# GLOBAL VALUE CHAINS AND DEVELOPMENT: Governance, Upgrading & Local Economies

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## AGENDA

- 1. Origins of the GVC Framework
- 2. Clarifying Concepts: GVCs, Governance & Upgrading
- 3. Small Countries and High Tech: Medical Devices GVC in Costa Rica
- 4. GVC Competition for US Market: China vs. Mexico
- 5. GVCs and Emerging Economies

# WHERE DO GVCS COME FROM?

# The New Global Economy

#### Old World of Trade (pre-1980)

- Countries trade finished goods
- Build national industries (ISI)

#### **New World of Trade**

- Countries trade intermediate goods; imports needed to export
- Join global industries (EOI)

#### Trends

- GVCs  $\rightarrow$  80% of world trade (UNCTAD, WIR 2013)
- Rise of intermediate goods trade (import content of exports): 20% in 1990; 40% in 2010; 60% in 2030 (P. Lamy, WTO)
- **Consolidation** within GVCs in fewer, larger suppliers
- Concentration of production and consumption in relatively few large emerging economies



## **MAJOR STEPPING STONES**

- GCCs (global commodity chains) → GVCs (global value chains) (1990s-2000s)
- Rockefeller Foundation's Global Value Chain Initiative (2000-2005) -- <u>https://globalvaluechains.org/</u>
- Duke Center on Globalization, Governance & Competitiveness (Duke CGGC) (2005-present) -- <u>http://www.cggc.duke.edu/</u>
- Adoption and Elaboration by International Organizations of GVC Approach to Development (ca. 2010-2016) --<u>https://dukegvcsummit.org/</u>
  - E.g., World Trade Organization, OECD, World Bank, Inter-American Development Bank, African Development Bank, Asian Development Bank, ILO, UNCTAD, UNIDO, USAID, DFID, GIZ, etc.

## Google Scholar Publications Referencing GVC/GCC/GPN Frameworks



Google Scholar search results that mention a framework in their titles, abstracts, keywords, or full texts: global value chain (GVC), global production network (GPN), and global commodity chain (GCC). *Source:* Google Scholar, <u>https://scholar.google.com/</u>. Retrieved Feb. 11, 2015.

## LANDMARK PUBLICATIONS

- "The organization of buyer-driven global commodity chains: How U.S. retailers shape overseas production networks," Gereffi (in Commodity Chains & Global Capitalism, 1994)
   2491 google scholar citations\*
- "International trade and industrial upgrading in the apparel commodity chain," Gereffi (J of Internat'l Economics, 1999)

- 3185 google scholar citations\*

- "The governance of global value chains," Gereffi, Humphrey & Sturgeon (Review of Internat'l Political Economy, 2005)
  - 4122 google scholar citations\*
  - \*As of 04/21/2016.

# **CLARIFYING GVC CONCEPTS**

## MASTER GVC CONCEPTS: GOVERNANCE & UPGRADING

Global value chain analysis provides both conceptual and methodological tools for examining the global economy

- Top-down: a focus on lead firms and inter-firm networks, using varied typologies of industrial "governance"
- Bottom-up: a focus on countries and regions, which are analyzed in terms of various trajectories of economic, social and environmental "upgrading" (or "downgrading")

## LINKING GLOBAL CHAINS AND LOCAL CLUSTERS



# **TYPES OF CHAINS**

## Global Supply Chains

- Logistics (transportation focus: reduce time + costs)
- Trade Facilitation (lower barriers at the border)

## Global Commodity Chains

- Producer-driven chains: Trade + FDI (e.g., aircraft, autos, mining, oil)
- Buyer-driven chains: Trade w/o FDI (e.g., consumer goods); global subcontracting by retailers, brands & supermarkets

## Global Value Chains

- Rise of intermediate goods trade (import content of exports: 20% in 1990; 40% in 2010; 60% in 2030 P. Lamy)
- Create, capture & sustain domestic value added (e.g., Chinese i-Phone example; build capabilities of domestic suppliers)

## Regional Value Chains

 Growing in importance, esp. since 2008-09 and in emerging economies; beyond fragmentation and EOI development model.

