



EUROPE'S FUTURE: WHY MANUFACTURING STILL MATTERS

Prof. Dr. Murat Yulek
Center for Industrial Policy and Development
Istanbul Commerce University

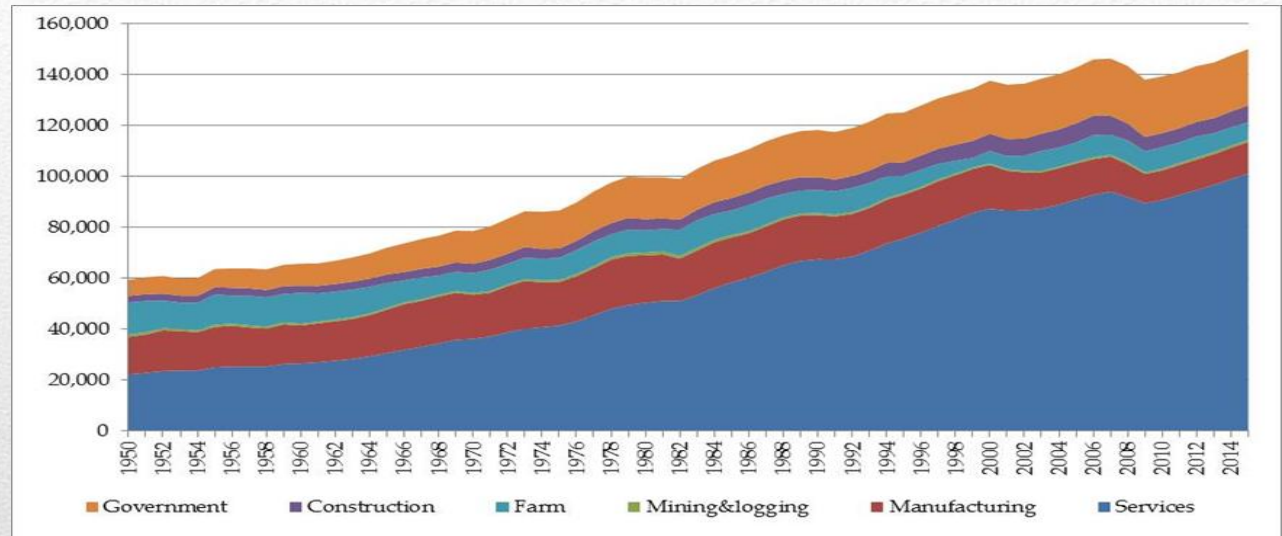
Outline/ Summary

In an era of “de-industrialization” and “offshoring” of manufacturing jobs in the developed economies and the “middle income trap” and “premature de-industrialization” in developing ones, I will review a number sub-topics:

- Services vs industry: does manufacturing still matter? If so why?
 - Is manufacturing “poor men’s business”?
 - Who manufactures? Who does not?
 - International trade & manufacturing
 - How does manufacturing relate to middle income trap?
 - How does it apply to Europe which is experiencing economic slow down on the one hand and interregional discrepancies in per capita income and development?
 - Industrial policy vs science, technology and innovation policy: horizontal ve vertical policies; merits and sequencing
 - What is a strategic industry? How to identify it?
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Services vs industry

Sectoral Employment in the USA



Source: BLS

- Services: the hotbed of employment

Productivity in non-farm services and manufacturing sectors in the USA

	services sector	manufacturing sector
1990-2000	2.2	4.1
2000-2007	2.6	4.7
2007-2016	1.1	1.7*
*2007-2015		

- Manufacturing: the hot bed of innovation and productivity

Source: Bureau of Labor Statistics <https://www.bls.gov/lpc/prodybar.htm> (accessed 17 February 2017).

Services vs industry

- Services: the hotbed of employment

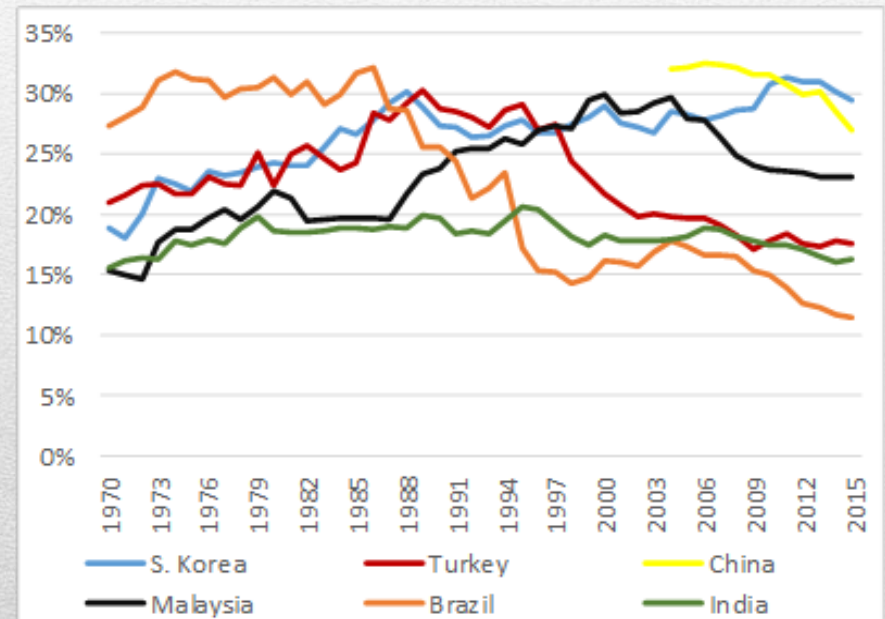
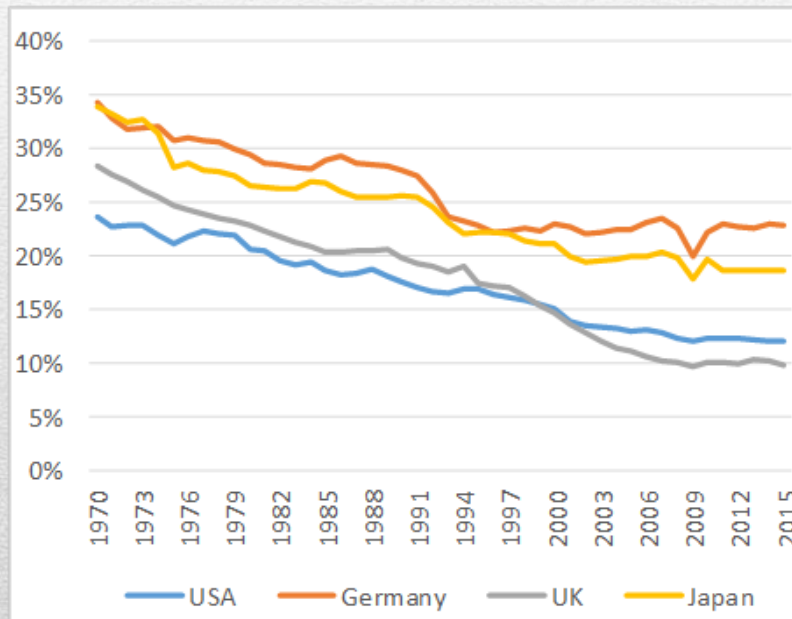
- Manufacturing: the hot bed of innovation and productivity

