Technology Evolution in the Business World

EXPO COMM Argentina 2006

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2006 IEEE President

Outline

- Rationale
- Economic Background
- Strategic technological goals for Latin America - Organization of American States
- Relation of identified activities and the IEEE strategic goals

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What Technology Offers

- Possibilities
  - Doing things differently, better
- Improving standards of living
  - Power, water, food, health, community
- HOPE
  - For a better world, better future
- However, technology CANNOT deliver on any of these
  - Technology together with business, government, society, MAY be able to deliver
- The promise of technology, unlike the promise of science, lives, breathes, succeeds and fails within the fabric of our socio-economic systems
  - If this is ignored nothing is achieved

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Starting Point

- The state of technology and the state of a nation/region are intimately connected.
- We must have technological progress and expertise in order to have economic advancement
- We must have a healthy economy to support technological progress

So?

- We technical professionals need to be partners with other areas of our society and economy
  - They don’t understand us
  - We don’t understand them
- It is our responsibility and key to the IEEE vision

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IEEE Vision

- Advance Global Prosperity by
  - Fostering technological innovation
  - Enabling members careers
  - Promoting community
- Worldwide

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IEEE Core Focus

- The other side of this ‘general view is the personal view captured in one of our foci
  - Enable technical professionals to distinguish themselves in a globally competitive environment
- What about IEEE members enabling their regions/countries to distinguish themselves in a globally competitive environment?

WORLD COMPETITIVENESS SCOREBOARD 2006

International rank, score and change in rank from 2005 - 61 countries listed

- **Chile 24 (19) 69.997▼**
- **Colombia 40 (47) 57.351▲**
- **Sao Paulo 48 (43) 49.408▼**
- **Brazil 52 (51) 46.416▼**
- **Mexico 53 (56) 44.871 ▲**
- **Argentina 55 (58) 43.663 ▲**
- **Venezuela 61(60) 32. 662►**
- **Peru not listed**

Source: IMD *World Competitiveness Yearbook 2006* Based on Economic performance, government efficiency, business efficiency, infrastructure

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The Global Competitiveness Index 2006–2007

Country/Economy	Overall Score	Innovation Factors
Switzerland	**1**	**2**
Finland	**2**	**6**
Sweden	**3**	**5**
Denmark	**4**	**7**
Singapore	**5**	**15**
United States	**6**	**4**
Japan	**7**	**1**
Germany	**8**	**3**
Netherlands	**9**	**11**
United Kingdom	**10**	**10**

The Global Competitiveness Index 2006–2007

Country/Economy	Overall Score	Innovation Factors
Chile	**27**	**33**
Barbados	**31**	**54**
Costa Rica	**53**	**35**
Panama	**57**	**62**
Mexico	**58**	**52**
Jamaica	**60**	**56**
El Salvador	**61**	**75**
Colombia	**65**	**48**
Brazil	**66**	**38**
Argentina	**69**	**79**

Mexico

- Was largest economy in Latin America in 2004,
  - Grew 3 percent in 2005, below 3.7 predicted by International Monetary Fund
- Economy surpassed by Brazil in 2005
- Inflation reached 4.6 percent in 2005, slightly less than the 4.7 registered in 2004.
- Losing market share to China
- Needs to generate 1 million jobs a year to keep up with population growth

Sources: Latin America Times 16 Feb; Latin Business Chronicle.

Brazil

- Brazil recaptured the top spot among Latin America's economies 2005, four years after losing it to Mexico.
- Its GDP was expected to grow by 3.3 percent in 2005.
  - less than the impressive 4.9 percent expansion in 2004, but good news, as it cements the continued growth after previous years of weak or no growth.
- In 2006 the GDP will expand by another 3.5 percent, according to the International Monetary Fund
- Inflation was set to reach 6.8 percent in 2005, slightly less than the 6.6 percent posted in 2004.
- In 2006, inflation will likely reach 4.6 percent, the IMF forecasts.

