



Information Technology and Sustainable Development

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Sustainable Development

(and its implications for business)

“Beyond greening lies an enormous challenge - and an enormous opportunity. The challenge is to develop a sustainable global economy: an economy that the planet is capable of supporting indefinitely. ...

The achievement of sustainability will mean billions of dollars in products, services, and technologies that barely exist today.”

Prof. Stuart Hart, Univ. N. Carolina Business School



The Market Driver for Sustainability

$$\text{Impact} = P \times A \times T$$

Population: 6 billion now; 8-11 billion by 2050

Affluence: must rise by ~5x to stabilize population at 2x
20% of the people now use >80% of the resources

Technology: must improve by 10-20x or more to keep
impact at an acceptable level

Technology means **products, services, and business models**: the efficiency by which affluence is produced.



The Sustainability Market

*Reducing life cycle impacts
in the developed world*

*Avoiding the collision course
in the emerging economies*

(1 billion)

(2 billion)



- Highly innovative technologies that disrupt and ultimately displace mature industries (e.g. the “hypercar”: conventional price/performance at 200-300 mpg)
- Provide materials in a service business model (“what you market is what you sell”)

- Similar to developed world, but with an urgent need to avoid the wasteful earlier steps
- Supply basic resources (food, water, clean air)

(3 billion)

Meeting the unmet needs of the survival economies

- Rethink business models to provide services in a “down-market” setting
- Microcredit financing (e.g. Grameen Bank)

From Stuart Hart, Univ. N. Carolina





The Fundamental Global Ecosystem Threats

Most important:

- Atmospheric CO₂ and other global warming gases
- Land-grown food (and associated soil loss, water use, and pollution)
- Water (and effects of diversions)
- Species habitat loss due to human appropriation (urban and agricultural)
- Fisheries
- Forests

These issues are global in reach; they currently endanger the viability of interdependent ecosystems whose health is vital to the entire planet.

Less important:

- Mining
- Low levels of hazardous chemicals
- Air pollution, low level water pollution

While important, these threats have a lower degree of immediacy, and typically more localized impact.

Relatively unimportant (and will be eliminated by solving the others):

- Waste disposal; recycling to reduce landfills





The State of the World's Ecosystems

Water:

- ◆ Humans use 54% of accessible freshwater flows (70% of it for agriculture)
- ◆ 1/3 of world population is experiencing moderate to severe water stress (consumption exceeds 20% of supply)
- ◆ At least one billion people are without safe drinking water
- ◆ Cost of new supplies is on average 2-3x that of existing investments

Agriculture:

- ◆ 20% of earth's surface is covered by crops, pasture, or urban-industrial infrastructure
- ◆ ~50% production increase required for medium-range population growth by 2027
- ◆ Yield increases from genetics are slowing down

Fisheries:

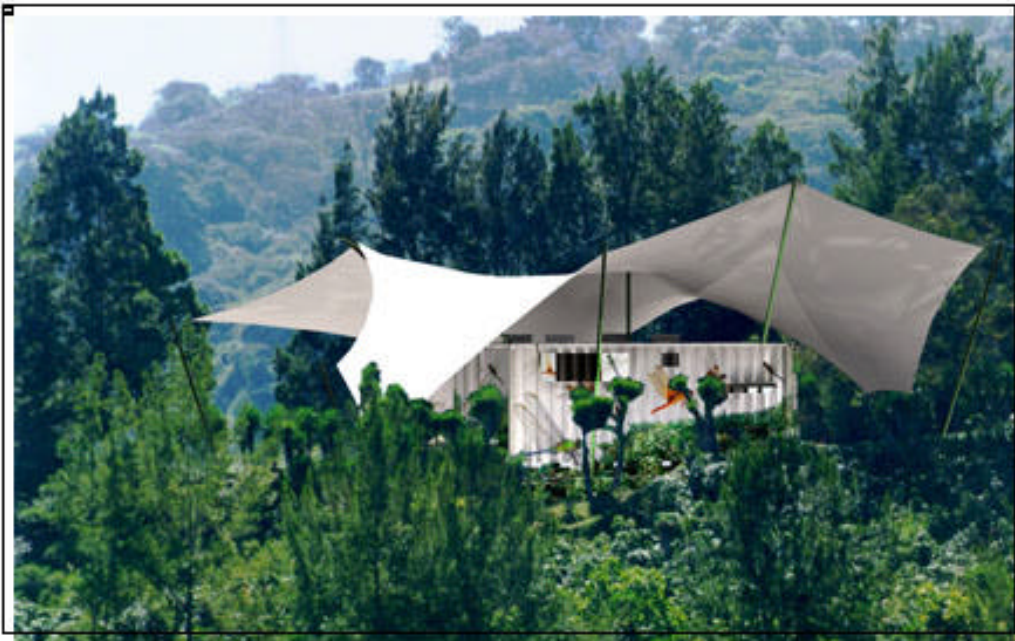
- ◆ Constitute the major protein source for 1 billion people; 20% of all animal protein for humans; demand is rapidly rising (nominally 50% more by 2010)
- ◆ Half of fish stocks are fully exploited; 22% overexploited

