

Slicing The Knowledge Based Economy in Brazil, China and India:

A Tale of 3 Software Industries

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(SOFTEX) – in Brazil Chapter

The International Software Market

- How to ride the global software & services market?
 - Value for 2001: USD 300 Billion
 - Value for 2008: USD 900 Billion (estimate)
- Packaged software market
 - Sales of \$ 196 Billion in 2001
 - Traded share of sales is 15%
- Software related services
 - Market smaller than products
 - Traded share is 35%
- Offshore / outsourcing (BPO) exhibits strongest growth
 - in the US, 25% per year
 - In Europe, it will double between 2002 and 2005

Software in Selected Countries in 2001

	Sales (10 ⁶ USD)	Sales / GDP	Industry Develop. Index	Domestic Industry Develop. Index	Exports (10 ⁶ USD)	Employees
US**	200,000	2.0%	0.5	0.5	n.a.	1,042,000
Japan*	85,000	2.0%	0.8	0.8	73	534,000
Germany	39,844	2.2%	0.9	0.9	n.a.	300,000
India	8,200	1.7%	7.8	1.9	6,220	350,000
Ireland	7,650	7.4%	3.4	0.5	6,500	25,000
Israel*	3,700	3.4%	1.8	0.5	2,600	35,000

* Values for 2000 ** Values for 2002

Emerging Prescriptions from the 3 I's?

- Nurture a Strong Human Capital Base
- Foster Entrepreneurship
- Develop a Large Export Base
- Establish Strong Anchor to the US Market
 - Export Base
 - Multinational Investment
- Leverage the US Links
 - Diaspora
 - English
 - Culture

Single Track?

Size and Growth of Software

Million of USD*	Brazil	China	India
Sales in 1992	1,100	695	390
Sales in 2001	7,700	7,400	8,200
Annual Growth Rate	24%	30%	40%

*Conversions of Local Currency to USD

Evolution of values in USD highly influenced by exchange rate fluctuations during decade

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India	8,200	1.7%	7.8	1.9	6,220	350,000
Brazil	7,700	1.5%	2.2	2.2	100	158,000
Korea	7,694	1.8%	1.1	1.1	35	n.a.
Ireland	7,650	7.4%	3.4	0.5	6,500	25,000
China	7,400	0.6%	1.8	1.7	400	186,000
Taiwan	3,801	1.2%	0.7	0.6	349	n.a.
Israel*	3,700	3.4%	1.8	0.5	2,600	35,000
Argentina*	1,340	0.5%	0.4	0.4	35	15,000
Mexico	<1,000	<0.2%	0.2	0.2	n.a.	n.a.

* Values for 2000 ** Values for 2002

Preconditions: Education, Research and Technology

Variable	Units (year)	US	Brazil	China	India
Population	World Rank (2001)	3 rd	5 th	1 st	2 nd
NS&Eng Grad	Total / Year (1997)	199,057	50,233	203,238	176,000
NS&Eng Grad	/ 10 ⁶ pop (1997)	700	292	159	170
IT Graduates	Total / Year (2000)	51,236	17,847	41,000	71,000
IT Graduates	/ 10 ⁶ pop (2000)	180	101	32	69
ICT Expenses	% GDP (2001)	7.9%	8.3%	5.7%	3.9%
PCs	/ 1,000 pop (2001)	585	44	16	5

Market Structure in Brazil, China & India

	Brazil	China	India	
Sales	7,700	7,400	8,200	
Market Focus	Services	56%	58%	80%
	Products	44%	42%	20%
Exports	1.5%	5.5%	76%	
Firms w/ Software Activity	10,700	10,000	n.a.	
Software Firms	5,400	5,700	2,800	
Employees	158,000	186,000	350,000	

