istec

IBERO AMERICAN SCIENCE & TECHNOLOGY
EDUCATION CONSORTIUM

Education and Technology: ISTEC

Santiago de Chile - Dec 14-15, 2000

Outline

- Motivation
- What is ISTEC?
- Initiatives and Projects:
  - Library Linkages (LibLink)
  - Advance Continuing Education (ACE)
  - Research and Development Laboratories (R&D Labs)
  - Los Libertadores
- Strategic Alliances
- Los Libertadores 2001
- Recommendations

HOPI saying: does this talk grow corn?

Motivation

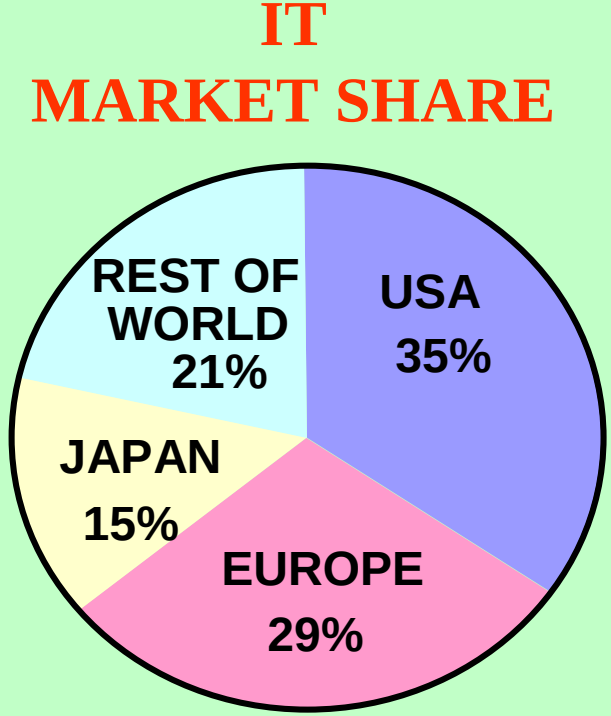
IT Reality

- Teledensity

  (telephone lines per 100 inhabitants)
  - Industrialized nations is over 48
  - Middle-income nations around 10
  - Least advanced countries is about 1.5
  - World average is 11.5

- Informatics gap

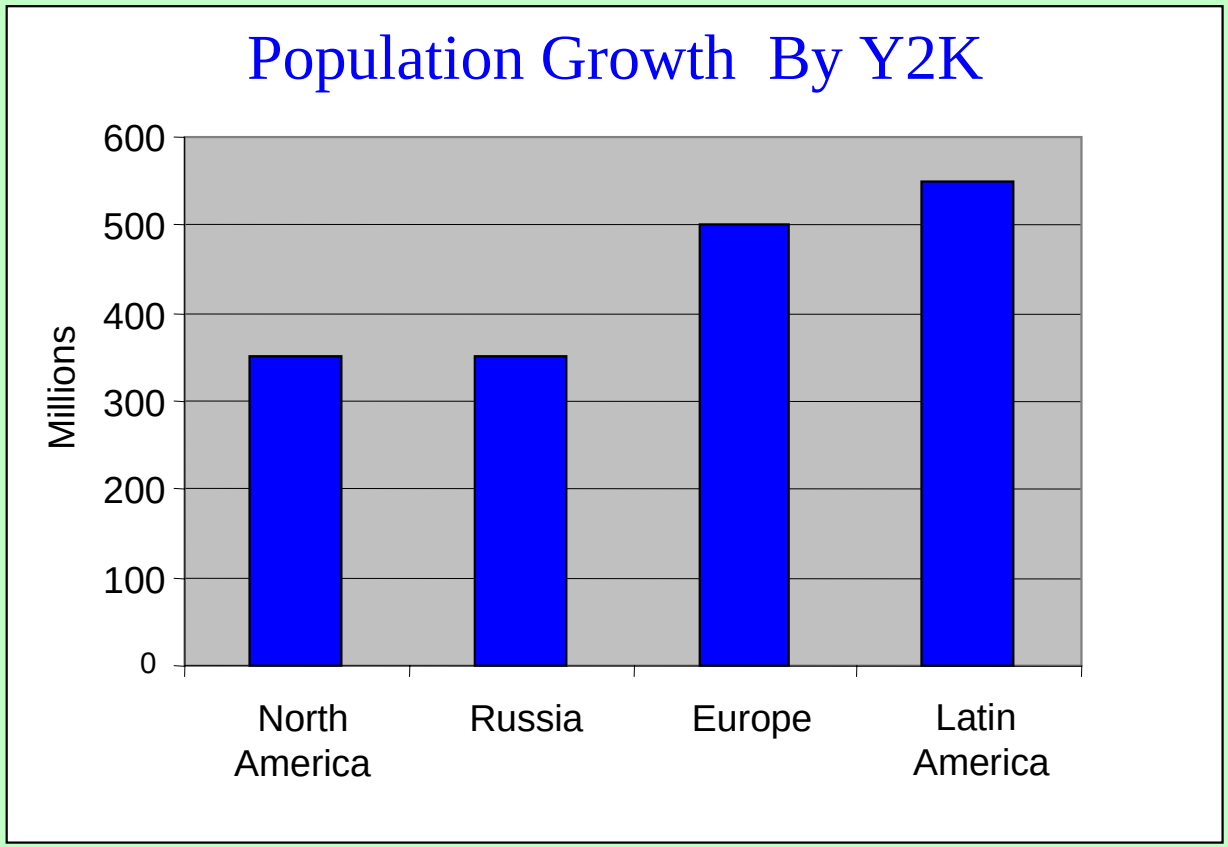
  (PC ratio per 100 inhabitants)
  - Industrialized nations is over 18
  - Middle-income nations around 2.3
  - Least advanced countries is about 0.01



Latin America Y2K

There are hidden resources in Latin America.

