



# Global Production Networks and Regional Development: Implications for Smart Specialisation

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# Global Production Networks and Regional Development: Implications for Smart Specialisation

## Outline

- ▶ Introduction
- ▶ Value capture trajectories and strategic coupling
- ▶ Strategic coupling of regions with global production networks
- ▶ Promoting strategic coupling: implications for smart specialisation

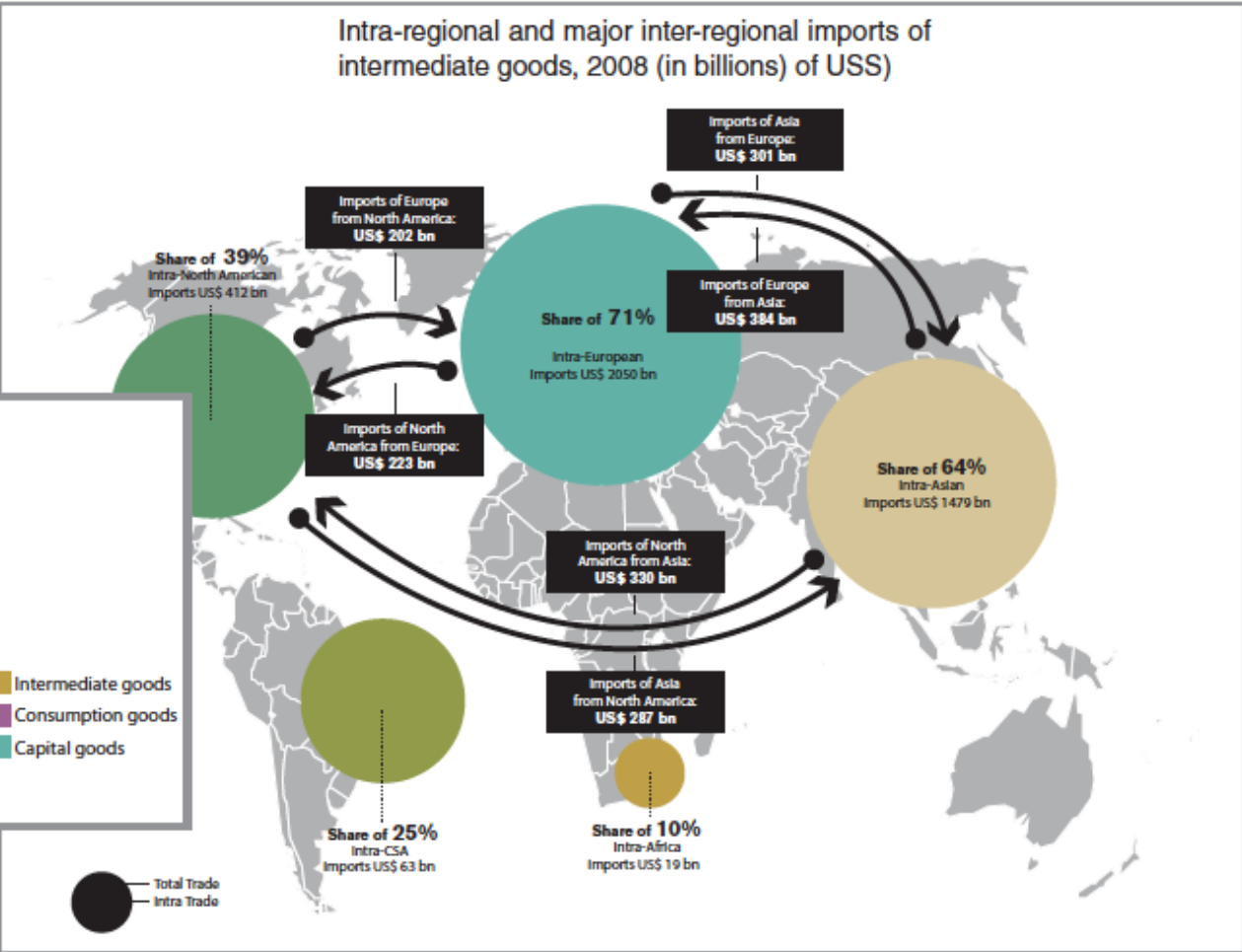
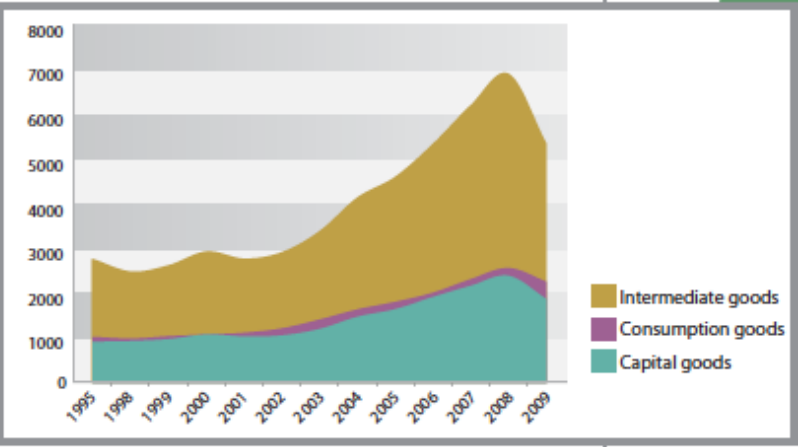
# 1. Introduction

