the impacts on business and society.

Seven interrelated issues illustrate the broader systemic implications of climate change:

- › **Ecosystem Services & Biodiversity:** Rapid climate change threatens biodiversity and disrupts ecosystem services, such as provision of clean air and water. Increasingly, we anticipate companies will be held accountable for the way in which they deplete and/or restore environmental services such as wetlands, clean water, forest assets, and biodiversity habitat.
- › **Poverty:** Environmental impacts from climate change disproportionately affect the poor. Poverty can undermine the stability of civil society, which in turn can negatively impact business and GDP growth assumptions.
- › **Public Health:** Climate change could substantially increase the proportion of the world's population living in malaria/dengue transmission zones, as well as accelerate the rate of disease migration. Public health implications of climate change may impact companies' external environment.
- › **Demographics, Migration and Urbanization:** Future increases in the frequency and intensity of severe weather systems may trigger large scale demographic responses and migration, which will have significant internal and external impacts on business in certain areas.
- › **Human Rights:** While developed countries are responsible for the majority of GHG emissions, often the most vulnerable populations are more severely impacted. While the human rights aspects of climate change have had limited recognition to date, it may be a future risk for companies given the potential for increased litigation.
- › **Human Capital Management:** As numerous surveys show, employees are more motivated when they work for companies with which their values are aligned. Employee motivation to work for a company with strong environmental values may influence a company's internal culture as well as its competitive position.
- › **Responsible Lobbying:** To understand political motivations and the integrity of a company's climate change position, lobbying practices must be scrutinized.

Fiduciary Responsibility: Increasingly fiduciaries should understand that addressing systemic climate risks is a fiduciary responsibility and not doing so may be a breach of fiduciary duty.¹

Summarizing Bottom Line Impacts: The following table identifies specific areas where climate change can concretely impact a company's financial position²:

Financial impact	Potential value drivers	Examples
	Supply chain	<ul style="list-style-type: none"> · Energy use · Exposure of supply chain to weather risk · Increased purchase costs for raw materials (timber, water, etc)
	Emissions Trading	<ul style="list-style-type: none"> · Purchase cost of carbon allowances
	Emissions Reductions	<ul style="list-style-type: none"> · Net of cost and benefit of mitigation of carbon emissions
	Compliance	<ul style="list-style-type: none"> · Costs associated with emissions trading and compliance · Costs from building modifications · Other adaptation costs
Operating Costs	Distribution	<ul style="list-style-type: none"> · Transport costs to market · Delays due to weather disruption
	Emissions Trading	<ul style="list-style-type: none"> · Sale of excess carbon allowances · Arbitrage opportunities
	Shifting Market Demand	<ul style="list-style-type: none"> · Increased sales from firm's products (new design) · Increased sales, margins, and overall loyalty from enhanced brand reputation · Increase/Decrease in demand due to shift in climate · Increase customer's understanding and willingness to pay for external costs
	New Products/Services	<ul style="list-style-type: none"> · Renewable products, energy efficient products · Problem-solving products (e.g., health solution for diseases) · Offering carbon-free or carbon-neutral services
	Pricing	<ul style="list-style-type: none"> · Passing costs to customers · Impact on volumes
Revenue		
Capex	Asset investments	<ul style="list-style-type: none"> · Investments in plant/assets to reduce emissions · Compliance costs & higher maintenance costs · New assets in new geographies that will not be affected by climate risk
Balance Sheet	Weather risk	<ul style="list-style-type: none"> · Depending upon asset base exposure to weather related changes
	Asset risk	<ul style="list-style-type: none"> · Asset write-down for defunct assets that cannot be upgraded
	Increased assets	<ul style="list-style-type: none"> · Technology investments for energy and climate efficiency
	Litigation	<ul style="list-style-type: none"> · Litigation risks on balance sheet
Financing	Cost of Capital	<ul style="list-style-type: none"> · Equity risk premium where company has risky climate profile
	Brand Exposure	<ul style="list-style-type: none"> · How exposed is a company's brand to climate change response
	Taxes	<ul style="list-style-type: none"> · Effects on tax deductibles
	Other	Insurance

¹ For more on fiduciary responsibility, please see "The Prudent Trustee: The Evolution of the Long Term Investor" by Jed Emerson (Generation Foundation), see www.genfound.org.

² Table adapted from The Carbon Trust, "Investor Guide to Climate Change" Briefing Pack, January, 2005, p.9.

III. Frameworks

Business Quality – Evaluating Carbon Intensity of Profits

Despite the uncertain and complex nature of climate change, it has real and tangible impacts on business operations, such as access to resources, access to capital, security of supply, access to markets, and liabilities. One way to identify which companies will be at higher risk from direct carbon exposure is to use a measurement of the “Carbon Intensity of Profits.” Carbon intensity is expressed as the amount of CO₂ equivalent emitted per million dollars of EBITDA. Normalization in terms of EBITDA gives insight into the relationship between a measure of returns and CO₂ emissions. Any analysis of this type must take both direct and indirect emissions from the first tier of each company’s supply chain into account. This measurement is useful for comparing companies within a sector, more so than between sectors because of the varying levels of materiality of climate change to different business models. In addition to looking at carbon intensity of production, a company’s product portfolio can also reveal those companies better positioned to succeed in a carbon-constrained world.

Management Quality – Evaluating Carbon Discipline

The concept of Carbon Discipline embodies two elements of quality management: 1) the extent to which management recognizes the long-term material risks and opportunities of climate change on their business, and 2) the extent to which these risks and opportunities are being managed through R&D, technology, mitigation and/or adaptation activities. Below are suggested lines of inquiry under five areas—leadership, internal processes, reputation, stakeholder engagement, and transparency & reporting—to enable a more robust assessment.

Best Practice Framework for Carbon Discipline

Leadership

- › Defining boundaries of climate change responsibility and communicating its impact on business
- › There is strategic alignment of climate change with broader corporate strategy
- › Disclosure of both direct and indirect emissions from product/service lifecycle
- › Clear view on boundaries of responsibility in GHG accounting (asset or liability)
- › R&D spend geared to developing climate change related products and services

Internal Processes

- › Internalization of external costs via pricing and product/service positioning
- › Adjustment of Investment Appraisal Protocols to include carbon pricing—companies in high carbon intensity businesses must understand the price of carbon and how it impacts its costs and project returns over the long term
- › Portfolio decisions based on climate change considerations
- › Participation in trading schemes such as ETS, CCX, or regional trading schemes
- › Accounting for emissions in JVs as well as core business (boundaries well defined)

- › Quantified targets set against baseline, in line with long-term planning
- › Use of an independent organization to verify GHG inventory
- › Risk management system includes climate change risk scenarios

Reputation & External Relations

- › For investor relations, integrated value of impact clearly communicated to investors
- › Building trust with stakeholders through commitment to climate
- › Level of staff retention and ability to attract talent through company reputation
- › Education of clients on what externalities go into the business and pricing in those externalities where possible
- › Educating of analysts as to how and why climate change impacts shareholder value

Stakeholder Engagement

- › Ability to forge long-term partnerships with other companies, NGOs, employees, and customers to address climate risks and reduction strategies
- › Companies that encourage government to act on climate change policy can build competitive advantage for their firms
- › Responsible lobbying consistent with external commitment to climate change

Transparency & Reporting

- › Participation in Carbon Disclosure Project (CDP) and involvement in coalitions and working groups related to climate change (IIGCC, Pew Center, GHG Protocol, and other voluntary commitments)
- › Reporting level of materiality in company communications such as the GRI, OFR, the MD&A of the SEC 10-K, and the annual report. Companies should also have adopted ISO 14001 as a baseline (if not, why)
- › Milestones and controls for emissions
- › Track record of emissions trading and responsible accounting for those emissions
- › External audit to verify GHG emission and reporting on equity share basis (allocating emissions according to a company's equity share in an installation).
- › Emissions quantified not only from operations but also from products and services

IV. Sector Insights

Industrials

- › Climate change is front and center for the entire industrial complex. Energy efficiency, water scarcity, urbanization, sustainable mobility and infrastructure are all trends that are significantly affected by climate change.
- › This sector also has significant upside potential for companies that can design products and services for a carbon constrained world and demonstrate clear carbon transition strategies.
- › Process optimization, demand-side efficiencies, biofuels, solar, geothermal and wind energy, carbon capture and storage, hybrid vehicles, liquefied natural gas, clean coal, desalination, green architecture, and adaptation infrastructure are all fast growing sub segments that directly address the climate challenge. Long-term strategies for lower-carbon product lines may establish market leadership positions.
- › Specifically within the energy sector, the evolving regulatory environment will have clear financial impacts on business models with high carbon exposure.
- › There are significant physical risks for companies with infrastructure in vulnerable areas, as well as weather-related impacts on supply and distribution networks.
- › The ability of companies to mitigate climate change impacts through energy efficiency initiatives and take advantage of carbon market trading mechanisms (such as EU Emissions Trading Scheme) may develop a competitive advantage.
- › As countries invest more in adaptation to climate change (e.g., to fortify potential flooding zones), there will be growth in ecosystem remediation and infrastructure restoration.
- › Companies that are working on solving the world's greatest challenges such as climate change may also be able to attract and retain high-performance employees, especially given the talent crunch.

Financials

- › For insurance companies, climate risks should be integrated into their internal governance procedures and for re-insurance companies, prices will have to increase to reflect higher risk natural weather events.
- › Banks should review and optimize their risk management systems to include climate change as a factor in any rating process. Also, as owners of extensive real estate and buildings, banks have a significant end-use carbon footprint because buildings account for 40% of all end-use CO₂ emissions.
- › Initiatives such as the Equator Principles are often adopted by financial institutions to ensure that projects they finance are developed in a manner that reflects sound environmental and social management practices.
- › There is also opportunity to build expertise in carbon markets and related financial instruments such as weather derivatives and catastrophe bonds.
- › Companies that provide project finance explicitly for restoration and regeneration projects may become increasingly attractive.
- › From a macroeconomic perspective, a global climate crisis may trigger the rise of protectionism and lead to rising inflation, increased financial volatility and higher levels of systematic risk.
- › On the extreme, a climate crisis could spur events like water wars and resource terrorism which would ultimately impact the financial markets.

Consumer

- › The Retail and Food Manufacturing industries may be broadly influenced by increased costs in the supply chain and disruptions in agricultural production, changes in consumption patterns, increased energy prices, and changes in public sentiment toward companies.
- › For retailers, direct impacts will be high cost of electricity and transport. This will expose the 'food (or clothes) miles' burden which will be borne more by retailers than by manufacturers. For household and personal care (HPC) sector, rising energy prices affect feedstock costs.
- › Many HPC companies are targeting emerging market customers, who may be more vulnerable to the impact of natural disasters and changing agricultural patterns on disposable income (e.g. companies with Base of the Pyramid strategies will be most exposed).
- › Climate change will have a long-term impact on sustainable agriculture due to flooding, enhanced soil moisture evaporation and intensified land use by "climate refugees." As more land is affected, there will be consequences for commodity producers. Higher food prices may move the category mix away from land-and-energy-intensive meat products as well as increase the perceived need for GMOs. Where food price increase, costs will likely be passed to the consumer.
- › For retailers, there are also opportunities to solve emerging customer needs as there will be more demand for consumer products that can deliver energy efficiency in the home.
- › Indirectly, public concern for energy consumption may reveal transport-inefficient locations (out of town developments, big box formats) forcing consumers to drive large distances and consider alternatives.

Healthcare

- › While Healthcare has lower direct exposure to the physical risks of climate change, the sector faces increased price pressure from intensive energy consumption in its production processes.
- › Healthcare companies will face a potential increase in need for drugs and medical treatments due to increased heat and precipitation in high population density areas, especially in developing countries. Climactic shifts will also have disease migration implications, especially for diseases such as malaria.
- › The impact of natural disasters may squeeze public expenditures. For example, Hurricane Katrina grew the U.S. deficit by \$100 billion which put incremental pressure on other national spending such as healthcare.

Telecom, Technology and Software

- › These sectors are not highly exposed to climate impacts but they are not immune. For example, for companies with distribution networks, both physical and regulatory economic impacts may be felt.
- › In the technology sector, there is potential for decreasing the energy intensity of existing and new technologies.
- › Electronic communication and infrastructure enablement may also flourish.
- › The drive to reduce costs will increase attention to money saving efficiency measures and also grow demand for distributed energy systems (off-grid), as well as on-grid technologies such as smart metering.

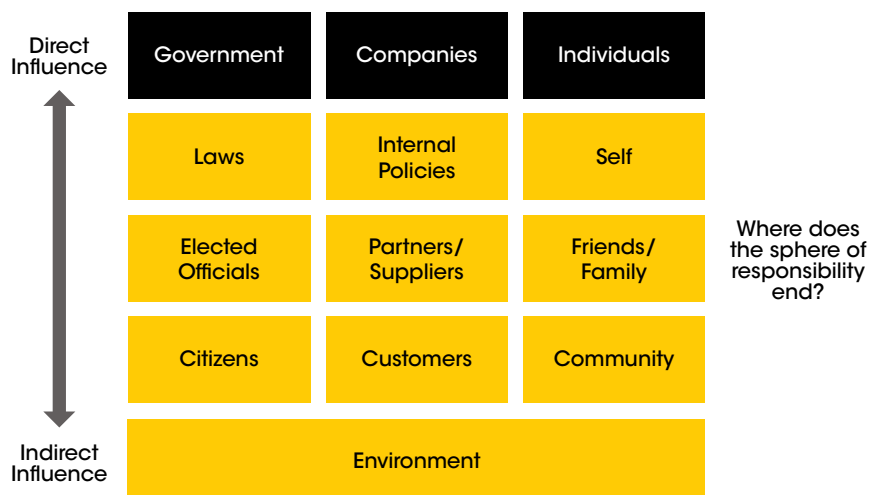
2 | Climate Change

- › For the software sector, global trends like climate change can change the way business practices work and how customers behave. The move towards energy efficiency can be assisted by new software products to look across the supply chain for improvements.
- › Telecoms are not significantly impacted by climate change risks beyond physical plant disruptions. However, these potential costs are not material given the size of most companies in this sector.

V. Further Aspects

Dearth of Global Governance: According to Business Week, “80% of CEOs said that climate change was a potential risk, but only 40% were doing something about it.”³ A CEO’s ability, or inability, to identify and manage known risks associated with climate change provides broad insight into the quality of the firm. As outlined below, a company/government/individual has many levels of influence—from the direct to the indirect. In turn, these influences have intended and unintended systemic consequences. Often unintended consequences on the environment (such as climate impacts) fall outside of any entity’s sphere of responsibility. This leaves certain environmental needs unmet in perpetuity, mainly due to abdication of responsibility by most of society. However, this will not be so in the future if the price of pollutants (such as carbon dioxide) is internalized by our economic system.

Sphere of Influence and Responsibility



To address the challenges of climate change, governments, companies, and individuals will all need to broaden their scope of responsibility to match their sphere of influence. Companies that understand their scope of responsibility and the value-enhancing potential of proactively addressing it will generate superior shareholder value. Critical to this value crystallizing is the company’s ability to communicate it to the investment community.

³ Business Week. August 16, 2004.

The response to global climate change is hindered by the essential nature of the problem as illustrated by the “Tragedy of the Commons” and the “Prisoner’s Dilemma.”

The Tragedy of the Commons highlights the conflict between individual interests and the common good. The term was coined by Garrett Hardin in 1968 to describe a situation where each farmer keeps adding more livestock to graze the Commons, because it costs him nothing to do so, but eventually the Commons are overgrazed and the village perishes. As Hardin writes, “Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited.”⁴ This metaphor applies to climate change, because individuals, corporations, and governments use the atmosphere as a public good, yet they do not bear the appropriate cost of their usage. Sadly, the best and most rational short-term strategy for any single entity is to try to exploit more than his share of the public resource, until a moderating or regulatory system is put in place. In the case of climate change, this is just beginning to happen with the carbon markets.