- **100 million without basic education; 44 million illiterate**



Trends

- Makes creativity and innovation possible
  - flourishes under unconstrained government bureaucracy
  - flourishes with a vision and free of legacy business models
- Innovation: independent of who you work for, what rank you have, comes from the best ideas
- Does not allow a term like “allow”, it disallows. Allow what users demand.
- Based on the principle “end-to-end”, democracy
- Control and intelligence is placed on the “end”, diversity is good
- Network is kept simple, no discrimination
- Frees innovation from the past, taps into creativity that is already distributed

INTERNET

Trends

- Information doubles every 5 years; by 2010 every 72 days
- Moore's Law: CPU performance doubles every 18-24 months
- Bandwidth doubles every 9 months
  - 1 Tbps data network being deployed
- 90 days to launch an IPO: business model change
  - Brick and mortar to click and mortar (partnerships, solutions partners)
- Digital divide gap: info-rich vs info-poor
- Middle Ages to Renaissance
  - Central vs Distributed Systems
  - Closed vs Open Systems
  - Political Democracy vs Economic Democracy (Creative Economy)

Trends

- IT industry share of US GDP
  - in 1991 - 5.8%
  - in 1999 - 8.2%
- IT industry contribution to annual GDP growth
  - in 1991 - 6.6%
  - in 1999 - 19.2%

Competitive = creativity + innovation

Creative Economy = information + ideas

Connectivity

- 3% of Latin America is connected to the Internet
  - currently 9 million, next 3 years grow to 35 million
  - 15% population, info-rich, upper-class
  - 68% of software is pirate
- 41% of USA is connected to Internet; 19% EU; 2% Eastern Europe; 1% Middle East
- Telephone Internet access
  - Wash DC $45/month
  - Argentina $171/month
  - Bolivia $302/month
  - Honduras $344/month

New Models

- BS degrees awarded in IT declined from a high of 42k in 1986 to 24.2k in 1997
- In 1994 managers complain that degrees awarded do not reflect the needs of employers
- Many university programs have been slow to react to changes in the marketplace
- Degrees focus on outmoded technologies
- Curricula update: EECE + Biology + Business + Ethics

New Models

- Education: Static vs Dynamic
  - Teamwork
  - Multidisciplinary
  - Teach entrepreneurship
  - Generate ideas
  - Create opportunities
  - Knowledge creation, administration, management
  - Universalization vs Privatization
  - Leadership
- Transparency, Efficiency, Effectiveness
  - Internet is the new equalizer, democratizes, and brings accountability
  - Does not tolerate bureaucracy nor legacy business models
  - “do not trust people over 35 years”
  - Know-how vs know-who

Education

- USA Web based training
  - 1997: $197 million
  - 2002: $6 billion
- Latin-America Web based training
  - 2000: $2.5 billion

Just-in-time

Curricula Reform Accreditation

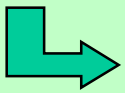
E-commerce

- More than 8% (11 million) of US population made an on-line purchase in 1997
- In 1998 was over 15 million
- World market:
  - by 2000: 200 billion
  - by 2003: 1.3 trillion
- Latin America currently $300 million, grow to $1.5 billion in 3 years
  - 80% is collected outside (USA, EU)
  - 77% of transactions are books, food, and PCs

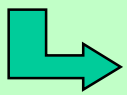
What is ISTEC?

ISTEC Process (1990)

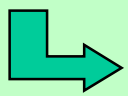
EXPLORED OPPORTUNITIES



IDENTIFIED OBSTACLES



DEVELOPED RECOMMENDATIONS



CREATED ISTEC MISSION

Obstacles (Why do it?)

- Lack of current information for planning and developing technology.
- Lack of expertise in the use of information.
- Lack of international cooperation in developing the critical mass needed for projects and joint efforts.
- Lack of interaction (lack of confidence,