Employment and output by major sectors in the USA (2015)

	Employment (million)	Output (billion USD)	Output/employee (000 USD)
Manufacturing	12.4	2,170	175.60
Services	101.3	12,293	121.41
Agriculture	6.9	175	25.23
Government	22.1	2,338	105.80
Mining	0.7	328	441.18
Construction	6.6	732	110.46
Total	150.0	18,037	120.22

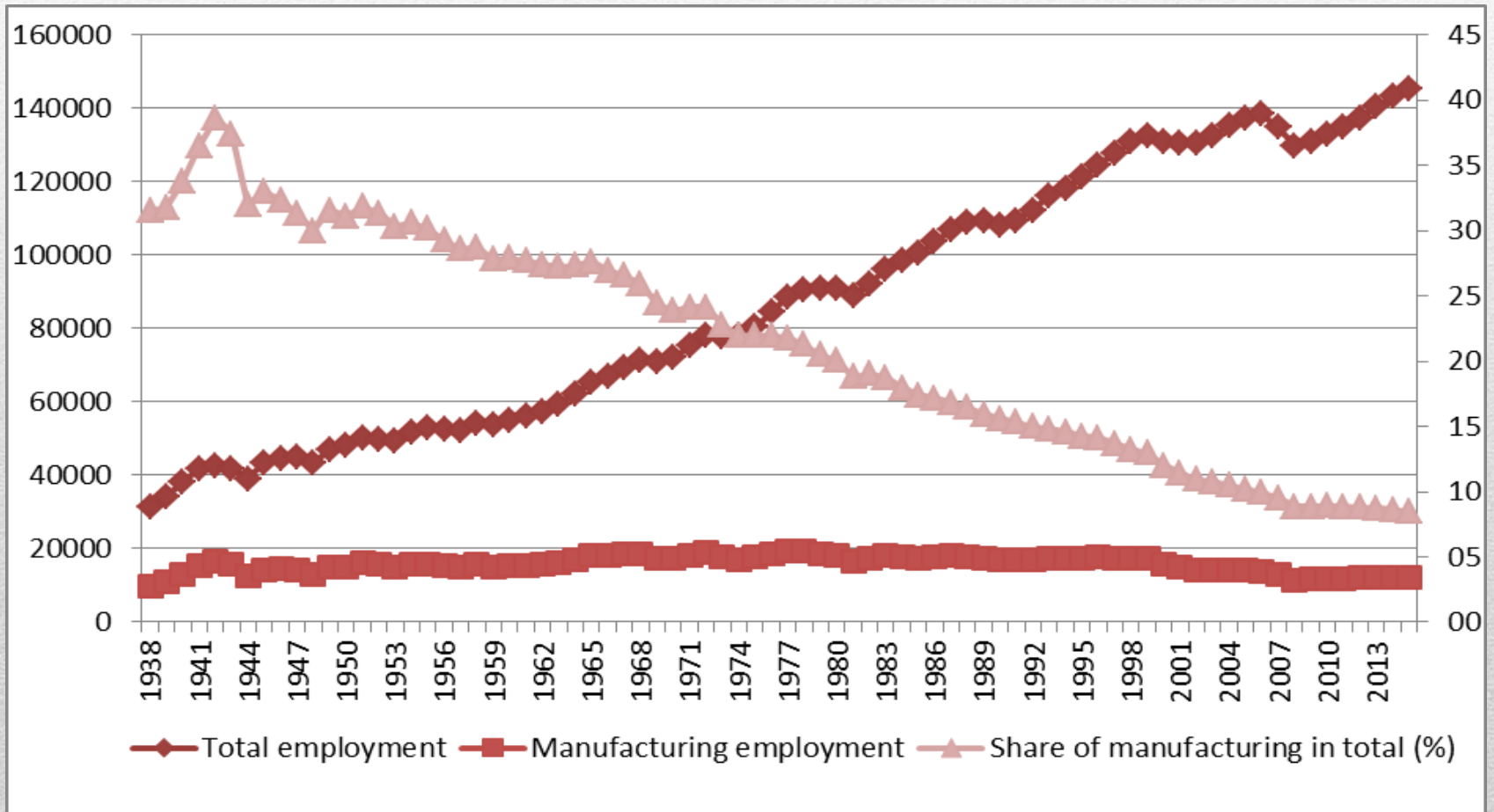
The paradox of manufacturing

Decline of Manufacturing: selected developed economies
(share of manufacturing in total output)



The paradox of manufacturing

Manufacturing employment in the USA (1939-2016)