## Regions in global production networks (GPNs) and global value chains (GVCs)

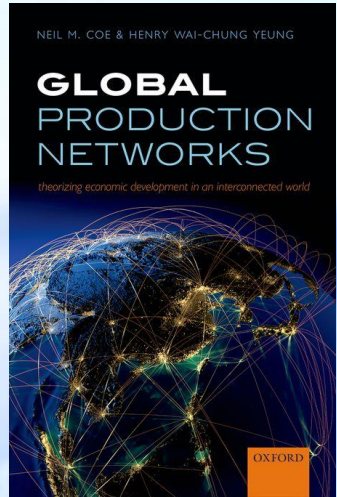
- ▶ 80% of world trade organized through GPNs (UNCTAD's *World Investment Report 2013*)
- ▶ GPNs and GVCs as “the world economy’s backbone and central nervous system” (World Bank, 2010)

**FIGURE 8.6: Global production sharing**

Global production sharing is the norm, not the exception



Source: FGI Supply Chain Study.



Coe and Yeung (2015)  
Oxford University Press.

# 1. Introduction

## “Strategic coupling” with global production networks (GPN 2.0)

- ▶ **Strategic coupling** as an *interactive mechanism* connecting **regional dynamics** (e.g. smart specialisation initiatives) and **GPN imperatives** (e.g. new markets or production arrangements)
- ▶ Regional development as an evolving process of shifting *value capture trajectories* in a world of global production networks

## 2. Value capture trajectories and strategic coupling

### Value capture trajectories: beyond upgrading as a pathway to regional development

- ▶ Linear trajectory in most upgrading studies: from product upgrading to process and functional upgrading and chain upgrading?
- ▶ Smart specialisation as a “leapfrogging” strategy? Issues of national/regional contexts, type of firms, means-vs-ends of upgrading: *who* gets upgraded and *who* captures value?

## 2. Value capture trajectories and strategic coupling

- ▶ Value capture trajectories: much more varied, contingent, and multi-directional
  - firm-specific: different possible roles and trajectories
  - value capture as the ultimate outcome
  - different starting points and dynamics
- ▶ Regional development as the dynamic aggregate effect of the value capture trajectories of the various firms located in a particular territory

## 2. Value capture trajectories and strategic coupling

### Value capture through the mechanism of strategic coupling

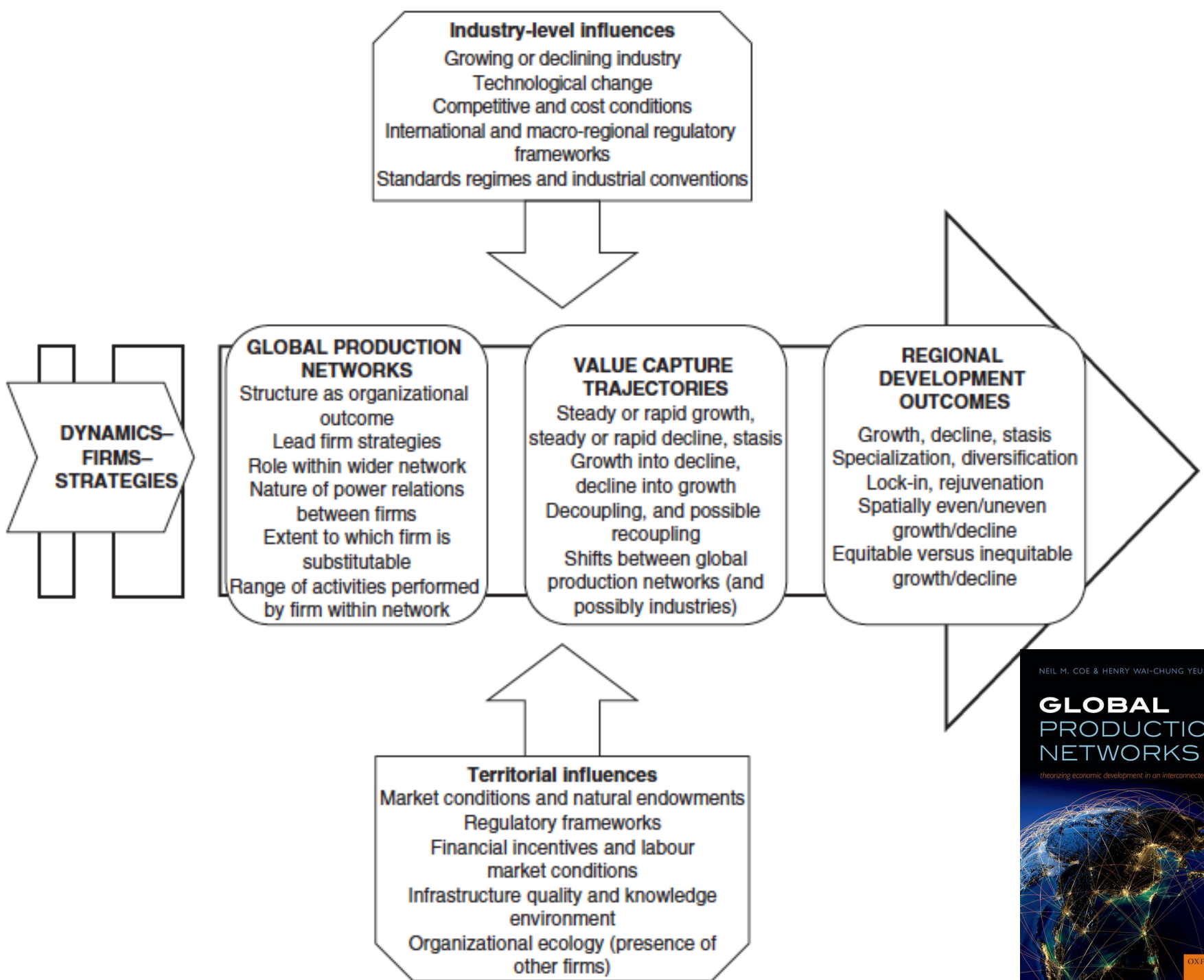
- ▶ GPN actors:
  - global lead firms and their market control through product and market definition;
  - strategic partners, suppliers, and other actors
- ▶ Strategic coupling of regions with GPNs: making smart specialisation work through mutual complementarity and dynamic articulation