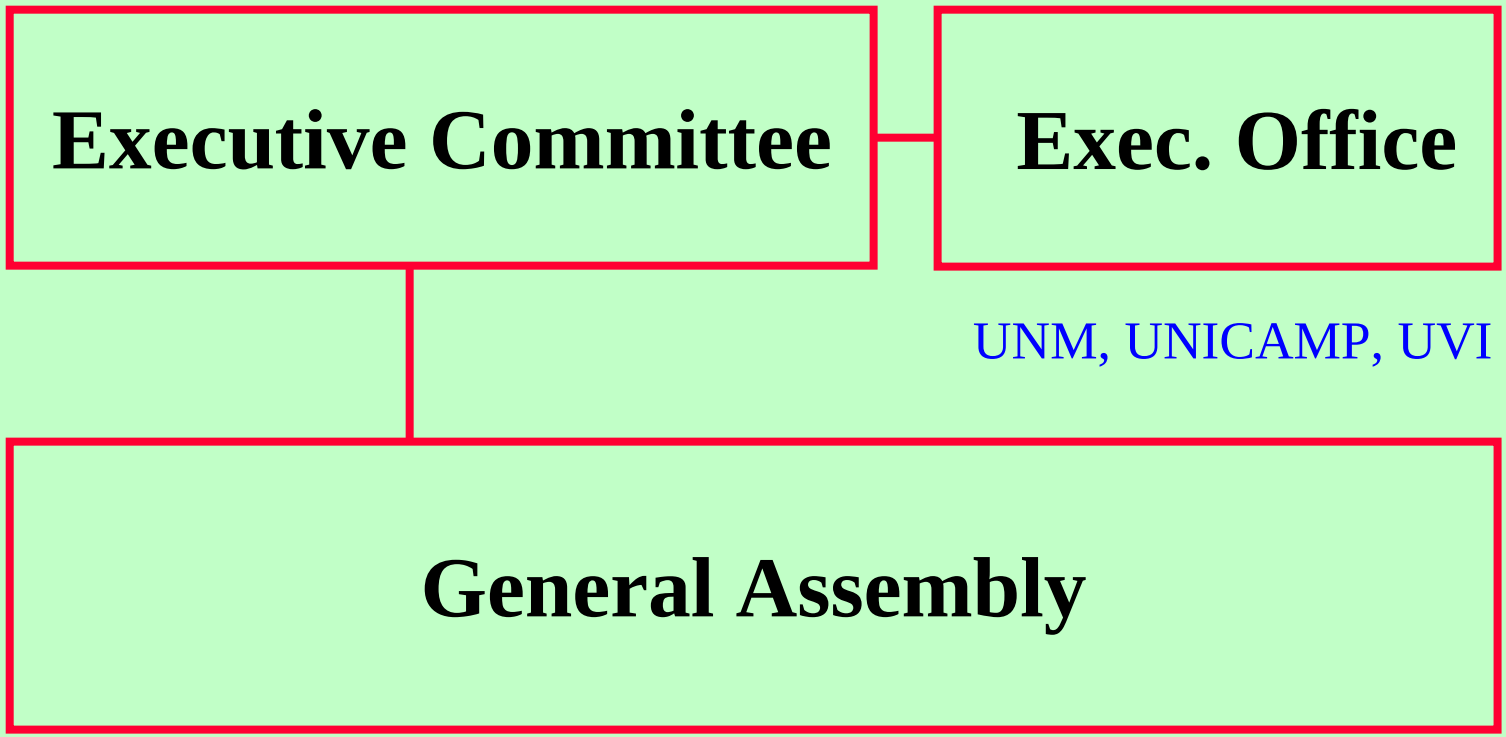
  lack of information) among academia, productive sector, governments and international agencies.
- Lack of availability of technology.

Mission Statement 12/4/90

ISTEC is a non-profit organization comprised of educational, research, and industrial institutions throughout the Americas and the Iberian Peninsula. The Consortium has been established to:

- foster scientific, engineering, and technology education;
- conduct joint international research and development efforts among its members, and
- provide a cost-effective vehicle for the application of technology.