Argentina

- Since the economic recovery started in 2002, Argentina has had 16 consecutive quarters of economic growth
- GDP grew about 9% from 2003-2005; up 8.6% from Jan '05-Jan '06.
- Inflation rate is at 11%
- Full employment has grown 7.4% since 2002; +2.2% in 2005
- But the unemployment rate is still high at 11.6%

Sources: Argentina Economic Indicators: Ministerio de Economia, Rebuplica Argentina, July 06; CIA Fact Book

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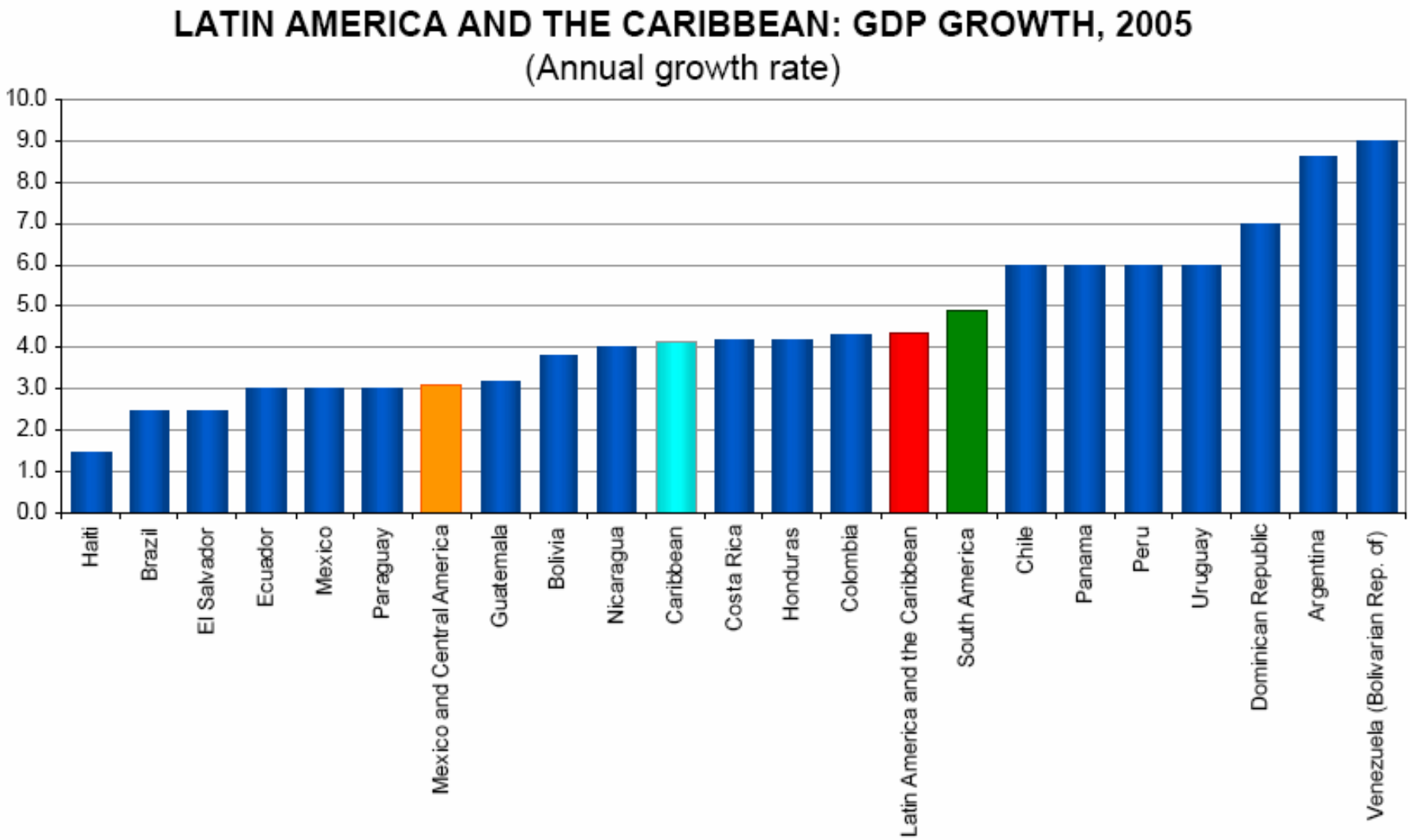
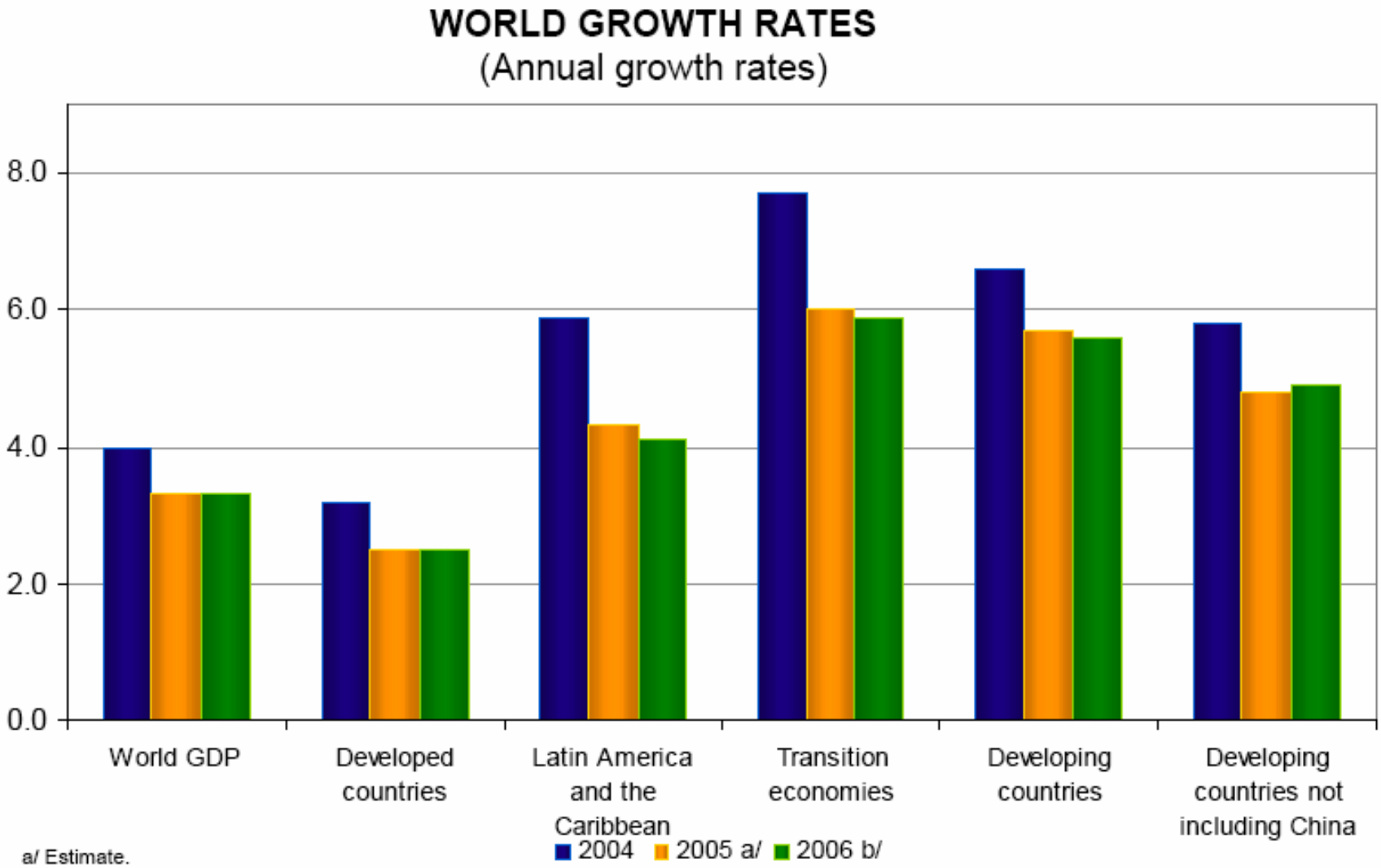
The next 4 slides are from a report presented by Argentinean Jose Luis Machinea, working in CEPAL

"Preliminary Overview of the Economies of Latin America and the Caribbean - 2005"

