

Global Technology Integration - A Canadian Perspective

- David T. Fung
- ACDEG Group
- At Research Money Annual Conference
- National Arts Centre, Ottawa (ON), Canada
- March 12, 2009

Global Financial Crisis - How did one survive?

We **did not have** Play Stations, MP3, Nintendo's, I-Pods, Video games, 99 Cable TV channels, DVD's, Home Cinema, Mobile phones, Home Computers, Laptops, Chat-rooms, Internet, etc ... **BUT, we had REAL FRIENDS!!!!**

WWW.SNOOPY.COM



Integrated Technologies

**Real Friends
(Innovations)**

-
**The White
Knight
on a Brown
Horse**



**Evolving
Markets**

Technology and Enterprises

- A white knight without a healthy horse is a **dead** knight
- “NORTEL has **technologies** stuffed up to its rafters”
- The “Blackberry” is the **right differentiated** technology for the evolving market at the right time.

Presentation

- The ACDEG Group
- CME Manufacturing 20/20
- The Rising Emerging Economies
- New Reality of **Value Creation**
- Driving Forces in **Global Value Chains**
- **Differentiated Technologies**
- Enterprises of **Global Integration**
- Summary

ACDEG Businesses

Energy

Environment

Efficiency

Partnerships and Joint Ventures

- Waste gas to electrical power
- Renewable energy
- Recycling packaging wastes
- Forestry wastes to bio-fuels
- Wood pulps to paper products
- Specialty chemicals distribution
- Specialty electronics
- Marine Equipment
- Agri-food and seafood

1980 Sulphuric Acid Distribution System

- 1.5 million MT per year
- 220,000 MT of storage
- 10 storage terminals
- Unit trains of 36, 54 and 108 cars
- Dedicated shipper-owned cars
- Only power and tracks from railways

Distribution Innovation



Unit
Trains of
Sulphuric
Acid



Economic Distance of Acid Distribution



300 km
extended
to
2,000
km

Manufacturing

- Drywall Finishing Tools *



*Business Sold

Advanced Designs and Manufacturing

- 10 U.S. patents
- Canadian intellectual property
- Manufacturing in Canada
- Capital from Asia
- Global Sourcing of Parts
- Markets in North America, Europe and Australia

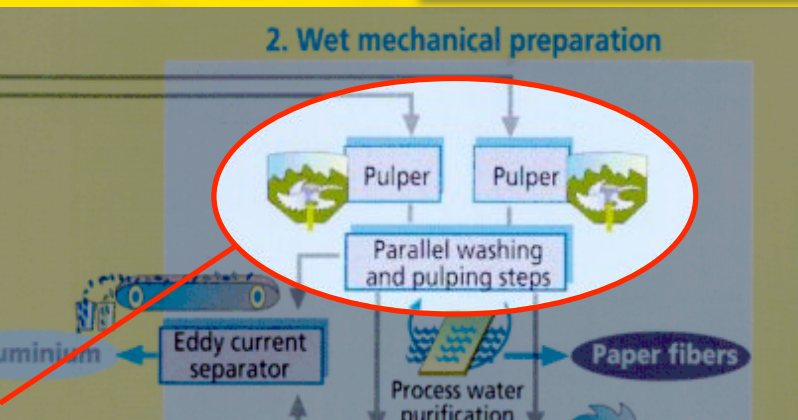
Waste Plastics Recycling in China



2009.03.12

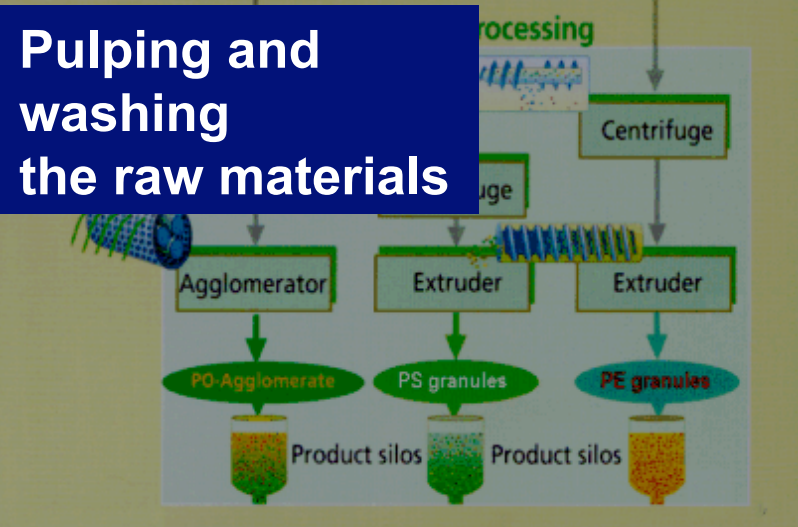
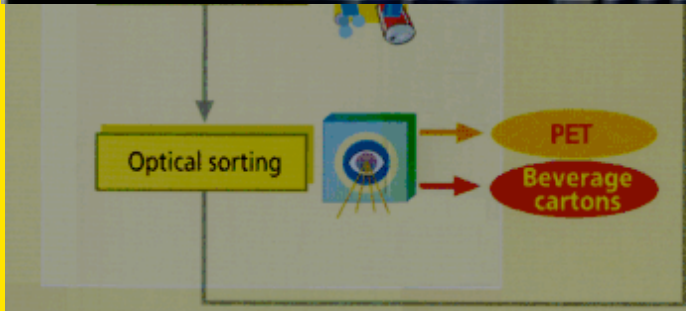
Wet Mechanical Preparation

 SORTEchnology 3.0



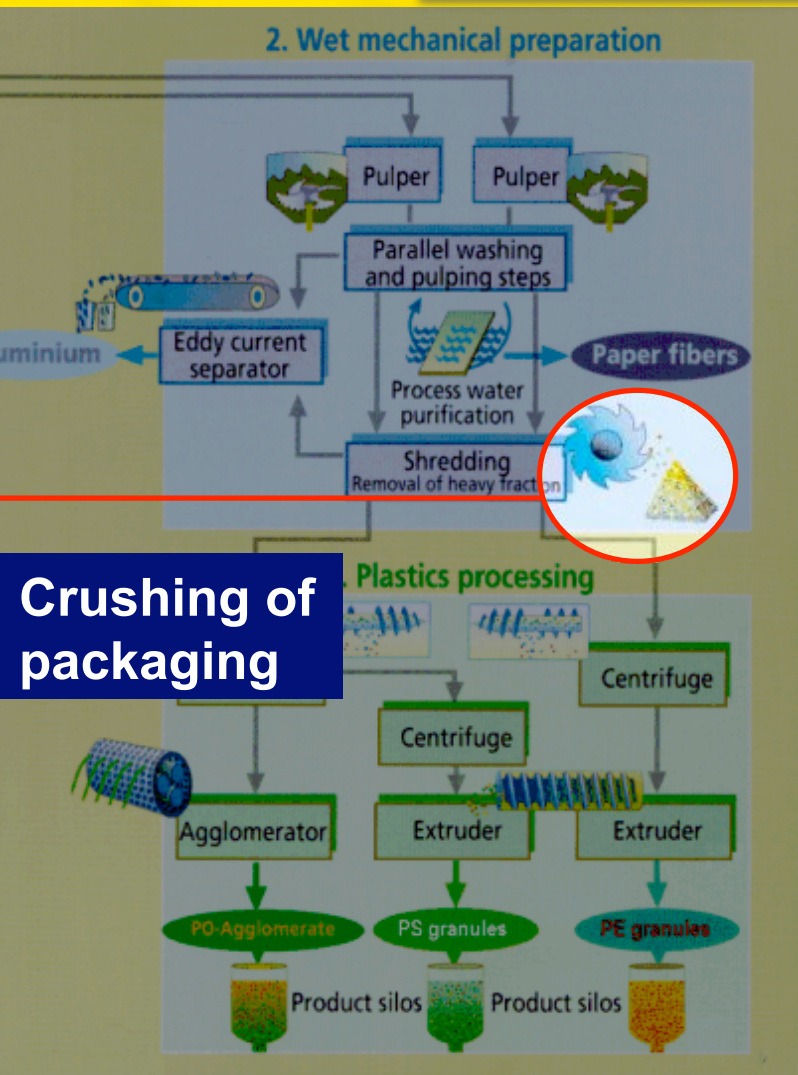
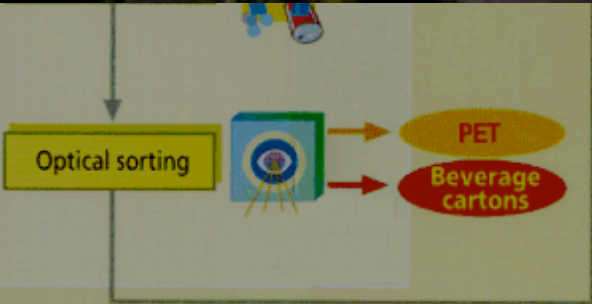
Central separation of composites

Pulping and washing the raw materials



Wet mechanical preparation

 SORTEchnology 3.0

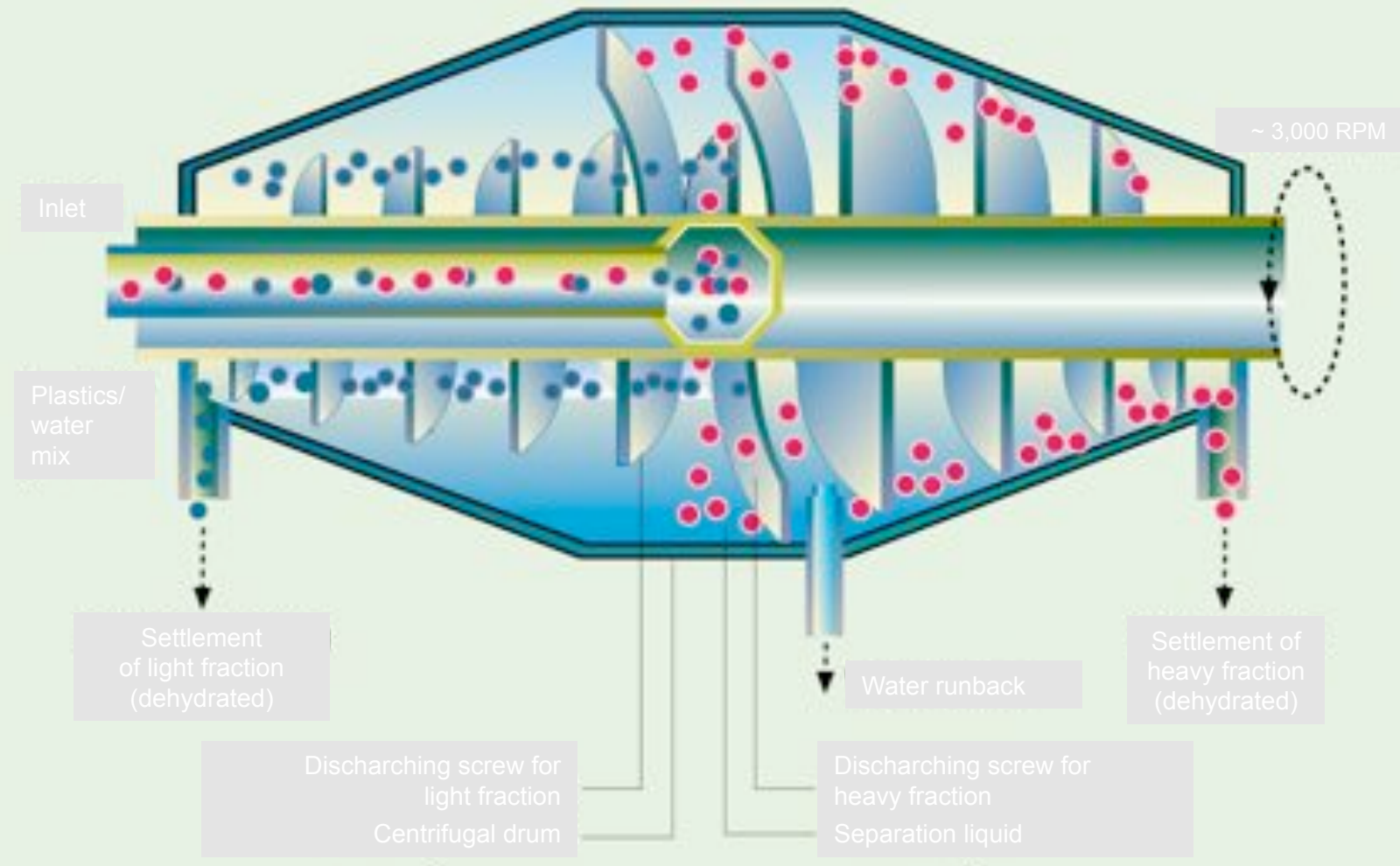


Plastics Processing

 SORTEchnology 3.0

Plastics separation

Sorting centrifuge



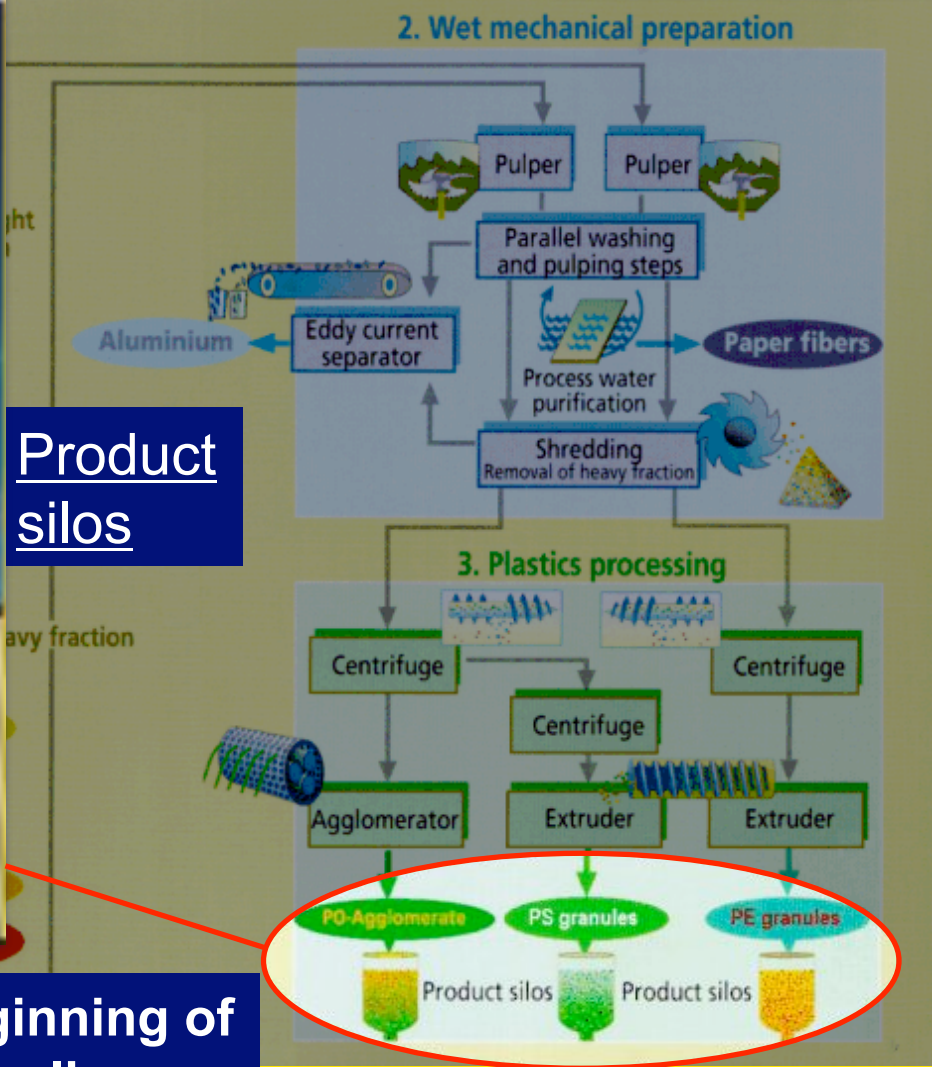
Plastics Processing

 SORTEchnology 3.0

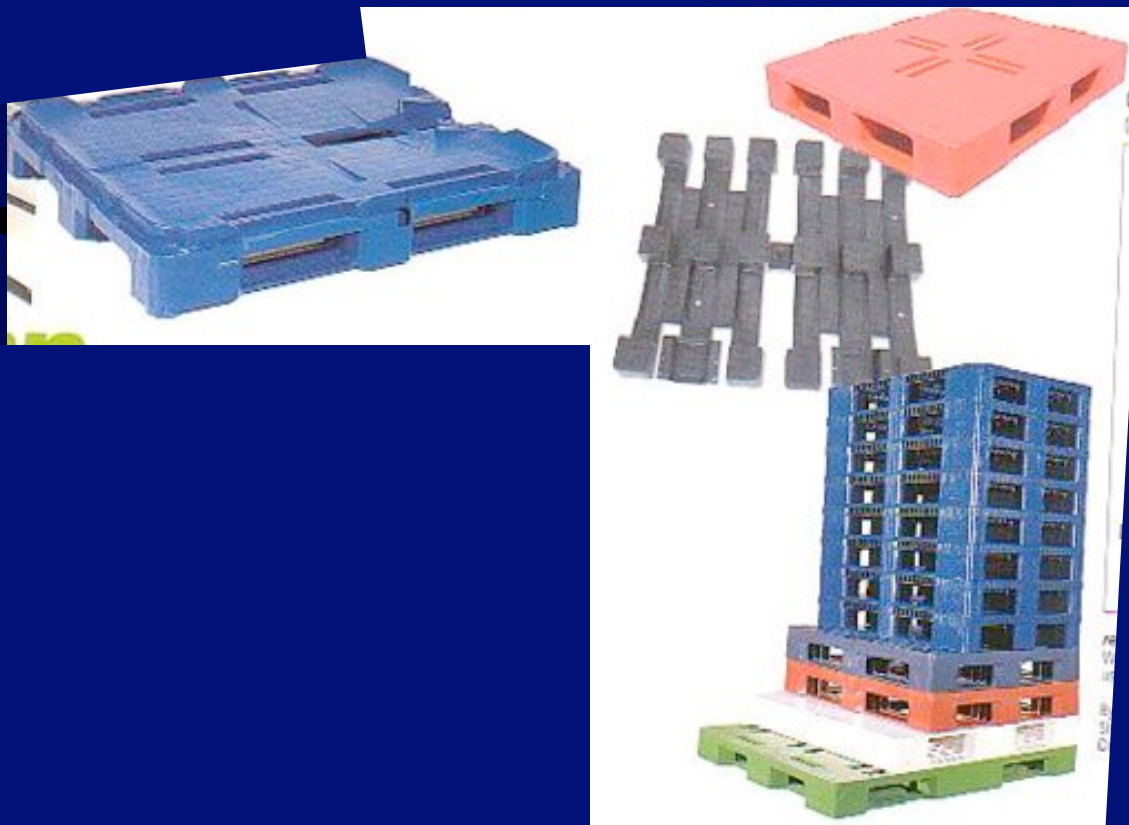


Product silos

Beginning of recycling



New Products from Recycled Plastics



Toys from Recycled Plastics



Environmental Businesses (1)

- Packaging wastes to recycled products
 - Venture in **Asia**
 - Financing from **Asia and Europe**
 - Technology from **Germany and Canada**

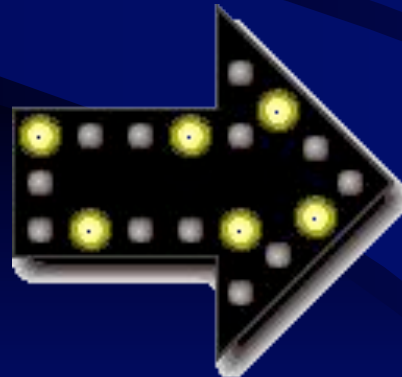


Shanghai WEI-Gang Energy Co., Ltd.



