# The Philippine Electronics Industry: Cultivating an Innovation and Entrepreneurship Culture

De La Salle University - Manila
June 11, 2010

Presented by:

**Arthur J. Young, Jr.**
Chairman and CEO, PSi Technologies, Inc.
Chairman, Semiconductors & Electronics Industries in the Phils., Inc. (SEIPI)

SEIPI

PSi TECHNOLOGIES, INC.

# Outline

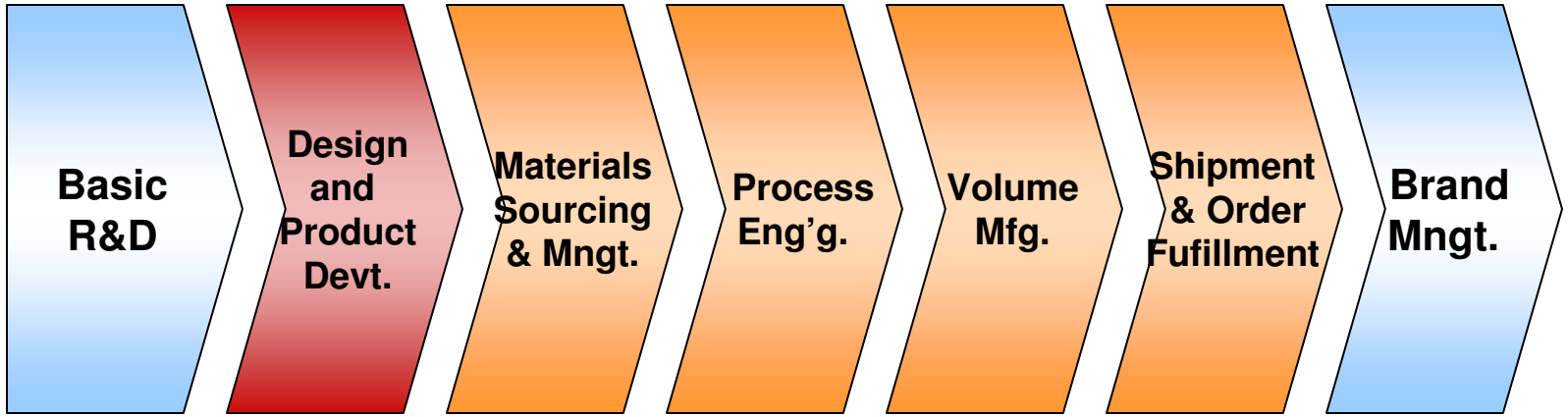
- Global Electronics and Semiconductors
- The Philippine Electronics Industry
- Philipine Electronics: Updates and Outlook
- Industry, Government and Academe: Alliance Towards an Innovation and Entrpreneurship Culture


Global Electronics &
Semiconductor Industry

# Electronics Industry Supply Chain

- Original Equipment Manufacturers (OEMs)
- Electronics Manufacturing Service (EMS) Providers
- Original Design Manufacturers (ODMs)
- Integrated Device Manufacturers (IDMs) / Semiconductor M'facturing Service (SMS) Providers

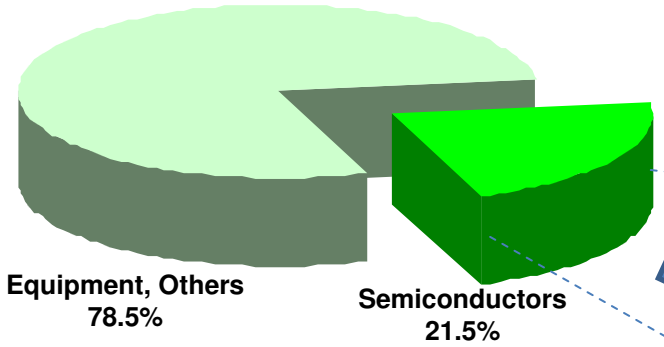
IBM, SONY, NOKIA, FOXCONN, FLEXTRONICS, JABIL, ASUS, COMPAL, wistron, Texas Instruments, ST, NXP, ASE Group, Amkor Technology, SPIL



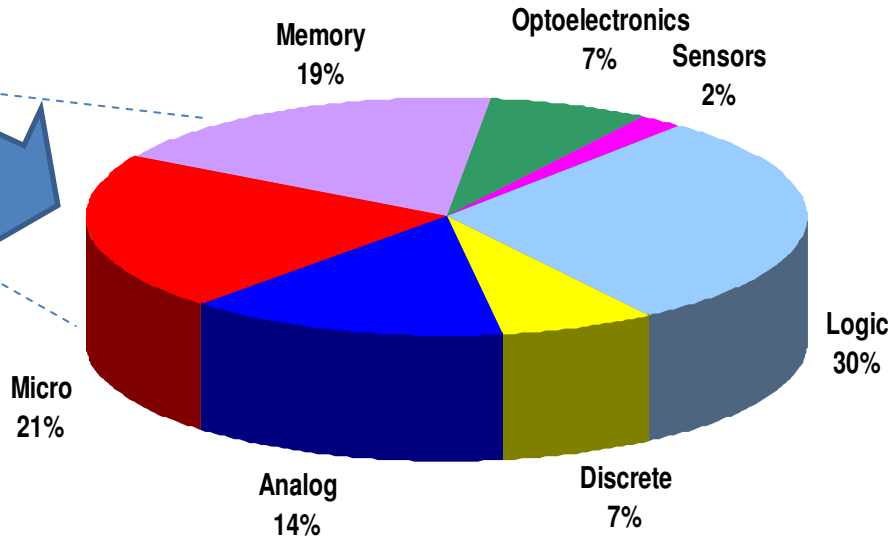
# Global Electronics Market Size

**2009 WW GDP = $55.6 Trillion**

**2009 WW Electronics Systems Revenues = $1.109 Trillion**



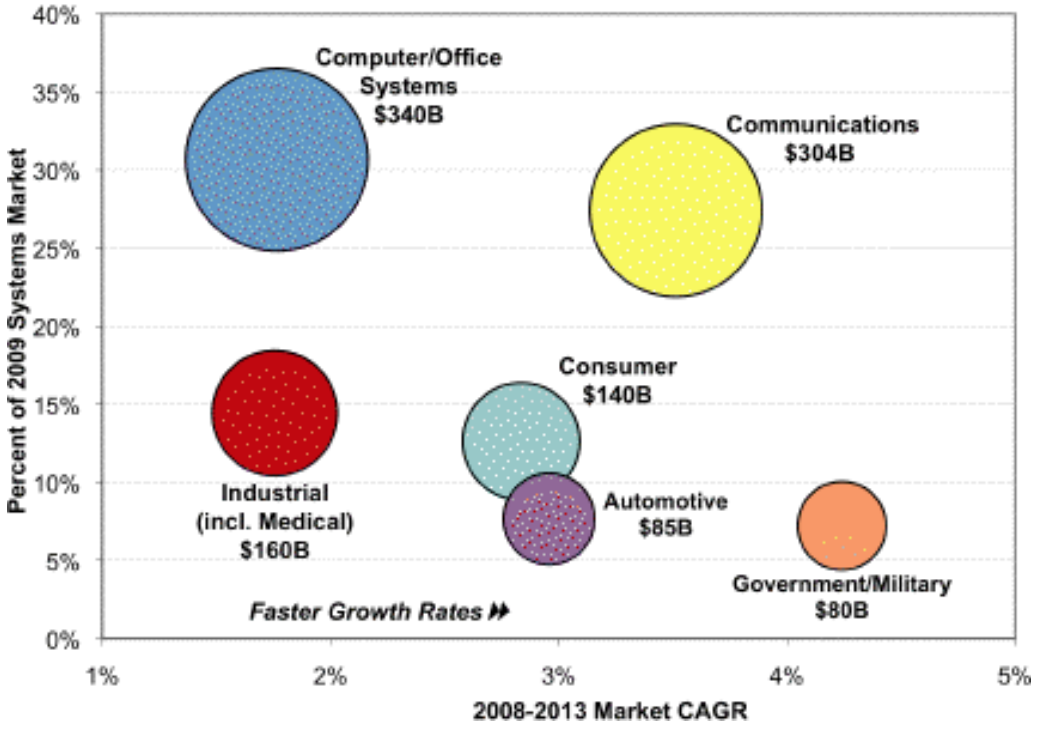

**2009 WW Semiconductor Revenues = $239 Billion**




Source: IC Insights, March 2010

# Electronics Systems Markets and Forecast

## 2009 Electronics Systems Markets
## Market Revenues = $1.109 Trillion




**Worldwide electronic systems sales are forecast to increase 7% in 2010, the highest level since 2004.**

Source: IC Insights: Integrated Circuits Market Drivers 2010

SEIPI

PSi TECHNOLOGIES, INC.

# Consumer Demand Driving Current Global Electronics Market

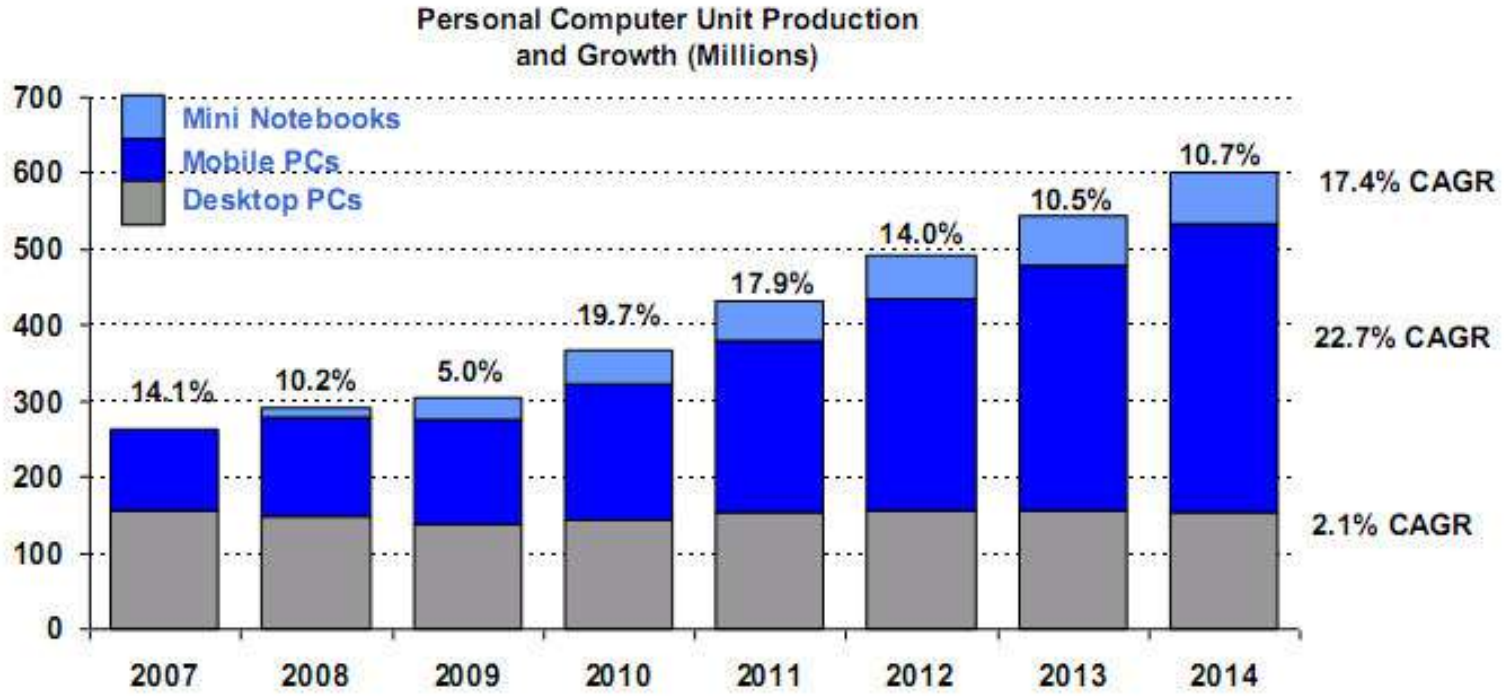
- A major factor driving demand in the first quarter of 2010 and beyond is consumer demand for electronic products, which continues to surpass expectations.

- Strong sales growth is predicted for 2010 in PCs, mobile handsets, LCD-TVs and other semiconductor-rich electronic systems.