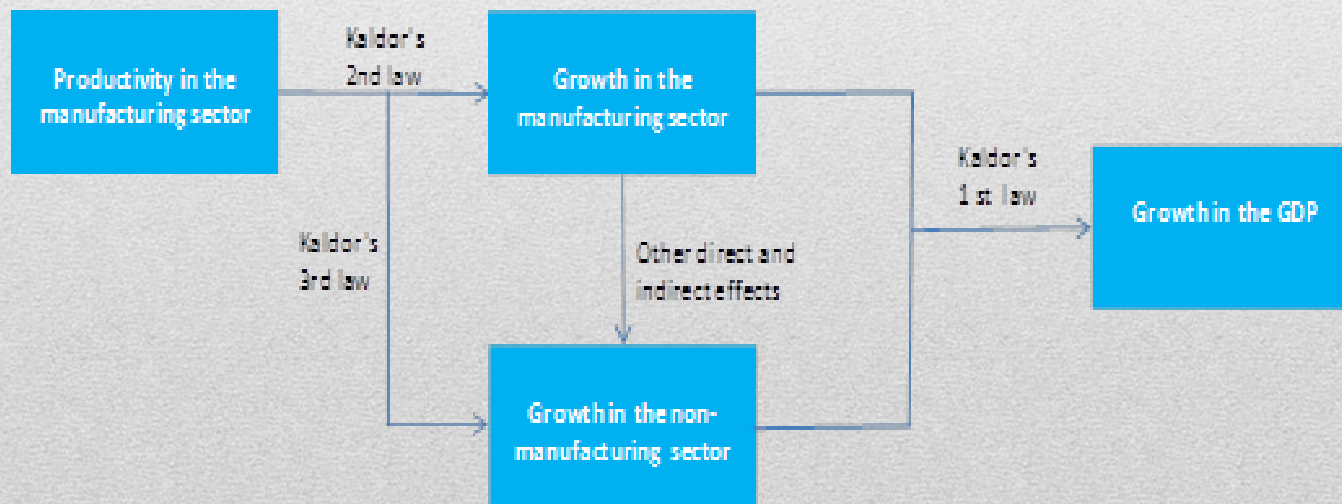


What did Kaldor say?

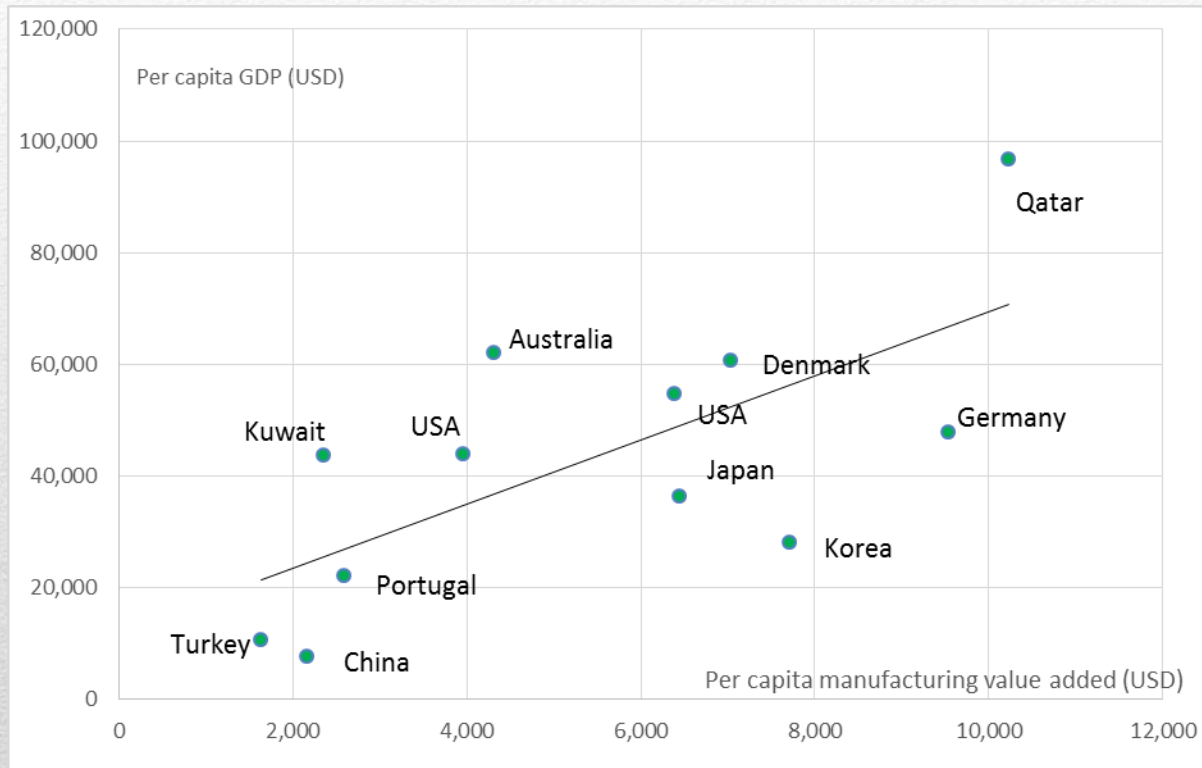
The second law of Kaldor: Productivity drives the growth of the manufacturing sector (also known as Verdoorn's (1949) law)

The third law of Kaldor: Productivity of the non-manufacturing sector is positively related to the growth of the manufacturing sector.

