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Made in China 2025 Unveiled:

China breakthrough industrial strategy for the next decades – Impact on the world economy, opportunities and threats for Italian industries

Guido D. Giacconi
Co-founder and Chairman

Beijing, March 24th 2017

In July 2015 State Council launched MiC2025

Excerpt of MiC2025 issued by State Council (July 2015)

"

- ✓ ***We can turn challenges into opportunities*** *and capture the manufacturing high ground in the new competitive landscape, by having a global view and deploying new strategies,*
- ✓ ***We must immediately adjust the development structure and raise the quality of development****. Manufacturing is the engine that will drive the new Chinese economy,*
- ✓ ***China is still in the process of industrialization, and all challenges must be solved for China to become an advanced manufacturing power,***
- ✓ ***Manufacturing innovation will be the main theme, improving quality and performance the main core****, integration of the next-generation IT into manufacturing the main thread, smart manufacturing the main priority, and meeting the demands of economic and social development and national defense the main goal,*
- ✓ ***We need to rely more on domestic equipment and companies****, to realize the transformation from Made in China to Created in China, from China Speed to China Quality,*
- ✓ ***By doing this we can execute the strategic task of transforming Chinese manufacturing from large to strong.***

"

Source: 《Made in China 2025》 State Council July 7th 2015

MiC2025 aims at addressing economic and social radical transformations in China (New Normal) through a comprehensive and thorough Industrial strategy …

MiC2025 background (excerpts from State Council)

New domestic demand arises from urbanization, agricultural modernization, digitalizazion and industrialization

China's New Normal includes growing resource and environmental constraints, slowing growth of investment and export

Deep integration of next generation IT into manufacturing forms transformation and new growth opportunities

China's manufacturing output has become the largest in the world, and has laid the foundation to transform China into a global leader of manufacturing power

The guide for China's Manufacturing Strategy till 2049

Developed countries has planed to further upgrade manufacturing and regain advantages

Developing countries gradually gained advantages over China on low cost manufacturing

Lack of made-in-China products quality and few global brands, digitalization level is low

China's manufacturing sector is large but not strong: innovation capability is weak and external dependence for key tech and advanced equipment is high

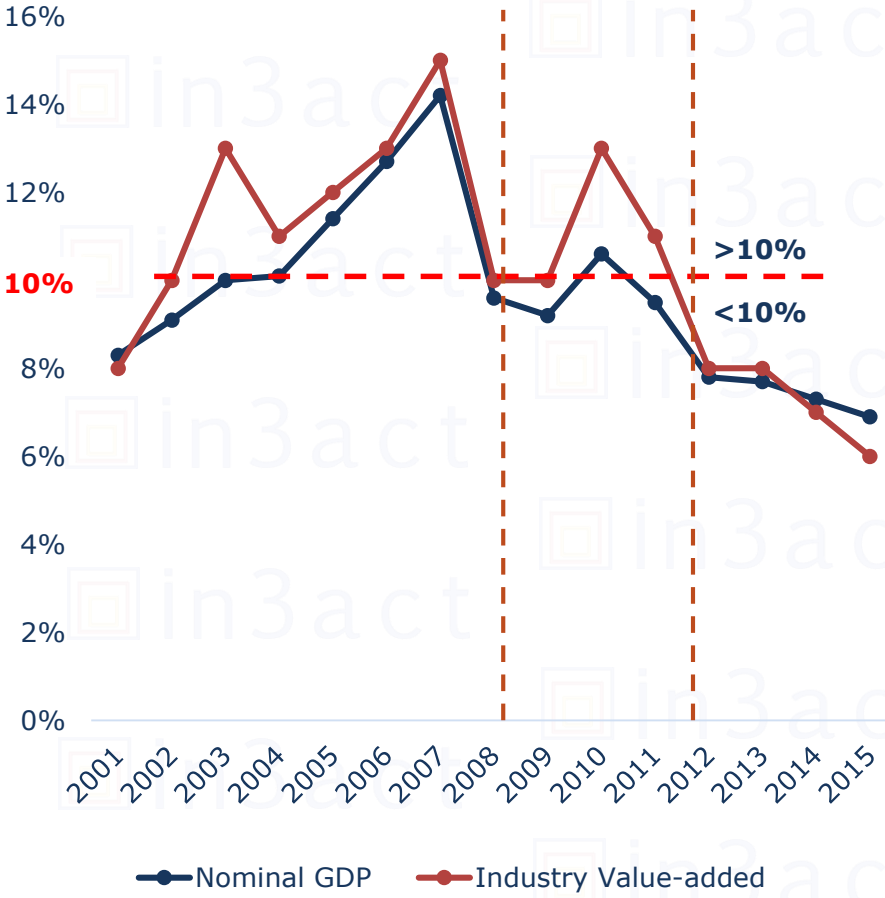
MADE IN CHINA 中国制造 2025

& Beyond

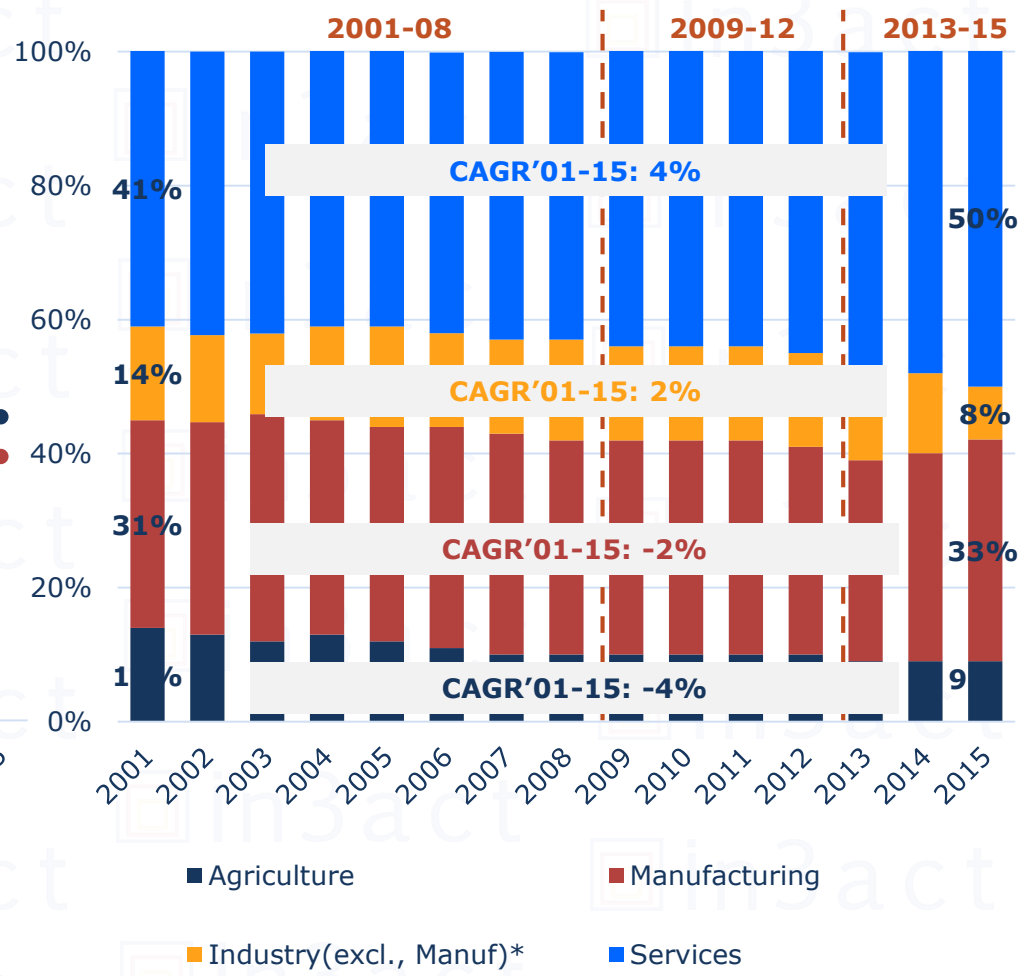
Source: 《Made in China 2025》 State Council July 7th 2015

China growth has already dropped to single-digit level since 2011, while the economic structure base has evolved towards Services

China's GDP growth YoY, 2001-2015 (at constant prices, CNY)

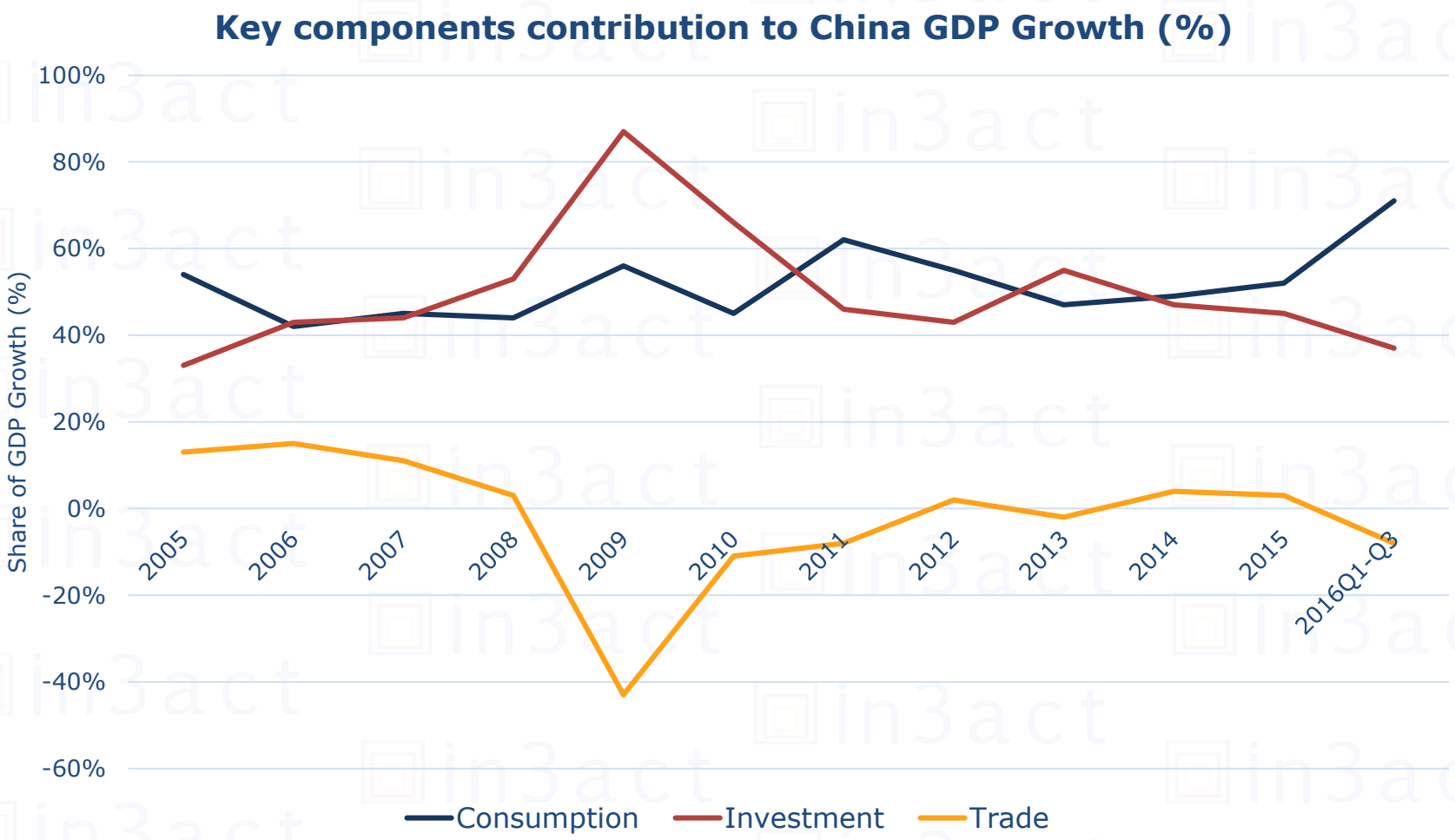


Value-added output in China, 2001-2015 (% of GDP, at current market prices)



*Includes electricity, gas, water supply, and construction, based on ISIC, Rev.3.
Source: World Bank, ADB, In3act Analysis