Leading Firms in the 3 Nations

BRAZIL			INDIA			CHINA		
Company	Sales	Origin	Company	Sales	Origin	Company	Sales	Origin
Microsoft	362	US	TCS	813	IN	Founder	438	CN
SERPRO	372	BR	Infosys	535	IN	PuTian	186	CN
Comp. As.	260	US	Wipro	481	IN	Legend	175	CN
EDS	240	US	Satyam	357	IN	DongFang	134	CN
CPM	204	BR	HCL Tech	277	IN	ChongRan	126	CN
Accenture	194	US	Patni	153	IN	ChangTian	125	CN
Oracle	182	US	Silverline	126	IN	T.DongFang	115	CN
SAP	124	GER	Mahindra BT	113	JV	YianTai	107	CN
Politec	104	BR	Pentasoftware	96	IN	CVIC	94	CN
Consist	77	US	HCL Perot	94	JV	Top	93	CN
Microsig	72	BR	Mascot	84	IN	IBM	78	US
CPqD	64	BR	NIIT	84	IN	Microsoft	65	US
DBA	62	BR	I-Flex	82	IN	Oracle	58	US
CITS	57	BR	Mphasis	66	IN	Sybase	30	US
Proceda	52	BR	Mascon	64	IN	Informix	26	US

Understanding Role of Multinationals

■ Local competitors in products and services

- May affect local producers - but also strengthens market
 - e.g. SAP competes with local ERP Producers
- The realities...
 - Stronger in Brazil
 - Moderate in China and India

■ Local market as base for development in international arena

- Supports local industry and is welcomed
 - e.g. Siemens PBX in Brazil or TI development center in India
- The realities
 - Strong in India
 - Moderate to low in Brazil and China

India - China - Brazil Considerations

	Focus	Differentiators	Opportunities	Barriers
India	<ul style="list-style-type: none"> • Low Tech Services • Exports 	<ul style="list-style-type: none"> • Deep Labor Pool • English • Process Maturity • Global Links 	<ul style="list-style-type: none"> • Business Process Outsourcing • High Level Export Services 	<ul style="list-style-type: none"> • Wage Pressure • Domain Knowledge • Low-End Competition
China	<ul style="list-style-type: none"> • System Integration • Products 	<ul style="list-style-type: none"> • Government Action • Strong Domestic Market 	<ul style="list-style-type: none"> • Export Services • Hardware Links • Multinationals 	<ul style="list-style-type: none"> • Process Capability • Small Firms • Open Market Experience
Brazil	<ul style="list-style-type: none"> • Verticals - Prod+Serv • Products 	<ul style="list-style-type: none"> • Domestic Market • Strong Client Sectors 	<ul style="list-style-type: none"> • Export Higher Level Services in Verticals • Export Products 	<ul style="list-style-type: none"> • Small Firms • International Visibility • No Active Policy

Conclusions & Takeaways for 3 Nations

- **Large and over-developed industries**
 - Sell USD 8 Billion in Software
 - Annual growth rates on the order of 30%
- **Preconditions for past success & bright future**
 - Demand at home and/or abroad
 - Human and financial capital
 - Government policy - can have stifling or leveraging effects
- **Industry development may follow different paths**
 - Critical to find the right development anchor!
 - Strong service exports for India
 - Vibrant domestic products/services for Brazil and China
- **Challenges ahead remain...**
 - Competition between nations will become more acute
 - Important to leverage industry strengths
 - Multinationals will play increasing role
 - NO SET WINNERS!

Paths for China and India

CHINA: A low level but strengthening industry

- Sector Linkages - Users and manufacturers
- Export Services - Replacing India in low level
- Spillovers of multinational interest in China

