



# Manufacturing Footprint in the Next Decade

January 2020

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## Executive Summary.

A new round of manufacturing relocation and global value chain renovation has been initiated. Following historical trends, the decade to come will witness an increasing number of manufacturers leaving China for other emerging markets.

Pressured from shrinking labor arbitrage, pollution control, punitive tariffs, and intensified competition, manufacturers are seeking new alternatives to replace China in the near future.

Southeast Asia and India are the most promising economies to absorb foreign investment in the manufacturing sector with key focuses on textile/garment, consumer electronics, and machinery.

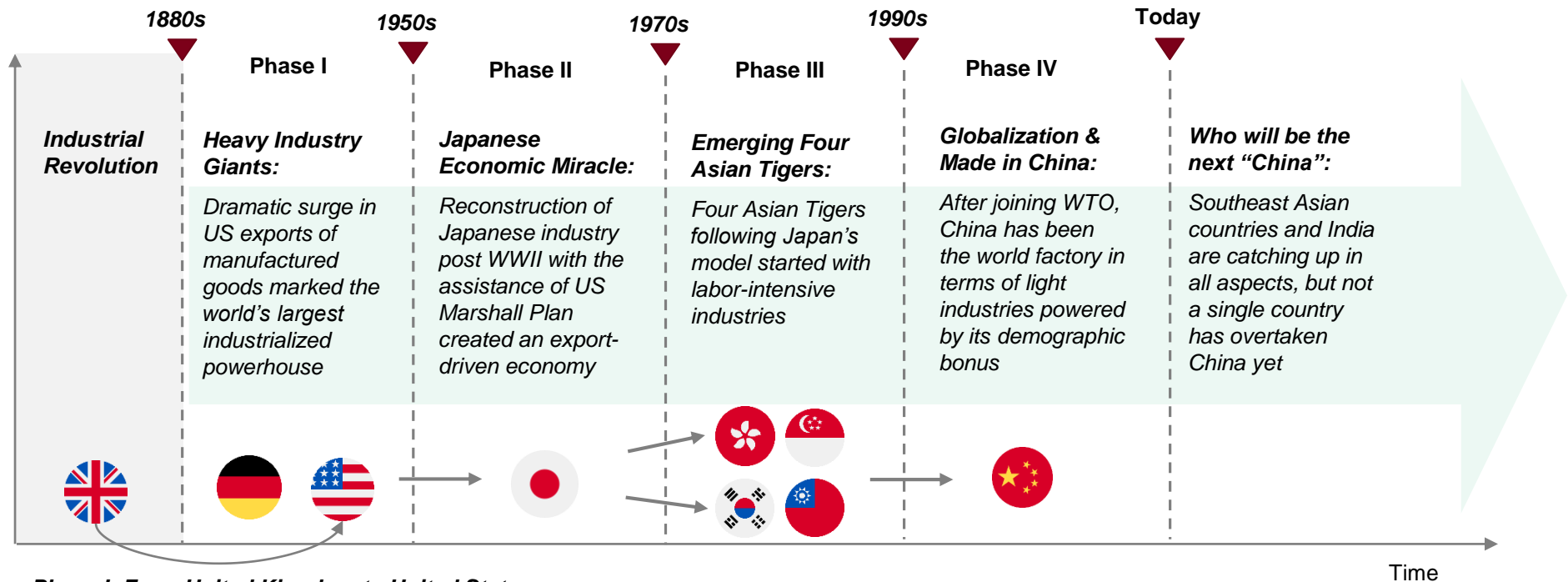
The Belt and Road Initiative by China has objectives to promote trade, sustain growth, and upgrade the domestic value chain through connectivity, another key contributor to outward production shifting.

The migration of manufacturing to another country normally takes at least two years to transition into mass production from initiation; pre-study of migration feasibility requires an excessive amount of research about targeted countries' demographics, economic openness, infrastructure, logistics, etc.

It is an inevitable trend for manufacturers to leave China for cheaper production, but given the scale of its economy, China will continue to be the world's largest manufacturing hub, surrounded by multiple satellite countries with respective specializations in certain product categories.



# Given the historical trend of shifting manufacturing from time to time, China will gradually lose its global manufacturing share in the decade to come.



## Phase I: From United Kingdom to United States:

The population, land, and natural resources of the US soon replaced UK as the global manufacturing hub, reaching its peak after WWII.

## Phase II: From United States to Japan:

The manufacturing shift from US to Japan began during the Cold War. Strategic interest of the US government allowed Japan to re-establish industrialization and become the beneficiary of cheap technology, raw materials and favorable export terms; the global market was soon flooded with Japanese products.

## Phase III: From Japan to Four Asian Tigers:

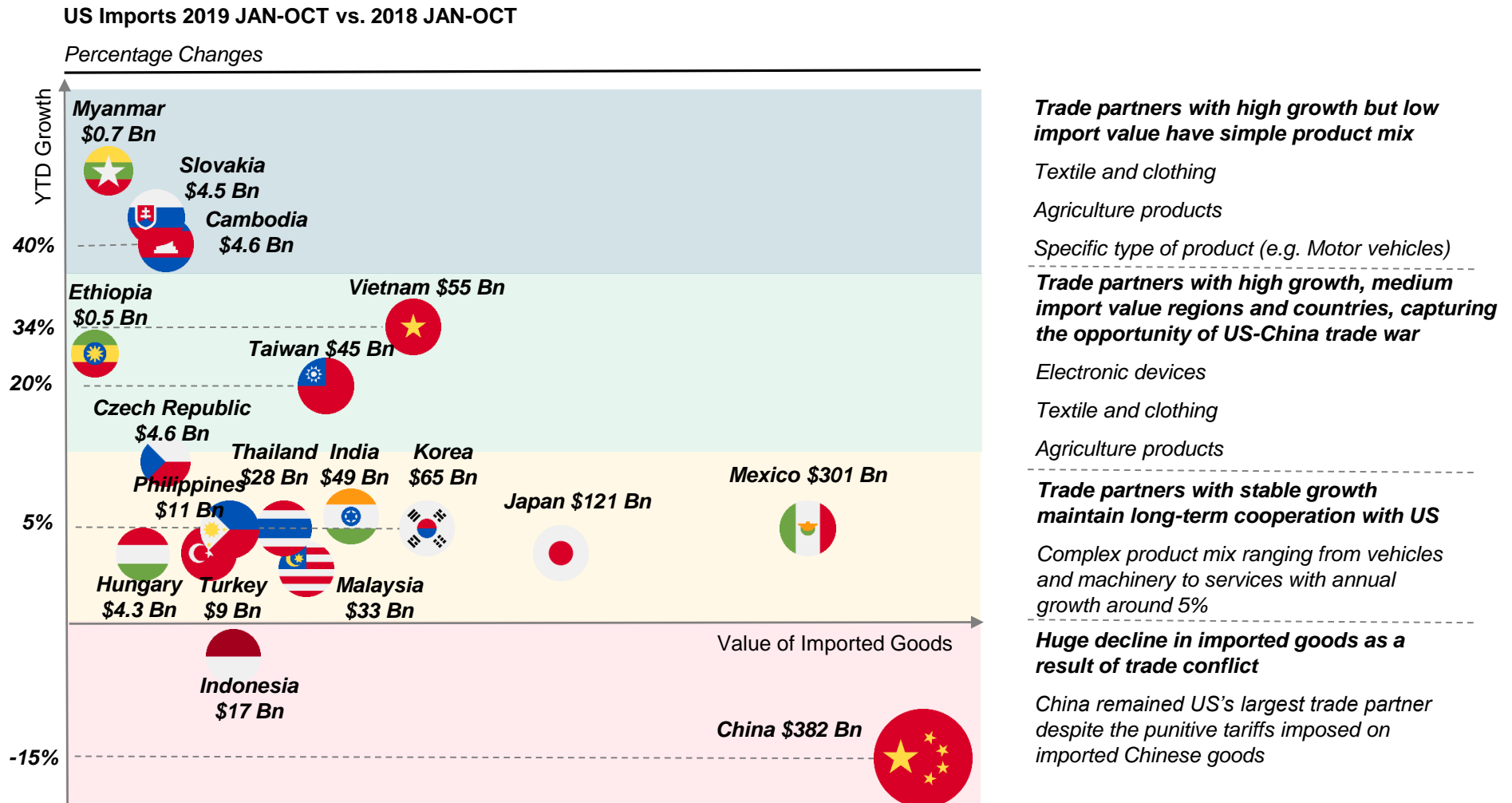
In the 1970s, South Korea, Hong Kong (CN), Taiwan (CN) and Singapore started to emerge by replacing Japan in the textile industry; lack of natural resources and limited domestic market forced these countries and regions to form an "export-driven" economy, eventually upgraded during the electronic revolution.

## Phase IV: From Four Asian Tigers to mainland China:

With China's economic reform, foreign capital has flooded into the Chinese market and factories were established along the coast; China became the world's largest export economy with high product complexity.