Environmental Businesses (2)

- Waste gas to electrical power
 - Equity from **North America**
 - Debt financing from **China**
 - Technology from **North America, Europe and China**



Biomass Recovery



Cogeneration

Left to rot



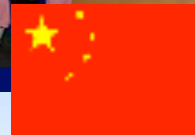
Environmental Businesses (3)



- Bio-mass Energy
 - Financing from **Canada, Europe, Asia**
 - Silviculture rehabilitation and agricultural wastes in the **Americas**
 - Technology from **Americas, Europe and China**
 - Markets in **China and Europe**

Global Value Generation

Recovery

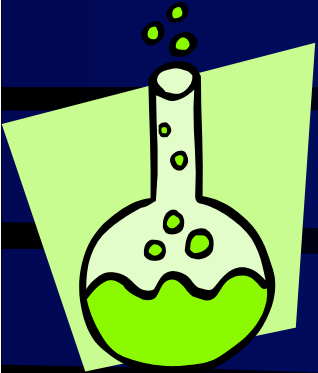


Global value

Left to Rot



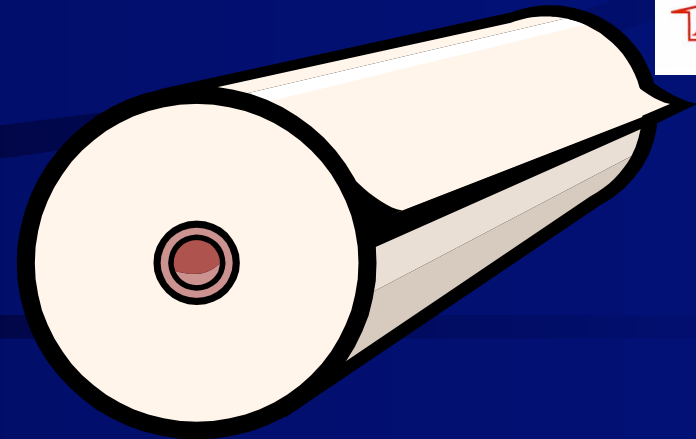
A Virtual Specialty Chemicals Business



- Markets in **North America**
- Sourcing from **China and Europe**
- Quality control at ports of shipment
- Marketing and logistics from **Montreal**
- Technical support from **Atlanta, GA**
- Financing from **Vancouver**

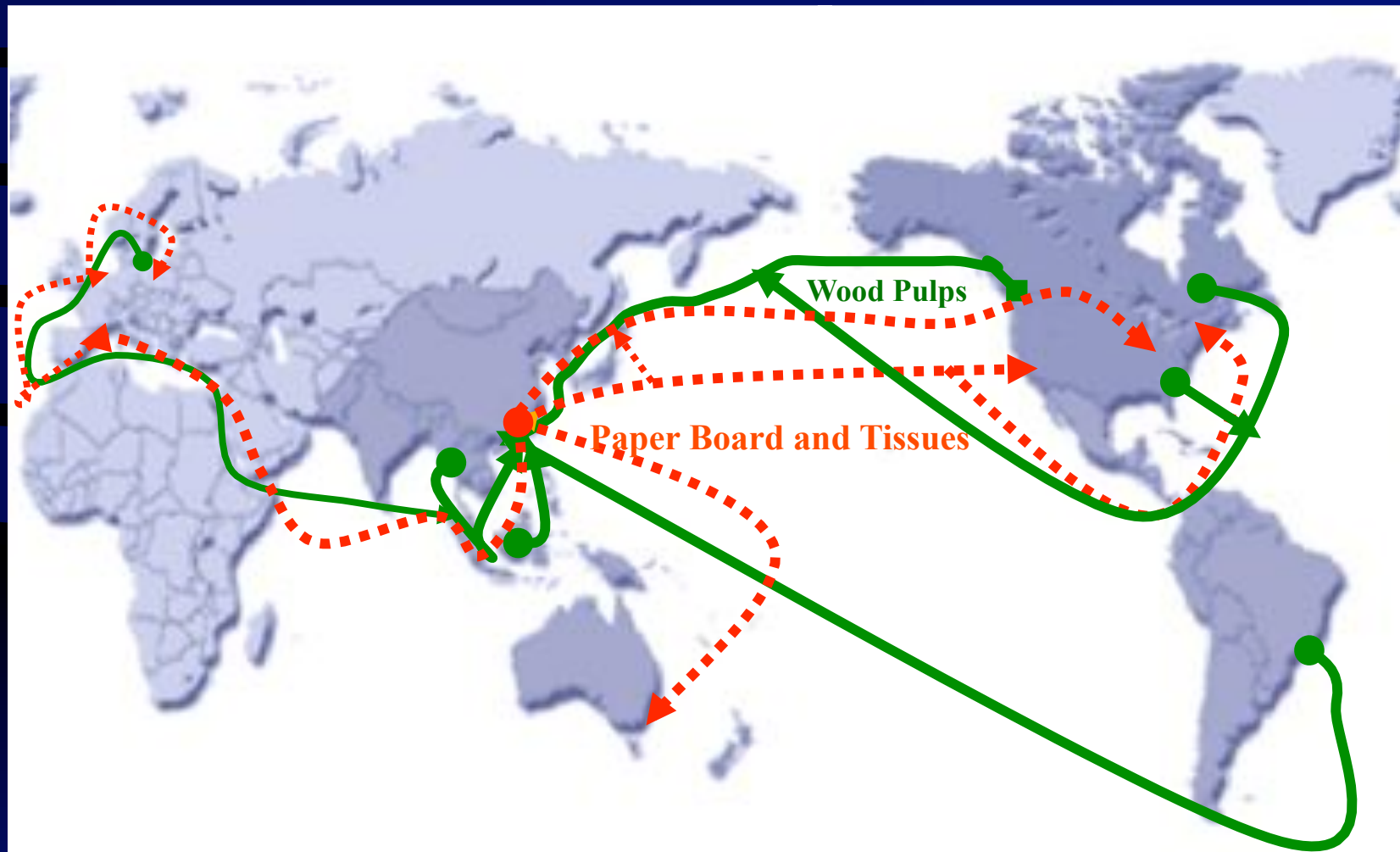


Pulp and Paper

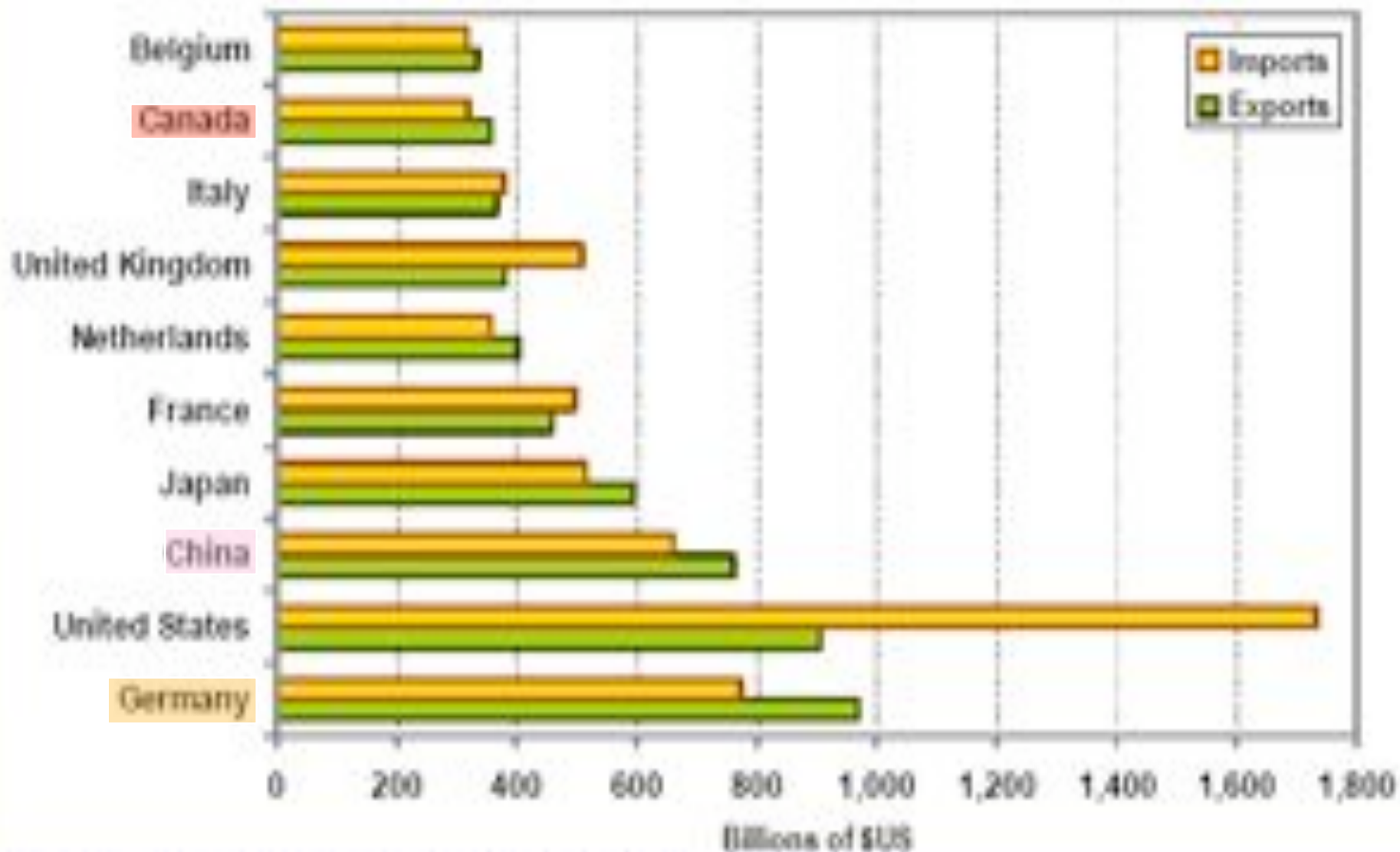


- Fibre sources from the **Americas, Europe, Indonesia and Thailand**
- Paper products markets in **North America, Europe and Australia**
- Financing from **North America, Europe and China**
- Logistics from **Hong Kong and Europe**

Global Supply Chain and Marketing Pulp and Paper



World's Top 10 Trading Nations in 2005



CME Global Business 20/20

- Take **actions** to enable productive and competitive Canadian industries to go **global**



Canadian
Manufacturers &
Exporters

Manufacturiers et
Exportateurs du
Canada





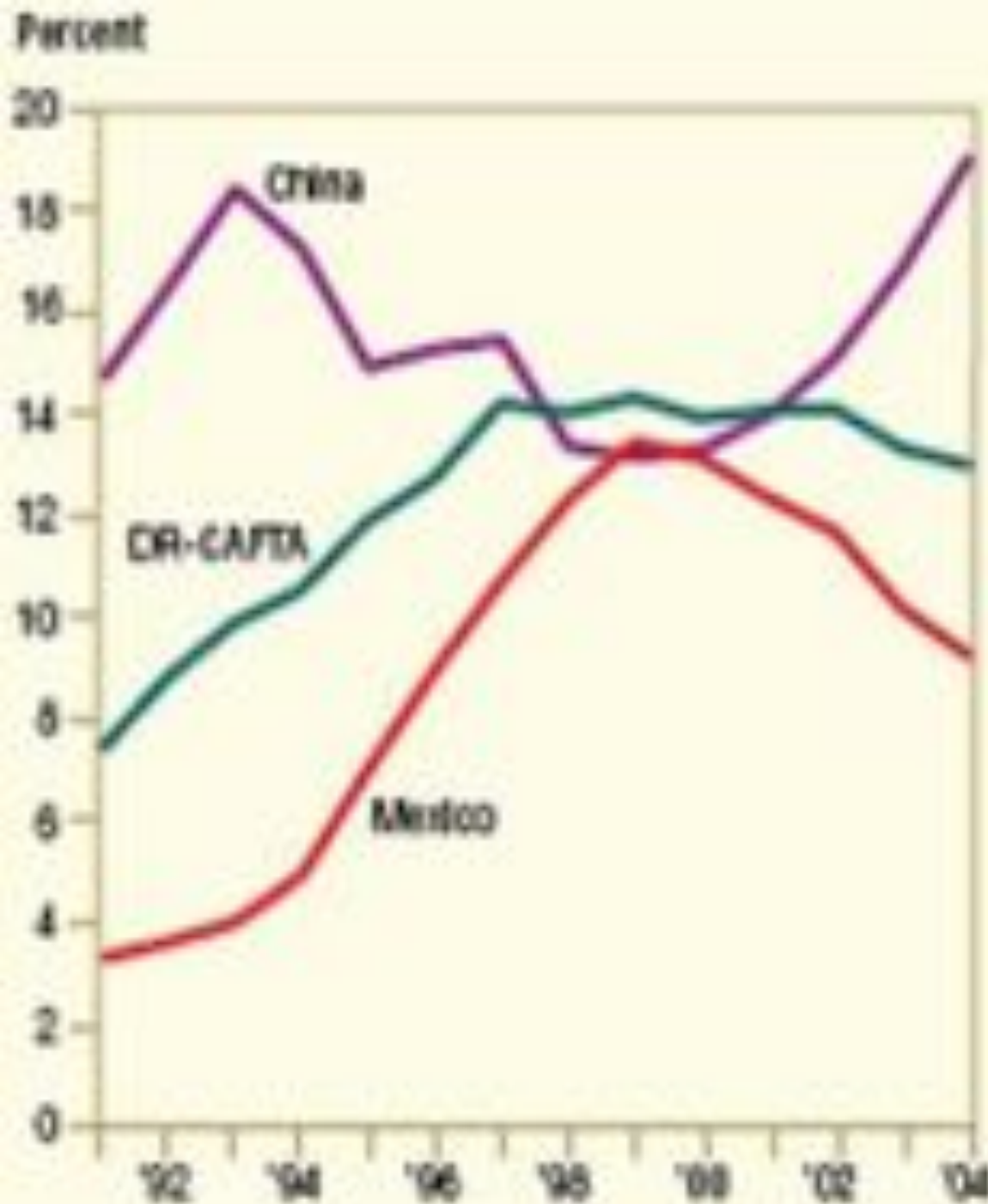
Canadian
Manufacturers &
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Manufacturiers et
Exportateurs du
Canada



Growth in US Merchandise Trade

	Percent Change (1990-2005)
Canada	155%
Mexico	355%
China	1339%
Asia Pacific (incl. China)	143%
Latin America	177%
Europe	122%
Total World Trade	157%



