History of ICT in Sri Lanka and Lessons for the Future

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Distinguished Guest Professor, Peking University, China**

Video Interview by
**Aruni Goonetilleke
Colombo, Sri Lanka, 31 August 2016**

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A NATIONAL COMPUTER POLICY FOR SRI LANKA (COMPOL)

Report of the Special Presidential Committee of the Natural Resources, Energy and Science Authority, Colombo, Sri Lanka

to

His Excellency J.R. Jayewardene

President of Sri Lanka

April 1983

1983

MEMBERS OF SPECIAL PRESIDENTIAL COMMITTEE ON: NATIONAL COMPUTER POLICY FOR SRI LANKA (COMPOL)

Dr M. Munasinghe, (Chairman)	Senior Energy Advisor to HE the President
Mr R. B. Ekanayake	Bank of Ceylon
Dr N. W. N. Jayasiri	NIBM
Mr Ajit Kanagasundram	Central Bank
Prof. S. Karunaratne	U. Moratuwa
Prof. V. K. Samaranayake	U. Colombo
Mr N. U. Yapa (Secy.)	NARESA

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A NATIONAL TELECOMMUNICATIONS POLICY FOR SRI LANKA

Report of the Special Presidential Committee on Telecomunications

to

His Excellency J.R. Jayewardene
President of Sri Lanka

July 1985

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1985
MEMBERS OF SPECIAL PRESIDENTIAL COMMITTEE ON NATIONAL TELECOMMUNICATIONS POLICY FOR SRI LANKA

Mr. K.K. Gunawardena SL Telecom. (Chairman)

Prof. K.K.Y.W.Perera — Sec/Min. Power & Egy.

Dr. Mohan Munasinghe — Senior Energy Advisor to HE the President

COMPOL Report was presented to H.E. President J.R. Jayewardene in April 1983. (L to R) COMPOL Members: N.W.N. Jayasiri, Sam Karunaratne, Ajit Kanagasunderam, Mohan Munasinghe (Chair): and R.P. Jayewardene (Chair, NARESA).Prof. Munasinghe was first requested to prepare this report in December 1982 – the document was completed quickly in 4 months!

CHAPTER III

NATIONAL COMPUTER POLICY GUIDELINES

3.1 General Philosophy

The Committee is of the view that computer policy guidelines to achieve the above objectives should be both broad and flexible, given the wide and rapidly evolving nature of the computer field. Government policy should seek to guide, encourage and support the many public and private entities involved in the area of computers, rather than control and over-regulate, and thereby effectively stifle their activities. Furthermore, the policy guidelines indicated below are only a starting point. They should be monitored, interpreted and modified when necessary, on a continuous basis, to reflect future changes in both the national socioeconomic and political environment as well as technological trends.

COMPOL included extensive literature search & dialogue with experts from other countries. At the time, there were very few nations who had thought of computer policy. We started from a long-term development policy view and adapted technology to suit our needs. Teamwork outstanding – no prima donnas!

COMPOL: GOALS OF NATIONAL COMPUTER POLICY

The broad objectives of a national computer policy for Sri Lanka included:

a) **Harness all aspects of computer technology for the benefit of the people of Sri Lanka, and to further socio-economic development of the nation**

b) **Improve the quality of life of the people of Sri Lanka, including the job satisfaction and working conditions of employees.**

c) **Increase the flexibility and dynamism of Sri Lankan society to enable it to successfully meet the challenges of the future, arising from the ever increasing pace of worldwide scientific and technological advances.**

d) **Promote and guide the development of computer related resources and their application, to anticipate and meet the future needs of the national economy.**

e) **Enhance and supplement manpower resources and increase efficiency and productivity of management and workers at all possible levels.**
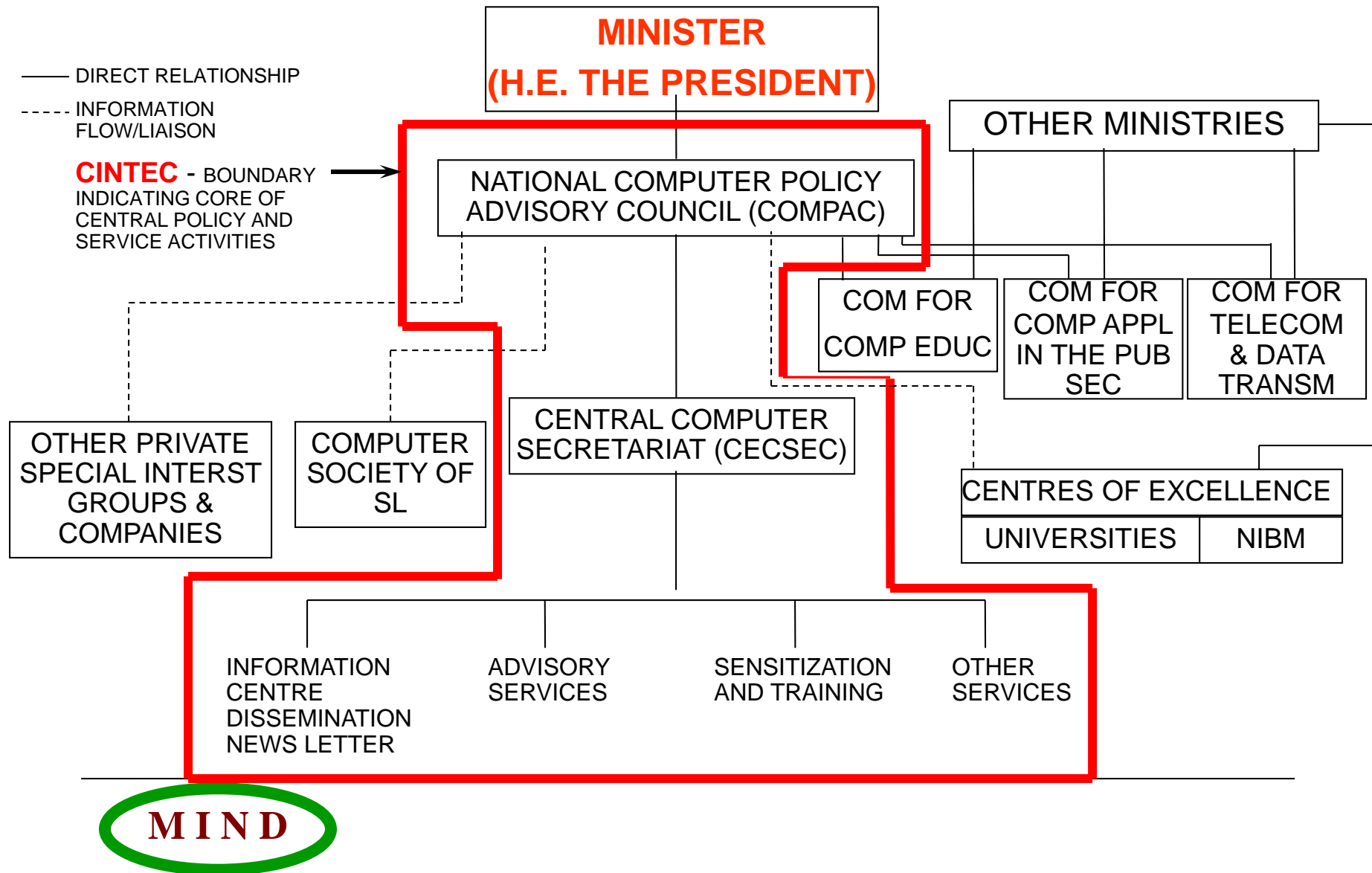
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KEY COMPOL RECOMMENDATIONS

1. **Create a National Computer Policy Advisory Council (COMPAC) functioning directly under H.E. the President.**

2. **Create a Central Computer Secretariat (CECSEC) to service the needs of COMPAC.**

3. **Create permanent committees of COMPAC on: (a) Computer Education; (b) Computer Applications in the Public Sector; (c) Telecommunications and Data Transmission; to advise on and promote activities in these areas.**

4. **Support the growth and development of several centres of Excellence, identified in the first instance as, the Universities of Colombo, Moratuwa and Peradeniya and the NIBM.**

5. **Establish channels of communication with and draw on the contributions of the Computer Society of Sri Lanka, and other private special interest groups and companies.**

C I N T E C

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PROPOSED ORGANISATION OF ICT SECTOR IN SRI LANKA (1983) – Central Role of CINTEC

MINISTER (H.E. THE PRESIDENT)

OTHER MINISTRIES

—— DIRECT RELATIONSHIP

----- INFORMATION FLOW/LIAISON

CINTEC - BOUNDARY INDICATING CORE OF CENTRAL POLICY AND SERVICE ACTIVITIES

NATIONAL COMPUTER POLICY ADVISORY COUNCIL (COMPAC)

COM FOR COMP EDUC

COM FOR COMP APPL IN THE PUB SEC

COM FOR TELECOM & DATA TRANSM

OTHER PRIVATE SPECIAL INTERST GROUPS & COMPANIES

COMPUTER SOCIETY OF SL

CENTRAL COMPUTER SECRETARIAT (CECSEC)

CENTRES OF EXCELLENCE

UNIVERSITIES	NIBM

INFORMATION CENTRE DISSEMINATION NEWS LETTER

ADVISORY SERVICES

SENSITIZATION AND TRAINING

OTHER SERVICES

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TRADITION OF DIRECT PRESIDENTIAL INVOLVEMENT WAS SET IN 1983

H.E. President J.R. Jayewardene handled the new Ministry himself and submitted Cabinet Memoranda on ICT Policy

MIND

20 February 1985

CABINET MEMORANDUM
on the
Computer and Information Technology Council

The Computer and Information Technology Council CINTEC Act No.10 of 1984 was made effective on 1st May 1984, by Cabinet. However, CINTEC activities were constrained to a modest level up to the present, because Cabinet requested this, and only very limited funds were allocated by the Treasury (on a supplementary basis), for 1984. A summary report of CINTEC's work programme in 1984 was submitted to Cabinet on 16th January 1985.