The Prisoner’s Dilemma further explains the lack of cooperation regarding a global climate response. Based on game theory, it is assumed that each individual player (“prisoner”) can choose between two moves, either “cooperate” or “defect.” Each player gains when both cooperate. However, if only one of them cooperates, the other one, who defects, will gain more. Giving the desire to maximise his own advantage, each prisoner chooses to defect even though the joint payoff would be higher by cooperating. Unfortunately for the prisoners, each has an individual incentive to cheat even after promising to cooperate. This is the heart of the dilemma, and also the challenge when global players whose short-term motivations are at odds with the optimal long-term solution.

These two concepts illustrate why it is so hard for any one entity (a company, a government, an individual, an investor) to embrace the responsibility of climate change. This also explains why politicians and CEOs do not take more aggressive steps toward climate response and mitigation. In most cases, it might not be in their short-term interest to do so. The timing issue (“not on my watch”) plays to the inherent short-term thinking of capital markets.

⁴ Hardin, Garrett. “The Tragedy of the Commons,” *Science Magazine*, December 13, 1968.

3 | Pandemics: A Systems View of HIV/AIDS

November, 2005

I. Context

Synopsis: The complete white paper looks at the implications of HIV/AIDS on Brazil, Russia, India and China, with a particular focus on the macro implications for GDP growth, the second-order impacts of the pandemic, and an analysis of best practice corporate response.

Background: Next to a widespread avian flu pandemic, HIV is the single biggest existing global public health challenge. AIDS kills 8,000 people a day—the equivalent of 20 jumbo jets crashing daily. Presently there are approximately 40.3 million people worldwide living with HIV, almost half of them women. While 65% of all HIV cases are in Sub-Saharan Africa, HIV/AIDS is increasingly an economic growth challenge in BRIC economies—Brazil, Russia, India and China—which account for over 42% of the world's population. Given economic, social and political factors, the disease has the potential to migrate to the general population in these regions. Despite the rapid spread of the disease in emerging economies, 70% of the world's largest transnational companies still do not have policies or programs on HIV/AIDS.[†]

Conclusions: Pandemics such as HIV/AIDS have the ability to erode the stable operating environment for business over a long-term time horizon. This poses both risks and opportunities for businesses, depending upon their level of geographic exposure and level of management commitment to the issue.

Sample Investment Ideas:

- › **Industrial sector:** worker health, direct and indirect management of pandemic risk, strong stakeholder management and community involvement, ability to build public private partnerships.
- › **Financials sector:** integration of pandemic risk into investment processes, micro-lending facilities in developing countries, premium for pandemic insurance.
- › **Consumer sector:** supply chain management in HIV-prevalent areas, Base of the Pyramid markets, discretionary spending, HIV/AIDS as a philanthropic cause to motivate employees, awareness building and education.
- › **Healthcare sector:** access in developing countries, patents in developing countries, generics, new models for healthcare delivery.
- › **Telecom, Technology and Software sector:** just-in-time delivery model could be jeopardized by rising absenteeism, disruptions in labor supply from sickness, and retraining.

[†] UNAIDS 2004 Report

II. Implications for Business

Macro Threat to GDP: HIV/AIDS is a material and urgent issue for global business due to the negative impact on GDP growth estimates in developing countries—a measure that may not yet be reflected in current growth models. BRIC economies in aggregate account for 8% of global GDP today, growing to 11% in ten years.¹ Some experts project that HIV/AIDS would trim 1% off each country's annual GDP growth. This does not even begin to capture the economic and social impacts on the informal economy.

Country Level Impacts: While ineffective surveillance systems in many countries obscure accurate data, the number of people living with HIV has been rising in every region of the world, though it is concentrated in developing regions such as Sub-Saharan Africa, Asia, and Eastern Europe. In the BRIC economies, different vectors drive migration of the disease as seen below.

Transmission Vectors and Estimates of Infected Population (2004)

	Vectors	Total Population	Approx. Infected
Brazil	Drug use, contaminated blood, prostitution	186m	660,000
Russia	Drug use, moving to sexually transmitted infection	143m	860,000
India	Heterosexual sex, prostitution, drug use	1,080m	5,100,000
China	Heterosexual sex, sex between men, prostitution, drug use	1,306m	840,000

Source: UBS based on UNAIDS (Data at end of 2003 and estimated in July 2004)

Systemic View: The emergence of a pandemic like HIV/AIDS cannot be pinned to a single root cause, but rather, to an unfortunate convergence of systemic issues. HIV/AIDS is not just an African issue, or a homosexual issue, a sex trade issue or a drug use issue—it is all of these, plus more: a poverty issue, a demographic issue, a literacy issue, a political issue, a migration and urbanization issue, an environmental issue, and so on. By understanding the interrelationships between this disease and other sustainability challenges, we are more likely to understand the future impacts of the pandemic on specific companies. Through this systemic view we may also come to a conclusion on the institutional capacity of certain countries to address such public health challenges.

Eight interrelated issues illustrate the broader systemic implications of a pandemic such as HIV/AIDS:

- › **Poverty:** HIV/AIDS strikes hardest at the most vulnerable groups in society. It exacerbates wealth disparity and exaggerates existing problems such as lack of social protection, limited access to healthcare, gender inequalities, and child labor. In addition to being a cause of health challenges, poverty is also a consequence of HIV/AIDS.

¹ UBS and F&C Asset Management. "HIV/AIDS Beyond Africa: Managing the Financial Impacts," May 2005.

3 | Pandemics

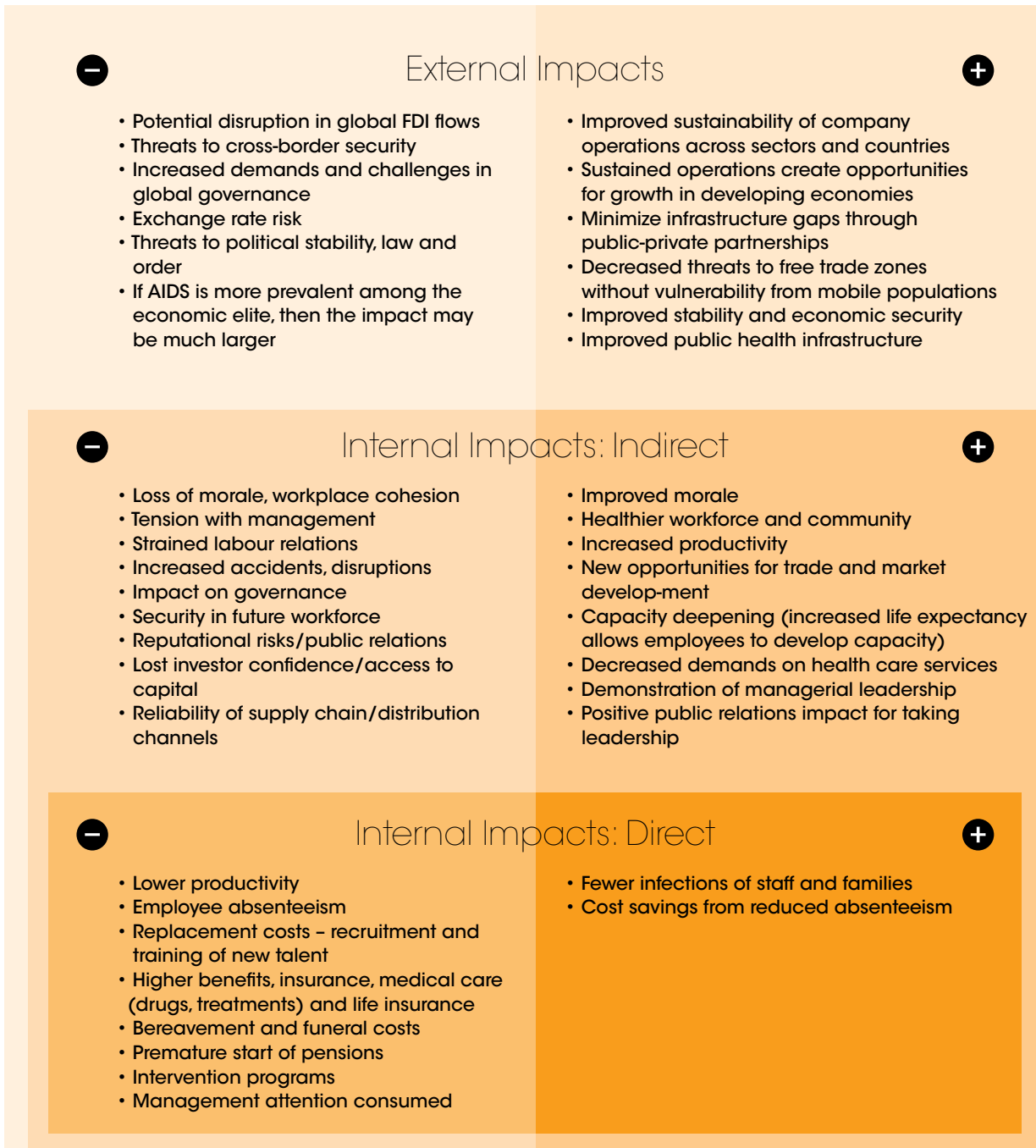
- › **Demographics:** HIV/AIDS disrupts the demographic profile upon which social support systems have evolved in many countries. There are fewer people of productive age to support an ageing population, thus disrupting the “dependency ratio.” This demographic impact leaves destitute elders and orphans who would otherwise rely on wage earners for economic support.
- › **Migration & Urbanization:** The rate and spread of HIV is strongly linked to the mobility of people—both transience and migration (urbanization). A study by UNDP found that 67% of the people living with HIV/AIDS said that migration was the main factor that led to their HIV-vulnerability.
- › **Human Capital Management:** As HIV/AIDS becomes more pervasive, it will increasingly become a strategic HR issue. On a very different level, companies with indirect exposure to HIV/AIDS (through supply chain) may leverage the cause as a philanthropic commitment to drive employee morale and/or consumer awareness.
- › **Social Movements:** The evolution of HIV/AIDS awareness shows one way in which values-based social movements can evolve over a long time period to eventually become material to business. As social movements around HIV/AIDS gain momentum and relevance, there is increased consequence for businesses that do not address the issues.
- › **Environment:** Environmental degradation can feed the roots of poverty and disease. Poor populations are often deprived of ecological benefits such as fresh water, nutritious foods, and clean air, which further fuels disease vulnerability.
- › **Drug Access for Developing World:** Core to the HIV/AIDS challenge is the extent to which access to medicine is a basic human right and how governments, companies, multilaterals and NGOs can provide access to a continuum of care for treatment.
- › **Security:** HIV/AIDS has risen on the global agenda since it aggravates many of the underlying tensions in developing countries which can lead to threats of national security. Perversely, the very providers of national security in developing countries (uniformed forces) can also be the very vectors of disease transmission.

III. Frameworks

Business Quality – Direct/Indirect and Internal/External

Geographic Exposure of Business: Depending upon business model, the impact of HIV/AIDS on Business Quality can be assessed by looking at direct and indirect costs for business as well as exposure of earnings to at-risk geographic regions.

Internal and External Impacts (Risks and Opportunities) of HIV/AIDS on Business



Management Quality – Leadership and Strategic Awareness

Management Quality is tested by senior level commitment and their ability to address the impact of public health challenges on their future business growth. A best practice framework can be applied to companies with both direct and indirect exposure.

Best Practice Framework for companies with direct exposure to HIV/AIDS

Policy & Non-Discrimination

- › Publicly available Policy on HIV/AIDS, with board sign off and CEO endorsement
- › Committee in place to oversee policy implementation and monitoring
- › HIV/AIDS anonymous testing for employees with confidentiality clause
- › Prohibit discrimination on the basis of real or perceived HIV/AIDS status when hiring, promoting, transferring or training staff or allocating pay or benefits

Prevention, Education and Behaviour Change

- › Education and awareness raising internally and externally
- › Condom promotion and provision

Testing & Counseling

- › Free/subsidized ARV medicines and facilities for diagnosis and treatment and counselling
- › Help employees with HIV-related illnesses to continue in appropriate work while able

Care, Support & Treatment

- › Provide health insurance for all employees, which covers HIV/AIDS treatment
- › Ensure the availability of affordable or free facilities for viral-load tests and treatments for opportunistic infections
- › Coverage for partners, families, suppliers and contractors. Housing for migrant workers

Donations & Corporate Philanthropy

- › Identification of shareable assets (marketing, distribution channels, intellectual capital)
- › Contribution of products and/or services directly for public health purposes
- › Donations to public health organizations, NGOs, and health campaigns

Below points are relevant for companies with indirect exposure:

Strategic Assessment

- › Considerations of public health infrastructure of operating countries is integrated into the highest levels of strategy
- › Understand current and potential impact of critical illnesses such as HIV/AIDS on their workforce, customer base, and stakeholder relations, as well as their financial performance
- › Commitment to HIV/AIDS is linked to a company's strategic or moral vision
- › Both direct and indirect impacts have been identified and material risks addressed

Business Associates & Supply Chain Engagement

- › Discussion of public health issues with its supply chain, distribution network, and contractors
- › Extend HIV/AIDS provisions to subcontractors and dedicated suppliers (e.g., where the responding company is the exclusive client)

Advocacy & Leadership

- › Participation in cross-sector collaborations and embrace advocacy role to speak out to break stigma and keep AIDS on the agenda
- › Awareness of the government's policy and response to HIV/AIDS
- › Where appropriate, lobbying governments for increased response and resource mobilization
- › Company managing intervention efforts in an infected region (assisting governments and public health communities)

Community & Government Partnerships

- › Involved in Business Associations and Coalitions in tackling AIDS at a national level
- › Work with NGOs and unions where possible for best practice
- › Member of Global Business Coalition on HIV/AIDS and participate in other cross sector initiatives such as World Economic Forum's Global Health Initiative
- › Consideration of building public-private partnerships as part of local HIV/AIDS response

Monitoring, Evaluation & Reporting

- › Use guidelines set by International Labor Organization (ILO). Report using frameworks like the Global Reporting Initiative
- › Provide regular updates to stakeholder groups on new initiatives and measurable progress

IV. Sector Insights

Industrials

- › Most multinational industrial companies have some geographic exposure to HIV/AIDS either in their employee base, in their supply chain, or in their distribution networks in developing countries.
- › For companies reliant on natural resources in developing countries (such as mining, forestry, fishing), their operations may be located in regions with high HIV prevalence and high levels of migrant workers.
- › However, as companies move to automation of manufacturing and logistics, this may decrease exposure to HIV/AIDS through the labor supply.
- › To ensure the health and safety of direct employees or suppliers, companies may need to address a public health agenda within a broader community or even on a government level. The ability to manage complex stakeholder relationships will be essential.
- › Beyond risk management, there are also opportunities for companies with extensive distribution and retail networks to leverage their assets to address public health challenges like HIV/AIDS (by distributing anti-retrovirals or working with government to disseminate educational materials).

Financials

- › Many segments of the global financials sector are linked to the health of emerging market economies. The two main drivers of retail banking growth in developing countries are 1) affordability and 2) expansion of the middle class—this second driver could be jeopardized by HIV/AIDS in the long term if the disease jumped to a more productive segment of the population (which would lead to absenteeism, higher health costs, drain on spending, saving, and investing power). This may raise lending rates for certain groups, which would grow the 'access to capital' divide.
- › Micro-lending facilities in developing countries can help give people access to better health services.
- › At the extreme, a global health crisis could create financial volatility which could raise the levels of systematic risk and, in turn, hamper global markets.
- › If the spread of HIV/AIDS severely accelerates in a country like India, national financial institutions may even become public policy instruments to mandate HIV testing before giving a loan or providing financing, or implement a premium for pandemics insurance.

Healthcare

- › Healthcare companies making HIV drugs have been central to the debate on access in developing countries. The moral dilemma has played out over the past decade with clear winners and losers in terms of corporate reputation and profits.
- › The companies that have dropped their patents in developing countries and/or worked with NGO partners and governments have avoided reputational damage.