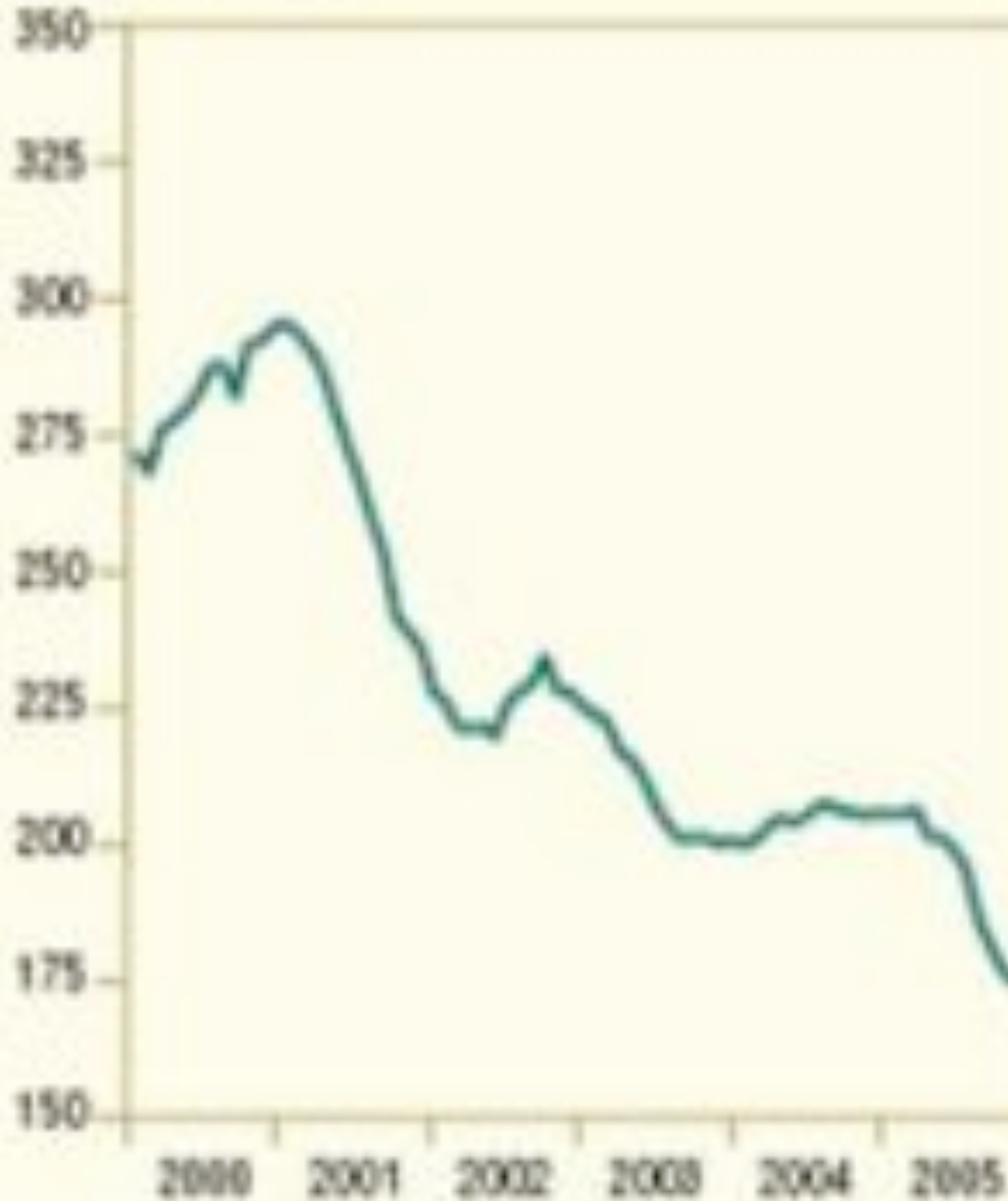
Mexico lost market share in U.S. as NAFTA effect dissipated

Sources: Federal Reserve Bank of Dallas and OECD

Jobs in Mexico's Textiles and Apparels in Maquiladoras

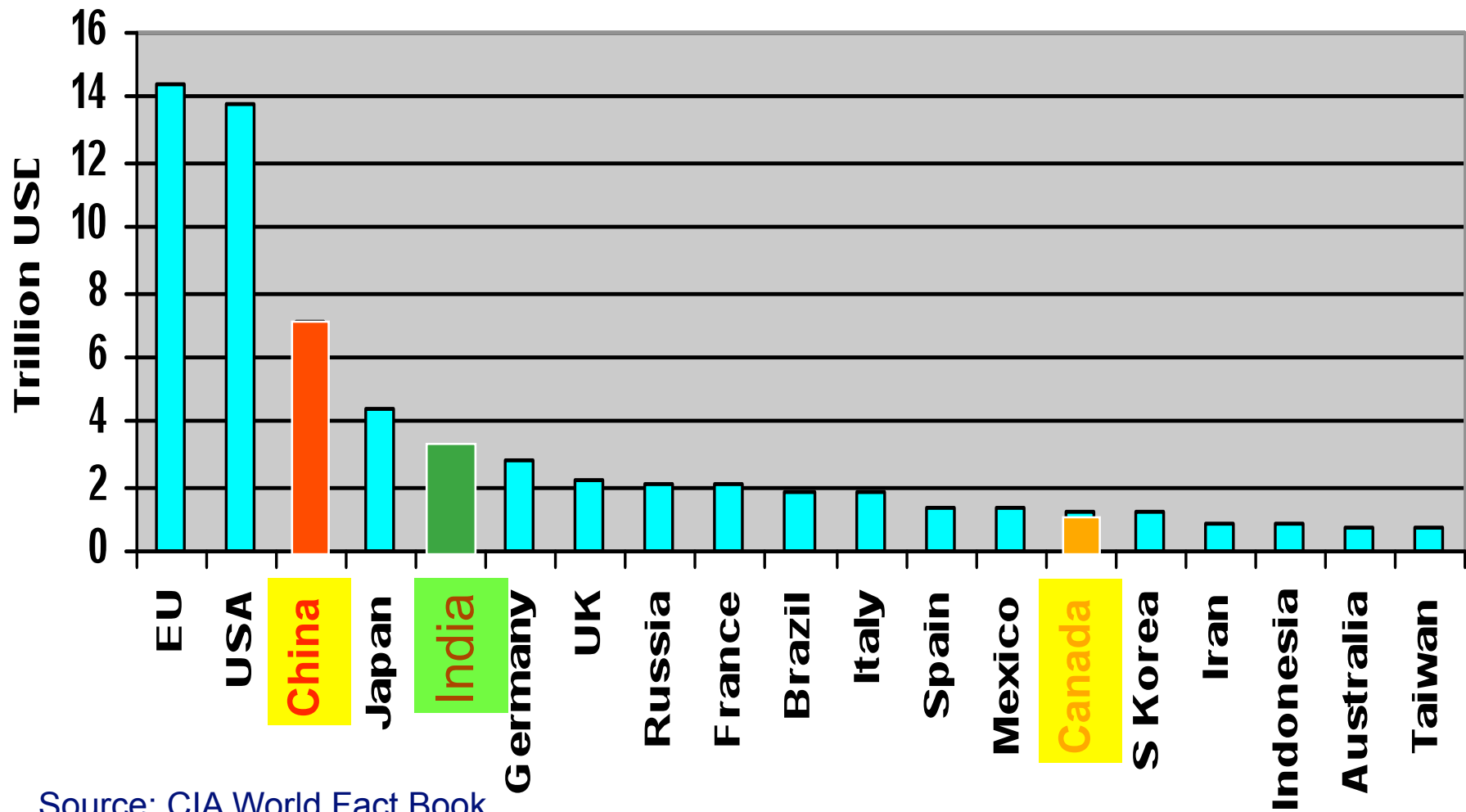
Sources: Federal Reserve Bank of Dallas and Instituto Nacional de Estadística, Geografía e Informática

Thousands of jobs



2007 GDP Ranking

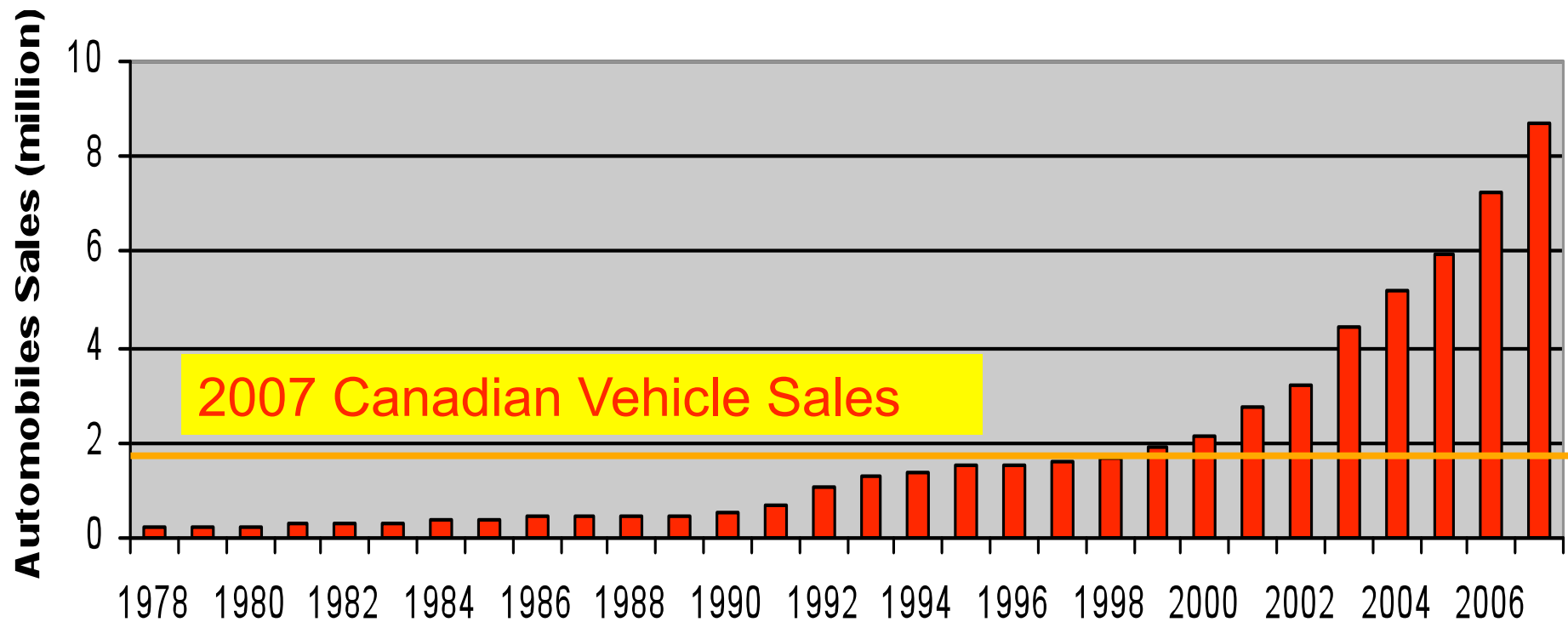
(Purchasing Power Parity Basis)



Source: CIA World Fact Book

China Grew While We Relaxed

Automobiles Sales in China (1978-2007)

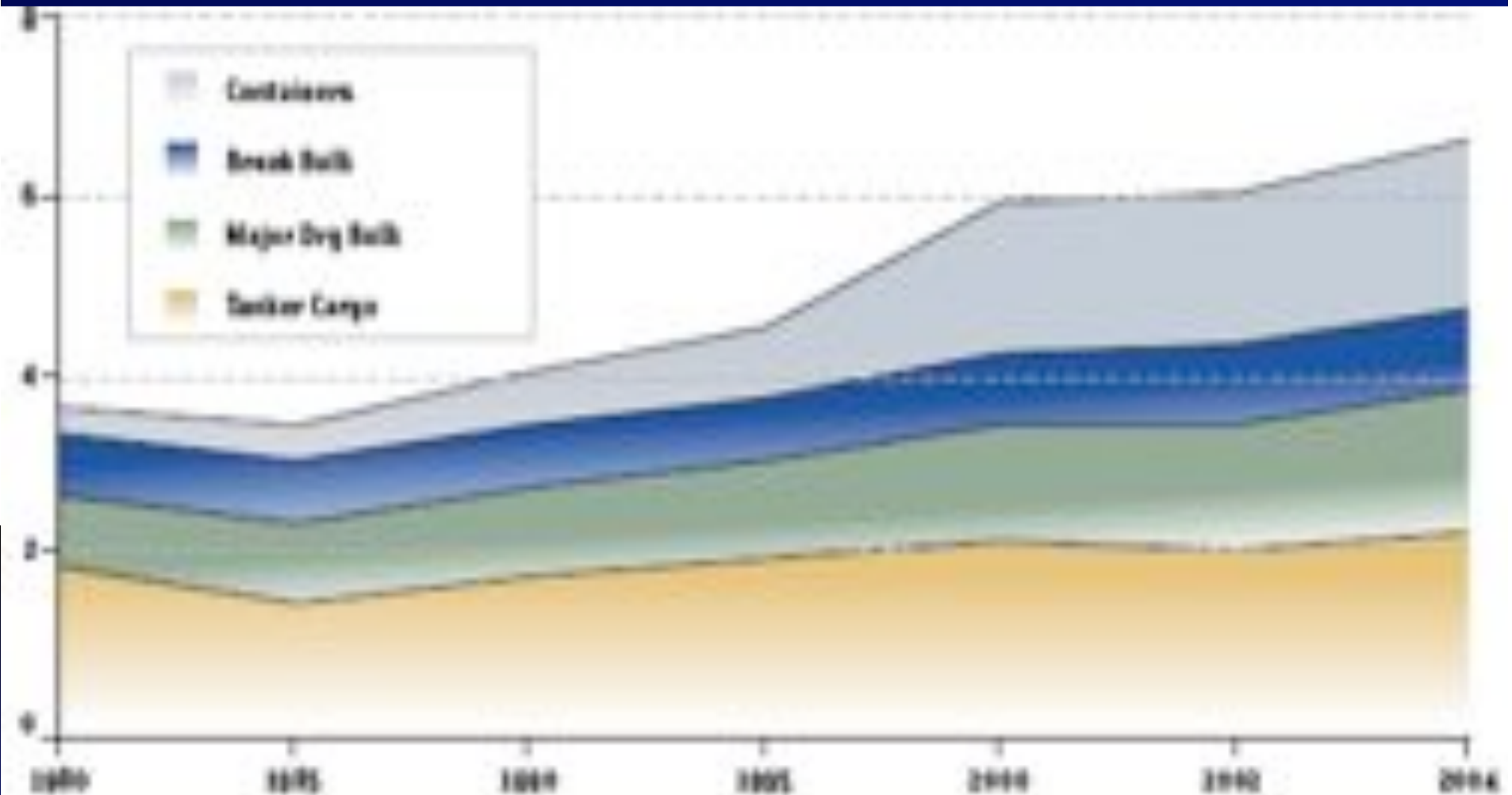


Motor Vehicles Manufacturing

(million vehicles in 2006)

• Canada	2.6
• USA	10.8
• Mexico	2.1
• North America Total	15.5
• Japan	11.6
• China	8.9
• South Korea	4.1
• North Asia Total	24.6

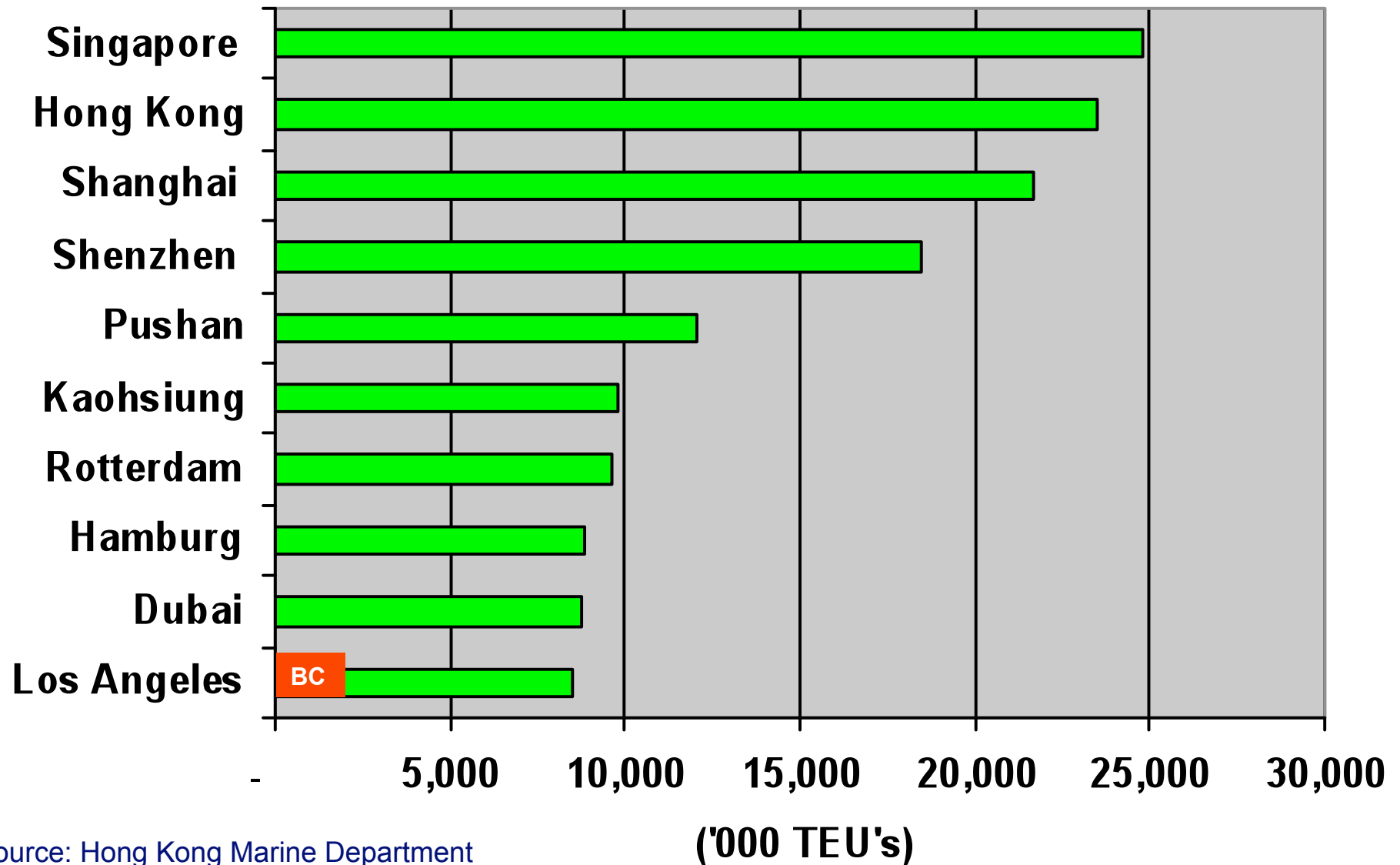
World Seaborne Cargo Billion Tonnes (1984-2004)