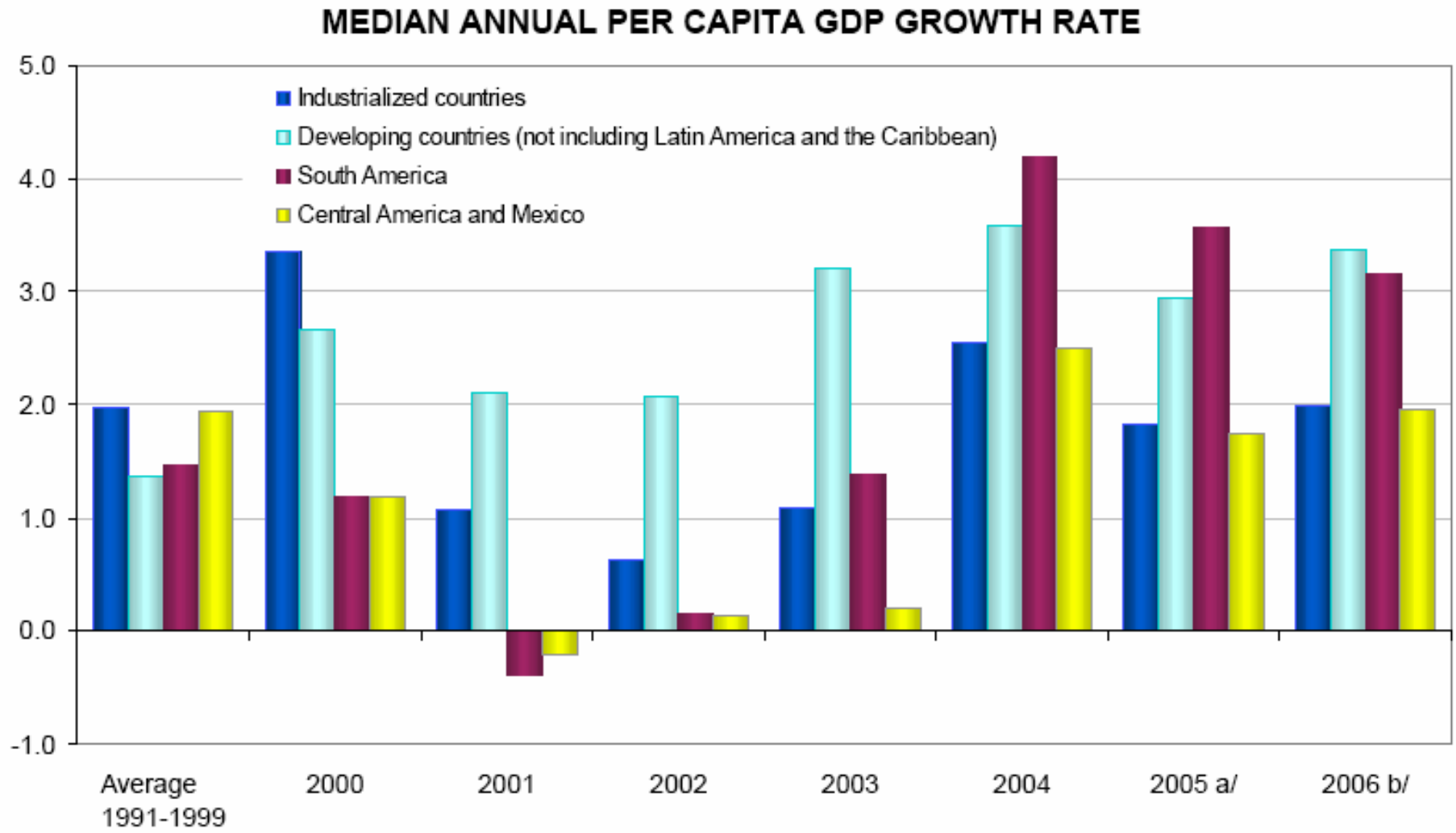
2005 will be the third straight year of economic growth



Yet the region is growing more slowly than the developing countries as a group



This is due partly to slower growth in the region's two largest economies



a/Estimate.
b/Proyection.