The Treasury has already approved a budget of Rs.4.5 million for 1985, and CINTEC activities will expand correspondingly.

As CINTEC becomes fully operational, I now propose to appoint the remaining nine members of the Board (in addition to the Chairman Dr Mohan Munasinghe, already appointed by me on 11th May, 1984), under Article 4 of the CINTEC Act. The selection will be made from among the candidates given in the attachment. The observations of Cabinet are invited. These nominees have been selected on the basis of their coverage of relevant disciplines, long-run and balanced national viewpoint, interest in the work of CINTEC, wider knowledge and perspective, maturity and credibility, and ability to work together as a team.

J.R. Jayewardene
Minister in charge of the
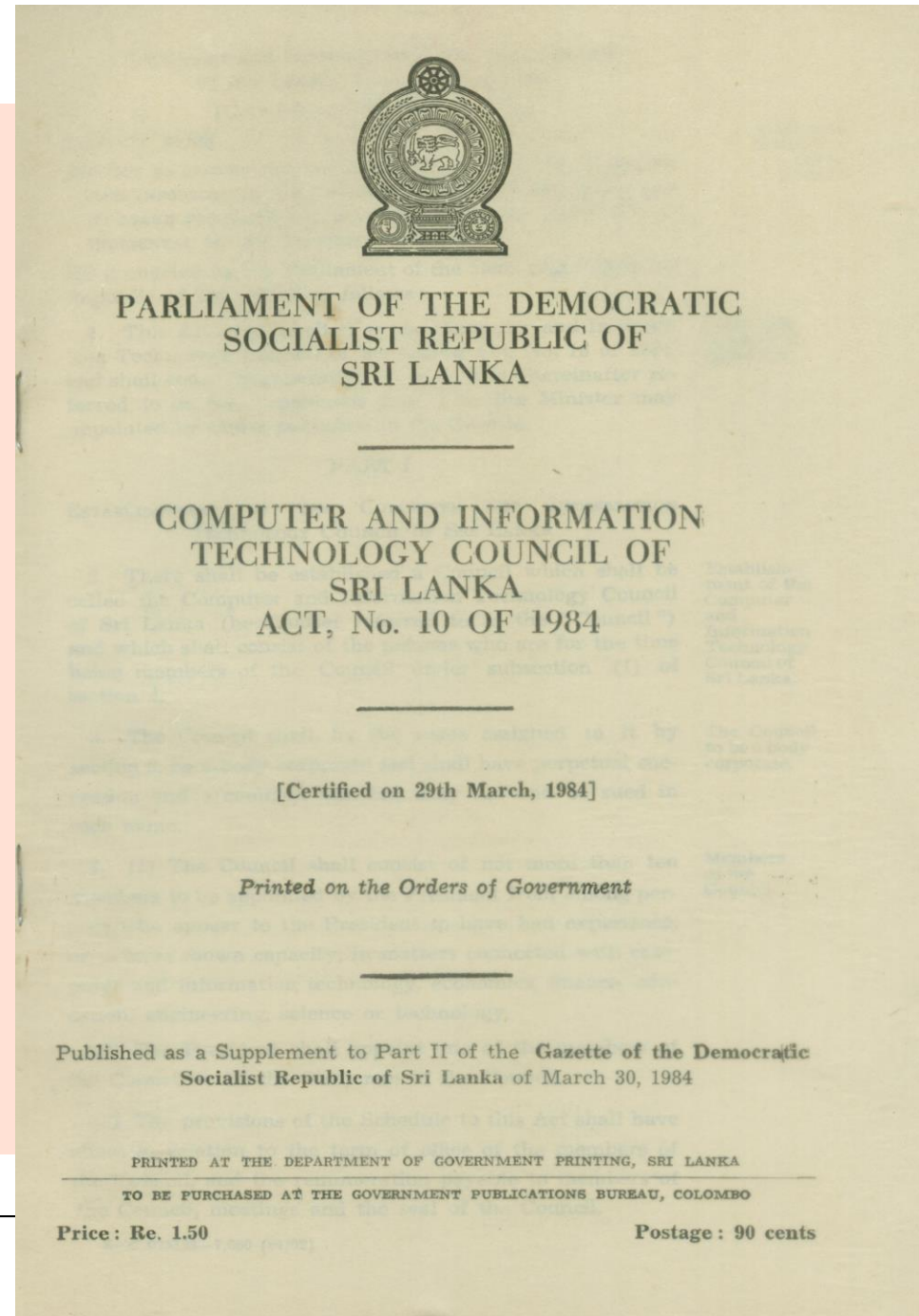Computer and Information Technology Council

CINTEC: Computer & Information Technology Council Act No.10 of 1984

CINTEC: Science and Technology Development Act No.11 of 1994 – Part III

19 years

ICTA: Information and Communication Technology Act No. 27 of 2003

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PARLIAMENT OF THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

COMPUTER AND INFORMATION TECHNOLOGY COUNCIL OF SRI LANKA ACT, No. 10 OF 1984

[Certified on 29th March, 1984]

Printed on the Orders of Government

Published as a Supplement to Part II of the **Gazette of the Democratic Socialist Republic of Sri Lanka** of March 30, 1984

PRINTED AT THE DEPARTMENT OF GOVERNMENT PRINTING, SRI LANKA

TO BE PURCHASED AT THE GOVERNMENT PUBLICATIONS BUREAU, COLOMBO

Price : Re. 1.50   Postage : 90 cents

5.   The functions and duties of the Council shall be—

(a) to advise the Minister on—

(i) the formulation and implementation of a national policy on computer and information technology ;

(ii) measures to promote, facilitate and assist, the use of and application of computer and information technology in Sri Lanka with a view to improving the quality of life of its people and enabling Sri Lanka to acquire the necessary capability to meet the challenge of technological change ;

(iii) measures to develop and improve the infrastructural facilities necessary for the introduction of computer and information technology to Sri Lanka ;

(iv) measures to develop education in computers and information technology in all its aspects ;

(v) measures to advance the skill and knowledge of persons employed in the computer and information technology industry ;

(vi) measures to establish professional standards in the computer and information technology industry with particular reference to the integrity of data in computer and information technology installations and the abuse of personal information in such installations ;

(vii) measures to assess the manpower requirements necessary for the development of the computer and information technology industry in Sri Lanka and the training of such manpower ; and

(viii) measures to promote the export of computer and information technology services ;

(b) to promote and conduct research on all aspects of computer and information technology ;

(c) to monitor development in computer and information technology and to adapt these developments for use in Sri Lanka ;

(d) to collect and disseminate information on computer and information technology and related subjects, and to provide education to the public on such subjects ; and

(e) to do such other things as may be necessary for the performance and discharge of the duties and functions of the Council and for the development of computer and information technology in Sri Lanka.