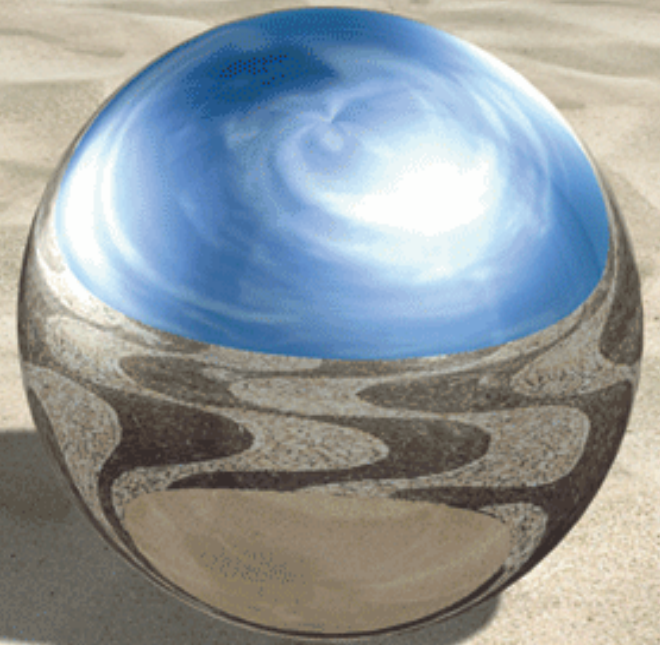
☞ NEED: Process Capabilities & International Marketing

INDIA: Tension between value and volume

- Climbing service value chain & enter product markets
- Invest in BPO, ITES and other
- Face multinational competition with domestics

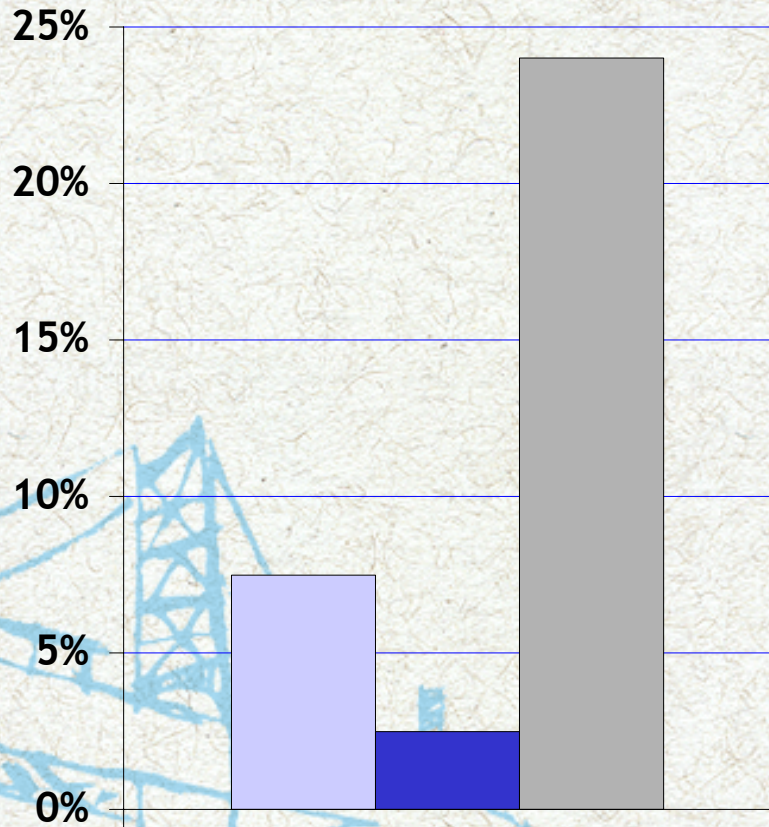
☞ NEED: Product/Domain Knowledge

What About Brazil?



The Brazilian Software Industry

■ GDP (USD) ■ IT (USD) ■ SW (USD)*



CAGR 1991/2001

Sales in 2001

**Billion
of USD**

Total Software

(Products and Services)

7.7

Software Products

(Package, Custom and Embedded)

3.6

Software Services

(Outsourcing, Development,
Integration and Consultancy)