## 2. Value capture trajectories and strategic coupling

### Value capture through the mechanism of strategic coupling

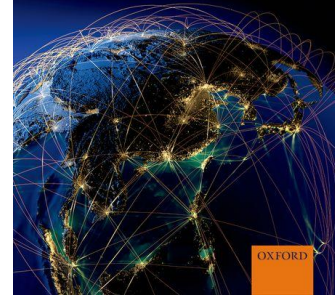
- ▶ *Territorial* dynamics at the regional scale: regional institutions and assets (potential for smart specialisation)
- ▶ *Network* dynamics at the global scale: competitive logics of lead firms seeking
  - cost efficiency
  - market access and development
  - financialization and capital gain
  - risk minimization



NEIL M. COE & HENRY WAI-CHUNG YEUNG

## GLOBAL PRODUCTION NETWORKS

*theorizing economic development in an interconnected world*



OXFORD

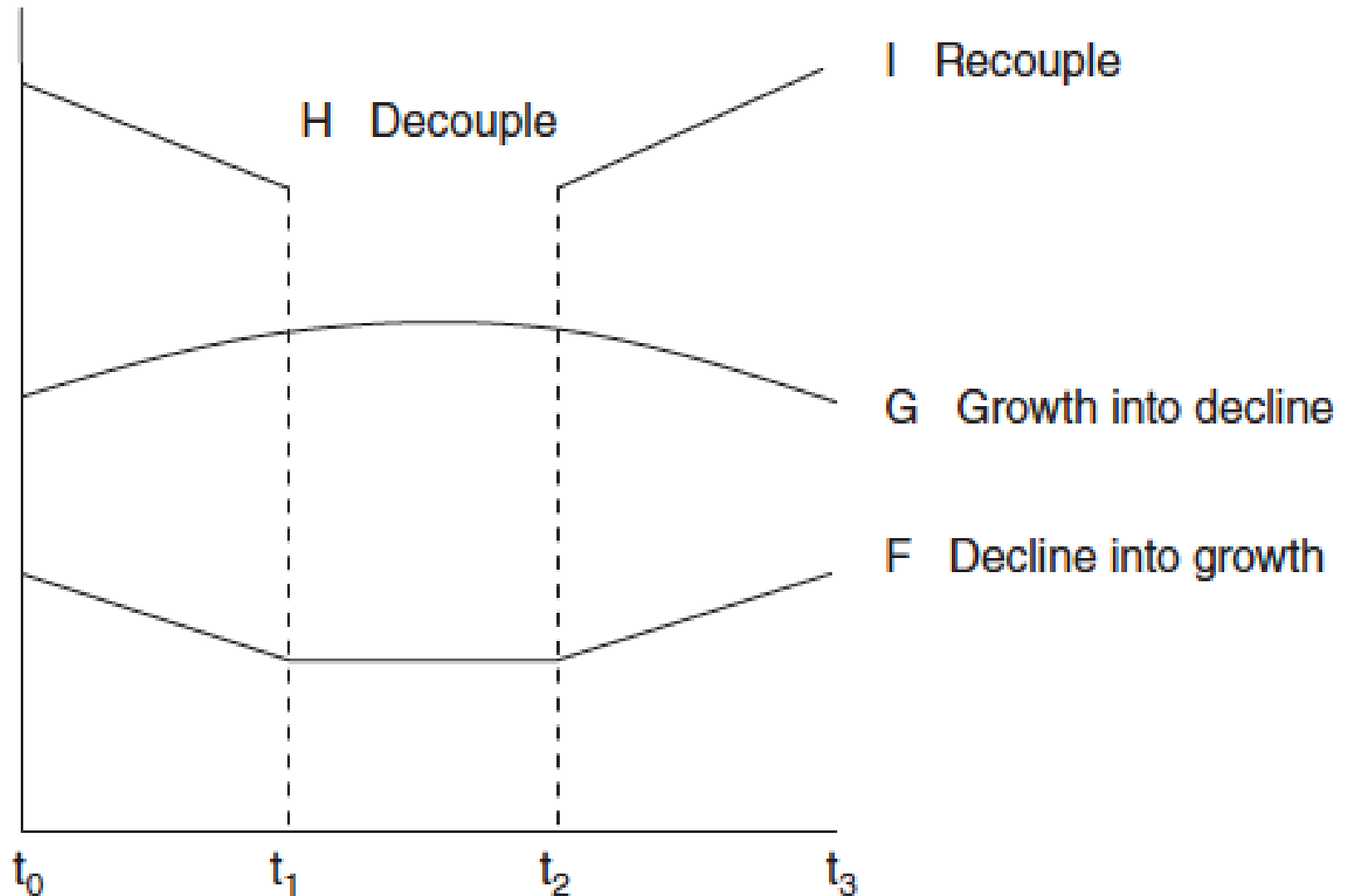
### 3. Strategic coupling of regions with GPNs