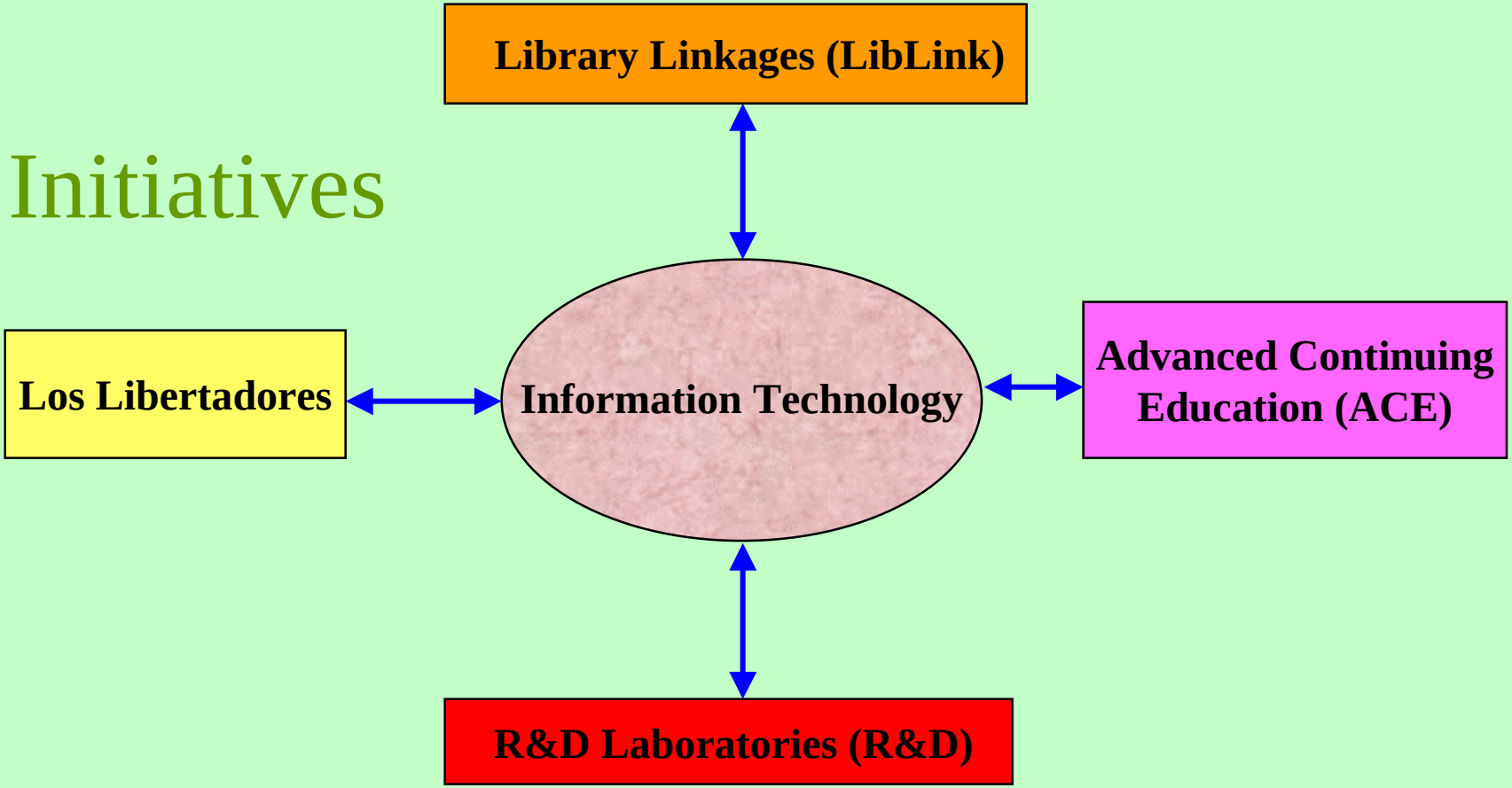
ISTEC Organization



Initiatives and Projects

ISTEC - Contributions

Initiatives



Library Linkage Initiative

GOAL: design and implementation of innovative, international Science and Technology information-sharing services.

TECHNOLOGY: Internet services and connectivity. Search and Push engines. Ariel, Randex, Phronesis, VxInsight/SciSearch tools. Seed funding from Nortel Networks. IPO, EBSCO, SilverPlatter

STATISTICS: annual compound growth rate of >200% since 1995. Over 50 libraries in 24 countries connected in real-time. Open collections in the region: LigDoc, PrEBi, REBIDIMEX, RedCOL. Development of on-line scientific journal, and database on S&T, ETDs. Workshops. Member of ALLIANCE.

ACE Initiative

GOAL: upgrade of human resources and curriculum development through on-site training, distance learning, and non-traditional exchange programs.

STATISTICS: 6 satellite courses to 250 institutions with ATEI. Short courses for Motorola. 196 scientists trained in DIP with OAS support. Over 50,000 ftp grabs of web DIP course. “Sandwich” programs. ARIADNE alliance. Curricula enhancement. Morgan-Kaufmann, Infocast, SCT alliances.

TECHNOLOGY: on-site training, web-based education, video courses, satellite delivery, and “sandwich” graduate programs. Infocast.

R&D Laboratories Initiative

GOAL: design and installation of modular, flexible, and expandable laboratory facilities for education, training, and R&D (link with productive sector).

TECHNOLOGY: Motorola microprocessors (680XX), microcontrollers (68HC11) and DSPs (56XXX).
Microsoft, Sun Microsystems, Nortel Networks, MentorGraphics, Synopsys, Khoral, Infocast.

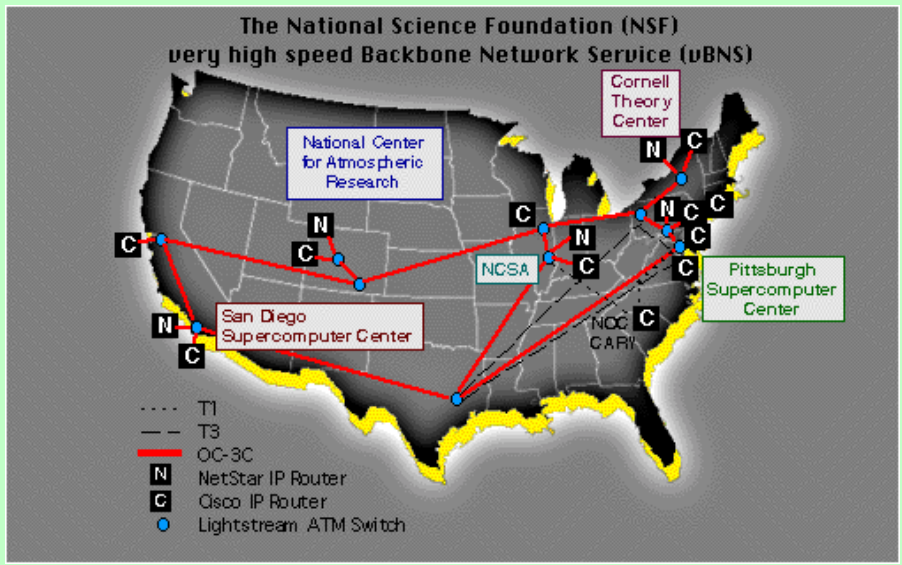
STATISTICS: to date 123 Motorola facilities in 67 sites. Approximately 30,000 users trained since 1991. 9 facilities with Nortel Networks, 2 with Fluke and 14 with VeriBest. Efforts: Multicom-21, LatinChip, C&S, Divertinanza.