4.1

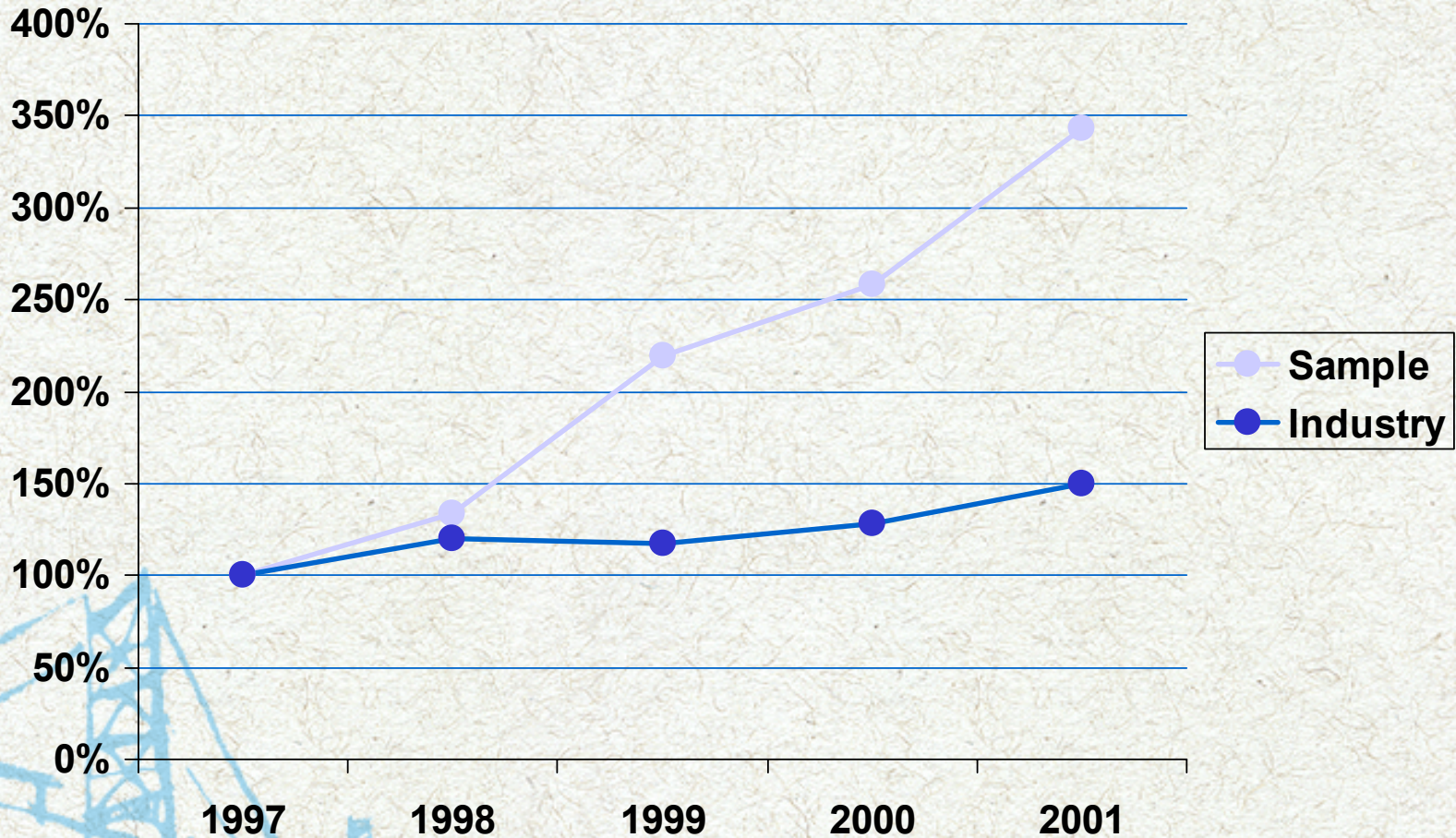
* 1992/2001

Indicators of Domestic Competitiveness

	Software	Industry
Growth 1995-2000 (%)	~300%	11%
VA / Employee (10^3 R\$)	97	26
Average Salary (10^3 R\$/Year)	30	11
R&D / Sales* (%)	8%	3.8%