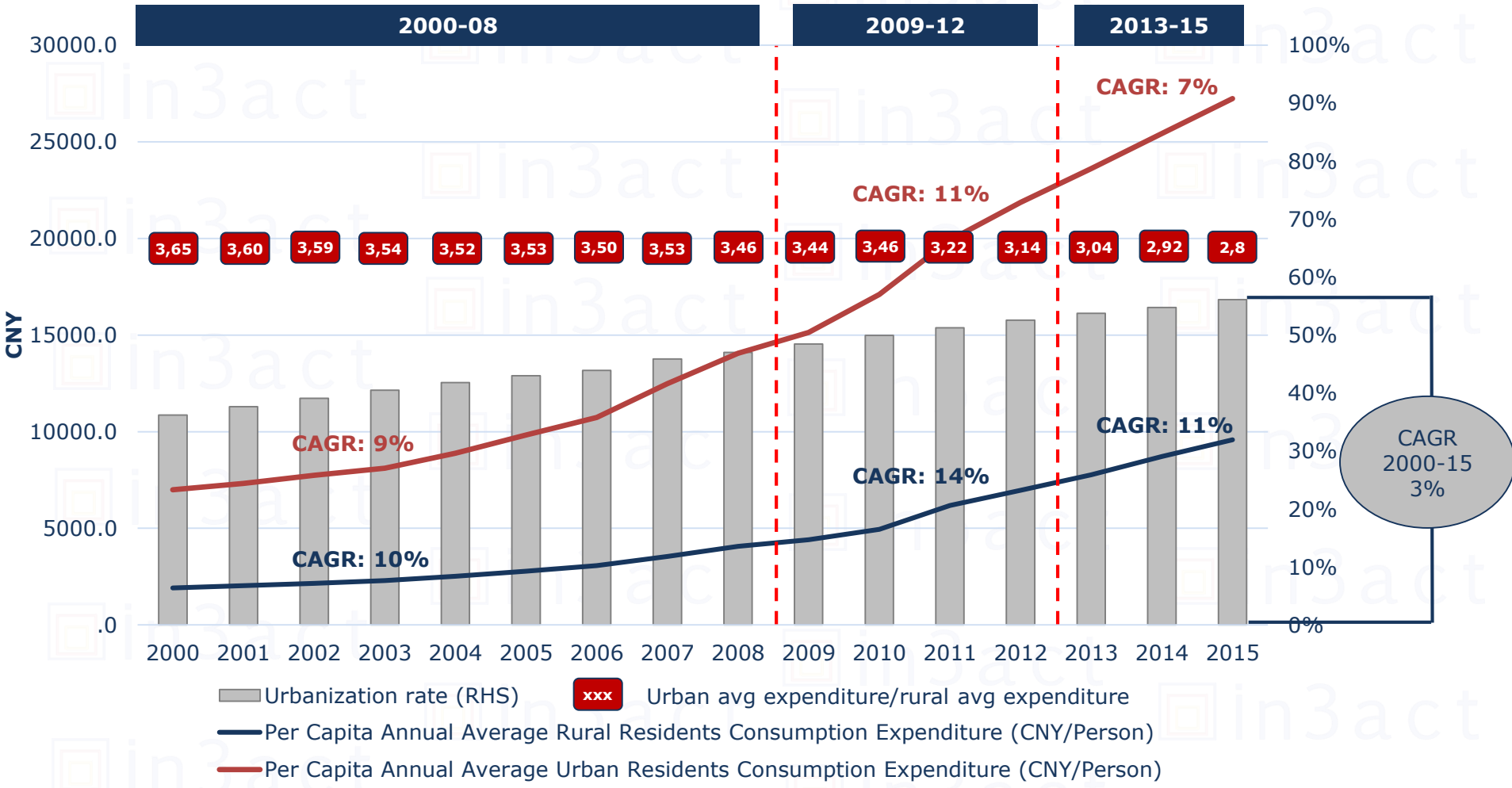
Consumption continued to lead in GDP growth, contributing 71% of total increase in first 3 quarters of 2016



Source: NBS, In3act Analysis

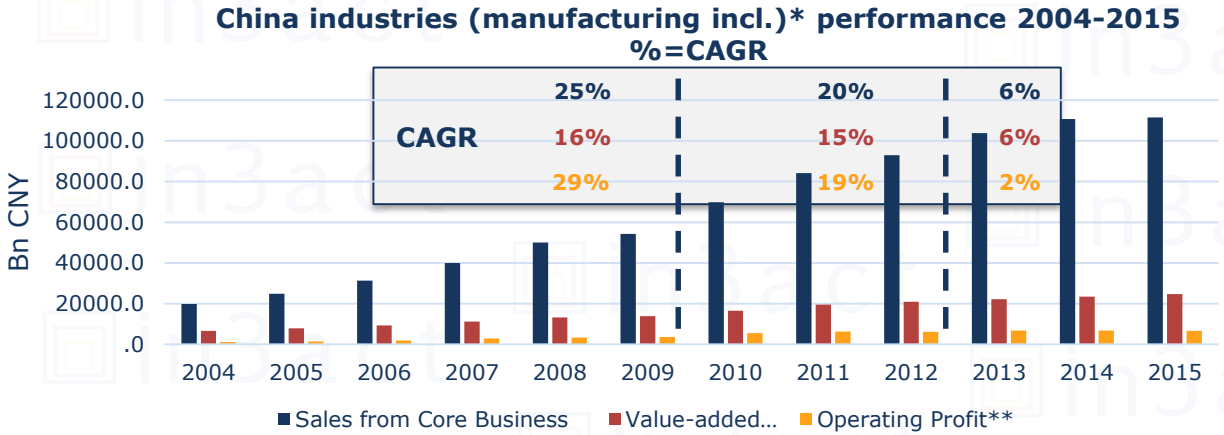
Urbanization is affecting also consumption: both urban and rural consumption per capita are increasing, although rural one at higher pace

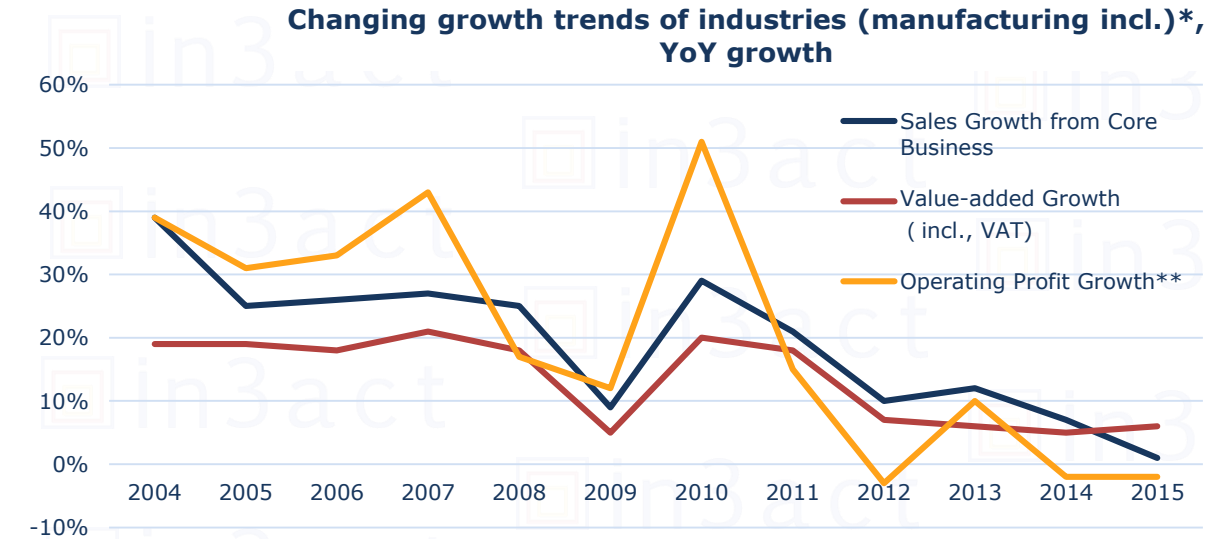
Trends of Consumption Expenditures per capita & Urbanization in China, 2000-2015



Source: NBS, ADB, In3act Analysis

Industries (incl. manufacturing) growth YoY has slowed down over the past decade





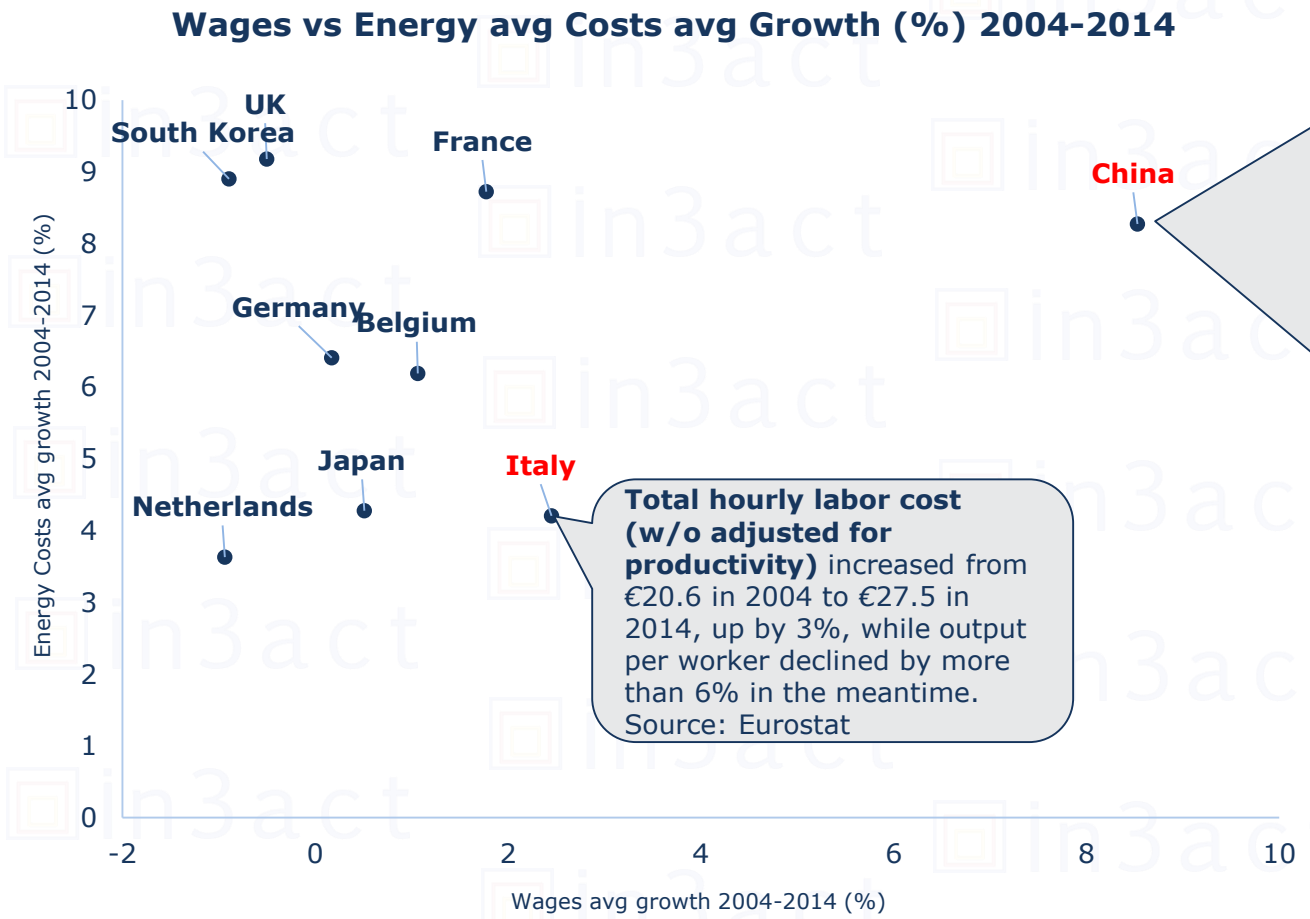
- China's total industry sales in value in 2015 were nearly 3.5 times the ones in 2004,
- Industry sales, value-added, and operating profit have been growing over the past decade, although growth has constantly decelerated,
- **'New Normal' period (2013-2015) has seen the most significant drop in growth.**

* Growth data of sales from core business operations and operating profits are from industrial companies above designated size. Above designated size refers to all companies with at least CNY5 million annual sales from major business (b/t 1998-2010), and with at least CNY20 million since 2011.

**Definition: the profit earned from a firm's normal core business operations. This value does not include any profit earned from the firm's investments or non-core business.

Source: NBS, In3act Analysis

China has seen the highest growth of wages and energy costs over the past decade versus the most advanced countries



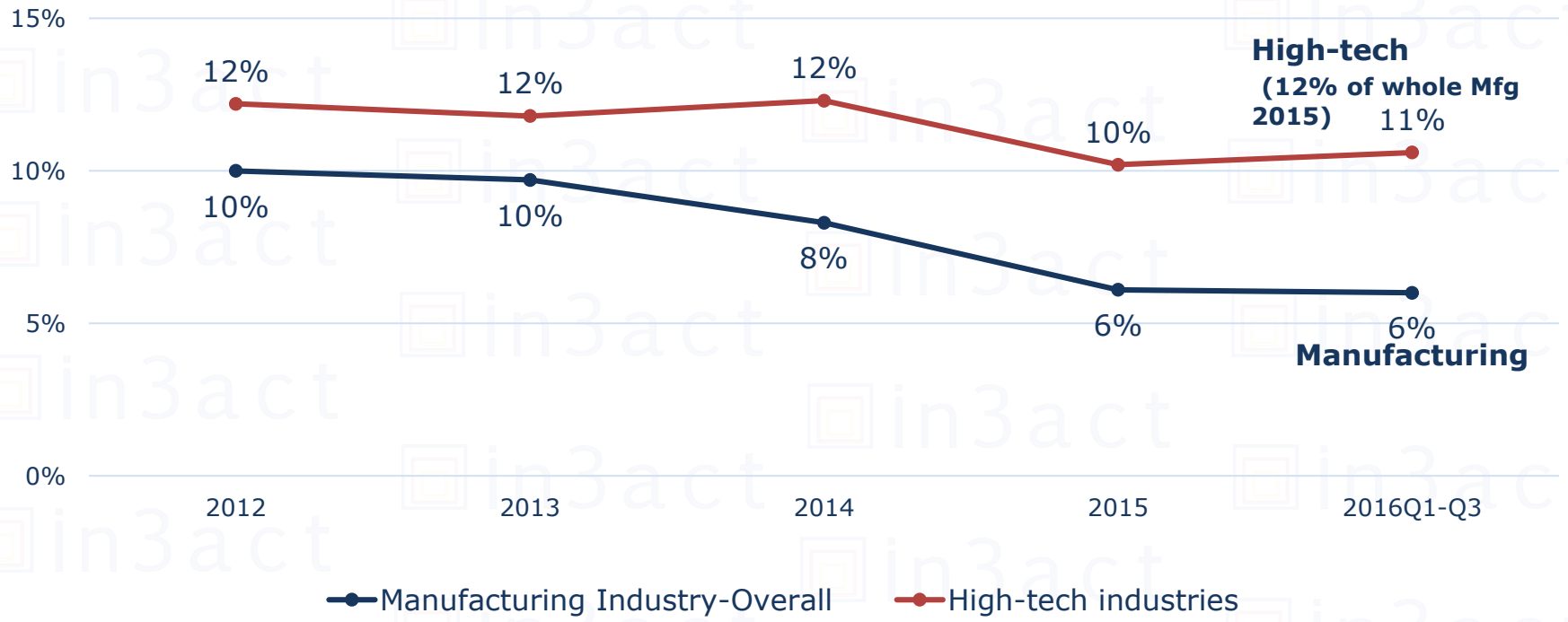
Total hourly labor cost (w/o adjusted for productivity) increased from €20.6 in 2004 to €27.5 in 2014, up by 3%, while output per worker declined by more than 6% in the meantime. Source: Eurostat

- **Increased labor cost:**
  - In 2004, manufacturing wages adjusted for productivity averaged **$4.35/hr** in China, compared with $17.54 in the U.S,
  - Adjusted for productivity differences, labor costs in China almost tripled, to **$12.47/hr** in 2014, while in US, it only rose by 27%.
- **Increased Energy costs:**
  - In 2004-2014, the cost of industrial electricity increased by **66%**, while the cost of natural gas for industrial users soared by **138% (**in Italy respectively 35% and 75%),
  - Also Coal costs have more than doubled in 2004-2014, with a pick in 2011-2012 when Coal cost arrived to be 4 times the one in 2004.