- › New business models for developed world healthcare may emerge as more effective than existing models. Already, generic drug companies have the opportunity to exploit niche markets for life saving drugs that are less desirable from the point of view of large pharmaceuticals.
- › New developments (drugs, technologies) in the treatment of HIV may not have a strong market unless they are subsidized and carefully marketed to accommodate ethical issues.

Consumer

- › Retail companies with manufacturing and/or supply chains in HIV-prevalent areas will have direct and indirect impacts. For example workers may have higher absenteeism and lower productivity.
- › Companies that are launching strategies to serve the 4 billion people living at the base of the economic pyramid may encounter a demographic profile which may be particularly vulnerable to infections like HIV.
- › If healthcare costs increase and earnings per household decrease in developing countries like Russia, India and China, discretionary spending will be curtailed. However, until the disease reaches the middle income consumer, it is doubtful that there will be much economic impact (impacts will be much greater in the informal economy).
- › Some consumer companies with strong brands have taken on HIV/AIDS as a philanthropic cause to motivate employees, gain goodwill and fulfill a moral obligation.
- › Global media companies can play a role in awareness building and education around HIV/AIDS in developing countries.

Telecom, Technology and Software

- › Many technology companies have manufacturing components of their supply chain located in developing countries.
- › The just-in-time delivery model could be jeopardized by rising absenteeism, disruptions in labor supply from sickness, and retraining. While most companies will not be dependent on any one source, any widespread pandemic would have at least short-term impacts.
- › Over the long term, many technology and software companies are leveraged to emerging market growth which may slow prematurely in the event of HIV acceleration.
- › Telecoms companies with mobile operations in places like Africa and China are highly exposed to demographic trends and GDP growth estimates. For large companies in these regions there also may be impact of HIV on the employee base and on suppliers.
- › Telecommunications companies generally have strong relationships with local governments and may have a role to play in education and outreach on the disease.

V. Further Aspects

A Long Term Event: HIV/AIDS is a long wave event, like global warming; the problem is non-linear and cause and effect are far apart in space and time. Such events have implications that unravel over a long time period, often too long for people to feel the urgency of the issue. Whereas a one-time pandemic outbreak of bird flu could drastically impact global populations, it would be a short wave event with a clear cause and immediate action as it passes through the population in 1-2 years. One of the major challenges to a global AIDS response is there is no tipping point in the short term. It remains to be seen how business, government and civil society will respond to new HIV/AIDS progression in the BRIC economies.

Business Response from Risk to Responsible Leadership: As the funding gap grows and governments and multilateral support falls short, the obligation to address public health issues such as HIV/AIDS increasingly falls on the shoulders of business. The corporate sector is just beginning to understand the risks of HIV/AIDS, and still this understanding is limited to the physical exposure of their business. Very few companies see it as the responsibility of business to address issues such as public health and poverty in developing countries. In part this is because companies that choose to address HIV/AIDS face-off often face a first-mover disadvantage.² From a purely economic point of view, the leading companies that choose to internalize the external costs of public health will be less profitable in the short term as they assume some of the education, training, testing, and treatment costs of HIV/AIDS. However, in the long-term, investments in public health infrastructure will pay valuable dividends over time by creating a stable operating environment for global business. Global companies have a significant role to play in being part of the solution to this challenge.

² Bendell, Jem. "Waking Up to Risk: Corporate Responses to HIV/AIDS in the Workplace," UNRISD & UNAIDS, 2004, p.36.

4 | Real Needs at the Base of the Economic Pyramid

March, 2006

I. Context

Synopsis: The complete version of the white paper looks at opportunities for business to address markets at the Base of the Economic Pyramid by focusing on the real needs of low-income consumers and co-creation of value. The paper describes best practice approaches, and discusses the potential disruptions of existing business models in emerging markets.

The World Economic Pyramid

Annual Per Capita Income*	Tiers	Population in Millions
More than \$20,000	1	75-100
\$1,500-\$20,000	2 & 3	1,500-1,750
Less than \$1,500	4	4,000

*Based on purchasing power parity in U.S.\$ Source: U.N. World Development Reports

Background: C.K. Prahalad and Stuart Hart define the Base of the Pyramid (BoP) as the 4 billion people with annual per capita income based on purchasing power parity in U.S. dollars less than \$1,500 (what is considered the minimum to sustain a decent life).[†]

According to some experts, the Base of the Pyramid is an untapped market opportunity of \$13 trillion in annual sales as well as significant invisible assets.[‡] In *The Mystery of Capital*, Hernando de Soto estimates that there are well over \$9 trillion such unregistered assets (houses, equipment, and so on) in the rural villages and urban slums of the world.[§] These are assets that could be used to collateralize loans/credit to allow people to become part of the economic system or market. Other evidence of BoP potential includes market demand for microfinance is close to \$300 billion, as compared to the \$4 billion of current supply. Today there are over 3,100 microfinance institutions that served close to 100 million clients. And remittances are somewhere between two and three times the level of development aid from rich to poor countries. For example, a total of \$167 billion in remittances flowed to developing countries last year.[°]

[†] C.K. Prahalad uses the term “Bottom of the Pyramid” while Stuart Hart uses the term “Base of the Pyramid”—for this paper we have chosen to use Base of the Pyramid (BoP) throughout.

[‡] 13D Research. “Transforming the World Economy with a Stroke of Pen,” March 2002.

[§] Hart, Stuart. “Capitalism at a Crossroads,” Wharton School Publishing, with Pearson Education, 2005, p.112.

[°] Lamont, Crabbe.

4 | Real Needs at the Base of the Economic Pyramid

Conclusions: Only in the past 5-10 years have certain multinational companies begun to experiment with new business models, products, and services aimed at the Base of the Pyramid (BoP) market. Understanding how a company thinks about markets at the base of the economic pyramid can provide insight into new growth opportunities (business quality indicator) and a company's leadership and ability to innovate (management quality indicator).

Sample Investment Ideas:

- › **Industrial sector:** distributed and renewable energy to address energy poverty, provision of clean water (desalination), ecosystem services, sustainable agriculture technology, urbanization, sustainable transport infrastructure, climate change mitigation, clean air technologies, mass habitats.
- › **Financials sector:** access to finance (microcredit lending, insurance products, securitization), remittances, affordable mortgages/housing, lending facilities for infrastructure development, pro-poor lending policies for developed markets, sustainable finance products.
- › **Consumer sector:** access to nutrition, food, hygiene products, clean water products/services, sustainable agriculture.
- › **Healthcare sector:** access to healthcare and medicine (generics), new models for healthcare delivery, distributed healthcare research and diagnosis, healthcare infrastructure (hospitals, treatment centers).
- › **Telecom, Technology and Software sector:** digital divide, open source, digital commons, intellectual property, wireless connectivity, mobile and networked solutions, job creation and human capital management dimensions of outsourcing, low-cost and universal delivery of education, medical assistance.

II. Implications for Business

Across sectors, evidence to date suggests there are four common characteristics to corporate initiatives to engage with consumers at the Base of the Pyramid¹:

- › **Scale:** Essential to a BoP strategy is scale and the aim of profitability. These strategies are not intended to be philanthropic initiatives run out of a company's corporate foundation, but rather strategic business development activities. BoP initiatives should be core to the business and have the potential to grow. Prahalad suggests that the poor can be the engine of the next round of global trade and prosperity, as well as a source of innovation.
- › **Cost Efficiency/Risk Management:** Serving the BoP "involves bringing together the best of technology and global resource base to address local market conditions... Four elements—creating buying power, shaping aspirations, improving access, and tailoring local solutions—are key..."² True BoP initiatives need to be disruptive rather than incremental by inventing new, low-cost systems. Given the transformative nature of some projects, strong risk management is important.
- › **Co-Creation of Value:** Operating at the Base of the Pyramid requires that companies work in new ways to understand real needs.

¹ Insights drawn from work of The Next Practice (C.K. Prahalad, C. Cohon) and The BoP Learning Lab at the Cornell University's Johnson School (S. Hart).

² Prahalad, C.K. & Stuart Hart. "The Fortune at the Bottom of the Pyramid," Booz Allen Hamilton Inc. February 1, 2002.

- › **Learning/Experimentation:** Most companies are only in exploration and experimentation mode as these are still early days. While few models have been finalized, partnerships with government, local NGOs, and multilateral agencies have proven to be a successful component of any company's BoP strategy.

III. Frameworks

Business Quality – Identifying New Markets

There are two opposing risks in addressing the world's poorest markets:

1. Not doing anything and losing out on growth (high value-at-risk of not having a BoP strategy), and
2. Getting it wrong and suffering reputational damage, or worse, negatively impacting vulnerable communities.

Best Practice Framework for Approaching New Markets

- › **Scale:** There are scale opportunities to make the businesses profitable as well as maximize its reach and there is a considerable margin pool to go after. The target BoP market has been sized and well researched and the business case for the initiative is clear and financial plan is robust.
- › **Cost Efficiency/Risk Management:** The company understands the country's legal structures, the overall investment climate and how to manage corruption and other risks. The investment utilizes only the most appropriate and sustainable technologies. There are well laid-out plans to monitor and address any unintended negative impacts associated with the business model.
- › **Co-Creation of Value:** BoP products/services are designed to increase earning power of its consumers, remove constraints, and build potential/capacity. The principle of co-creation of value with local communities embedded in their initiatives and processes. The company provides the opportunity for local participants to generate income either through selling goods or participation in the supply chain. The company is able to build needed public-private partnerships. The company reports transparently, involving key stakeholders in on-going dialogue.
- › **Learning/Experimentation:** Leaders share best practices with local partners to the extent possible. Company is authentic in its commitment to increase community value and must be able to terminate a project after test period if it is not deemed to be mutually beneficial.

4 | Real Needs at the Base of the Economic Pyramid

Management Quality – Leadership and Innovation

The Process of Building BoP Strategies: New skill development is needed for successful BoP initiatives. Stuart Hart calls for “deep listening, indigenous knowledge, native capability, and engaging fringe stakeholders.”³ The ability of a company to build public-private partnerships (PPPs) associated with its BoP activities is one of the early indicators that the company understands the need to build local community benefits to succeed. A company’s approach to the BoP can reveal much about the senior leadership of a company, their culture, and their approach to innovation.

Best Practice Framework for BoP Leadership

- › The company has been thinking about the BoP market for several years and it has been discussed in depth by the senior management team. There is an internal champion for it.
- › The company is looking for a new leg of growth and is open to innovation.
- › The initiative has senior level buy-in and ownership. Resource allocation authority lies with a manager on the executive committee.
- › The company has identified which non-profit or multilateral organization(s) they will partner with. The company can describe exactly why they identified and selected these partners over others as well as outline what type of co-creation strategy is in place.
- › The employees involved with the initiative are from a cross section of the company and are all allocating a portion of time to the project. External experts are involved.
- › Decisions are driven by a small group of decision-makers, including representatives from partner organizations.
- › The management participates in learning forums and shares best practice.

Red Flags

- › The motivation is a PR move rather than a business decision (look out for “BoP-washing”).
- › Partners (such as NGOs) do not like working with the company and paint a picture that is inconsistent with what the company says.

³ Hart, Stuart. “Reaching the Base of the Pyramid: the MNC Challenge,” Johnson School, Cornell University (presentation).

IV. Sector Insights

Industrials

- › Some of humanity's greatest challenges (needs for energy, water, and sanitation) can be addressed through improved industrial infrastructure and services.
- › Private sector commitment can go above and beyond what development agencies can provide, but government collaboration is important as these services are essential to sustainable development.
- › Transparency will be required where companies are operating in low-income markets, especially because of the implications for human rights and who has the right to own the "commons."
- › Other investment themes include: provision of clean water (desalination), sustainable irrigation technology, sustainable transport, distributed and renewable energy to address energy poverty, off-grid energy production, climate change mitigation, ecosystem services, urbanization, sustainable infrastructure in developing countries, energy-efficient buildings, mass habitats.

Financials

- › Expanding access to capital is core to poverty alleviation. The emergence of microfinance as a new asset class reveals new business models and investment opportunities, such as micro-lending and securitization products.
- › While microfinance as an attractive public equity investment is still far off (and still limited to wealthy and sophisticated investors due to the high risk profile), there are immediate ways to explore sustainable finance products to suit lower income populations such as remittances, affordable health insurance, and basic housing finance.
- › Remittances are attractive as they are counter-cyclical and stable by nature (migrants tend to send more in remittances during economic downturns).
- › Potential for disruption in cross-border payment models due to technology advances.

Consumer

- › Significant R&D, marketing and distribution networks can be leveraged to access new markets and reach the BoP customer with relevant products/services. To do this, companies must be sensitive to establishing the proper local networks with NGOs and government to gain credibility and legitimacy.
- › Local and sustainable agriculture is one investment theme to help address access to food and nutrition at the BoP.
- › This sector is one where companies have a lot to gain from expanding their markets, but also have a lot at stake if they get it wrong. A key challenge for consumer goods companies in BoP markets is whether or not their products and services are relevant to their target population's real needs.

4 | Real Needs at the Base of the Economic Pyramid

Healthcare

- › There is a clear social contract in the healthcare sector between companies and their customers (often patients) and communities. The standards are very high and international NGOs are critical, which may limit the ability of companies to experiment with new models of healthcare delivery.
- › There is room for innovation in disease prevention and treatment, as well as new models for healthcare delivery. Breakthroughs in distributed research and diagnosis (using open source collaboration).
- › IP issues will remain a challenge for the healthcare industry. While there are several examples of how companies have been able to strike the delicate balance between profitability and improving public health, it is a tremendously grey area.

Telecom, Technology and Software

- › Communications technology can raise people out of digital poverty by opening up access to information, education and knowledge networks. With this may come unexpected changes in the way services are bundled and the way users respond.
- › Enabled by the telecommunications revolution, open source platforms and increased wireless connectivity, companies can expect to see more commons-based peer production delivering services to the BoP market.⁴
- › Mobile phones are moving from being communications devices to being value-added service providers.
- › Other investment themes include: mobile and networked solutions, job creation and human capital management dimensions of outsourcing, and low-cost and universal delivery of education via technology platforms.

V. Further Aspects

Poverty Penalty: As pointed out by C.K. Prahalad in his book, *Fortune at the Bottom of the Pyramid*, the current economic system makes it more expensive for people living in poverty to access goods and services to fulfill basic needs. Given the growing chasm between rich and poor, the current financial system disproportionately penalizes the poor. Below is an example of what Prahalad calls the 'poverty premium' or, perhaps more appropriately, the 'poverty penalty':

Cost	Dharavi Mumbai shantytown	Warden Road Mumbai City Centre	Poverty Premium
Credit (annual interest)	600% 1000%	12% 18%	53 X
Municipal Grade Water (m3)	\$1.12	\$0.03	37 X
Phonecall (per/minute)	\$0.04 \$0.05	\$0.025	1.8 X
Diarrhea medication	\$20.00	\$2.00	10 X
Rice (per kilogram)	\$0.28	\$0.24	1.2 X

Source: Prahalad, C.K. "Serving the World's Poor, Profitably," November, 2002. Harvard Business School.

⁴ Benkler, Yochai. "Coase's Penguin, or Linux and the Nature of the Firm."

A capitalist system which disadvantages the poor in this way is flawed because it is based on an assumption that all poor people have an extremely high level of credit default risk. It also overlooks the fact that the poor already live a “dense life of economics” and often have a deeper sense of financial responsibility than the average person. This misconception also leaves room for companies that can operate cost-effectively to capture scale advantage in viewing the poor as able market participants rather than as victims.

Imperative of Market Inclusions: By the year 2050 85% of the world’s population of some nine billion people will be living in developing countries. If these people are not, by then, engaged in the marketplace, the benefits of the global market will be diminished, and companies will not continue to prosper. Disenfranchised populations, if continually excluded from the market, may turn to non-economic alternatives to address their needs (including violence and terrorism). This could become a significant security threat for stable operating economies. According to UN Secretary General Kofi Annan, “It is the absence of broad-based business activity—not its presence—that condemns much of humanity to suffering. Indeed, what is Utopian is the notion that poverty can be overcome without the active engagement of business.”⁵ Business has a unique opportunity to bring new customers into the marketplace by addressing real needs, and in so doing pursue future legs of growth (especially as existing markets become saturated).