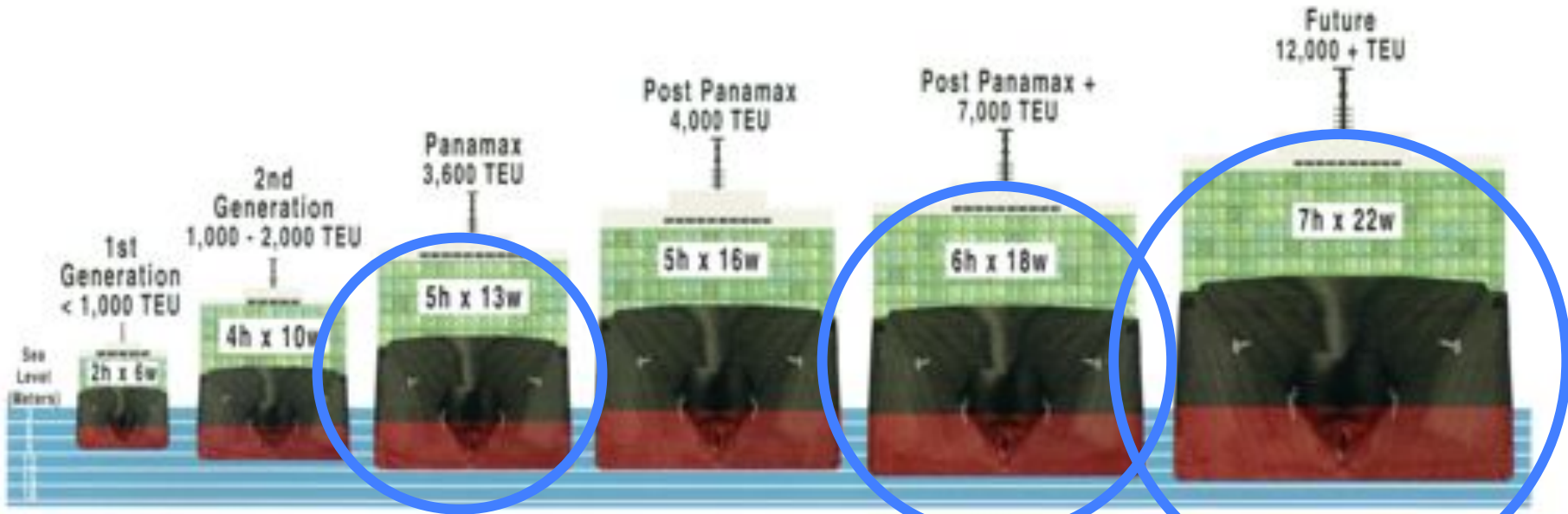
Source: UNCTAD, Review of Marine Transport

Courtesy of DFAIT and Transport Canada

World's Top 10 Container Ports in 2006



Rapidly Escalating Vessel Size



**Future Coastal
Freighters**

**Current
7-9,000
TEU**

**Future
12-15,000
TEU**

Picture Courtesy of Prince Rupert Port Authority

Prince Rupert Fairview Terminal 2008



Courtesy of Prince Rupert Port Authority

Prince Rupert Fairview Terminal 2012



2 Million TEU's

CN RAIL CONNECTION TO MAJOR MARKETS

- CN's main line to Prince Rupert is the best rail line to the Pacific Coast in North America



New Gateways across Continental North America

Pacific Gateway and Corridor
\$6 billion investment projects

Initial Transit Times	
Chicago	107 hours
Toronto	108 hours
Montreal	115 hours
Memphis	135 hours

Courtesy of Prince Rupert Port Authority

Vision – Dare to Dream

Hong Kong – Macau – Zhuhai Bridge



Determination – Dare to Invest

Door-to-Door Service



Discipline – Dare to Build

-25 Million TEU Chinese Commitment

32 km causeway

Yangshan Port,
Shanghai



The Baltic Dry Index



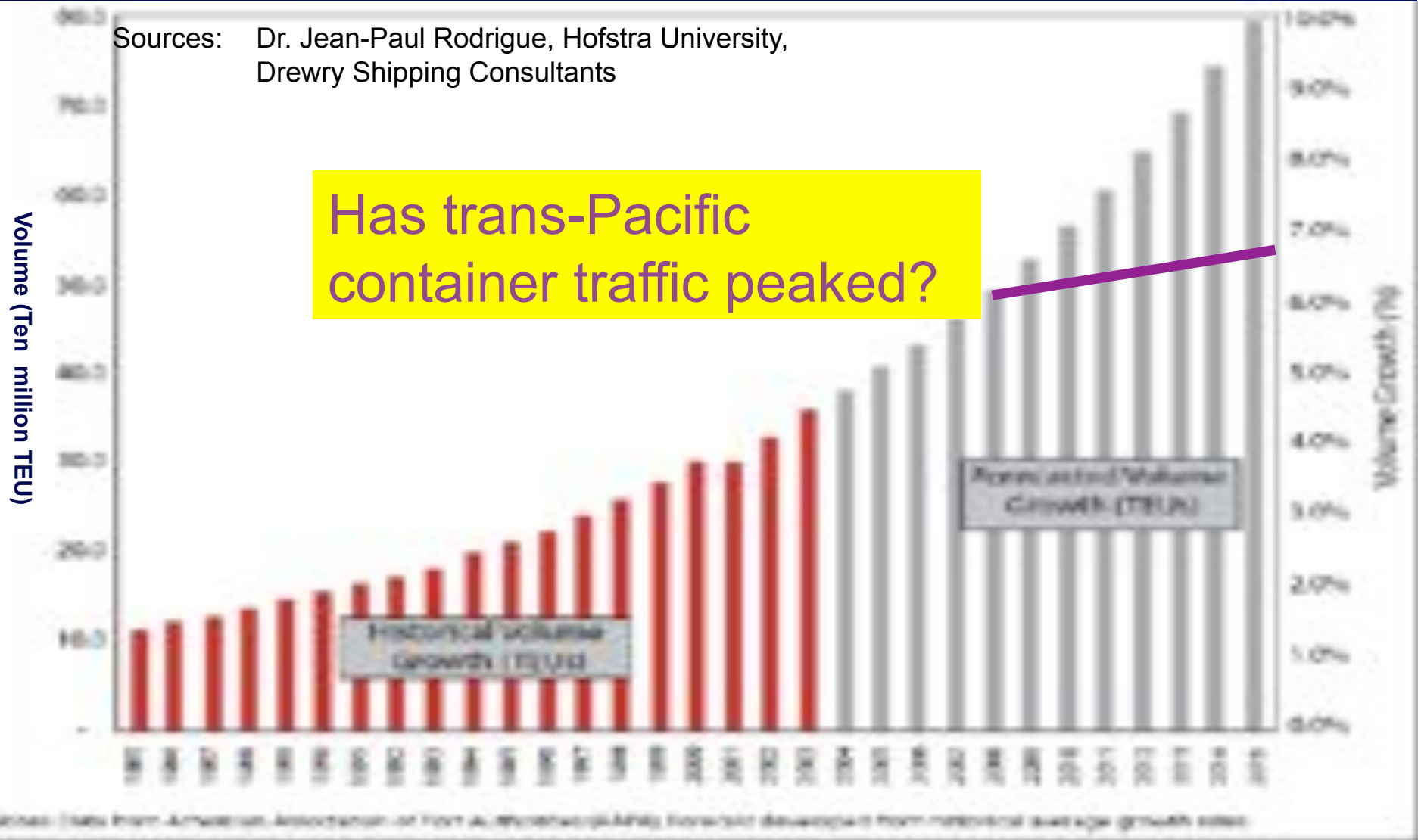
Impact of 2008-9 Financial Crisis

130 vessels anchored in Singapore



Container Volume Delivery and Forecast Continental USA and Canada

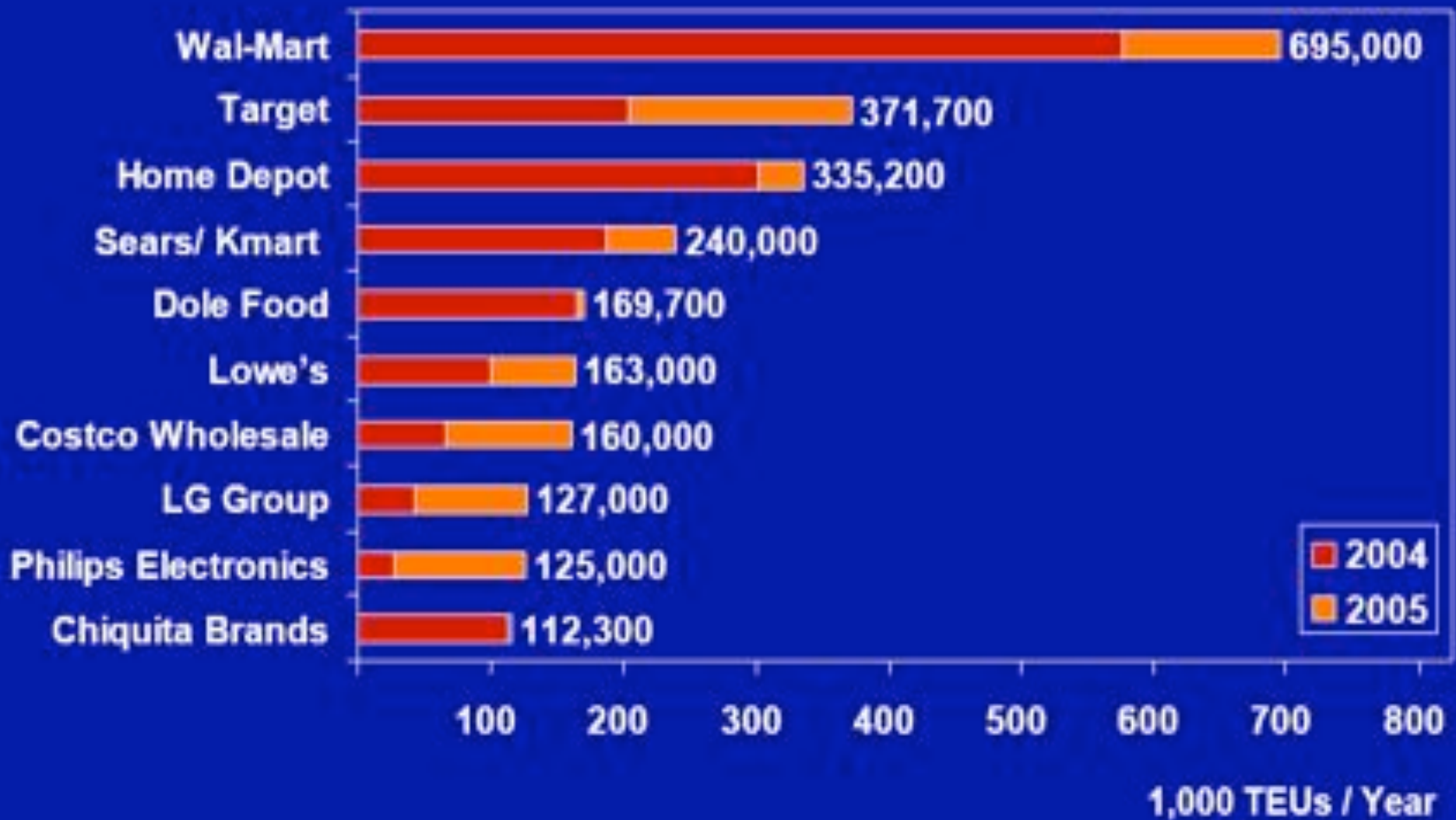
Sources: Dr. Jean-Paul Rodrigue, Hofstra University,
Drewry Shipping Consultants



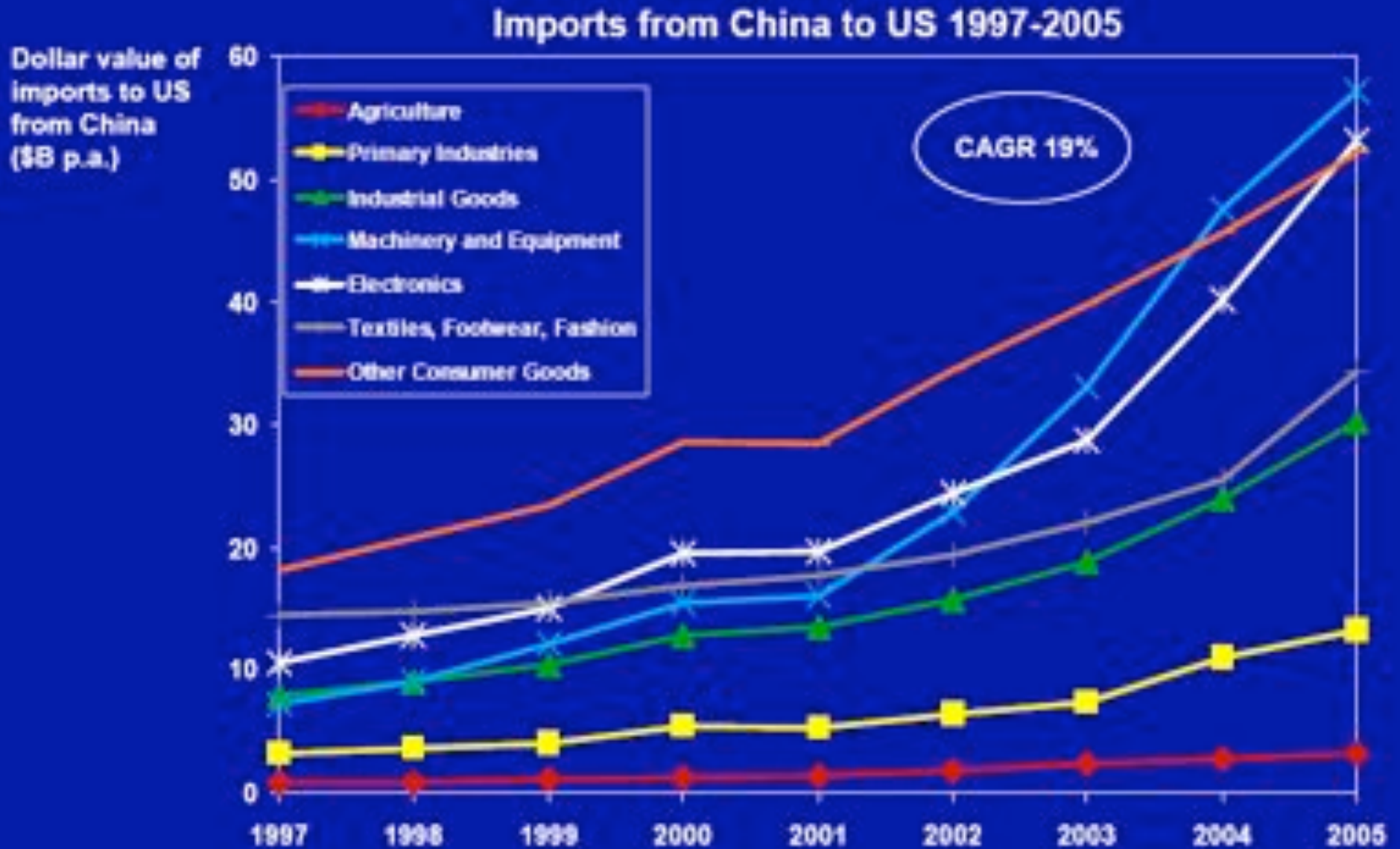
Ocean Freight of U.S. Importers from China

	Typical Shelf Price	Shipping Costs
TV Set	\$700	\$10.00
DVD/CD Player	\$150	\$1.50
Vacuum Cleaner	\$150	\$1.00
Scotch Whisky (bottle)	\$50	\$0.15
Coffee (1 kg)	\$15	\$0.15
Biscuits (Tin)	\$3	\$0.05
Beer (Can)	\$1	\$0.01