Source: iSuppli, May 6, 2010

# PC Production Forecast

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Semi TAM ($bn) | 50.3 | 46.1 | 47.2 | 60.9 | 64.1 | 62.5 | 65.6 | 71.0 | CAGR '09-'14 |
| Year/Year Growth | 4.6% | -8.4% | 2.5% | 28.9% | 5.4% | -2.6% | 5.0% | 8.3% | 8.5% CAGR |




- **Mobile PCs will continue to drive the PC forecast.**

Source: Gartner Semiconductor Forecast, 1Q10, March 2010

SEIPI

PSi TECHNOLOGIES, INC.

# Cellphone Production Forecast

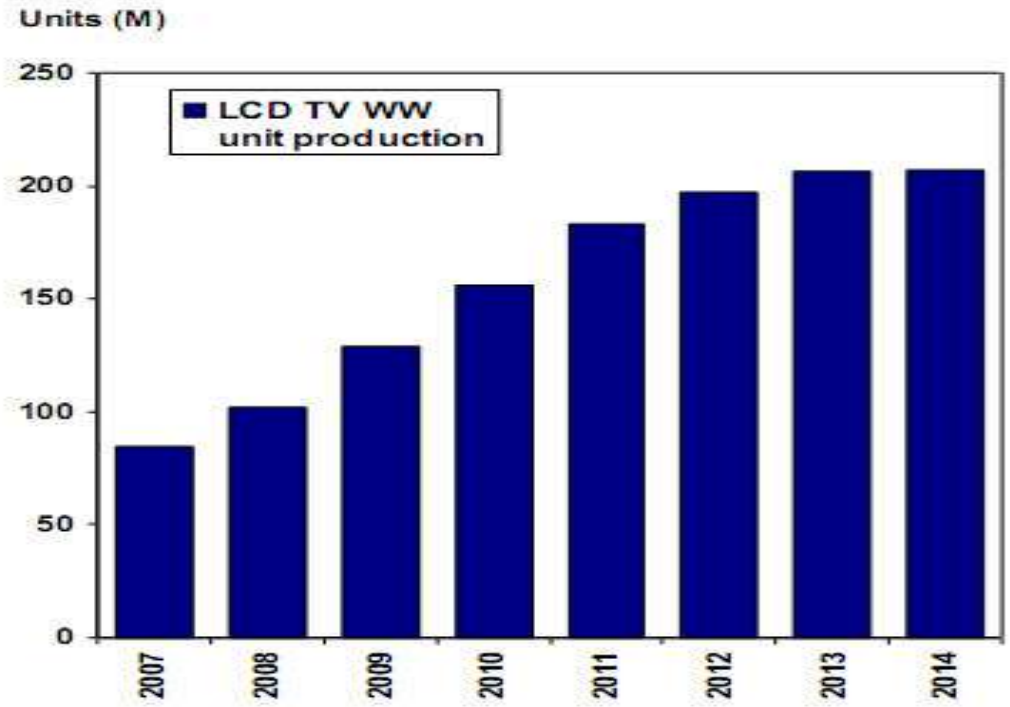
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Semi TAM ($B) | 46.4 | 44.7 | 41.8 | 46.6 | 50.5 | 52.0 | 51.7 | 51.9 | CAGR '09-'14 |
| Year/Year Growth | 7.4% | -3.6% | -6.6% | 11.5% | 8.4% | 2.9% | -0.6% | 0.4% | 4.4% CAGR |


- **Smart Phones will have a CAGR of 30.7% in the period 2009-2014 while Basic and Enhanced Phones production continue to decline.**

Source: Gartner Semiconductor Forecast, 1Q10, March 2010

# LCD TV Production Forecast

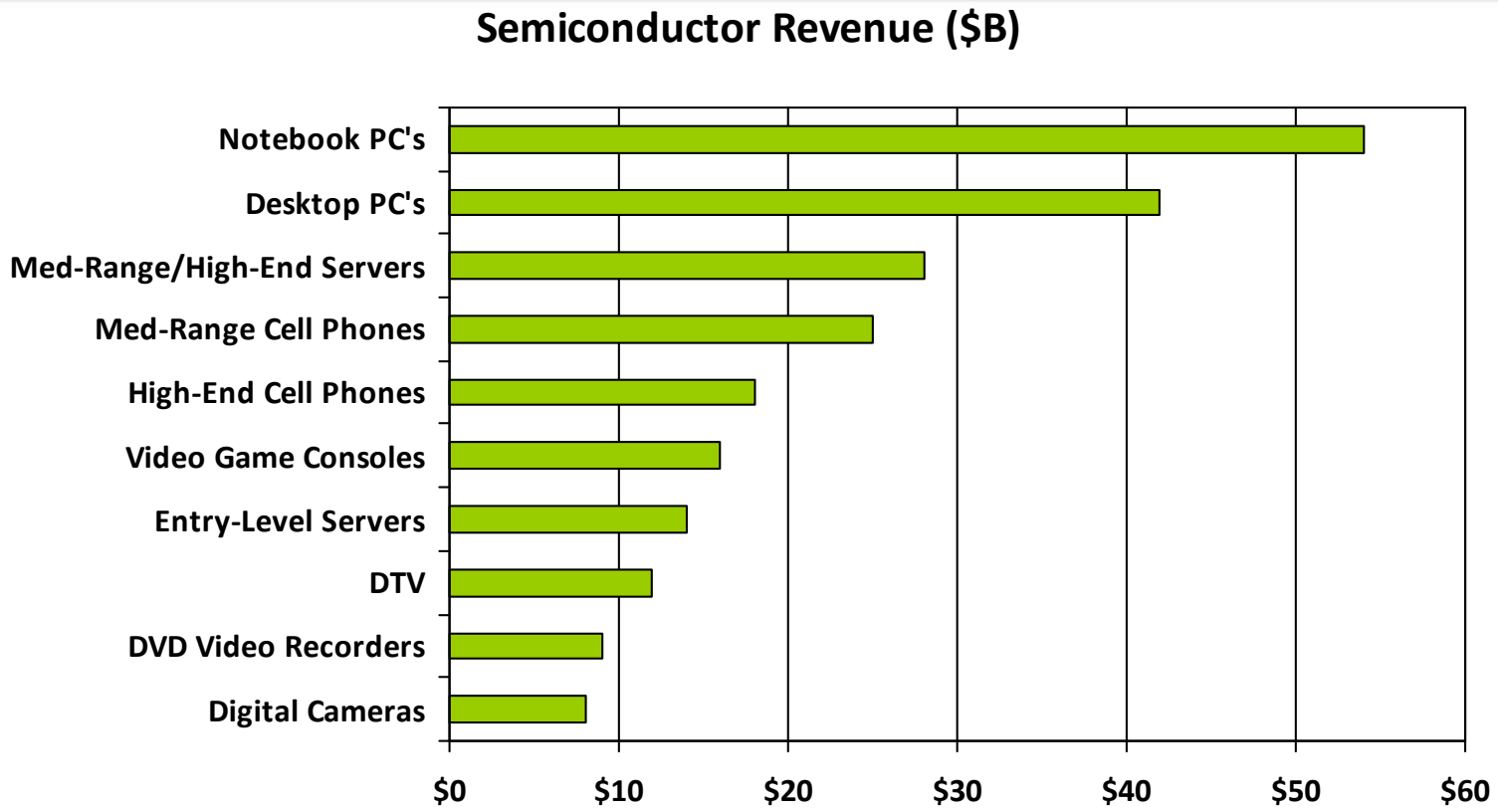
**LCD TV Unit Production**
**(Million Units)**




- **LCD TVs with integrated internet access providing access to alternative video content wil show high growth in 2010/2011.**

Source: Gartner Semiconductor Forecast, 1Q10, March 2010

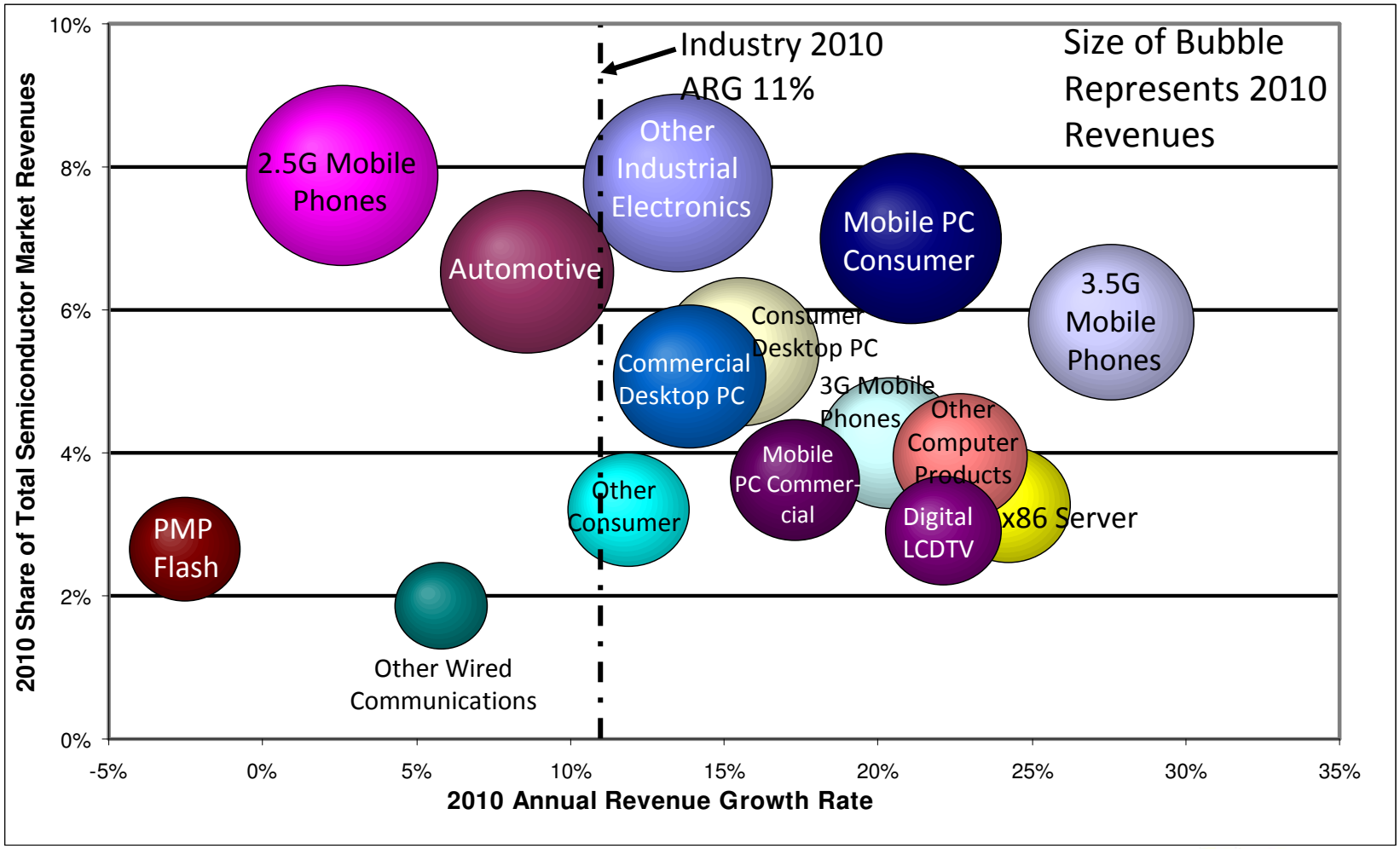
# 2010 Top 10 Semiconductor Applications Markets




- **Traditional market drivers like PCs and cell phones continue to dominate the semiconductor markets.**