#### **Producer-driven Commodity Chains**



Branded manufacturers ship parts for overseas assembly and re-export to the manufacturer's home market

Source: Gary Gereffi, "The organization of buyer-driven global commodity chains: How U.S. retailers shape overseas production networks," in G. Gereffi & M. Korzeniewicz (eds.), Commodity Chains and Global Capitalism (Praeger, 1994), p. 98.

# **Five GVC Governance Types**



G. Gereffi, J. Humphrey & T. Sturgeon, "The governance of global value chains," Review of International Political Economy 12, 1 (2005), p. 89.

# Global Value Chains: Theoretical Underpinnings

1. Transaction Costs Economics

Key concept: Asset specificity Academic field: Institutional economics

2. Production Network Theory

Key concepts: Trust, reputation, repeat transactions, social networks, geographic proximity, power

Academic fields: Economic sociology, economic geography

## 3. Firm-Based Competencies

Key concepts: Resource view of the firm, learning, core competence, coevolution (buyer-supplier and industry)

Academic fields: Strategic management, operations management, evolutionary economics

# A Parsimonious Model: Three Explanatory Variables

- 1. <u>Complexity</u> of information required for a transaction
- 2. Extent to which this information can be <u>codified</u>
- 3. <u>Supplier capabilities</u> in relation to a transaction's requirements

## **Determinants of GVC Governance**

	Governance Type	Complexity of transactions	Ability to codify transactions	Capabilities in the supply-base	Degree of explicit coordination and power asymmetry
	Market	Low	High	High	Î
Network org. forms	Modular	High	High	High	
	Relational	High	Low	High	
	Captive	High	High	Low	ţ
	Hierarchy	High	Low	Low	

Gereffi at al, "The governance of global value chains," RIPE (2005), p. 87.

## **Dynamics in Global Value Chain Governance**

Governance Type	Governance Fype				Ability to codify transactions				Capabilities in the supply-base			
Market		Low			High				High			
Modular	1	High 2	ľ	4	High				High			
Relational		High		3	Low			5	High (	6		
Captive		High			High				Low	V		
Hierarchy		High		Low				Low				

*①* increasing complexity of transactions (harder to codify transactions; effective decrease in supplier competence)
 *②* decreasing complexity of transactions (easier to codify transactions; effective increase in supplier competence)
 *③* better codification of transactions (open or de facto standards, computerization)

- *It de-codification of transactions (technological change, new products, new processes)*
- ③ increasing supplier competence (decreased complexity, better codification, learning)
- © decreasing supplier competence.(increased complexity, new technologies, new entrants)

Gereffi at al, "The governance of global value chains," RIPE (2005), p. 90.

## **GVC LEAD FIRMS & THEIR SUPPLY CHAINS**

#### **Giant Retailers: Wal-Mart**

- > Largest retailer in the world directs the biggest supply chain
- > 60,000 suppliers worldwide and over 80% are in China

#### **Global Brands: Nike**

- Nike, the largest sportswear company in the world, does not own any factories.
- > Nike products made in 930 factories (subcontractors) in 50 countries
- >1 million workers in supply chain, but just 38,000 direct employees in U.S.

#### Manufacturers w/o Factories: Apple

- Apple, the top smartphone company in the world, designs and markets its products but owns no factories
- Foxconn, the largest electronics contract manufacturer in the world, makes Apple products and employs >1 million workers in mainland China

## WHERE ARE THE HIGH-VALUE ACTIVITIES IN GVCS?

There has been a tendency for developed countries to concentrate in higher value activities while developing countries are generally concentrated in lower value activities



Source: Fernandez-Stark, Karina, Stacey Frederick and Gary Gereffi. (2011). "The Apparel Global Value Chain: Economic Upgrading and Workforce Development. In G. Gereffi, K. Fernandez-Stark & P. Psilos (Eds.), Skills for Upgrading: Workforce Development and Global Value Chains in Developing Countries. Durham: Center on Globalization Governance & Competitiveness and RTI International.