The region needs to build up its competitiveness

- Keeping exchange rates competitive
- Diversifying and adding value to exports
- Increasing investment
  - Clear and reliable rules (political agreements)
  - Fiscal and sectoral reform and competitiveness-building
  - Production policies
  - Long-term financing
  - Investment in infrastructure (public and private)

Globalization Index

- The globalization index of 17 countries looks at six factors that measure a country's links with the outside world:
  - Exports of goods and services as a % of GDP
  - Imports of goods and services as a % of GDP
  - Foreign direct investment as a % of GDP
  - Tourism receipts as a % of GDP
  - Remittances as a % of GDP
  - Internet penetration
    - first annual Latin American Globalization Index developed by *Latin Business Chronicle*.

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LATIN AMERICAN GLOBALIZATION INDEX

Rank, country and score

- 1 Panama 14.46
- 2 Dom. Rep 13.54
- 3 Costa Rica 12.99
- 4 Honduras 11.20
- 5 Chile 10.62
- 6 Nicaragua 9.77
- 7 El Salvador 9.53
- 8 Uruguay 8.59
- 9 Mexico 8.19
- 10 Paraguay 7.59
- 11 Ecuador 7.36
- 12 Guatemala 6.47
- 13 Venezuela 6.43
- 14 Brazil 5.56
- 15 Colombia 5.55
- 16 Peru 5.55
- 17 Argentina 5.53

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E-readiness rankings, 2006

Rank '06	'05	
31	31	Chile ▶
39	37	Latvia (tie) ▼
39	36	Mexico (tie) ▼
41	38	Brazil ▼
42	39	Argentina ▼
48	45	Venezuela ▼
49	50	Peru (tie) ▲
49	47	Romania (tie) ▼

Source: Economist Intelligence Unit-- based on innovation, information security and governments' commitment to e-commerce, 4 06

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Growth of E-Commerce in Peru

- **The number of Peruvians with personal computers and Internet access is low but growing.**
- **According to the National Statistics and Information Institute (Instituto Nacional de Estadística e Informática), 6.8% of households had computers in 2005, up from 4.4% in 2000.**
- **Telefónica reported that at end-2005, 20% of Internet users had a personal computer; the remaining 80% used cabinas públicas, a type of Internet café.**

Source: The Economist; Global Technology Forum, "Growth of E-commerce in Peru" 13 June 06

More Broadband Connections

- Telefónica of Peru says the country had the fastest growth rate of broadband Internet connections in Latin America in 2005: 129%, to reach 400,000 accounts.
- Overall, there are 500,000 Internet connections in the country.
- There were 4.3 domestic Internet connections per 100 homes in 2005, according to the National Household Survey carried out by the National Statistics and Information Institute (Instituto Nacional de Estadísticas e Informática).

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Comments

- These very few slides give a small taste of the economic situation of Latin America
- Much more is needed to get necessary details relevant to technical professionals in this region
- Now let us look at Latin America from a scientific and technical perspective

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Science, Technology, Engineering and Innovation for Development

A Vision for the Americas in the Twenty First Century

Organization of American States

Secretary General
José Miguel Insulza

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- Four central areas of policy are examined, indicating the need of a qualitative change in current ways of thinking and acting:
- First, recognition of the role of science, technology, and innovation in competitiveness:
  - It is essential that the stakeholders, businesses, governments and institutions of research and development, support the productive sector.
- Second, rethinking the innovation model:
  - part of the transformation strategy is to substitute the fragmented, linear, and sequential models dominant over previous decades, for integrated innovation models that stimulate linkage and simultaneous interaction between stakeholders throughout the entire innovation cycle.

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- Third, quality for competitiveness:
  - Businesses' competitiveness is based on the quality of their products, and this quality is a direct result of their measurement capabilities.
    - Metrology is the science of measurement, and good measurement capabilities allow enterprises to provide goods and services that comply with international standards and specifications. It is fundamental for any country to develop a national measurement infrastructure that will support the competitiveness of their enterprises.
- Fourth, responding to market demands:
  - Science and technology efforts must have a much greater scope, enriching their substantive content and synchronizing their dynamics with that of a changing market.
    - This means that innovation, science, technology, metrology, and quality systems must be integrated in an attempt to consolidate and facilitate trade in the Western Hemisphere over the coming decade.