Source: Semico Research, May 27, 2010

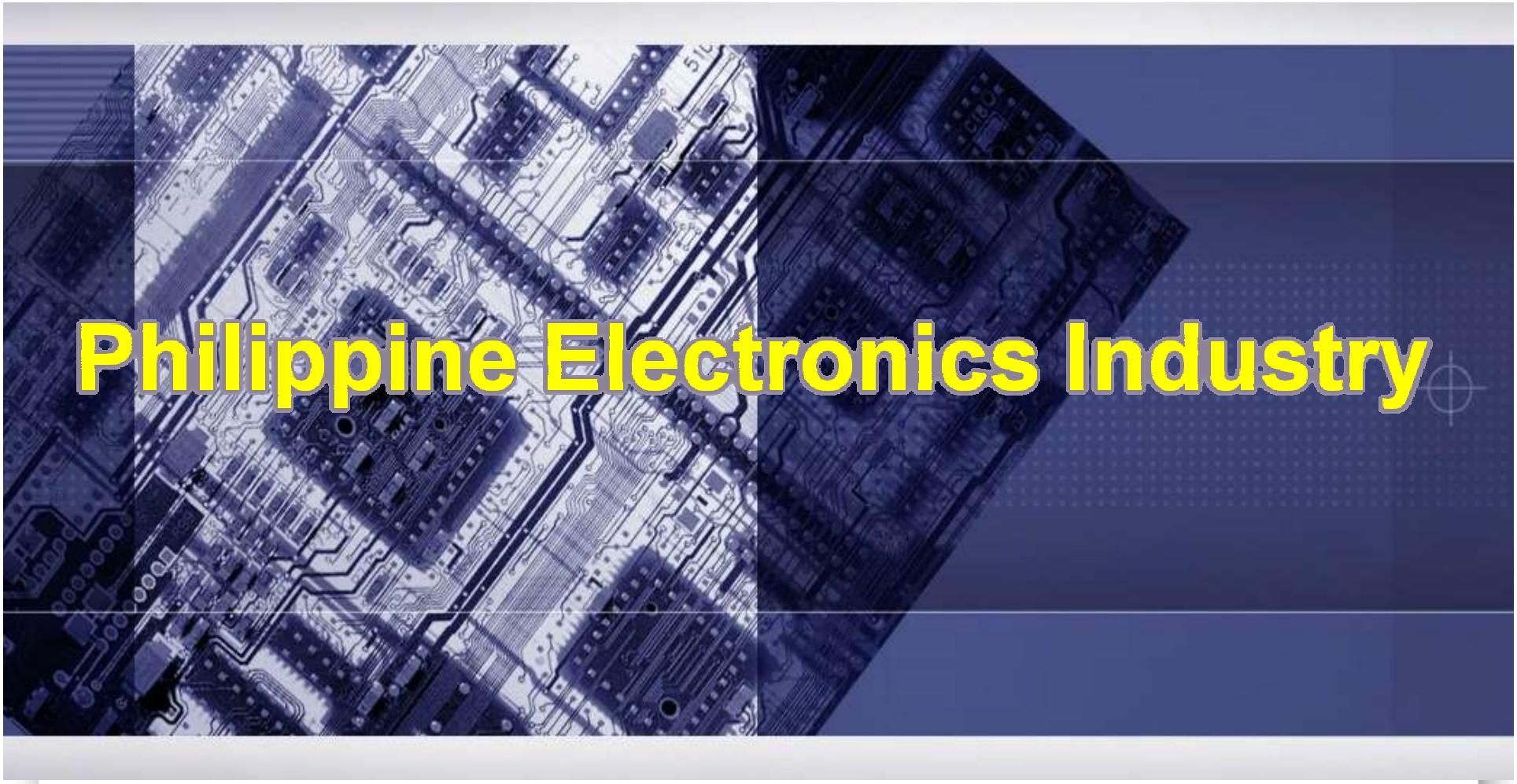
# Semiconductor Largest Market Opportunities



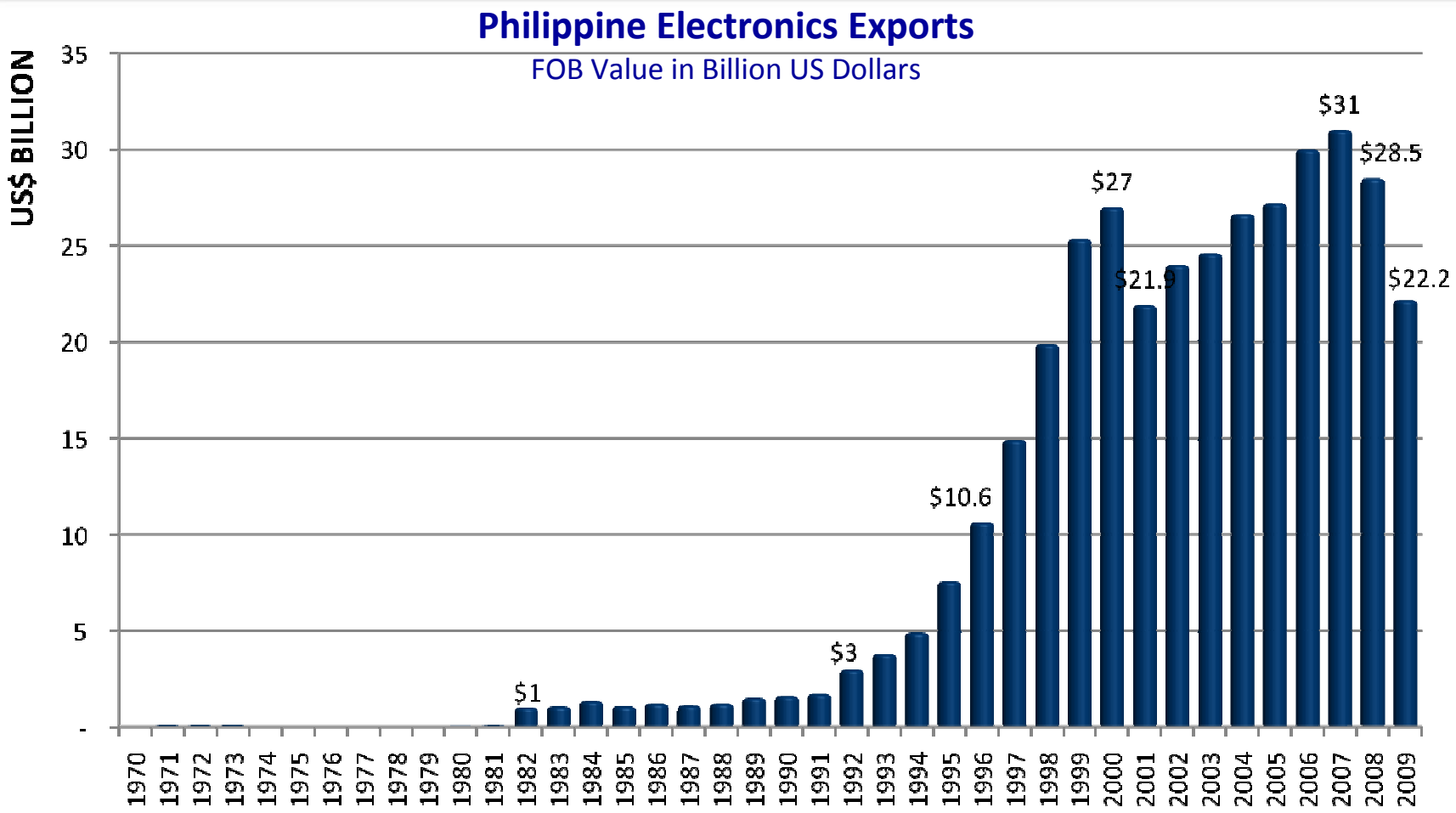

Source: IDC WW Semiconductor Applications Forecaster, December 2009

SEIPI

PSi TECHNOLOGIES, INC.


Philippine Electronics Industry

# Philippine Electronics Industry
# 1970 - 2009

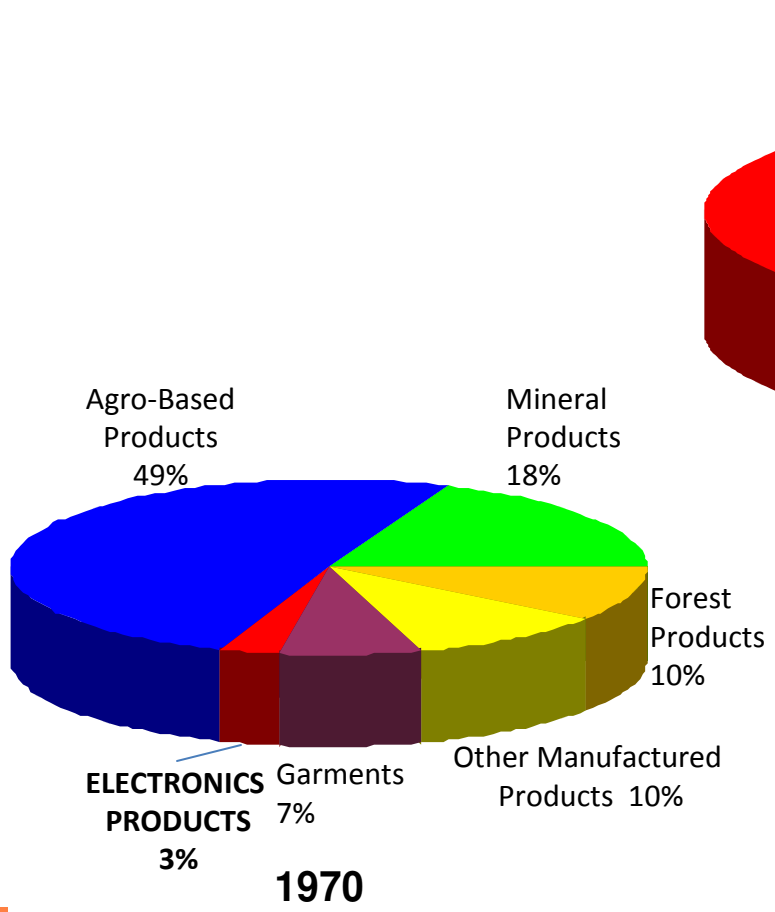


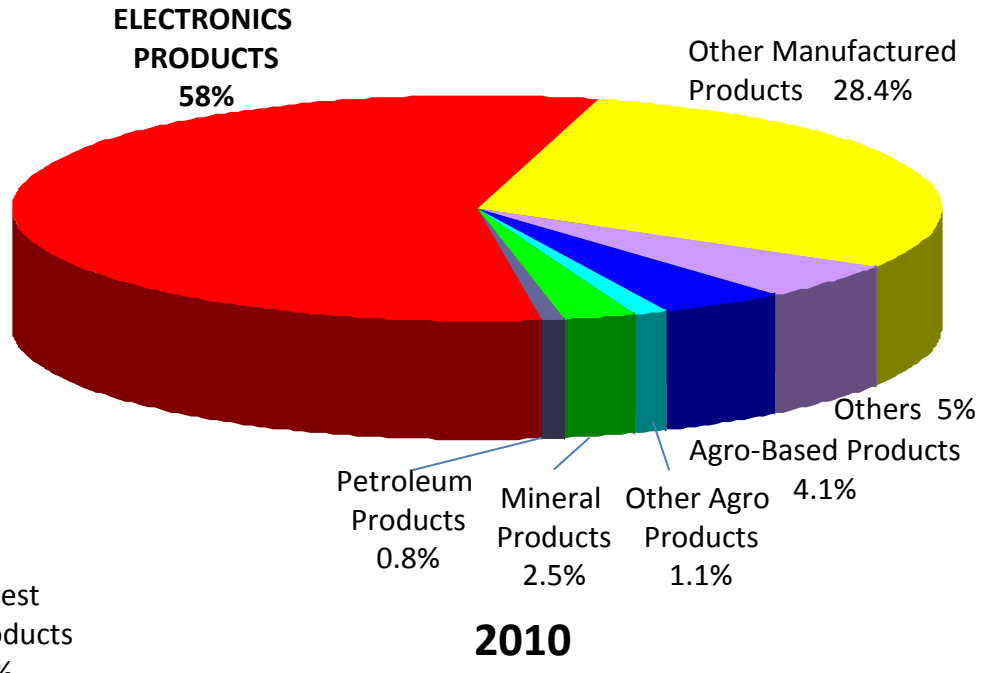

Source: National Statistics Office, May 2010

SEIPI

PSi TECHNOLOGIES, INC.

# Changing Face of Exports



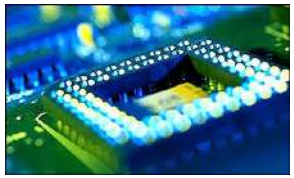




Source: National Statistics Office, May 2010

SEIPI

PSi TECHNOLOGIES, INC.