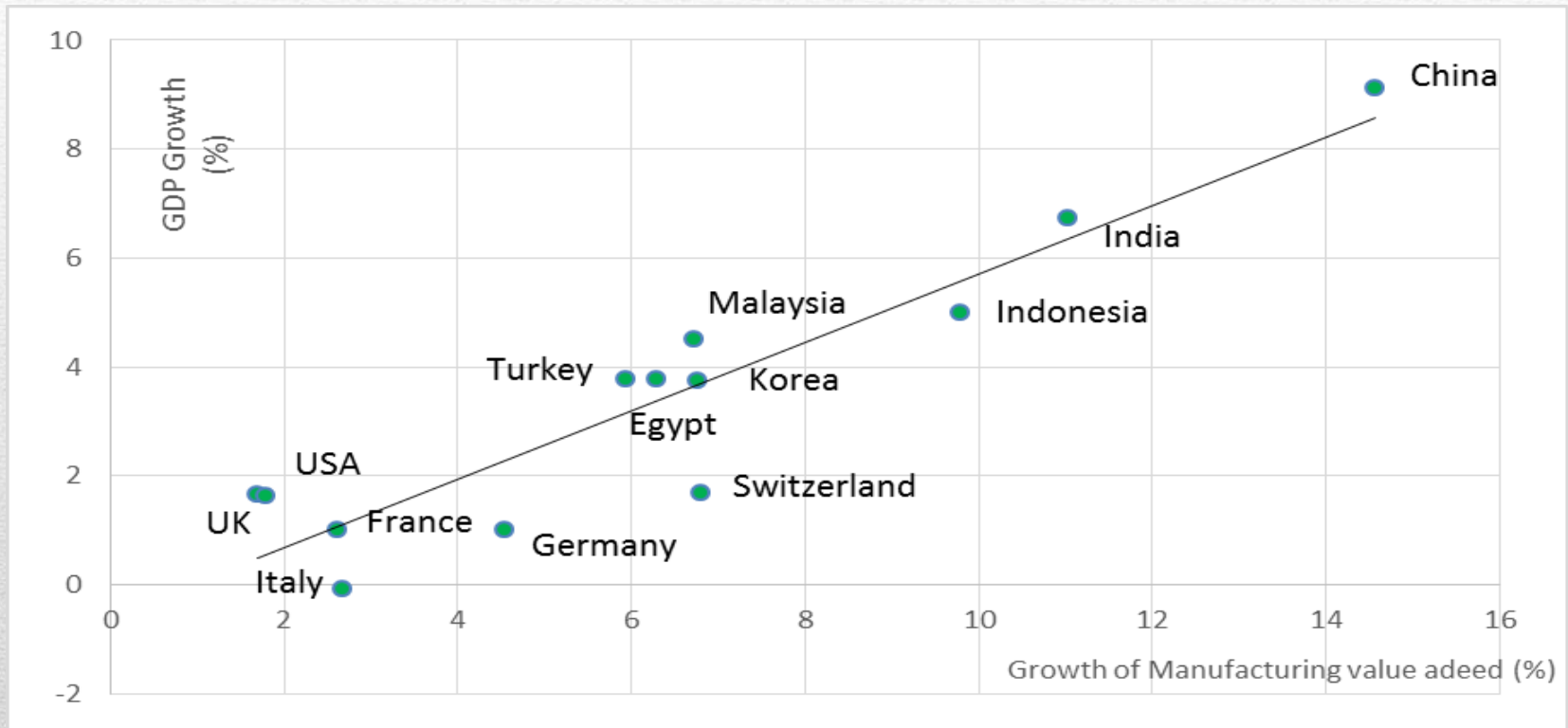
The first law of Kaldor: The manufacturing sector is the engine of GDP growth.



Is manufacturing poor men's business? income & manufacturing



Is manufacturing poor men's business? growth & manufacturing



A ranking of industrialization: who manufactures?

Rank	Country	Manufacturing value added (billion USD)
1	China	3,713
2	USA	1,944
3	Japan	905
4	Germany	788
5	S. Korea	390
6	India	322
7	Italy	297
8	France	284
9	UK	283
10	Russia	249
11	Brazil	219
12	Mexico	217
13	Indonesia	187
14	Spain	167
15	Switzerland	129
16	Turkey	126
17	Thailand	112
18	Holland	96
19	Australia	94

Another ranking of industrialization: who manufactures?

Country	Per capita manufacturing value added (USD)	Per capita GDP (USD)
Porto Rico	20,048	
Switzerland	15,793	
Ireland	11,062	
Singapore	10,022	
Germany	9,546	
Austria	8,484	
Sweden	8,238	
S. Korea	7,720	
Finland	7,173	
Denmark	7,043	
Norway	6,690	
Japan	6,443	
USA	6,392	
Belgium	5,745	
Holland	5,602	
Israel	5,361	
Canada	5,094	
Czech Rep.	5,027	
Italy	4,962	
Slovenia	4,787	
UK	4,476	
Australia	4,307	
France	4,209	
Slovakia	3,627	
Spain	3,537	

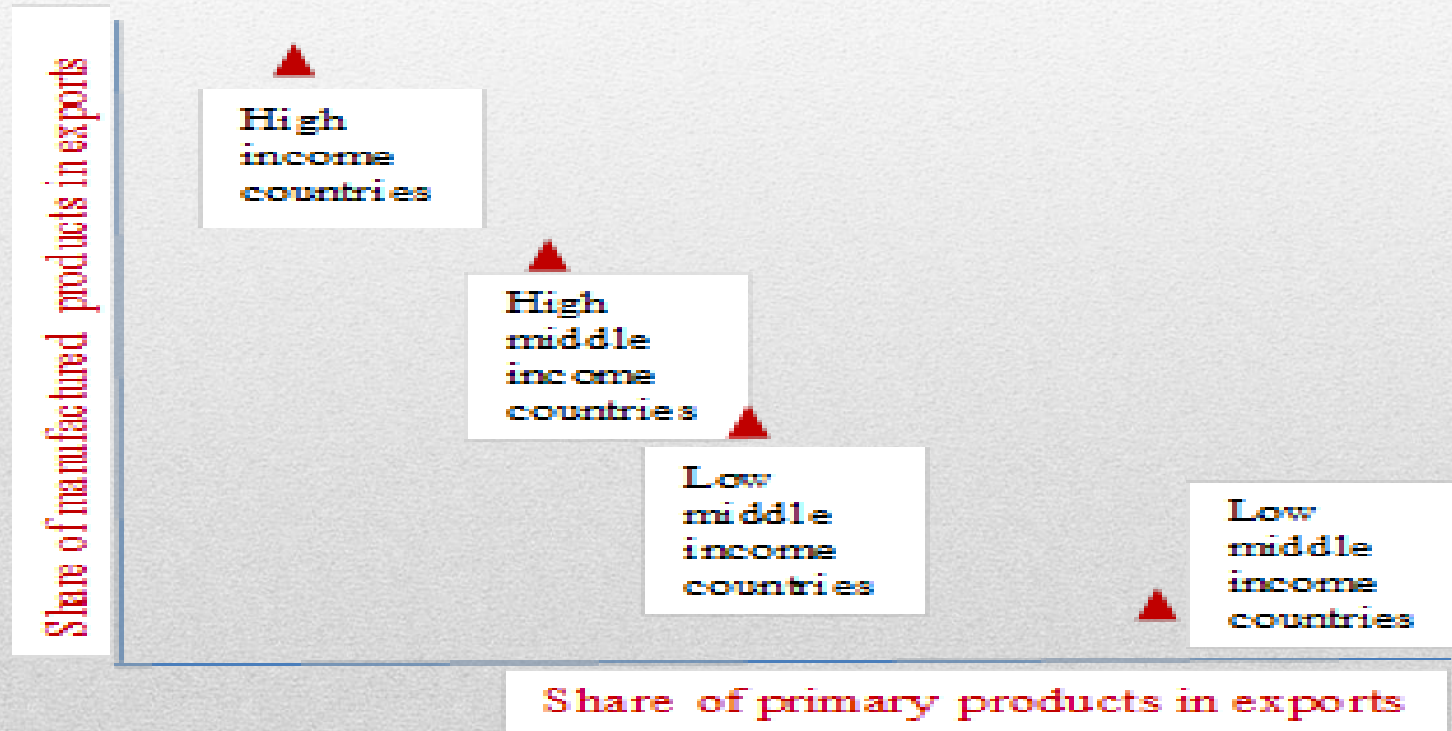
World trade primarily consists of manufactures (2015)