#### Dynamics of strategic coupling and regional development

- ▶ Coupling not a static equilibrium concept
- ▶ Evolutionary possibilities
  - coupling/articulation
  - decoupling/disarticulation
  - recoupling/re-articulation

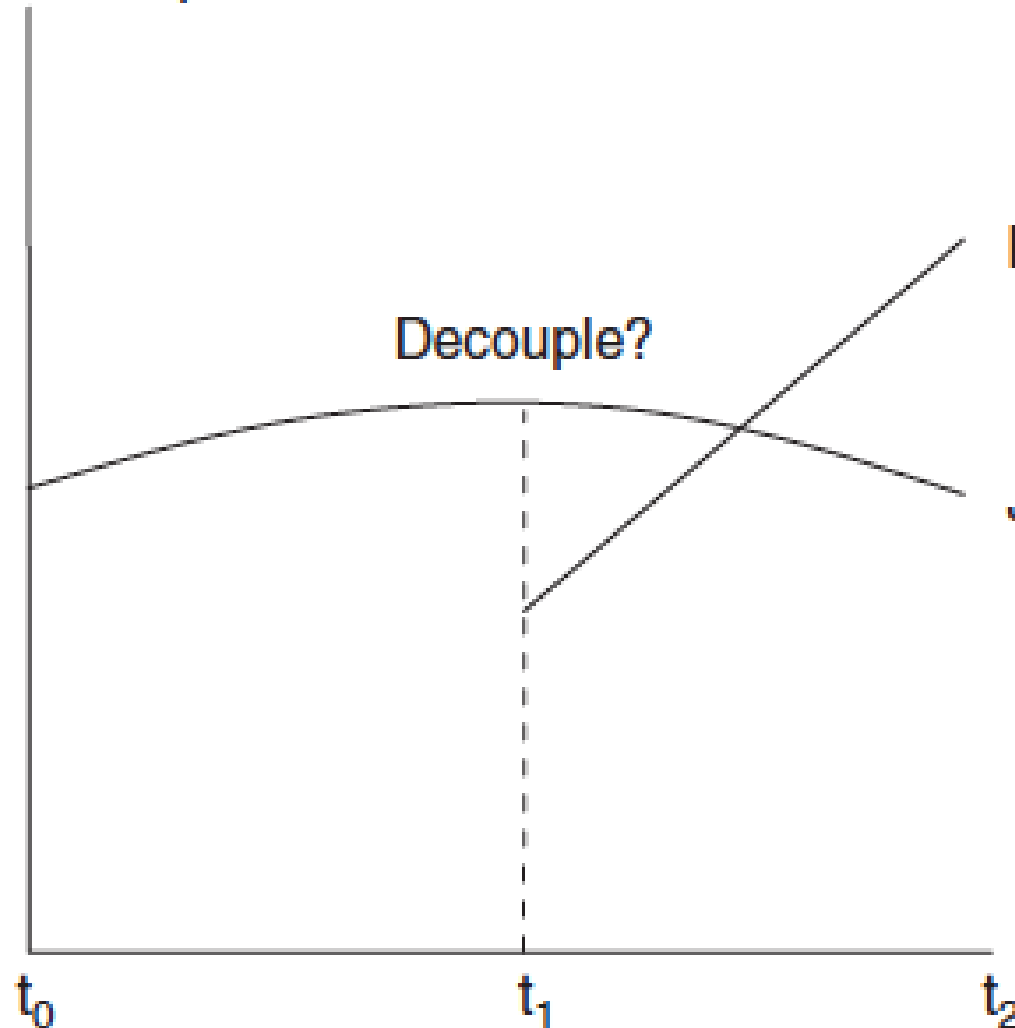
**(b) Multi-directional paths**

Value capture



**(c) Shifts between global production networks**

Value capture

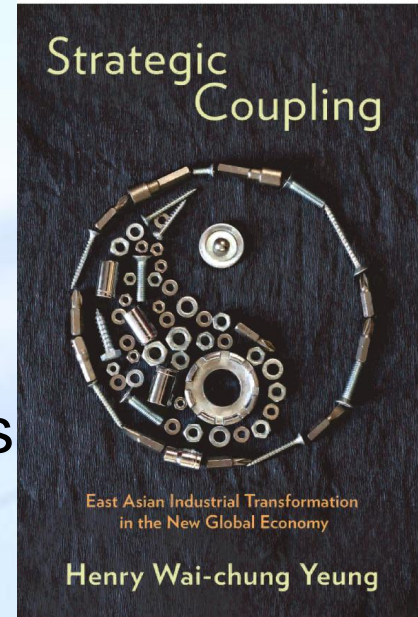


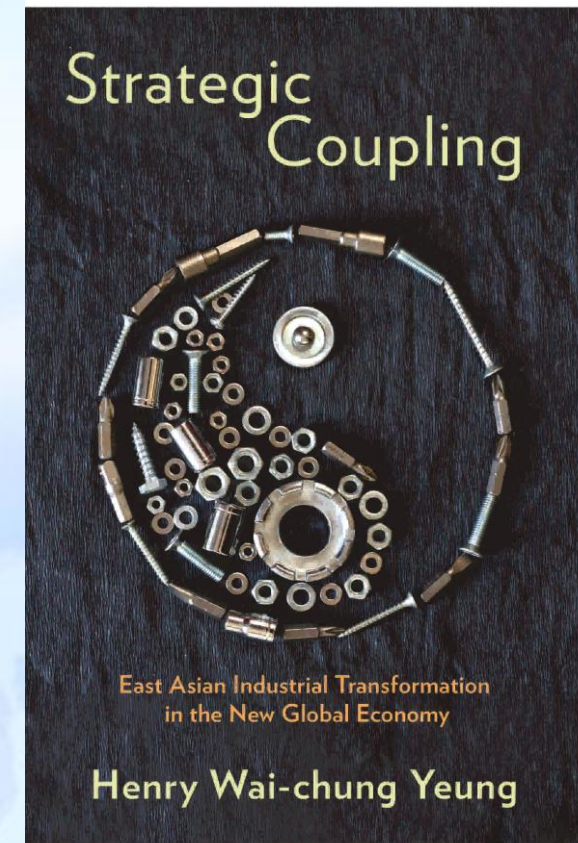
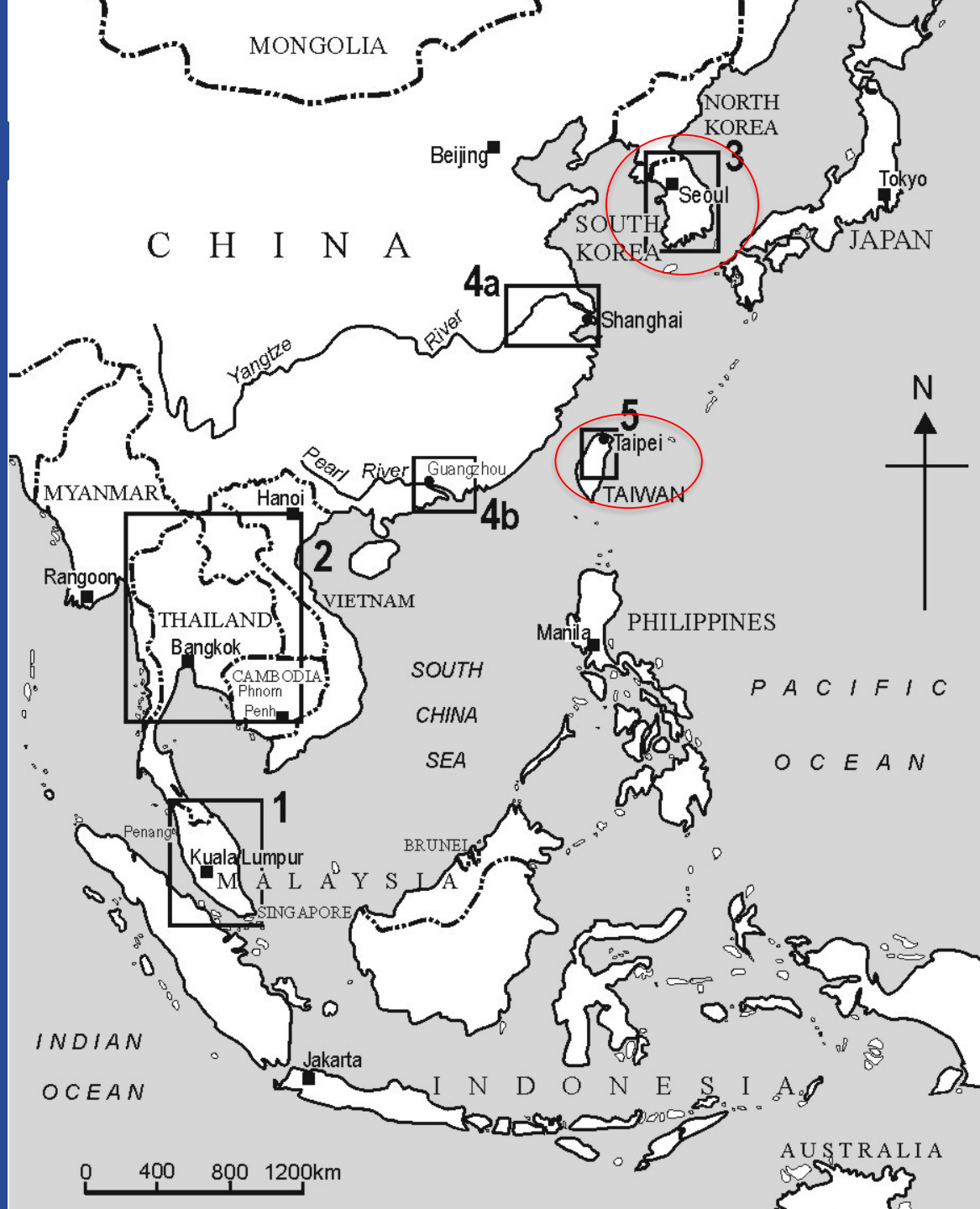
**K** Decouple from and recouple with different network or industry

**J** Entering decline

## Development outcomes (e.g. East Asia in the ICT and other industries)

- *Strategic coupling*: local/regional economies “working with” key actors in GPNs
- Upgrading: not just economic (industrial), but also social (people and employment conditions)
- Path dependency and regional lock-ins: short- and long-term consequences (e.g. “race to the bottom”)
- Vulnerabilities and disarticulations: what about “unplugging” from chains and networks?