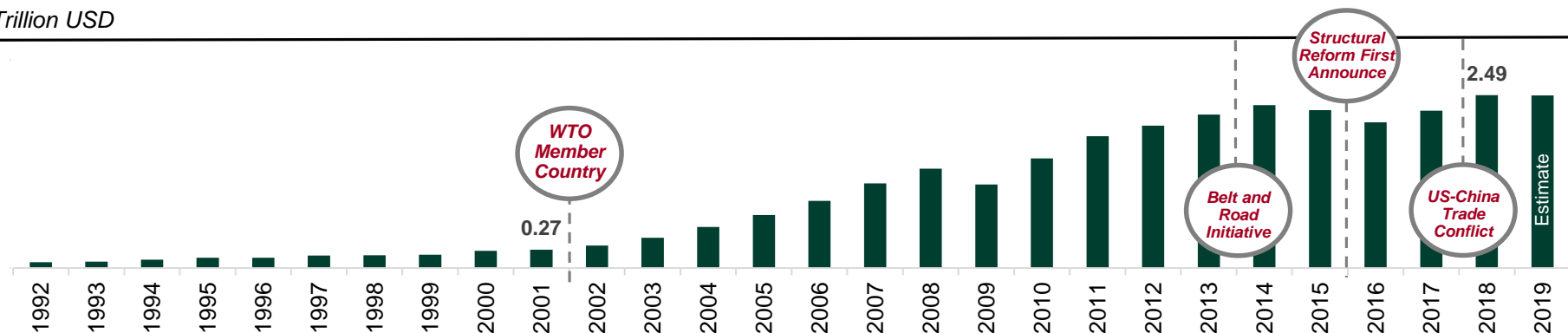
# The shift of manufacturing out of China has been speeding up as the decline in US imports from China has been partially compensated by other LCCs.



# Dynamic change in China's export specialization is a snapshot of the world's largest exporter's structural reform in precedent years.

## China Export of Merchandised Goods

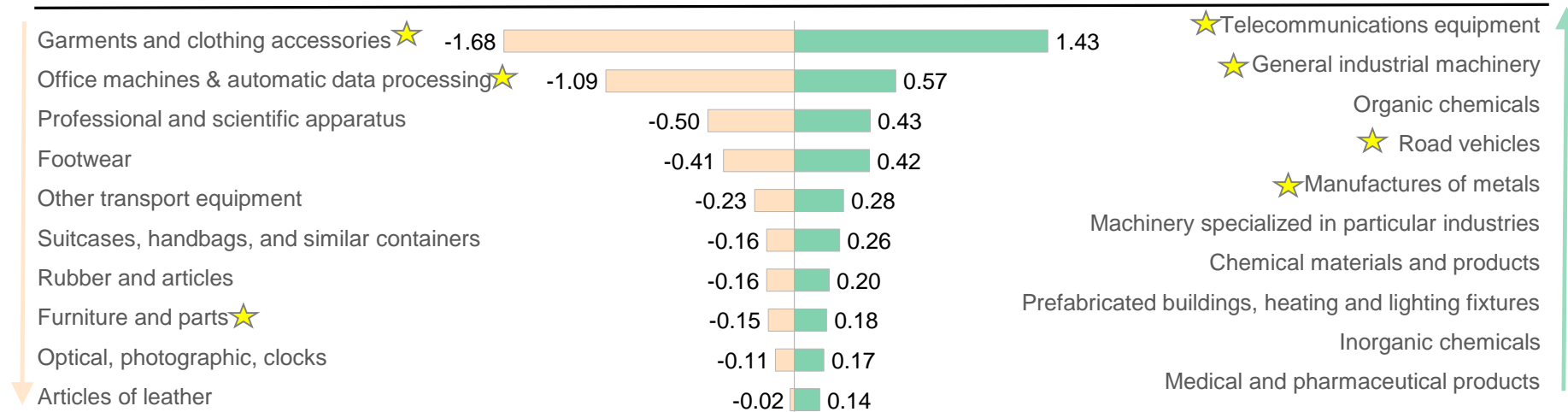
Trillion USD



- China's foreign trade reached historical high in 2018 with total exports of 2.5 trillion USD; Exports in the first eleven months of 2019 to the US, China's largest trade partner, slumped by 8.4%. Regional protectionism will continue to halt exports and accelerate China's domestic reform.
- Compared with 2013, the shares of total exports of garments and clothing, office machining, and furniture have been shrinking despite the overall growth, indicating that orders from these industries have been diluted and transferred to other countries; on the other hand, telecommunication and industrial equipment, road vehicles, and manufactured metal articles increased their shares.

### Top 10 export categories with shrinking and surging export share, 2013 vs. 2018, PPT

Starred categories represent >3% total 2018 export



Source: China Customs



# Manufacturing shift from China is powered by both internal and external factors.



Internal

## 01 Expensive Labor

With shrinking labor arbitrage, China is moving towards a market-attractive rather than cost-attractive country

Internal

## 02 Structural Reform

Starting in 2013, China established a series of policies to regulate production aiming to move up in the global value chain

External

## 03 Tariff Uncertainty

Fear about punitive tariffs has been lingering around in the past eighteen months, triggering companies to find new alternatives

External

## 04 Emerging Markets

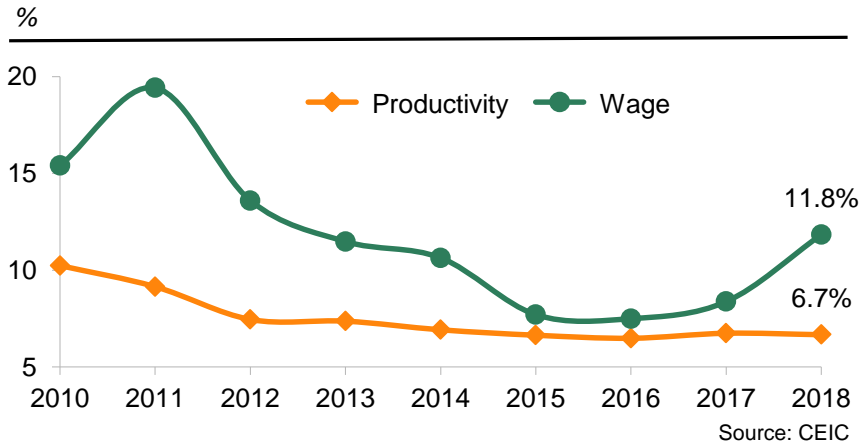
Competition from other emerging markets intensifies with increasing foreign capital leaving China for these markets



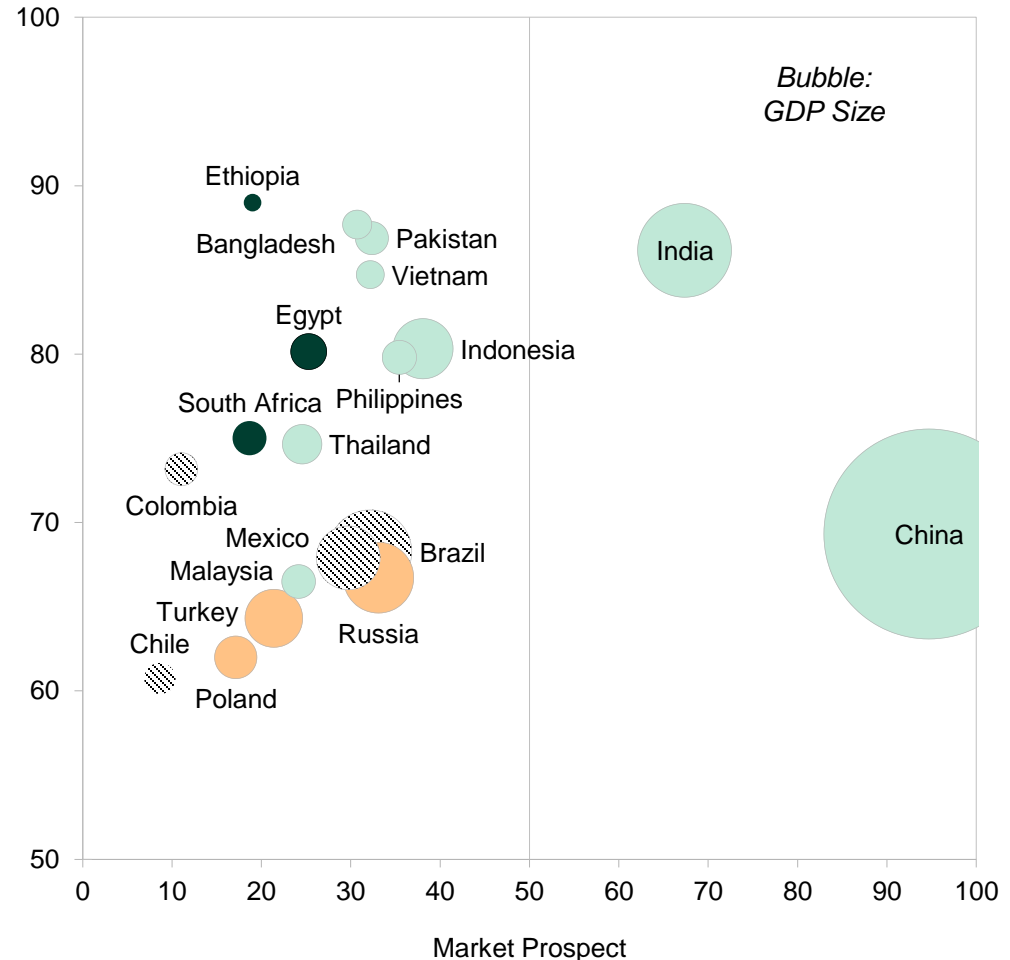


# 1 Expensive Labor: With shrinking labor arbitrage, China is moving towards a market-attractive rather than cost-attractive country.