Strategic Fit: Whether or not a company chooses to explore the BoP market depends upon the materiality of the new business to their growth strategy as well as their internal capability to execute. As put by Stuart Hart and C.K. Prahalad, “The aspiring poor present a prodigious opportunity for the world’s wealthiest companies. But it requires a radical new approach to business strategy.”⁶ It is also important to note that the corporate sector is not in the position to address all needs at the Base of the Pyramid. Government and civil society have significant roles as well.

⁵ World Business Council on Sustainable Development.

⁶ Prahalad, C.K. and Stuart Hart. “The Fortune at the Bottom of the Pyramid,” Booz Allen Hamilton Inc. February, 2002.

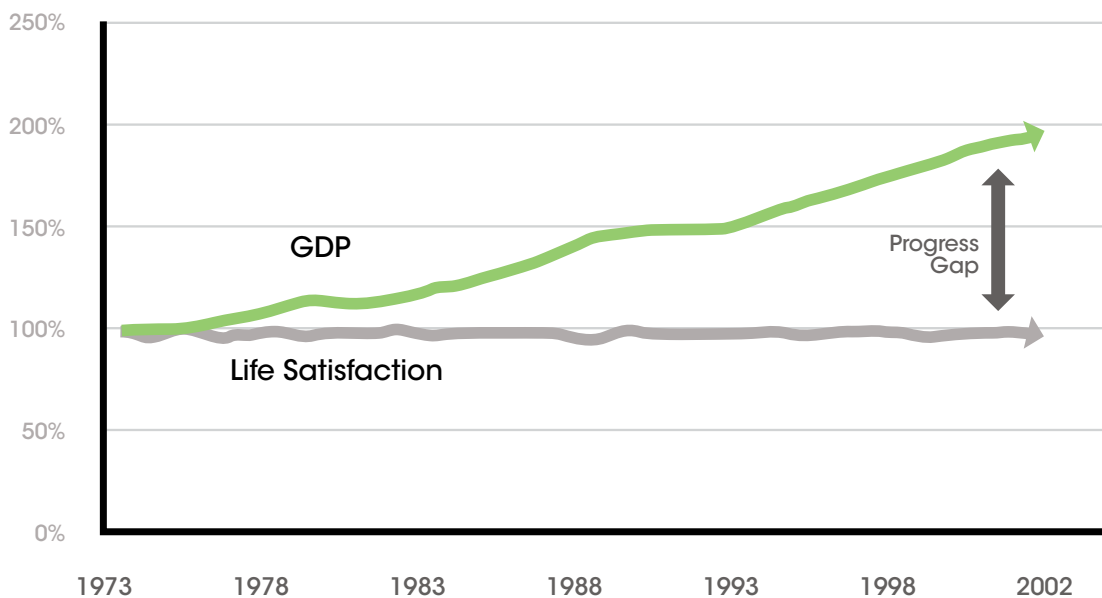
5 | Real Needs at the Peak of the Economic Pyramid

March, 2006

I. Context

Synopsis: The complete version of the white paper explores the “progress gap” between GDP growth and life satisfaction, and the social contract between companies and their stakeholders. Specifically, the paper looks at a company’s human capital management, their ability to understand changing customer values and needs, and how they interpret their broader social contract with the community.

UK Life Satisfaction and GDP: 1973-2002



Background: Due to an emerging culture of post-consumerism and possibly post-materialism, “Society is undergoing a fundamental shift from ‘material want’ to ‘meaning want,’ with ever larger numbers of people reasonably secure in terms of living standards, but feeling they lack significance in their lives.”[†] The “conscious consumer” market is already a \$250 billion dollar market, growing at double digits. Changing consumer values are mirrored by changing employee expectations. This is relevant for many companies, because as much as 80% of a company’s worth is tied to human capital compared to the reverse 50 years ago when a majority of a company’s value came from buildings, plant, land and inventory.

[†] Easterbrook, Gregg. “The Progress Paradox : How Life Gets Better While People Feel Worse,” Random House, New York, 2004, p. 30.

Conclusions: Despite fifty years of economic growth in developed countries, the gap between economic prosperity and personal well-being has widened. Companies—through the work they do, the products they sell, and the way they treat their staff—have opportunities to address the real needs of their employees, customers and communities and, in so doing, create enduring value.

Sample Investment Ideas:

- › **Industrial sector:** green buildings, ecosystem restoration, climate change mitigation, products to manage energy consumption and reduce environmental impact, demand-side efficiency, hybrid technology, renewables (wind, solar, bio-fuels, hydrogen).
- › **Financials sector:** community banks, housing lending/affordable mortgage products, educational loans, health insurance and savings products, sustainable banking (across asset management, project finance), philanthropic financial services.
- › **Consumer sector:** leisure, food safety, organic/fair trade, sustainable agriculture, energy efficiency in the home, shifting demographics, conscious consumerism and post materialism, loyalty and products with enhanced social utility.
- › **Healthcare sector:** healthy lifestyles, alternative medicine, preventative healthcare (genetic testing), life-saving drugs and devices.
- › **Tech, Telecom & Software Sector:** functionality over features, clean and green design, technologies or products that can knit closer ties across communities (on-line and real world), online services/remote education, open source, control of content, wireless connectivity, mobile and networked solutions, harnessing the power of online communities and collaboration.

II. Implications for Business

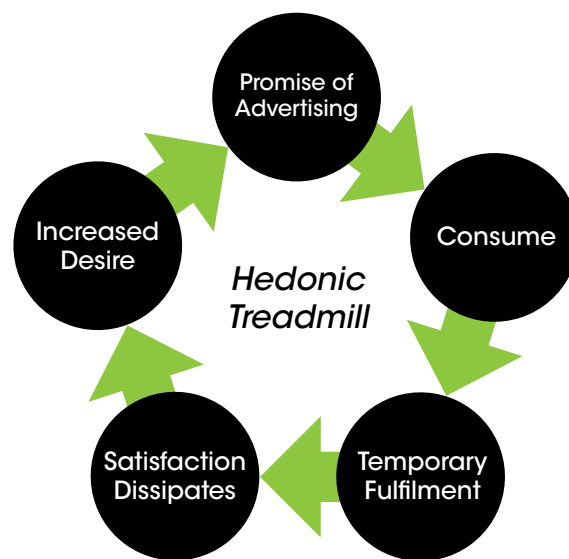
Causes of the Progress Gap: Here we suggest some causes of the progress gap, where business may have a role as part of the problem. However, many of these causes are simultaneously effects which also can have an impact on business.

- › **Limitations of Consumerism:** Material goals are easy and tangible benchmarks of success, yet it is hard for people to set, pursue, and showcase non-material aspirations and accomplishments. We have become so focused on generating economic wealth that other types of wealth (such as emotional) are hard to achieve through material goals.
- › **Advertising's Empty Promise:** Advertising pervades our lives in many new and subtle ways. True to its claim, advertising is very good at creating perceived needs, and can create a vicious circle by reinforcing the problems it promises to ease.¹ "When people already possess all the goods and services they need, growth can be stimulated only by discovering new needs. Advertising creates gaps in our lives in order to fill them."
- › **The Tyranny of Choice:** Companies, in pursuit of incremental economic growth, develop products and services that are differentiated. Consider, however, "choice anxiety." Having too many choices causes stress, uncertainty, and anxiety. We require additional time to inform our decision, which is complicated by conflicting claims, and undermined by the remorse of not having everything.
- › **Stress:** The inevitable complement of becoming too reliant on material possessions is the fear of losing them. This mental condition of today's generations is referred to as "collapse anxiety" where successful people imagine they could lose it all tomorrow. Furthermore, wealth often brings complexity rather than simplicity into people's lives.

¹ Monbiot, George, "What do we really want?" The Guardian, August 27, 2002.

5 | Real Needs at the Peak of the Economic Pyramid

- › **Peer Comparison as a Social Externality:** “We are creatures of comparison. We compare ourselves to where we want to be and to other people. As we achieve our goals, we change whom we compare ourselves to and find a new source of unhappiness. The goalposts are always moving.”² It is not the absolute level of income that matters most to people, but rather one’s position relative to peers. This drives consumption and can create envy and even crime, which are negative externalities that society must bear.
- › **Excess Debt:** The average consumer in the U.S. is overextended on credit and living beyond his/her means. In the UK, the Financial Services Authority has observed “growing signs of distress among consumers, including more insolvencies, more late payments on credit cards, and a rise in mortgage repossession orders.” Yet, most people are trapped by the “tyranny of the unnecessary”—we insist on having products with the latest bells and whistles.
- › **Hedonic Treadmill:** The advertising > consumption > fleeting fulfillment > perceived deficiency cycle can be simplified to “work-spend-work.” Economists refer to this relentless striving to get ahead as the “hedonic treadmill.” The phenomenon of putting material gains ahead of personal happiness is common in western societies. Television has had a role in fueling this cycle.



- › **Commercialization of Intimacy:** Our consumption-focused society has conditioned us to commercialize relationships and emotions. Relationships are consumed rather than cultivated, and people are paying for support services usually provided by family. The packaged emotional/spiritual/sexual experiences that products now promise to deliver appear to replace the experiences we traditionally sought from interpersonal relationships.
- › **Independent Isolationism:** Robert Putnam argues that the decline of local civic organizations in the U.S. has led to a fracturing of society and increased isolationism. In 1957, 3% of Americans described themselves as “lonely,” today that number has risen to 13%. One reason for this may be increased mobility in developed economies—as people move from city to city they lose connectivity and community.

- › **Lack of Political Participation:** Decentralized government and the possibility of political participation are important drivers of country-level happiness. “Happiness may differ among countries because [people’s] political and social lives are governed by different institutions. Institutions fundamentally shape how a society is organized.”³ It appears that having some level of influence over one’s social organization creates satisfaction and/or hope.

While companies can be responsible for some of the drivers of the Progress Gap, they can also be part of the solution through some of the areas below:

- › **Social Capital:** The concept of social capital is another way of exploring the gap between economic growth and well-being. Social capital refers to the institutions, norms and networks that enable collective action, or as some put it, the “social glue” that binds a group together. Social capital is a broad term that is applied to communities of all shapes and sizes—from nations to companies.
- › **Trust:** Even if the norms and networks in a society are clearly articulated, they only function if community members trust they will be upheld. Low trust means higher cost for security, more checks and balances, more enforcement, and more propagation of laws and codes. The price of all of this is forgone investments in other priorities such as health or education and fewer freedoms to exercise independent judgment. Given the growth of the networked organization, those societies that have a high degree of social trust have a natural advantage.
- › **Engagement:** Fundamentally, social capital is about engagement. We should consider reversing the trend of dis-engagement that is leaving people at home, alone, consuming materialism at a faster and increasingly dissatisfying rate. Companies play a role in this because the most common context for engagement is one’s work. Work is where most individuals will spend the majority of their time, and therefore fulfillment at work can deliver broader social benefits by combating social isolation, depression, and even crime. Failure to engage people to their fullest can create social externalities; jobs provide people with a broader purpose and identity in the world.
- › **Minimizing Externalities:** Markets should, over time, “price in” the costs of externalities that erode social (or natural) capital. More broadly, negative social externalities such as depression, anxiety, boredom, and crime are a threat to human sustainability because they erode the conditions which nurture resilient and secure individuals, families, friendships, communities and civil society.

III. Frameworks

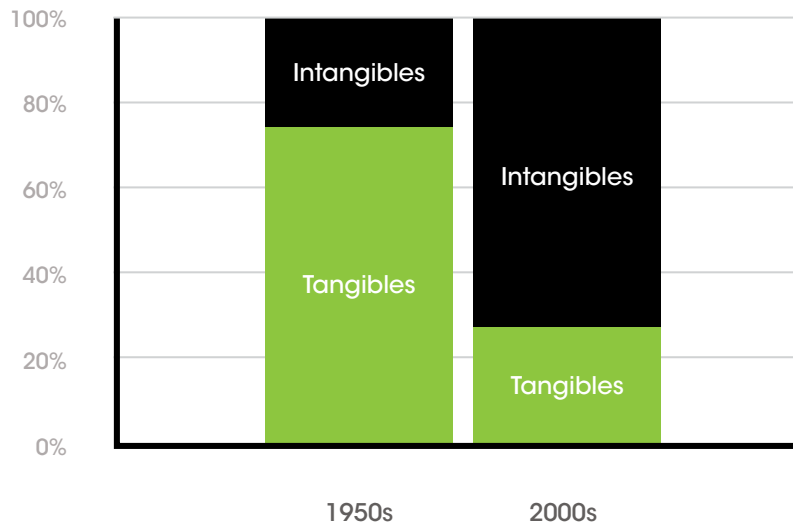
Management Quality – A New Company-Employee Contract

The Limitations of a Traditional View of Human Capital: In a knowledge-based economy, intellectual property and human capital account for more of a company’s value than physical assets. Experts agree that today, as much as 80% of a company’s worth is tied to human capital (compared to the reverse 50 years ago when 80% of a company’s value came from buildings, plant, land and inventory).

³ Fray, Bruno S. and Alois Stutzer.

5 | Real Needs at the Peak of the Economic Pyramid

Growth in Human Capital as a % of Company Value

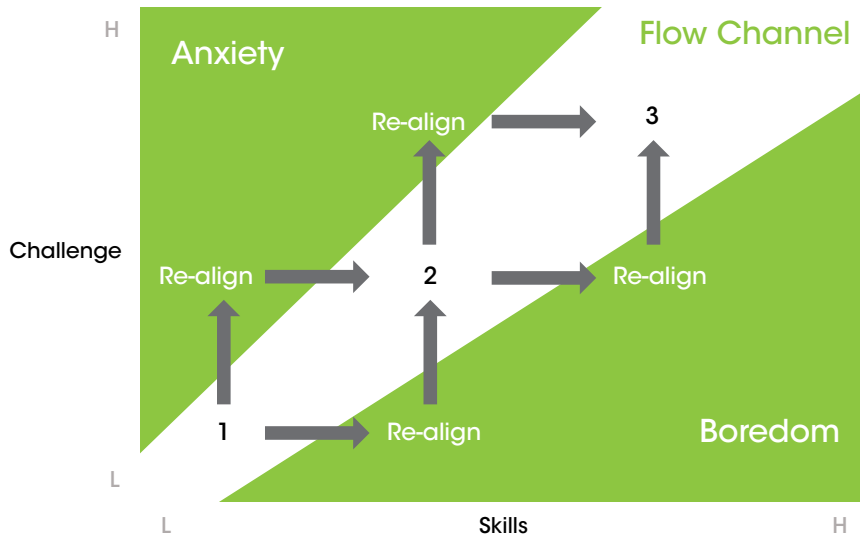


A successful company will unlock this potential, but there are few measures to monitor how they are doing this. Traditional metrics for understanding the value of a company's human capital management have fallen short of capturing what is most important. Such metrics have focused on ratios like employee ROI, employee value added, recruitment, retention and attrition rates, compensation, etc. While these metrics are useful, they do not reflect the fact that human capital is rented, not owned and high performance is more coaxed than coerced. We must realize that a company makes moral and implicit contracts with its employees, which makes the case for a more nuanced approach to understanding this relationship.

A New Model for Organizational Learning – “Flow”: In his book “Flow: The Psychology of Optimal Experience,” Mihaly Csikszentmihalyi describes the concept of “optimal experience” as a state in which, “people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it at great cost, for the sheer sake of doing it.”⁴ He describes this state as the flow experience.

⁴ Csikszentmihalyi, Mihaly. “Flow: The Psychology of Optimal Experience,” Harper & Row, Inc., New York, 1990.