Composition of world exports		
	Value (USD billion)	%
Merchandise*	16,482	82%
Services*	3,670	18%
Total world exports*	20,152	100%

* Excluding intro - EU exports

Source: WTO (World Trade Statistical Review 2016)

Who exports what?



Who exports what?

High income economies: Manufactured goods

- Primarily: Automobiles and other transport equipment, chemicals, machinery (electrical and non-electrical)

Low income countries: Primary goods

- Primarily: food, agricultural raw materials, minerals)
-

Who exports what?

		High income countries								
		Belgium	Denmark	France	Germany	Italy	Japan	S. Korea	United Kingdom	United States
HS 1988/92 Product Group	01-05_Animal	2.2	10.3	3.0	1.7	1.3	10.3	0.3	1.6	1.9
	28-38_Chemicals	22.8	11.2	15.1	12.2	9.7	11.2	6.9	13.3	10.1
	16-24_FoodProd	4.9	6.8	6.6	3.0	4.9	6.8	0.7	4.1	2.8
	64-67_Footwear	1.2	0.7	0.6	0.4	2.4	0.7	0.1	0.5	0.1
	27-27_Fuels	11.4	6.6	3.9	2.7	3.7	6.6	9.7	10.8	9.6
	41-43_HidesSkin	0.4	1.6	1.4	0.3	2.9	1.6	0.3	0.4	0.4
	84-85_MachElec	10.2	23.0	19.3	26.4	25.9	23.0	34.6	20.2	23.7
	72-83_Metals	7.1	6.0	6.9	7.5	9.7	6.0	8.2	5.6	4.9
	25-26_Minerals	0.6	0.2	0.2	0.2	0.3	0.2	0.1	0.2	0.7
	90-99_Miscellan	7.0	16.6	7.8	11.8	8.4	16.6	7.4	9.5	17.7
	39-40_PlastiRub	8.0	2.8	5.1	5.3	5.0	2.8	7.1	3.2	4.8
	68-71_StoneGlas	5.9	1.0	2.3	2.0	4.8	1.0	1.1	11.1	4.7
	50-63_TextCloth	3.3	4.9	2.9	2.3	6.9	4.9	2.8	2.6	1.6
	86-89_Transport	10.1	3.4	19.0	20.6	9.5	3.4	19.8	14.3	9.6
	06-15_Vegetable	2.8	2.6	3.5	1.2	2.4	2.6	0.2	0.9	4.8
	44-49_Wood	2.2	2.2	2.3	2.6	2.3	2.2	0.7	1.9	2.5
01_99_All Products	100	100	100	100	100	100	100	100	100	

For 2014. Source: World Integrated Trade Solutions

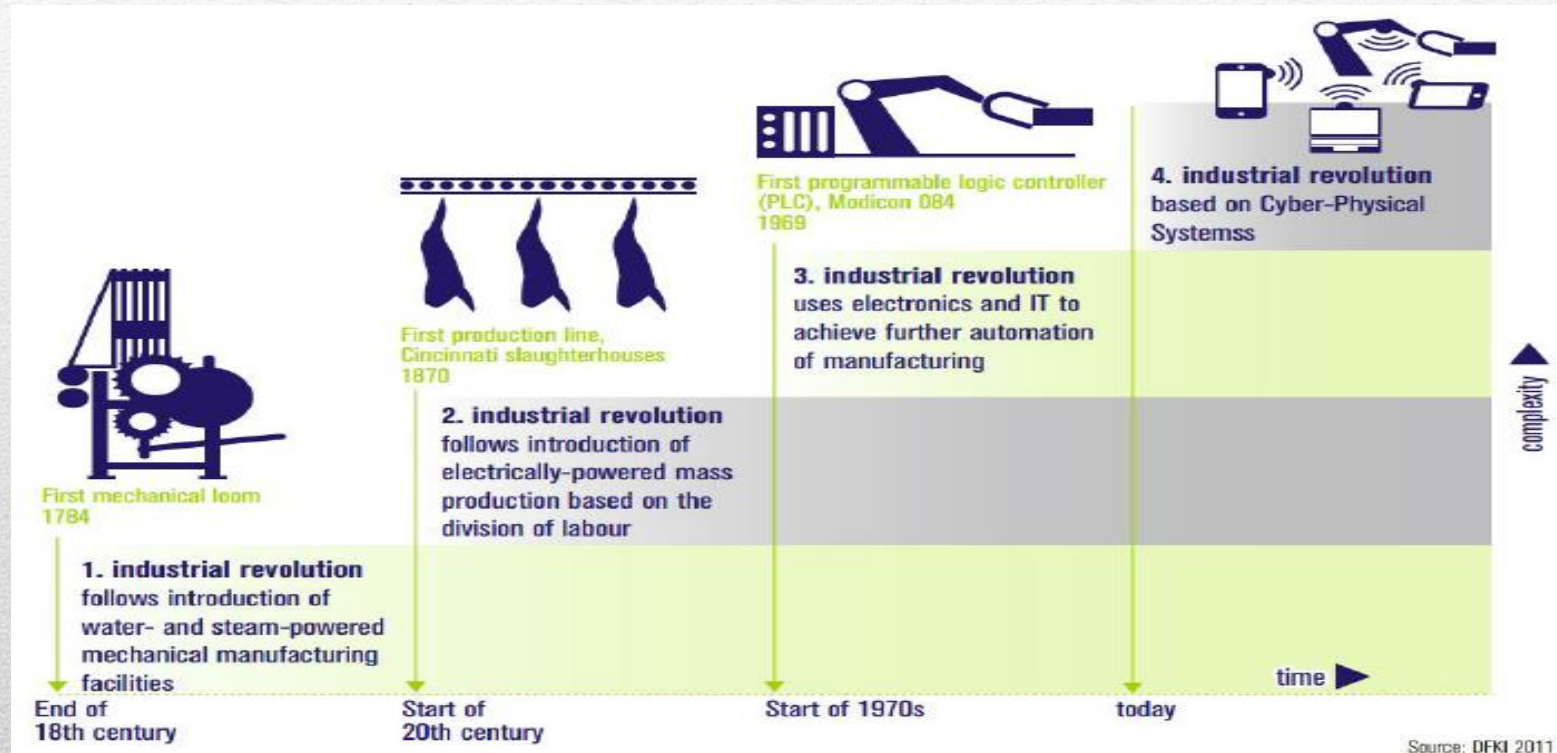
Top 10 manufactured goods exporters of the world (2015)