CINTEC BOARD 1984
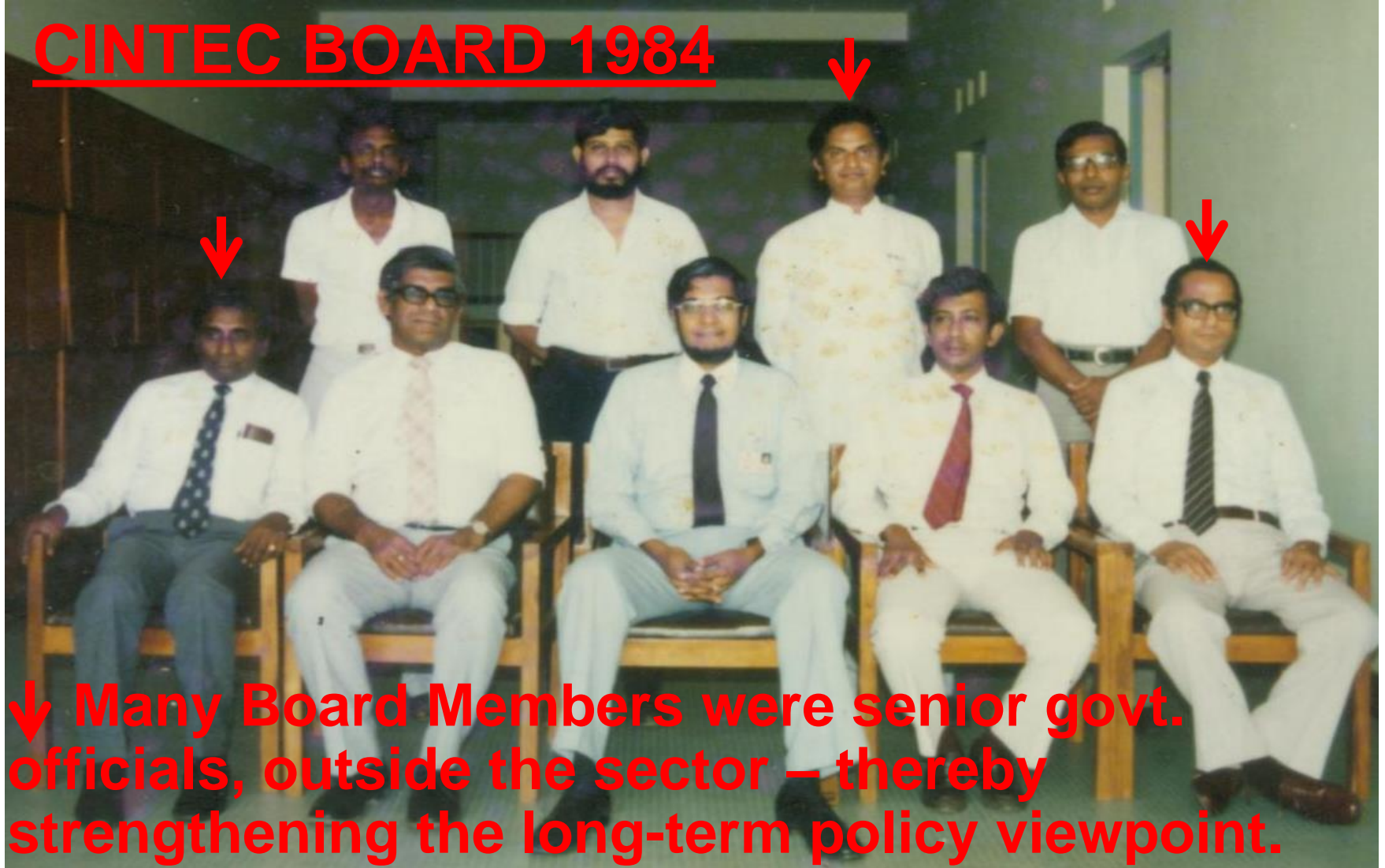
Many Board Members were senior govt. officials, outside the sector – thereby strengthening the long-term policy viewpoint.
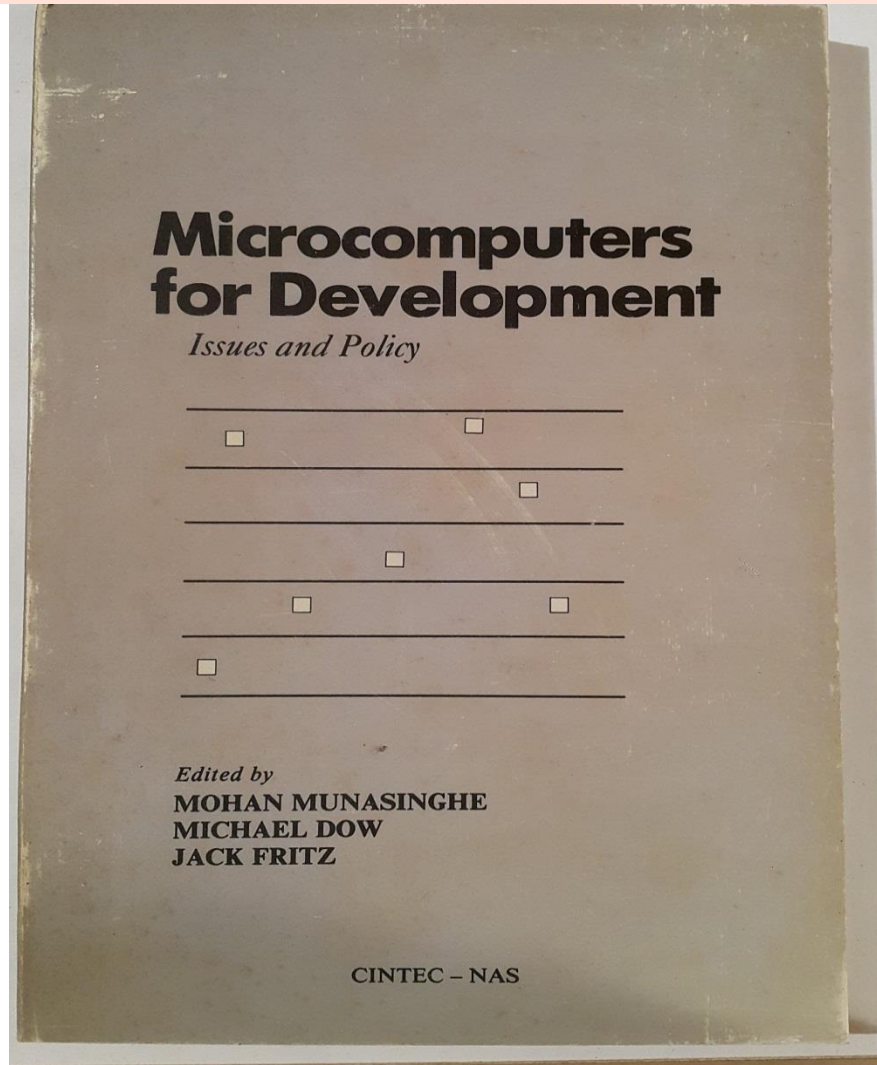
Seated – A.S. Gunasingham, V.K. Samaranayake, M. Munasinghe (Chair),
        K.K. Gunawardena, Akiel Mohamed.
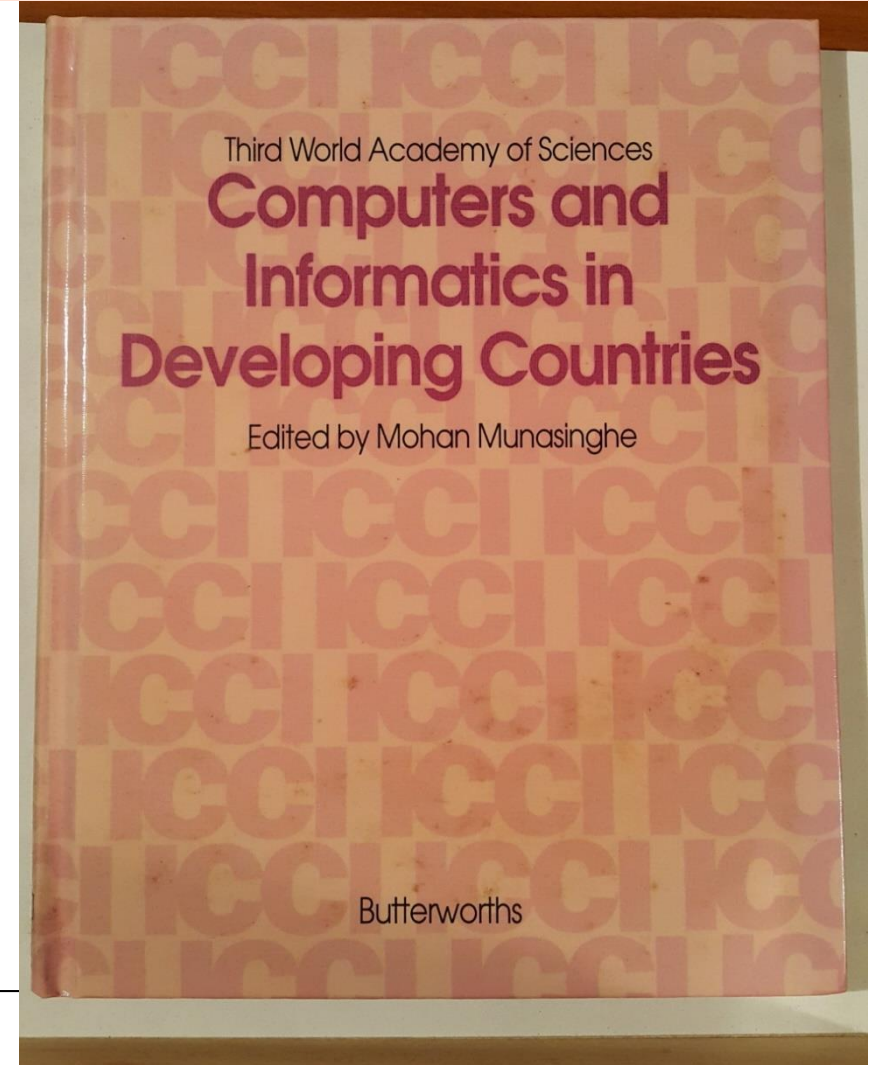Standing – J.A. Gunawardena, A. Induruwa, G. Cumaranatunga, R.B. Ekanayake

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CINTEC key 1980s role model for Developing Countries

Book distributed worldwide 1985 by National Academy of Sciences, Wash. DC, USA

Book distributed worldwide 1989 by Third World Academy of Sciences, Trieste, Italy

Microcomputers for Development

Issues and Policy

Edited by
MOHAN MUNASINGHE
MICHAEL DOW
JACK FRITZ

CINTEC – NAS

Third World Academy of Sciences

Computers and Informatics in Developing Countries

Edited by Mohan Munasinghe

Butterworths

CINTEC had wide ranging activities. ICTA also had program like e-Sri Lanka ICT Roadmap.