YoY Growth, China Manufacturing Wages vs. Labor Productivity



Labor Cost Competitiveness



- **Not “LCC” anymore:** China’s labor wages in the manufacturing sector have been increasing at double-digit levels in the past decade. With surging labor productivity, China remains cost competitive globally, but as the gap gets closer to the current trend, China should no longer be considered a traditional low-cost country.
- **Unbalanced Growth:** Industrial clusters are mostly located along the east coast where goods can be easily exported abroad and feed the domestic market; migrants to major manufacturing cities expect higher income at the cost of roaring living expenses.
- **Aging Population:** Moreover, the 1.4 billion population is aging faster than its neighbors as a result of China’s one-child policy. It’s estimated that by 2060, population above age 65 will account for ~30% of the nation’s total population.



## 2 Structural Reform: Starting in 2013, China established a series of policies to regulate production, aiming to move up in the global value chain.

Target	Year	Policy	Achievements
To reduce excessive production capacity	2013	<ul style="list-style-type: none"> <li>The State Council published a guideline for reducing excessive production of certain industries (steel, cement, aluminum, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>~<b>150 million tons</b> of eliminated crude steel production</li> <li>~<b>810 million tons</b> of eliminated coal production</li> </ul>
To save the operating cost of local enterprises	2016	<ul style="list-style-type: none"> <li>The State Council published “work plan to reduce the cost of substantial economy enterprises”</li> </ul>	<ul style="list-style-type: none"> <li>¥<b>1,300 Billion</b> tax reduction for enterprises’ operating cost in 2018</li> <li><b>6%</b> down in government tax income month-to-month</li> </ul>
To reform the misallocation of work force	2019	<ul style="list-style-type: none"> <li>The State Council established a leading group on employment to ensure and stabilize the transformation of the work force</li> </ul>	<ul style="list-style-type: none"> <li><b>10.4%</b> decrease in employed population of secondary industry in 2018 compared to 2013</li> <li><b>28.9%</b> increase in employed population of tertiary industry in 2018 compared to 2013</li> </ul>
To reform the development inequality of different areas	2019	<ul style="list-style-type: none"> <li>The Central Committee of CCP published instructions on developing high quality commerce. It emphasized the optimization of the overall arrangement of different economic zones</li> </ul>	<ul style="list-style-type: none"> <li>The northwest province of Gansu Province received <b>596</b> investment projects valued at <b>¥493.6 billion</b> in the first half of 2019</li> <li>Beijing pushed out <b>399</b> general manufacturing companies in 2019</li> </ul>
To tackle environment pollution	2019	<ul style="list-style-type: none"> <li>The Central Committee and State Council together published the working regulations for the Central Environment Protection Inspecting Group</li> </ul>	<ul style="list-style-type: none"> <li><b>6.5%</b> increase in the number of major cities that reached the air quality goal in 2018</li> <li><b>46.5%</b> reduction in imported trash in 2018</li> </ul>

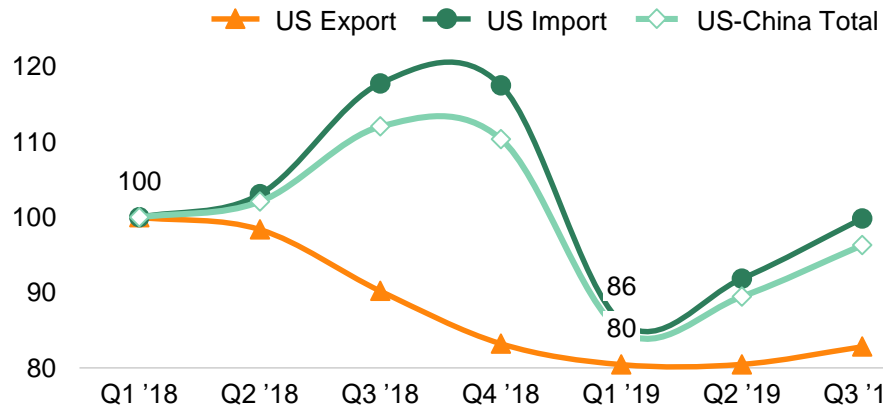




### 3 Tariff Uncertainty: Fear about punitive tariffs has been lingering around in the past eighteen months, triggering companies to find new alternatives.

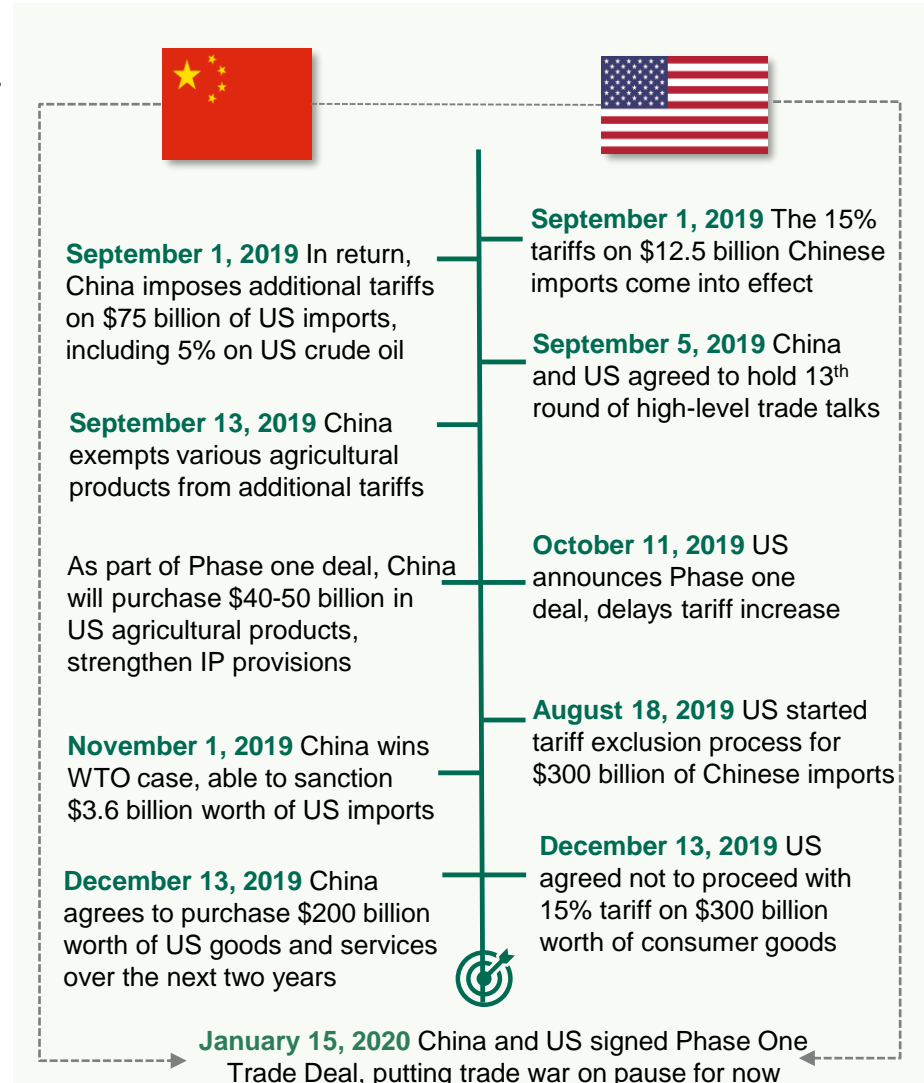
Indexed US Trade in Goods with China

Q1 2018=100



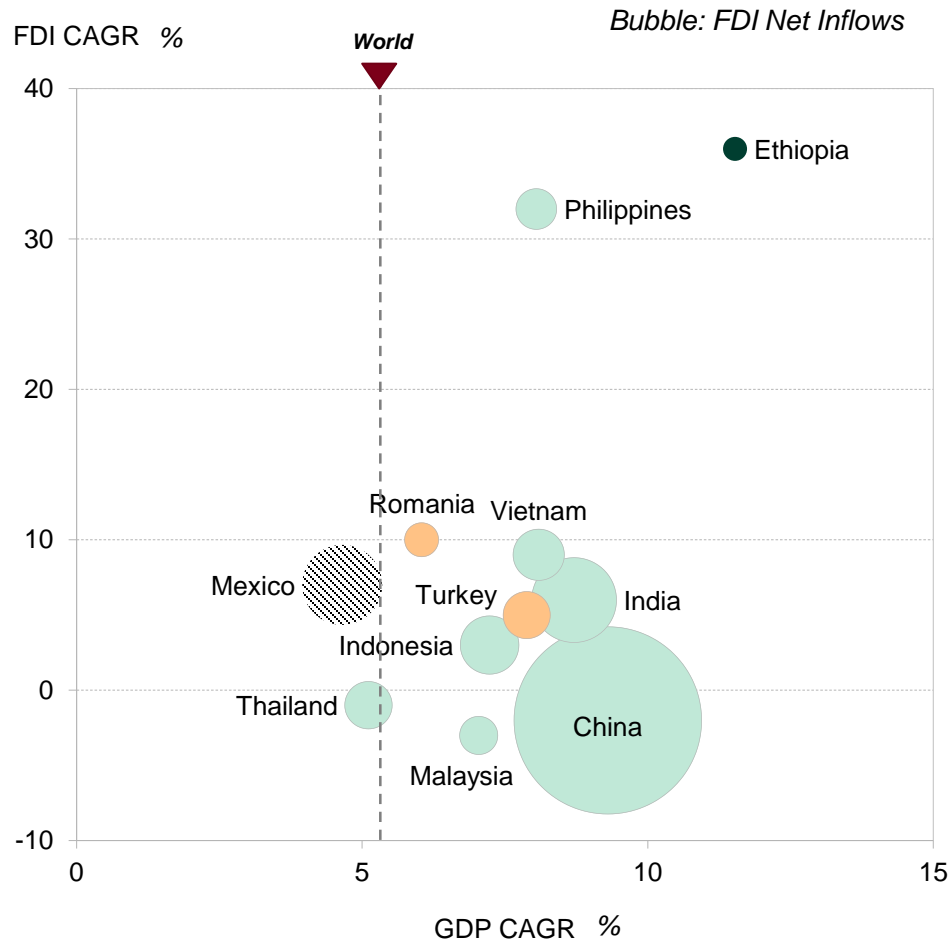
Source: US Census Bureau

Dollar Value	Imported Chinese Goods	Effective Date	Tariff
\$34 Billion	Industrial Machinery, Plastics, Optical Equip., Telecommunication Equip.	JULY 2018	25%
\$16 Billion	Chemicals, Mechanical equipment, Semiconductors	AUG 2018	25%
\$200 Billion	Remaining industrial products, consumer goods	SEP 2018 MAY 2019	10% 25%
\$300 Billion	All remaining products: textile, toys, electronics, etc.	<b>Phase One Trade Deal</b> <i>(Reduce tariffs of 15% on \$120B by half; not to proceed with 15% tariffs)</i>	