	Value (billion USD)	Share in world exports of manufactured goods(%)			
	2015	1980	1990	2000	2015
European Union (28)	4,239	-	-	43.0	36.6
extra-EU (28) exports	1,601	-	-	14.1	13.8
China	2,153	0.8	1.9	4.7	18.6
USA	1,126	13.0	12.1	13.8	8.7
Japan	545	11.2	11.5	9.6	4.7
S. Korea	470	1.4	2.5	3.3	4.1
Hong Kong, China	437	-	-	-	-
domestic exports	5	1.2	1.1	0.5	0.0
re-exports	432	-	-	-	-
Mexico	312	0.4	1.1	3.0	2.7
Singapore	266	0.8	1.6	2.5	2.3
Chinese Taipei	240	1.6	2.6	3.0	2.1
Canada	208	2.7	3.1	3.7	1.8
Top 10 exporters	9,445	-	-	87.0	81.6
World exports of manufactured goods*	11,572	100.0	100.0	100.0	100.0
Memo: World merchandise exports	16,482				

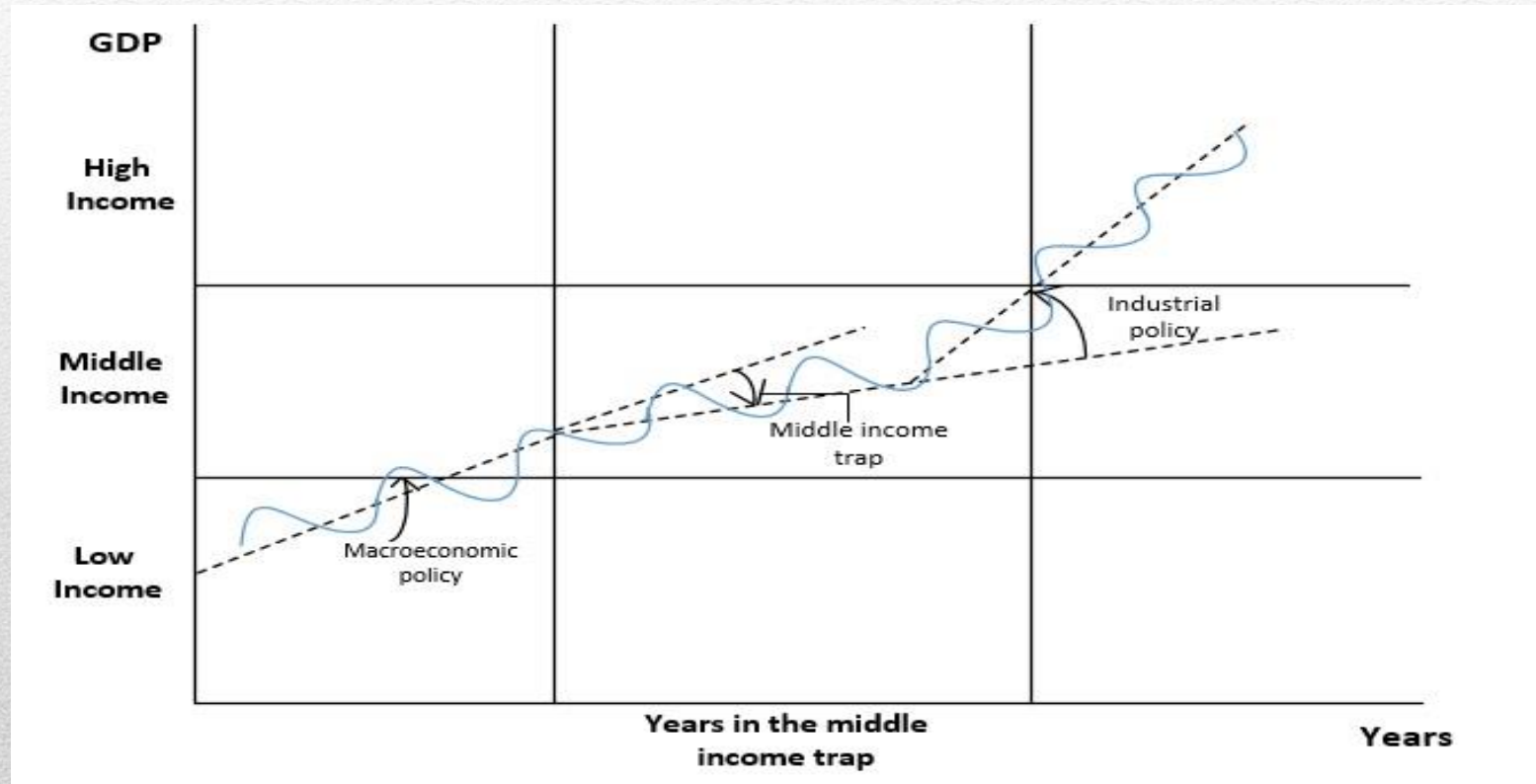
* WTO statistics for manufactured products exclude the large export item of manufactured arms and armaments.