Source: Eurostat, the BCG Manufacturing Cost-Competitiveness Index, Coal Strategic Planning Research Institute, In3act Analysis

High Tech sector VA growth YoY has been in any case higher than whole Manufacturing over the past years, even before MiC2025

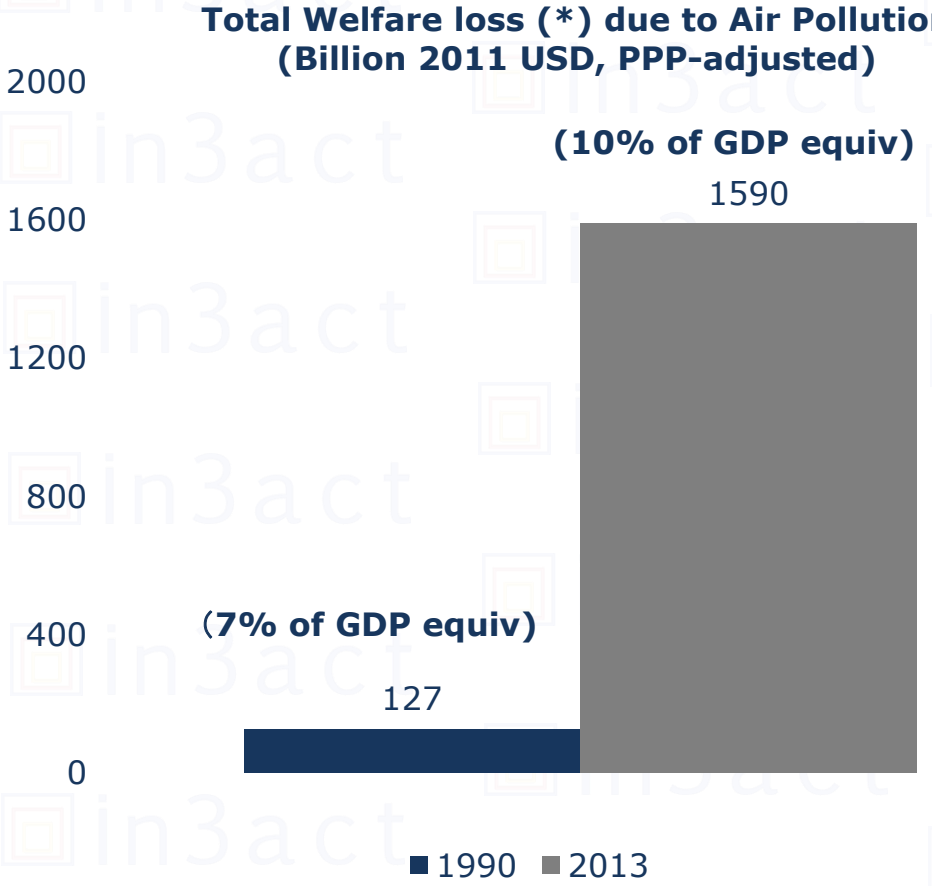
China High Tech and whole Manufacturing sectors Value-added Growth YoY 2012-2016
(industry value-added above designated size*)



*Only counting companies with at least CNY20 million of annual sales (since 2011)

Source: NBS, In3act analysis

Economic growth happened at the cost of environment and people welfare/health



(*) Total welfare losses are estimated using a value of statistical life (VSL), which is an aggregate measure of people's willingness to pay (WTP) to reduce fatality risks. Country-specific VSLs are derived from empirical studies done in high-income countries, which are then adjusted to account for cross-country differences in per capita income. The absence of WTP studies in many low- and middle-income countries contributes to the uncertainty of the VSL-based estimates of welfare losses, as does a lack of consensus about the elasticity of the VSL with respect to income.

Source: World Bank, IHME, American Chamber of Commerce HK 2012, in3act analysis

Other costs of pollution in China (illustrative examples)

- ✓ **Harms in Agriculture:**
  - In China, Surface ozone has reduced yields of summer wheat by an estimated 6-12% per year and soybeans by an estimated 21-25%.
  - Cost of acid rain and SO2 pollution on agricultural output in China at CNY 30 billion (2003 prices) per year,
  - It's estimate that about 2% of arable land is lost due to pollutants,
- ✓ **Loss of Urban Competitiveness**
  - Ambient PM2.5 (mean annual) rose from 39.3 in 1990 to 54.4 in 2013,
  - Around 1/3 of employers said they were having a harder time recruiting overseas candidates because of concerns about air quality (2012 survey).

Everything you know about Made in China 2025 is .....

… since Industry 4.0 concepts cover only a part of MiC2025

Made in China 2025 is a comprehensive industrial strategy and IS NOT the Industry 4.0 Chinese version …

What IS NOT MiC2025

- ✓ **A bare China manufacturing technological upgrading program**,
- ✓ **Equivalent to Industry 4.0**, Manifattura 4.0, etc.
- ✓ **Traditional 5-year plan model**,
- ✓ **A single policy** or GB or HB,
- ✓ **A bunch of informal guidelines** coming from leaders public speeches,
- ✓ **A bare Gov financial stimulus** to support industries,
- ✓ **A set of general statements** about focusing on innovation,
- ✓ **An evolution/completion of past industrial strategies,**
- ✓ ……

What IS MiC2025

- ✓ **A comprehensive Industrial strategic program** aimed at supporting further economic development of China till 2049 aimed at transforming Chinese manufacturing from "large to strong",
- ✓ **A continuous "work in progress" program**, from principles to specific implementation minimal details to guidelines for financing,
- ✓ **Also focused in identifying very detailed projects and programs** across the different sectors,
- ✓ **Concepts coming from "Industry 4.0s" are only a segment/slice** of the whole MiC2025 strategy,
- ✓ ***"the strategic guide for China's manufacturing/industrial strategy during the coming decades".***

Industria 4.0 addresses/supports the need of a dramatic upgrade of manufacturing base through new technologies and innovation …

Industria 4.0: La 4° rivoluzione industriale

1° Rivoluzione industriale

Utilizzo di macchine azionate da energia meccanica

Introduzione di potenza vapore per il funzionamento degli stabilimenti produttivi

Fine 18° secolo

2° Rivoluzione industriale

Produzione di massa e catena di montaggio

Introduzione dell'elettricità, dei prodotti chimici e del petrolio

Inizio 20° secolo

3° Rivoluzione industriale

Robot industriali e computer

Utilizzo dell'elettronica e dell'IT per automatizzare ulteriormente la produzione

Primi anni '70

4° Rivoluzione industriale

Connessione tra sistemi fisici e digitali , analisi complesse attraverso Big Data e adattamenti real-time

Utilizzo di macchine intelligenti, interconnesse e collegate ad internet

Oggi -

Industria 4.0: Le tecnologie abilitanti

1	Advanced Manufact. Solutions	• Robot collaborativi interconnessi e rapidamente programmabili
2	Additive Manufacturing	• Stampanti in 3D connesse a software di sviluppo digitali
3	Augmented Reality	• Realtà aumentata a supporto dei processi produttivi
4	Simulation	• Simulazione tra macchine interconnesse per ottimizzare i processi
5	Horizontal/ Vertical Integration	• Integrazione informazioni lungo la catena del valore dal fornitore al consumatore
6	Industrial Internet	• Comunicazione multidirezionale tra processi produttivi e prodotti
7	Cloud	• Gestione di elevate quantità di dati su sistemi aperti
8	Cyber-security	• Sicurezza durante le operazioni in rete e su sistemi aperti
9	Big Data and Analytics	• Analisi di un' ampia base dati per ottimizzare prodotti e processi produttivi

Source: Ministero Dello Sviluppo Economico, Piano nazionale Industria 4.0, In3act analysis

… while MiC2025 is a comprehensive and thorough manufacturing strategy allowing China to become the world wide manufacturing leader in the medium/long term

	Industria 4.0	MiC2025
Vision	✓ A leading G7 player in industry 4.0 ✓ Address mid-term innovation Manufacturing upgrade	✓ 'From Large to Strong', becoming a global leading manufacturing power,
Scope	✓ An Italy model of Industry 4.0 plan which emphasizes on **investment/financing in smart manufacturing innovation/technologies** as well as **skills & research**	✓ **A comprehensive long term industrial strategy demonstrated by 9 guiding strategies and 10 key industrial sectors,** ✓ '1+X' implementation scheme demonstrated by 5 programs, 4 development guides and 2 action guides
Timeframe	✓ 2020	✓ -2025-2035-2049 (3 steps)
Keywords	✓ Investment, Productivity, Smart manufacturing, Innovation	✓ world wide Leadership, Innovation, Smart Manufacturing, Industrial Bases, Green, High-end Equipment, domestic shares

Developed 5 themes(Robots, Advanced Monitoring & Control System, Digital Factory, IoT & Big data, Cyber Security) and identified issues, targets, tools, actions, timeline, resource, etc.	**Technical Roadmap**	**Covers 10 key sectors** (e.g., Machine tools & Robots, Aerospace equip, etc.), with lists of >180 key products, equipment and materials, >150 core technologies, and > 80 pilot projects,
Use public fund and encourage/boost private investment, tax incentives (e.g., tax credit for investment in R&D), recap of SME Guarantee fund, support to VC/start-up, and infrastructure(ultra-broadband), etc	**Investment & SME**	Establish more Gov supported industrial investment funds to leverage private capital; Establish R&D subsidy program and updated funding scheme tailoring to R&D demand in different, set SME fund, etc.
Creation of **'Competence Centers'** and digital innovation hub connected firms w/ best Univ; National plan for digital education (e.g. New 4.0 courses), fund supporting specialized PhDs;	**Innovation & Research**	**Innovation Centers** connecting firm, institute and universities, and establish mechanism of manufacturing-learning-R&D-commercialization (产学研用, in Chinese)

Source: Ministero Dello Sviluppo Economico, Piano nazionale Industria 4.0, State Council MiC2025 Official Doc, ITALY EUROPE 24, In3act analysis

CAE designed a weighted index to assess what were considered international "Manufacturing Powers" vs China …

Purpose of the index

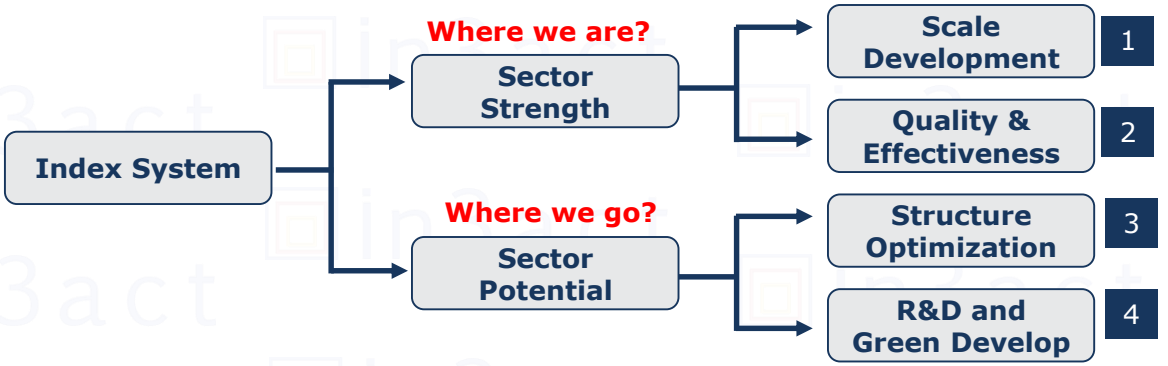
- ✓ To assess level of 'manufacturing power' versus other countries,
- ✓ Provides definition and characteristics,

Comparative Analysis

- ✓ **Int'l Indices:** IMD, World Economic Forum, United Nations, Deloitte, Porter's Diamond Model,
- ✓ **China Indices:** Academy of Social Science, Renmin University, Nanjing University of Aeronautics and Astronautics,

Setups on Weighted Average Index

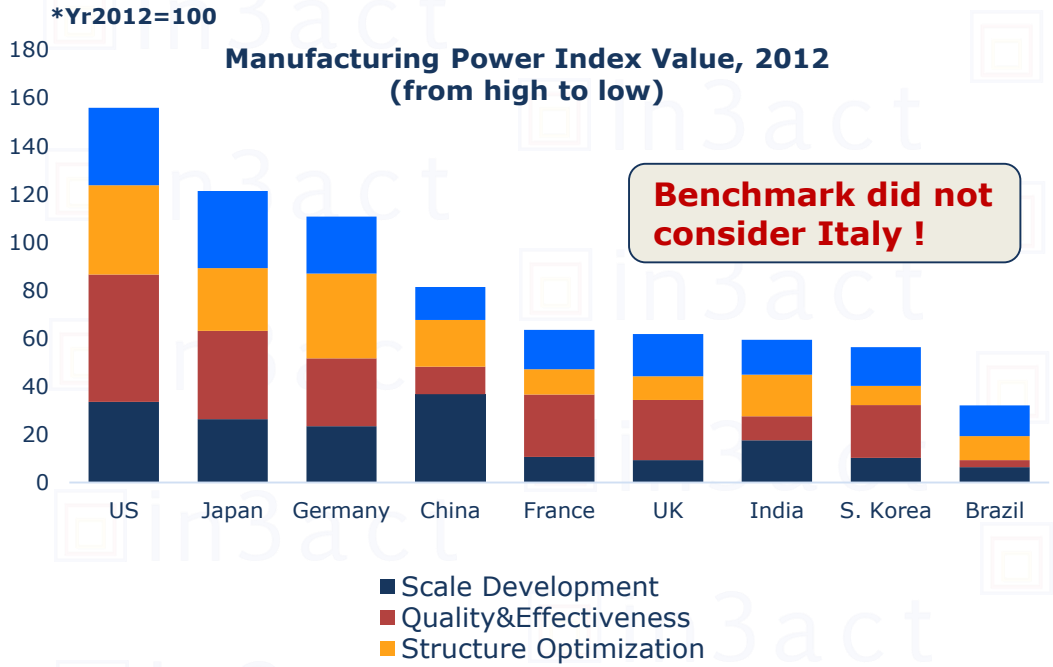
- ✓ **2 principles:** comprehensive & representative,
- ✓ **Built from 1978-2050,**
- ✓ **4 selection criteria:** A. Overall scale, Scale Competitiveness; B. Quality efficiency, Profitability; C. Structure(Int'l), Structure(domestic); D. Innovation, Green Development, Digitalization,
- ✓ Identified **4 level1 indicators & 18 level2 indicators** and assigned weights,
- ✓ Innovation was also indirectly measured in Quality & Structure,
- ✓ Evaluating national overall scores and sector-specific scores.