## 4 Emerging Markets: Competition from other emerging markets intensifies with increasing foreign capital leaving China for these markets.

2010-2018 CAGR GDP Growth vs. FDI Net Inflow



- From 2010 to 2018, selected emerging markets had an average GDP growth of 7.6%, while the world in total had been growing at a rate of 5.5%; emerging markets including Ethiopia, Philippines, India, Vietnam, Turkey, Indonesia, and Romania outperformed the world's average, whereas Mexico and Thailand fell behind
- Malaysia, Thailand, and China had a negative CAGR in foreign direct investment (FDI) net inflows during the period from 2010 to 2018; economies capturing highest growth in FDI are Ethiopia, Philippines, Romania, Vietnam, Mexico, India, and Turkey
- For countries like China and India, considering the massive economic scale, even the ratio of foreign direct investment (FDI) to GDP is not high (still higher than world average), the absolute value of FDI is quite significant; China is experiencing negative growth in FDI inflows and has had an increasing tendency to invest in other countries in recent years



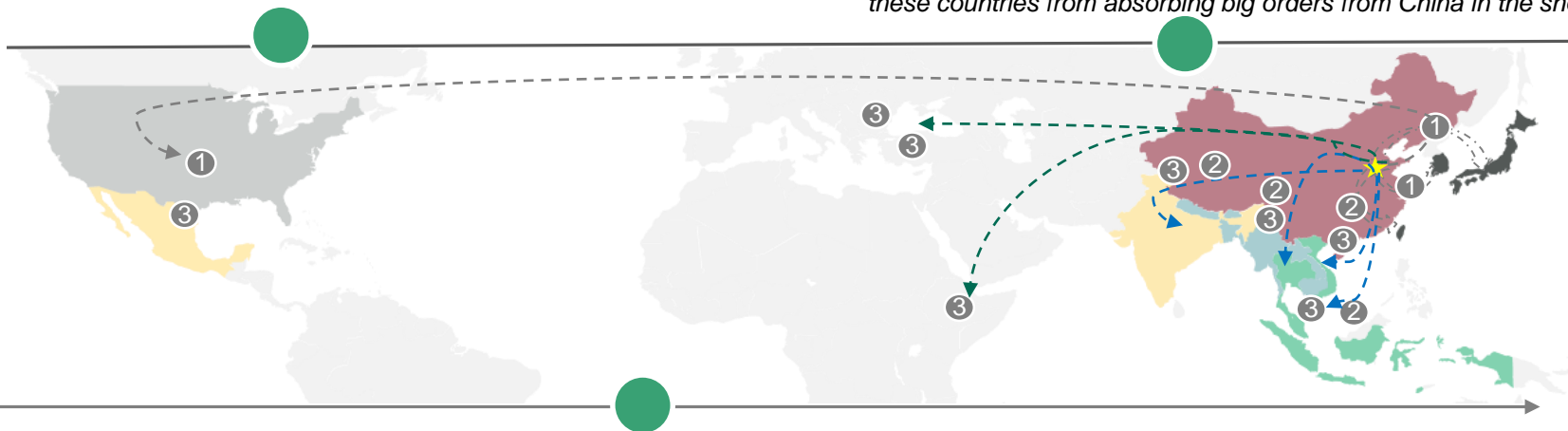
# The move of production out of China follows three patterns where the top destinations are Southeast Asia and India.

## 1 Backshoring to developed countries and regions:

Companies move production backwards to United States, Japan, South Korea and Taiwan to eliminate short-term risks associated with US-China trade conflict; most of which are domestic manufacturers producing high value-added goods with well established factories in these areas.

## 2 Labor-intensive industries already transferred:

The relocation of high labor-dependent industries such as textile/clothing to other LCCs started prior to the tariff imposition. The price gap in manufacturing garment is getting narrower due to rising costs of labor, rent, and pollution control in China; the trade war accelerates the process, yet lack of scale in manufacturing prevents these countries from absorbing big orders from China in the short term.



## 3 Future trends to move production:

Companies in the consumer electronics and textile/clothing sectors are planning to relocate to Southeast Asia and India. India is comparatively more attractive for healthcare equipment and heavy machinery with lower environmental requirements. Within Southeast Asia, the development is unbalanced with Malaysia, Thailand, and Vietnam being the first runners. In addition, Mexico, Eastern European and African countries are also popular destinations for production moves.



# Textile, machinery, and consumer electronics are among the top industries to potentially be moved out of China.

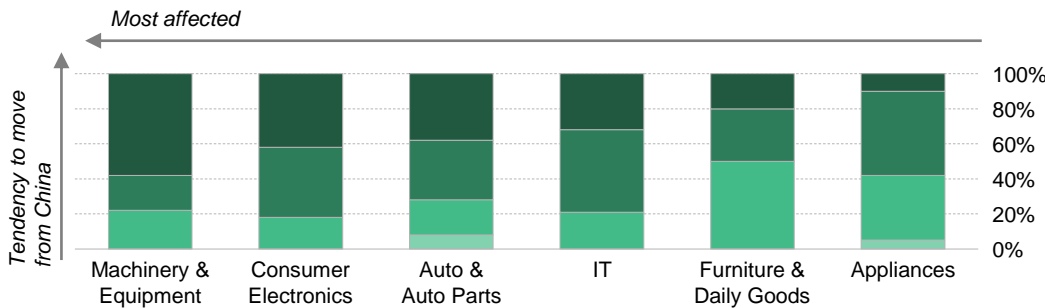


Heavily dependent on agriculture and labor, the textile and clothing industry has been relocated to some South Asian countries in the past decade; India, Bangladesh, Vietnam became major exporters in fiber, fabrics, and garment; Chinese companies are also seeking new opportunities through BRI in Central Asia countries: Tajikistan, Uzbekistan, and even Turkey are attracting Chinese overseas investment in the textile industry

Manufacturers in the machinery sector are trying to find new alternative countries to eliminate rising costs and risks associated with currency and tariffs; Firms are moving production from China to multiple locations with close proximity to end markets: Mexico and India have become popular destinations

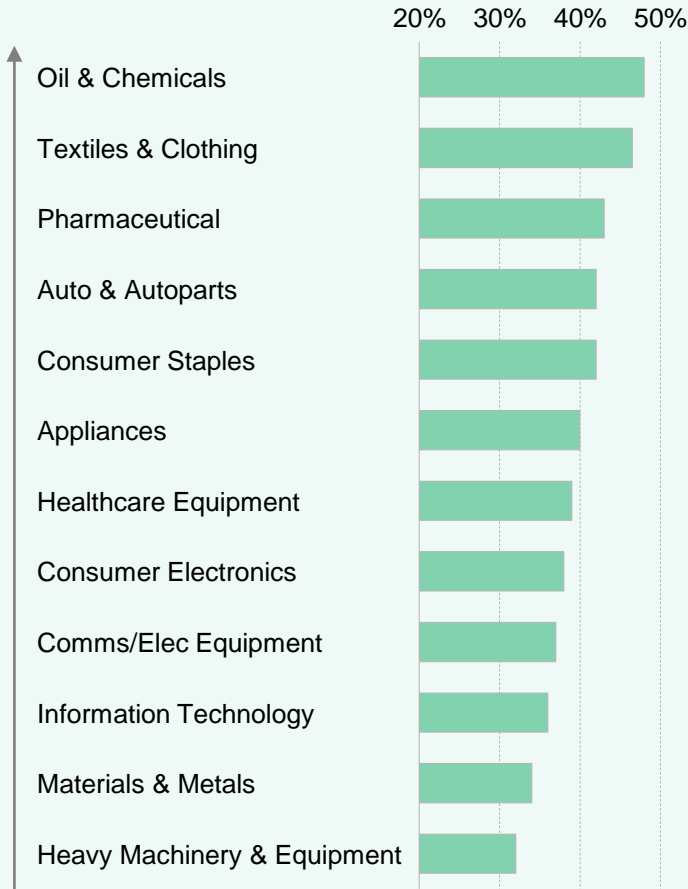


Production of smartphones, computers, and other electronic equipment has been relocated to Southeast Asian countries as an increasing number of contract manufacturers and high-tech companies have opened new production sites in Vietnam, India, and Thailand, following the same trend in the early 2000s when China took over business from Japan and South Korea



BRI=Belt and Road Initiative


% of Chinese production that has or is planned to be moved out of China by sector



Source: UBS



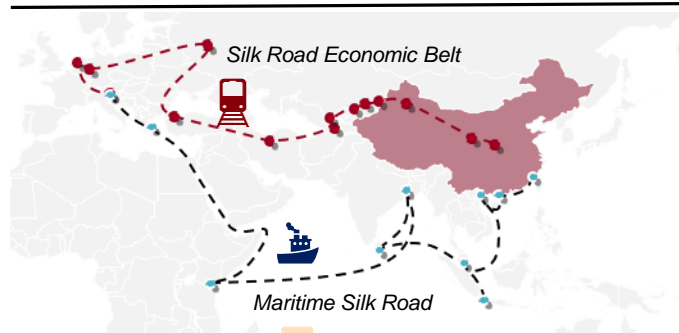
## New investments in consumer electronics, machinery, and appliances flow to Southeast Asia, India and Mexico.