Source: WTO.

Fourth industrial revolution?



Industrial policy and the middle income trap



What is industrialization?

- Many factories = industrialization?
- Ecological degradation?

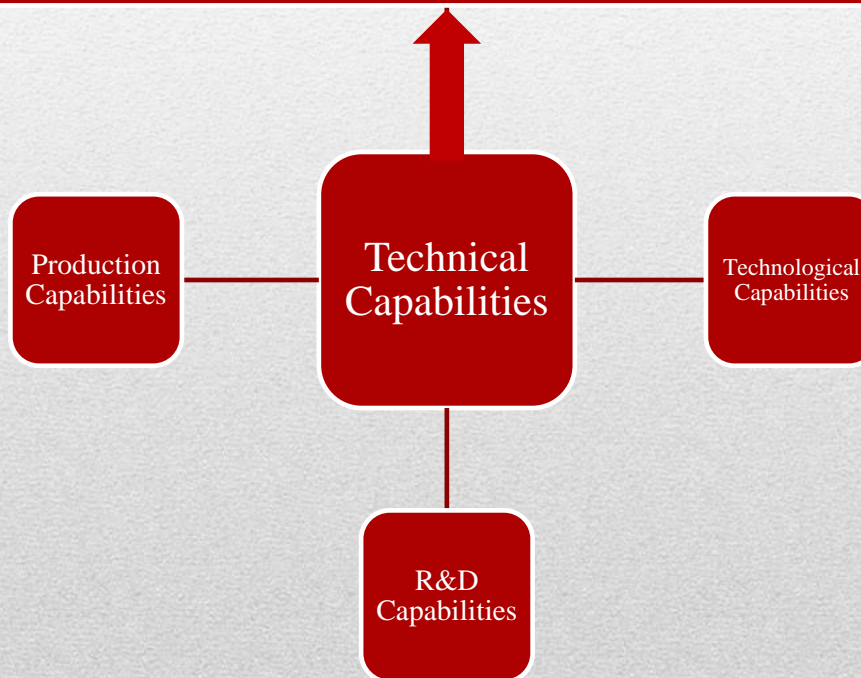
Industrialization = A capacity building process

Industrialization, technical progress and skills

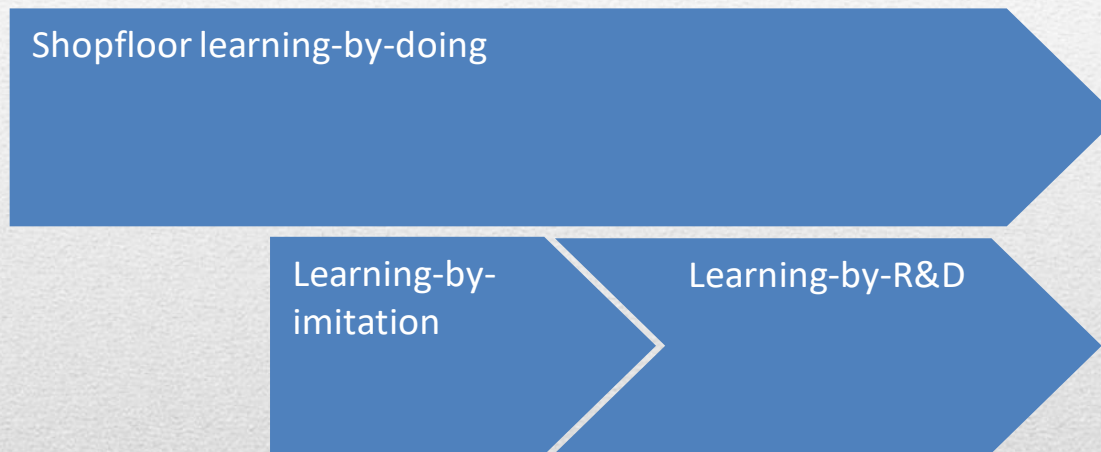
Stages of Industrialization	Stage I Import and Use Machinery	Stage II Technology Adoption (Better Use of Machinery)	Stage II Technology Adoption (Servicing and Repairing Skills)	Stage III Imitation	Stage IV Innovation and Product
Remarks	Increased labor productivity through capital deepening	Increasing firm and country level productivity primarily through increasing labor productivity at given level of capital deepening	Increasing firm and country level productivity through, inter alia, <ul style="list-style-type: none"> ● lower repair and maintenance costs ● lower down times 	Development of new industrial sectors within the country; generation of new learning-by-doing skills; possible jump effects on GDP in the medium to long run	Generation of TFP growth; generation of new capital deepening avenues through newly developed machinery and equipment