	Weights	Weights ranking	Level 2 Indicators	Weights	Weights ranking
1	0.1951	4	Manufacturing Value-added	0.1287	1
			Global Share of Manufactured Exports	0.0664	9
2	0.3620	1	Exported Products Recall Notice Index	0.0431	11
			# of Global Brands	0.0993	2
			Value-added Growth	0.0356	13
			Productivity	0.0899	3
			High-tech products trade competitiveness index	0.0689	7
			Sales profitability	0.0252	14
3	0.2116	3	Global share of industrial bases sectors Value-added (MT, components, etc)	0.0835	4
			Share of domestic companies in Global500	0.0686	8
			Share of Value-added of Equip sector/Manufacturing sector total	0.051	10
			Concentration level of key industries(top 5 comps sales/total # of comps)	0.0085	18
4	0.2313	2	# of issued global IP/Value-added output	0.0821	5
			% of R&D expense/sales revenue	0.0397	12
			# of R&D employees/# of total employees	0.0132	15
			Energy consumption per unit in manufacturing	0.0748	6
			Utilization rate of industrial solid waste	0.0116	16
			Networked Readiness Index	0.0099	17

Source: CAE documents, In3act analysis

… reflecting China's structural issues and global positioning; its research also drew some key findings from developed countries' past experiences



China's Index Composition & Shares, 2012

Level 1 Indicators	Value	% Share
Scale Development	36.7	45%
Quality & Effectiveness	11.6	14%
Structure Optimization	19.3	24%
R&D and Green Development	13.8	17%
Index Total	**81.42**	**100%**

Scale counts about 45%, indicating manufacturing was large but not strong

CAE's Key findings from devleoped countries

- Manufacturing will continue to play a **leading role** in the economy, despite its **share in GDP** will further decline in the following years,
- **Boost from government support** is necessary, in particular with regards to industrial policies and legislation,
- **Quality & Brands** are national strategic needs once the nation reached certain stage of manufacturing development,
- **Small and medium-sized enterprises** are also very important support force for boosting national manufacturing power,
- Advanced education system and emphasis on **talent development,**
- **Equipment manufacturing sector** serves as fundamental infrastructure to the national economy, and to certain degrees determines the levels of technical development as well as industry leadership in related industrial sectors.

*Year2012 benchmark value is based on the average value of each indicator from 6 countries such as US. Germany, Japan, UK, France and South Korea

Source: CAE, In3act analysis

Italy has been considered and benchmarked only within Automotive sector

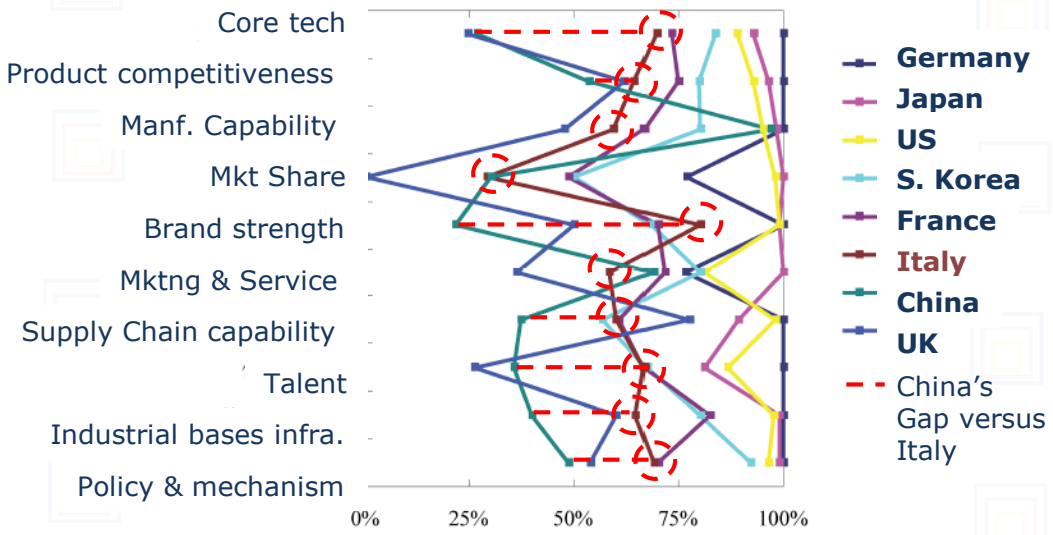
Automobile Sector

- Index benchmarked 7 countries, with 10 indicators selected,
- Index values from 0 to 100,
- Benchmark value is determined by the relative versus the highest value with respect to each of the 10 indicators,

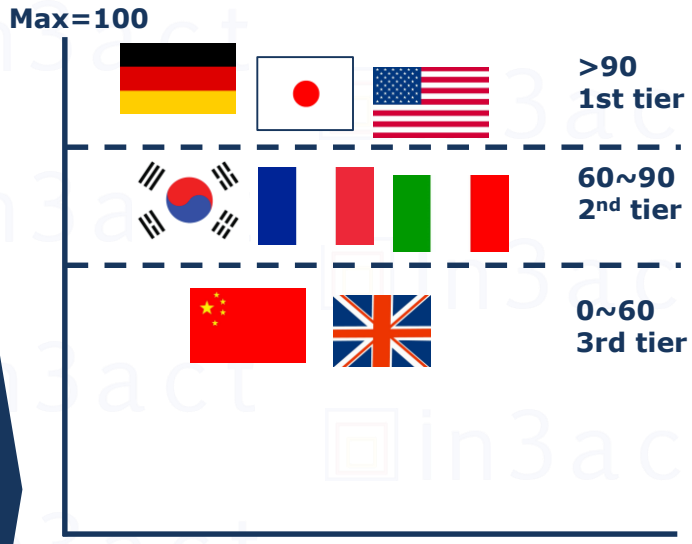
- **Auto index system indicator weights(=100)**

Core Tech	18.4	**Brand Power**	9.7
Supply Chain Capability	13.8	**Industrial Base Infra.**	9.1
Market Share	10.7	**Prod. Manuf. Capability**	6.9
Product Competitiveness	10.5	**Mktng & Service**	5.5
Talent	10.2	**Policy & Mechanism**	5.2

- **Strength by country in each indicator**



Source: CAE, In3act analysis



- **Strength by country in each indicator**

- **Developed goals and paths to reach 2nd tier by 2020, and 1st tier by 2035** (in terms of global market share, domestic car manufacturers and components suppliers),
- Reach value of 95 by 2045,
- Potential largest mfg for new energy autos and self-driving vehicles in 2030/35,
- Lessons from leading countries are national level strategy and policies, tech-driven innovation and major supports to domestic companies.

For Italy, cooperation proposals regarding core tech, product, brand, supply chain, talent, industrial base…

MiC2025 is a complex and continuously shaping Industrial Development Strategy that will guide China to become a ww leading Manufacturing power by 2049

Overall MiC2025 Strategy

"Group" Strategy

China's Ultimate Goal

A global leading manufacturing power (From Large to Strong)

4 Basic Principles to guide the strategy

1. Market-oriented & Gov-led
2. Pragmatism & Long-term view
3. Overall Plan & Major Projects
4. Independence from & Collaboration with others

3 Steps to accomplish the strategy

2025	2035	2049
Step1	Step2	Step3
Consolidate & Improve	Raise to the level of a mid-ranking manufacturing nation	Global leader

Execution & Support system

9 Guiding Strategies across all Industries

10 Priority Industrial Sectors where to achieve leadership

8 support measurement system (Gov-led)

1. Deepen mechanism reforms
2. Fair Market Environment
3. Financing
4. Fiscal and Taxation Policy
5. Talent Cultivation Systems
6. SME Policy
7. Openness
8. Org & Implement Systems

1 + X implementation scheme
(1= MiC2025, X=so far 11 official documents)

5 Programs

- ✓ Project/Products/Tech detailed list, w/ some emphasis on the 10 sectors
- ✓ Set for 2016-2020

4 Development Guides

- ✓ 3 Industries
- ✓ Talent System

2 Action Guides

- ✓ Service oriented Manufacturing
- ✓ Quality & Brands

Source: Series of Government issued plans and guides relating to MiC2025, In3act Analysis

The 9 Guiding Strategies (6 missions - 3 enablers) interconnect the X Implementation Schemes (11 so far, all issued by end of Jan,2017)

"9 Strategy"

Missions

1. **Enhance national manufacturing innovation capability**
2. **Deep integration of IT & Industrialization** (Smart manufacturing)
3. **Strengthen industrial bases** (Parts, Technique, Materials, Technology)
4. **Strengthen Quality & Global Chinese brand**
5. **Enforce Green manufacturing**
6. **Achieve the world wide leadership in 10 key sectors,** Defined Strategic Industries, high-end

Enablers

7. **Restructure industries to improve efficiency** and output
8. **Develop service-oriented manufacturing** and manufacturing service
9. **Foster global cooperation and strengthen global manufacturing competitiveness**

"X Scheme (11 so far)"

5 Programs Action Guides

- Innovation Centers
- Smart Manufacturing Projects
- Development of Industrial Bases
- Green Manufacturing Projects
- High-end Equip Manufacturing

2016-2020

4 Development Guides

- Pharmaceutical industry
- New Materials Industry
- Information Industry
- Talents for Manufacturing

2016-2020

2 Special Action Guides

- Development of Service-oriented Manufacturing

2016-2020

- Quality & Brands enhancement in equipment manufacturing

2016-2025

Smart manufacturing, viewed as main direction of execution of MiC2025, has set focus in '5-3-5-10' types of key missions in its program action guide

BACK UP

5 Core Equip (catogories)	3 Infrastrucutres
• High-end CNC machine tools & robots • Additive manufacturing equipment • Smart sensing & control equipment • Smart sensing & assembly equipment • Smart logistics & warehousing equipment	• National level smart manufacturing standard system (generic, core tech, and key industry level) • Enhance smart manufacturing software capability (from design, simulation, control, business management, data management, systematic solution to test and validation) • Foundation of internet of things and information security system
5 Smart Manufacturing Models	**10 key sectors (smart integrations/digitalization equip)**
• Discrete smart manufacturing • Process smart manufacturing • Network cooperative manufacturing • Mass customization • Remote operation and maintenance services	• 10 sectors identified in MiC2025 State Council doc, including: New IT, High-end CNC machine tools & robots, Aerospace equip, Ocean engineering & high-tech ships, Advanced rail transport equip, Low-consumption & new energy autos, Power equip, Agricultural Equip, New Materials, Bio-pharm & High Performance (HP) medical devices • **Example in Chinese:** High-end CNT MT & Robots sector (excerpt from the program action guide) 高档数控机床和机器人领域。高精度床身箱体类零件智能加工成套设备；高精度丝杠与导轨、高速主轴、长寿命模具、高压大流量泵阀等核心零部件制造所需的精密加工与成形制造成套装备；微纳加工、电加工与激光特种加工成套装备；机器人减速器、伺服电机精密制造成套装备。

4 Development Guides target Pharma, New materials, ICT and Manufacturing Talents; so far only the Pharma guide has been released (Example)

4 Development Guides Structure

Pharmaceutical industry (released in Nov, 2016)

New Materials Industry

Information Industry

Talents for Manufacturing

➢ Jointly Releases by**: MIIT, NDRC, MOST, MOFCOM, NHFPC (**National Health and Family Planning Commission), **CFDA** (China Food & Drug Admin)

➢ **Defined 8 Major Goals and Missions** following MiC 2025 X scheme and traditional Gov approach:

Goals	X scheme	Traditional Approach	Goals
✓ R&D expense (industry):>2% ✓ Grow new drug registration	Innovation	Industry Growth Target	✓ Industry revenue: >10% annual growth
✓ # of companies with GMP >100	Quality Improvement	Supply security	
✓ Lower energy consumption, CO2, water consumption, VOCs per unit of value-added	Green Development	Restructuring	✓ Raise industry concentration level
✓ MES usage reach 30% ✓ Build a # of pilot smart production depts.	Smart Manufacturing	Internationalization	✓ Export/sales ratio > 10% ✓ Overseas investment, int'l technical cooperation, etc.