Los Libertadores Initiative

GOAL: network of Centers of Excellence equipped with the latest telecommunications and computer technology to provide real-time access to a world-wide system of expertise and knowledge.

TECHNOLOGY: creation of the Ibero-American academic and R&D Internet backbone. A partnership among industry, academia, governments, and international agencies.

EFFORTS: technical assistance in telecommunications and S&T legislation in Ecuador, and Bolivia. Awareness campaigns in IT throughout the region. Agreements with IADB, OAS, WB, UNESCO, UN (ECOSOC).



Theme

- **Los Libertadores: Integrate the region through Science and Technology**

  - **Utilize appropriate state-of-the-art technology**
  - **Create new and modify existing programs of study**
  - **Improve R&D capabilities**
  - **Promote joint national and international R&D programs**
  - **Upgrade existing or acquire new information technologies**
  - **Permit real-time access to information**
  - **Promote Effectiveness, Efficiency, and Transparency**

Theme

- **Recruit multinational industry and US universities**
- **Project Identification, Partnering, and Fund Raising**
  - **Industry (local, international)**
  - **Universities (public, private)**
  - **Government (State and Federal)**
  - **International Agencies and Organizations**
- **E-transactions**

Projects

- BDDIS
  - Expertise and activities
  - Who's who, Surveys, Indicators
- STEP Portal
  - Deployment of Servers
  - Expand Intranet, E-services
  - Workshops, Conferences, Seminars
  - Create/Expand Strategic Alliances with OAS, IADB, UNESCO, WB, UNDP, CAF and others
  - Work with Government Agencies
  - Launch the Motorola IT Challenge, LatinChip
  - From the laboratory to the marketplace: HighTechGurus.com, Industrial Members

Strategic Alliances

Strategic Alliances

- 1) Motorola
  - **IT Challenge Goal:** The objective is to sponsor conferences, workshops and forums with the participation of high-ranking government officials, academia, industry and international organizations to create awareness, analyze existing IT models in other regions, develop an IT agenda, and obtain commitments to implement an IT plan for the next decade. The agenda will address issues such as the automated process for production, e-commerce, e-government, distance employment and education, S&T policies, IP protection, social and cultural values, health, strategic alliances, and universal access to information. Planned four regional workshops per year for 2001-2002.
  - ISTEC Portal development
  - Laboratories enhancement and creation, curricula reform, R&D efforts
  - Licenses of new technologies (DSP)
  - Mentor Graphics (Verilog) and Synopsys software
  - Technology transfer of M*CORE to be followed by DSP 568XX
  - M-CORE textbook in collaboration with Morgan Kaufmann
  - Digital Libraries, knowledge management
  - Internet2 projects

Strategic Alliances

- **2) Plan ISTEC/IACD for Central America, Caribbean, Bolivia and Paraguay – Inter-American Agency for Cooperation and Development (IACD)/Organization of American States (OAS)**
  - Digital Libraries
  - Distance Education
  - IT Challenge Workshops
  - Portal and Distributed Database

- **3) Nortel Networks**
  - Laboratories development in telecommunications
  - IT infrastructure development in the region
  - Distance Learning
  - Equipment discounts
  - Curricula reform
  - R&D efforts
  - IT Challenge Workshops

Strategic Alliances

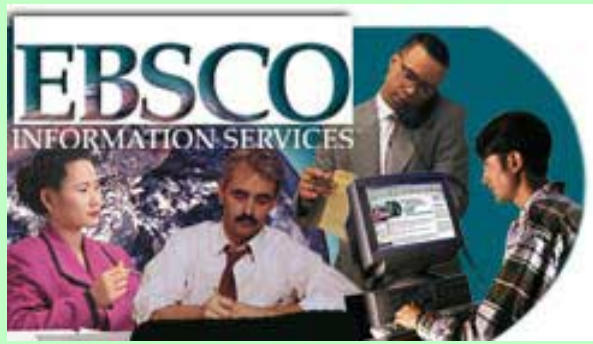
- 4) Sun Microsystems
  - Laboratory development in networking, system administration, and software
  - Incubation at universities
    - IT infrastructure
    - Venture Capital
  - Equipment purchases
    - Dollar for dollar matching
    - Competitive prices
    - Educational discounts
  - Certification centers
  - E-services
  - IT Challenge Workshops

- 5) SCT
  - Enterprise Resource Management software
  - E-services
    - Connected learning
    - Fundraising
    - Faculty, employee, and student retention
    - Resource management
  - Educational discounts

Strategic Alliances

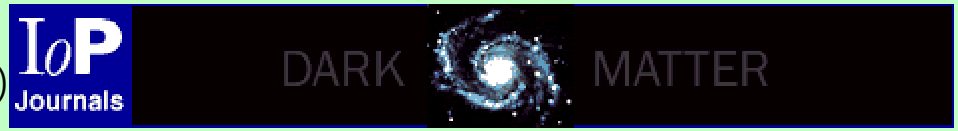
- 6) Microsoft
  - Student consultants
  - Laboratory development in software engineering
  - R&D workshops
    - Faculty and researchers (April 2001)
    - Faculty summit (July 2001)
  - Accreditation workshops with ABET
  - Software development contest
  - Venture Capital for ISTEC projects
  - Software donations for ISTEC projects
  - IT Challenge Workshops
  - Five servers for real-time forum and Alexandria Project and student support