	Company	Country	Product	Investment
<b>Consumer Electronics</b> 	Samsung	Vietnam	Smartphone	\$17.3 B (to date)
	Samsung	Vietnam	OLED Display	\$2.5 B
	Foxconn	Vietnam	Smartphone	\$200 M
	Compal	Vietnam	Laptop	\$500 M
	Goertek, Luxshare	Vietnam	Earphones	\$260 M
	Samsung	India	Smartphone	\$360 M
	Xiaomi	India	Smartphone, powerbank, etc.	\$510 M
<b>Machinery, Appliance &amp; Equipment</b> 	Haier	India	Home appliances	\$440 M
	Midea	India	Home appliances	\$180 M
	Honda	India	Automobile	\$1.2 B
	TCL	Vietnam	TV	\$54 M
	Hyundai/Kia	Indonesia	Automobile	\$1.5 B
	Epson	Philippines	Inkjet printer	\$140 M
	Panasonic	Mexico, Thailand	Refrigerator	\$180 M
	ZKW	Mexico	Headlamp (Automobile)	\$ 75 M
	Nidec	Mexico	Auto parts, home appliance parts	\$180 M



# The Belt and Road Initiative by China has objectives to promote trade, sustain growth, and upgrade domestic value chain through connectivity.

## Belt and Road Initiative(BRI) Roadmap



- › **Route:** 1. **Overland Belt** (China--Central and South Asia--Europe); 2. **Maritime Road** (China--Southeast Asia--the Gulf countries--East and North Africa--Europe)
- › **Population:** 4.6 Billion (population density: 84/ km<sup>2</sup>)
- › **Participants:** 122 countries, 29 organizations
- › **Networks:** Six identified economic corridors
- › **BRI investment:** Energy and Power (46%), Transportation and Shipping (25%), Chemical Engineering (13%), Construction and Real Estate (7%), Metallurgy and Mining (4%)

### Bilateral and Regional Trade

- Economies participating in the BRI initiative account for 40% and 15% of the world's population and GDP, respectively
- Further objectives of BRI are to increase trade and investment in the BRI, develop free trade zones along the Silk Road, enhance financial co-operation within the region, gain access to natural resources, strengthen transport infrastructure
- Exports from China to BRI economies increased from 20% of its total exports twenty years ago to one-third in 2017. Studies show that BRI-related activities are expected to boost global trade by 5% by 2030

### Supply Chain Renovation

- The BRI will facilitate China's reform in moving up the value chain from traditional labor-intensive industries to high value-added technology and service sectors; China non-financial investment totaled 15.6 billion USD in 2018, up by 9% from last year
- BRI countries are important destinations for foreign direct investment with majority in energy and transportation with the hope of increasing the role of BRI economies in global value chain
- The BRI will also change the comparative advantage of countries and regions as trade and transportation costs are effectively reduced

### Internal Shift of Manufacturing

- Another aim of the BRI is to promote growth in China's west and the northeastern provinces to reduce economic inequality: Xinjiang, Gansu, Qinghai are on the silk road economic belt with connectivity to Central Asian countries
- The underdeveloped northwestern provinces of China will serve as the bridge to other BRI economies as well as regional manufacturing hub and logistics center
- Cheaper labor, loose environmental policies, and incentive tax policies have fueled the expansion of manufacturing in central and western provinces of China



# Malaysia, Thailand, and Poland are considered relatively matured LCCs from four dimensions while Vietnam is catching up.

## Ease of Doing Business

measures processes from business incorporation, getting permit, obtaining electricity connection, to engaging in international trade, etc.

## National Competitiveness

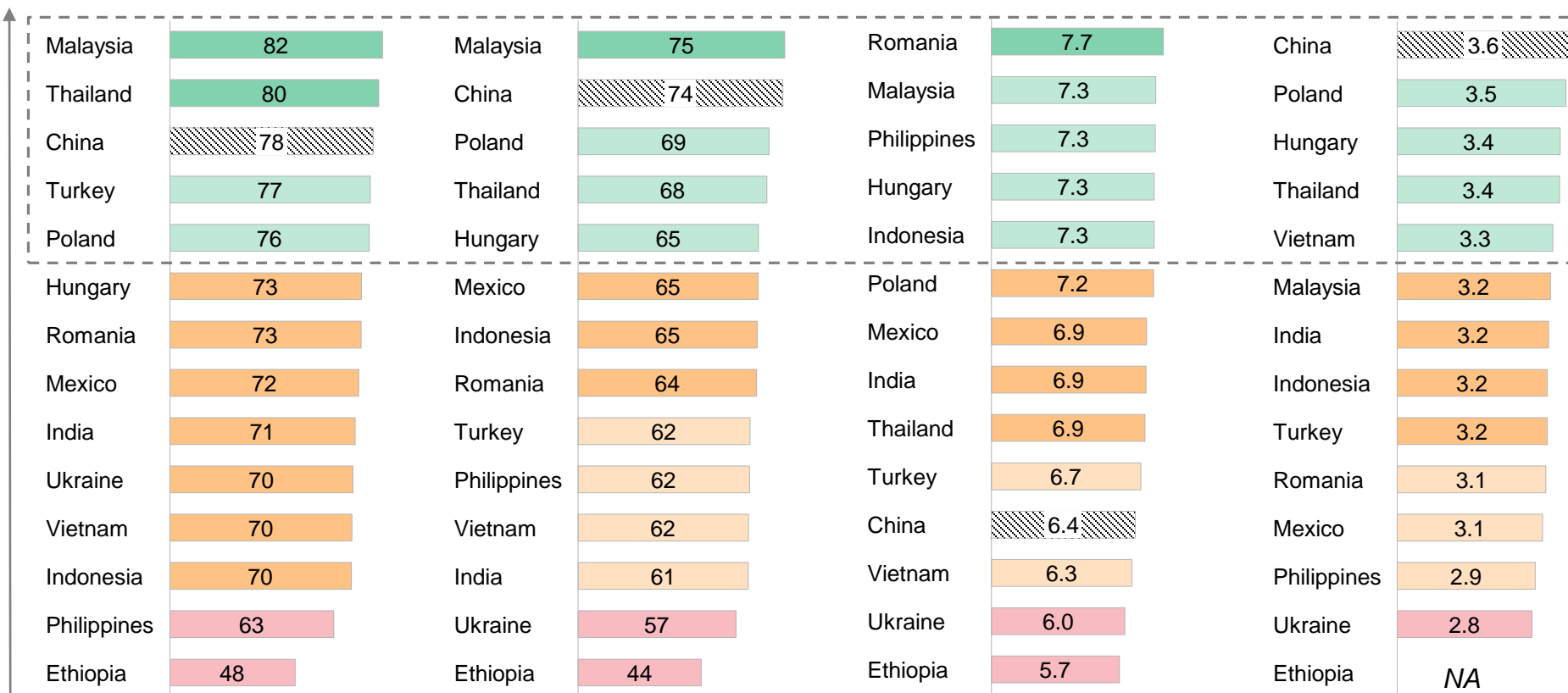
measures national competitiveness by mapping factors and attributes that drive productivity, growth and human development

## Economic Freedom

measures the degree to which policies and institutions are supportive of economic freedom in terms of legal, trade, regulation, etc.