# Classification of Electronics Exports

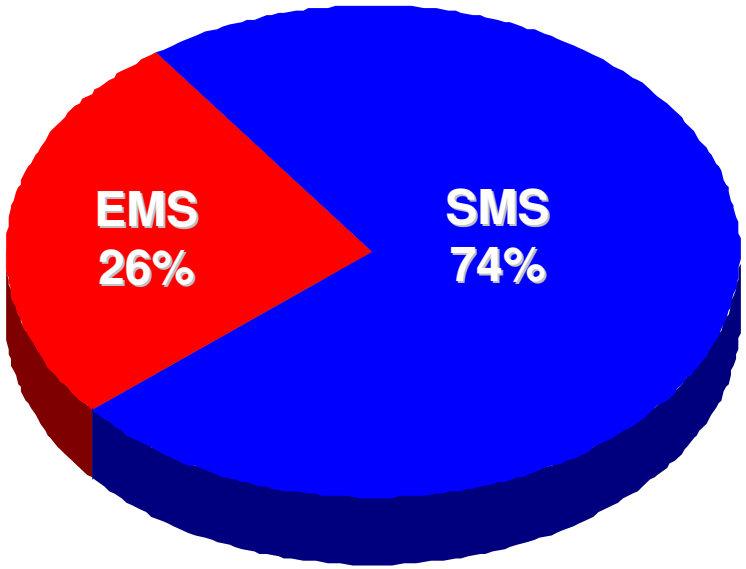


**Semiconductor Manufacturing Services (SMS) – 74%**

COMPONENTS AND DEVICES – 72.38%

**Electronics Manufacturing Services (EMS) – 26%**

COMPUTER REL.PROD./EDP – 20.97%
CONSUMER ELECTRONICS – 1.26%
AUTOMOTIVE ELECTRONICS – 1.16%
COMMUNICATIONS AND RADAR – 2.7%
OFFICE EQUIPMENT – 0.78%
TELECOMMUNICATIONS – 0.32%
CONTROL & INSTRUMENTATION – 0.26%
MEDICAL AND INDUSTRIAL – 0.17%




SEIPI

PSi TECHNOLOGIES, INC.

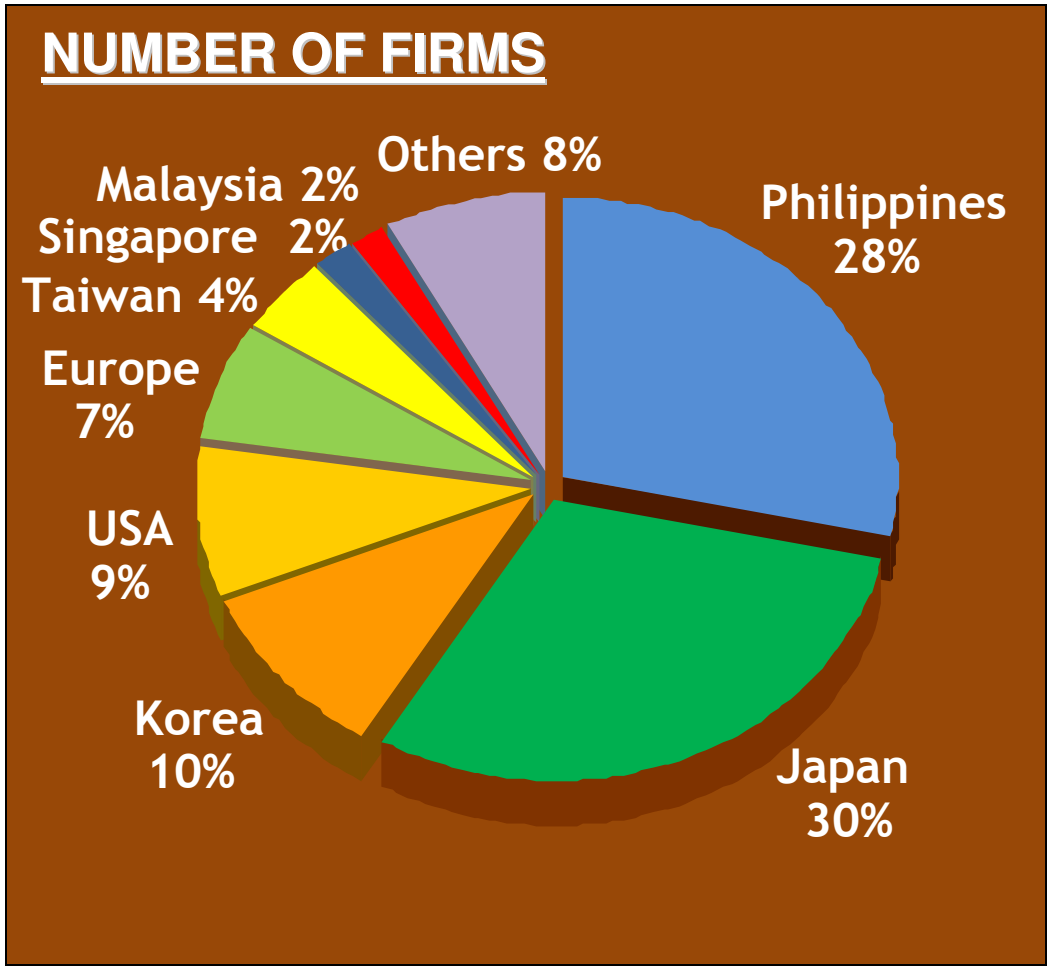
# Companies in the Electronics Industry

**NO. OF FIRMS:**

926

**NATIONALITY:**

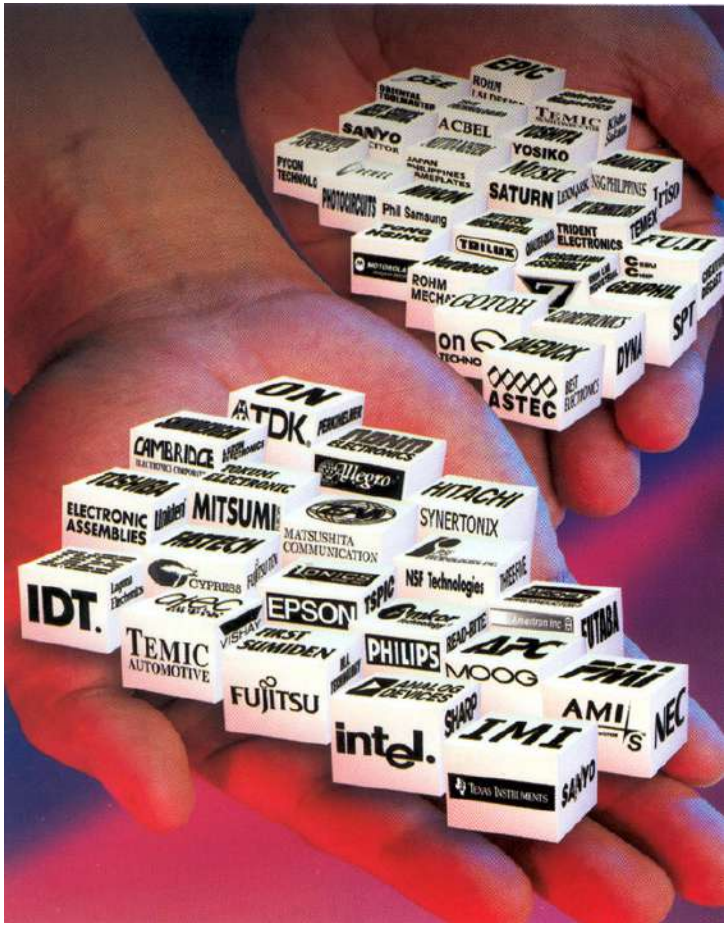
- 72% Foreign
- 28% Filipino




SEIPI

PSi TECHNOLOGIES, INC.

# Profile of Typical Electronics Companies




- ISO Certified
- Practices the Best Known Methods in Manufacturing (JIT,TQM, 5S, QPIC)
- Capabilities Range from IC Packaging, PCB Assembly, Full Product Assembly
- In-house Training Capability
- Runs at 3 Shifts a Day
- Better Compensation Package
- Non-Unionized with Low Turnover
- Located in Economic Zone or BOI Registered
- Operates with clean rooms and fully integrated manufacturing facilities

SEIPI

PSi TECHNOLOGIES, INC.

SEIPI

Semiconductor and Electronics Industries in the Philippines, Inc.

# THE PHILIPPINE ELECTRONICS INDUSTRY

**Experienced Leadership of a Competitive Electronics Industry**
**Competent World Class Workforce**
**Investing in Our People**

# The Top Chipmakers


Texas Instruments


Fairchild


Analog Devices


ON Semiconductor


NXP


Sanyo


STMicroelectronics


ROHM

# The World's Top Electronics Firms

- **Four of the largest HDD producers are in the Philippines**

Hitachi

Toshiba

Fujitsu

NEC

- **Cebu Mitsumi** – employs >20,000, biggest employer in the Philippines; Manufactures computer peripherals and components such as CD-R, CD-RW, optical pick up

# The World's Top Electronics Firms

- **AMKOR** – employs 8,000 people for its IC packaging with 400 formats, from leadframe to BGA solutions

- **EPSON** – employs 5,000, one of the top 3 terminal printer production base of global Epson group, has produced over 10 million printers.

- **LEXMARK** – produces 40 million printheads/year.

SEIPI

PSi TECHNOLOGIES, INC.

# The Homegrown SMS and EMS Firms

IMI

Ionics

PSI


Fastech

… and a cluster of homegrown Electronic Manufacturing Services (EMS) and Semiconductor Manufacturing Services (SMS) companies producing products such as:

time recorders, AVRs, power supplies, alarm systems, electronic ballasts, testers, GPS tracking, automated toll collection, others

# Silicon Design and Development

There is a budding silicon design and development industry in the Philippines.

- **IC DESIGN:**

  ASIC AND FPGA DESIGN, VHDL VERIFICATION (INTEL, ROHM LSI DESIGN PHILS., SANYO SEMICONDUCTOR, EAZIX, SYMPHONY, BITMICRO)

- **IC PACKAGING DESIGN:**

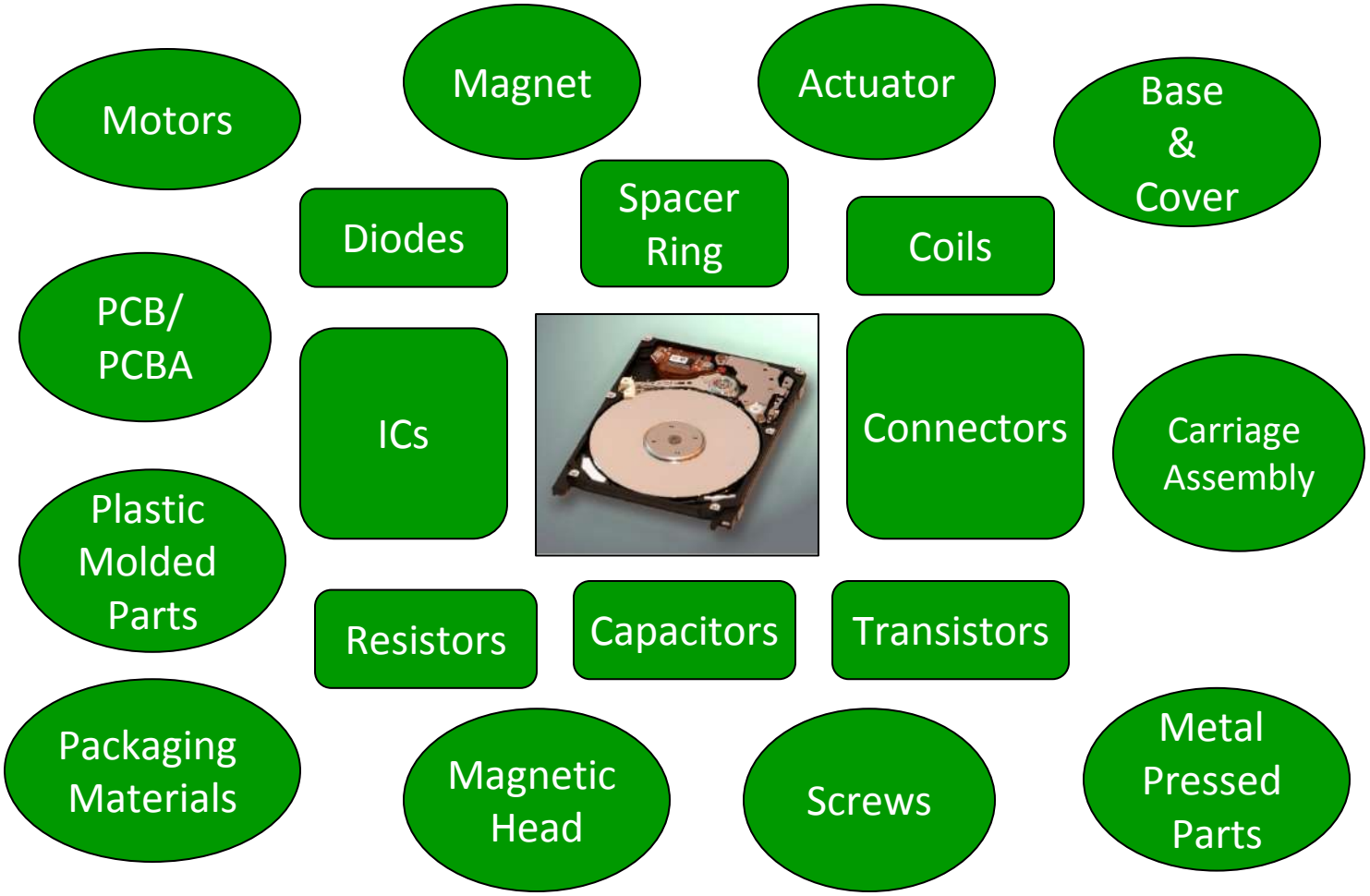
  (TI PHILS., INC., FAIRCHILD SEMICON)