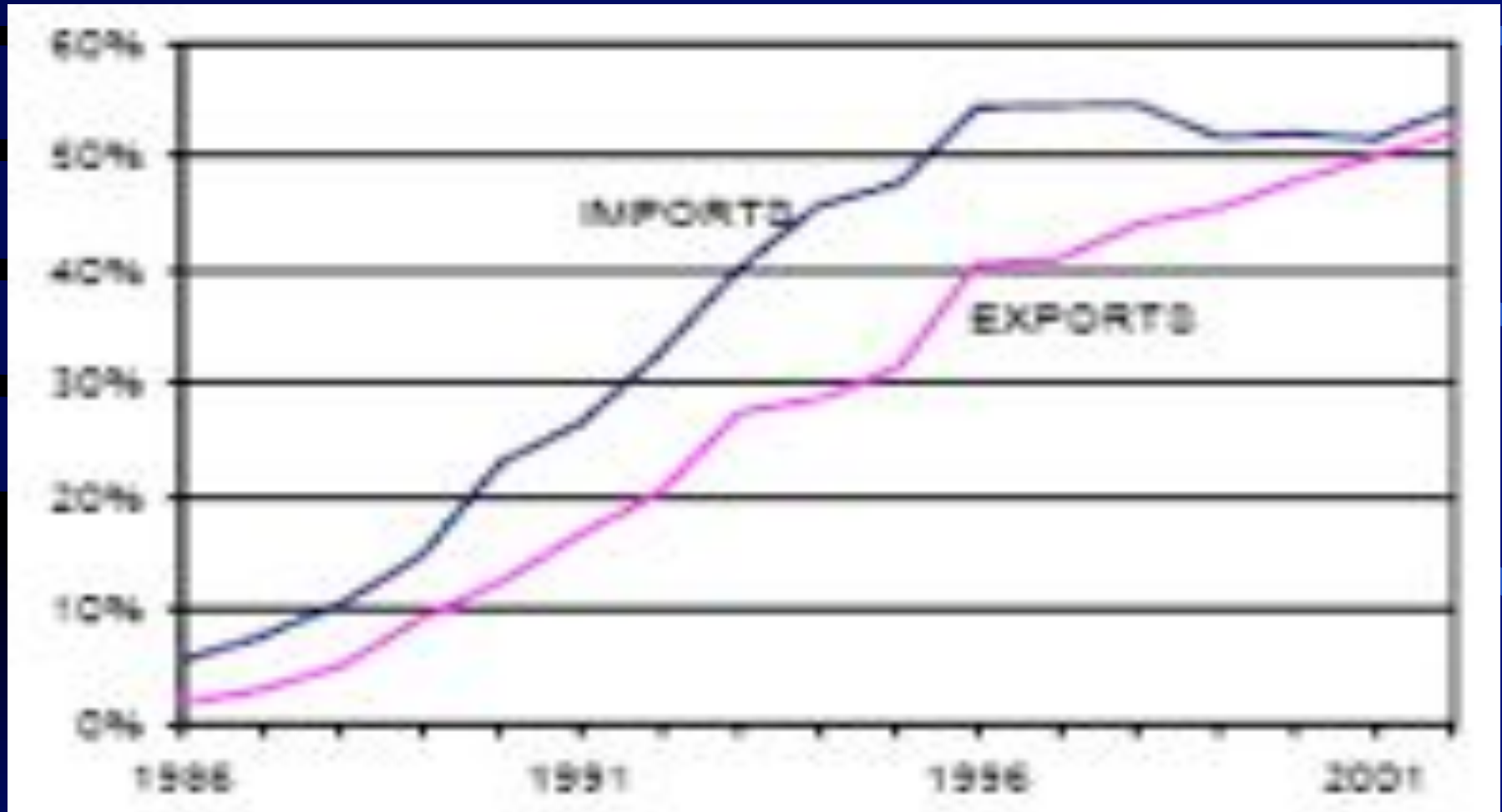
The Largest U.S. Importers from China



U.S. Imports from China



Share of Foreign Invested Enterprises in Chinese Merchandise Trade





Canadian
Manufacturers &
Exporters

Manufacturiers et
Exportateurs du
Canada



Changing Trade Patterns

- China is becoming the hub of trade between Asia and North America
 - By 2020, China is expected to account for **60%** of all Asian-North American trade.
- Foreign companies account for **60%** of Chinese exports – intra-corporate exports.

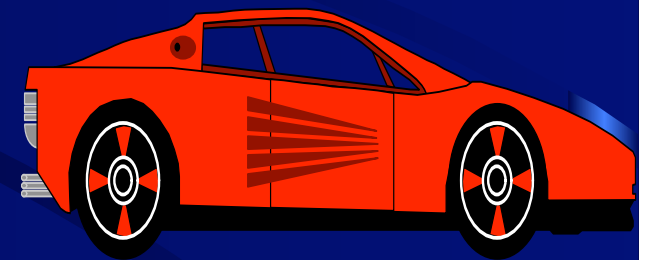
Global Partnering Turns Bilateral Trade Policies Obsolete – Construction Equipment



Traditional Vertically Integrated Manufacturing

Ford in Cleveland

- Iron Ore to Automobiles



55

U.S. Paper Board Manufacturing

- Forest to paper board
- Full integrated single pulp furnish, single-ply technology
- **Advantages turned to liability?**
- Competing with global pulp furnish and multi-ply technology



Canadian
Manufacturers &
Exporters

Manufacturiers et
Exportateurs du
Canada



MADE IN
FABRIQUE AU



Scope of Manufacturing

- R&D, Design, Engineering
- Value Chain & Logistics Management
- Production Systems & Maintenance
- Innovation, Continuous Improvement & Quality Control
- Information Management
- Marketing, Distribution, Sales & Service
- Business & Customer Financing
- Life Cycle Management



Canadian
Manufacturers &
Exporters

Manufacturiers et
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Canada

CANADIAN
MANUFACTURERS
AND EXPORTERS
20/20
BUILDING FOR
OUR VISION FOR
THE FUTURE

MANUFACTURIERS
ET EXPORTATEURS
DU CANADA
20/20
FAÇONNER
NOTRE
AVENIR



MADE IN
FABRIQUE AU
CANADA



Changing Nature of Manufacturing

- Half of the workers never touch the product *

*IBM Bromont



Canadian
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CANADIAN
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AVENIR

Canadian Vision
Global Perspectives
MADE IN
FABRIQUÉ AU
Canada

ACDEG

Competing in World Markets

- Value = Capitalize on knowledge



Canadian
Manufacturers &
Exporters

Manufacturiers et
Exportateurs du
Canada



New Manufacturing / Trade Reality

Tier	Market Access	Supply Chain	Intellectual Property	Manufacturing	Skill
Tier 1	Global	Global	Product Technology	Integration Test	Product Management Appl./Des. Engineering Supply Chain Mgt.
Tier 2	Global Regional	Global Regional	Technology Process	Major Assy Fabrication	Des./Mfg. Supply Chain Mgt. Process Mgt.
Tier 3	Regional Local	Regional Local	Process Fabrication	Sub Assy Production Mgt.	Mfg. Eng. Production
Tier 4	Local	Local No	Niche Fab.	Production	



New Value Proposition



Current Value Proposition



Canadian
Manufacturers &
Exporters

Manufacturiers et
Exportateurs du
Canada

CANADIAN
MANUFACTURERS
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20/20
BUILDING FOR
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DU CANADA
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FAÇONNER
NOTRE
AVENIR



Manufacturing

- Creating & delivering value via tangible goods

New Reality of Manufacturing

- Increasingly **volatile** global markets
- Limited **responsiveness** of traditional manufacturing assets
- **Open architecture** of trade oriented distributed manufacturing
- **Lean** and **global** supply chains
- Lots of jobs but **different** jobs