Yeung (2016)  
Cornell University Press.

# Strategic coupling: industrial market specialization through foundries and IDMs in global semiconductors

**2016F Top 20 Semiconductor Sales Leaders  
(\$M, Including Foundries)**

2016F Rank	2015 Rank	Company	Headquarters	2015 Sales*	2016F Sales*	2016/2015 Forecast
1	1	Intel*	U.S.	52,144	56,313	8%
2	2	Samsung	South Korea	42,043	43,535	4%
3	3	TSMC (1)	Taiwan	26,439	29,324	11%
4	5	Qualcomm (2)	U.S.	16,008	15,436	-4%
5	6	Broadcom Ltd.* (2)	Singapore	15,183	15,332	1%
6	4	SK Hynix	South Korea	16,649	14,234	-15%
7	7	Micron	U.S.	14,483	12,842	-11%
8	8	TI	U.S.	12,112	12,349	2%
9	10	Toshiba	Japan	9,429	10,922	16%
10	9	NXP*	Europe	10,563	9,498	-10%
11	13	MediaTek (2)	Taiwan	6,699	8,610	29%
12	11	Infineon	Europe	6,916	7,343	6%
13	12	ST	Europe	6,873	6,944	1%
14	17	Apple (2,3)	U.S.	5,531	6,493	17%
15	14	Sony	Japan	6,263	6,466	3%
16	18	Nvidia (2)	U.S.	4,696	6,340	35%
17	16	Renesas	Japan	5,682	5,751	1%
18	15	GlobalFoundries* (1)	U.S.	5,729	5,085	-11%
19	19	ON Semi*	U.S.	4,866	4,858	0%
20	20	UMC (1)	Taiwan	4,464	4,455	0%
<b>Total Including Foundries</b>			—	<b>272,772</b>	<b>282,130</b>	<b>3%</b>
<b>Total Without Foundries</b>			—	<b>236,140</b>	<b>243,266</b>	<b>3%</b>

(1) Pure-play foundry

(2) Fabless supplier

(3) Custom processors for internal use made by TSMC and Samsung foundry services.

\*2016 and 2015 sales include Intel/Altera, Broadcom/Avago, NXP/Freescale, GlobalFoundries/IBM, and ON/Fairchild sales for all of 2015 and 2016.

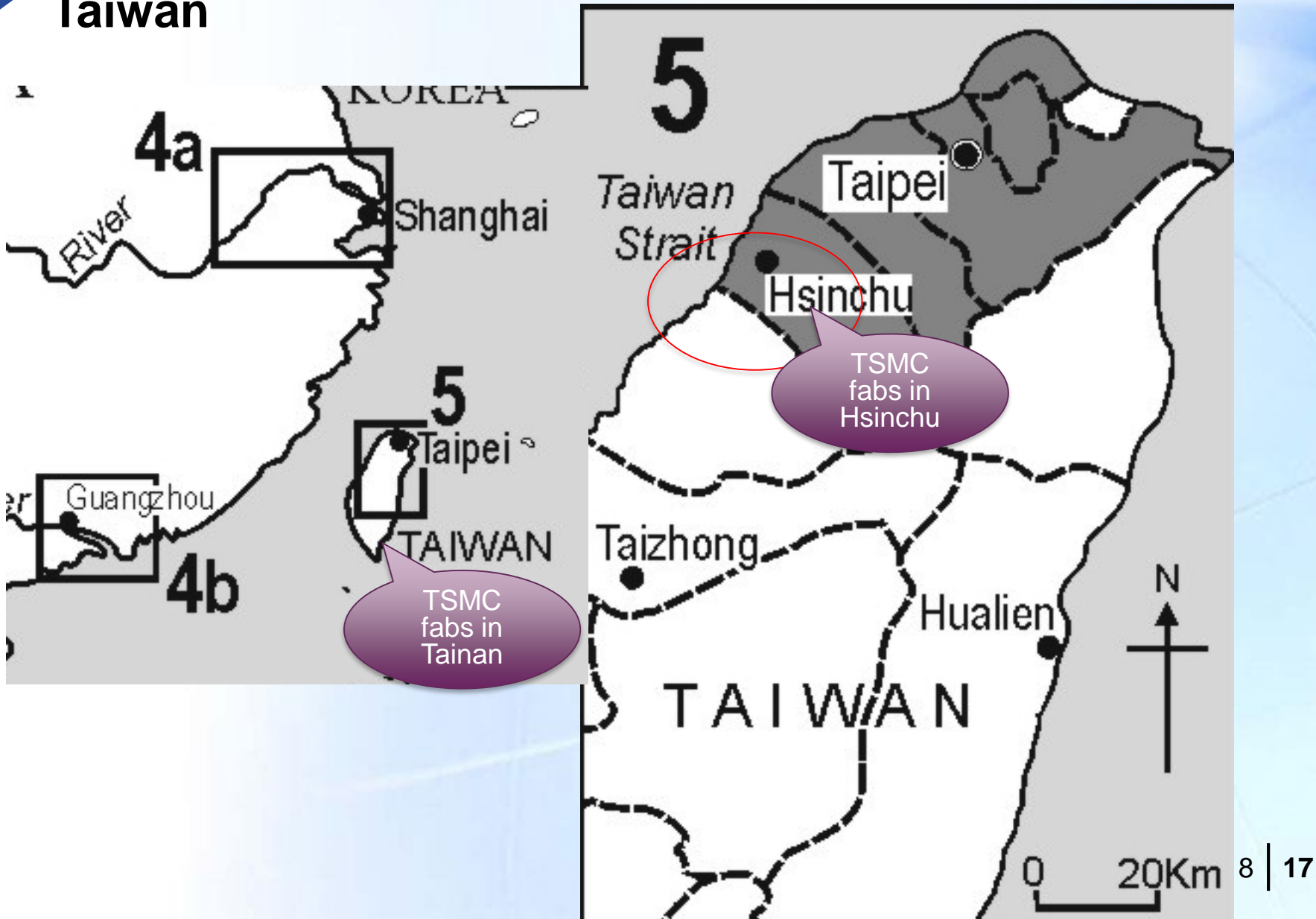
Source: Companies, IC Insights' Strategic Reviews Database