Technical progress and technical capabilities

Technical Progress



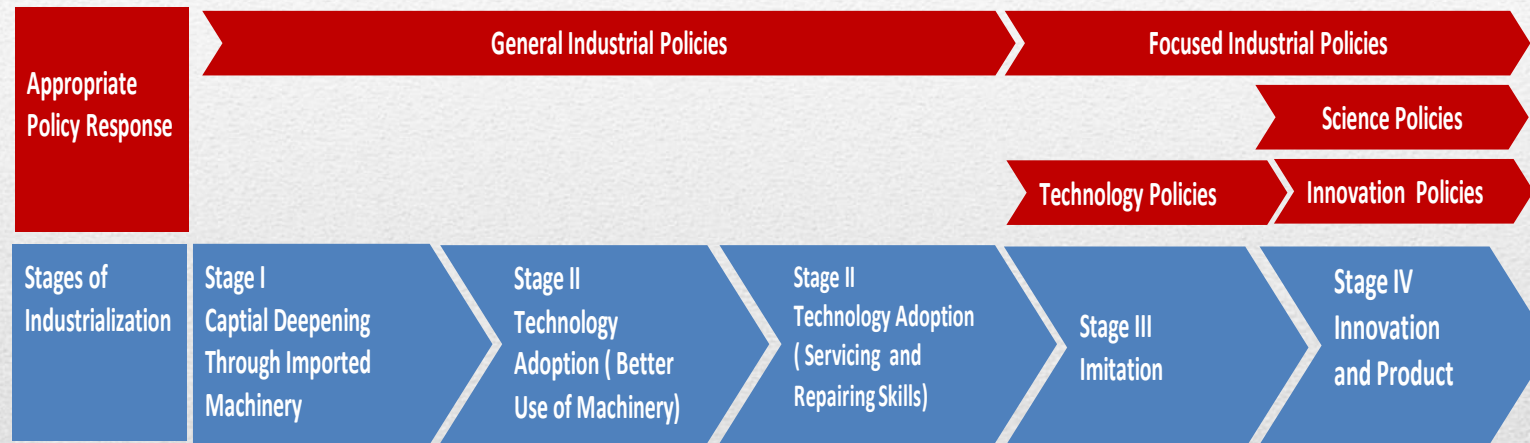
The three learning processes of the manufacturing firm



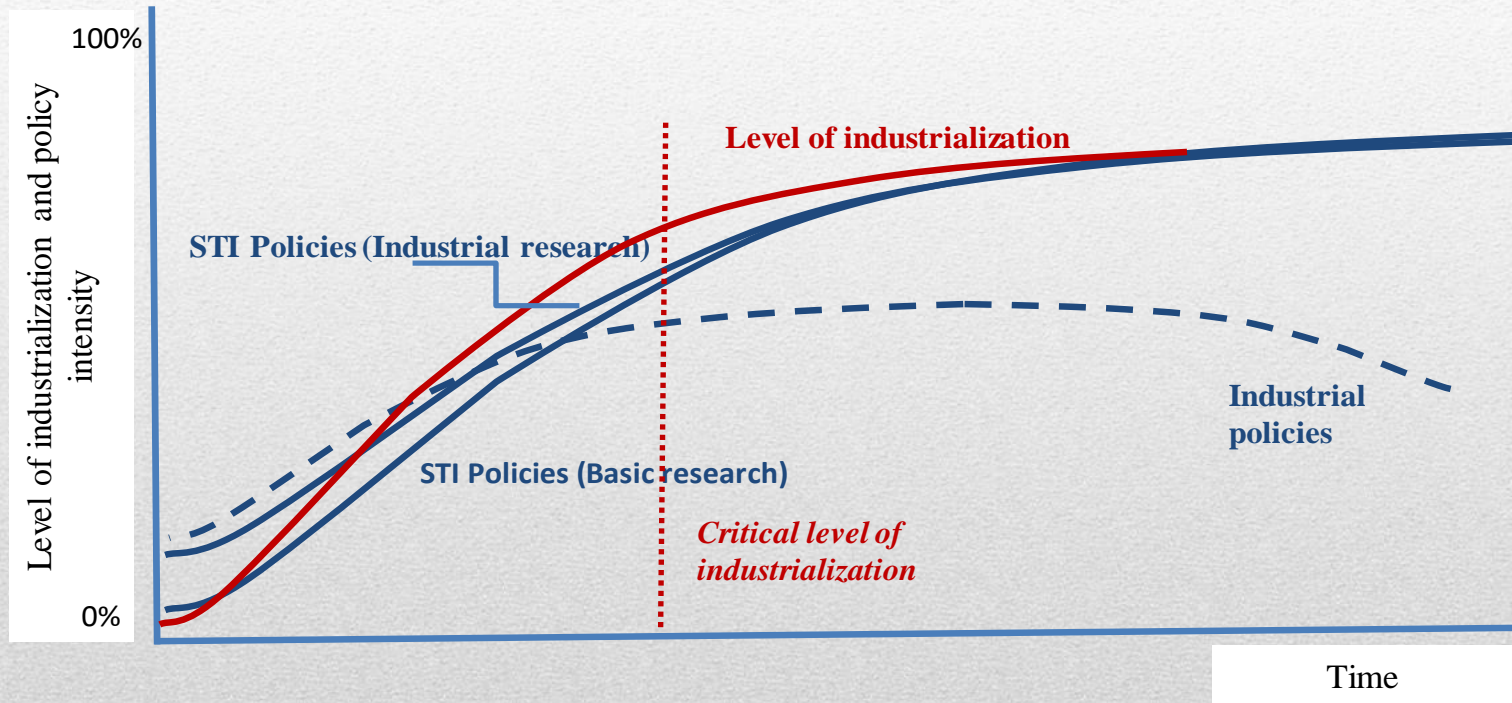
Technological learning and technological capability



Industrial policy & STI policy merits and sequencing



Industrial policy & STI policy merits and sequencing



How to select strategic industries

A sectoral or product-based industrial policy which may be instrumental to build key industrial capabilities in developing countries can concentrate on four strategic drivers.

These factors can be quantified to reach an overall 'sector strategicness index' that may be used to make sectoral rankings and comparisons:

- (i) Value add potential which directly feeds into per capita income or its growth rate in the overall economy,
- (ii) backward linkages,
- (iii) depth (potential) of learning by doing
- (iv) technological depth.

How to select strategic industries

They can be (each as an index, for example ranging from 0 to 100) combined under a simple functional form in order to determine empirically the importance of the sector or product:

$$S_i = EVAP_i \times Li_i \times LbD_i \times TD_i$$

where, S_i is the estimated strategic importance of sector/product i ; $EVAP_i$ represents the economic value add; Li_i represents the 'linkages'; LbD_i represents the 'learning potential', and TD_i represents the technological depth of the sector or product.