*Probably Includes Substantial Costs Associated to Product Development

Understand by Looking at Leading Firms



Patterns of Leading Firms
- Sample of 55
- Represent 20% of Industry

Nature of the Leading Firms

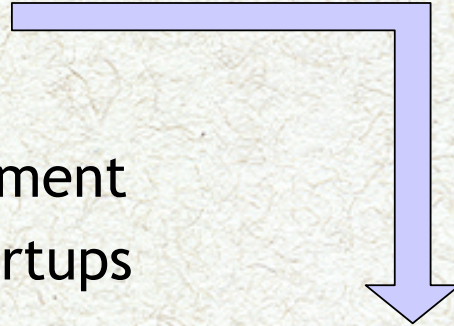
Main Revenue Source	Share of Firms	Business Model	Share of Firms	Share of Revenue
Products	58%	Embedded/Component	34%	13%
		Customizable Product	20%	10%
		High Value Services	35%	62%
Services	42%	Low Value Services	7%	14%

Sample: 56 Firms

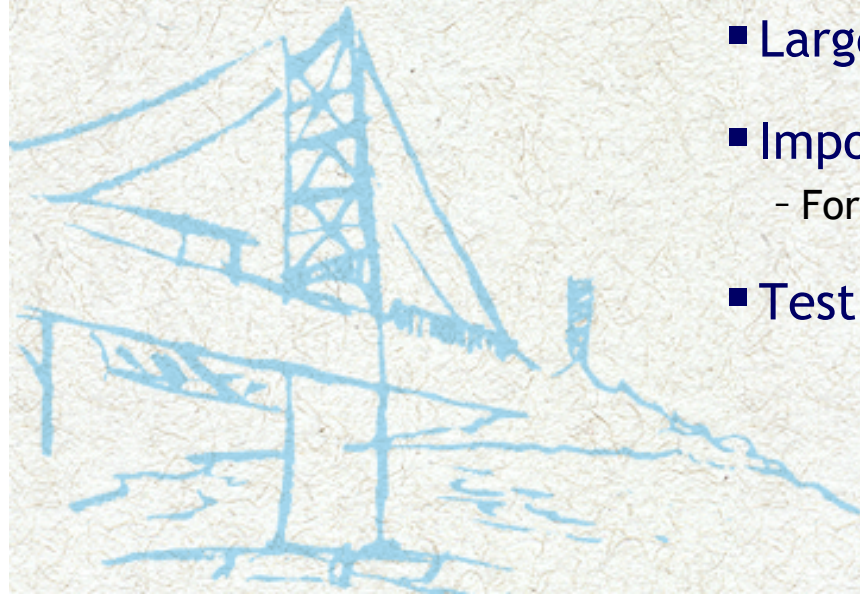
The Promise of the Domestic Market

■ The existence of Lead Sectors

- Banking
- Telecom
- e-Government
- Niche Startups



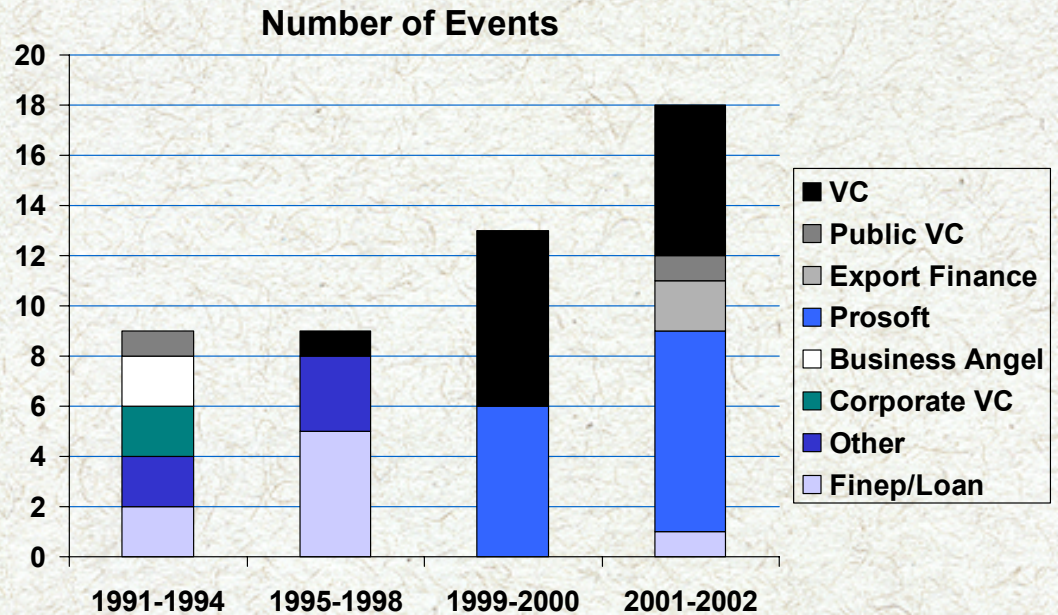
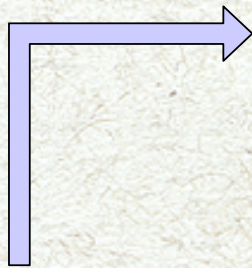
- Internationalized and Competitive
- Large IT investment - 30% of Brazil Total
- Important Market for Software companies
 - Foreign, Local Large & Small-Specialized
- Test bed for Innovation



The Promise of the Domestic Market

■ The existence of Lead Sectors

- Banking
- Telecom
- e-Government
- Niche Startups



■ Mechanisms to discipline competence creation