# Value Chain – Types of Upgrading

1. Fabrication (Value chain entry)	Fabrication	Focus on fabrication; suppliers assemble inputs, following buyers' specifications. Inputs may be imported due to limited availability and quality concerns over local inputs. Product focus may be relatively narrow.
2. Supply Chain (Functional upgrading)	Procurement Distribution	Broader range of manufacturing-related functions, such as sourcing inputs and inbound logistics as well as fabrication. The supplier may also take on outbound distribution activities.
3. Product Design (Functional upgrading)	Design 3 2 1 2	Supplier carries out part of the pre-production processes such as design or product development. Design may be in collaboration with the buyer, or the buyer may attach its brand to a product designed by the supplier.
4. Product Brand (Functional upgrading)	Marketing 3 2 1 2	Supplier acquires post-production capabilities and is able to fully develop products under its own brand names. Can be in collaboration with the buyer or by establishing a new market channel.
Product upgrading	R&D Services O 3 2 1 2 1 2	Increase unit value by producing more complex products, which requires increasing the capabilities of the firm. Countries must move from low-cost commodities to higher value goods that warrant higher returns as labour costs increase.
Process upgrading	R&D Services	Improving productivity through new capital investments. Improving IT and logistics. Reducing lead time and increasing the flexibility of the supply chain process.

# The Smile Curve in GVCs: Variations



# COSTA RICA IN THE MEDICAL DEVICES GVC

### COSTA RICA IN THE MEDICAL DEVICES GLOBAL VALUE CHAIN, 2012



Local firms are mainly in packaging & support services (12 of 19) versus 4 in limited role in plastics molding & metal finishing and 1 OEM with exports under \$2 million.

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### **EVOLUTION OF MEDICAL DEVICES EXPORTS FROM COSTA RICA**



#### Costa Rica's Medical Exports by Product Category: 1998-2011

- **Disposables** still the largest product category exported, but no longer a strong growth area.
- Exports in surgical instruments have grown steadily since 2005.
- Therapeutics has become 2<sup>nd</sup> largest category since 2008; likely to increase as newly established firms complete transfer of new product lines.
- Limited export of highest value capital equipment (eg. Electronic/software devices)

## FIRMS IN THE COSTA RICA MEDICAL DEVICES SECTOR

Entry Year	Firm Characteristics	Main Product Export Category	Core Market Segments	Product Examples	Select Firms
<b>Up to 2000</b> 24 firms: 8 US 15 CR 1 German	4 OEMs 8 Components 1 Input distributor 7 Packaging 1 Finishing 3 Support services	Disposables	Drug delivery; Women's health	Intravenous tubing (I) Mastectomy bra (I)	Hospira; Baxter; Amoena; Corbel
<b>2001–2004</b> 13 firms: 9 US 3 CR 1 Colombian	<ul><li>3 OEMS</li><li>6 Components</li><li>1 Finishing</li><li>1 Logistics provider</li><li>2 Support services</li></ul>	Instruments	Endoscopic surgery	Biopsy forceps (II)	Arthrocare; Boston Scientific; Oberg Industries
2005–2008 8 firms: 7 US 1 Puerto Rico	2 OEM 4 Components 1 Packaging 1 Finishing	Therapeutics	Cosmetic surgery; Women's health & urology	Breast implants (III) Minimally invasive devices for uterine surgery (II)	Allergan; Tegra Medical; Specialty Coating Systems
2009–2012 21 firms: 16 US 1 CR 1 Ireland 1 Japan 2 Joint ventures (US-CR)	5 OEMS 7 Components 2 Non-OEM assemblers 1 Input Distributor 2 Sterilization 2 Packaging	Therapeutics Disposables Instruments	Cardiovascular Drug delivery	Heart valves (III) Dialysis catheters (III) Guide wires (III) Compression socks (I)	Abbott Vascular St. Jude Medical Covidien Moog Synergy Health Volcano Corp.