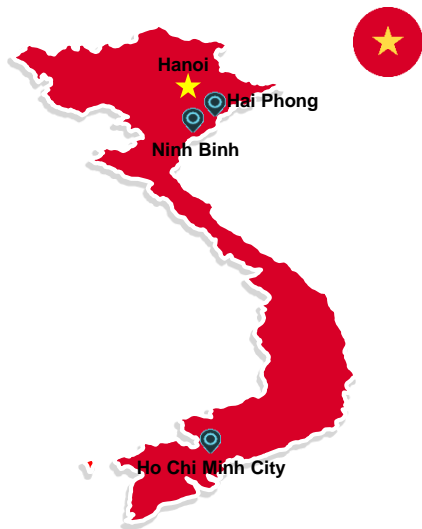
## Logistics Performance

Measures relative efficiency of customs, infrastructure, intl. shipments, logistics competence, tracking, and timeliness



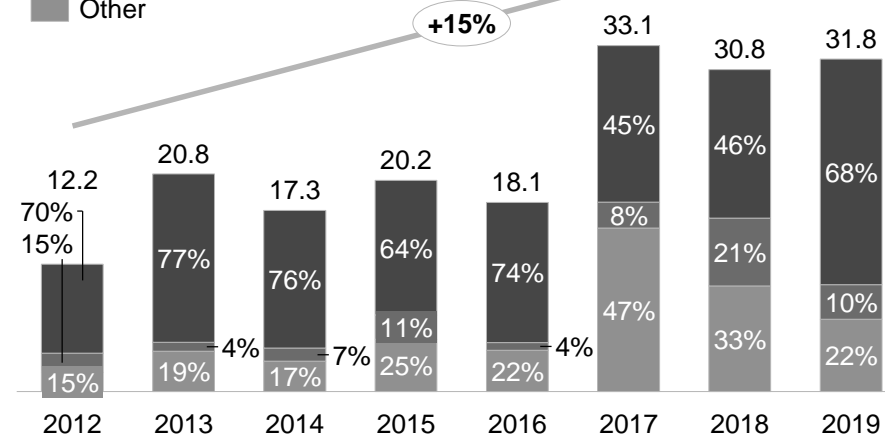
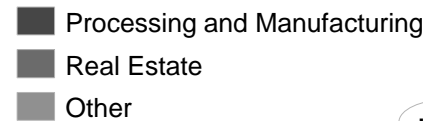


# Following China's model, Vietnam emerged to be an important electronics exporter with ongoing foreign investment flows to the manufacturing sector.



## Total Foreign Direct Investment, Vietnam

Billion USD



Year	Top Investors
2013	Japan, Singapore, Korea
2015	Korea, Malaysia, Japan
2017	Japan, Korea, Singapore
2019*	Hong Kong, Korea, Singapore

The processing and manufacturing sector has absorbed the majority of foreign direct investment over the years; In 2013, 2015 and 2017, the second largest investment area was the production and distribution of electricity

\*Investment from China increased nearly 2X, while that from Hong Kong increased 3.9X as compared to the same period in 2018

- > **Area:** 331,212 km<sup>2</sup>
- > **Population:** 95.5 million
- > **Labor Force:** 57 million
- > **GDP (nominal):** \$262 billion (2019 est.); \$2,740 per capita
- > **Industry % GDP:** 33.3%
- > **Major Industries:** Electronics, Food processing, Construction, Mining
- > **Main Export Partners:** US (20%), China (15%), Japan (8%), South Korea (7%)
- > **Main Import Partners:** China (26%), South Korea (21%), Japan (8%), Thailand (5%)

## Advantages:

- ✓ Competitive labor costs compared to other emerging markets
- ✓ Close proximity to China's supply chain and markets
- ✓ Improving physical connectivity through significant investment in infrastructure
- ✓ Favorable trade agreements (e.g. CPTPP, EVFTA) with European Union, ASEAN, and US

## Obstacles:

- ✗ High inflation in labor cost eroding cost competitiveness
- ✗ Limitation on size of population and workforce

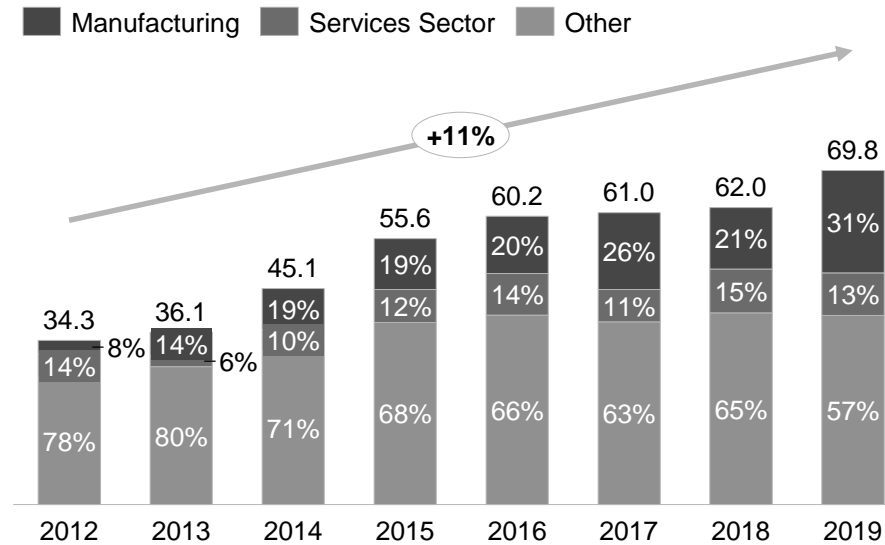


# Favorable demographics and aggressive reforms fueled India's growth, but power-generation capacity might hinder.



## Total Foreign Direct Investment, India

Billion USD



Year	Top Investors
2013	Singapore, Mauritius*, UK
2015	Singapore, Mauritius, US
2017	Mauritius, Singapore, Netherlands
2019	Singapore, Mauritius, Netherlands

Being one of the most important service outsourcing providers, India continuously receives FDI inflows to the service sector, outweighing other small sectors

Manufacturing investment has plunged in recent years with significant FDI growth in telecommunication, automotive, and computer hardware

\*Investments through Mauritius are means of tax avoidance for foreign investors

- › **Area:** 3,287,263 km<sup>2</sup>
- › **Population:** 1.35 billion
- › **Labor Force:** 520 million
- › **GDP (nominal):** \$2.94 trillion (2019 est.); \$2,172 per capita
- › **Industry % GDP:** 23%
- › **Major Industries:** Telecom, Automotive, Information & Technology, Pharmaceutical
- › **Main Export Partners:** Arab League (17%), EU (17%), US (16%), ASEAN (11%)
- › **Main Import Partners:** Arab League (20%), China (14%), ASEAN (12%), EU (11%)

## Advantages:

- ✓ Huge demographic dividend and aggressive domestic reforms to boost GDP growth
- ✓ Attractive market prospect and potential domestic demand associated with population
- ✓ Competitive advantages in particular industries such as information & technology, pharmaceutical, etc.

## Obstacles:

- ✗ Incomplete control and authority over states by the central government and complexity of languages
- ✗ Power-generation capacity hinders development of manufacturing as over half of India's electricity consumption is from coal with inefficient burning



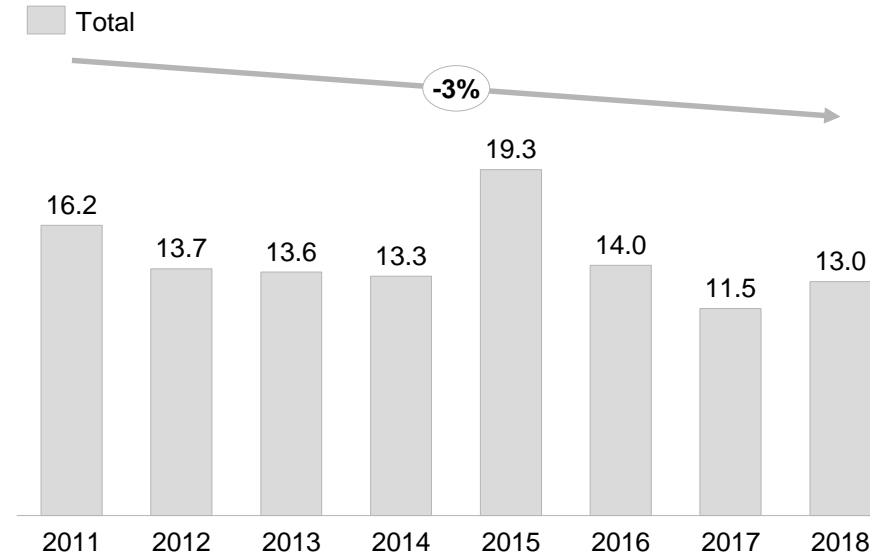
# Connectivity to three continents made Turkey a popular manufacturing hub, but investments are subject to political unrest, both domestic and abroad.



- > **Area:** 783,356 km<sup>2</sup>
- > **Population:** 82 million
- > **Labor Force:** 33 million
- > **GDP (nominal):** \$743.708 billion (2018); \$9,405 per capita
- > **Industry % GDP:** 27.1%
- > **Major Industries:** Textiles, Food Processing, Auto, Electronics
- > **Main Export Partners:** Germany (9.6%), UK (6.1%), UAE (5.9%), Iraq (5.6%), US (5.5%)
- > **Main Import Partners:** China (10%), Germany (9.1%), Russia (8.4%), US (5.1%), Italy (4.8%)

## Total Foreign Direct Investment, Turkey

Billion USD



Year	Top Investors
2013	Germany, Russia, Azerbaijan
2015	Luxembourg, Spain, Netherlands
2017	Azerbaijan, Spain, Saudi Arabia
2018	Netherlands, Azerbaijan, UK

Most of the FDI to Turkey came steadily from EU member countries, but the trend is poising downward due to the country's political unrest and currency crisis

Launch of Star Oil Refinery boosted the investment from Azerbaijan, making it one of Turkey's top investors; Moreover, Chinese investors are increasing their share of investment through BRI

## Advantages:

- ✓ Preferable trade agreements and low tariffs with EU members (EU–Turkey Customs Union)
- ✓ Connectivity to three continents, located in the middle of the Eurasian Continent, bordering the Mediterranean Sea and close to Africa
- ✓ Rapid development in infrastructure in recent years

## Obstacles:

- ✗ Close to the politically unstable area of the Middle East
- ✗ Energy shortage, high dependence on imported oil & natural gas and taxed heavily