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- The main agreement reached is
  - the fundamental importance of having the countries of the region incorporate science and technology as a driver in their economic development strategy.

- The following central ideas emerge as key to a sustainable development of science, technology engineering, and innovation in the Americas:
  - Investment in science, technology, engineering, and innovation in the Americas
  - The need for a common area of scientific research for the Americas
  - Global implications of scientific research
  - National, international, and regional collaboration

- Science and technology in democracy and social development
  - A crucial aspect of social development is the capacity of employment generation as the basis of sustainable development.
  - It is important to ensure that innovation systems reach the medium and small enterprises that are the economic basis of many countries in the region and expand their capacity as a source of better quality jobs.
- Measuring the social impact of national and regional science and technology programs

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- These central ideas converge in proposed common science and technology policies and strategies that are further addressed throughout this document. These proposals are summarized in the following seventeen issues:

- 1) Generating national strategies and policies in each member country
- * 2) Strengthening the scientific community and scientific institutions at the national and regional levels
- * 3) Focusing on the support of countries that are lagging in science and technology
- * 4) Hemispheric cooperation for the popularization of science and technology
- * 5) Training and education of human resources

- * 6) Promoting the formation of networks of scientific institutions and individuals
- 7) Stimulating collaborative research in projects involving south-south, and north-south (triangulation) interactions
- 8) Identification of centers of excellence for training and research for the region
- * 9) Collaboration with other international and regional institutions that share similar purposes
- * 10) Promotion of clusters and enterprise associations

- 11) Development of the national institutional infrastructure
- 12) Intellectual property
- * 13) Technology transfer and industrial development
- * 14) Facilities and standards
- 15) Development of science and technology indicators
- 16) Science and technology to promote and expand democracy
- *17) E-science, cyberinfrastructure, and the digital gap

* = natural connection to IEEE activities 10/17

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Tech Review Top 10 Feb. 2006

- Comparative Interatomics
- Nanomedicine
- Epigenetics
- Cognitive radio
- Nuclear reprogramming
- Diffusion tensor imaging
- Universal authentication
- Nanobiomechanics
- Pervasive wireless
- Stretchable silicon

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Key Technology Areas for Latin America

- Biotechnology
- Clean technology and renewable energies
- Information technology and advanced networks
- Materials and nanotechnology

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Biotechnology

- Areas where policy is needed
  - Agriculture/Aquaculture
  - Health/Human Welfare
  - Environment
- Examples of Current Successes
  - Health and health policy
  - Plant virus control
  - Regional cooperation in biotechnology
  - DNA identification in Costa Rica
  - Bacterial leaching of copper in Chile

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Clean technology and renewable energies

- **Sampling of recommendations and policies**
  - Formulate, propose, and develop policies in cleaner technologies and renewable energy.
  - Stimulate dissemination, education, and research and development on cleaner technologies & renewable energy.
  - Convince all stakeholders of the benefits available with the use of cleaner technologies.
  - Share countries' research experiences, skills, and knowledge in the areas of cleaner technologies and renewable energy, through fellowships, technical assistance missions
  - Promote the Internet as a vehicle for improving the quality and augmenting the exchange of information

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Information technology and advanced networks

- With over a decade of network development
  - achievements include islands of progress with state-of-the-art infrastructure,
  - the emergence of the Latin American Cooperation for Advanced Networks (Cooperación Latino Americana de Redes Avanzadas - CLARA), to support regional advanced networking.
- However, national research and education networks (NRENs) are largely based on commercial Internet services at low speeds;
  - there is limited global connectivity and great unevenness in levels of country development.
- The region is not positioned to participate effectively in global research or global economy.

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Information technology and advanced networks

- **Recommendations and Policies**
  - Invest in advanced national networks to stimulate national and regional economic development
  - Promote a policy and regulatory environment that encourages the deployment of advanced networking infrastructure and ready access to new technologies for research and education.
  - Focus on building local cyber infrastructure first, expanding in concentric circles to national, regional, continental, and worldwide scale.
  - Focus first on getting broadband capabilities to those with immediate needs, e.g., universities and hospitals.
  - Promote uses of networks within government.