## **UPGRADING SUCCESS: A LEADING MEDICAL DEVICES MNC**

2004	2005	2008	2010	2011							
First production plant opens in Costa Rica (10,000m <sup>2</sup> )	Exports: US\$18 million	Second plant opens. (32,000m <sup>2</sup> ) First plant restructuring	Initial plant reopens after restructuring	Exports: US\$120 million							
Functional Upgrading	<ul> <li>2004: M</li> <li>2012: En segment;</li> </ul>	<ul> <li>2004: Manufacturing functions</li> <li>2012: Engineering for process improvements → Focused on cardiology segment; strategy – to alleviate R&amp;D costs in the US.</li> </ul>									
Product & Proce Upgrading	<ul> <li>Biopsy forceps→ Labor intensive, basic metal works &amp; extrusion.</li> <li>Urethral stent→ Thermoforming, laser marking, coating capabilities.</li> <li>Guide Wires → Sophisticated Laser cutting &amp; welding.</li> <li>Today – CR facilities cover 42 manufacturing processes.</li> </ul>										
Market Diversification	• Gastroen	terology segment 🗲 Urology	➔ Cardiovascular								
Forward Linkag	• Recent co to global	-location of sterilization vendo distribution centers	ors will allow the firm to ex	port directly							

#### BRAZIL Y MEXICO: EXPORTACIONES DE DISPOSITIVOS MEDICOS 1998-2011



# GVC BATTLE FOR THE U.S. MARKET: CHINA VS. MEXICO



# Mexico vs. China



- Head-to-head competition in U.S. market
- China is world's leading exporter of many manufactures, esp. consumer goods
- China and Mexico are typically among the top three exporters to the U.S. market in many product categories
- China is moving ahead of Mexico with dominant market shares in the United States, especially in 2000-2005 period

## Mexico's and China's Competing Exports to US Market

		2000		2007		2014		Change in	Change in	
SITC Category	Product		Value (billions)	Share of US market	Value (billions)	Share of US market	Value (billions)	Share of US market	Market Share 2000-2007	Market Share 2007-2014
	Automatic Data	Mexico	6.4	11.5	5.6	9.6	13.5	16.6	-1.9	7.0
752	Processing	China	6.3	11.3	28.6	49.3	53.3	65.7	38.0	16.4
	Machines	US Total	55.9		57.9		81.1			
	Talaaam	Mexico	9.1	20.6	10.8	13.6	12.1	10.2	-7.0	-3.4
764	Fauipment	China	4.6	10.3	29.6	37.3	68.7	58.0	26.9	20.8
	Equipment	US Total	44.3		79.5		118.4			
	<b>F</b> leetrieel	Mexico	3.1	18.3	5.0	21.8	7.2	21.4	3.5	-0.4
778	Machinery	China	2.0	11.9	6.1	26.6	11.2	33.2	14.7	6.6
		US Total	17.1		23.1		33.7			
		Mexico	4.6	16.3	10.2	22.2	19.1	30.4	5.8	8.2
784	Auto Parts	China	0.4	1.5	3.6	7.8	8.3	13.2	6.2	5.4
		US Total	28.4		46.2		62.9			
		Mexico	3.2	16.9	4.6	13.6	7.6	18.3	-3.3	4.7
821	Furniture	China	4.5	23.6	16.2	47.7	19.2	46.3	24.1	-1.4
		US Total	18.9		33.9		41.5			
	Apporal and	Mexico	8.7	13.6	4.7	5.8	4.0	4.4	-7.8	-1.4
84	Apparel and	China	8.5	13.2	27.1	33.4	34.2	37.9	20.2	4.5
	Couning	US Total	64.3		81.2		90.2			

Source: US Department of Commerce (http://dataweb.usitc.gov), Downloaded Aug 26, 2015

# Why is China gaining U.S. market share over Mexico?

- China is a lower-cost producer overall (labor costs lower, but not transport & tariffs)
- China has huge scale economies
- China has a coherent and multidimensional upgrading strategy – diversify and add high value activities
- China is using direct foreign investment to promote "fast learning" in new industries
- China uses access to its domestic market to attract TNCs and promote knowledge spillovers