UNDERLYING STRATEGIC PRINCIPLES STILL RELEVANT FOR 21ST CENTURY

1. **Major thrust area for national (sustainable) development based on SD triangle: including service to the people, supporting economic growth & reducing environmental pressures.**

   - **Broad vision to address SD challenges**
   - **Deep knowledge of the technology**

2. **Govt. – defines national interest; provides enabling/guiding policy framework (light)**

3. **Business – main driver of innovation and technology development**

4. **Academia – capacity building in centres of excellence, expand democratic space & civil society awareness, etc.**

1. Why do we need the SDG - Globally?

➢ **Goes beyond MDG – covering key social and environmental issues**

➢ **SDG framework will incorporate current global challenges like:**

   ➢ growth within planetary resource boundaries
   ➢ global inequality
   ➢ climate change and disaster risk reduction

➢ **SDGs will guide global system towards a sustainable & equitable path – balancing economic, social and environmental objectives.**

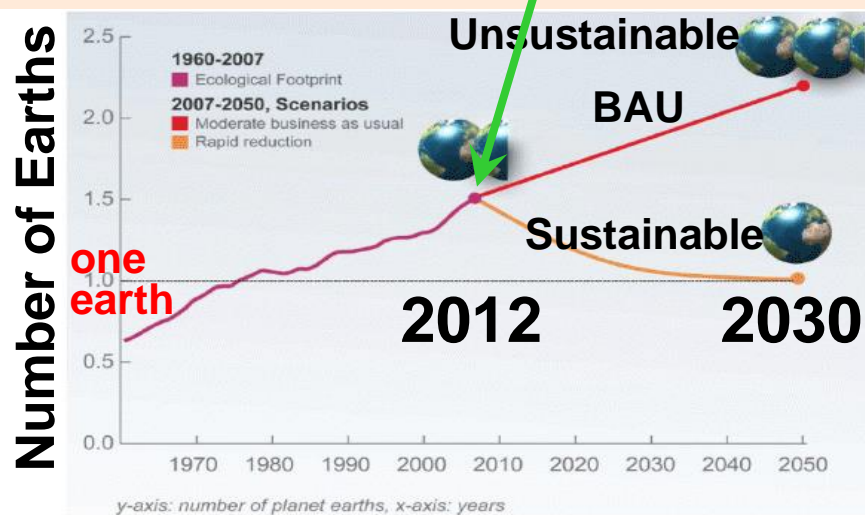## Else, we risk Global Breakdown due to Many Shocks

- **Financial-economic crisis: Asset bubble**
- **Persistent poverty and growing inequity**
- **Resource shortages: water, food, energy**
- **Environmental harm, extreme events, conflict mass migrations, pandemics**
- **Climate change: the ultimate threat amplifier**

Multiple threats interact destructively. SDG provide comprehensive and Integrated approach.
Stakeholder interests divergent. Responses are uncoordinated & piecemeal – lack of leadership
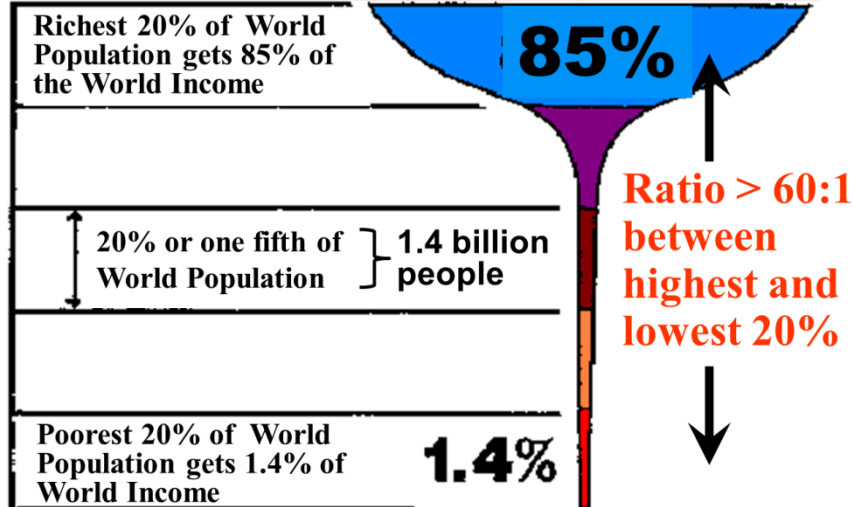
a) Ecol. Footprint of Humanity

In 2012 we needed 1.5 earths; and by 2030 almost 2 Earths

Unsustainable

BAU

Sustainable

one earth

2012   **2030**

1960-2007
Ecological Footprint

2007-2050, Scenarios
Moderate business as usual
Rapid reduction

Number of Earths

y-axis: number of planet earths, x-axis: years

b) Unfair World Consumption Pattern 2010

Champagne Glass

85%

Richest 20% of World Population gets 85% of the World Income

20% or one fifth of World Population } 1.4 billion people

Ratio > 60:1 between highest and lowest 20%

Poorest 20% of World Population gets 1.4% of World Income   **1.4%**

2014 Wealth distribution: 85 richest > 3.5 billion poorest (50% pop.)

c) 8 Millennium Development Goals (MDG) & 17 SDG

United Nations Millennium Declaration, 2000 and Post-2015 Agenda

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality & empowerment
4. Reduce child mortality
5. Combat HIV/AIDS, malaria & other diseases
6. Improve maternal health
7. Ensure environmental sustainability
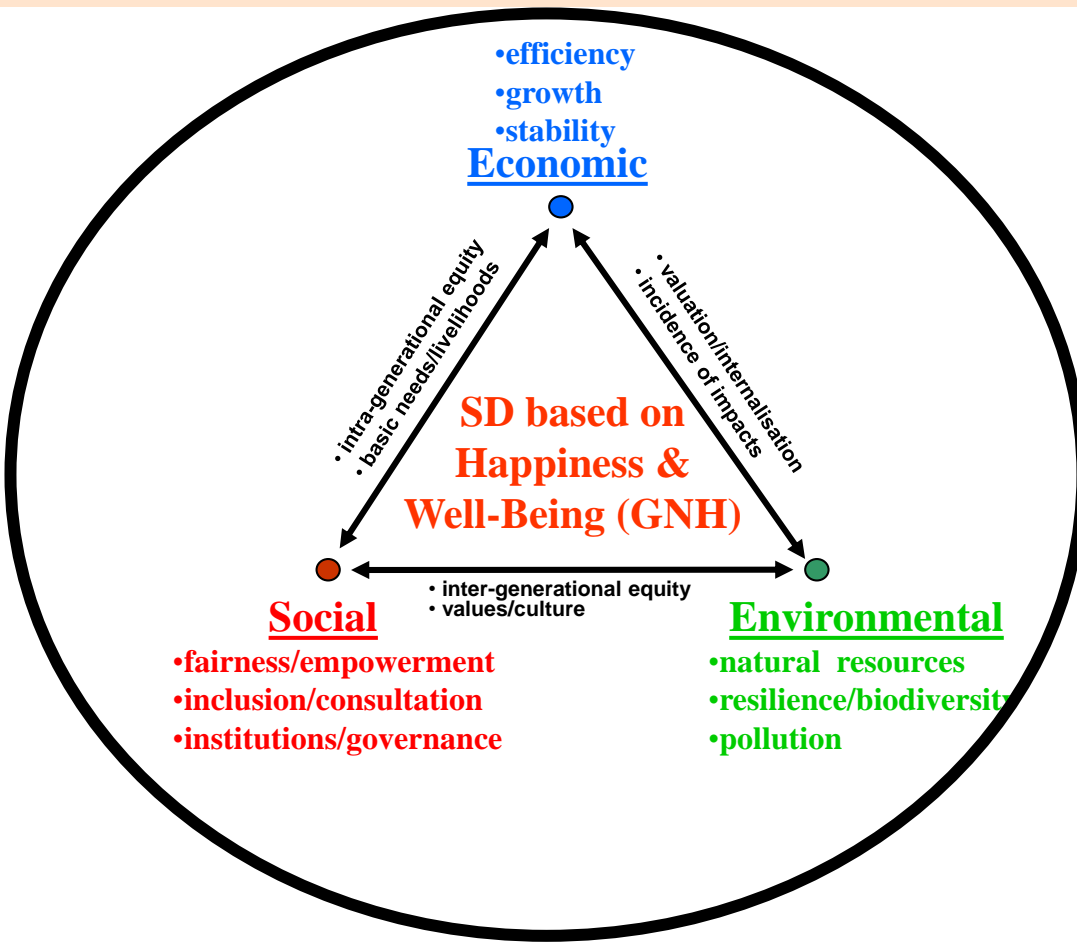8. Global partnership for development

Worthy targets, but if the rich consume more than one planet worth, where are the resources to feed the poor, esp. after CC.

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FRAMEWORK: World Eco-Civilization of 21st Century focusing on Happiness & Well-Being (GNH) - depending not only on material consumption (GNP)

- efficiency
- growth
- stability

Economic

- intra-generational equity
- basic needs/livelihoods

- valuation/internalisation
- incidence of impacts

SD based on Happiness & Well-Being (GNH)

- inter-generational equity
- values/culture

Social
- fairness/empowerment
- inclusion/consultation
- institutions/governance

Environmental
- natural resources
- resilience/biodiversity
- pollution

Global Vision 2030: SDG

Social: meet basic needs of all human beings especially the poor & vulnerable, ensuring peace, harmony, social justice & security.

Environmental: respect nature & reduce humanity's global ecological footprint to less than one planet earth.

Economic: build a sustainable economy that is prosperous and resource-efficient, but respects critical environmental and social sustainability constraints.