Level of Fulfilment Increases with Flow



For any given specific activity, two things can happen. First, if a person's skills improve, he or she may become bored unless matched by the appropriate level of challenge. Second, if challenge increases, anxiety can result unless skills are improved in step. By maintaining the right challenge/skill balance, an employee can maintain the sense of flow, and therefore be pushed to higher levels of performance.

A New Company-Employee Contract: How can we, as investors, determine whether or not there is "values alignment" within a business and whether the senior management fundamentally views his/her employees as risks or opportunities? A new type of contract between companies and their employees will be one that attempts to address real needs by addressing *Meaning, Strong Leadership/Management, Aligned Incentives, Values & Spirituality, Identity and Diversity*.

A New Analytical Framework: There is a need for a competing framework to assess what is really going on between companies and their employees. Freada Klein, the Founder and Board Chair of the Level Playing Field Institute and human capital consultant for firms like Goldman Sachs, cites two of the limitations of traditional metrics as: 1) overemphasizing the costs of human capital (best practices, benefits, training, and recruitment), and 2) underemphasizing the benefits (greater productivity, lower absenteeism, higher quality output). Her recent research into why people leave companies reveals that many people simply do not want to check their values at the door and are looking for companies where they can bring their whole self and identity to work.

To better understand the way companies cultivate human capital, Generation has developed a MQ Best Practice Framework with respect to human capital. It includes lines of inquiry into the following areas:

- › Commitment from the Top: Leadership/Management
- › Work Environment: Structure/Inclusion, Culture
- › Career Development & Mentoring
- › Work-Life Balance

5 | Real Needs at the Peak of the Economic Pyramid

- › Process: Employee Surveys, Complaint Handling
- › Approach to Diversity: Training, Recruiting & Retention
- › Incentives: Compensation and Benefits

Business Quality – New Customers Understanding

New Values: In an age of plenty, customers are demanding more from the products and services they buy, putting the contract between companies and their customers under pressure. This is in part a result of our post-materialist economy. As one writer describes, “Society is undergoing a fundamental shift from ‘material want’ to ‘meaning want,’ with ever larger numbers of people reasonably secure in terms of living standards, but feeling they lack significance in their lives.”⁵

New Markets: Patricia Auburdene points to a specific demographic category, called “cultural creatives,” that consists of the 25% of the American population that is interested in health and spirituality, and searching for quality and integrity in the things they buy. These and other consumers place higher expectations on a company’s brand. The emerging health and wellness market is now estimated at \$99 billion in the U.S.

How can we build a stronger qualitative view of customer alignment? Will there be an *authenticity premium* for companies that address customer’s real needs? The following four real needs suggest areas where companies may deliver enduring value to customers:

- › **Simplicity:** Our corporate and economic system thrives on year-over-year increase in personal consumption. Consumption can secure business growth, attract new investment, and ideally match tax revenues to public service demands. However, it also encourages customers to consume more, even if it is better for them to consume less.
- › **Quality Leisure:** The category of “recreation and leisure industries” now accounts for a larger share of GDP than “petroleum and utility industries.” Companies that can free up time for people (with new technologies, information management systems) are valuable, but so too are the companies that can get people to use that free time for self-actualization (travel, social activities, family time, volunteering). Despite a rise in leisure hours, quality leisure time has become a luxury good and customers are willing to pay a premium for products and services that can deliver them quality experiences in their leisure time.
- › **Connectivity, Meaning & Relationships:** Personal relationships are one of the most important aspects of well-being and that they link us to a sense of a higher purpose. However, research suggests we are spending too much time increasing our economic wealth, rather than fostering these crucial relationships. For companies, it is no longer enough to create a product, a service, or an experience that is reasonably priced and adequately functional. Consumers are demanding something more—such as spirituality or emotion—as they seek fewer and deeper connections through the products and services they buy. Commitment and meaning are making a comeback, linked to the growth of the values-driven “conscious consumer” market.

⁵ Easterbrook, Gregg, “The Progress Paradox : How Life Gets Better While People Feel Worse,” Random House, New York, 2004, p.xix.

- › **Secure & Healthy Environment:** In the face of sustained environmental degradation, the consumer complacency of the last 40 years may be dissipating, especially as issues like climate change reach a tipping point in terms of public awareness. The link between an unhealthy environment and the health of its inhabitants is finally being internalized, albeit 35 years after Rachel Carson's *Silent Spring*. An unhealthy environment can jeopardize the health of its economy and of its inhabitants. For example, life expectancy in China has gone down over the last 3 years, predominantly because of air and water pollution.

IV. Sector Insights

Industrials

- › Demand growth in green building design will come from changing regulations as well as urbanization trends in developing countries.
- › Companies involved in ecosystem restoration and regeneration will become increasingly valuable as these services are "priced in" to investment decisions.
- › A commitment to climate change mitigation and transparent reporting will improve company reputation and environmental risk management.
- › Growth in demand for products to manage energy consumption and reduce environmental impact.
- › Demand-side efficiency, hybrid technology, renewables (wind, solar, bio-fuels, hydrogen) are other areas ripe for investors.

Financials

- › Certain financial products and services may address the progress gap by improving access not just to finance, but to other well-being aspirations such as home ownership, education, and health coverage.
- › Housing lending, affordable mortgage products, educational loans, and health insurance and savings products are sustainable financial services with growing demand.
- › For the bulge bracket firms, a new interest in sustainable banking will encourage companies to implement environmental and social risk management across the business, including in asset management, project finance, and M&A activities.
- › Philanthropic financial services may be a new growth area as wealthy families and individuals seek intermediaries to guide high impact philanthropic commitments.
- › Effective human capital management within financial sector firms will be a central to long-term value creation.

Consumer

- › Investment opportunities exist in growing area of healthy lifestyles and leisure, including travel and tourism.
- › As consumers become more aware of health issues associated with diet, issues like food safety, organic/fair trade, and sustainable agriculture may creep up the consumer agenda.

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- › Rising energy security coupled with climate change awareness will drive energy efficiency in the home, which is positive for companies that provide energy efficient products such as household appliances.
- › Demographics shifts and aging population in many developed countries may drive a demand for more meaning in consumption (brands linked to values, or products with social utility).
- › The rise of the conscious consumer has myriad implications for cause-related marketing and authentic goods and services.
- › Authenticity of content will be a dominant theme in value creation for media companies.

Healthcare

- › As incidence of obesity continues to raise awareness about ramifications of a poor diet and limited exercise, healthcare solutions such as diabetes control and weight management may experience strong demand.
- › As people take more control of their own healthcare responsibilities, areas such as alternative medicine, preventative action, and genetic testing may grow in popularity.
- › Life-saving drugs and devices will continue to grow in moderately protected niches as they provide a clear customer benefit.

Telecom, Technology and Software

- › Attractiveness of products with simple features associated with clean and green design.
- › As the Open Source movement grows, there will be opportunities for technologies or products that can knit closer ties across communities (virtual and real world).
- › Online services/remote education is an area that may grow to harness the power of online communities and collaboration.
- › Wireless connectivity, mobile and networked solutions will provide opportunities to knit people closer together even if they work/live further apart.

V. Conclusions

Common Purpose: If we accept that progress has lagged GDP, and that there is market demand for improvement, then we face an opportunity. We face both a market opportunity and social opportunity. Richard Layard argues in his book *Happiness* that “a society cannot flourish without some sense of shared purpose.” Social capital is enhanced when people feel they have a role in society. In the past few years, events like the Asian tsunami and September 11th may have started to shake the global indifference much of the world has experienced since WW II. The growth of the volunteerism movement in the U.S. also suggests that people are looking for meaningful ways to connect with causes rather than continue in a “conspiracy of silence.”

Growth Revisited?: By combining common purpose and a thirst for meaning, we can redefine the concept of growth. “What if a factory that makes textiles also purifies the water and makes oxygen?” asks architect and designer Bill McDonough. “What if we eliminate waste as a by-product of growth?” He describes a world in his book *Cradle to Cradle* where economic activity has no negative externalities, investments inspire common purpose, and communities derive meaning.

Business Leadership: Among corporate leaders, we are already seeing mobilization of business toward a common cause. For example, in the corporate sector, companies are designing products to enable their clients to compete in a carbon constrained world, they are combating disease through treatment and also through prevention, they are addressing the demand for quality food by sourcing local and organic produce, they are greening their supply chains, and they are making strategic philanthropic investments. While these initiatives are about making money for shareholders, they have the dual purpose of motivating staff, customers and communities to a broader purpose of business to address some of the world's biggest challenges.

6 | Water Perspectives: Investment Implications

October, 2006

I. Context

Synopsis: The complete version of this white paper is a product of a collaborative research process involving the entire Generation investment team. The paper looks at water issues from both a top-down and a bottom-up perspective. Topics covered include: macro issues (supply-demand imbalance, water rights and pricing), two country level case studies (China and the U.S.), and sector-specific discussions of desalination, bottled water, sustainable agriculture, water metering and efficiency, and ecosystem services.

Background: Against a fixed global supply of freshwater, population has doubled and water use has quintupled over the last century. With the global population expected to increase by a further 2-3 billion by 2050, will society be able to meet human demand for fresh water?

History is littered with examples of societal collapse due to neglect of natural resources such as water. As our ability to harness powerful rivers, tap aquifers, and treat and re-use waste water has increased, many regions have become complacent about water availability. This abundance has underpinned industrialization, 'fuelled' increases in per capita consumption, and has allowed people to live—even play golf—in previously uninhabitable areas. However, as population grows and water demand increases, this complacency will likely be shaken. More than half of the global population lives in countries with falling water tables. Three of the world's largest grain producers—China, India, and the U.S.—face some of the most severe water supply-demand imbalances. While the collapses of previous eras should be avoidable due to technological advances, basic lack of freshwater may constrain economic growth and affect human well-being, even in areas currently regarded as developed and economically strong.

Conclusions: The collision between our civilization and the hydrological system already is visible in certain areas of the world. Challenges related to the availability of clean water will likely become more pressing within the next 15 years—from an investment perspective this is relatively soon and therefore it is worth understanding how these challenges will impact companies and equity markets over time.

On a company level, the dynamics of water availability, price and quality can impact different points in their value chain, and some businesses are more vulnerable than others. To fully assess the water impacts on business, it is helpful to look at both direct and indirect water use along the full value chain. Going forward, there is enormous opportunity for investing in water solutions.

Sample Investment Ideas:

- › **Industrials Sector:** desalination (membranes); water treatment; wastewater management; infrastructure for storage/distribution (reservoirs, aqueducts, bladder transport); engineering/consulting services; pumps, piping and valves; demand-side efficiency (low flush toilets) and water meters
- › **Financials Sector:** water-related ecosystem service markets (clean water credits, wetland banking); real estate with fresh water assets; project finance for water projects; microfinance for water technology in emerging markets.

- › **Consumer Sector:** bottled water, water efficient household products; disinfection/ filtration/purification of drinking water; efficient irrigation systems and equipment for sustainable agriculture; drought resistant crops; water intensity of supply chain
- › **Healthcare Sector:** water intensity of operations; treatment for water-related disease; bio-prospecting in rainforests
- › **Telecom, Technology & Software Sector:** water metering and management; technology for mapping water resources; services for water utilities (such as billing); monitoring and testing equipment; automation systems; GPS for precision irrigation

II. Implications for Business

Macro Level Impacts

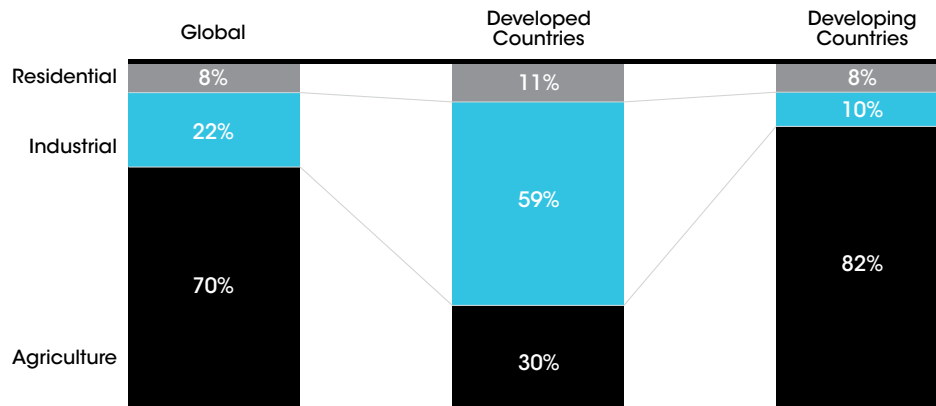
Our current water consumption habits will put 2/3 of the global population in 'water stressed' regions by 2025, meaning 3 billion people short of fresh drinking water.¹ The water challenge can be split into quantity (water availability) and quality (water usability) issues. Demand for water far outstrips supply in many parts of the world and this gap will grow in the future. Moreover, the quality of available water is getting worse which exacerbates the challenge. The question of whether and how to price water is rising up the political agenda as water infrastructure is failing in many regions of the world, mainly due to years of chronic underinvestment. It is yet unclear how our societies will pay for the huge investments required to refresh the global water infrastructure, not to mention the costs associated with maintaining the status quo. Already, lack of clean water and basic sanitation knocks at least \$556 billion a year off the world's potential economic growth, equivalent to 1% of global gross GDP.²

Water Quantity: With respect to quantity, water withdrawal has doubled from 1960 to 2000 due to factors such as population growth, rising water intensity of per capita food consumption (shifts to meat diets), energy production, growing urban and commercial demands, outsourced manufacturing to developing countries with less water, power demands, rising wealth and consumption (pools, golf courses). As developed economies have moved from agricultural to industrial economies, the balance of water consumption has changed. Some communities have been withdrawing water from aquifers at rates that far outstrip the recharge rates (parts of India), and other communities already have to transport water out of one watershed into another (China, Western U.S.). The proportion of water used by agriculture in developing countries is higher than in developed countries because commercial needs are still nascent. However, if they follow the path of developed countries, there will be even more competing uses for water resources.

¹ The United Nations

² The World Health Organization

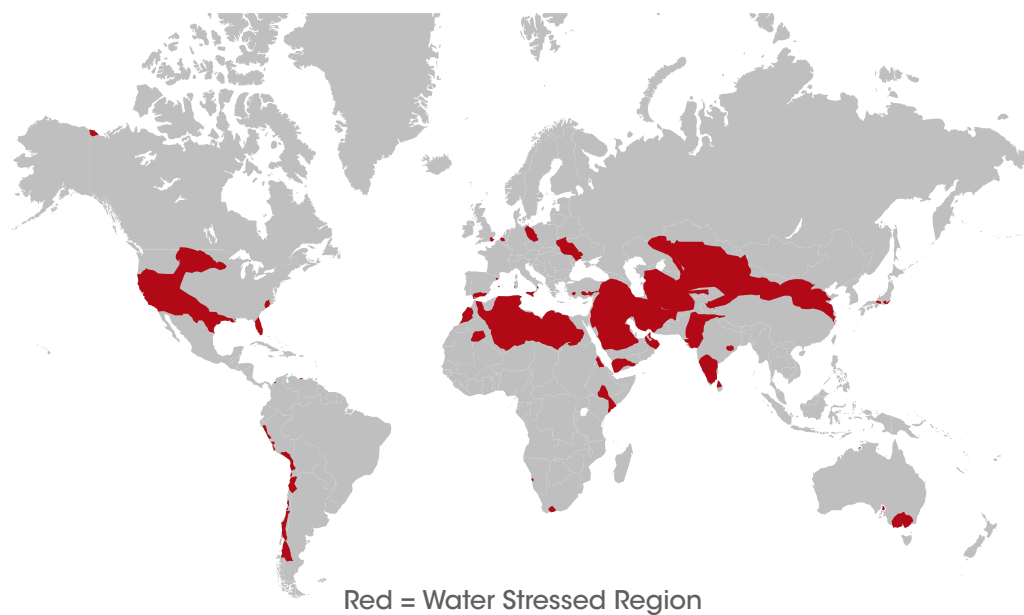
Chart 1: Global Profile of Water Users



Source: The United Nations World Water Development Report, 2006

Water Quality: In addition to the physical number of gallons available, there is concern over the quality of each gallon. Water courses now routinely contain household sewage, industrial effluents, and the sediments, nutrients and pesticides that derive from modern agriculture. *Indeed, if pollution keeps pace with population growth, the world will lose 18,000 cubic km of water by 2050—nearly nine times the volume of all countries now use for irrigation.*³ The consequence is that increasing pollution can render water effectively unusable even before physical scarcity bites. The losses are both environmental—damages to natural ecosystems and marine life—and economic—spoiled fisheries, lost water resources for downstream users and unusable places of recreation.