- 7) EBSCO
  - Access to scientific collections
  - Electronic Thesis and Dissertations (ETD's)
  - Educational discounts per volume
  - Portal development



Strategic Alliances

- 8) IOP
  - Access to scientific collections
  - Electronic Thesis and Dissertations (ETD's)
  - Educational discounts per volume
  - Portal development



- 9) SilverPlatter
  - Access to scientific collections
  - Electronic Thesis and Dissertations ETD's
  - Educational discounts per volume
  - Portal development

- 10) High Tech Gurus
  - Venture capital / incubators
  - Consulting
  - Data-mining
  - Databases
  - Total Quality in Basic Education

Strategic Alliances

- 11) IMPSAT
  - Connectivity/bandwidth: Ibero-American backbone

- 12) Inter-American Development Bank
  - Matching Funds for IT Challenge
  - IT Challenge Workshops
  - International Leaders Forum

- 13) CORINEX
  - Wireless LANs and WANs
  - Data Billing Software
  - Broadband data billing software
  - Power line technology
  - Educational discounts

Strategic Alliances

- 14) MIT Media Laboratory
  - Joint research and development efforts
  - IT awareness workshops
  - From the lab to the marketplace
  - Education projects (on-site, remote, and professional development)
  - Internships

- 15) University of Tennessee - Knoxville
  - Education projects (on-site, remote, and professional development)
  - Internships
  - EECE MS and PhD recruitment and scholarships
  - Content development

Strategic Alliances

- 16) University of South Florida
  - Master Degree in Library Sciences
  - Semiconductor Training Center
  - EECE MS and PhD recruitment and scholarships
  - Education projects (on-site, remote, and professional development)
  - Internships
  - Content development

- 17) University of New Mexico
  - Chair in Information Sciences and Technology
  - EECE, and CS MS and PhD recruitment and scholarships
  - Education projects (on-site, remote, and professional development)
  - Internships
  - Content development
  - High-Performance Computing Center

Strategic Alliances

- 18) Los Alamos National Laboratory (LANL)
  - Early warning and precision agriculture
  - Internships
  - Joint R&D efforts
  - IT Challenge workshops

  Los Alamos science serving society
- 19) Infocast
  - Education projects (on-site, remote, and professional development)
  - Content development
  - Educational discounts and licenses

- 20) Khoral Research

  - Content development and IT Consulting
  - Educational discounts and licenses
  - Software development projects
  - Commercialization of projects

Strategic Alliances

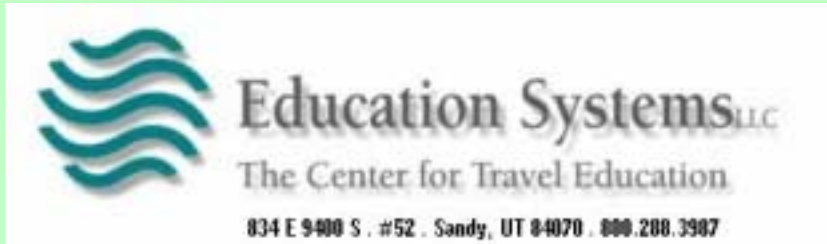
- 21) University of Puerto Rico at Mayagüez
  - ECE MS & PhD recruitment and scholarships
  - Outcomes Based Curriculum Development
  - ABET 2000 Accreditation Process
  - Strategic Planning to support Science & Technology Policy
  - Alliances with industry and government
  - Joint research and curriculum development projects
  - The Learning Factory

- 22) CLEI (Centro Latinoamericano de Estudios en Informatica – Latin-American Center for the Study of Informatics)
  - Joint R&D, workshops and conferences
  - Curriculum Development
  - Accreditation Process
  - Strategic Planning to support Science & Technology Policy
  - Alliances with industry, government, international agencies
  - Joint membership

Strategic Alliances

- 23) GWEC (Global Wireless Education Consortium)
  - Joint R&D, workshops and conferences
  - Curriculum Development
  - Accreditation/certification Process
  - Strategic Planning to support Science & Technology Policy
  - Alliances with industry, government, international agencies

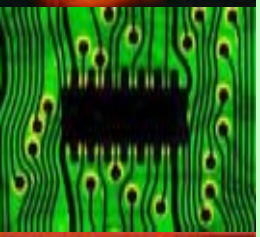
- 24) Education Services
  - Wireless campus networks
  - E-services for ISTEC Portal
  - Joint R&D, workshops, conferences

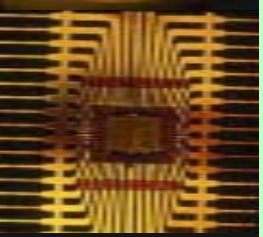


Strategic Alliances

- 25) AMPATH
  - Broadband communications – Internet2
- 26) EpicEdge
  - End-to-end e-transaction solutions
- 27) Newark
  - Electronic components
  - Instrumentation
- 28) LatinChip - CEITEC
  - Microelectronics R&D, and Education Center


Ibero-American Center
for Advanced Electronics Technology
CEITEC


GOVERNMENT OF RIO GRANDE DO SUL STATE

CITY OF PORTO ALEGRE

MOTOROLA

PROCERGS

PROCEMPA

FIERGS

FEDERASUL

abinee

PUCRS Univ.