21st Century Global Eco-Civilization: Digital technologies have a key role.
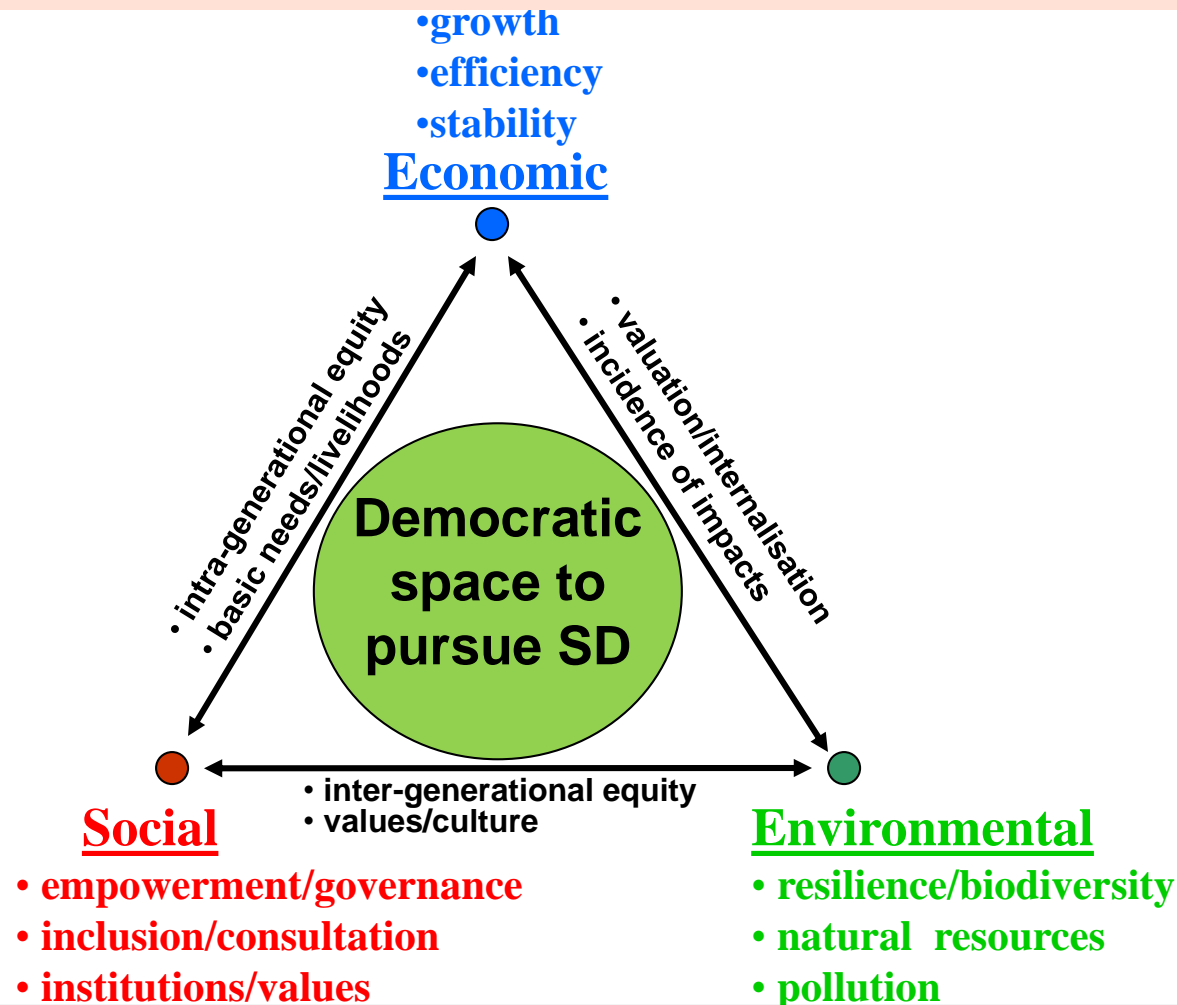
ICT Professionals have role in Good Governance

- Governance is <u>not</u> the sole preserve of the state
- Speak out for good governance and <u>demand</u> higher standards (effectiveness, accountability, honesty/integrity, rule of law, transparency, participation, equity, etc.)
- Reduce paternalism, micro-management, & state interference
- Provide leadership in building the social consensus
- Show greater activism in government, business, and civil society, and participate more in decision making

What ICT Professionals can do for SD in Sri Lanka:

- **Better mobilize, organize and empower business, and civil society** to use ICT & work synergistically with government, to make development more sustainable

- **help the poor** and lift them out of poverty

- **teach young people** sustainable values based on ethical principles.

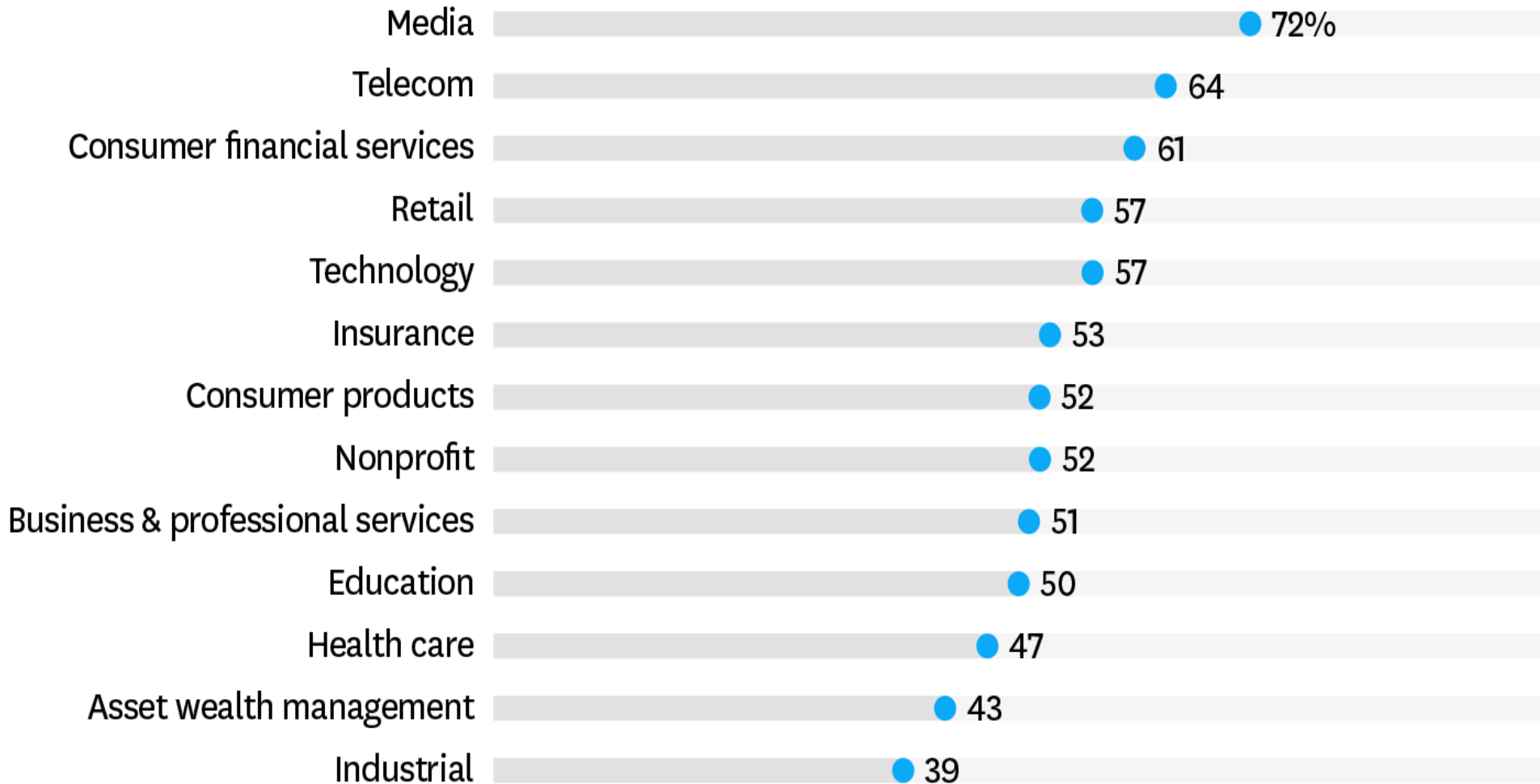# Harmonise, balance & integrate SD Triangle to create Democratic Space for sustainable human development