- **MODULE DESIGN, PRODUCT DESIGN:** (LEXMARK, EAZIX, BLUE CHIP)

- **FIRMWARE**:

  EMBEDDED SYSTEMS HW/SW, EMBEDDED LINUX (CANON I.T., TSUKIDEN)

# A Growing Base of Suppliers for HDDs



# Test and Packaging Design

**Strong in assembly, test and packaging design for semiconductor manufacturing services…**

DSPs

Microprocessors

Logic devices

Analog devices

Flash memory

Memory chips

Power devices

Opto devices

**…CAPTURING 10% OF THE SMS WORLD SUPPLY**

SEIPI

PSi TECHNOLOGIES, INC.

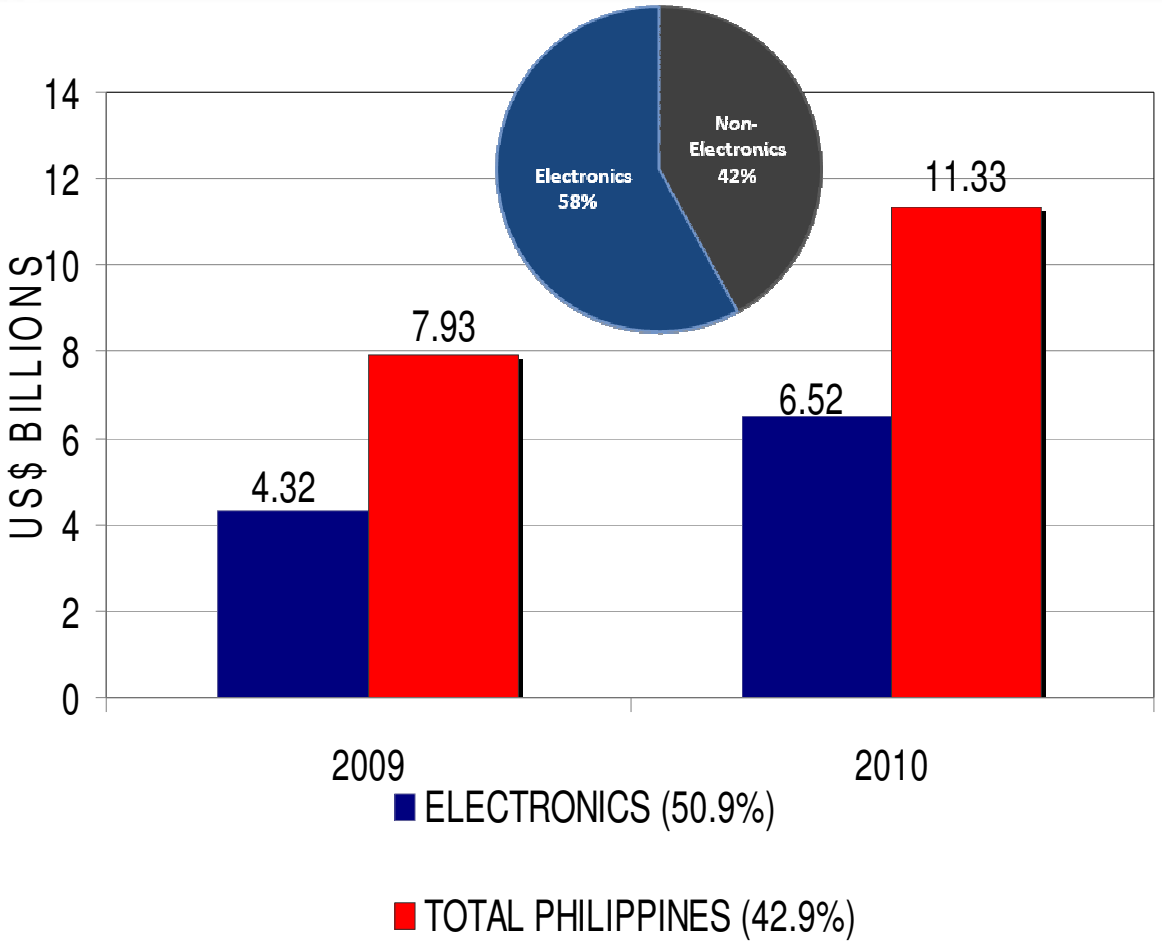
# Historical Investments in the Electronics Industry

| YEAR | INVESTMENTS |
|---|---|
| 1992 | US$ 40 M |
| 1993 | 220 M |
| 1994 | 1.290 B |
| 1995 | 2.160 B |
| 1996 | 1.080 B |
| 1997 | 1.470 B |
| 1998 | 670 M |
| 1999 | 790 M |
| 2000 | 1.240 B |
| 2001 | 720 M |
| 2002 | 270 M |
| 2003 | 230 M |
| 2004 | 443 M |
| 2005 | 776 M |
| 2006 | 747 M |
| 2007 | 1.400 B |
| 2008 | 394 M |
| 2009 | 484M |

Sources: Philippine Board of Investments (BOI) & Philippine Economic Zone Authority (PEZA), May 2010


Philippine Electronics:
Updates and Outlook

# Philippine Electronics Exports
# Jan - Mar 2009 vs. 2010



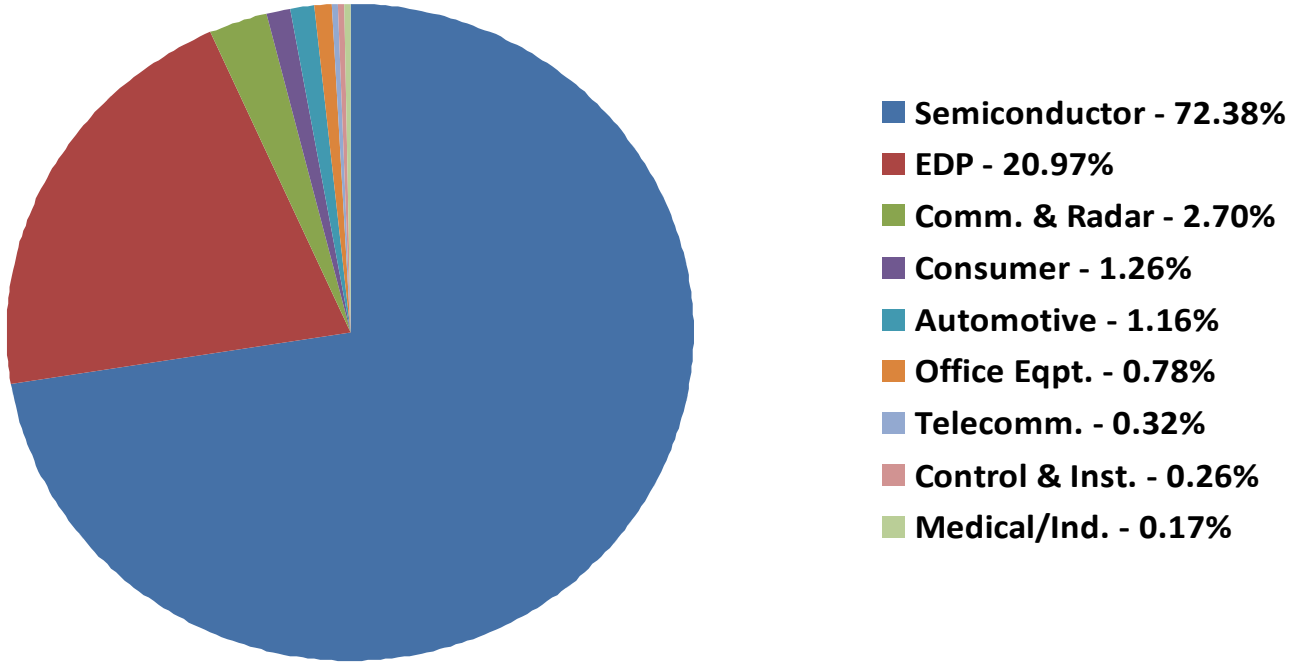

- **Electronic Products amounted to $6.52 billion in the 1st Quarter of 2010, growing 50.9% compared to Q1 2009.**
- **Electronics comprised 57.55% of all Philippine exports in the period Jan-Mar 2010.**

Source: National Statistics Office, May 2010

SEIPI

PSi TECHNOLOGIES, INC.

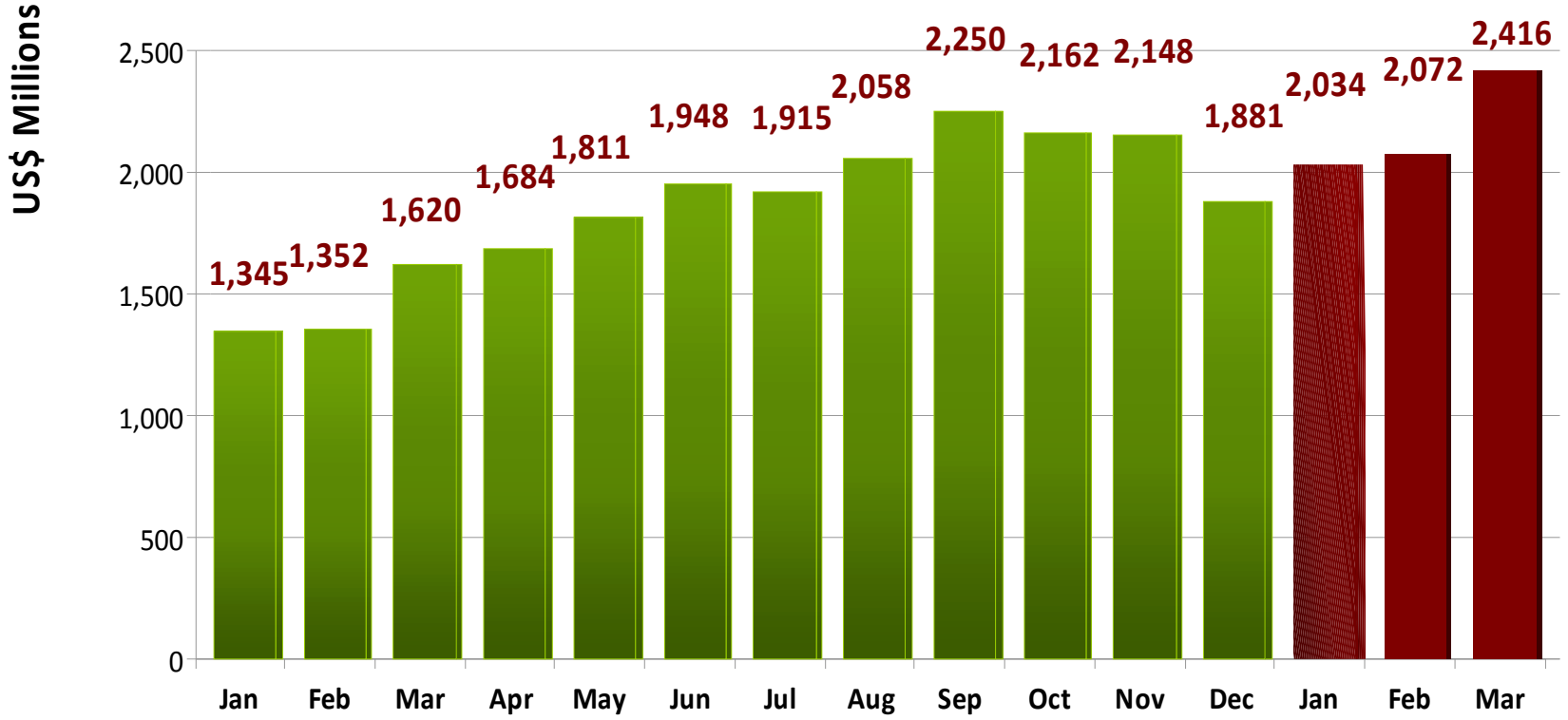
# Philippine Electronics Exports by Sector
# Jan - Mar 2010