Chart 2: Map of Water Stress Regions by Watershed



Source: World Resources Institute

³ Comprehensive Assessment of Water Management In Agriculture. "Insights," Stockholm World Water Week, 2006

Country Level Impacts:

Even though people talk about a global water crisis, water issues are most often local and watershed-specific. Unlike global warming where a reduction in CO² in Brazil can offset carbon emission increases in China, water abundance in the Amazon basin is irrelevant to the *1.2 billion people who do not have access to clean drinking water and 2.6 billion who lack access to adequate sanitation*.⁴ Furthermore, the fragmented nature of water governance globally and regionally means that there is a high level of inertia in the system with respect to new investment.

Water Pricing: Another reason to analyze water issues on a regional level is because water pricing is highly contentious and depends on local context; it is unrealistic to think that water price increases will be politically or practically feasible in all areas. In most regions, prices do not reflect the true cost of water; water may be under-priced in developed countries and overpriced in developing countries. Despite a mis-match between supply and demand, people are resistant to increased taxes and usage fees—in part because access to water has traditionally been viewed as a basic human right. However, the age of readily available and clean water is coming to an end in some parts of the world. *But the question isn't really about the "end of water" or "peak water" but rather, water "at what cost"?* In developed economies, the mindset is beginning to shift from paying for water per se, to paying for water logistics and management services; effective water management may hinge on our ability to value water for its true or total cost. In developing countries, the context is very different since there are still over a billion people without access to clean drinking water, a violation of a basic human right.

Case Study: China

Although China is viewed as one of the engines of future global economic growth, it only has 7% of the world's freshwater to supply 22% of the world's population. There are chronic and growing problems with both the quantity of water available—particularly in the North—and the quality of water as China's rapid industrialization and imperfect regulatory and enforcement structures combine to create massive pollution problems. These issues are already creating health problems, economic losses, and agricultural and industrial disruption.

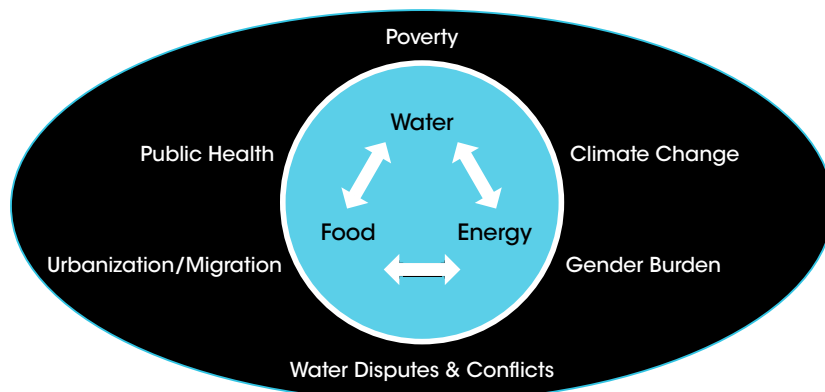
Case Study: Western U.S.

Water scarcity in the US is an emerging issue which may have implications for the agriculture, industrial, construction, and consumer sectors over the long-term. While the average global citizen needs 13 gallons of clean water a day (for drinking, cooking, and sanitation), the average American uses about 150 gallons per day for the same purposes. However, the question is not so much about the relative quantity used in comparison to the world average, but whether that quantity can be sustained by a healthy hydrological cycle, and be available at the right time, for the right use. While water issues play out on watershed basis, most water regulation in the US is managed on a state by state basis, making water management in the US a classic "tragedy of the commons" issue with certain areas like the Ogallala Aquifer, the San Joaquin Delta and the Colorado River in danger.

Systemic Level Impacts:

Water, Energy and Food are the three natural resources that humankind has relied upon for centuries to address its basic needs and their abundance has fuelled economic growth, stability, and prosperity.

Chart 3: Tradeoff Between Water, Energy and Food



First Order Impacts:

In the *near term*, technological advances are bringing these circles ever closer together. Where one or more of these resources are constrained, tradeoffs must be made.

Water and Energy: Just as energy is needed to treat and transport water, water is needed to produce energy. *Current electricity production from fossil fuel and nuclear energy accounts for 39% of all freshwater withdrawals in the U.S.*⁵ Gains in one rarely come without greater use of the other. Some activities—like accessing ever-falling aquifers, inter-basin transfers, and water bottling and delivery—require *more energy*. Other practices—oil sands exploitation, ethanol production—require *more water*. This vicious circle can have serious implications. The most significant way to avoid the usual tradeoffs is to reduce end-demand by increasing both water and energy efficiency. As traditional energy costs increase, clean water delivery becomes more expensive. Conversely, as water scarcity increases, energy costs may rise over the very long term. Water planners at the federal, state, and local levels have largely failed to consider the energy implications of their water investment decisions and vice versa.

Water and Food: Much like the water-energy overlap, food and water have competing dynamics. *According to the Millennium Ecosystem Assessment, global demand for food is projected to grow 70-85% by 2050, resulting in a 10-20% decline in forest and grasslands. The World Water Council says we will be 17% short of necessary water to feed our global population by 2020.* With fixed freshwater resources, this means that the agricultural sector will have to face the challenge of producing more food from less land, with less water. In certain areas like northern China, this challenge is already acute. Furthermore, as GDP grows, more and more people shift from grain-based to meat-based diets. This could have implications for crops, resulting in a food shortfall which may then burden the global food market.

⁵ Sandia National Laboratories. "Energy-Water Nexus Overview – US Energy Sustainability." www.sandia.gov/energy-water/nexus_overview.htm (Accessed August, 2006)

Food and Energy: Our technological advances are finding new ways to scale food energy for industrial/commercial use. The rise of ethanol as an alternative to oil is one example of the food-energy trade-off. As more and more crops are grown for fuel purposes, there is less land available for food production. The debate over farming intensification is highly relevant. While some biofuels are from lower-water intensive crops such as switchgrass, others like corn and sugar are more water intensive. The question of food allocation has shifted to whether the food supplied should feed the poor or fuel developed country automobiles.

Second Order Impacts:

There are several second order systemic implications of the Water-Food-Energy overlap that may become material to business *over the longer-term*.

Climate Change: Climate change may have a destabilizing effect on the world's water system. To date, our water treatment and management systems are based upon historically observed hydrological conditions that have generally been predictable. For example, U.S. municipalities depend on reliable weather patterns for sewage management; India relies on a predictable monsoon season to drive its economy. Climate change poses a new series of unprecedented challenges for the equilibrium of the global water system. The following climate factors exacerbate this challenge.

- › **Melting Glaciers may create an illusion of an abundance of water:** 40% of the world's population inhabits areas that live off of spring systems coming from Himalayan glaciers that are at risk of melting within the coming 50 years. *However, the short-term implications (flooding) may actually create the illusion of short-term abundance.*
- › **Changing precipitation patterns may affect the timing of delivery of traditionally expected rainfall and water events:** Precipitation changes will vary by region and runoff patterns are likely to be disrupted, increasing the intensity of droughts and floods depending upon the region.
- › **Change in location of rainfall:** There will also be (and have already been) abnormal shifts in the geographic distribution of rainfall. This will also affect growing seasons, often adjusting seasons just enough to change crop mix.
- › **The hydrological cycle is accelerating:** The overall "tempo" of the hydrological cycle is picking up speed as warmer temperatures increase evaporation and air holds more moisture, thus intensifying weather events.
- › **Increased evaporation:** The loss of lake ice cover in winter means that, without insulating layer, evaporation continues year round.
- › **Snowpack changes affect downstream water management:** Warming may change the mix of precipitation from snow to rain, preventing the build up of annual snowpack, which could deprive farmers of critical water supplies in the spring/summer.
- › **Flooding increases the salinity of aquifers:** In coastal areas, a rise in sea level from global warming will increase the saline content of freshwater aquifers near the coast.
- › **Eutrophication on the rise:** We now have two times as much nitrogen and three times as much phosphorous in our hydrological system in certain areas. The nitrogen cycle impacts the quality of the water cycle, and can contribute to a loss of marine life and species.

6 | Water Perspectives

Poverty: Water issues have direct and indirect poverty implications. One of the eight Millennium Development Goals is to “Reduce by half the proportion of people without sustainable access to safe drinking water” by 2015—*this means increase the number of people who have water supply by 1.6 billion (or 32%) and increase the number with access to sanitation by 2.2 billion (or 59%).*⁶ At the current pace, it is unlikely this goal will be met.

Gender Burden: The freshwater burden falls disproportionately on the poor, and even more so on poor women. In most developing countries, women carry out 80% of water-related work and are often responsible for managing their community’s water supply. And yet women have traditionally been isolated from decision-making and implementation of development programs in the areas of water and sanitation. Often the time spent on provision of water (up to 6-8 hours a day) takes girls away from school, thus forfeiting their education.

Public Health: *Every year 30 million get ill and 5 million people die of waterborne diseases such as diarrhea (the #1 water-related contributor to the global disease burden). Almost half of these deaths are children; 60,000 children die each day from lack of water and/or dirty water. Four billion people are still not connected to a sewage system.*

Urbanization/Migration: Today, half of the world’s population lives in urban centres. In most urban areas in low- and middle-income countries, between 25% and 50% of the population lacks provision for water and sanitation. *There are an estimated 25 million people displaced due to water issues around the world (a greater number than that of war refugees).* The number of these “water refugees” could rise to 100 million by 2025 considering the changes occurring in the Yellow River basin, the Ganges, and the Nile.⁷

Water Disputes & Conflict: *Sixty percent of the world’s population lives on one of 263 river basins shared by two or more countries, and the number of international water disputes is on the rise.* The most material implication for investors of the advent of increasing regional water conflicts is the impact on the civility of society. On a macroeconomic level, the rise of resource nationalism with regards natural capital is a very real trend and can only raise the stakes for geopolitical relationships globally.

III. Frameworks

Evaluating Direct and Indirect Water Impact on Companies

As the impact of global economic growth on the world’s water resources becomes clear, the focus is increasingly shifting onto the ability of companies to manage the risks associated with the management and consumption of this increasingly scarce resource. This section deals with a framework for assessing how a company’s financial performance and license to operate could be affected by issues of water scarcity.

Generally, companies are exposed to the following water-related pressures:

- › **Water availability.** Water may no longer be available to the company where it has previously been, or the available quantities for use may be restricted.

⁶ The UN Millennium Development Goals: www.un.org/millenniumgoals/

⁷ Myers, Norman. “Environmental Refugees: An Emergent Security Issue,” Oxford University, U.K., May, 2005

- › **Water prices.** Water prices may rise to reflect the ‘true cost’ of its use, including both the full cost of infrastructure and the cost of ‘externalities’ associated with water extraction.
- › **Water quality.** With growing demands placed on watersheds, water quality may diminish forcing companies to do more pre-treatment of water they use and more wastewater treatment of water they discharge.

I. Direct Water Use

Importantly these dynamics can affect companies at different points in their value chain. Most obviously, they can influence a company’s *direct use* (water used by the company’s own facilities). They can also affect the company’s *upstream* suppliers (water used by the company’s supply chain) and *downstream* customers (consumption of water associated with the company’s products). For the companies to whom water represents a substantial direct input, there are several sources of financial risk:

1. Immediate risk of supply interruptions if water scarcity occurs in regions where they have facilities;
2. Potentially rising costs from of water consumption;
3. Potential compromising of the company’s license to operate and generation of adverse publicity; and
4. Costs associated with falling water quality

II. Indirect Water Use

1. **Upstream Water Use:** Essentially, the same pressures that affect a company directly may also affect a company’s upstream suppliers. A potentially material and perhaps less well understood challenge for many companies relates to the externalities that are created when a company has a water-intensive supply chain (such as relying on agricultural inputs that require large amounts of water to grow).
2. **Downstream Water Use:** Although many companies have very low direct water usage and operate low water-intense supply chains, the consumption of their products may be closely associated with water. This may also provide risks and opportunities for these companies. Risks could include a drop in demand for their products as costs of water use become internalized (e.g. swimming pools). In addition to risks, water scarcity can also create a number of opportunities for companies that promote and support water efficiency. There are many companies that have products and services that directly provide solutions to water quantity and quality challenges worldwide.

Framework for Assessing Business and Management Quality Related to a Company's Water Use

	Business Quality – Minimized Exposure	Management Quality – Responsible Management
Indirect Use (Upstream or Downstream)	<p>Does the company draw water from sustainable sources?</p> <p>Are there growing future claims to the same water resources? Do urbanization and industrialization trends in the region threaten water quality?</p> <p>What are they paying for their water? Are regional or national governments discussing higher water rates, or water rates at all? Are infrastructure investments planned that would necessitate cost recovery through higher rates?</p> <p>What degree of 'pricing power' does the company have to pass on higher water costs to their customers?</p> <p>Does the company operate a brand that may be vulnerable to any misuse of water resources?</p> <p>Do supplier costs properly reflect upstream economic and environmental costs of water use?</p> <p>Are existing procurement patterns exposed to water shortages?</p> <p>Does the company's product add to or solve a water use pressure for its customer?</p>	<p>What measures are in place to monitor water use and watershed pressures?</p> <p>How can the company's water efficiency be improved, and how does it compare to their peers? What measures do competitors have in place?</p> <p>What efficiency gains are possible? How can processes, or even products, be changed? Can locations be moved easily?</p> <p>Who does management think the relevant stakeholders are for its water resource? How are they engaging with those stakeholders?</p> <p>Does the company consider water as part of long-term strategic planning?</p> <p>Does the company have a contingency plan if water quality/quantity is disrupted?</p> <p>How does the company monitor upstream and downstream water pressures affecting their stakeholders (i.e. suppliers, customers, governments etc)?</p> <p>Can the company improve the water-efficiency of its suppliers to reduce its own vulnerability? Should the company establish longer-term fixed contracts with less vulnerable suppliers even if it means less flexibility?</p> <p>Has the company considered investment in ecosystem services markets to protect valuable natural inputs?</p>

IV. Sector Insights

Industrials

- › **Desalination:** Now viewed as a solution to the water challenge in some regions, desalination also comes at a high energy price. Desalination directly addresses water scarcity, offers a clear growth trajectory, and provides recurring revenue opportunities and strong barriers to entry. However, the model is still evolving; in addition to its energy intensity, waste management is an issue, the projects are getting larger and more difficult to manage, complex financing structures are emerging, and there are still issues around corruption. Desalination is certainly not a panacea and should be analyzed within the regional/geopolitical context. Trends are emerging in dual-use plants for water and power, and in renewable energy options for desalination (such as solar-thermal or even nuclear) to reduce its overall carbon footprint.

Financials

- › **Water Financing:** There are a number of codes and conventions in place to guide how banks should undertake water financing projects by integrating social and environmental goals/imperatives into their internal processes to ensure franchise preservation and maximization of long term shareholder value. Strategic understanding, operational competence, and transparency and communication are important elements of project finance for water infrastructure deals. On the opportunity front, a new debt finance model might be required to mobilize the massive finance for water infrastructure which is needed, because existing financial mechanisms may be inappropriate.
- › **Ecosystem Services Markets:** The Millennium Ecosystem Assessment found that 15 out of 24 of the world's most critical ecosystem services are declining in productivity. Ecosystems are a crucial and fragile part of the human economy, especially when it comes to maintaining the balance of the hydrological cycle. Global Financials", third sentence: "Ecosystem service markets price specific ecological services—such as clean air, carbon, or wetlands—which provide clean and available water. Monetization of ecosystem services may be the only way to preserve them in the long run, yet many of these complex services lack a market price that reflects their full value. That said, market studies estimate the global ecosystem services markets—excluding carbon markets—today total \$11.35 billion dollars of regulatory driven and voluntary markets, including \$1 billion in water-related payments.