Economic
- growth
- efficiency
- stability

· intra-generational equity
· basic needs/livelihoods

· valuation/internalisation
· incidence of impacts

Democratic space to pursue SD

· inter-generational equity
· values/culture

Social
- empowerment/governance
- inclusion/consultation
- institutions/values

Environmental
- resilience/biodiversity
- natural resources
- pollution

Sustainable Development Triangle – harmonising key elements and interconnections (corners, sides and centre) <u>Source</u>: Munasinghe [1992], Rio Earth Summit
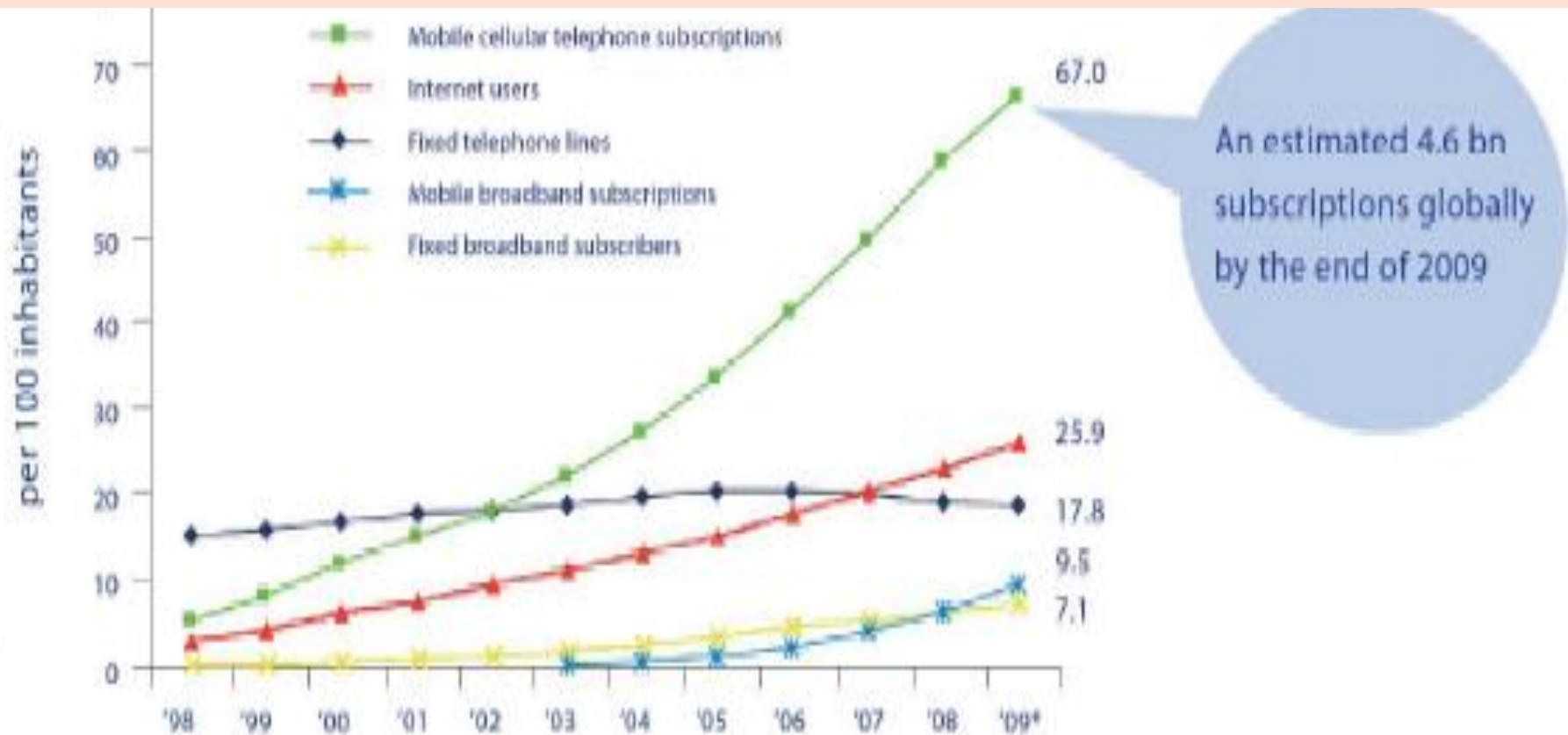
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Risk: change due to massive digital disruption

Executives Who Anticipate Moderate or Massive Digital Disruption in the Next 12 Months, by Industry

Industry	Percent
Media	72%
Telecom	64
Consumer financial services	61
Retail	57
Technology	57
Insurance	53
Consumer products	52
Nonprofit	52
Business & professional services	51
Education	50
Health care	47
Asset wealth management	43
Industrial	39

Global Status: A Decade of Growth in cell phones, internet users, mobile and fixed broadband. Only fixed phones declined.

Mobile cellular telephone subscriptions
Internet users
Fixed telephone lines
Mobile broadband subscriptions
Fixed broadband subscribers

67.0

An estimated 4.6 bn subscriptions globally by the end of 2009

per 100 inhabitants

25.9
17.8
9.5
7.1

'98 '99 '00 '01 '02 '03 '04 '05 '06 '07 '08 '09*

Source: ITU World Telecommunication/ICT Indicators Database.
* Estimates.

Mobile-cellular Subscriptions Growth approaching one per person worldwide (2013), but rich-poor divide

- 7 billion mobile-cellular subscriptions.
- Mobile-cellular growth is slowing, as the number of subscriptions approaches global population figures.
- Mobile-cellular penetration rates stand at 96% globally; 128% in developed countries; and 89% in developing countries (Africa and Asia below world average)
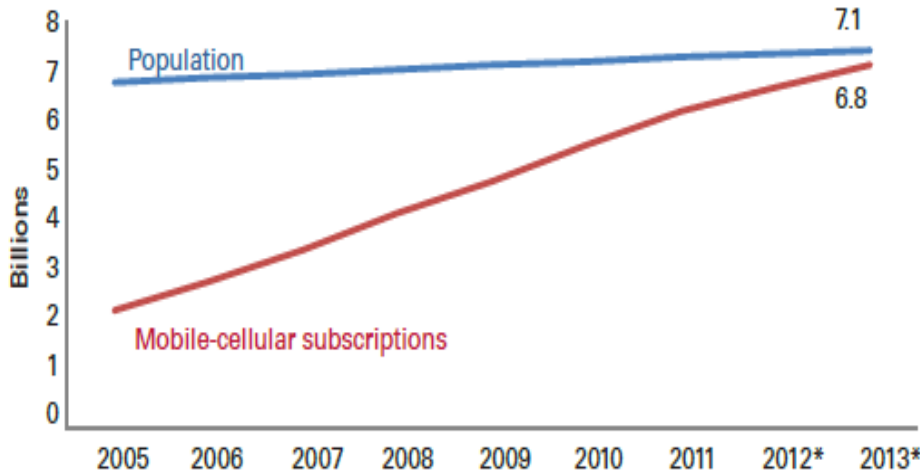
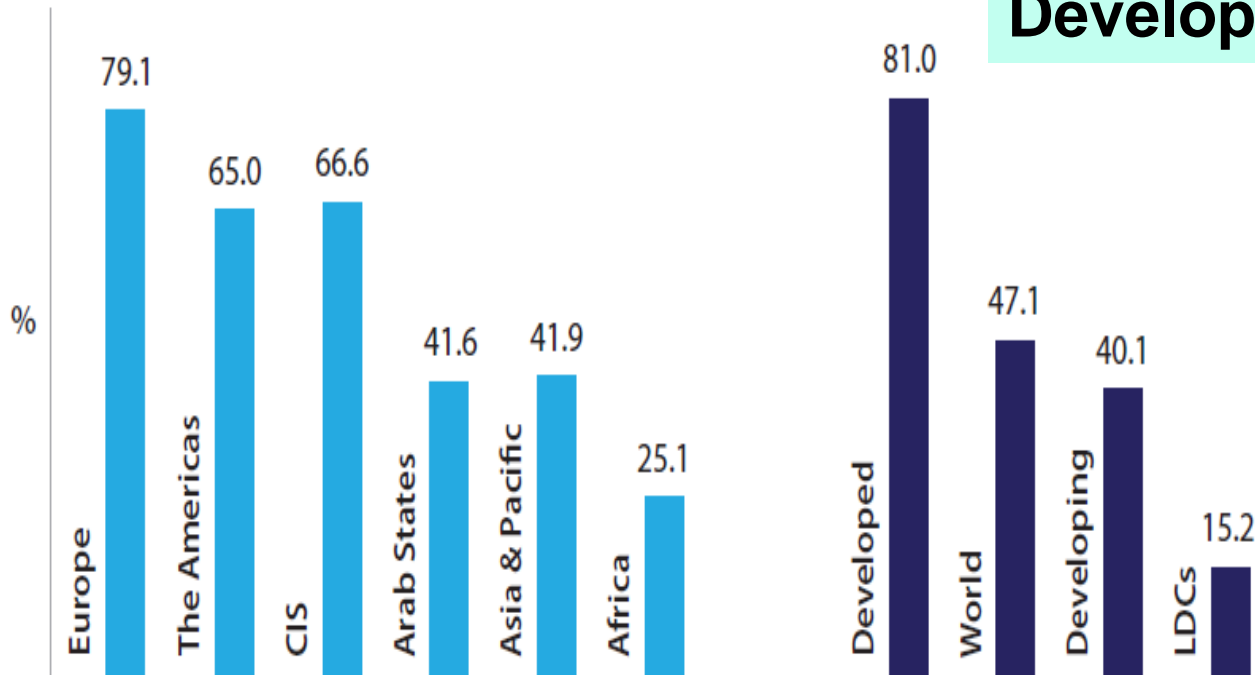Source: ITU World Telecommunication /ICT Indicators database
Note: * Estimate
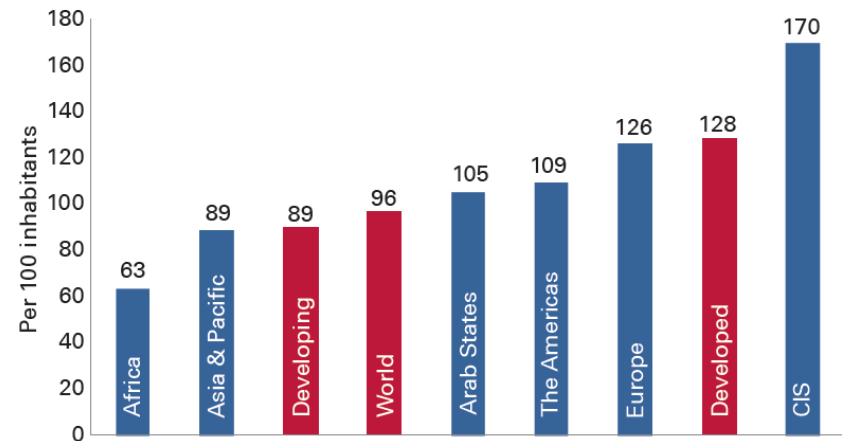
Source: ITU World Telecommunication /ICT Indicators database
Note: * Estimate

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THE DIGITAL DIVIDE (2016)
% of individuals using the Internet

Percentage of individuals using the Internet

World = 47%
Developed = 81%
Developing = 40%

79.1 — Europe
65.0 — The Americas
66.6 — CIS
41.6 — Arab States
41.9 — Asia & Pacific
25.1 — Africa
81.0 — Developed
47.1 — World
40.1 — Developing
15.2 — LDCs

%

Close to one out of two people (47%) in the world are using the Internet but only one out of seven people in the LDCs.