- **Semiconductor remains the biggest sector among the Philippine electronics exports.**
- **Growth in the electronics exports in Q1 2010 came from almost all product sectors.**

Source: National Statistics Office, May 2010

# Philippine Electronics Exports 2009 / 2010



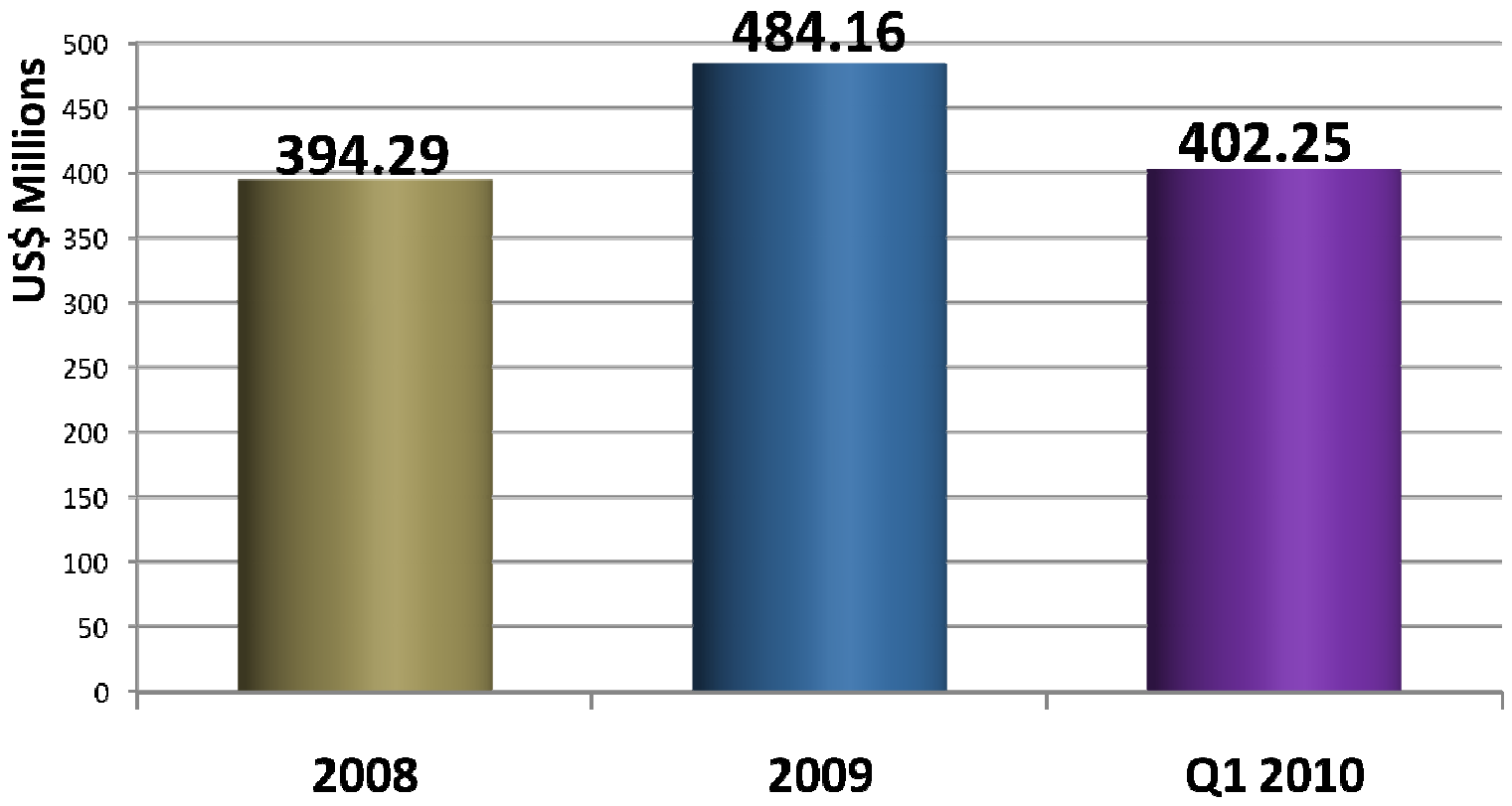

**EXPORTS BY MONTH**

Source: National Statistics Office, May 2010

SEIPI

PSi TECHNOLOGIES, INC.

# Electronics Investments 2008 vs. 2009 & Q1 2010




Sources: Philippine Board of Investments (BOI) & Philippine Economic Zone Authority (PEZA), May 2010

SEIPI

PSi TECHNOLOGIES, INC.

# Philippine Electronics

**All indicators point to a very strong recovery for Philippine electronics industry in 2010:**

- **16.6% month-on-month exports growth in March (vs. February 2010)**
- **49.13% annual exports growth in March 2010 from March 2009**
- **50.9% annual exports growth in Q1 2010 versus Q1 2009**
- **Investments for the 1st quarter has exceeded the total investments in 2008 and is close to matching the total investments in 2009.**

# Industry, Government and Academe: Alliance Towards an Innovative and Entrepreneurship Culture

SEIPI

PSi TECHNOLOGIES, INC.

# Industry, Government and Academe

**SEIPI**

Semiconductor and Electronics Industries in the Philippines, Inc.

**THE PHILIPPINE ELECTRONICS INDUSTRY**

**COMSTE**
Congressional Commission on Science & Technology and Engineering

**CONGRESSIONAL COMMISSION ON SCIENCE AND TECHNOLOGY AND ENGINEERNG (COMSTE)**

DOST Ateneo CLSU DLSU Mapua MSU-Iligan USC UP

**ENGINEERING RESEARCH & DEVELOPMENT FOR TECHNOLOGY (ERDT) CONSORTIUM**

# COMSTE – Bold New Strategies for Improved Global Competitiveness

**Bicameral Committee with expert panels in Health, IT, Agriculture, Education and Electronics**

**Propose new legislation and innovative programs that will leverage new S&T investments by the government**

**Industry-Academe-Government working in concert with common vision, mission, and objectives**

**Establish international collaboration to leverage our investments and benchmark our R&D**

**Personalities – Executive Director, Electronic Panel Members**

# COMSTE – Strategic Competitiveness for the Electronics Industry

**Strategic Science and Technology plan that will change dramatically our competitive position in the different sectors**

**Comprehensive review of the competitiveness of the electronics industry – near term and far term**

**Near Term – Invest in our scientists and engineers**

- **Retain and retraining during the downturn**
- **Facilitate loans to position industry for upturn**
- **Attract strategic partners to the Philippines**

**Far Term – High value added electronic services**

- **Chip design**
- **Green electronics**
- **Biomedical electronics**
- **Attract startup ventures in the Philippines**

SEIPI

PSi TECHNOLOGIES, INC.

# Green Electronics

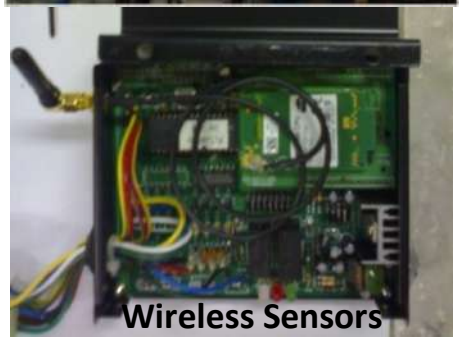
## Solar Systems for Rural Communities

- 2000 PV 2 kW systems in 3 years
- Lighting, Edutainment, and Clean Water
- 3  15 MW solar power systems in 3 years
- Unleash Filipino creativity in green tech
- Create local market for Green Electronics
- Working with our universities (through ERDT) to enhance the transfer of technology
- Hybrid wind - solar designs
- 'Philippines- Leader in Green Engineering'

**Stimulate New Green Electronics Investments**
- PV manufacturing
- Power management electronics
- Energy Internet components


Low Cost PV Arrays


Community
Built and owned


Wireless Sensors

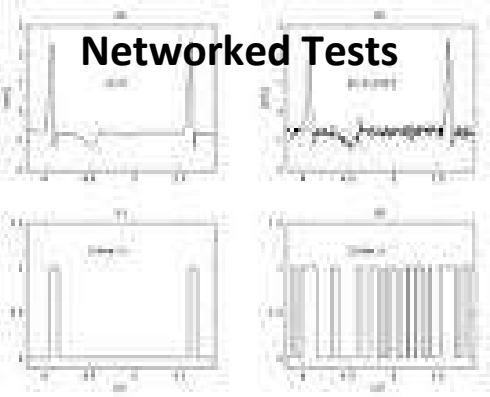
SEIPI

PSi TECHNOLOGIES, INC.

# Biomedical Telemedicine Consortium
## Hospitals, SME in Electronics, Investors, Government

**Focus: Improved Barangay (Grassroots Community) Level Medical Delivery**

- **100 New Telemedicine Clinics in rural areas in 2 years**
- **Networked Medical Testing and Telemedicine Terminals**
- **New Biomedical Devices / Subsystems - ECG, Blood Tests, Urinalysis, Disease Screening**
- **Rural Hospitals, Remote Clinics, and Local neighborhood stores**
- **Build-in family medical databases to support Public Health Initiatives**
- **Working with our universities (through ERDT) to enhance the transfer of technology**



SEIPI

PSi TECHNOLOGIES, INC.

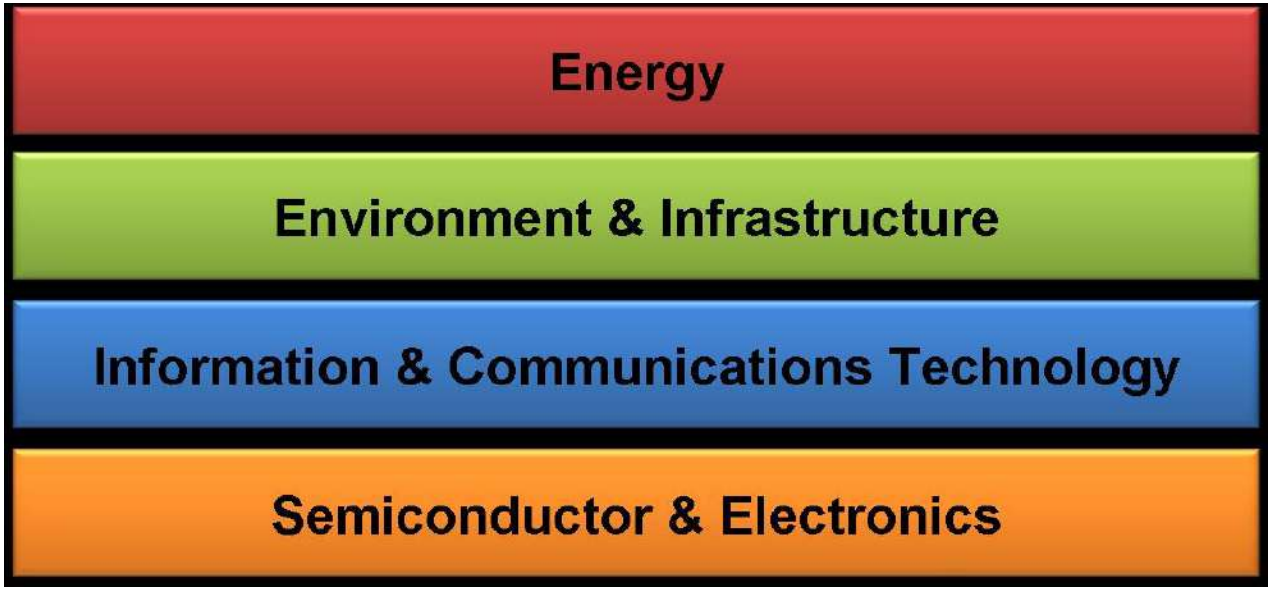
# ERDT – Investing in Our Future as Innovators