Forests:

- ◆ 1/5 of tropical forest area was cleared between 1960 and 1990
- ◆ The major causes of deforestation are subsistence farming and conversion to ranching
- ◆ Paper is ~10% of forest product use, but has grown 300% in the last 30 years



LINCOS (Little Intelligent Communities) or “Unwiring the World”



Industrial partners:
Hewlett-Packard, Tachyon,
Microsoft, FTL Happold,
Northsails, UTC, Becton-
Dickenson, Wyle, V-Tel



**Foundation for Sustainable Development of Costa
Rica (former President Jose Maria Figueres)**
Institute of Technology of Costa Rica
MIT Media Lab
University of Rochester



Digital Town Centers

- 8-10 Computers
- 2 Printers, 2 Scanners
- Cell phone base station
- Smart card reader
- Medical diagnostic bay
- Analytical equipment
- External large screen
- Satellite connection



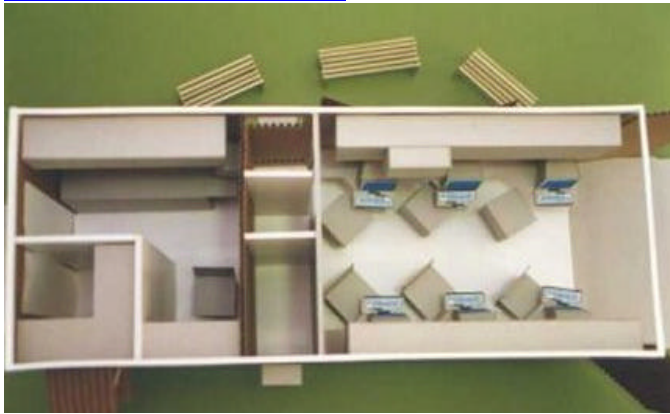
- Community owned
- Provides services for fee to business, government, individuals
- True “Town Center”: symbol of community pride and status

Purpose: to provide a multi-purpose information center for isolated regions, with high-speed (40 Mb/s) internet access and integrated local wireless communications, at affordable cost for developing nations

Telemedicine
Agricultural extension services
Environmental monitoring
Education

Computer Lab
Electronic Commerce
Banking
Digital Services





History and Status

◆ **HP donated computers, printers and scanners for two demonstration units;** displayed at MIT (30 Mar 99) and at ITCR in Costa Rica (21 Apr 99).

- ◆ Dominican Republic ordered 30 units; 5 will be installed in December 99
- ◆ Negotiations with El Salvador progressing
- ◆ Meeting at MIT (Aug 99) to discuss business applications and telemedicine

◆ **Agilent participation**

- International Business Development (Health Services Group)
- Latin America Operations
 - Technology, applications
 - Health monitoring products
- Agilent Labs
 - Advanced technology (lower cost; Point of Care diagnostics and therapies; information management)

◆ **HP participation**

- Strategic Business Development (Inkjet Imaging Systems)
- Investigating the establishment of a LINCOS-dependent business in Costa Rica (a pilot that can be easily replicated and expanded), with emphasis on business incubation and entrepreneurial development



Distributed Digital Services in Developing Countries



- Government
- Hospitals
- Hospitals
- Large Companies

E-services network

Entrepreneurial training and business development

Digital Town Centers in non-urban areas

Education

Healthcare

Finance

Agriculture extension

Environmental monitoring

Outsourced digital services

Small industry process control

Small business IT support

- Locally owned/operated businesses and government or NGO-driven services will be initially established by *entrepreneurial consultants* HP/Agilent derive fees for service.
- Value will be enhanced by unique *physical technologies* (health diagnostics, agricultural & environmental sensors, wireless communications, industrial automation) and by *E-services* (*digital image and information management, remote applications, portals*)



The Role of Sustainability in a Corporation

“Doing Good”

“Doing Well”