➢ **Promote development of 6 major areas/products**

1.Bio-pharmaceutical
2.Chemical medicines
3.Chinese medicines
4.Medical devices
5.Pharmaceutical excipients & packaging systems
6.Pharmaceutical equipment

2 special action guides, issued by MIIT, provide improvement solution guides along the entire manufacturing value chain and areas

Special Action Guide1: Development of Service-oriented Manufacturing

Objectives

2016-2018

By 2018,
- cultivate 50 "role model" companies,
- support 100 pilot projects; establish 50 public platform,
- identify 5 "role model" cities with service-oriented business a major role

Enhance Value chain

Manufacturing R&D design	Manufacturing Quality & Effciency	Sales & Aftersales Service	Business (Service oriented) Model
• Innovative design, • Customization,	• Supply chain optimization, • Internet of things based collaborative manufacturing, • Tech, process and knowledge outsourcing	• Product full lifecycle management, • System solution (eg., total integrated EPC, energy management contract), • Innovative value-added infoservice	Forge new competitive edge: • Relevant financial service • Innovative service mode integrating innovation and 'interenet plus' • B2B ecommerce mode, bid data,etc

Special Action Guide2: Quality & Brands enhancement in Equipment Manufacturing

Phase1	Phase2	Phase3
2016-2018	**2019-2021**	**2021-2025**
Breakthrough in major area Improved performance indicators	Enhance the entire sector, and MiC equip market share are largely lifted	Match the world leading countries of manufacturing power

Enhance 6 Major Areas in Value Chain

- Integration of Quality & Brand,
- Breakthrough in core generic tech,
- Focus on the 10 key sectors,
- Enrich service portfolio of manufacturing,
- Enhance equip performance and quality to boost downstream manufacturing,
- "Go global" strategy implementation,

MiC2025 lists 10 key sectors/20 sub-sectors as development priorities. A Technology Roadmap has been developed by NMSAC

10 Sectors in MiC2025	20 Sub sectors
New IT	• Integrated circuits and special equip • Telecomm equip • Operating systems and industrial software • Smart manufacturing core info equip
High-end CNC machine tools & robots	• High-end MT & basic manufacturing equip • Robots
Aerospace equipment	• Aircraft • Engine • Airborne equip & system • Aerospace equip
Ocean engineering & high-tech ships	• Sub-sectors not defined
Advanced rail transport equipment	• Sub-sectors not defined
Low-consumption & new energy autos	• Low-consumption vehicle • New energy vehicle • Smart connected vehicle
Power equipment	• Power generation equip • Power transmission & transformation equip
Agricultural Equipment	• Sub-sectors not defined
New Materials	• Advanced base material • Key strategic material • Cutting-edge new material
Bio-pharm & High Performance (HP) medical devices	• Bio Medicine • HP medical device

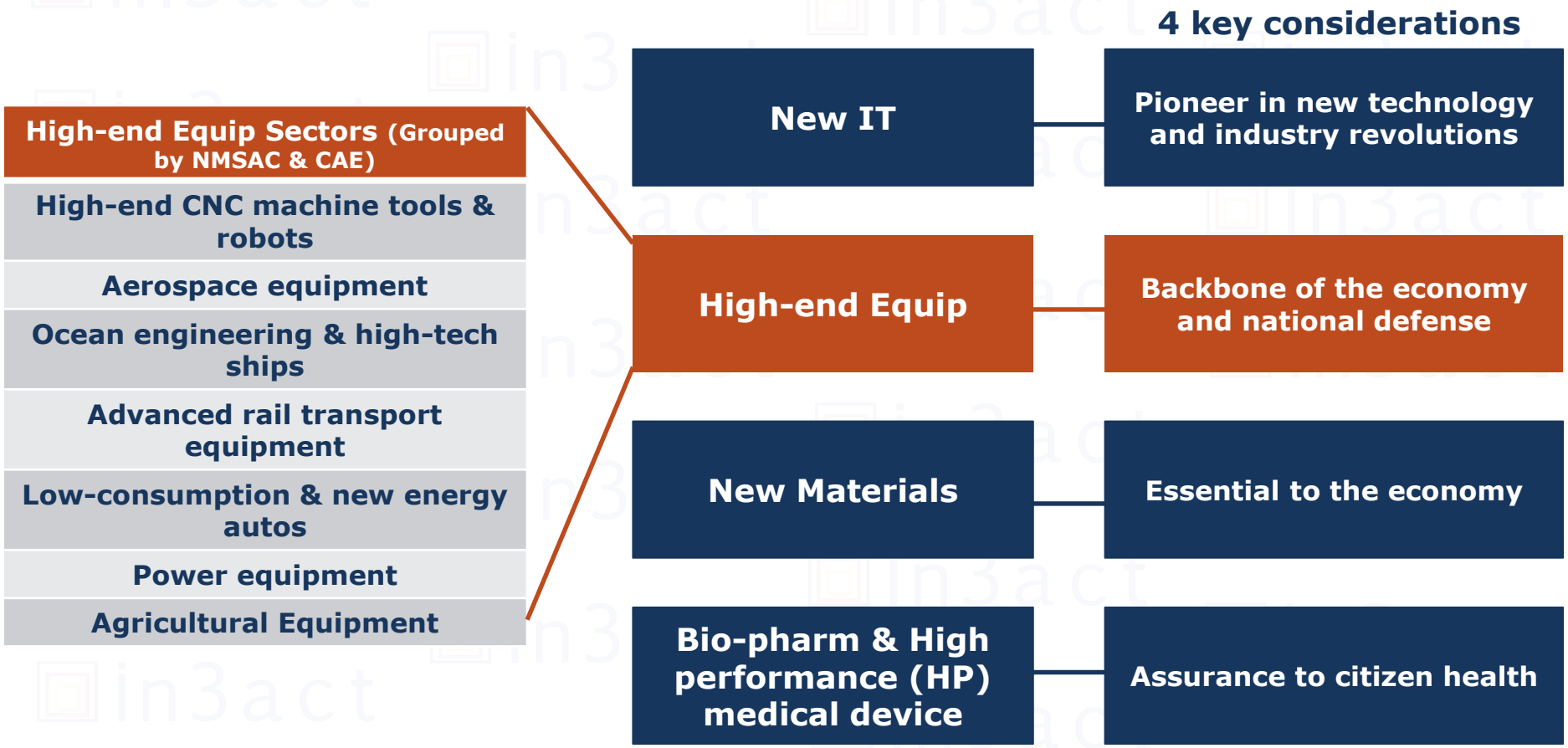
- **State council established NMSAC** (National Manufacturing Strategy Advisory Committee) in 2H2015 as an advisory body to State Council steering group,
- **NMSAC has been assigned to develop the 10 Strategic Industries Technical Roadmap** (demand, targets/indicators, focus areas, portfolio of key products/equipment and techniques, pilot projects, and support systems)
- **NMSAC also tracks sector performance** and progress annually,
- So, far, Tech Roadmap covers:
  - **> 180 key products, equipment and materials**,
  - **> 150 core technologies**,
  - **> 80 pilot projects**.

Source: 《Made in China 2025》 State Council July 7th 2015, MiC2025 Technology Roadmap, In3act analysis

NMSAC Technical Roadmap contains key directions for the 10 Strategic Industries, detailed through 2 key criteria and 4 key considerations

2 Key criteria:

- **Essential to national economy, defense, technology and people's well-being**
- **Need Government supports for development (cannot rely only on market dynamics)**



Source: MiC2025 Major Areas Technology Roadmap, In3act analysis

Each Priority Industrial Sector has its own specific Tech roadmap: example – High-end Computer Numerical Control (CNC) machine tools & robots

CNC MT & Basic Manufacturing Equip

- ✓ **Sector definition:** high-end CNC MT exhibits functions such as high-speed, precision, smart intelligence, integration, multi-axis, and network comm. Basic manufacturing equip refers to manufactures of all kinds of machines and equip.
- ✓ **Objectives:** world's largest producer, consumer and importer of machine tools, moving up from low/mid-end to high-end of value chain,
- ✓ **Domestic focus leadership, and tech leadership**
- ✓ **Key Components:** focus on high-end additive manufacturing and CNC system,
- ✓ **Support System:** innovation centers,
- ✓ **Downstream Strategic Focus:** not only from new materials and new technology, but also from key industries such as IT, aerospace, ship, rail, auto, electrical energy, engineering, agriculture, etc.

9 equip sets 10 key components
4 core generic tech 4 pilot projects

Sector Goal

Domestic Mkt Share acquired,%	2020	2025
High-end CNC MT & equip	70	80
CNC system (standard - smart)	60 - 10	80 - 30
Mid to high-end key components	50	80

Robot Manufacturing

- ✓ **Sector definition:** representative product of smart manufacturing, divides into industrial robots and service robots in non-manufacturing environment
- ✓ **Demand:** No.1 industrial robot sales market in the world, with service robot entering the implementation stage
- ✓ **World class tech leadership, MTBF target**
- ✓ **Key Components:** focus on reducer, controller, servo system and sensor,
- ✓ **Support System:** innovation centers, government led action guide, int'l standardization participation, 5-8 industry clusters,
- ✓ **Demand & capacity in China (000 units)**

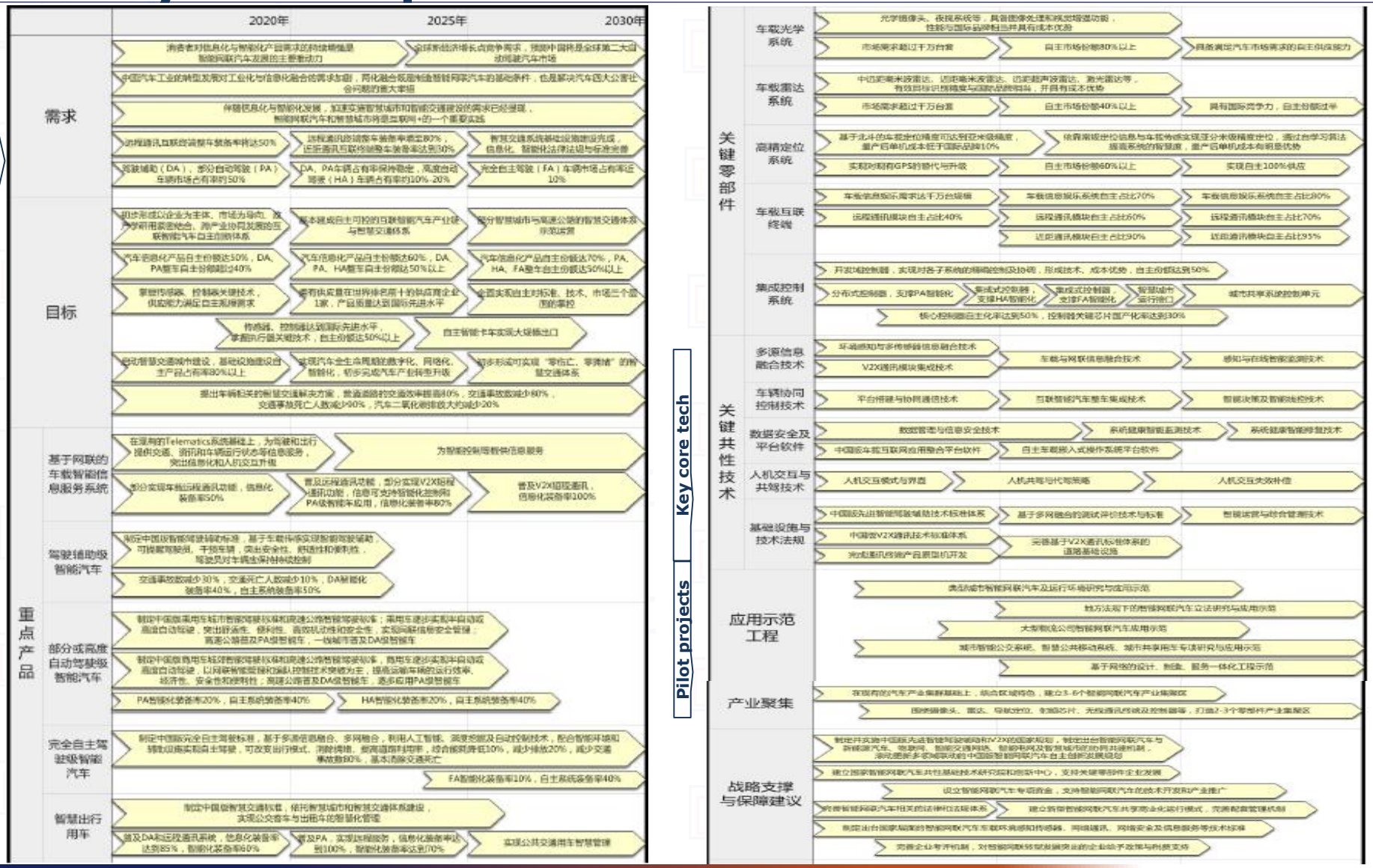
i. 150 & 800 (Yr2020)
ii. 260 & 1800 (Yr2025)