Developed regions are home to one billion Internet users, compared to 2.5 billion users in the developing world.

Gender Gap (2016): In developing nations 8% fewer women than men use Internet. In developed nations the gap is only 2%.

Unequal Affordability of Broadband
Poor pay 300% of monthly income and rich < 2%

- **In the developing countries**, the monthly cost of fixed broadband is **about 300% of average monthly income** (GNI per capita).
- **In the developed countries**, fixed broadband prices correspond to **less than 2% of average monthly income.**
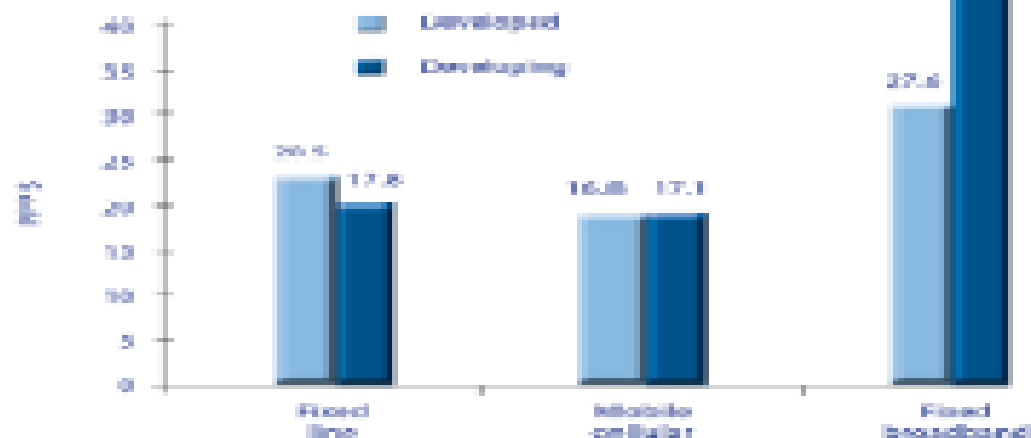
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Issues with ICT Developments

- **Security:** Aftermath of NSA "spying" revelations
- **Communication:** Fiber capacity rising; Multiple Standards caused non-compliance (wired and wireless); Telecom de-regulation slow; access cost high; VoIP still banned by many governments; Domain name registration process in limbo; security issues.
- **Computer Processing:** Pace of advancement too fast; more dis-connected PCs than connected; Schools and community PC needs can be better addressed through recycling; innovative PC assemblies needed for the less privileged.
- **Digital Storage**: longevity of storage media; practicality of near online storage vs. cost of online storage; scalability always a concern; security protection.
- **Software:** Multiple applications causing interoperability concerns; upgrades seldom facilitate seamless migration; proprietary software challenged by open source; support & maintenance cost issues; user interface can be better; copyright protection concerns.
- **Capability:** knowledge sharing & transfer evasive; continuous training becoming a must to stay current; cost of training issues; uneven human capacity building between North and South; brain drain vs. reverse brain drain; participatory process in int'l forums still unbalanced.
- **Content:** sectoral data standards still evolving; OCR not successful for some international languages; online content production needs a push; online translation lacking; security, copyright and privacy issues; some Internet content outdated.
- **Standards**: constantly being enhanced (catch up game); different global standards (case of cellular networks); developed nations more in compliance than developing countries (more awareness); participatory process also unbalanced between countries of N & S.
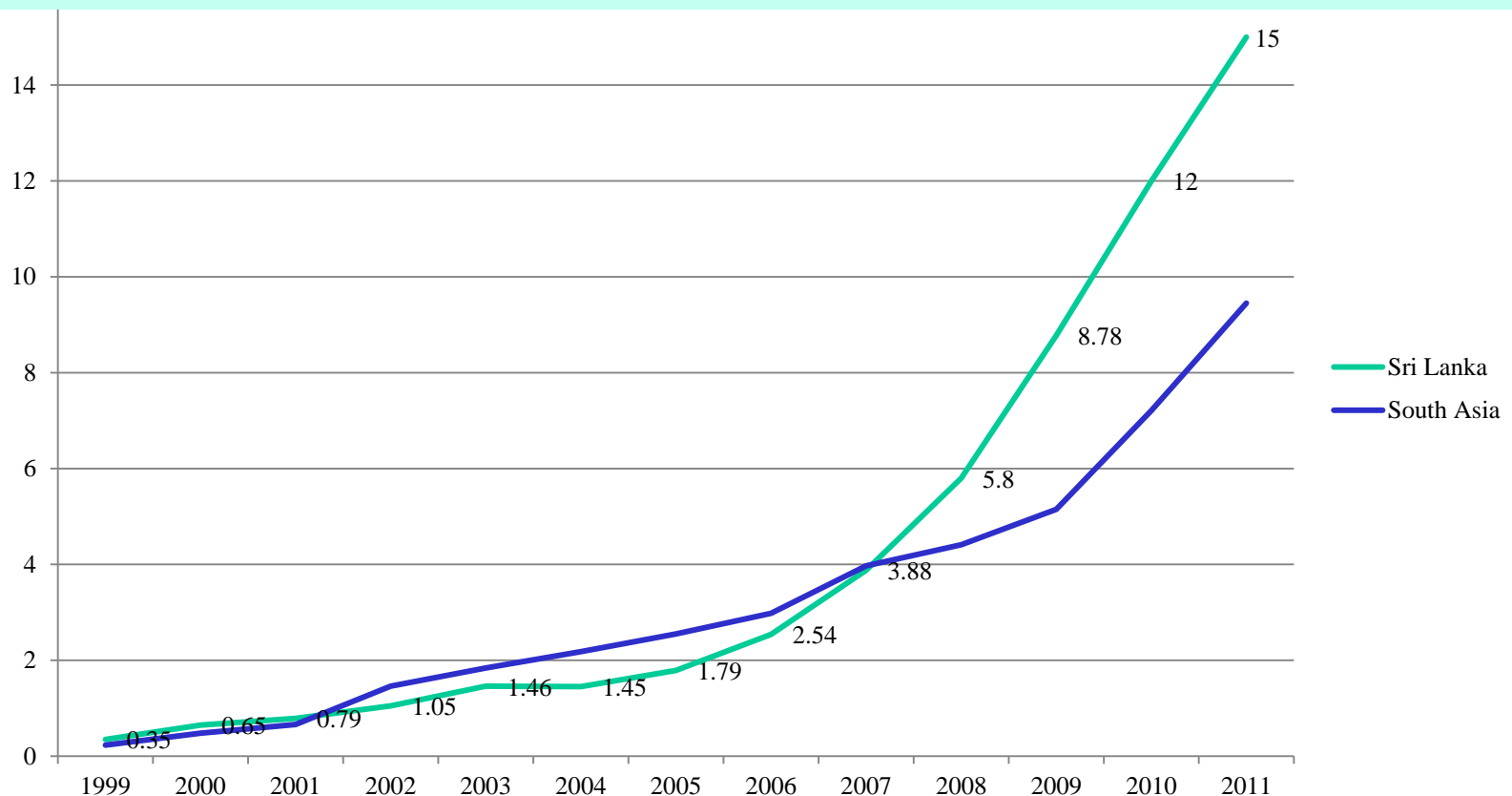
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SRI LANKA PROSPECTS (2013)
Internet Users (% pop) - Sri Lanka leads South Asia but far behind western countries,
No. of mobile phones ~20 million = population
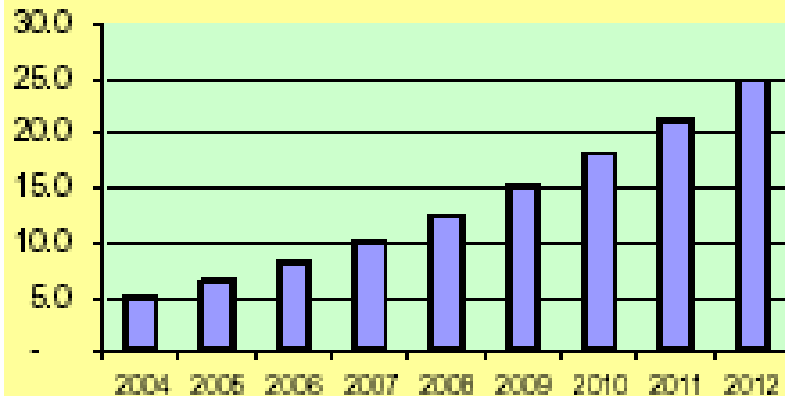## Urban-rural gap in computer ownership & literacy