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Materials and nanotechnology

- **Latin America examples**
  - Nano materials networks in Mexico (nano clays, nano composites, nano magnets, nano catalysts, optical devices and sensors)
  - In Brazil, four nano materials research networks (nanobiotechnology, nanostructured materials, interface and molecular nanotechnology, and nano semiconductor devices) were established as the Nanosciences Millennium Institute.

Materials and nanotechnology

- **Recommendations and Policies**
  - Enhance and expand support for collaborative research activities involving small groups. (e.g., Inter-American Materials Collaboration--CIAM).
  - Establish regional materials-research and nanotechnology centers and networks with shared facilities for fabrication, characterization, modeling, and applications development.
  - Establish regional centers of nanoscale metrology.

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Materials and nanotechnology

- **Recommendations and Policies**
  - Encourage strong industrial collaboration and establish incubator facilities near the research centers to leverage the research infrastructure.
  - Enable exchanges of students and researchers across the Americas.
  - Promote materials meetings and workshops to report on advances and identify new opportunities.
  - Encourage and support activities that take advantage of nanoscale science and engineering to promote mathematics, science, and technology learning.

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Network for the Popularization of Science and Technology (Red-POP)

Red-POP is an interactive network of centers and programs for the popularization of science and technology, operating by means of regional cooperation mechanisms that foster exchanges, training, and use of resources among its members. The network was established in November 1990, in Rio de Janeiro, inspired by the UNESCO's Science, Technology, and Society Program. The members of the Red-POP are formally institutionalized centers and programs for science and technology popularization that have applied for membership to the network, to support and promote Red-POP activities. Currently, the network has over 70 members from more than 12 countries in Latin America and the Caribbean; it also relates to science and technology popularization centers in many countries throughout the world (Directory of Full Members). Red-POP activities are established in the Cooperation Program, which is discussed and approved by the General Assembly at the Red-POP meetings held every two years.

Latin American Prize for the Popularization of Science and Technology

This prize is the highest recognition awarded in the region to a center, program, or specialist for outstanding work and national and regional impact in the fields of science and technology popularization. Its objective is to promote activities to popularize science and technology in Latin America and the Caribbean and to highlight efforts and undertakings that are exceptional because of their creativity, originality, rigor, impact, and contribution both at national and international levels. The prize is awarded every two years at a Special Session of the General Assembly of Red-POP.

IEEE Strategic Themes

- **We currently have identified six (6) themes:**
  - **Reputation**
  - **People**
  - **Global Reach**
  - **Knowledge**
  - **Innovation**
  - **Organization Vitality and Financial Viability**

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IEEE Focus on the Future: 10 Strategic Objectives

- Develop affordable and attractive alternative membership models that maximize membership opportunities, maintain the prestige of IEEE membership, protect IEEE's reputation, and ensure the economic viability of the enterprise.
- Position IEEE as a leader in Standards in the global marketplace and a trusted source for assessing the conformity of product and applications to appropriate IEEE standards.
- Establish IEEE as a leading provider of continuing education and professional development.
- Increase the value of the technical content and market relevance while continuing to provide trusted technical information products and services.

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IEEE Focus on the Future: 10 Strategic Objectives

- Position IEEE as a highly visible force in model curricula development, global university-level accreditation and professional credentialing of individuals.
- Evolve an IEEE-wide strategy in fast-developing regions of the world with an initial focus on China.
- Promote public awareness, understanding and appreciation of engineering and technology.
- Improve IEEE's volunteer and staff organization and its governance processes.
- Embrace emerging technologies, broaden technologies already served, and build new technical communities as a means of fostering technological innovation.
- Diversify IEEE's net-revenue generating portfolio.

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Conclusions

- IEEE should be, and is, a broad forum to discuss the issues of our regions and the world
  - Including economics, policy, technology
  - Not just IEEE business
- We should, and do, make a difference in the technical and economic success of our countries and regions
  - Remember the IEEE vision
- Take the opportunity of IEEE meetings to expand the range of our discourse and ultimately our influence
- The future well-being of the world depends on the successful global partnership of science, technology, business and governments

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- Thank you
- Muchas gracias

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