#### China's Supply Chain Cities in Apparel

#### Made in China, Shipped Worldwide

The factory towns on	Factory orders, 2003	PRODUCTION	TOTAL SALES	U.S. EXPORTS
the coast of China manufacture clothing to keep America's closets full making	MEN'S WEAR Zhucheng	100 MILLION PIECES	\$600 MILLION	\$100 MILLION
everything to wear	— P CASUAL WEAR	160 MILLION	\$260	\$58
from head to toe.	Haiyu, Changshu	PIECES	MILLION	MILLION
0 Miles 1,000	<b>DOWN-FILLED PRODUCTS</b>	26 MILLION	\$470	\$290
River	Xintang, Hangzhou, Xiaoshan	PIECES	MILLION	MILLION
Beijing CHINA Area of detail	TIES Shengzhou	300 MILLION PIECES	\$1.21 BILLION	\$384 MILLION
ZHEJIANG	<b>socкs</b>	9 billion	\$1.57	\$240
	Datang, Zhuji	PAIRS	BILLION	MILLION
CHINA	Jinjiang, Shenhu	969 million	\$360	\$290
0 Miles 300		PIECES	MILLION	MILLION
GUANGDONG	WEDDING DRESSES, EVENING GOWNS Chaozhou	510 million PIECES	\$950 MILLION*	\$640 MILLION†
*Includes all textiles made in the city.	JEANS	225 million	\$1.04	\$480
†Wedding dress and evening gown exports	Xintang, Zengcheng	PIECES	BILLION	MILLION

Sources: China National Textile Council; Shenhu Underwear Association; Datang Town Government

The New York Times

Source: David Barboza, "In roaring China, sweaters are west of socks city," New York Times, Dec. 24, 2004.

# MNC R&D Centers in China How are engineers being used?

- What kinds of work are Chinese, Indian, and American engineers actually doing?
  - Answer: Not just product adaptation, but cutting-edge research & commercialization



Rockwell











- China: More than 1,200 MNC R&D Centers
  - GE's China Technology Center: Advanced research in energy storage, environmental management
  - Microsoft Research Asia: Cutting-edge graphics & multimedia research

# China Is Climbing the Value Chain...

- Moving from low-tech to high-tech manufactured goods
- Moving from manufacturing to high value services

   R&D, design, marketing of national brands, logistics, finance
- Moving from inward FDI (joint ventures & technology transfer) to outward FDI (primary commodities, computers, shipping)
- BUT BEWARE...High tech exports don't necessarily mean high value added production → e.g., China's iPod

# China assembles all iPods, but it only gets about \$4 per unit – or just over 1% of the US retail price of \$300



The bulk of the iPod's value is in the conception and design of the iPod. That is why Apple gets \$80 for each of these video iPods it sells, which is by far the largest piece of value added in the entire supply chain. Apple figured out how to combine 451 mostly generic parts into a valuable product.

Source: Varian, Hal R. The New York Times, June 28, 2007. An Post Has Global Value. Ask the (Many) Countries That Make It.

## U.S. Trade Balance with China for iPhone 4 (US\$, 1 unit)



Source: G. Gereffi and J. Lee, "Why the world suddenly cares about global supply chains," *Journal of* Supply Chain Management (2012). 37

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# THE ROLE OF EMERGING ECONOMIES IN GVCs

# Seven Selected Emerging Economies in Comparative Perspective, 2013

	Population	Exports	GDP	GDP/capita	GDP/capita	GDP growth	Per	Percent of GDP <sup>3</sup>			
Country	(Millions) <sup>1</sup>	(\$Billions) <sup>2</sup>	(\$Billions) <sup>1</sup>	(USD) <sup>1</sup>	(PPP) <sup>1</sup>	YoY (%) <sup>1</sup>	Agriculture	Industry	Services		
China	1,357	\$2,209	\$9,240	\$6 <i>,</i> 807	\$11,906	7.7	10	44	46		
South Korea	50	\$560	\$1,305	\$25,977	\$33,140	3.0	3	39	58		
Russia	143	\$527	\$2,096	\$14,611	\$24,114	1.3	4	38	58		
Mexico	122	\$380	\$1,261	\$10,307	\$16,463	1.1	4	36	60		
India	1,252	\$337	\$1,877	\$1,498	\$5,412	5.0	17	26	57		
Brazil	200	\$242	\$2,246	\$11,208	\$15,038	2.5	6	26	68		
South Africa	53	\$95	\$351	\$6,618	\$12,507	1.9	3	29	68		
Total or Avg.	3,177	\$4,350	\$18,376	\$11,004	\$16,940	3.2	7	34	59		
World Total	7,125	\$17,635	\$75,593	\$10,610	\$14,397	2.2					
% of World Total	45%	25%	24%	2 104%	118%	146%					
Sources:	(1) World Ba	(1) World Bank, World Development Indicators: http://data.worldbank.org									
	(2) UN Comt	rade, Internati	ional Trade Ce	enter: http://o	comtrade.un.o	org/					
	(3) CIA World	l Factbook, Co	ountry Profiles	s: https://www	w.cia.gov/libra	ary/publicatior	ns/the-world-fa	actbook/			