Consumer

- › **Sustainable Agriculture:** The use of water by the agricultural sector can be significantly improved through a mixture of policy change (pricing, international trade), change in practices (such as changes to farming practices, crop choices, and diets), and application of certain technologies (such as low-volume irrigation, precision farming, new seed varieties). To some degree, disparities in water for agriculture are alleviated by the international trade of food and crops. However, given that most countries prefer food self-sufficiency, water shortages in certain regions still pose serious threats. Moreover, even though international trade will likely increase, sudden failure of crop growth in certain regions may occur faster than the global system can accommodate, especially in light of climate change.

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- › **Bottled water:** Despite a perception of superior water quality, bottled water standards are variable across products and there is no single standard. However, bottled water is a large consumer market that is growing fast. Over the medium to long term, we expect the operating environment of the bottled water companies to evolve, including a rise in the cost of license to operate and perhaps price increases in the form of royalties or taxation of water extraction much like we've seen in the oil, gas, and timber sectors. Downstream, more clarity is required in labelling and marketing bottled water products. On the environmental impact side, the most material risk for the industry is landfill waste. While some companies are experimenting with biodegradable corn-based plastics, this trend is still nascent.

Technology

- › **Water Efficiency:** In many parts of the world, 30 to 40% of water goes unaccounted for due to water leakages in pipes and canals and illegal tapping. Domestic water metering and changing industrial processes are two areas of investment potential to promote conservation. However, increased metering could discourage suppliers from encouraging other demand-side efficiency measures (without price increases, efficiency measures may mean lower revenues for utilities). Efficiency improvements in industrial processes could also be a fertile area for investment. Water reuse remains one of the most robust sectors of the water business, and water recycling programs—from the domestic to the large industrial—are rapidly gathering steam.

V. Further Aspects

Water as a Basic Human Right: Water is a unique product—a ubiquitous, non-renewable, and simple commodity that is essential and irreplaceable for life. This aspect of the issue has huge implications for investors who seek to realise a return from the water sector because they must do so delicately. Water triggers a growing debate about selling public goods for private profit as some water-related ecosystem services and natural resources are transferred from public to private guardianship. With a broadened stakeholder group and growing allocation demands that range from suburban expansion to power generation, there is a need for new levels of transparency around water management. Water projects, like the Three Gorges Dam in China, have demonstrated the conflict between private and public interest in developing countries. Governments are facing more and more complex relationships with stakeholders around a resource considered by some as an economic commodity, and by others a basic human right. For companies, what is the extent of their obligation to deliver that right, and at what cost?

Infrastructure Investment Overdue: What is evident is the need for a massive improvement in the water infrastructure in both developing and developed countries alike. For example in the U.S., the Environmental Protection Agency's *2005 Needs Assessment* advocated for an investment of \$277 billion over the next 20 years for drinking water improvements alone—and this estimate has been creeping up. Other studies estimate a total of \$300 billion to \$1 trillion may need to be spent over the next 20 years to fully modernize global water systems.⁸ Despite the abundance of studies calling for massive capital investment, the real question is how much will *actually* be spent and how will it be unlocked? In addition to “how much” will be spent, the question of “when” is important given the high level of inertia of the water market.

⁸ Environmental Protection Agency; Congressional Budget Office. “Future Spending on Water Infrastructure,” January, 2003

Opportunities in Efficiency: The way in which society uses water will have a profound impact on the supply and demand balance and there are significant opportunities for improvement. For example, the difference between an ultra low flush toilet and a standard toilet is 22 gallons of water saved per day, or 8,000 gallons of water per family per year.⁹ Municipal water systems often treat all water to a drinking standard, though only a tiny fraction (1%) is consumed for drinking. Industry will have opportunities to invest in processing to minimize water use or maximize recycling abilities. Water efficiency (much like energy efficiency) is often overlooked as a solution because of ingrained habits and mindsets around free and unlimited use. It isn't enough to just say that a price signal would trigger more efficient water usage, but ingrained behaviours also have to change.

⁹ www.riversideca.gov/utilities/resi-ulft.asp

7 | Demographics: A Systems View

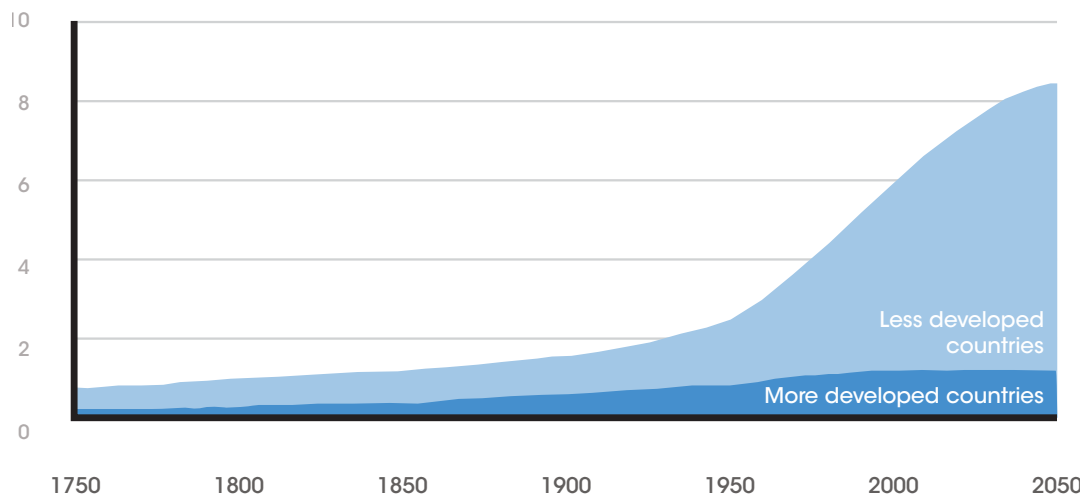
May, 2007

I. Context

Synopsis: The complete version of the white paper examines the implications of changing demographics for business, particularly in the context of five key drivers: 1) the rapidly aging population in many developed economies, 2) the youth bulge in developing countries, 3) the burgeoning levels of immigration and migration, 4) the changing role of women, and 5) pervasive urbanization.

Background: Every second, 2.5 people are being added to the global population, and demographers predict the world's population, which currently stands at 6.7 billion, will grow to 9.2 billion by 2050.[†] However, this growth will occur chiefly in the developing world, with many developed world populations smaller by 2025. This is because the demographic transition—which describes the shift from high mortality and high fertility to low fertility and low mortality—has been completed in most developed countries, but continues to be underway for most of the developing world. Ultimately, demographers will characterize the 21st century as a period of divergence between the mostly developed countries currently at their demographic peaks or in decline, and the mostly developing countries expected to hit the demographic “sweet spot” in the future. Moreover, while the absolute number of people in the world is growing, the rate of population growth has fallen dramatically.

Chart 1: Projected World Population



Source: UN. World Population Prospects: The 2006 Revision

[†] All demographic data in this report comes from the latest report of the UN's Population Division, *World Population Prospects: The 2006 Revision*, unless otherwise noted.

Conclusions: As demographers peer into the future, certain truths seem inevitable: people will live and work longer than ever, and an increasingly significant majority will live in the developing world. Increased immigration will result in heterogeneous, multicultural communities, and urban areas will play increasingly important roles in the global economy. Traditional social constructs of family and gender will change, and technology will become even more pervasive and ubiquitous. Climate change will continue to impose unexpected physical damage on the ecosystem, and the future of China and India, especially in the context of the resolution to their internal demographic tensions, will heavily influence global business.

Sample Investment Ideas:

- › **Industrials Sector:** upgrades to public transportation; sanitation/water infrastructure; home construction (pre-fab houses and “green buildings”); healthcare infrastructure (hospitals); clean energy and more efficient energy distribution; ecosystem restoration; sustainable agriculture
- › **Financials Sector:** microfinance and remittance products (for immigrant groups); affordable mortgages in the developing world; savings and investment products targeted at seniors in the developed world
- › **Consumer Sector:** wellness and anti-aging products (including nutrition, healthy foods); female retail (daycare, beauty and cosmetics, luxury goods and apparel, entertainment and travel, continuing education); tourism; base of pyramid consumer goods (nutrition and hygiene, food and clean water); ethnically-targeted products
- › **Healthcare Sector:** healthcare infrastructure; pharmaceuticals (generics, medical supplies, preventative testing, replacement surgery); expanded healthcare delivery for the developing world; treatment for diseases exacerbated by pollution (asthma), lifestyle changes (obesity), and climate change (malaria)
- › **Telecom, Technology & Software Sector:** software for sustainable urban design; green building technologies; open source; online education and distance learning; broadband and wireless connectivity; health related technology (hearing aids); electronic remittances

II. Implications for Business

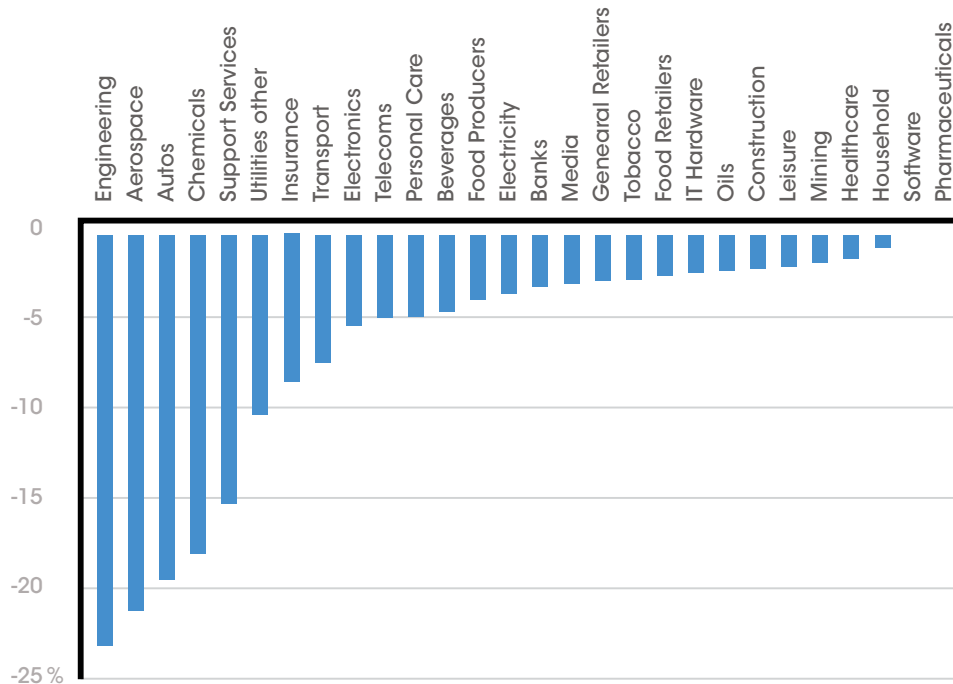
Demography is the ultimate “systemic” issue as human population growth takes place within a changing social, environmental, and geopolitical context. We see five categories of demographic drivers, whose implications will most significantly shape global markets over the next 5-50 years. These issues are inter-linked in most instances and the level of materiality varies significantly on a country- and company-specific basis.

Driver 1 – Aging Demographics in Post-Transition Populations: The 20th century transition to lower fertility and mortality has ignited an unprecedented growth in the number and percentage of elderly people. Globally, the number of persons aged 60 years or over is expected to almost triple, increasing from 673 million in 2005 to 2 billion by 2050. Although less developed countries will also experience dramatic growth in their elderly populations, it is in the developed economies that the situation will be most acute. In the US and Europe, the pension crisis will be bigger and more urgent than anticipated, and may destabilize companies in specific sectors as well as burden government systems. As people live longer, healthcare costs will skyrocket. The senior population will cause a boom in discretionary spending and leisure activities,

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and their concurrent interest in “generativity” may affect volunteerism and society at large. Meanwhile, the elderly will actively engage with technological innovations, and companies and researchers will target them both as consumers and users.

Chart 2: EU Sector Exposure to Aging: Percent of Pension Deficits Over Market Cap



Source: DrKW Macro Research,

Certain countries—including *Japan, Italy, South Korea, Mexico, and the United States*—will undergo a modified version of the aging crisis, but with very different ramifications for investors. Maintaining GDP momentum will be challenging for countries like Japan and especially Italy, where the aging crisis is most severe. Yet in countries like South Korea (which is rapidly aging), the economic ramifications of a declining workforce population could be offset by productivity gains made possible by ongoing investments in high technological literacy and broadband penetration. In Mexico and the US, the domestic economy will likely also prove resilient to aging in the near term, though for different reasons. In the US, above replacement fertility (the highest among developed economies), coupled with high levels of immigration, should enable the country to maintain its current status as the world’s third most populous country even into 2050.

Driver 2 – The Youth Bulge and Impact of Dependency Ratios in the Developing World: The “demographic window of opportunity” suggests that a country is likely to see acceleration in productivity based on low dependency ratios, which result from a low number of economic dependents (those under the age of 15 or over the age of 65) per capita. While this window has closed on countries like Japan, parts of India, Latin America and Africa will enter their “demographic sweet spot” in the future as large youth populations reach working age. In order to capitalize on this opportunity and absorb the youth bulge, countries must invest in the education needed for labor force participation, and ensure employment opportunities for young people. In the Middle East, inadequate investments in these two areas could

lead to the increased alienation of younger segments of the population. For an already volatile region, an unsupported youth bulge offers the potential for civil unrest and violence.¹

Sub-Saharan Africa, Vietnam, Ireland and Pakistan depict the opportunities and challenges associated with youth bulges. Ireland exemplifies the potential benefit that comes when a sizeable youth bulge reaches working age. Its recent economic growth is often attributed to an optimal dependency ratio, due to rapid fertility decline that followed the legalization of birth control in 1979. Vietnam must capitalize on the opportunities associated with its currently swelling working-age population, or watch its own demographic “sweet spot” go sailing past. Meanwhile, Pakistan’s lack of a fertility transition has left it with a large youth bulge in need of education and employment. Finally, Africa’s seemingly uncontrollable demographic (in many countries, the demographic transition has not even *begun*) poses significant security and humanitarian challenges that will only increase in the future.