**SAMSUNG**





# Mechanism 1: industrial market specialization through strategic partnership of semiconductor foundries in Taiwan



# Mechanism 1. strategic partnership of TSMC with Apple, Qualcomm, Broadcom, and Nvidia



## 12-inch GIGAFABS



**Corporate Headquarters, Fab 12A**  
8, Li-Hsin Rd. 6, Hsinchu Science Park,  
Hsinchu 300-78, Taiwan, R.O.C.  
TEL: +886-3-5636688  
FAX: +886-3-5637000  
GPS: E: 121° 57.7' N: 24° 46'27.9"



**TSMC R&D Center, Fab 12B**  
168, Park Ave. II, Hsinchu Science Park,  
Hsinchu 300-75, Taiwan, R.O.C.  
TEL: +886-3-5636688  
FAX: +886-3-6687827  
GPS: E: 120° 59' 51" N: 24° 46' 47"



**Fab 14**  
1-1, Nan-Ke North Rd., Tainan Science Park  
Tainan 741-44, Taiwan, R.O.C.  
TEL: +886-6-5056688  
FAX: +886-6-5051262  
GPS: E: 120° 16' 26.9" N: 23° 06' 46.2"



**Fab 15**  
1, Keya Rd. 6, Central Taiwan Science Park,  
Taichung 428-82, Taiwan, R.O.C.  
TEL: +886-4-27026688  
FAX: +886-4-25607548  
GPS: E: 120° 37' 2.4" N: 24° 12' 41.3"



## 8-inch Fabs



**Fab 3**  
9, Creation Rd. 1, Hsinchu Science Park,  
Hsinchu 300-77, Taiwan, R.O.C.  
TEL: +886-3-5636688  
FAX: +886-3-5781548  
GPS: E: 120° 59' 28" N: 24° 46' 31"



**Fab 5**  
121, Park Ave. 3, Hsinchu Science Park,  
Hsinchu 300-77, Taiwan, R.O.C.  
TEL: +886-3-5636688  
FAX: +886-3-5781546  
GPS: E: 120° 59' 55" N: 24° 46' 25"



**Fab 6**  
1, Nan-Ke North Rd., Tainan Science Park,  
Tainan 741-44, Taiwan, R.O.C.  
TEL: +886-6-5056688  
FAX: +886-6-5052057  
GPS: E: 120° 29' 55" N: 23° 06' 48"



**Fab 8**  
25, Li-Hsin Rd., Hsinchu Science Park,  
Hsinchu 300-78, Taiwan, R.O.C.  
TEL: +886-3-5636688  
FAX: +886-3-5662051  
GPS: E: 121° 01' 11" N: 24° 45' 44"



**TSMC China Company Limited, Fab 10**  
4000, Wen Xiang Road, Songjiang,  
Shanghai, China  
Postcode: 201616  
TEL: +86-21-57768000  
FAX: +86-21-57762525



**WaferTech L.L.C., Fab 11**  
5509 N.W. Parker Street  
Camas, WA 98607-9299 U.S.A.  
TEL: +1-360-8173000  
FAX: +1-360-8173590



**SSMC (TSMC-NXP JV)**  
70 Pasir Ris Drive 1  
Singapore 519527  
FAX: +65-62487606

## 6-inch Fabs



**Fab 2**  
121, Park Ave. 3, Hsinchu Science Park,  
Hsinchu 300-77, Taiwan, R.O.C.  
TEL: +886-3-5636688  
FAX: +886-3-5781546  
GPS: E: 120° 59' 55" N: 24° 46' 25"



# Mechanism 2: industrial market specialization through indigenous innovation: Samsung and South Korea

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## LOCATION

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<b>PLANT</b> - Xi'an - Suzhou	<b>PLANT</b> - Giheung - Hwaseong - Onyang	<b>PLANT</b> - Texas	
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# Mechanism 2: industrial market specialization through indigenous innovation: Samsung and South Korea



## KOREA (R&D CENTER)

### Samsung Hwaseong Research Center



- **Address**

1, Samsungjeonja-ro, Hwaseong-si, Gyeonggi-do 18448

- **R&D**

- Memory, System Logic

# Mechanism 2: industrial market specialization through indigenous innovation: Samsung and South Korea



## 🇰🇷 KOREA (PLANT)

### Giheung Complex



- **Address**  
1, Samsung-ro, Giheung-gu, Yongin-si, Gyeonggi-do 17113
- **Products**
  - Wafer manufacturing
  - Memory, System Logic