## Emerging Economy Export Profiles (Percentages of total exports: 2013)

	Share of exports by sector in 2013*				Total	Change in	Percentage point change in						
		I				Export	total export	sh	share of exports by sector, 2000-2013				
	Primary	Resource	Low Toch	Medium-		Value	value,	Primary	Resource	Low Toch	Medium-		
	Products	Based	LUW-TECH	Tech	High-Tech	(\$Billions)	2000-2013	Products	Based	LOW-TECH	Tech	High-Tech	
China	3%	8%	32%	23%	34%	2,209	786%	-4	0	-10	4	11	
South Korea	2%	17%	9%	43%	28%	560	226%	0	6	-8	10	-8	
Russia	55%	29%	2%	8%	2%	527	412%	6	10	-3	-3	-2	
Mexico	16%	8%	9% 🔇	42%	22%	380	129%	3	3	-6	4	-6	
India	14%	38%	20%	18%	8%	337	702%	0	9	-19	7	3	
Brazil	33%	33%	5%	21%	4%	242	340%	13	6	-7	-4	-8	
South Africa	25%	31%	6%	27%	3%	95	265%	8	1	-3	1	-1	
				1.1	A								
*Exports totals do	not include	e uncategor	ized export	s, and there	efore they r	may not equ	al 100%.	Legend:	x ≤ -6	-5≤x<0	$0 \le x \le 9$	x ≥ 10	

# Emerging Economies: Development Strategies in Conflict

**China**: Combining labor-intensive, technology-intensive and knowledge-intensive GVCs

- iPhone case: East Asian regional ecosystem
- Innovation & MNC R&D centers; joint-ventures

## Brazil

- Soybean value chain
- Electronics & Foxconn

## **South Africa**

• Climbing natural resource GVCs in Africa



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#### Main Competitors in the U.S. Market for Automatic Data Processing Machines (SITC 752)



Year

#### Main Competitors in the U.S. Market for Telecom Equipment (SITC 764)



Year

#### Main Competitors in the U.S. Market for Furniture (SITC 821)



Year

#### Main Competitors in the U.S. Market for Apparel and Clothing (SITC 84)



Year

# IMPLICATIONS OF C.R. MEDICAL DEVICES CASE FOR GVC UPGRADING AND INDUSTRIAL POLICY

- **GVC upgrading** is broader than innovation systems
  - Use high-value activities to diversify and climb GVCs
  - Move to profitable niches in GVCs (diverse "rents")
  - Downgrading outcomes are a recurrent issue in GVCs
- GVC lead firms were drivers of upgrading (FDI & trade to enter high-tech niches of medical devices GVC)
- Innovation bottlenecks require strengthening of NIS (e.g., sterilization and creation of Masters in Med Device Engineering)
- Target MNCs that will strengthen country's GVCs and find ways to diminish size of low-tech segments
- Strengthen the role of domestic suppliers and use TNCs as learning platforms
- Explore international partnerships to expand country's capabilities and footprint in GVCs

## **GVC-oriented Industrial Policies**

The GVC framework suggests ways to enhance the competitiveness of local economic clusters:

- Focus on quality and high-value activities in order to move up global value chains
- Target MNCs that will strengthen country's GVCs and create dynamic local linkages
- Strengthen the role of domestic suppliers and use TNCs as learning platforms
- Explore international partnerships to expand country's capabilities and footprint in GVCs

# The New Global Economy

## Trends

- GVCs as 80% of world trade (UNCTAD, WIR 2013)
- Concentration of production and consumption in relatively few large emerging economies
- Consolidation within GVCs in fewer, larger suppliers
- More South-South trade = shifting end markets

## Implications

- More opportunities for connection and upgrading in large emerging economies
- Challenges for small countries and firms on the periphery
- Economic upgrading ≠ Social upgrading