Chart 3: The World’s 10 Largest Countries in Population

2007		2050	
Country	Population (millions)	Country	Population (millions)
China	1 328 630	India	1 658 270
India	1 169 016	China	1 408 846
United States of America	305 826	United States of America	402 415
Indonesia	231 627	Indonesia	296 885
Brazil	191 791	Pakistan	292 205
Pakistan	163 902	Nigeria	288 696
Bangladesh	158 665	Brazil	254 085
Nigeria	148 093	Bangladesh	254 084
Russian Federation	142 499	Dem. Republic of the Congo	186 837
Japan	127 967	Ethiopia	183 404

Source: UN. *World Population Prospects: The 2006 Revision*

Driver 3 – Increasing Levels of Immigration and Migration: Exacerbated by income disparities between the developing and developed worlds, immigration levels are projected to rise. Between 2005 and 2050, the major net recipients of international migrants are expected to be the US, Canada, Germany, Italy, the UK, Spain, and Australia (listed according to the size of the increase). Meanwhile, China, Mexico, India, the Philippines, Pakistan, and Indonesia will be the most common source countries (listed by the size of the outflow). The demand for cheap labor in the developed world characterized by the “4 D’s”—dirty, difficult, dangerous, demeaning—will increase, even as political migration and asylum applications decline. As governments try to prevent these migratory patterns, human trafficking and related abuses may grow. “South-to-South” migration (that is, immigration between developing countries) will continue to open up new economic corridors, but these low-skilled workers are increasingly forced into exploitive labor conditions. For source countries, the brain drain remains a threat; however, financial and social remittances from diaspora communities are three times the level of official development aid, and can often spur economic growth. In areas like Sub-Saharan Africa, the brain drain of critical personnel—especially doctors—may

¹ World Bank. *World Development Report 2007: Development and the Next Generation*

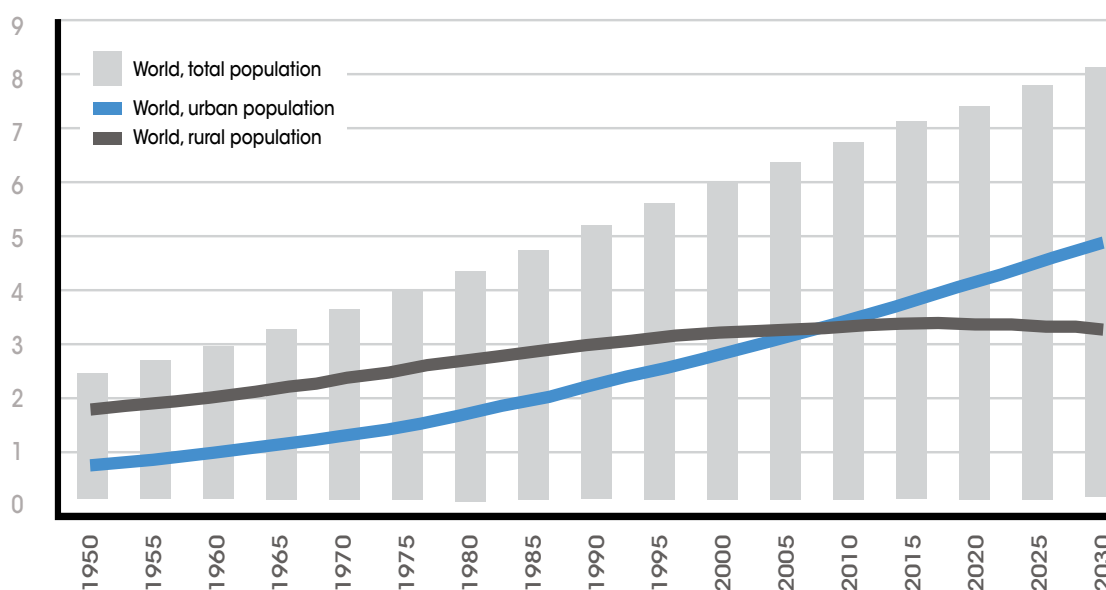
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be detrimental to regional prospects. In the developed world, immigration is no panacea for fertility decline and may spark social and political tension. Moreover, expect no easy resolution to xenophobia, cultural nationalism, and questions over assimilation.²

Driver 4 – The Evolving and Critical Role of Gender: Women, of course, play a crucial role in global demographic change. In the developing world, female empowerment inversely correlates with fertility. In the developed world, female labor participation is a potential mitigating factor to the aging dilemma. Businesses are already recognizing the growing importance of “womenomics,” and the rise of women as workers, consumers and investors. Socio-cultural changes have propelled a drop in the average age of puberty, and new social, occupational, and even spatial (community planning and development) pressures are changing the modern family structure. In countries like Japan, increasing female labor force participation could offset many of challenges posed by inopportune dependency ratios and an aging workforce, but only if supported by appropriate policies.

Driver 5 – Ubiquitous, Fast-Paced Urbanization: Urbanization will be a universal top-line trend in most societies of the future. 2007 marks the first year world population is more than 50% urban; by 2025, nearly 60%—some 3.9 billion people—of the total world population will live in cities. Housing shortages worldwide will require tremendous resource investment, especially in the developing world, but will only be addressed with supportive political and financial structures. The trend towards more sustainable cities will open up pockets of investment in green building design, sustainable mobility, and design for the public space. Urban areas will be hotbeds for certain public health challenges, especially in developing economies. Although urban areas have the potential to be more eco-friendly, cities pose various challenges. As seen in New Orleans, socioeconomic stratification can be devastating, and in Europe the cultural “ghettoization” of Muslim communities and failures of integration threaten countries with instability, unrest, and even terrorism.³

**Chart 4: The Urban and Rural Population of the World
1950-2030**



Source: United Nations Population Division, World Urbanization Prospects

² United Nations Population Fund (UNFPA). *State of the World Population 2006: Women and International Migration*

³ UN. *World Urbanization Prospects: The 2005 Revision*

Case Study: The Divergence Between China and India

No discussion of demographics would be complete without an investigation of the world's two largest countries. China and India might be the two economic engines of the future, but they exhibit widely divergent demographic structures. A comparison reveals China's rapidly aging population in polar contrast with India's young population and ascendancy to what will likely be its *permanent* position as the world's largest country in 2030. Within a few decades, China's population will peak, and by 2040, decline; meanwhile, India's population will continue to grow through 2050. 75 percent of Indians live in rural areas, and only 11% live in cities. China, on the other hand, is 47% urbanized, and will be 55% urbanized by 2020. By 2025, 70% of Indians will be of working age (up from 61% in 2005); meanwhile, within a generation, China will have an older population than the US, and its working-age population will peak in 2015. What does this mean for each country and what are the implications for the global economy?

Demographic Stress on “Eco-Infrastructure”: In addition to thinking about drivers of demographic growth, investors should also consider the consequences of growth. Along with the population explosion of the 20th century, there has been a dramatic change in the relationship between humankind and the planet. The rise in population is directly linked to an increased demand for increasingly scarce natural resources—food, land, water—and the advancement of science and technology have, so far, increased both the likelihood and magnitude of unexpected consequences.

III. Frameworks

Business Quality – Demographic Exposure of Business

Across sectors, companies will have different demographic vulnerabilities—ranging from growing pension liabilities to a shrinking or expanding customer base due to age characteristics or migration patterns. For example, what level of dependence does a business' supply chain have on areas of demographic stress, and what is management doing to mitigate or monitor those risks? Additionally, many multinationals will be impacted by the intersection of several of these trends and will discover new opportunities for products and services.

Chart 5: Demographic Drivers and Their Impact on Sectors

	Industrials	Financials	Consumer	Healthcare	Tech
High	Urbanization	Aging Urbanization	Aging Gender Urbanization	Aging Urbanization	Urbanization
Medium	Aging Youth Bulge Migration	Migration Gender	Youth Bulge Migration	Gender Youth Bulge Migration	Aging Youth Bulge Migration
Low	Gender	Youth Bulge			Gender

Management Quality – Demographic Preparedness

Good management teams will understand the impact that emerging demographics will have on their businesses. In different sectors there are distinct issues that should be monitored on an ongoing basis, while a number of broad concerns apply for nearly all investors. Whether or not a company is engaged in scenario planning with respect to demographics can be a good indicator of management quality by demonstrating preparedness.

Lines of inquiry that may reveal management awareness of the issues relating to demography include:

- › How do they see their susceptibility to aging and pension crises? What life expectancy assumptions are being used by companies for pension planning? Are they concerned about exposure to countries with particularly pronounced aging vulnerability?
- › How do they plan to capitalize on urbanization trends? What are the opportunities and risks associated with rapid urbanization in their key markets?
- › Does the company have any gender or age-focused products? How do they see these groups as they relate to their business? How does the company incorporate shifting demographic profiles of its own consumers? Do they consider the ramifications of changing demographic patterns, such as the emergence of significant foreign or ethnic populations as a result of immigration?
- › Does the company have products for an aging segment such as estate planning, and/or philanthropic giving?
- › Is the company involved in the construction boom in the developing world, and if so, what are its risk-management practices, especially with respect to corruption and bribery?
- › How does the emergence of developing-world consumers (base of the pyramid) affect business? How does the company innovate products for developing world consumers?
- › If the company is involved in healthcare, how significantly will increasingly older populations and skyrocketing healthcare costs put downward price pressure on medicine? Is there a way to capitalize on the health challenges that affect whole segments of the population?
- › How will technological change be driven by the emergence of powerful new demographic groups, be these aging segments or youth bulges?

IV. Sector Insights

Industrials

- › Urbanization will require major infrastructure improvements, as well as eco-efficient construction and green design for more sustainable cities.
- › Transportation infrastructure will need to adapt to increasing volumes, higher energy costs, and the desire for less pollution. Specific infrastructure changes include: construction and housing; water production, distribution, and treatment; waste management; energy distribution and generation (particularly clean energy or renewables); ecosystem services and sustainable agriculture technology; urban regeneration and construction of public buildings, such as schools and hospitals.
- › Although the developing world will likely see the biggest housing boom from its youth bulge, the developed world will also have greater demand for houses as the percentage of single-person households, particularly in urban areas, drives construction (even as population growth slows).
- › Many of the sub-sectors most exposed to pension deficits are in the industrials area, including engineering, aerospace, autos, and chemicals.

Financials

- › New financial products targeting emerging demographic cohorts, especially the elderly and women, may be lucrative.
- › Networks and mechanisms for the transfer of remittances will be in high demand. International transfers between immigrant diaspora communities and home countries will likely increase, as will demand for new models of community banking for migrant communities (in addition to financial services for first and second generation immigrant groups).
- › Affordable mortgages and other financing for housing, microcredit lending, and savings products for the developing world. In the Muslim world, Sharia-compliant investment and financial products.
- › Lending facilities to support infrastructure development and mortgage/microfinance products for the housing boom.

Healthcare

- › In areas with aging populations, healthcare infrastructure and investment will grow, as will demand for health-related products. Growth areas include replacement surgeries, less-invasive screening procedures, preventative testing, medical supplies, and devices.
- › In the developing world, cheap models for healthcare delivery, whether through more efficient infrastructure, open source knowledge systems, or cheaper medicines.
- › Increased immigration—as a vector for disease transmission—will likely require different healthcare responses. Digital health records and easy screening, testing, and treatment for communicable diseases will likely be in high demand.
- › Products to address health problems resulting from certain demographic trends that lead to sedentary and/or unhealthy lifestyles (such as obesity).

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Consumer

- › The boom in discretionary spending from seniors could see gains for the tourism and travel sector, as well as retail, beauty, health and wellness, cosmetic, and luxury goods companies that target the sector.
- › As people live longer, and pension benefits are reduced, expect the rise of an “elderly proletariat,” for whom low-cost consumer goods will be most important. Optimism over the boom in spending caused by an aging population needs to be tempered by a recognition that many of these seniors might have very low incomes, and that in many sectors—particularly retail—older people buy less.
- › Demand at the base of the pyramid—particularly given the youth bulge in many of these countries—will be strong. Products that meet basic needs will be in high demand.
- › As diaspora communities grow, national brand loyalties could drive consumer behavior. Immigrant communities will require different consumer products, and global brands and international media-delivery platforms should benefit from cross-border buyers.
- › As populations become more urbanized, consumers tend to become more globally sophisticated in their behavior, particularly in their appetite for global mass-media and entertainment, and international brands. There will be explosive growth of localized media in many countries with youth bulges, especially those in the Muslim world.

Telecom, Technology and Software

- › In countries with aging crises—such as South Korea or Japan—technology may be used to offset the impact of high dependency ratios. By enhancing productivity, and in some cases performing tasks previously delegated to workers, technological offerings can offset workforce decline.
- › The healthcare industry could benefit from cost savings from technology platforms, especially in their capacity to share, collaborate, and access data (both medical knowledge at large as well as patient histories).
- › Technology platforms for outsourcing and human capital management will become more important as workforces become more global and dispersed.
- › Increased urbanization, immigration and development all predict further penetration of information and communication technology, and transnational collaboration tools—whether in the form of VOIP or virtual communities—will be even more pervasive, as will broadband and wireless connectivity.

V. Further Aspects

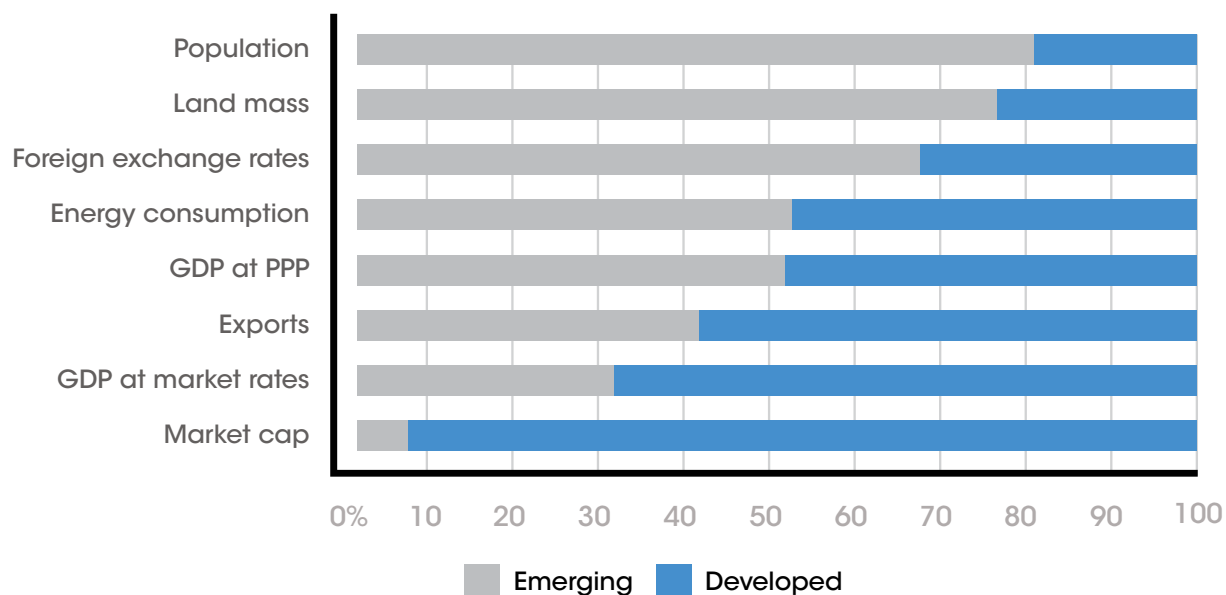
Demographic projections, of course, are not always accurate. Any significant variances in future growth models would likely come from the rate at which transitioning or pre-transition countries complete the conversion to low fertility/mortality, and the magnitude of further increases in life expectancy.

Life Expectancy: In the past few decades, life expectancy has soared at an unprecedented rate, far beyond the consensus estimates of most demographers even a few decades ago. Official projections assume that this strong growth will continue in the near term, but do not consider the historic growth rate in life expectancy to be sustainable. However, there is a body of opinion that argues such official projections are, as ever, far too conservative about what may happen to life expectancy in the future. What if the

historical growth rate were to continue? Further increases to human longevity have the potential to radically alter current economic projections, especially in the context of the aging crisis. What happens, for example, if the average life expectancy rises to 90 or above by 2020? And what about the distribution of this cohort—will most people live to be 90, or will there merely be a significant number of outliers living well past 100? Further increases in longevity would require significant resources, especially should these increases be merely in raw life expectancy and not mental acuity or functional capacity. The ability of technology and medicine to extend life may be positive for individuals but negative for society as a whole.

Development of the Developing World: Although significant challenges remain—including the increasing inequality gap—demographic projections offer hope that the developing world will likely play a greater role in the economy of the future. As developed economies grapple with their aging demographics and declining populations, they will confront two fundamental questions: Who will produce the goods they demand for consumption? And who will buy their assets in exchange for this production? Throughout history, the “old” have sold their assets to the “young” in exchange for goods and services. In the future, the US and other contemporary GDP leaders will sell their tremendous assets to the rest of the world, who will in turn provide the goods their aging populations will demand. GDP per capita is going up in the developed world, but the workforce is in retreat. One result is the relocation of the factors of production to the developing world, which represents an important shift. By the middle of this century the biggest markets will be in developing countries. For long-term investors, understanding this transition will be essential.

Chart 6: Emerging Economies as a Percentage of the Total World



Source: Merrill Lynch calculations, BP, IMF, MSCI

Generation Investment Management LLP
4 Cork Street
W1S 3LG
U.K.

Main: +44 (0) 207 534 4700

www.generationim.com