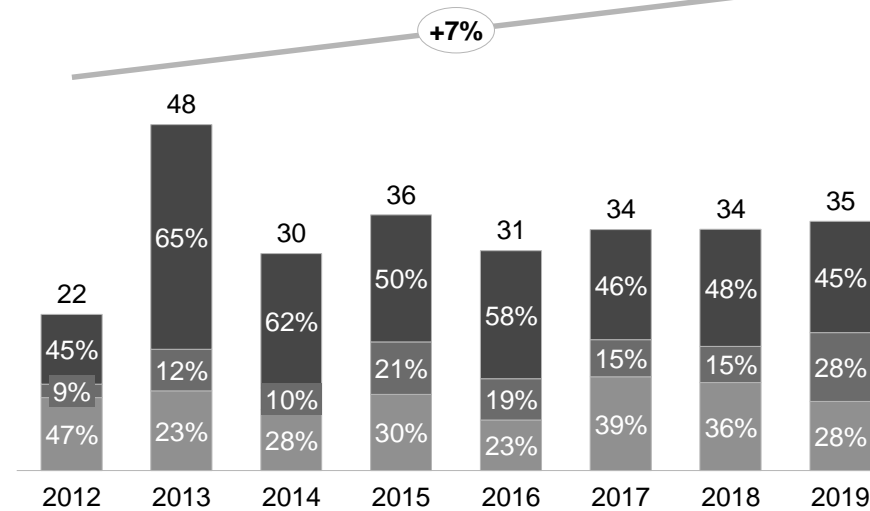
# Mexico is one of the most open markets to foreign investment, and clustered industries have been formed here due to its proximity to the US market.



## Total Foreign Direct Investment, Mexico

Billion USD

■ Manufacturing ■ Services ■ Other



## Year

## Top Investors

2013	United States, Belgium, Canada
2015	United States, Spain, Japan
2017	United States, Spain, Canada
2019	United States, Spain, Canada

Mexico has been undertaking the industry transfer from the US for decades and the trend will continue

Consistent with Mexico's high export value of manufactured goods (>80% of total export), the majority of foreign direct investment is absorbed by manufacturing

- › **Area:** 1,972,550 km<sup>2</sup>
- › **Population:** 126 million
- › **Labor Force:** 57 million
- › **GDP (nominal):** \$1.274 trillion(2018); \$9,797 per capita
- › **Industry % GDP:** 31.9%
- › **Major Industries:** Food & Beverages, Tobacco, Chemicals
- › **Main Export Partners:** US (80%), Canada (2.7%), China (1.5%), Spain (1.5%), Brazil (1.2%)
- › **Main Import Partners:** US (49%), China (16.6%), Japan (4.4%), Germany (3.4%), South Korea (3.4%)

## Advantages:

- ✓ Border with the United States, world's single largest market, close to South American market
- ✓ Free trade agreements with more than 46 countries/regions
- ✓ Existing industry clusters in computer manufacturing, aerospace, and automotive
- ✓ Access to skilled workforce and engineers with higher education

## Obstacles:

- ✗ Corruption and inefficiency of the government with drugs and criminality problems
- ✗ High economic dependency on the United States



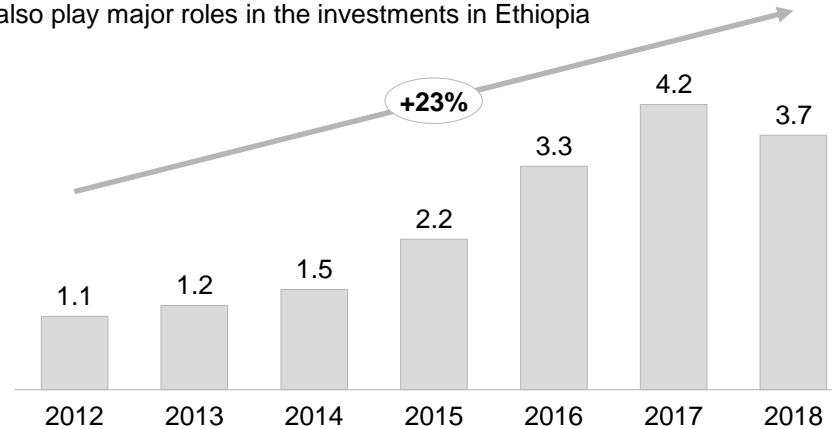
# Africa's second largest market, Ethiopia bears the greatest potential to be a regional manufacturing hub with China being its largest investor.



## Domestic and Foreign Investment, Ethiopia

*Billion USD*

China is Ethiopia's largest investor; Half of Ethiopia's \$26 billion external debt comes from China with an additional \$60 billion expected to be received in the next three years; the US, Saudi Arabia, Turkey, Italy & UAE also play major roles in the investments in Ethiopia



Ethiopia maintains strong investor interest as one of the top investment destinations in Africa

FDI dropped 17.6% in 2018 because of the civil unrest among ethnic groups but is likely to grow back for the stabilization of the country

The majority of Chinese investment is absorbed by infrastructure: building highways, railways, industrial zones, telecom base stations

- > **Area:** 1,104,300 km<sup>2</sup>
- > **Population:** 109 million
- > **Labor Force:** 54 million
- > **GDP (nominal):** \$ 80.289 billion(2018); \$852.88 per capita
- > **Industry % GDP:** 21.6%
- > **Major Industries:** Agriculture, Construction, Food Processing
- > **Main Export Partners:** US (9.2%), China (8.7%), Netherlands (6.9%), Saudi Arabia (6.8%), Germany (6.5%)
- > **Main Import Partners:** China (25.4%), US (7.9%), UAE (3.6%), Japan (3.4%), Italy (3.4%)

## Advantages:

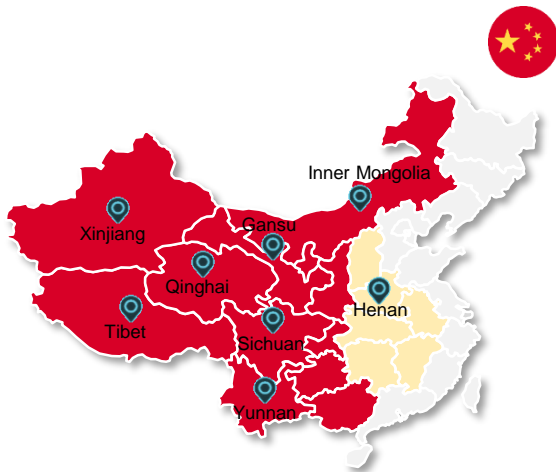
- ✓ Second largest market in Africa with a fast-growing economy and population
- ✓ Urgent need of industrialization and therefore provides preferential tax and tariff policies
- ✓ Construction of dozens of industrial parks lowers the barrier for foreign companies to set up business (Ethiopia's East Industrial Zone built by China is occupied by Chinese manufacturers)

## Obstacles:

- ✗ Landlocked in East Africa with no control of ports, and almost all the imports & exports must go through the port of neighboring country Djibouti
- ✗ Volatility of exchange rate and inflation rate, vulnerable to fluctuations in commodity prices
- ✗ Long payback time to build infrastructure, train labor, and develop domestic market



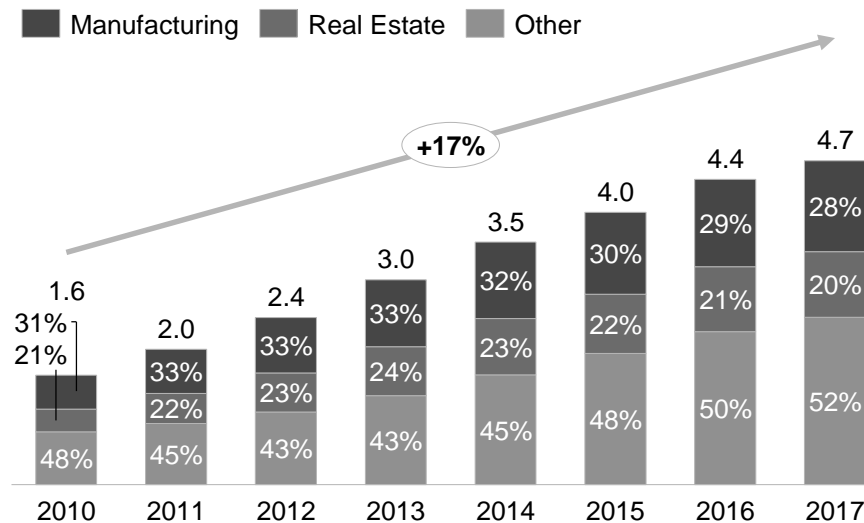
# Migration to inland China is another option to capture labor arbitrage; the government is supportive, but tariffs are unavoidable.