The Apple I-Pod



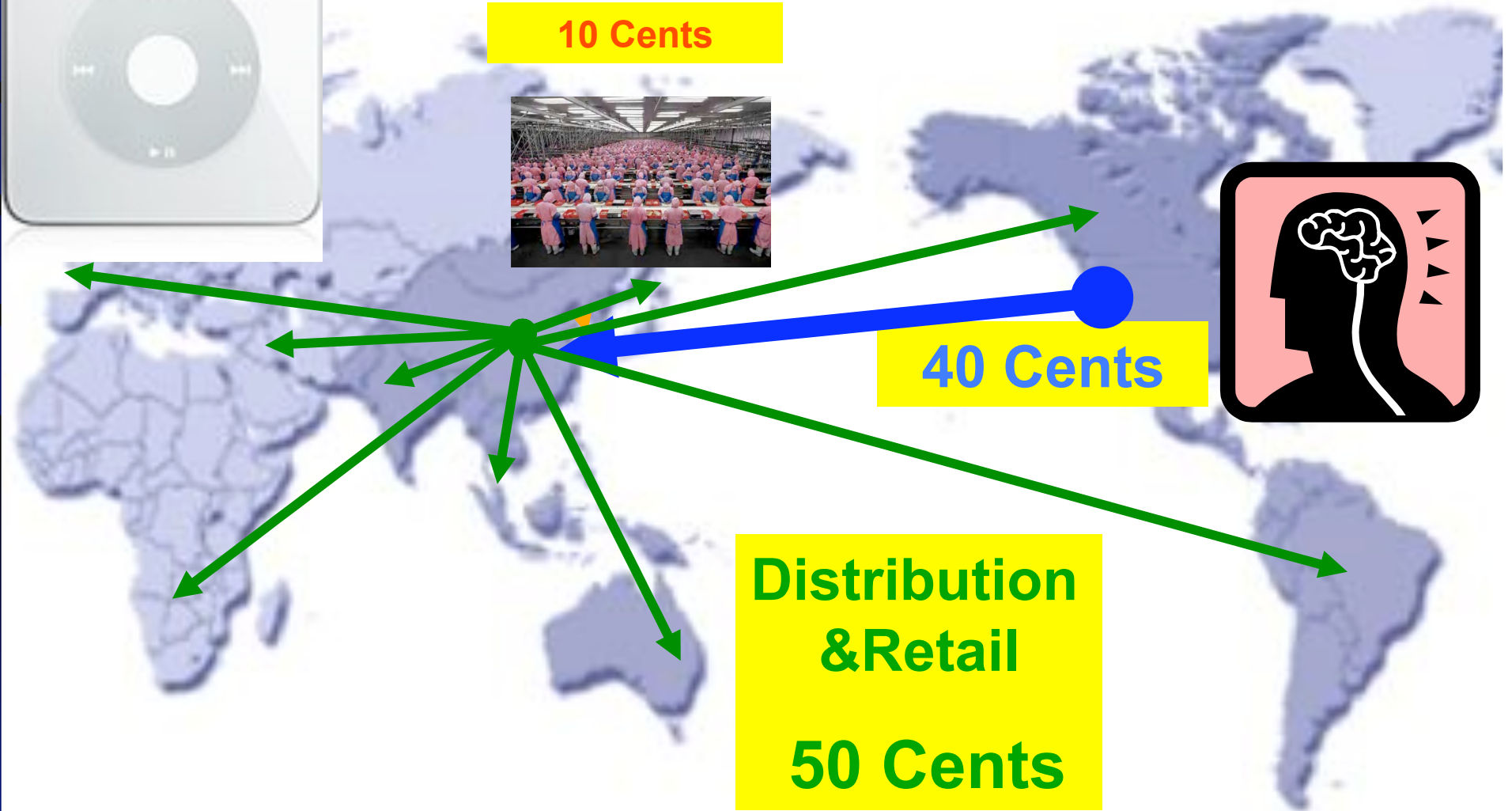
10 Cents



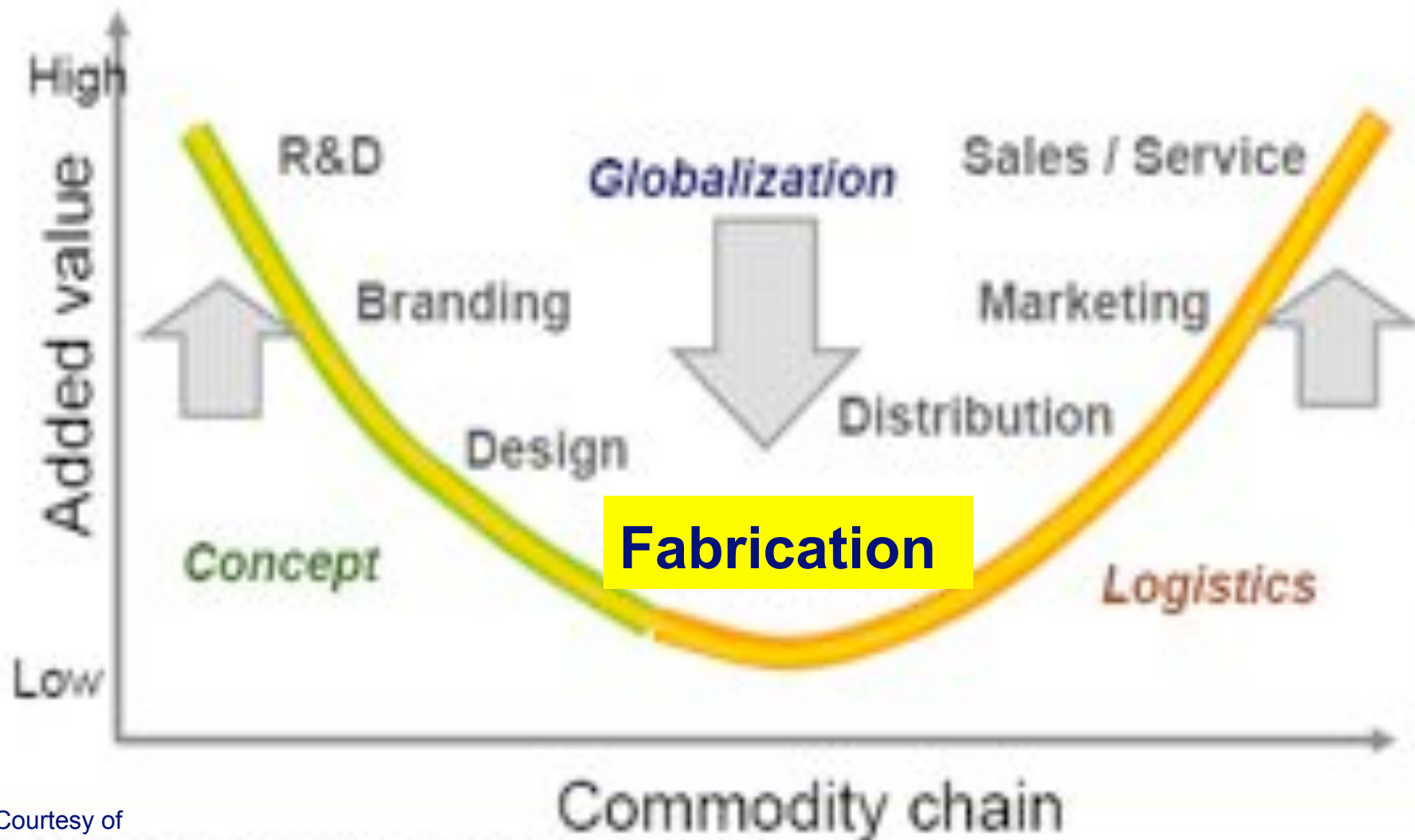
40 Cents



Distribution
& Retail
50 Cents



Economics of Advanced Technology Industries



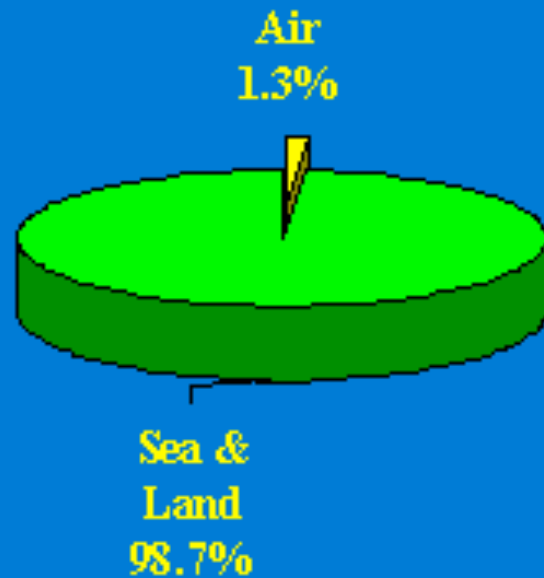
Courtesy of

Dr. Jean-Paul Rodriguez, Dept. of Economics and Geography, Indiana University

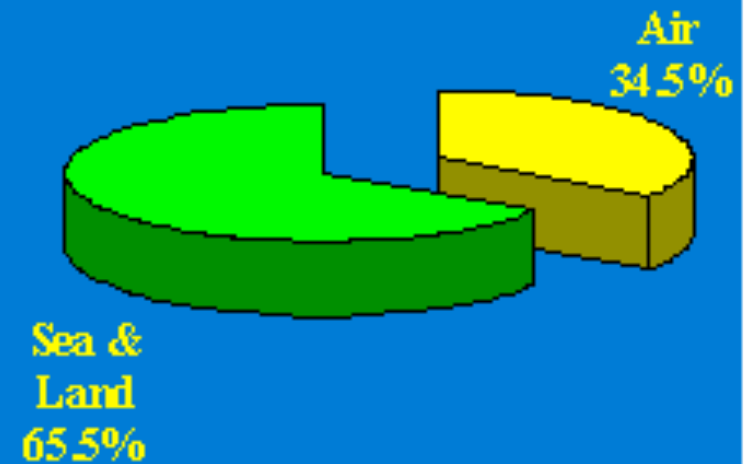
Value Proposition

2006 Hong Kong Air Cargo Throughput and External Trade Value

Tonnage Distribution by Mode

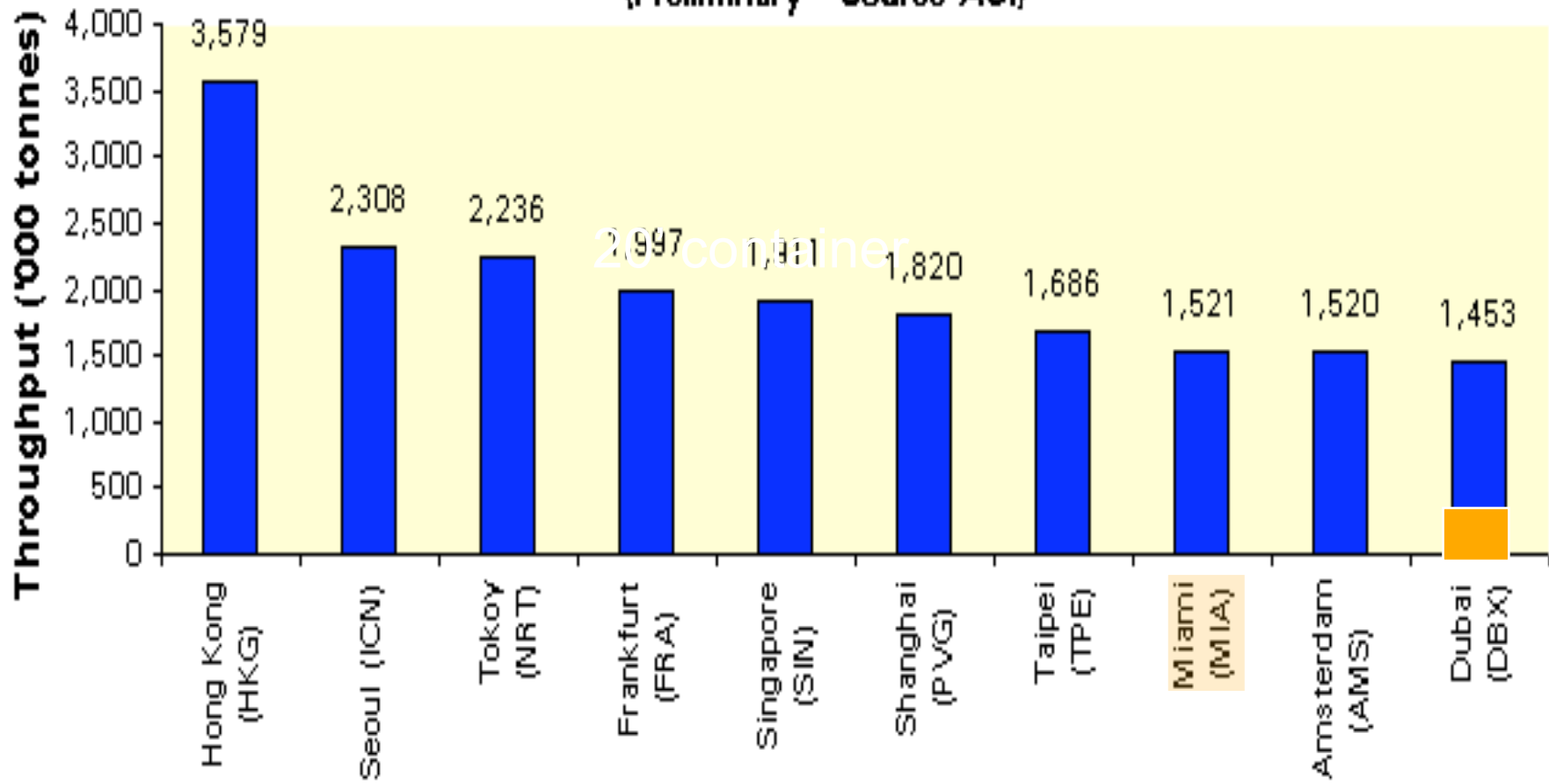


External Trade Distribution by Mode

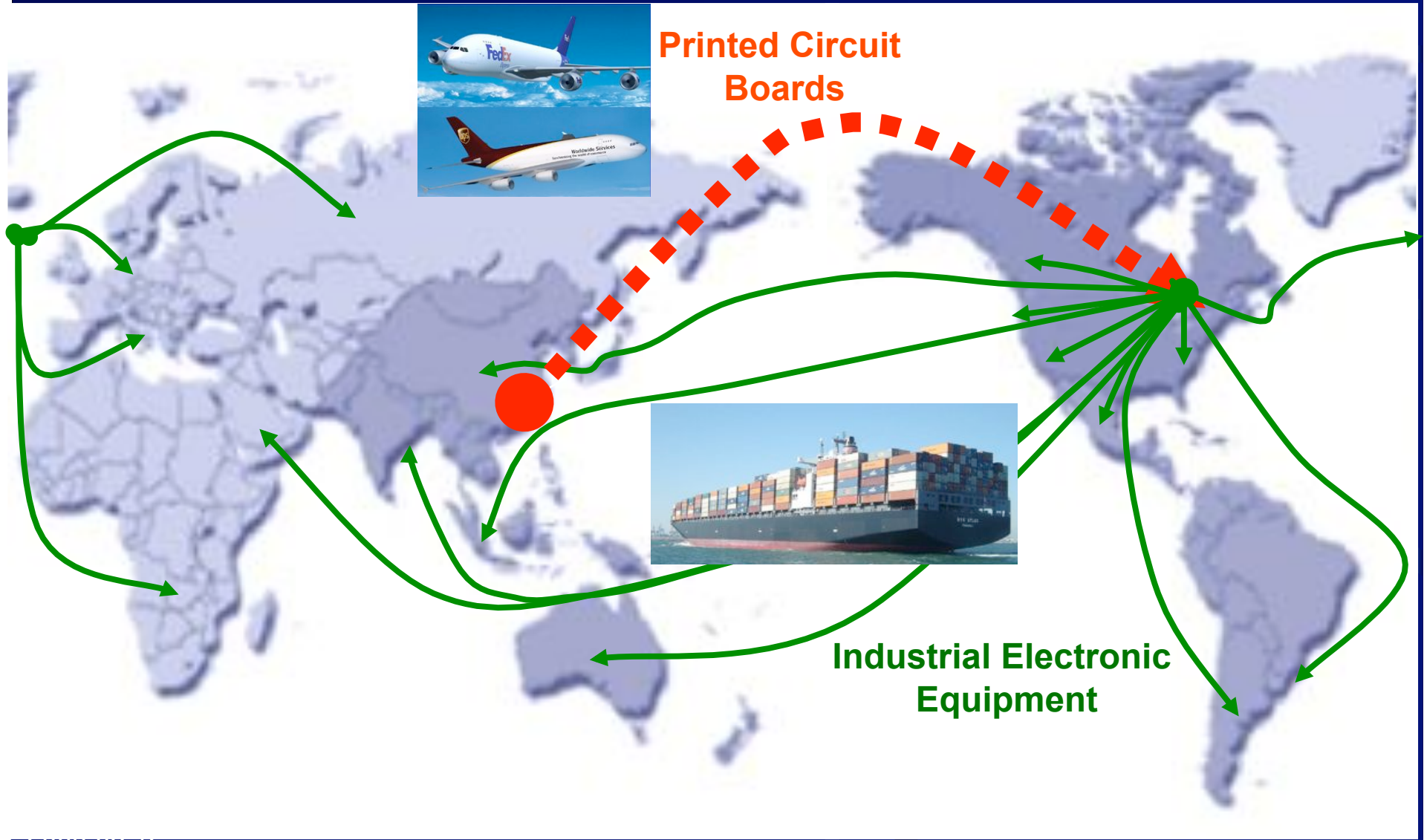


International Air Cargo 2006

Top 10 Busiest Airports in 2006 International Air Cargo Throughput
(Preliminary - Source ACI)



Worldwide Sourcing – Industrial Electronic Equipment



Driving Forces in Global Value Chains

- Labour and skills availability
 - Education and training
- Technology
 - Innovation
- Infrastructure
- Resources recovery
- Global vision

Sustainability



Ingenuity



Fossil Fuel, Where is thy sting?



Asian Supply Chains



Our Past and Their Present



2009.03.12

Courtesy of Asia Pacific Foundation

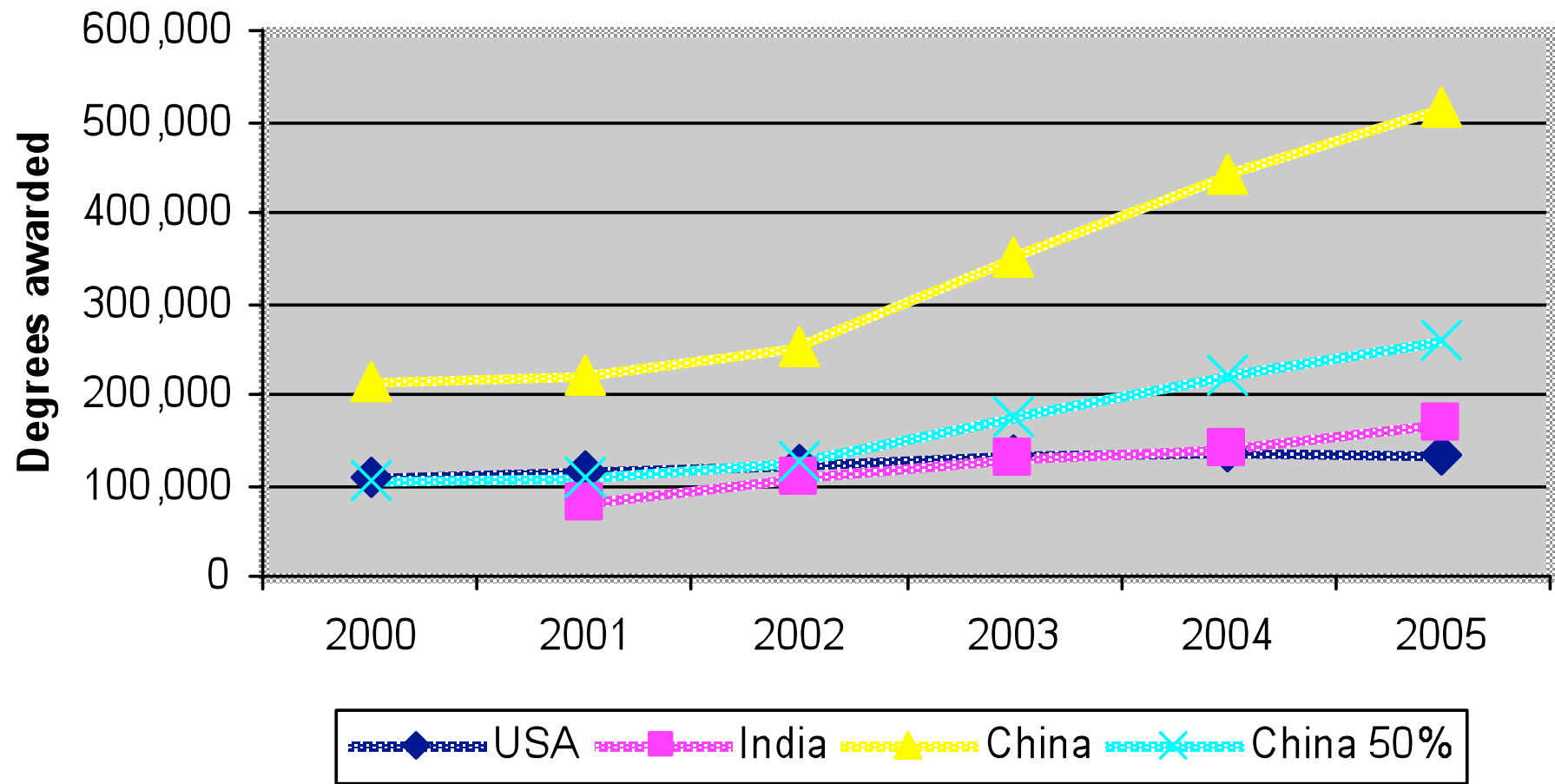
Our Competition ??



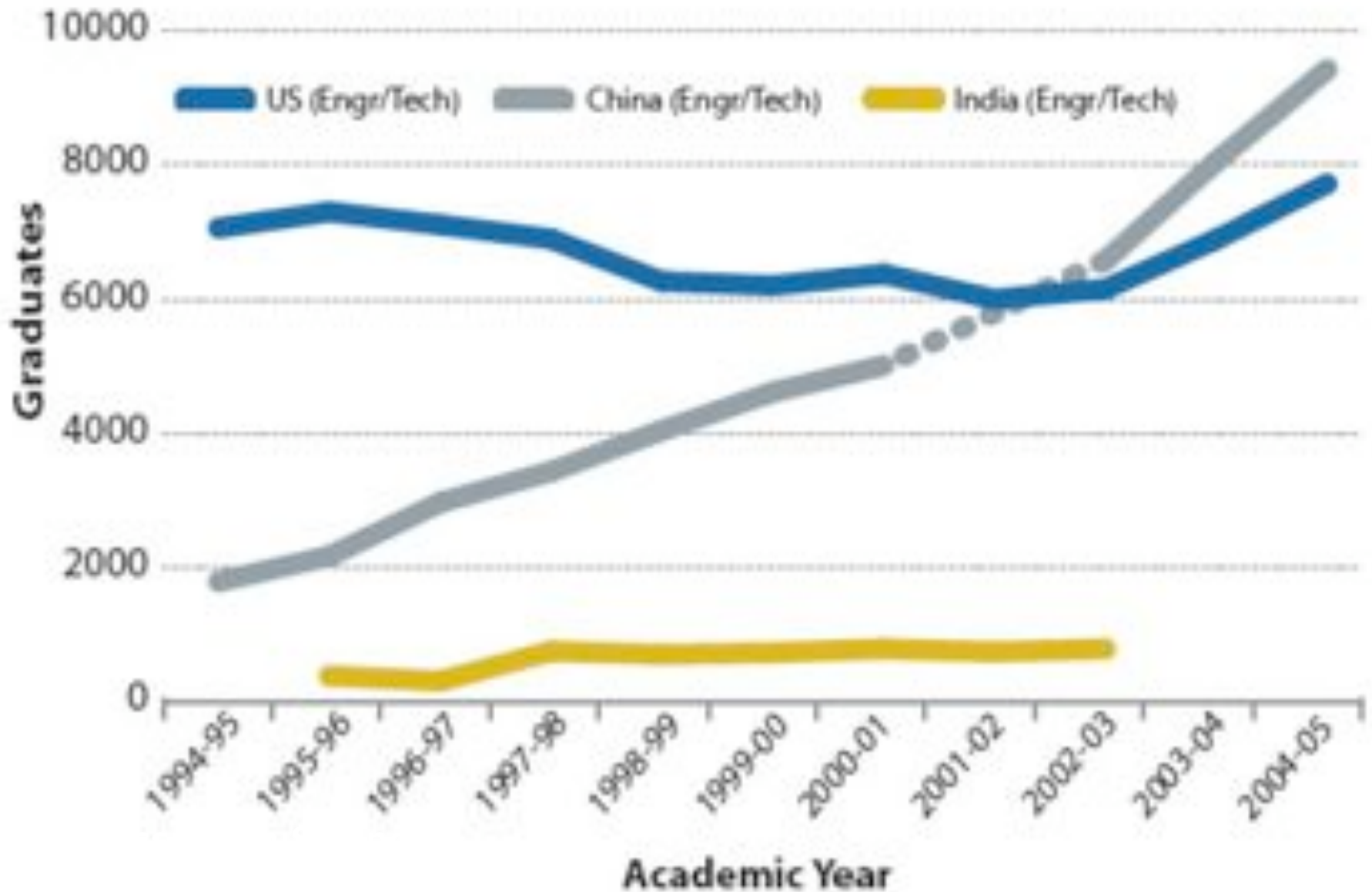
Courtesy of Asia Pacific Foundation

Engineering & Technology Resource

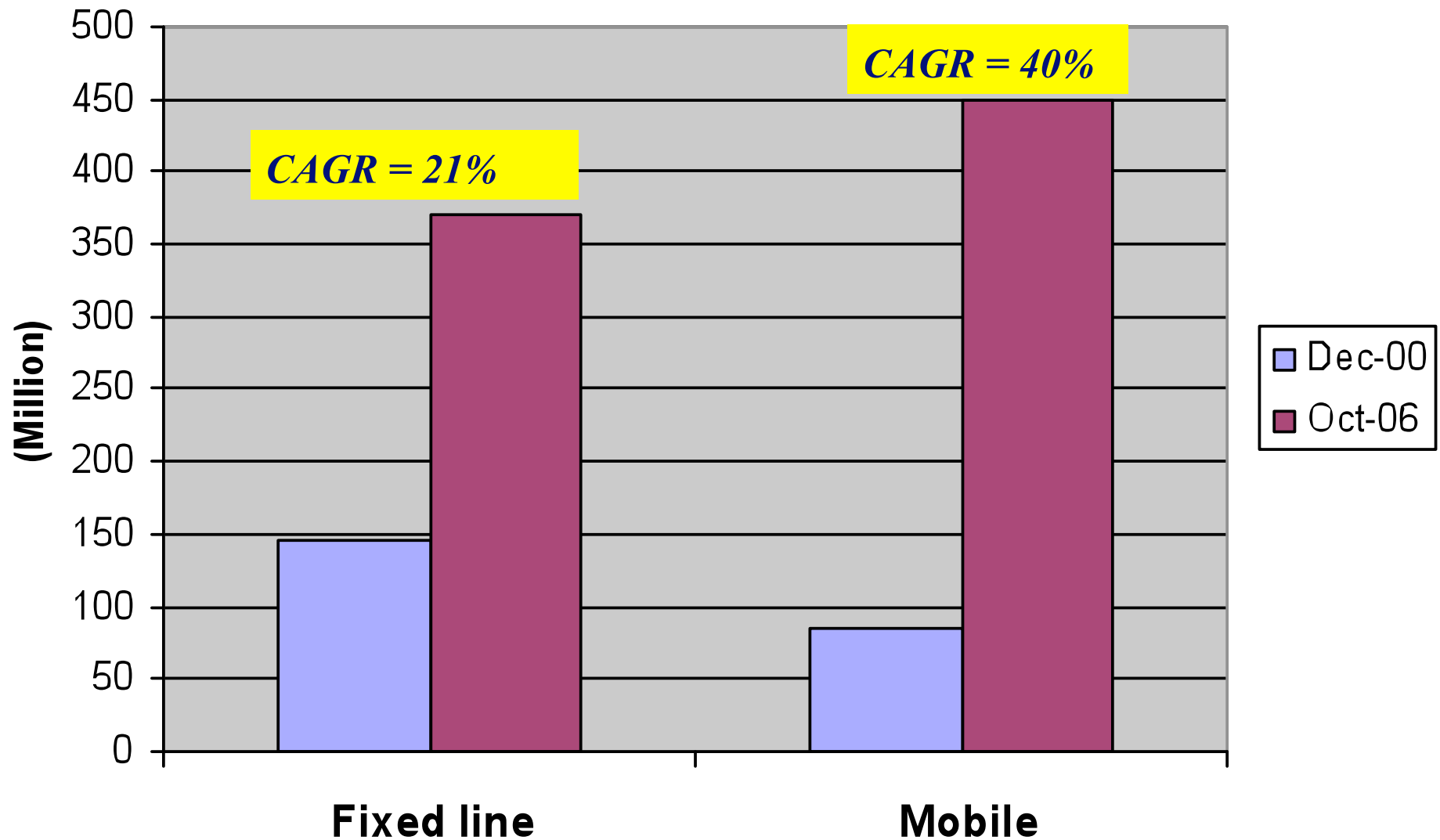
Four-Year Bachelor Degrees in Engineering, Computer Science and Information Technology