Sri Lanka
South Asia

0.35 0.65 0.79 1.05 1.46 1.45 1.79 2.54 3.88 5.8 8.78 12 15

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
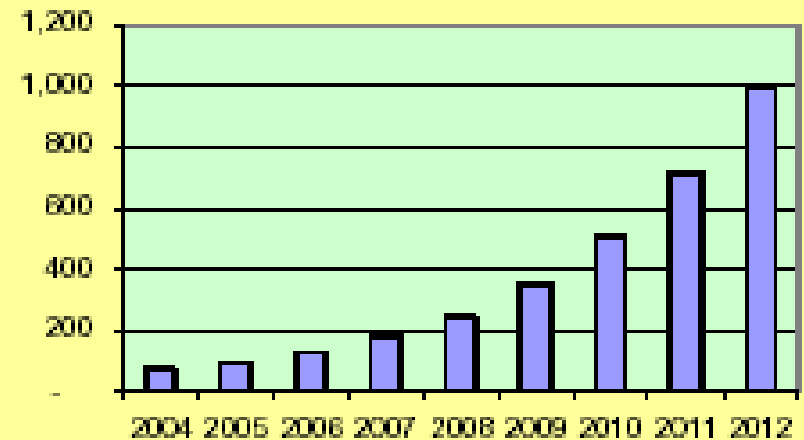
Year

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Based on World Bank data

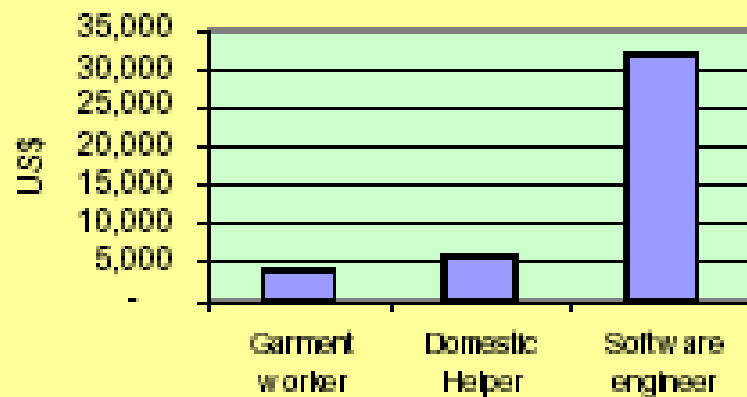# ICT supports Jobs, Exports & Income Growth

Software Workforce ('000)

Estimated Exports (US$) '000,000

Income Capacity / Year - (2003)

- ☐ Work force to be increased from 5,000 in 2004 to 25,000 in 2012
- ☐ Exports to be increased from US$ 80M in 2004 to US$ 1,000M in 2012
- ☐ Yield per employee to be increased from US$ 20 in 2004 to US$ 40 in 2012

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Key principles in 1982 are still valid now

Defining our Sri Lankan Sustainable Development vision - then adapting ICT policy to achieve that goal

DO NOT

Allow overwhelming technology trends to shape our development path and blindly follow others.

Some key issues

- **Geo-strategic position of Sri Lanka as future trade, transport and financial hub, supported by ICT hub.**
- **How to balance personal privacy versus national security – eg., surveillance policy and equipment.**

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12 potentially economically disruptive technologies

➤ **Mobile Internet** – Cheap, capable mobile computing devices & internet connectivity
➤ **Automation of knowledge work** - Intelligent software systems that perform knowledge work tasks involving unstructured commands and subtle judgments
➤ **Internet of Things** - Networks of low-cost sensors and actuators for data collection, monitoring, decision making, and process optimization
➤ **Cloud technology-** Use of computer hardware and software resources delivered over a network or the Internet, often as a service
➤ **Advanced materials -** Materials designed to have superior characteristics (e.g., strength, weight, conductivity) or functionality
➤ **Advanced robotics** - Increasingly capable robots with enhanced senses, dexterity, and intelligence used to automate tasks or augment humans
➤ **Autonomous and near-autonomous vehicles** - Vehicles that can navigate and operate with reduced or no human control
➤ **Next-generation genomics**- Fast, low-cost gene sequencing, advanced big data analytics, and synthetic biology ("writing" DNA)
➤ **Energy storage**- Devices or systems that store energy, including batteries
➤ **3D printing** - Additive manufacturing techniques to create objects by printing layers of material based on digital models
➤ **Advanced oil and gas exploration and recovery** - Exploration and recovery techniques that make extraction of unconventional oil and gas economical
➤ **Renewable energy -** Generation of electricity from renewable sources with reduced harmful climate impact   [Source: McKinsey]

Recent advances (2016) that can transform ICT

1. Silicon photonic chips using light instead of electrons can compute and transmit data faster, and use less energy.
2. Create and guide beams of "twisted light" for high-speed data transmission
3. Spintronic devices make use of spin magnetic moment of electron to store & process information on smaller and more energy efficient devices. Handle data in quantum computers.
4. Advanced optical fibre for faster data transmission and processing, including building quantum memories for quantum-information networks
5. Room temperature superconductors for energy efficiency
6. Quantum dots store, process data, & produce electricity from random noise to convert waste heat into useful energy.
7. Quantum-cryptographic systems already in use by banks and organizations to ensure secrecy of communications.
8. Advanced countries encouraging growth of industries based on Quantum Technologies.

ICT Performance Logarithmic Gains – Moor's Law

Moore's Law, again

Transistors per CPU
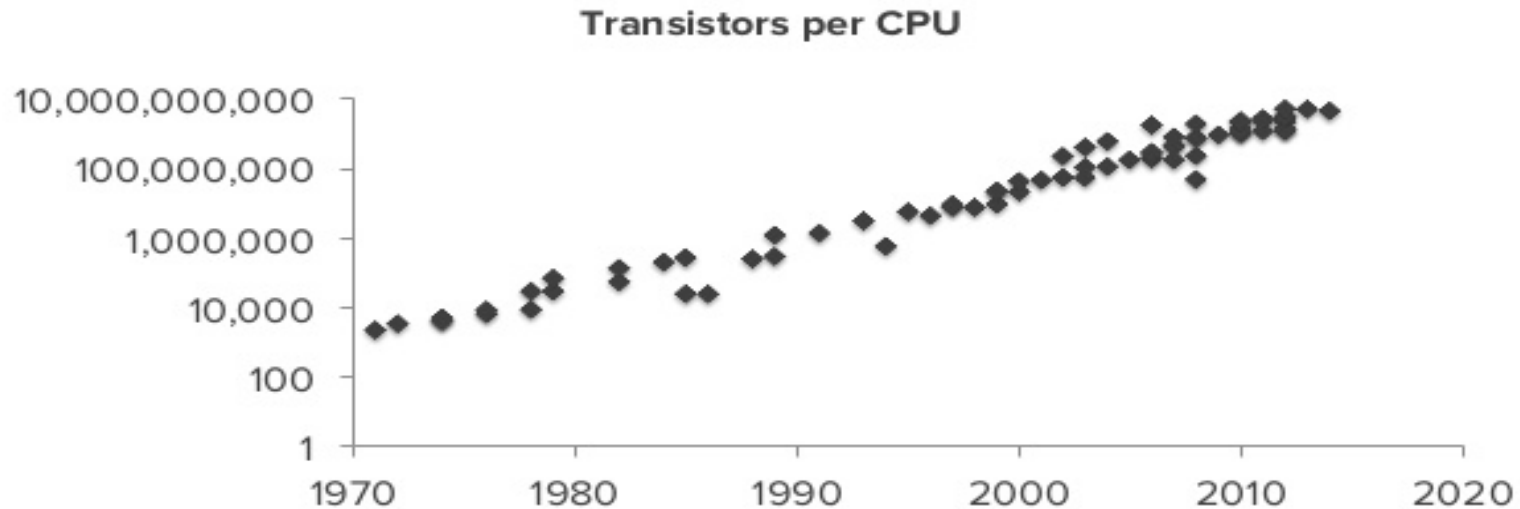
Personal Experience
1. Cambridge Eng. undergrad. 1964: slide rule & log. tables; EDSAC autocode & punched tape
2. MIT Physics grad. Stud. 1970: punched cards, Fortran, IBM 360/70 mainframe
3. Professional 1980: Radio Shack minicomp. (45K), hand calculator
4. Professional 1990s, 2000s: Microcomputers, internet, smart phones, cloud, etc. with platform, programs and apps.

Munasinghe Institute for Development

"making development more sustainable - MDMS"

10/1 De Fonseka Place, Colombo 5, Sri Lanka
<u>Phone/Fax:</u> +9411-259-0131; <u>E-mail:</u> MIND@mindlanka.org ; <u>Web:</u> www.mindlanka.org

- **Awards, Scholarships & Training**
- **Applied Research on Sustainability**
- **Engagement in Public Policy**

STHUTHI, NANDRI, THANK YOU!