- **Consortium of Eight Universities to Upgrade R&D in Energy, Electronics, ITC, Agriculture, and Health – Ateneo De Manila University, Central Luzon State University, De La Salle University, Mapua Institute of Technology, MSU-Iligan Institute of Technology, University of San Carlos, and University of the Philippines**
- **R&D Capacity Building**
- **Spur the Creation of New Businesses and Industries**
- **Significantly enhanced Technology transfer**
- **International Cooperative R&D to provide leverage and 'leap frog' to the state-of-the-art**

# ERDT - Strategic Plan for the Electronics Industry

## STRATEGIC COMPETITIVENESS FOR THE ELECTRONICS INDUSTRY

**STRATEGIC SCIENCE AND TECHNOLOGY PLAN THAT WILL CHANGE DRAMATICALLY OUR COMPETITIVE POSITION IN THE DIFFERENT SECTORS**

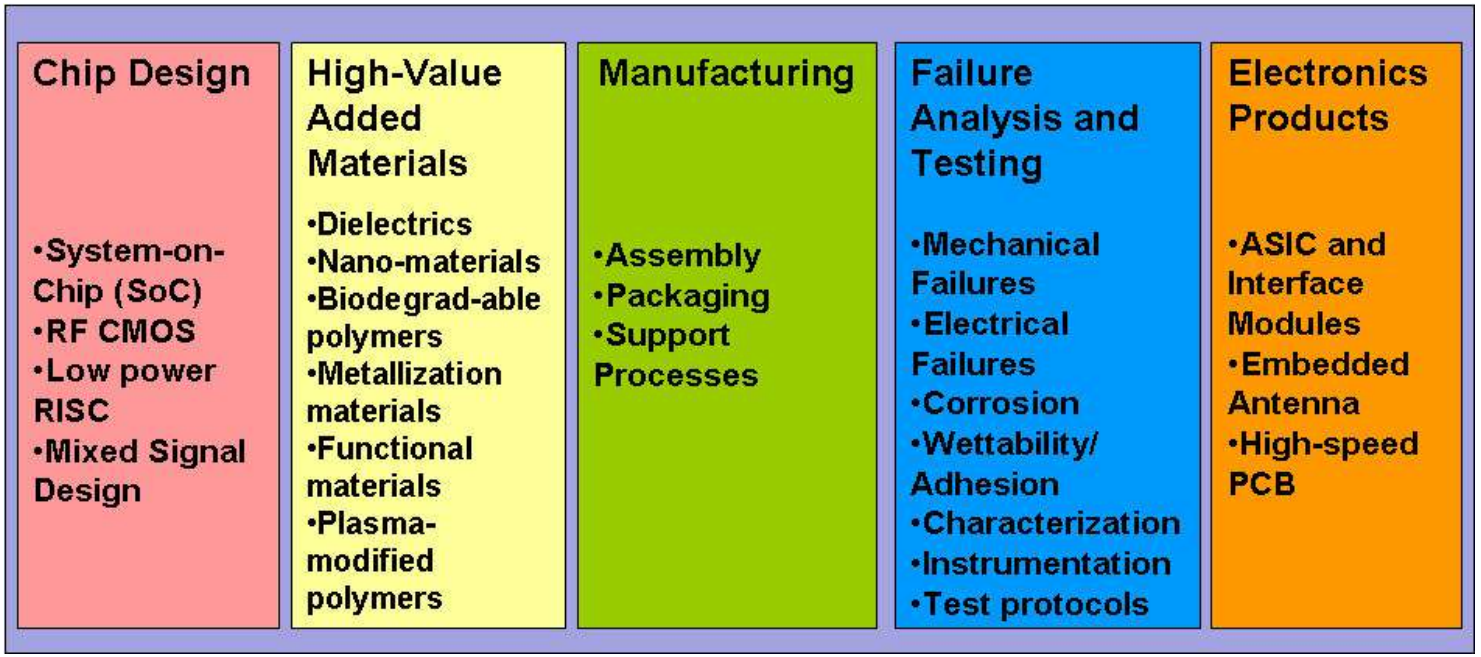


# ERDT - Strategic Plan for the Electronics Industry

## STRATEGIC COMPETITIVENESS FOR THE ELECTRONICS INDUSTRY

**COMPREHENSIVE REVIEW OF THE COMPETITIVENESS OF THE ELECTRONICS INDUSTRY, SUCH AS IN:**

**Semiconductor & Electronics**



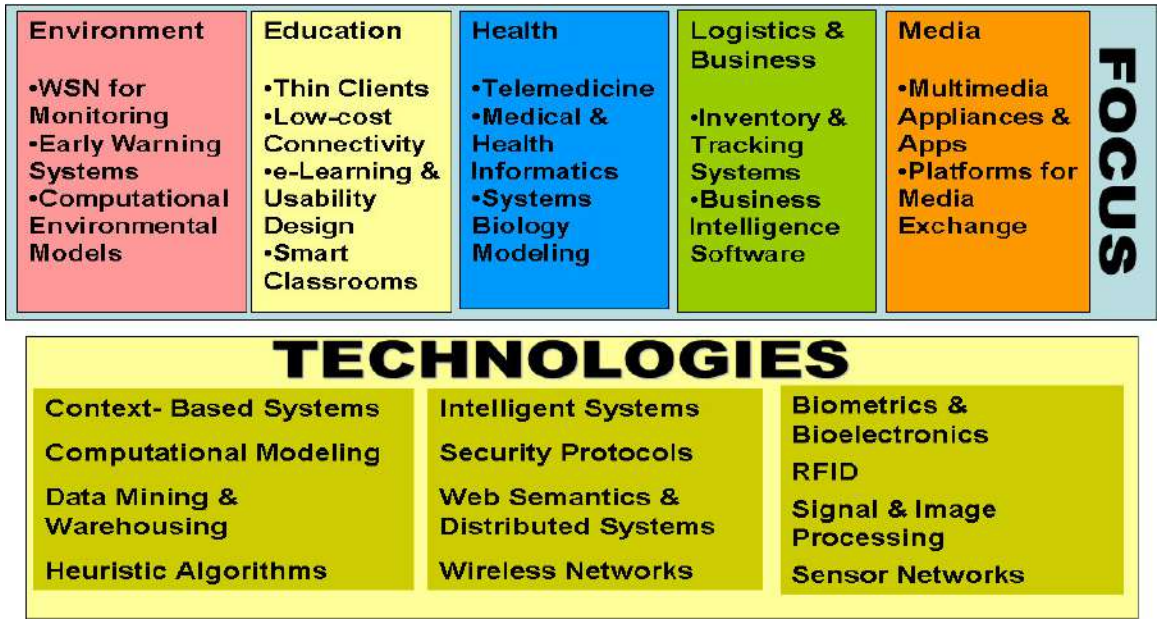
# ERDT - Strategic Plan for the Electronics Industry

## STRATEGIC COMPETITIVENESS FOR THE ELECTRONICS INDUSTRY

**INVEST IN OUR SCIENTISTS AND ENGINEERS FOR THE UPTURN**

**RETRAINING OF WORKFORCE IN HIGH GROWTH AREAS, SUCH AS IN:**

### Information & Communications Technology




SEIPI

PSi TECHNOLOGIES, INC.

# ERDT – Investing in Our Future as Innovators

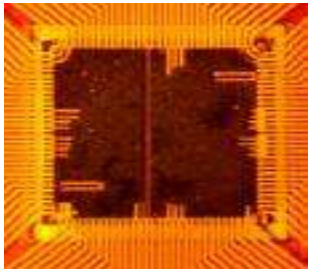
- Significant new investments in 2008
  - MS Students = 154, PhD = 53
  - First Year R&D expenditures represent 100% increase in Engineering R&D
  - Second Year R&D expenditures will be 175% of Year 1
- Electronics Projects Underway and in Process
- Wireless Sensor Systems
- Wireless Communications
- Embedded Systems for biomedical devices
- Advanced Testing

SEIPI

PSi TECHNOLOGIES, INC.

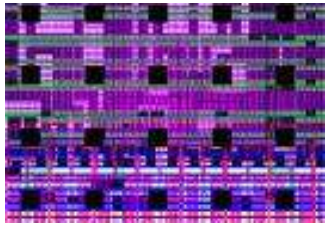
# Primary Focus: Chip Design

- Training
  - 50 trained Designers in 2008 as a result of initial training program in Taiwan.
  - Focus ERDT for University training – 200 students per year trained in Chip Design



- Focused Rapid Growth with Strategic Partners

- Designing High Performance Chips in Phils. – Embedded Systems, Cost Reduction Designs, New Applications
- Benchmark our capabilities with Partner Needs
- Create the Environment that Sustains New Startups



- Start joint ventures in Chip Design
- Create small Chip Design companies locally with world class tools and Industry and Investor support

SEIPI

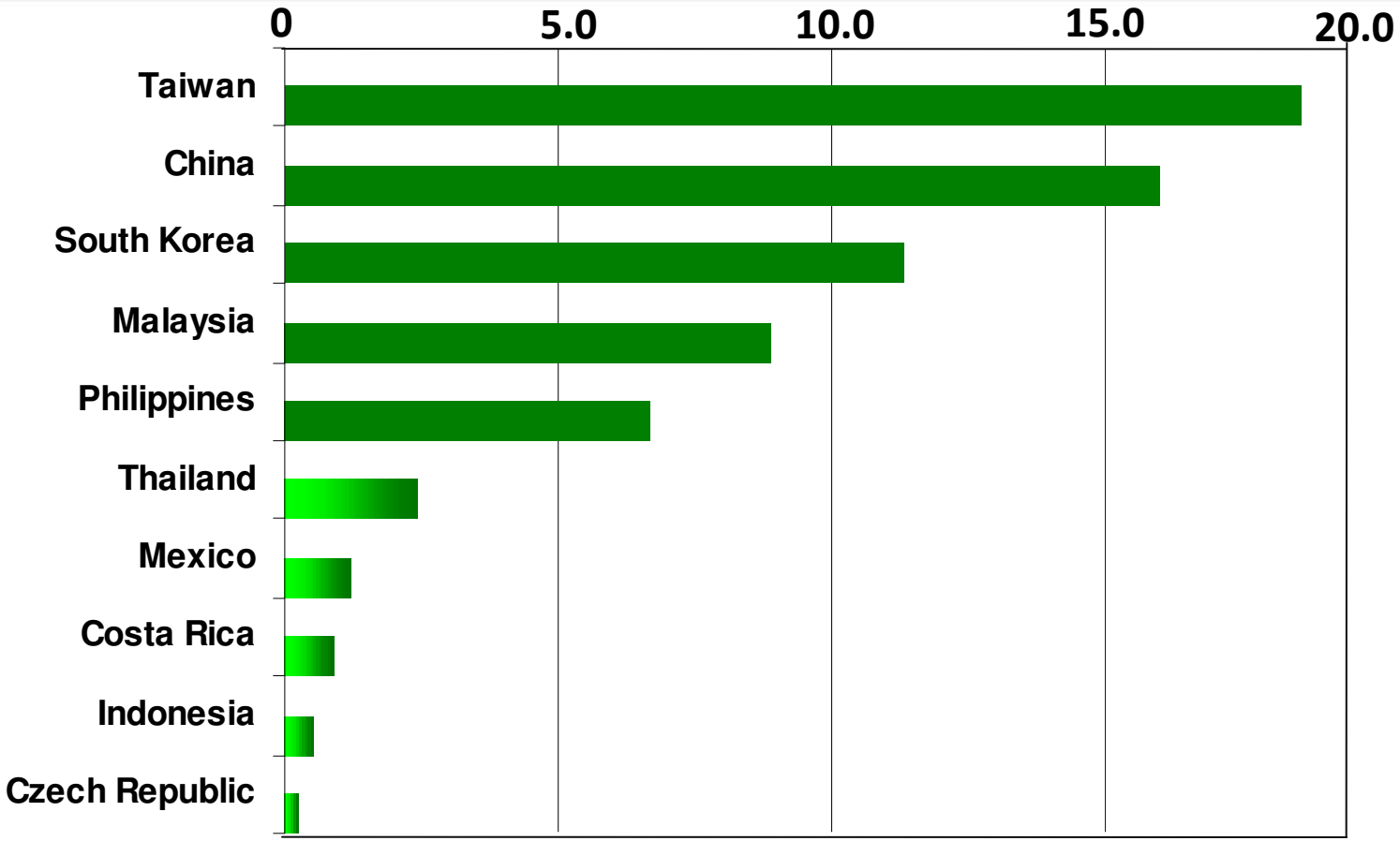
PSi TECHNOLOGIES, INC.