- › Central and western China refers to the provinces of Xinjiang, Gansu, Qinghai, Ningxia, Guizhou, Tibet, Inner Mongolia, Sichuan, Chongqing, Yunnan, Guangxi, Shaanxi, Hubei, Hunan, Shanxi, Henan, Jiangxi, Anhui
- › **Area:** 7.9 million km<sup>2</sup> (82% of China)
- › **Population:** 745 million (54% of China)
- › **GDP (nominal):** \$5.7 trillion (42% of mainland China)
- › **Major Industries:** Mining and ore processing, Energy and power, Food processing, Light industries

Total Investment in Fixed Assets, Central and Western China

Trillion USD



Majority of the fixed asset investment funding comes from government subsidy and public debt

The center of gravity of manufacturing is moving inland as these areas are attracting domestic manufacturers to shift from coastal provinces to save on costs

Central provinces are attracting FDI at a rate of 9.7%, higher than the national rate (Foxconn, for example, relocated from southern China to Henan Province); Western provinces register the fastest growth in FDI in comparison with other regions

## Advantages:

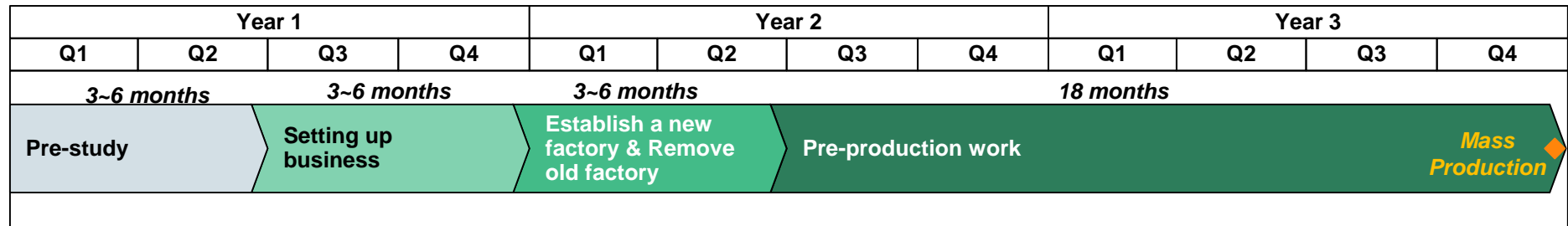
- ✓ Low labor costs and land costs comparable to some Southeast Asian countries
- ✓ Substantial cost saving to transfer existing production from coastal provinces compared to transferring production abroad; direct access to China's supply chain and markets
- ✓ China Western Development plan backed up by the Central Government with ongoing investment in infrastructure and education; Favorable tax and environment policies to attract investments
- ✓ Connectivity to Central Asia (western provinces) promoted by Belt and Road Initiative

## Obstacles:

- ✗ Relative low level of urbanization rate, population density, and infrastructure in western provinces
- ✗ Subject to tariffs imposed by US and other economies and restrictions on FDI
- ✗ Complex bureaucratic system and influential national and local policies



# Migration of manufacturing to another country normally takes at least two years from start to mass production.



## 1.0 Pre-study of migration feasibility

- Evaluate which products/activities to migrate
- Develop long/short list of targeted countries based on available information
- Prioritize migration activities, validate saving opportunities and make decisions

## 2.0 Setting up business

- Decide on business model for doing business with another country and means of financing
- Obtain investment registration certificate and business license from responsible national and/or local government

## 3.0 Establishment of new factory & removal of old

- Research on where to set up the factory (usually in the industrial zone), rent/purchase land for construction, build and install fixtures in the new factory
- Import and install machinery and equipment for production lines
- Remove old factory (cease operation, clear inventory, sale/transfer of assets, dismiss employees, etc.)

## 4.0 Pre-production work

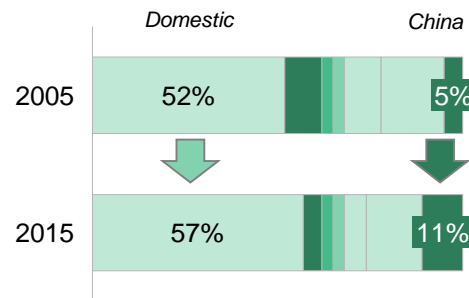
- Design and set up production line/warehousing area considering various flows
- Establish business processes and functionalities within the new entity (including production planning, sourcing and procurement, quality control, etc.)
- Hire and train workers, improve labor skills





# China will continue to be the world's largest manufacturing hub with multiple satellite countries specializing in certain product categories.

- › **China plays a significant role in supplying inputs and outsourcing manufacturing to other countries within Asia**



- **Clustered Industries:** Electronics assembly in Asia is concentrated around China--key location for contract manufacturing within the area
- **Value-added from China:** In 2015, 11% of value added in ASEAN's electronics exports come from China, up by 6% compared to 2005; meanwhile domestic value-added increased from 52% to 57% during the period

- › **Other countries' reliance on China's broad, efficient, and highly integrated supply chains**

- **Dependence on China imports:** India exports 20% of the world's generic drugs but India's reliance on imported active pharmaceutical ingredients (API) from China has been increasing despite Indian government's initiative to promote domestic production of API; **production costs** of API in China are ~**20-30% lower** than those in India due to higher utilization rate at Chinese production sites



- › **Not a single country can replace China in terms of scale, demographic dividend, infrastructure, etc.**

- **Workforce:** Vietnam's workforce totals ~55 million compared to China's 807 million; India has 522 million but about half in the agriculture industry; other emerging economies are of similar size to Vietnam in terms of population; **lack of skilled labor** is another obstacle when transferring production
- **Power, Infrastructure & Logistics:** Investment in infrastructure and power takes a longer time to pay back; India's coal-fired power plants are running at low efficiency at the cost of pollution
- It's unlikely for a single country to absorb all orders from China with their current level of labor force and labor productivity



# Case Study: Recommendation on mfg. footprint for CE OEM to mitigate decreasing labor arbitrage and risk of tariffs in China.

## Situation & Approach

### Industry and AV assignment:

- Client was global **OEM producer of consumer electronics** within AR/VR segment
- Manufacturing was outsourced to partner in China, but, as a result of eroding labor arbitrage, they wanted to look at new **long-term manufacturing locations**
- Due to short term risk of trade tariffs, the client was also in need of a **short-term back-up plan** that would mitigate trade tariffs

### Approach:

- Applied Value was asked to come up with short- and long-term recommendations and to answer four key questions
  - Where* – What country?
  - Who* – Which suppliers?
  - When* – When is the best time to move?
  - What* – What products should go there?
- Top down analysis of >70 countries based on >40 **macro data indices in weighted scoring model**
- Bottom up analysis based **on internal and external expert interviews**, country specific **desktop research** and **supplier RFIs**

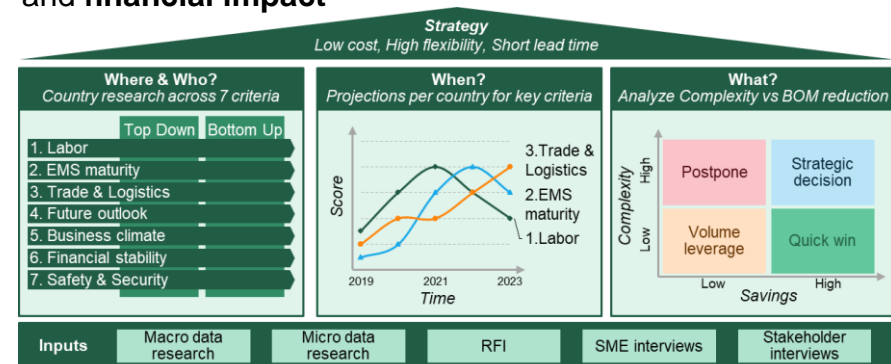
## Analysis & Results

**Analysis:** Analysis framework consisting of three pillars

- Where & Who:** Bottom up and top down country research across 7 criteria compiled in weighted scoring model
- When:** Quantitative and qualitative projections to key criteria to understand when the country is suitable
- What:** Analysis of product complexity vs country capabilities to understand risk and map against financial impact to determine what products and processes to move

### Results:

- Short- and long-term recommendations **Where** (what country), **Who** (which supplier), **What** (what products and processes), and **When** (when to move) based on **feasibility** and **financial impact**



# Case Study: Mfg. footprint changes and greenfield establishment within China for world leading company in energy efficient air treatment solutions.

## Situation & Approach

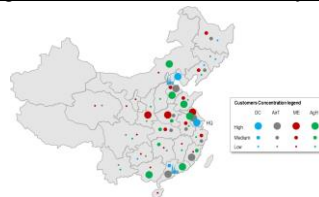
### AV Assignment:

- To validate the overall opportunity for manufacturing sites footprint consolidation in China (from current 3 sites to 2 or 1 sites)
- To establish the footprint vision for each business segment in China
- To outline roadmap with short- vs long-term perspectives

### Approach:

- Made approach for evaluation and data to analyze modeling and visioning
- Identified high-level investment requirements (in existing setup and for potential footprint changes)
- Conducted workshops in core team / stakeholders to validate, quantify, identify gaps

Logistics & Customers Base Analysis



## Analysis & Results

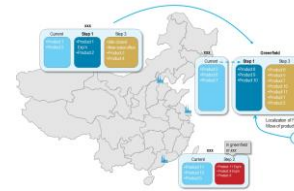
### Analysis:

- Analyzed business needs / drivers for change: availability, capacity, cost, capital, and competence
- Analyzed the big picture of the footprint, one-time costs, competencies and logistics flows
- Analyzed footprint alternatives

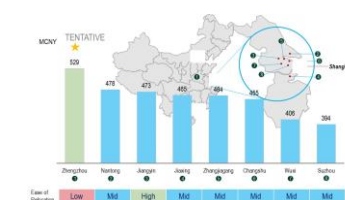
### Results:

- Made three step changes on manufacturing sites for each business segment in China
- Three existing sites will be consolidated to one existing site and one greenfield site within three years
- ~50 million CNY incremental EBITDA will be generated by 2019 due to manufacturing sites footprint changes in China

Manufacturing Footprint – Changes by Step



Greenfield Sites Location Analysis





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