Engineering & Technology Ph D degrees



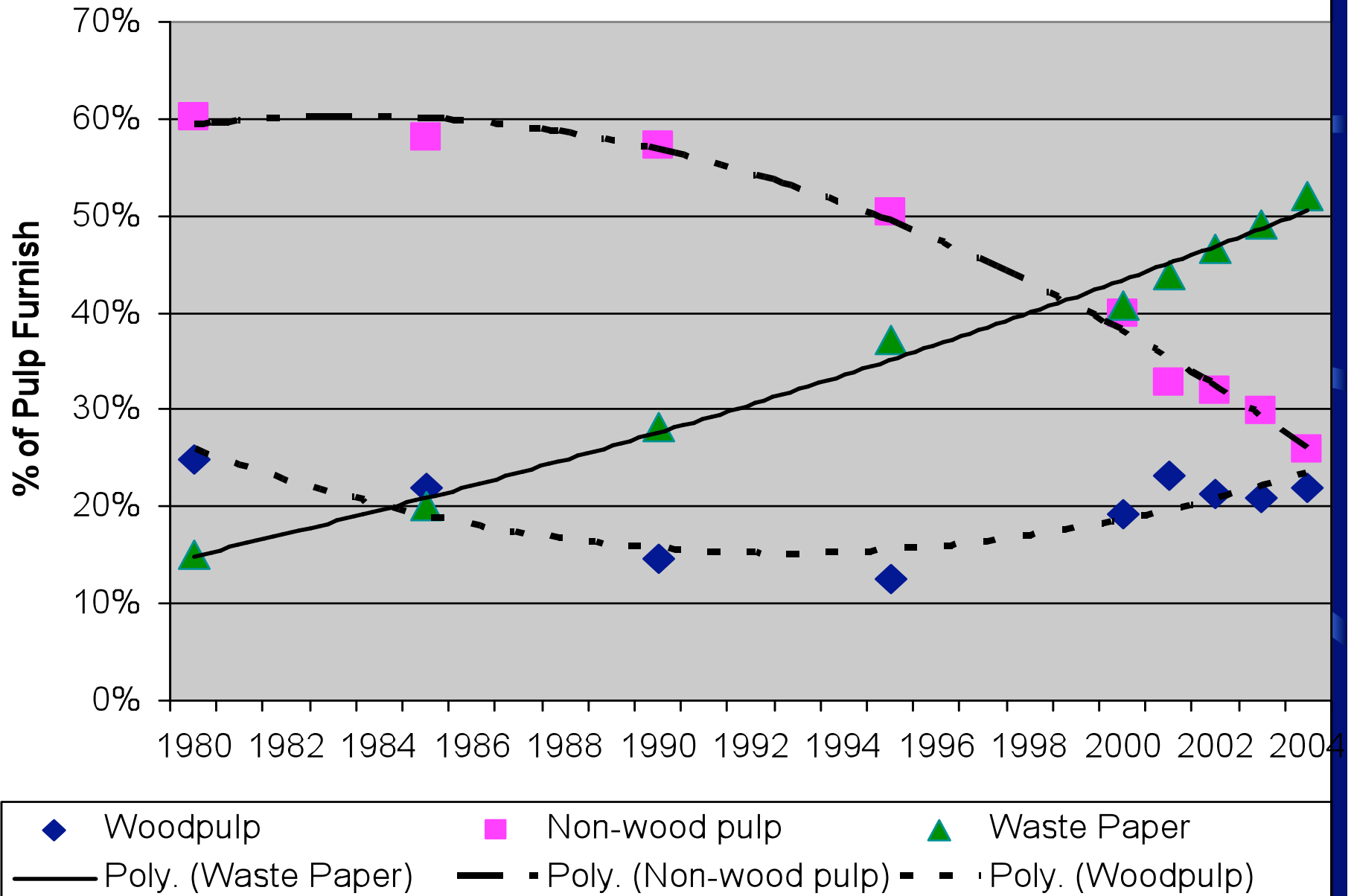
Telecom Growth in China



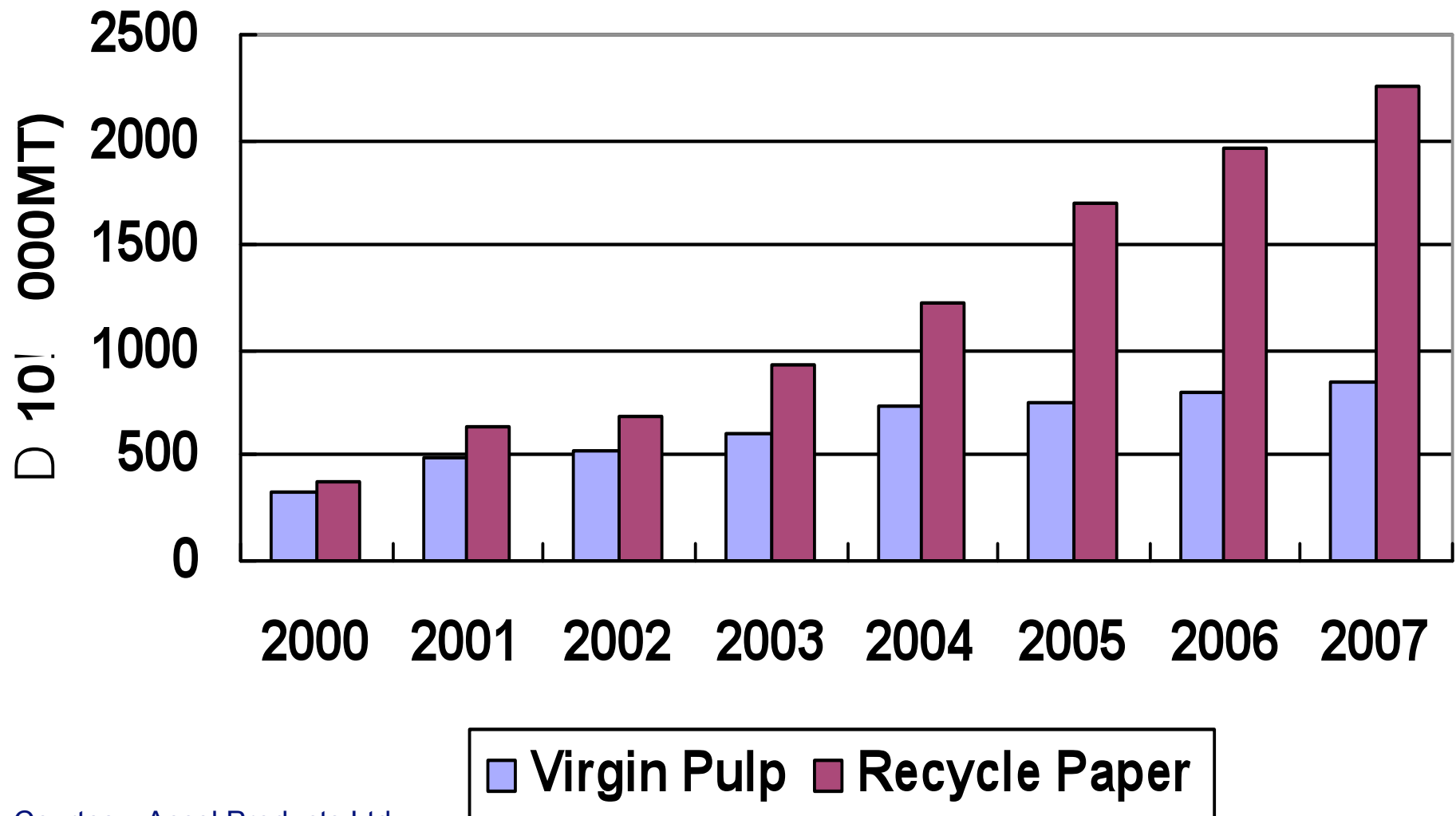
New Chinese Standards - A NAFTA Disrupting Strategy

- Standardized Linux operating system
- Media - EVD vs DVD
- RFID (Radio Frequency Identification)
- Audio visual - AVS vs MPEG-4
- Telecommunication - TD-SCDMA (3G)
as stepping stone to new 4G standards
- Wireless security - WAPI

Pulp Furnish Trends in China (1980-2004)



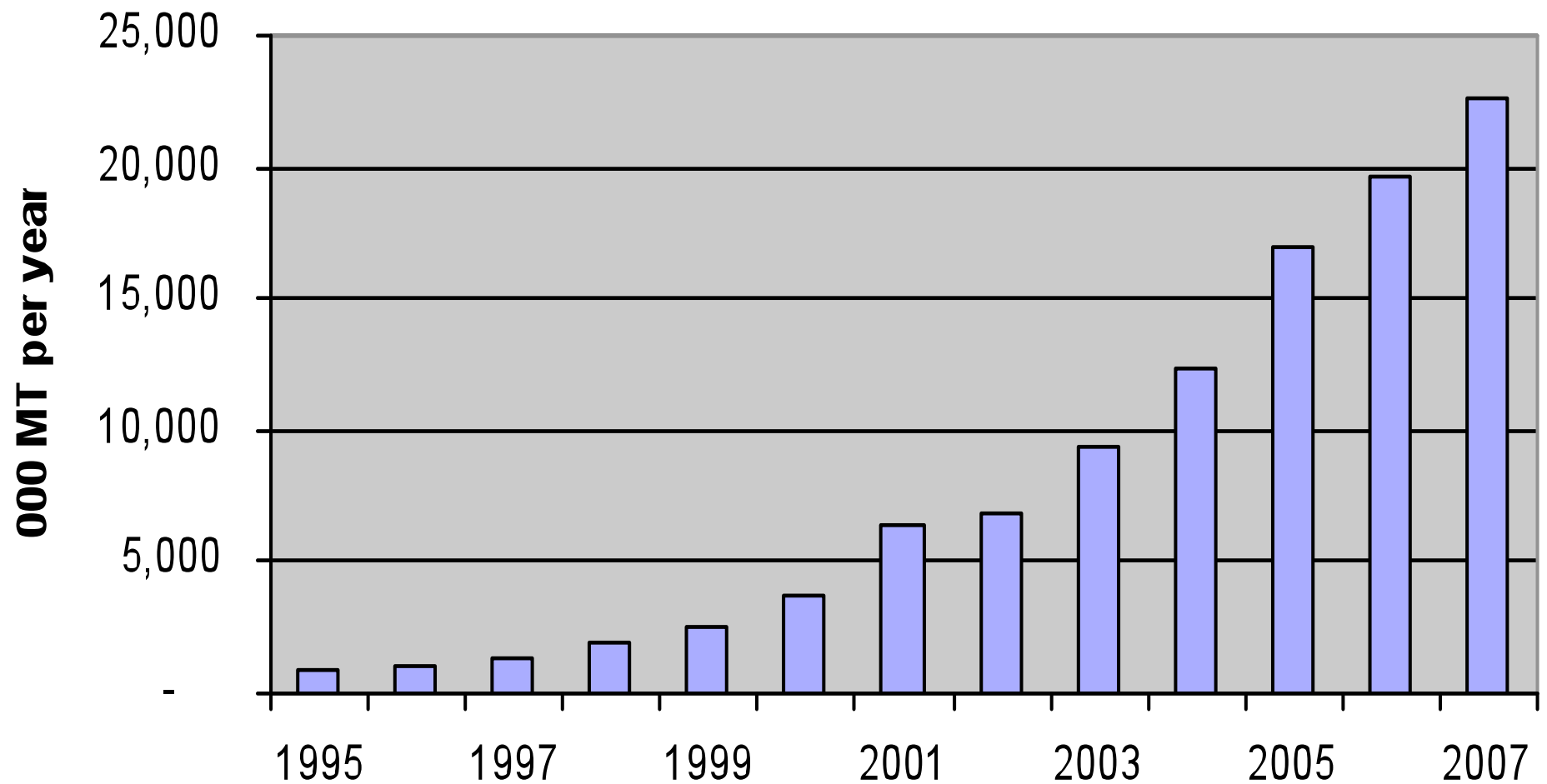
Chinese Fibres Import Growth



Courtesy: Accel Products Ltd.

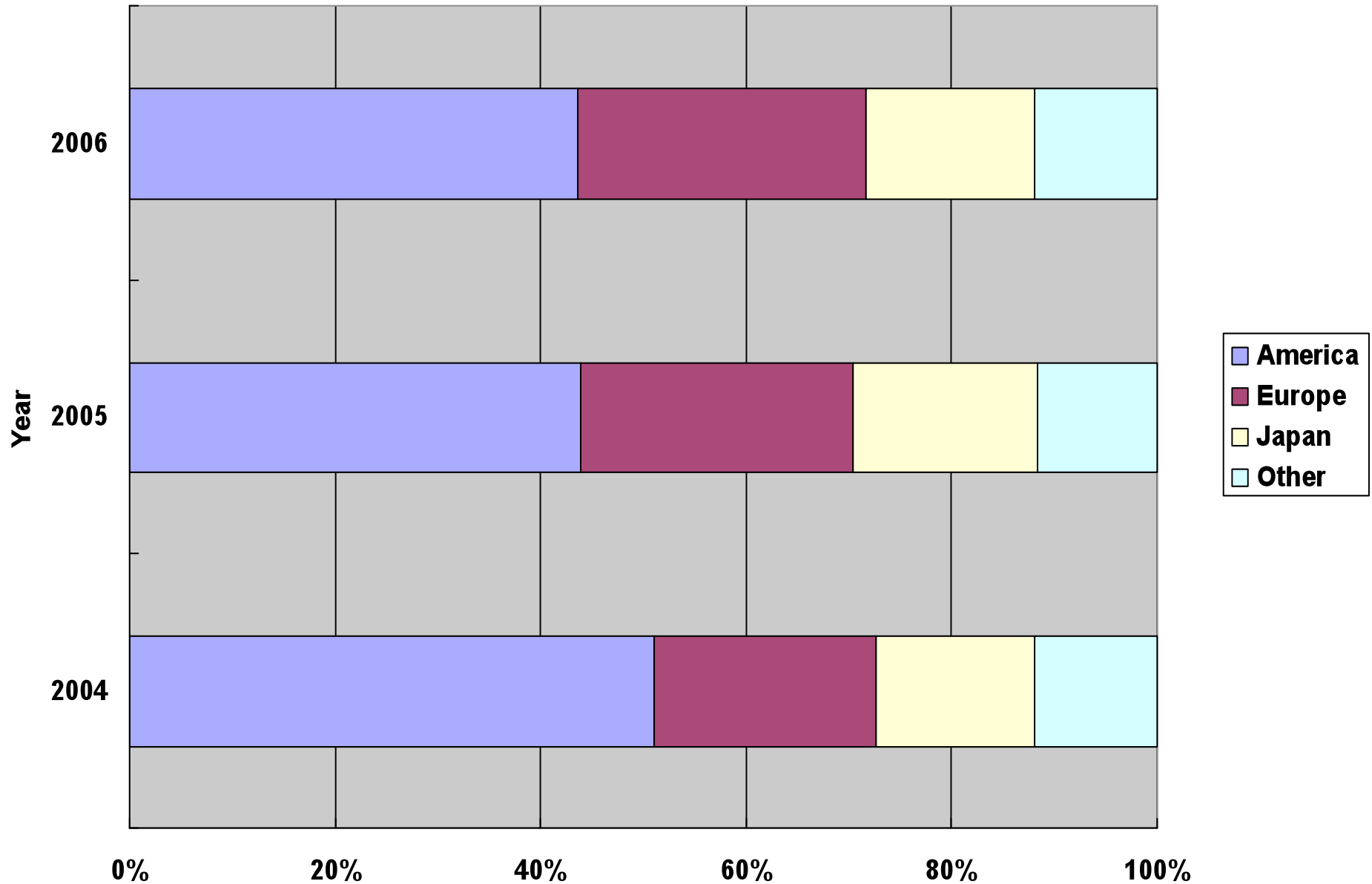
2009.05.12

Waste Paper Imports into China (1995 - 2007)