### Hwaseong Complex



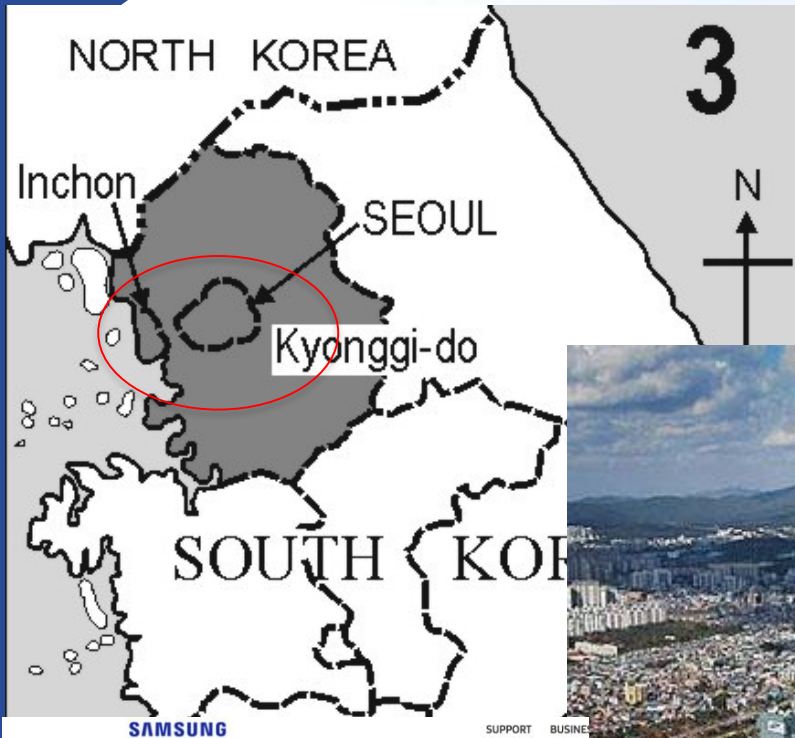
- **Address**  
1, Samsungjeonja-ro, Hwaseong-si, Gyeonggi-do 18448
- **Products**
  - Wafer manufacturing
  - Memory

### Onyang Complex



- **Address**  
158, Baebang-ro, Baebang-eup, Asan-si, Chungcheongnam-do 31489
- **Products**
  - Packaging and Testing
  - Memory, System Logic

# Mechanism 2: industrial market specialization through indigenous innovation: Samsung and South Korea



### 3. Strategic coupling of regions with GPNs

#### Changing modes of strategic coupling

- ▶ The “dark sides” of strategic coupling
  - strategic coupling but negative consequences
  - conflicting GPN and regional logics: cost efficiency vs. industrial upgrading
- ▶ Shifting dynamics of strategic coupling: disarticulations, with the possibility for re-articulation into different and more appropriate GPNs

**Table 2. Potential negative consequences of strategic coupling in global production networks**

	<b>Between GPN and region</b>	<b>Within region</b>
<b>Ruptures</b>	<ul style="list-style-type: none"> <li>• Disinvestment</li> <li>• Exit of foreign firms</li> <li>• More limited access to international markets</li> <li>• Financial and other risks</li> </ul>	<ul style="list-style-type: none"> <li>• Crowding out local firms</li> <li>• Reduction or removal of local linkages</li> <li>• Political exclusion</li> <li>• Displacement and eviction</li> </ul>
<b>Frictions</b>	<ul style="list-style-type: none"> <li>• Uneven value capture</li> <li>• Leakage of intangible assets (technology and knowhow)</li> <li>• External path dependency and regional “lock-ins”</li> <li>• Labour exploitation</li> <li>• “Clash” of cultures</li> </ul>	<ul style="list-style-type: none"> <li>• Uneven resource allocation</li> <li>• Social and class conflicts</li> <li>• Gender inequality</li> <li>• Environmental damages</li> </ul>

Source: Expanded from Coe and Hess (2011: Figure 11.2, p.135).



## 4. Promoting strategic coupling: implications for smart specialisation

### Cautions for policy makers and practitioners

- ▶ Changing modes of strategic coupling and their associated pitfalls: not a universal panacea or all-inclusive policy instrument
- ▶ Always a critical role for regional institutions and groups of actors to engage in joint decision and collective action
  - to mitigate “dark sides” of GPN coupling
  - to consider a more balanced and equitable form of regional development

## 4. Promoting strategic coupling: implications for smart specialisation

### Cautions for policy makers and practitioners

- ▶ Mindful of regional variations in resource endowments and institutional repertoires: a key plank of smart specialisation initiatives
- ▶ Role for sector-specific industrial policies in GPN-led regional development

## 4. Promoting strategic coupling: implications for smart specialisation

### Key considerations in GPN-led regional development POLICY

- ▶ Moving from national industries to specialized niches of regions in GPNs (i.e. smart specialisation)
- ▶ Recognizing the need for detailed knowledge and analysis of regional prospects in different GPNs
- ▶ Promoting new domestic capacity and/or foreign investment in value-adding segments of GPNs in regional economies

## 4. Promoting strategic coupling: implications for smart specialisation

### Key considerations in GPN-led regional development POLICY

- ▶ Developing global supply base through a combination of local and foreign firms
- ▶ Facilitating trade in production inputs and intermediate goods and services
- ▶ Leveraging GPNs for international market access and development of regional firms