# Challenge for the Philippines Electronics Industry

**With all the efforts, and the gains made by the three sectors – industry, government and the academe – so far, there is one clear challenge ahead – how to direct and align all these divergent projects and efforts into one national strategy to spur industry and economic development.**

# Where Are We Now And What's Next?

# Top 10 Source Countries, 2006 (in % of World Exports)



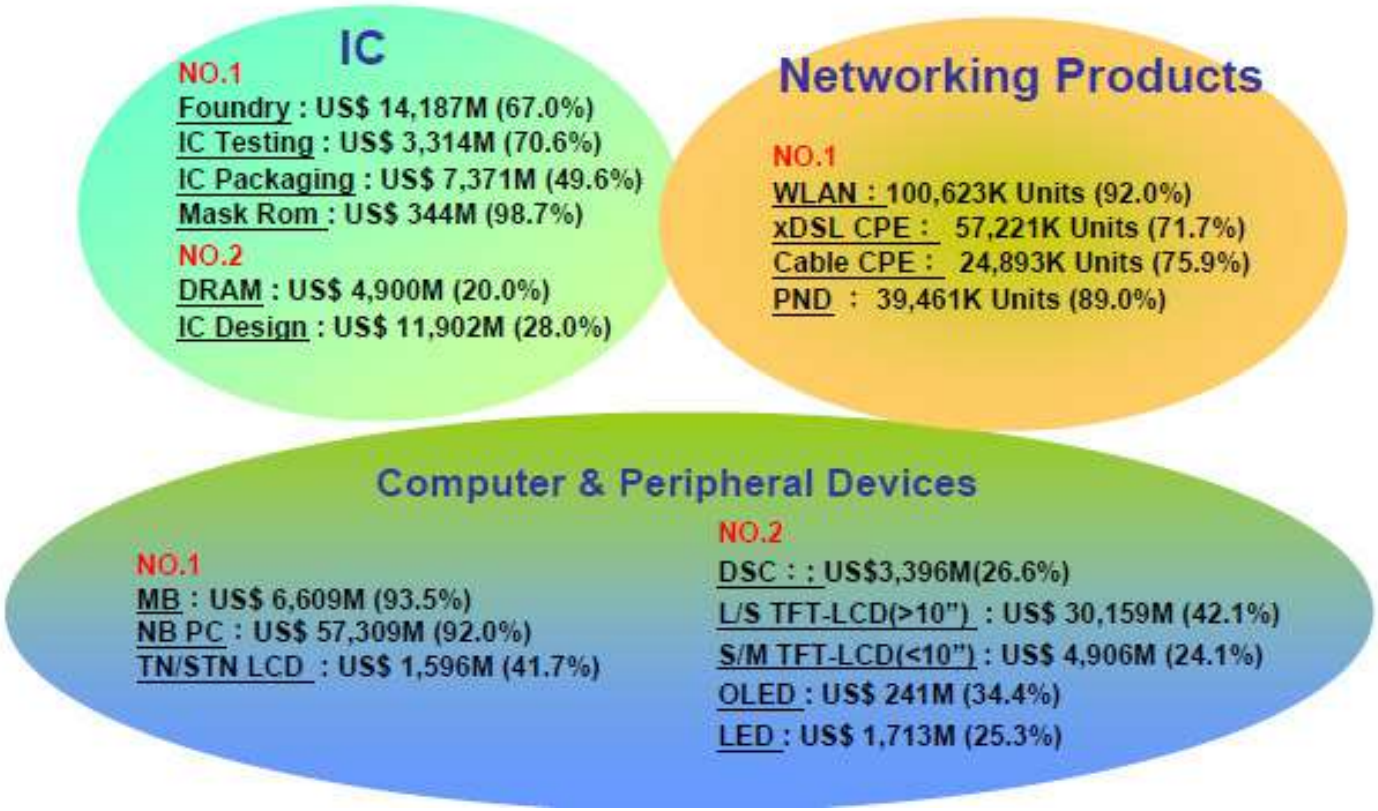

**These emerging countries are favored in terms of electronics components exports.**

SEIPI

PSi TECHNOLOGIES, INC.

# Taiwan : Electronics World Power - The Preferred Benchmark

## 2008 Taiwan Top 3 Products Worldwide




Note: Including overseas production ( ): World Penetration

Source: ITRI IEK March 2009

# The Taiwan Model

- Taiwan's strategy was to support industry and technology development and transform its economy from agricultural to industrial.
- The aim was to foster freer flow of goods, services, human capital, funds, and information.
- Government funds were used to support industry development directed through ministries and various councils to research institutes, and industry.
- The Ministry of Economic Affairs founded the Industrial Technology Research Institute (ITRI) in 1973 and contracted it to identify emerging growth industries that should receive incentives and support.

# Taiwan Industrial Technology Research Institute (ITRI)

- **A non-profit national research organization that serves to strengthen the technological competitiveness of Taiwan.**

- **ITRI has three mission statements:**
  1) **To expedite the development of new industrial technology;**
  2) **To aid in the process of upgrading industrial technology techniques; and**
  3) **To establish future industrial technology.**

Source: ITRI, March 2, 2009

# ITRI Technology Thrusts

**ITRI focuses on the following six major fields that will lay down the foundation for innovative research in the future of technological industry, and hence, transform Taiwan's domestic industry into global bedrock for technological innovation:**

- **Information and Communications**
- **Electronics and Optoelectronics**
- **Nanotechnology , Materials and Chemical**
- **Energy and Environment**
- **Precision Machinery and MEMS**
- **Biomedical Technology**

Source: ITRI Website, June 2010

# Core Business

**Venture & Incubator**

- Combine N. America's creativity & Taiwan's industrial strength to accelerate new ventures

**R&D Collaboration**

- Continue the one-to-one collaboration
- Assist Taiwan organizations to take part in international standards policies

**Technology Scouting**

- Search for technology transfer & cooperation opportunities
- Introduce transferable technologies to appropriate units

Source: ITRI Website, June 2010

# Core Business

**Recruiting &Training**

- Assist ITRI to recruit in the USA
  - Assist to arrange trainings, meetings and special events in USA

**IP Deployment**

- Assist in IP value addition services

**Policy Execution**

- Assist planning and execution of high rank officers visits
  - Assist other organizations in globalization communication network

**Networking**

- Continue to build networking infrastructure amongst Chinese American societies in USA
- Strengthen the global communication network

Source: ITRI Website, June 2010

# ITRI Major Milestones in Electronics

**1973: Founding of ITRI**

- Established from the merger of 3 research organizations of the Ministry of Economic Affairs (MOEA)

**1976: Acquisition of Semiconductor Process Technology from RCA**

- RCA transferred CMOS technology to ITRI engineers in the US. ITRI successfully transferred semiconductor process technology to Taiwan, laying the foundation for Taiwan's semiconductor industry. Today, semiconductor is Taiwan's star industry.

- **1979: Spinoff of UMC**
- UMC became the first specialized manufacturer of 4-inch wafers in Taiwan. UMC was also the first spinoff of a private enterprise through technology transfer by a research organization. Today UMC is the world's 2nd largest IC foundry with annual revenues of US$2.8 billion.

Source: ITRI Website, June 2010

# ITRI Major Milestones in Electronics

**1987: Spinoff of TSMC**

•ITRI spinoff Taiwan Semiconductor Manufacturing Co. (TSMC), the first 6-in wafer fab manufacturer in Taiwan. TSMC established an innovative model of wafer fab foundry. Today, TSMC is the world's largest IC foundry and the the 6th largest semiconductor company in the world with annual revenues of US$8.99 billion.

**1990: Establishment of Taiwan Notebook PC Consortium**

•CCL/ITRI united 47 domestic manufacturers to establish the "Notebook Computer Alliance." The Alliance helped make Taiwan the world's largest notebook computer producer.

Source: ITRI Website, June 2010

# ITRI Major Milestones in Electronics

**1994: Entering 8-inch wafer fab market, & VIS Spinoff**

•Spinoff Vanguard International Semiconductor (VIS) was the first 8-inch wafer fab and the first autonomous memory production co. in Taiwan upgrading it into the country of global semiconductor mainstream.

**1997: First Ink Jet Printing Head in Taiwan**

•ITRI developed the first ink jet printing head in Taiwan, establishing the development of key parts and components industry and a complete system of up-, mid-, and down-stream industry of ink jet printing head.

**2000: World's Smallest Bluetooth Wireless Communication Module Prototype**

•CCL/ITRI teamed up with MKE, a member of Japanese Matsushita Group, to develop mini Bluetooth module and produced the world's smallest wireless communications module prototype.

Source: ITRI Website, June 2010

# ITRI Major Milestones in Electronics

**2003: Establishment of Global Strategic Partners**

• ITRI has established integral and long-term collaborative efforts with Stanford Research Institute, Carnegie Mellon University, and UC Berkeley. In the meanwhile, ITRI enhanced cooperation and interchange relationship with MIT, Stanford University, Northwestern University, Tohoku University of Japan, and AIST.

**2003: Establishment of ITRI College**

•ITRI College integrated ITRI-developed core technologies, core laboratories, professional knowledge, and project planning. The courses offered by ITRI College included strategic technology courses on advancing industrial maintenance and promoting competitiveness, and systematic courses on innovative industrial knowledge, special custom systems and professional management.

Source: ITRI Website, June 2010

# ITRI Major Milestones in Electronics

**2004: Establishment of RFID Research and Applications Alliance**

•150 enterprises participated in the RFID Research and Applications Alliance launching event. They share the common goal of promoting together domestic RFID technology research and market applications.

**2004: Establishment of DelSolar Co.**

• MRL/ITRI teamed up with Delta Electronics to establish DelSolar Co. and transferred solar cell technology to DelSolar. By integrating the strongest domestic solar cell research team with world-leading power supply manufacturers, the establishment of DelSolar was a major milestone of solar cell industry development in Taiwan.

Source: ITRI Website, June 2010

# ITRI Major Milestones in Electronics

**2006: Randall M. Whaley Incubator of the Year Award**

• ITRI Incubation Center was awarded the 2006 Randall M. Whaley Incubator of the Year award by National Business Incubation Association (NBIA), the most important honor from NBIA – the Oscar Award of global incubation industries. It was also the first award received by Asian organization since the establishment of NBIA 20 years ago.

Source: ITRI Website, June 2010

# Taiwan Industrial Technology Research Institute (ITRI) Status

- Has 6,000 employees, including 1,093 PhDs and 60% holding either a Master's degree or PhD in their respective field of studies.
- Has a total 9,166 patents
- Has spunoff technology to industry and startups (Total 151 spin-offs as of March 2009)

Source: ITRI, March 2009; ITRI Website, June 2010

# In Summary: Factors for Taiwan's Success

- The effective guidance of government policy measures
- The vision and support of leaders in government
- Human resources
- The adoption and improvement of foreign technology
- The industry cluster effect
- The support of up-, mid- and down-stream industries

SEIPI

PSi TECHNOLOGIES, INC.

# One vision, One voice, One national strategy for Industry, Government and the Academe

SEIPI

PSi TECHNOLOGIES, INC.

# The Philippine Electronics Industry: Cultivating an Innovation and Entrepreneurship Culture

De La Salle University - Manila
June 11, 2010

Presented by:

**Arthur J. Young, Jr.**
Chairman and CEO, PSi Technologies, Inc.
Chairman, Semiconductors & Electronics Industries in the Phils., Inc. (SEIPI)