2 equip sets 4 key components
3 core generic tech 6 pilot projects

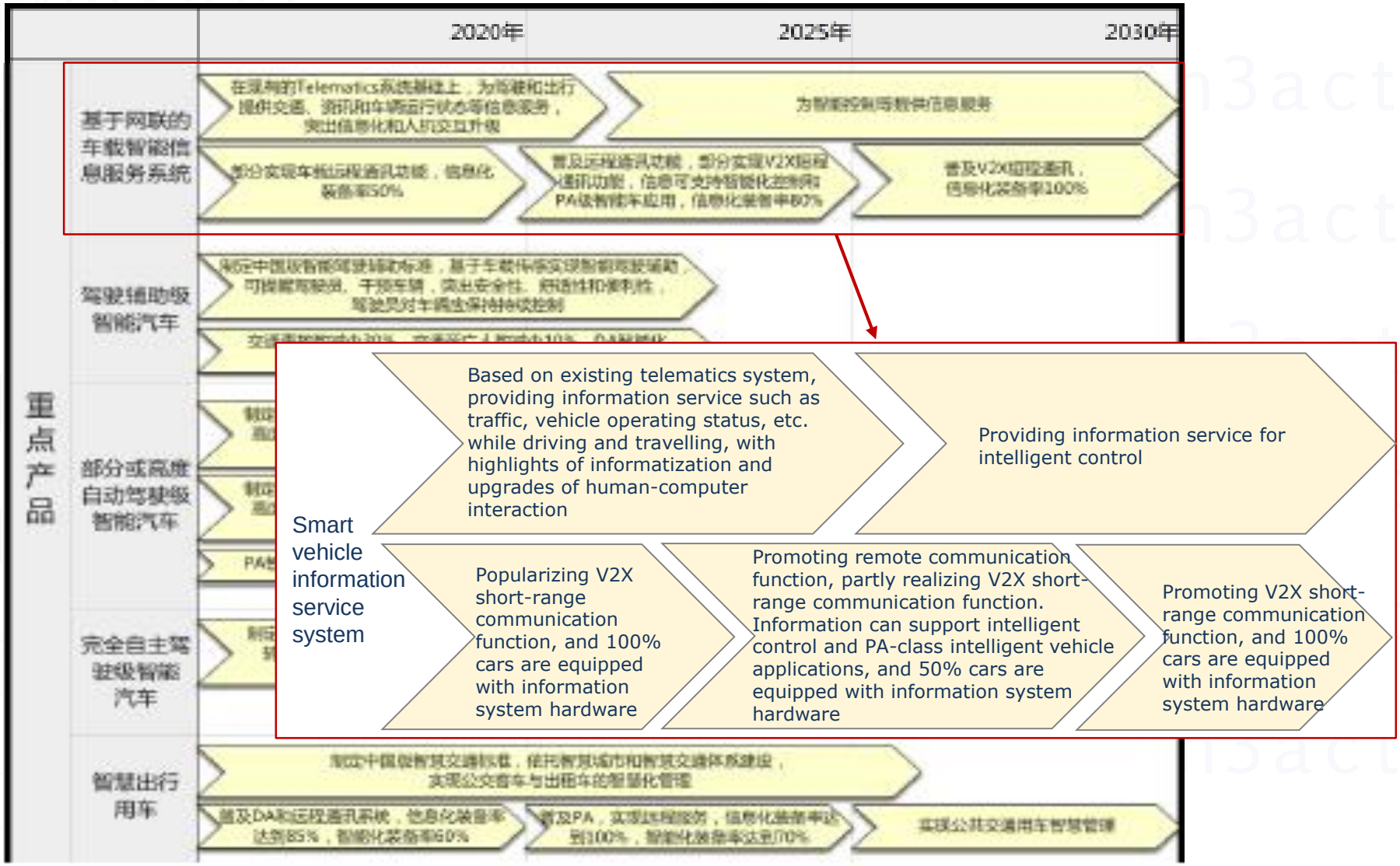
Sector Goal

Domestic Mkt Share acquired,%	2020	2025
China own brand robots	50	50
Key components made in China	70	70
1-2 Chinese companies in world top 5		

Specifically, each key sector has defined sub-sector detail for which it's possible to assess sector level maturity – Example: Smart Connected Vehicles



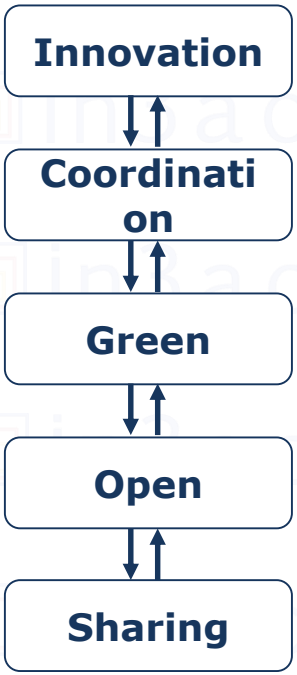
Each section is detailed with specific targets and directions – Example: Smart vehicle information service system



13th 5YP (2016-2020) embeds MiC2025 strategy and objectives setting goals with new concepts, larger scope and new framework/strategies/transformations

13th 5YP key structure

5 interconnected key concepts



Changes from the previous 5-yr plan

- ✓ **Extended scope:** 20 sections, 80 chapters (previous version: 16 sections, 62 chapters),
- ✓ **New framework:** defined 2 new categories: '**innovation driven**' and '**people's welfare**' for economic and social development goals, with some new indicators added,
- ✓ **New strategies/Transformations:**
  - **Innovation** driven strategy
  - **Optimize modern industry system**
  - **Develop internet economy**
  - **Establish modern infrastructure network** (transportation, energy, water, etc.)
  - **Incorporated marine economy** planning in overall regional development strategy
  - **Enforce ecological improvement planning** from previous green development planning
  - **Integrate MiC2025 and OBOR** into open door policy

Source: Xinhua News, In3act Analysis

We have already mapped the MiC2025 Org Structure from Steering Group and Key Contacts for conceiving a possible roadmap for Italy …

MiC2025 Steering Group (est. at MIIT)

Group Leader

Mr. Ma Kai (Vice PM)

Key Deputy Group Leaders

Mr. Miao (MIIT Minister)

Mr. Xiao (Vice Sec. G from SC)

Mr. Lin (Vice Chair - NDRC)

Mr. Cao (Vice Minister - MOST)

Mr. Liu (Vice Minister - MOF)

Other not key members

State Council

- Established steering group to plan, coordinate and review MiC2025 strategy
- Steering group office was set at MIIT

Ministry of Industry & Information(MIIT)

- **1st leader** in 10 of the X schemes (11 so far)

Key MIIT depts.	Director	Major Focus in MiC2025 scheme
Dept of Planning	Mr. Luo Wen	Gov doc release, regional planning, industrial bases, SEI
Dept of Science and Tech	Mr. Chen Yin	Innovation centers, Quality & Brand, IP, New energy autos
Dept of Equip Mfg.	Mr. Li Dong	Major equip special projects, smart Mfg.
Dept of Int'l cooperation	Mr. Tu Senlin	MiC2025 coordination w/ Germany, France and Korea, etc.
Dept of Software industry	Mr. Xie Shaofeng	Mfg. integrating w/ Internet plus, cyber security, big data
Dept of Raw materials industry	Mr. Zhou Changyi	New materials
Dept of Energy Conserv & Resource Utilize	Mr. Gao Yunhu	Green Mfg.
Dept of Industrial Policies	Mr. Xu Kemin	Service-oriented Mfg.
MIIT CIETC*	Mrs. Zheng Hong	Channel w/ embassies and chamber of commerce, etc.

NDRC - **1st leader** in High-end Equip program and energy equip, **2nd leader** in most of X scheme plans

MOST - Roles within science & technology fields in the X scheme
inistry of Science and Technology

MOF - Roles within finance and funding scheme in the X scheme

NMSAC

- **Advisory role** in MiC2025 and the X scheme, publisher of 2025 Technical Roadmap
- Mr. Zhou, Head of China Academy Engineering as Vice Chair

( ), levels in Chinese Gov

*Center for Int'l Economic and Technological Cooperation, MIIT

MiC2025 Gov organizational structure is very articulated: State Council sets overall guidance, MIIT is the main action leader, while NDRC leads high end equip planning

steps \ Role	Lead	Participate	Consult	Assess
National Strategy • MiC2025	State Council Steering Group	MIIT, NDRC, Ministries & Commissions Directly affiliated Gov bodies Regional Governments	NMSAC (**) CAE	State Council Steering group 3rd Parties
1 Plus X Scheme (5-yr) • Innovation Centers • Smart Manufacturing Projects • Development of Industrial Bases • Green Manufacturing Projects • High-end Equip Manufacturing	(MIIT) Ministry of Industry & Information (NDRC) Nation Development & Reform Comm (MOST) Ministry of Science and Technology (MOF) Ministry of Finance (MEP) Ministry of Environmental Protection MOFCOM AQSIP CAE		State Council Steering group MIIT, SASTIND (MOFCOM)Ministry of Commerce Ministry of Transport (NHFPC)National Health & Family Planning Commission China Insurance Regulatory Comm Advisory & Education Institutions	
• Development of Service-oriented Manufacturing • Quality & Brands enhancement in equipment manufacturing	NDRC MIIT MOST MOF NEA SASTIND CAE**			
• Pharmaceutical industry • More to be released*	MIIT NDRC CAE SASTIND (AQSIP) General Admin of Quality Supervision, Inspection & Quarantine		Dept of Industrial Policies, MIIT Dept of Science & Tech, MIIT Expert Advisory Board Other 3rd Parties	
Annual Special Action Plan • Strengthening Industrial Bases 2016 • Green Manufacturing 2016 • More to be announced..	MIIT NDRC CAE SASTIND		Dept of Planning, MIIT 3rd Parties	
	MIIT NDRC MEP MOST MOF		Dept of Planning, MIIT Dept of Energy Conservation and Resources Utilization, MIIT Chinese Academy of Science CAE	

(*) Rest include development guides for new materials & IT industry, talents for manufacturing (not yet released); other Gov bodies will be included
(**) NMSAC: Strategy Advisory Comm, NEA: National Energy Admin, SASTIND: State Admin of Science, Tech & Industry for National Defense CFDA: China Food & Drug Admin
Source: In3act analysis based on the collection of all MiC2025 related official documents

MiC2025 provides also key guidelines for financing, fiscal incentives and investments opportunities supporting the specific strategies

Financial Resources	Details
Diversified Financing Channel	➢ **Contribution from private capital:** Set up Central Gov-led fund to lead and encourage capital from regional government, VC/PE and other fund source (e.g. lunch of National SME fund, regional Gov fund), ➢ **Expand new financing channel and finance tools:** Use channels and tools available from capital market (for example, supply chain finance), encourage manufacturing company to set up finance companies and leasing companies.
Traditional Financing Channel	➢ **More supports to manufacturing companies:** Encourage banks to provide more loans, guide financial institutions to develop products and service tailored to manufacturing company needs, ➢ **China Development Bank and the Import and Export Bank** will set examples for supporting companies, as mentioned in MiC2025 official document (example: **China Development Bank (CDB) will provide more than 300 billion CNY financing** to support MiC2025 in 13th 5yr plan period, according to the CDB-MIIT agreement signed in Nov, 2016. CDB will also provide comprehensive financial service surrounding MiC2025, coving traditional sectors, OBOR initiative, emerging sectors, etc.).
Fiscal policy incentives	➢ **More fiscal policy incentives:** PPP investments, fiscal stimulus to innovation, value added service, key sectors R&D, etc., reforms of Central Gov Science and Technology Plan (special fund), Gov purchase programs, new tax credit on R&D expense, ➢ **Removal of preferential duty on imported key materials or components that are able to be manufactured domestically,** ➢ Use taxation and energy tariffs to encourage/discourage innovation, green, overcapacity, etc.
Investment in China/Global	➢ **Foreign investment with China:** More preference given to JVs investment and cooperative development, ➢ **Global investment from China:** Encourage to use industrial fund and gains from state owned capital **to support** (e.g. AGIC Capital focused on industry 4.0 in EU, with China's Sovereign Wealth Fund as LP), ➢ **Chinese overseas investments**, Chinese Companies Go-Global strategy (high-speed rail, electrical equip, EPC).

Source: In3act analysis based on the collection of all MiC2025 related official documents

In particular, for invested capital and corresponding project management within the context of MiC2025, China now wants to leverage private capital and professionals

MiC2025 Projects Financing Initiatives (Selections)

Industrial Projects (Current)

- **Establish more Gov supported industrial investment funds** such as **Advanced Mfg Fund** (Phase1, 20 billion CNY) to draw private capital and leverage national finance capital
- E.g., **National Integrated Circuit Investment Fund** was established in late 2014 in Beijing Phase-1 fund raised a total 140 billion CNY. Major shareholders include Ministry of Finance (majority shareholder), CDB capital, China Tobacco, E-town Capital, China Mobile, Guosheng Group, CETC, Tsinghua UNIgroup, Sino-IC capital (GP). The fund invested more than 26 billion CNY by the end of 2015.

R&D Projects (Current)

- **Establish R&D expense subsidy program**, covering varying degrees of firms' R&D total expense incurred in the previous year,
- **The funding scheme tailors to R&D demand in different phases** with different Gov sponsors: Startup-NDRC, MOF; Tech commercialization-MOST; SME-MOF, MOST, MIIT, MOC; etc.,
- **Project management will be handled by professional institutions**, while government's role is only within the scope of overall planning, policy and monitoring.

More Financial Leverages (Future)

- China will setup and promote more types of funds such as:
  1) Transformation & Upgrades Fund,
  2) SME Development Fund,
  3) Public-Private Partnership, etc.