UFRGS Univ

UNISINOS

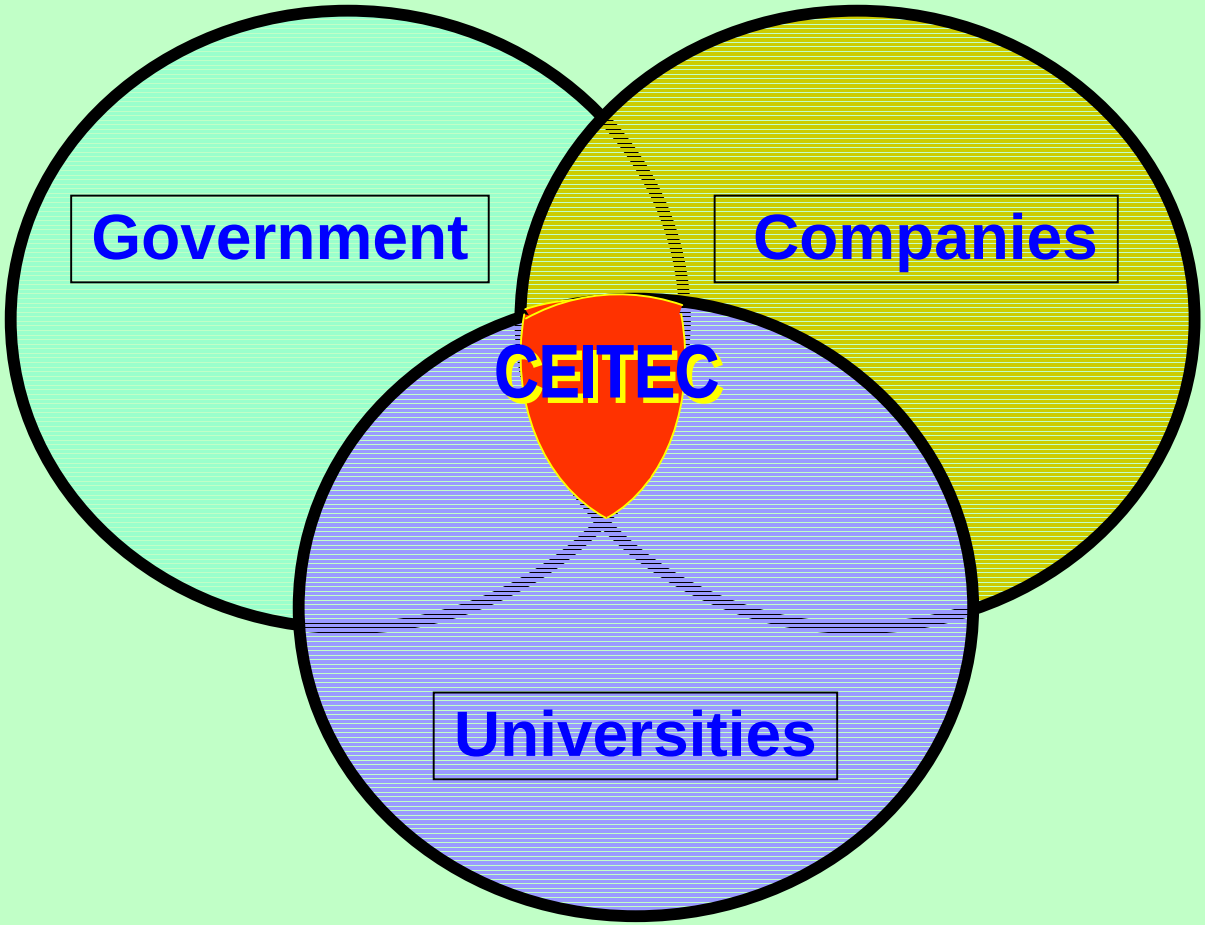
ISTEC

CEITEC

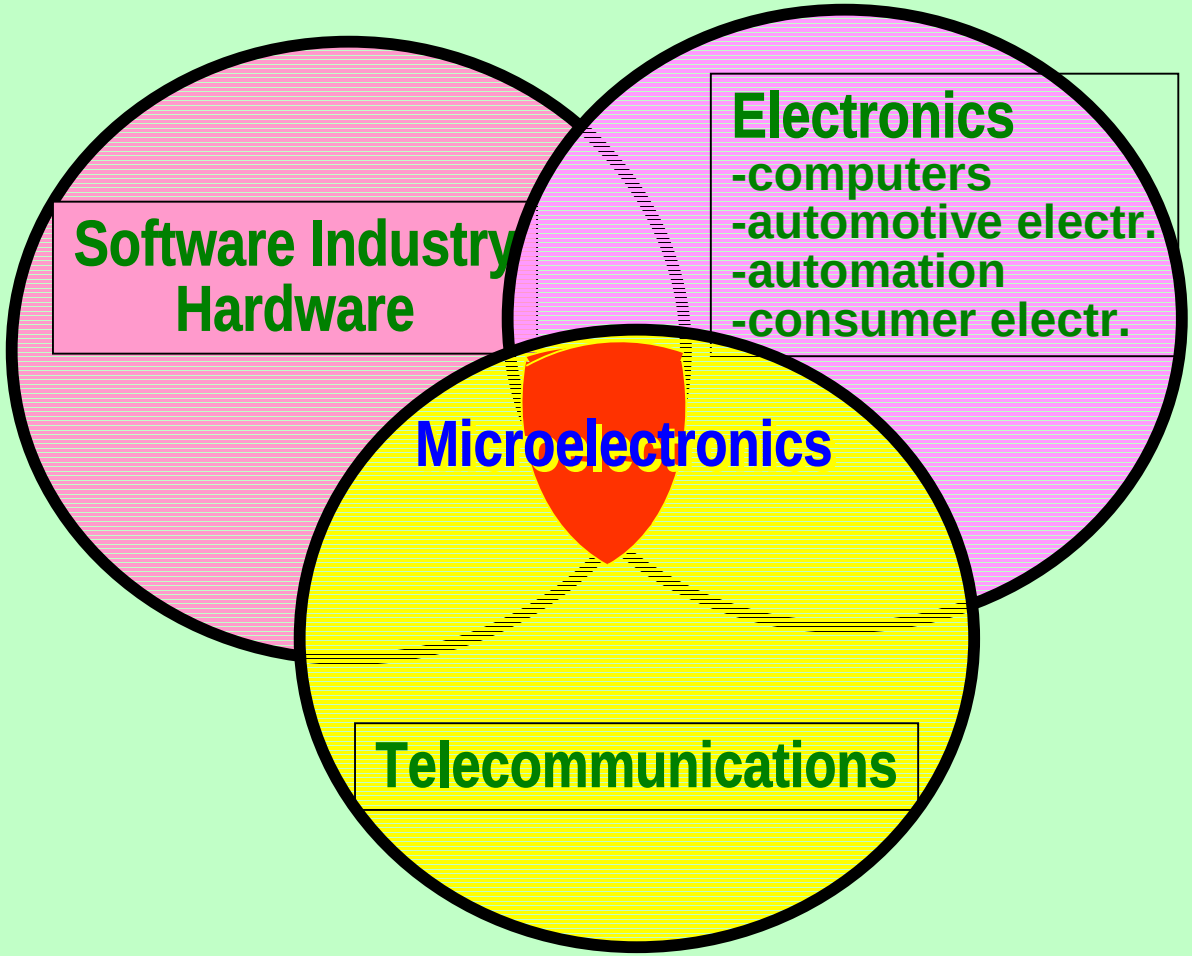
C E I T E C

- **A set of strategic actions and investments aiming at the goals:**
  - **CMOS Integrated Circuit Prototyping facility (first submicron CMOS in Latin America).**
  - **Infrastructure for advanced electronics technology.**
  - **Focusing on the attraction and creation of new strategic technology enterprises.**
  - **Strong R&D partnership with companies worldwide.**

Focus on Partnerships



Strategic Vision



Los Libertadores 2001

Los Libertadores 2001

- Centers of Excellence
  - Digital Libraries
    - ETDs
    - Local collections
    - On-line journals
  - Advanced Continuing Education
    - Professional development
    - Just-in-time education
    - Curricula enhancement
    - Accreditation/certification

Los Libertadores 2001

- Centers of Excellence
  - R&D laboratories
    - Curricula enhancement
    - R&D efforts
    - Incubation/spin-offs
    - Technology transfer
  - Connectivity
    - Hemispheric backbone – Internet 2
    - Wireless campus
  - E-services
    - ISP
    - ASP
    - Databases
    - Consulting
    - Datamining, market analysis

Los Libertadores 2001

- Revenue opportunities: sustainability
  - Sponsored research and development
  - Databases
  - Services: data-mining, S-o-C design, Software development
  - Business development
  - Consulting
  - Content
  - Marketing

Recommendations

LAC Opportunities

- Change: forces that cannot be controlled
  - Forces produce brand-new business
- Awareness is one thing, but the ability to do something about it is quite another.

When? Time is NOW!

LAC Opportunities

- Waves
  - Computers
  - Telecommunications
  - Netsources
- Positive or negative Feedback?
  - Need a sound, aggressive, long-term, and flexible national policy in Science and Technology (S&T)