- Venture Capital
- Public 'knowledgeable' Capital

The Effects of External Financing

■ Definition of a Clear Business Model

- Preparation of Detailed Business Plans
- Work with Outside Consultants
- Positive Impact of both Private and Public VC

■ Restructuring of the Management Structure

- Hiring of Professional Managers
- Restructuring of Management Responsibilities

■ An Example of a Lead Firm: Modulo

- One of the top 30 Brazilian Firms
- Got 2 rounds of VC financing from 1997 to 2001
- From security software development to security component
- Hired former CEO of American Express Latin America
- Files Reports according to US GAAP rules

The Curse of the Domestic Market

- Fast Growth of Domestic Demand
- Large Captive Markets - Private and Public
- Jump to Foreign Solutions
- High Interest Rates

■ Anti-Specialization Bias

- Diversified activities for growing regional market
- Not specialized work for whole country

■ Poor Institutions

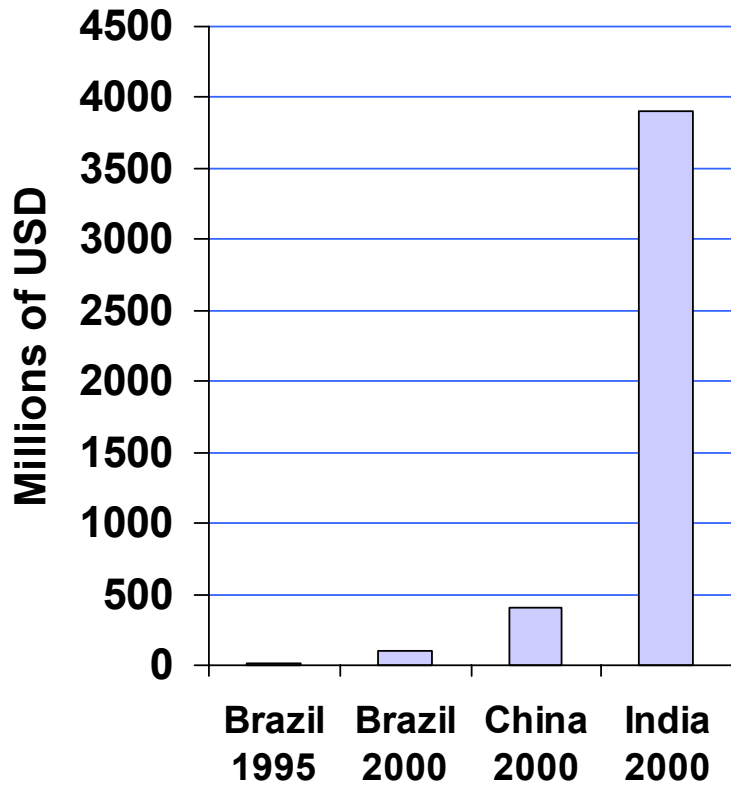
- Limited cooperation and no voice for the industry
- Absence of a structured development policy