Source: In3act analysis based on the keynote lecture content by Minister of MIIT in July, 2015

MiC2025 is already in execution: 'Plus X' Scheme has been put into practice since 2015, some executions started to generate results …

Implementation of MiC2025 following ''Plus X' Scheme (as of Jan, 2017)

Execution → 'Plus X'	Action Guides	Associated Guides/5-yr Plan/Catalog	Regional Gov Actions	Central Gov-led Execution Results	Further Strategic Research	New execution based on existing measures
Innovation Centers /platforms		New <core general tech guide> defined 205 key techs, etc.	Built innovation centers (e.g., center for power battery)			
Industrial Bases		Defined 11 category develop catalog, etc.			CAE-lead research and from other advisory bodies	1. >250 pilot projects accumulated in 4 yrs 2. MIIT monitor system launched in 2015
Smart Manuf		New guide on national system development, etc.	Industrial zones	1. **109 pilot projects** totaled in 2015-2016 2. High-end equip special initiatives	CAE-led research	
Green Manuf		Released Industry Green Development Guide, etc.	21 provincial level plans	Approved 51 low carbon industrial zones, 11 pilot plans and 200 key pilot projects		1. Major pilot projects on green transformation & industry recycling; 2. Financial incentives
Service-oriented Manuf			Achievements on industry design, new business model, industrial zone development			
Quality & brands		Manuf champion pilot company cultivation scheme (1st batch-60 companies identified)				Integrating with concepts of internet plus, smart manufacturing, etc.
High-end equipment	**Reflected in other 'Plus X' executions, including 4 major technology special projects**					
Production Safety		Covered in multiple guides, highlighted in 2016 investment roadmap				

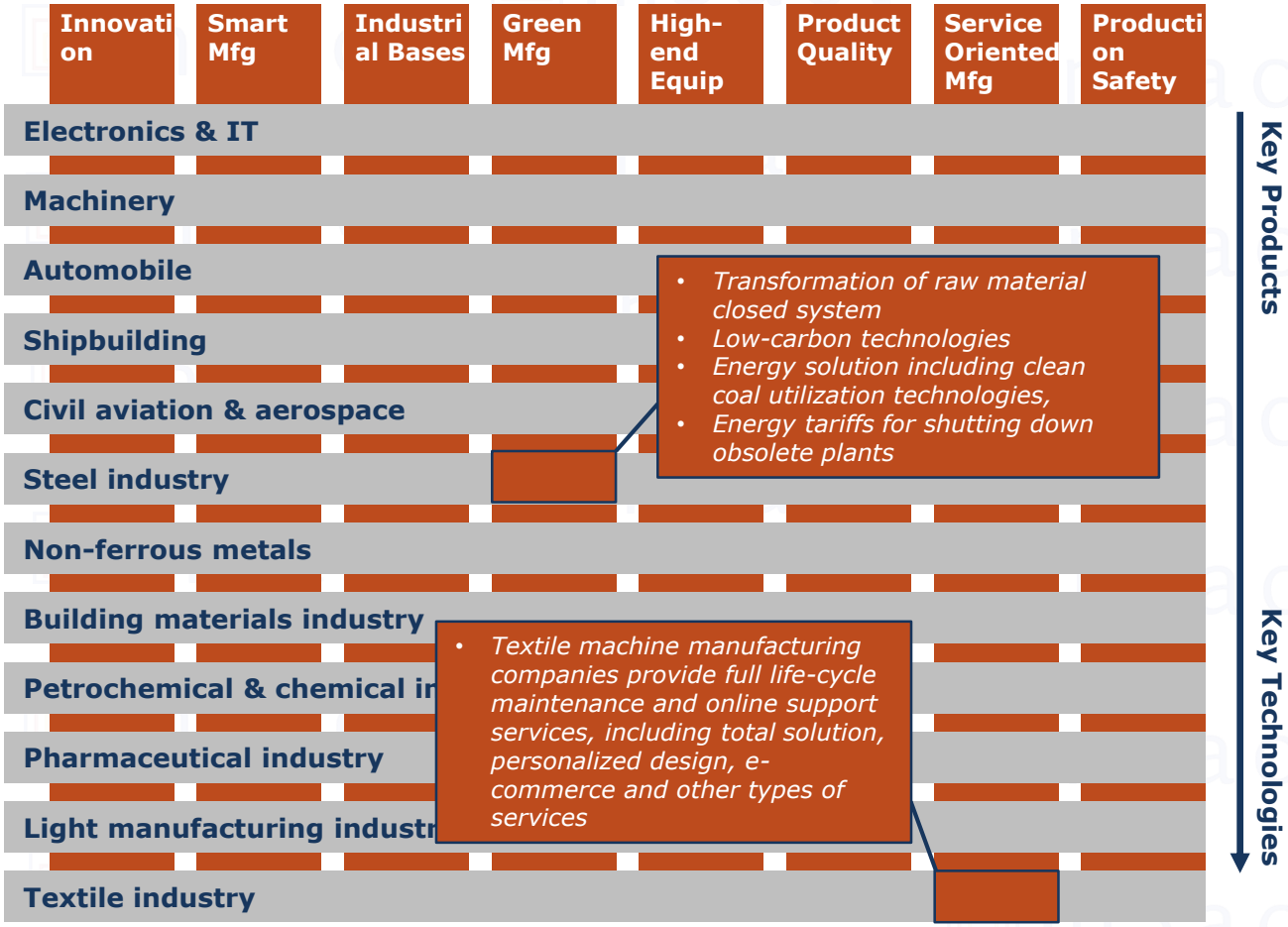
Results survey: Productivity +25%, Energy utilization +7%, Operating cost -20% on average; Domestic software & equip usage rate: 55-70%

Source: MiC2025 2015 Blue book, MIIT interviews, In3act analysis

Execution in progress

… as well as in Nov 2016, a MiC2025 investment roadmap has been released by advisory bodies led by China Int'l Engineering Consulting Corp, highlighting investment focuses

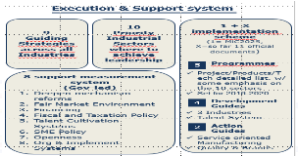
New Investment Roadmap highlighting Cross-sector Strategies
(selected examples from 2 sectors)



- ✓ Research output from China International Engineering Consulting Corp., along with 11 industry associations
- ✓ Incorporated MiC2025 framework, covering 12 industries with 8 cross-sector key dimensions
- ✓ Key investments guide for Government agencies at all levels and financial institutions, planned to be updated every 3 years
- ✓ For key industries, focus on several areas where breakthrough in technology and commercialization can be made in 3~5 years

Source: 2016 Industrial Companies Investment Guide, In3act analysis

MiC2025 execution is in progress: Example - Ningbo selected as 1st pilot city among 30 candidate cities (execution at Municipal level)



MIIT on MiC2025 Execution

MIIT's New Approach Exploration

- **Key handle to turn MiC2025 into actionable targets**, by integrating the 1PLUSX scheme w/ regional perspectives,
- **Pilot cities will set future** directions for other cities,
- **Leverage innovation and motivation of Regional Governments**,

Ideal Pilot City Guides

- **Quality & Efficiency Focus,**
- **Planning within the scope of MiC2025** (many cities/provinces went beyond it)
- **Layout 3-yr action guides for implementation**
- **Emphasis on regional unique characteristics and advantages**
- **Leverage policies and resource from MIIT**, provincial and city level governments
- **Leverage national level advisory bodies** such as NMSAC and CAE
- **Encourage experiences exchange** and 'role model' promotion
- **Implement performance evaluation system**

Ningbo Profile & Future

Unit: CNY; 2015 annual data

Gross output in industry value	Value-added in Industry output	Industry Value-Add As % of GDP	R&D as % of GDP
1670 bn	300bn	43%	2.4%

- Growth center in Yangtze River Delta Economic Zone
- No.1 Gross output of industry value in Zhejiang
- 8 industry clusters w/ more than 100 bn CNY output
- Equip sector: more than 45% of industry value-add
- Ningbo-zhoushan port is the world largest by cargo volume

Future Strategy (2015-25)

- **Smart manufacturing as main theme,**
- **Leading focus on sectors such as new materials, high end equip, and new IT,**
- **Enhance well established sectors** such as auto manufacturing, green petrochemicals, smart home appliances, textile & apparels,
- **Grow new industries** such as bio-medicine and ocean technology, and support the development of service-oriented manufacturing firms.

Source: Desktop research, In3act analysis

With respect to quality & brands, an implementation of Mfg individual championship pilot company cultivation scheme identified 60 companies as a first batch

Back up

- **MIIT selection criteria:** 1. focus on core business; 2. leading strength in domestic or int'l market and technology, review selected companies on a regular basis
- **Scheme mission:** by 2025, enhance capability of 200 certified pilot companies; identify and cultivate 600 companies to become manufacturing individual champions

List of pilot companies (selections)

Pilot companies/Chinese names (selections)	Location	Main Products
Zhenjiang Hydraulics Co/镇江液压股份有限公司	Zhenjiang, Jiangsu	Hydraulic steering control units
Hua Cheng Group-Zibo Water Ring Vacuum Pump Factory/淄博水环真空泵厂有限公司	Zibo, Shandong	Water-ring vacuum pump
Kingenta Ecological Engineering Group/金正大生态工程集团股份有限公司	Linqin, Shandong	Mixed (combined) fertilizers
Xi'an LONGi Silicon Materials Corp/西安隆基硅材料股份有限公司	Xi'an, Shanxi	Poly-fuorinated ethylene propylene, polyvinylidene fluoride
Shandong Huaxia Shenzhou New Material Co/山东华夏神舟新材料有限公司	Dongyue, Shandong	Mono-crystalline Silicon
Lovol Heavy Industry Co/雷沃重工股份有限公司	Weifang, Shandong	Grain combine harvester
Sinosteel Xingtai Machinery & Mill Roll Co.,Ltd /中钢集团邢台机械轧辊有限公司	Xingtai, Shandong	Rolls
…	…	…

State Council Circular 5/17 is an important signal in general and specifically for a possible fair treatment of Foreign Companies within MiC2025

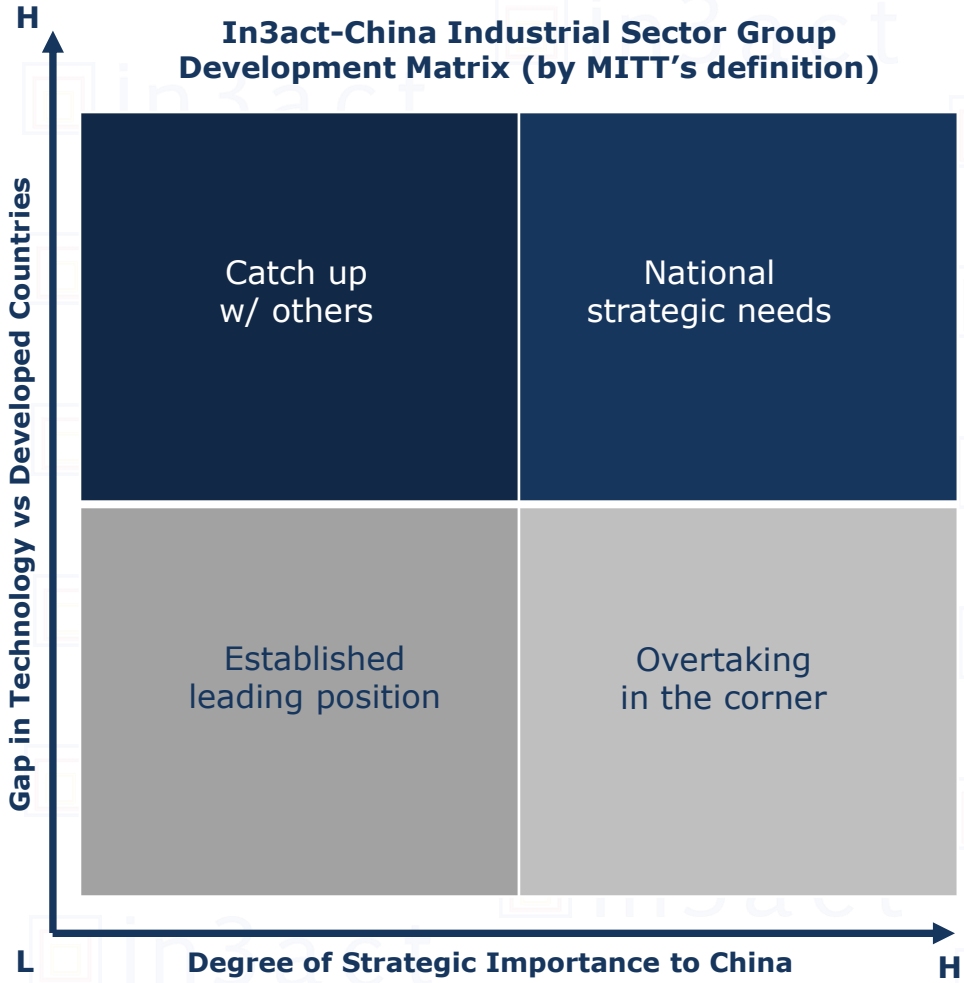
State Council Circular N. 5, Jan 17th 2017 Excert

1. ……. In addition, **it encouraged foreign investment to take part in the implementation of China's innovation-driven development strategy**, and transformation & upgrades in the manufacturing sector
2. **The service industry focuses on lowering restrictions on foreign capital access** …..
4. **Foreign-invested enterprises and domestic-funded enterprises shall be equally applicable to for the policies and measures issued in the "Made in China 2025" strategy**. (NDRC, MIIT, Ministry of Commerce, General Administration of Quality Inspection take responsibilities by divisions)
10. **Promote the equal participation of domestic and foreign enterprises in China's standardization work**. (Leading by National Standards Committee)
11. ……. **promote fair competition among domestic and foreign enterprises in Chinese government purchase bidding**.
12. Strictly protect Intellectual Property Rights of Foreign - invested enterprises in accordance with the Law. …..
13. Support foreign-invested enterprises to broaden the financing channels.

Source: State Council Circula N. 5 Jan 17th 2017

China Gov gathered the 10 Strategic Sectors within 4 groups on the basis of technical gap and strategic importance, each with strong ambition (goal) for MiC to fill

China's MIIT view in the positioning of its key industrial sector groups



Details of Key Industrial Sector Group (examples) (*)
• Aircraft & Aerospace equip • High-end CNC machine tools & robots • Integrated circuits & special equip
• Autos • High-end equip • New materials • Bio-pharm & HP medical device
• Telecom equip • Smart equip (wearable devices, etc.)
• Advanced rail transport equip • Electrical equip • Ocean engineering & high-tech ship • Household Equip

(*) Selected industries are not comprehensive, but cover most of 10 sectors highlighted in MiC2025

Source: In3act analysis based on the keynote lecture content by Minister of MIIT in July, 2015

MiC2025 implies both Opportunities and Threats for foreign countries and MNCs, to be carefully analyzed for getting prepared to get advantages …

•Opportunities for foreign Countries/MNCs

- Develop business where China needs technologies and solutions focusing on 9 Strategies,
- Fully exploit legislation changes and quick react to identify business opportunities in the specific industrial sector (e.g. green mfg.),
- Attract Chinese firms investments abroad to acquire know how and pursue "go global" strategy,
- Sell Technologies, equipment and solutions in the short/medium term,
- Set up Education patterns (not only vocational),
- Partnering at Government level for specific strategies (e.g. green manufacture) and/or industrial sectors (e.g. aerospace),
- Propose and leverage pilot projects,
- Finance participation to MiC2025 implementation with high IRR perspectives,
- Re-localize at home productions of goods not fitting Chinese internal market.