  - Degree of success is directly proportional to strategic investments in science, technology, and information systems
  - Countries that do not adapt to the technological explosion will not be able to compete
  - Need Center(s) of Excellence for S&T to enhance the capabilities of industry, government, health and educational institutions
  - International cooperation
  - Partnerships, alliances, new leadership

Recommendations

- **Project Identification, Partnering, and Fund Raising**
  - **Industry (local, international)**
  - **Universities (public, private)**
  - **Government (State and Federal)**
  - **International Agencies and Organizations**
- **Competitiveness: invest in Education, Science and Technology**
  - **create/enhance/maintain HR**
  - **HR exist in LAC**
  - **Worldwide demand for IT talent**
  - **Wages – Quality of Life**
  - **Competitiveness = innovation + creativity**

Recommendations

University-Industry Relations. Why?

- **Access to pre-competitive research**
- **Early warning of potential technology breakthroughs**
- **Pursue industry-relevant research**
- **Access to high-skill resources**
- **Conduit for intellectual creativity**
- **Branding and market development**

Benefits (Why do it?)

- Integrate Ibero-America with science and technology: promote and support the new multilateralism.
- Place Ibero-America in a leading role: a response to challenges from other regions.
- Make S&T an integral part and top priority for the economic development and sustainable growth of Ibero-America.
- Create new opportunities: business, academia, government.
- Reduce national/regional inequalities: invest in education and S&T.
- Competitiveness: create/enhance HR.

Integrating first, then negotiating

ISTEC Contact Information

www.istec.org

DD … DO IT!

obrigado
gracias
thank you
merci