■ Small National Firms

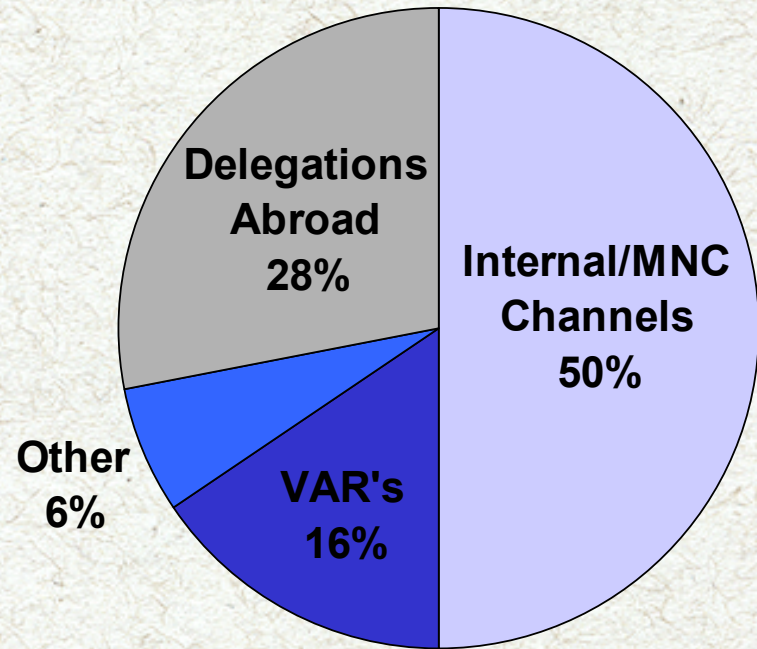
- Difficult to compete with foreign firms locally
- Difficult to compete in international market

Going Abroad

Software Exports



Export Strategy



Lessons from Brazilian Observations

- **Alternative paths to the export path**

- Rely on Lead Client Sectors
- Develop mechanisms that induce competence structuring

- **Recognize pitfalls created by domestic orientation**

- Anti-specialization bias
 - Limits to growth...
-

- **Important Challenges Remain**

- Have not succeeded the test of internationalization
- Leaders in vertical segments are entering in higher level segments more populated with large international suppliers

- **But outsourcing up scaling trend should benefit Brazil**

- Domain knowledge requirements and experience...

Development Paths for Brazil

BRAZIL: Exploring the International Market

- Secure vertical **Service** exports (higher level)
 - Exploit component & embedded softw. **Products**
 - Stimulate investment of software multinationals
 - Strengthen national positions...
-
- 👉 **NEED: Larger players - integration**
 - 👉 **NEED: Process certification or reputation**
 - 👉 **NEED: International marketing/visibility - Flag**
 - 👉 **NEED: Policy to influence specialization pattern**

Policy Mechanisms and Tools for Brazil

■ Services Driven Policy

- Process qualification
- Use purchasing power to generate critical mass
- Export benefits
- Policy to support Multinational investment Brazil

■ Product Driven Policy

- Stimulate Technology Transfer at all levels
- Foster Entrepreneurial Capability
- Support Development Costs
- Generate export and foreign Installation benefits

■ Generic Policy

- Continue support for 'smart disciplining capital'
- Create incentives for mergers
- Continue education support
- Help to generate 'national software flag'
- Reduce 'Brazil Cost'

Thank You!

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