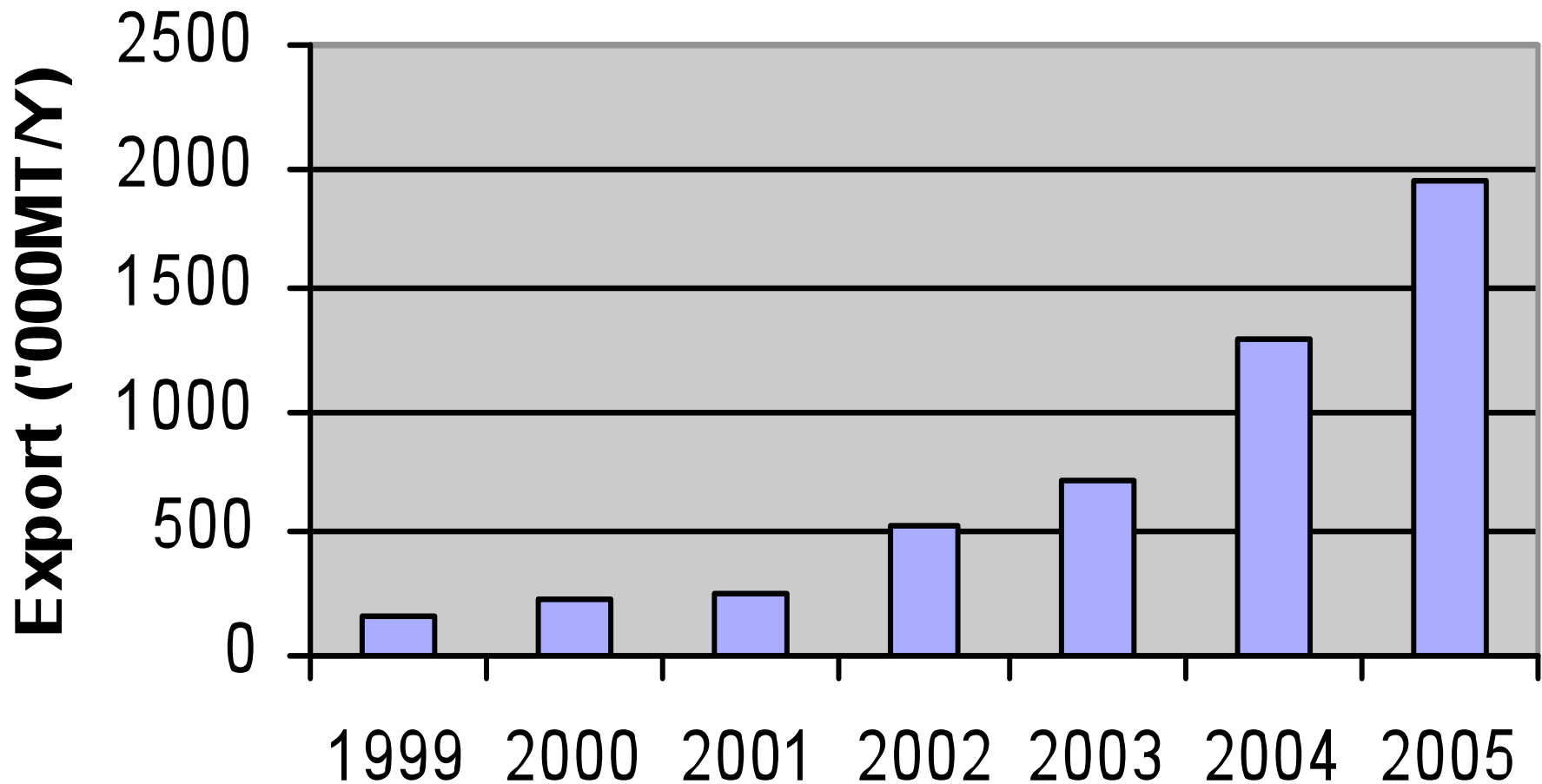
Courtesy: Accel Products Ltd.

Sources of Recovered Paper Imports



Courtesy: Accel Products Ltd.

Chinese Paper Products Export (1999-2005)



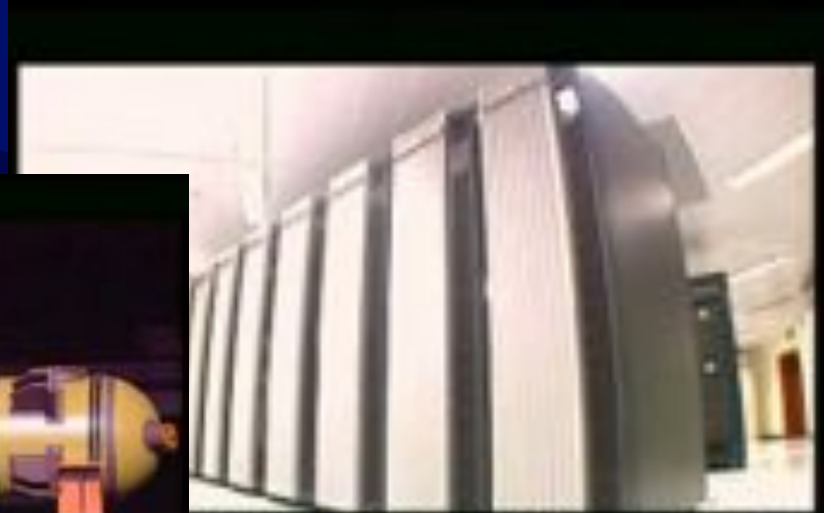
China's High Technology Plan 863 Priorities (1)

- ICT
- Biotechnology and pharmaceuticals
- New materials
- Advanced energy systems
- Resources and environmental



China's High Technology Plan 863 Priorities (2)

- **Advanced agriculture**
- Advanced manufacturing
- Ocean technology
- Global monitoring and aeronautics



Chinese Rocketry and Space Exploration



China's Urbanization

- 1993: 28%
- 2004: 42%

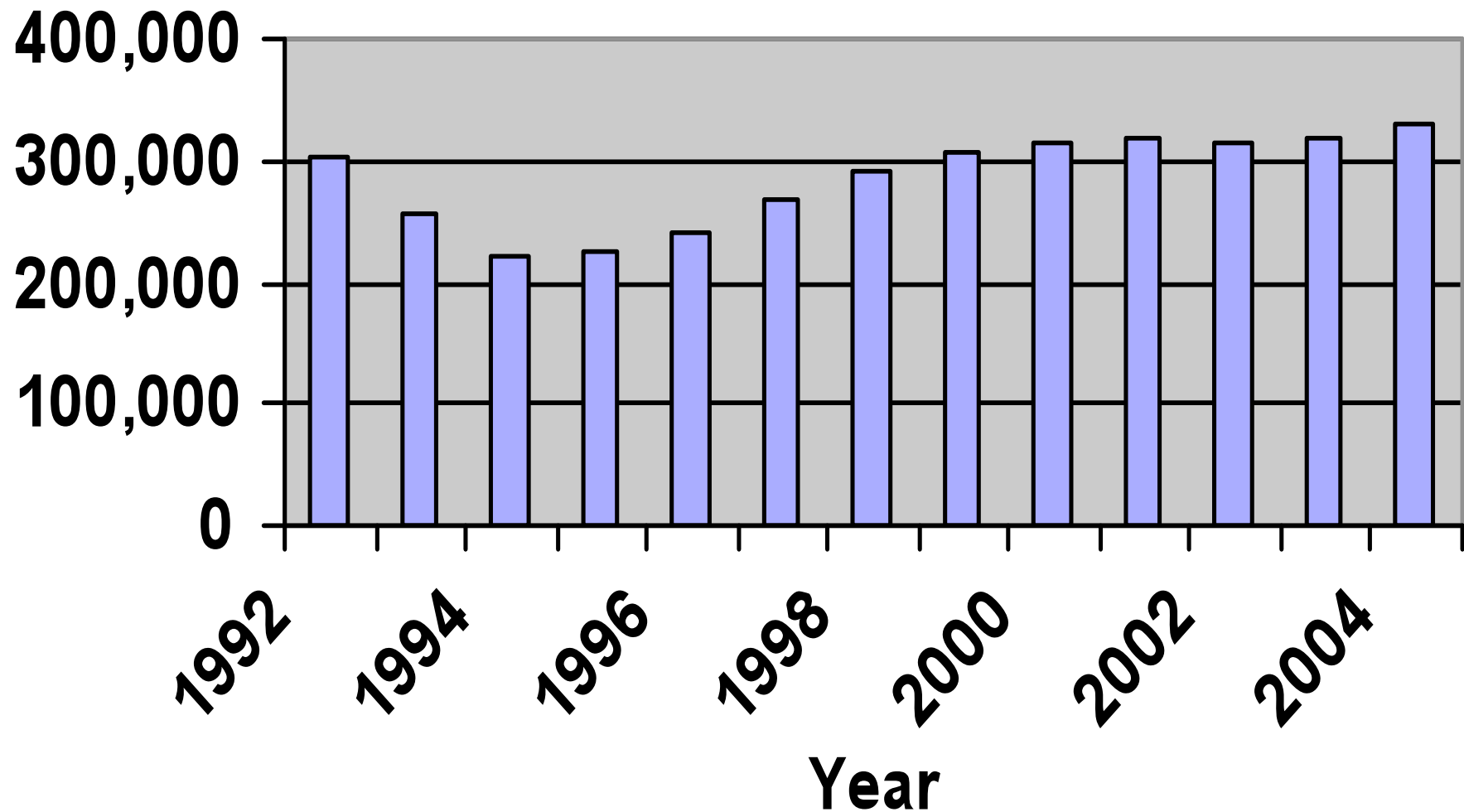
China's Environmental Challenges and Opportunities

- 40% of cities face water shortages
- Soil erosion on 37% of country's land mass
- Serious acid (<pH 5.6) rain in 41% of cities
- **US\$125 billion** environmental spending by 2010 (similar to the forecast investment in the Alberta Tar Sand projects)

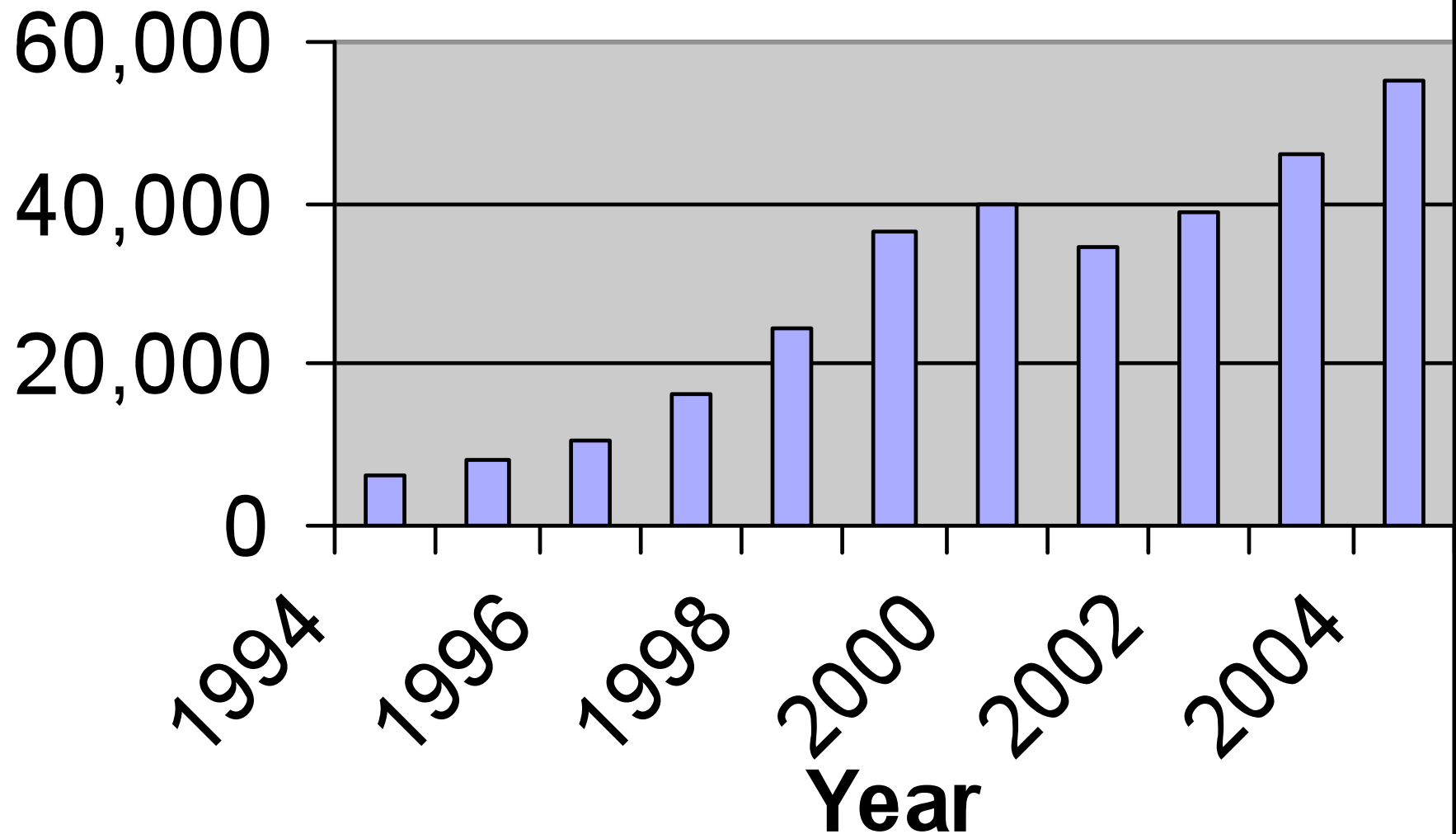
Enterprises of Global Integration

- IBM
 - Main frame computers in 1980's
 - High performance chips and Management services in 2000's
- Dell
 - Start-up in 1980's
 - Worldwide sourcing
 - Distribution and custom assembly services in 2000's

IBM Employees



Dell Employees



Impacts of Global Value Chains

- Lots of jobs but different jobs

Components of Innovation

- Driven by **market** needs
- Right **differentiated** technologies
- **Global integration** of resources

Innovative R&D Communities

- Park the **ego** at the gate
- Understand the **market** needs
- **Collaborate** to achieve global integration
- **Differentiate the goals** of training highly qualified personnel **vs.** innovations for commercial success

Global Vision

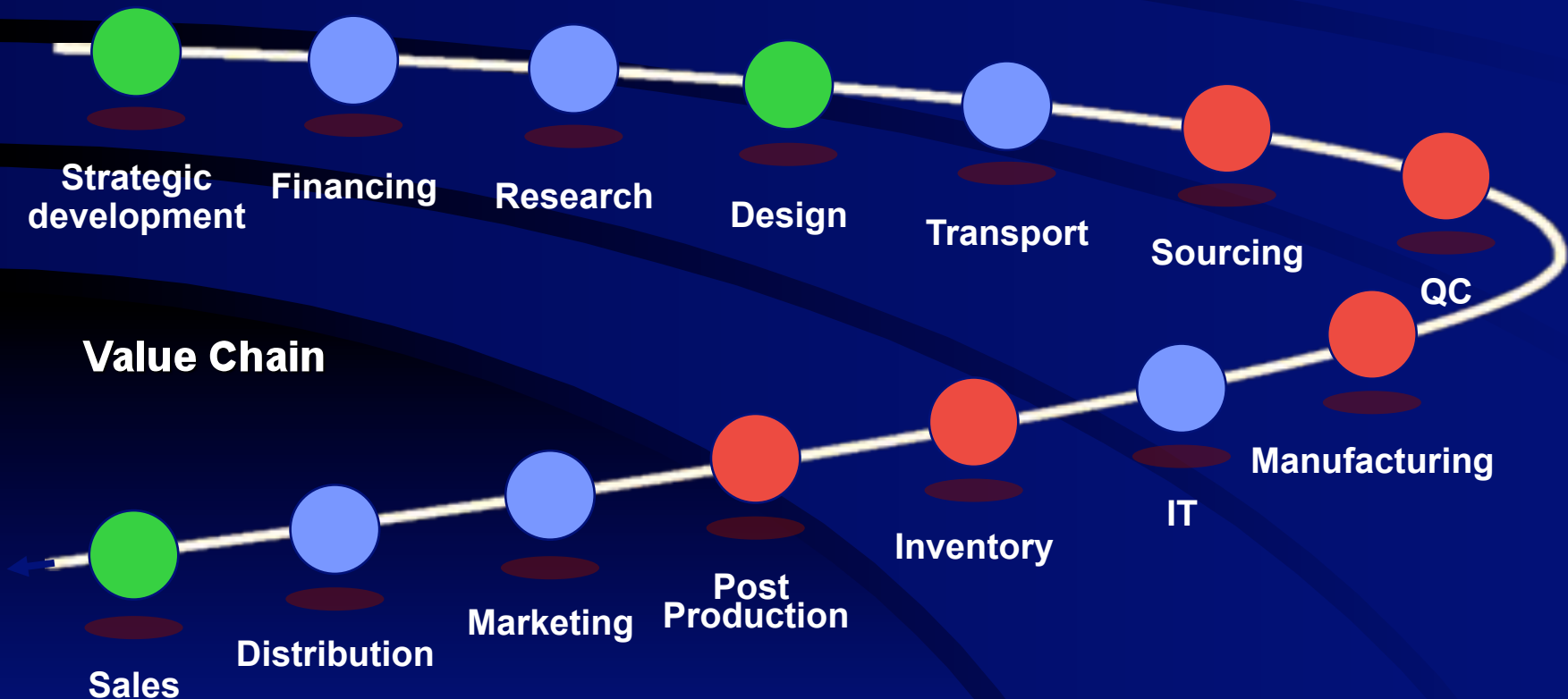
Flexible business models

In Home Market

In China

In Hong Kong

Producing in China for global markets



International Science & Technology Partnership Canada (www.ISTPCanada.ca)

An **independent non-profit** agency contracted by the Government of Canada to **implement** the bilateral science & technology agreements between **Canada** and selected countries and regions*

* Including **China, India, Brazil, California**, etc.

Summary

- New reality of **global manufacturing**
- Recognition of the multiple driving forces of **global value chains**
- **Innovation** – integrate market-pulled with technology-pushed
- Future belongs to **enterprises of global integration** of capital, resources, technology and markets
- Scientists must **park their egos** at the gate of commercialization.