Threats for foreign Countries/MNCs

Threats (general)

- Global high quality Chinese products competition in international markets,
- Higher import duties for 10 Strategic Industrial Sectors, harder times for "export" models within 10 Strategic Sectors in China,
- Know-how "suckling" from investments abroad, shutting down operations and move to China,
- "Selling out" know-how, technologies and firms not considering the real value for China (underselling",

Threats (if SC Circular won't be properly implemented)

- Market distortions through subsidies and incentives to Chinese firms and fully Chinese "indigenous" productions,
- More "presence" of Government and Party into business relationships, making harder to do business,
- B2G even more closed and tight,
- IP protection not fully enforced.

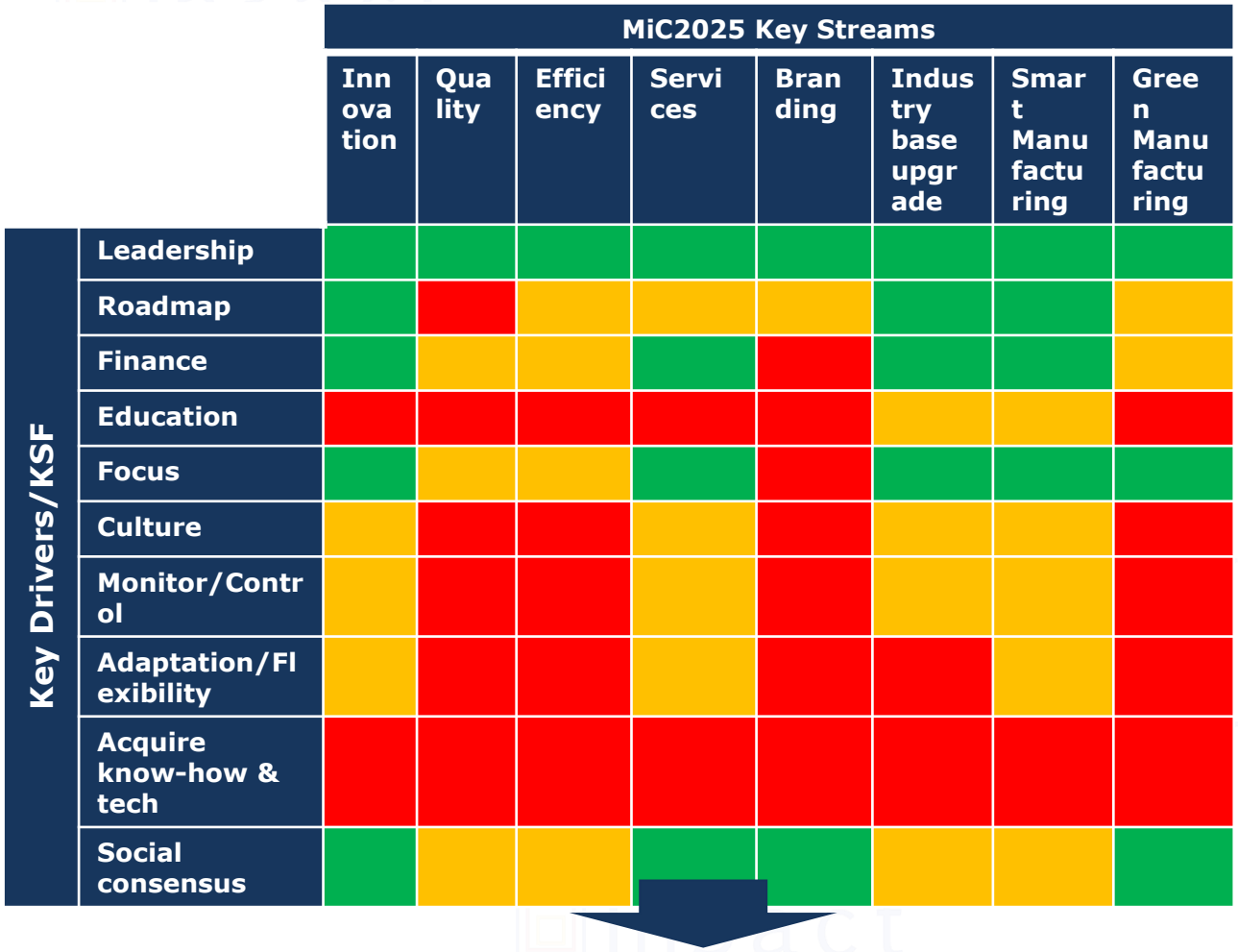
- **Fully and deeply understand MiC2025** in general and in detail for the specific industrial sector,
- **Dramatically increase R&D investments** and make innovation becoming a pivotal core strategy of the company,
- **Be prepared to fully exploit and possibly anticipate legislation changes** constantly monitoring political discussions and trends,
- **Get prepared to localize production in China** for the 10 strategic sectors,
- **Get prepared to compete at global and international level** with high quality Chinese products.

Education, Culture and how to acquire know-how and tech are going to be the most critical KSF for achieving MiC2025 goals…

Key Success Factors for accomplishing MiC2015

Key Drivers/KSF	
Leadership	Very Strong, China at turning point, MiC2025 is not an option.
Roadmap	Clear on intentions, not very clear on execution, "Chinese" in planning, but efforts are seen on better coordination among different levels of Gov bodies.
Finance	Very strong on paper, mostly rely on private finance.
Education	Actually, non significant mentioning as the only real base for accomplishing MiC2025. Some focus on vocational training. Weakest part of MiC2025!
Focus	Strong, although regional/local execution is introducing distortions.
Culture	Together with Education is the weak and not addressed driver, especially for Quality targets.
Monitor/Control	Very weak within the overall design.
Adaptation/Flexibility	Weak at national level, good at local level.
Acquire know-how and tech	Cooperation with Germany could be a wild card, since the foremost things are to change a mindset from 'developing country' to 'developed country', and to master not only the knowledge but also the interpretation skills.
Social consensus	No significant analysis on MiC2025 impact on social transformation and consensus.

… making the overall accomplishment uncertain if not in an unexpected "Chinese Way"



- Education and overall "Culture" will be the fiercest stumbling blocks for MiC2025
- Results Monitoring and Flexibility/Adaptation will be execution challenges

Will China be able to achieve the expected goals?

YES … in the "Chinese Way"

Many countries have already started specific MiC2025 cooperation programs, e.g. Germany/UK/France/Switzerland

	Progress in Cooperation & Proposals (examples)	Current offering to China
 Germany	• National level Memorandum of Cooperation signed in July 2015 between Govs., • Ministry level coordination b/t China MIIT & Germany Ministry of Economic Affairs & Energy, China MOST & Germany Federal Research Ministry, • 14 pilot projects in 2016 have been announced (e.g., Huawei SAP pilot joint solutions for smart manufacturing, Baosteel & Siemens Industry 4.0, Sino-Germany (Shenyang) High-end Equip Manufacturing industrial park, Shenyang Sino-Germany Smart manufacturing institute, etc.).	• Smart Manufacturing • 4.0 Standardization
 France	• Memorandum of Cooperation signed in May 2016, involving MIIT-Industrial Cultural Development Center, France Prospect & Innovation Foundation, CCICF, City Gov of Nanjing, Xuzhou, Ningbo and Liaoyuang, China Guanghua Foundation, • Shared visions in upgrading domestic manufacturing and improving quality of growth • Established cooperation in nuclear energy (e.g., EDF & CGNPC's joint investment in the UK's program), aircraft manufacturing, medical & health area; exploring opportunities in sectors such as finance, sustainability development, agriculture, etc.	• Equipment upgrades • Enhance manufacturing global competency • OBOR initiative collaboration
 UK	• Focus on sectors such as aerospace, automobiles, advanced manufacturing, innovative industry, marine industry and rail, establish regular work group, according to UK Trade & Investment, • Expertise in R&D, application research.	• Solution based consultancy • R&D & education • OBOR initiative collaboration
 Switzerland	• Joint statement between two nations on the establishment of an innovative strategic partnership in Apr, 2016, • Expected to expand cooperation in innovation, environmental protection, high-end equipment, etc., • Latest example: Sino-Swiss low carton city program between Swiss Agency for Development and Cooperation (under federal dept of foreign affairs) and city government of Yantai, Chongqing, Chengdu and Shanghai, started in 2016.	• Swiss made products used in key sectors highlighted in MiC2025

Source: Desktop research (as of Jan, 2017), In3act analysis

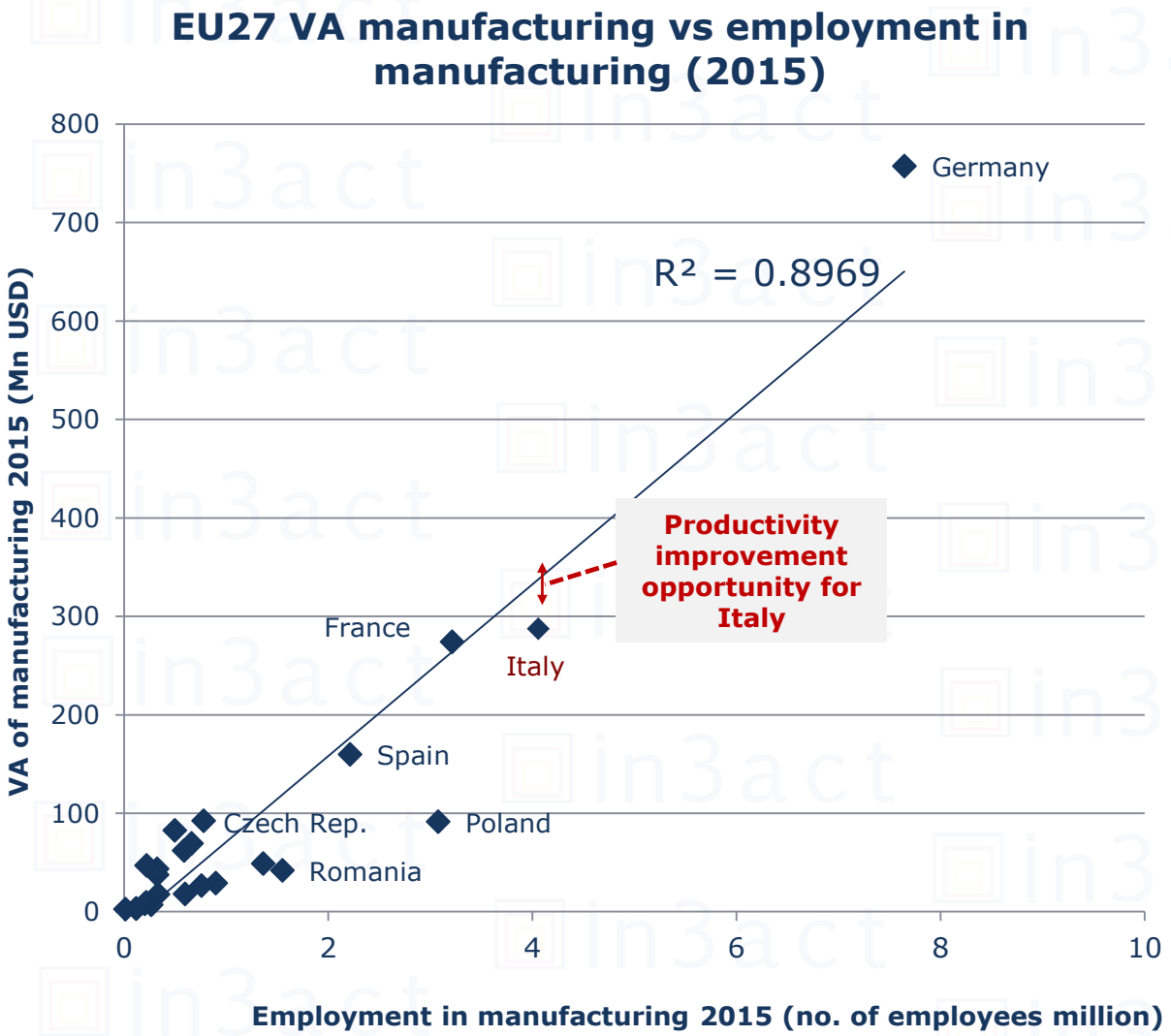
… with already pilot projects identified and running at national level across all the four strategic quadrants …

2016 list of Sino-Germany pilot projects (part1-industry cooperation)

Pilot projects with Germany companies	Sectors (on China's side)	China's Strategy Goal by Sectors
• Huawei SAP Smart Manufacturing Joint Solution	Telecommunication	Overtaking in the corner
• Baosteel & Siemens Industry 4.0	Traditional Sector	Transformation & Upgrades
• Cloud platform smart optimization • Bosch Jier Smart Manufacturing Scheduling System • Njsteel BSE Metallurgical integrated robot system	Aerospace equipment, Machine Tools, Robots	National Strategy Needs
• Haier Washing Machine cloud connected factories • Customized household appliances smart manufacturing digital plant • Photovoltaic modules smart plant	Household Equip, Electrical Equip	Established Leading Positions
• Advanced hydraulic parts smart plant	Autos	Catch up w/ others

Source: MIIT web, In3act analysis

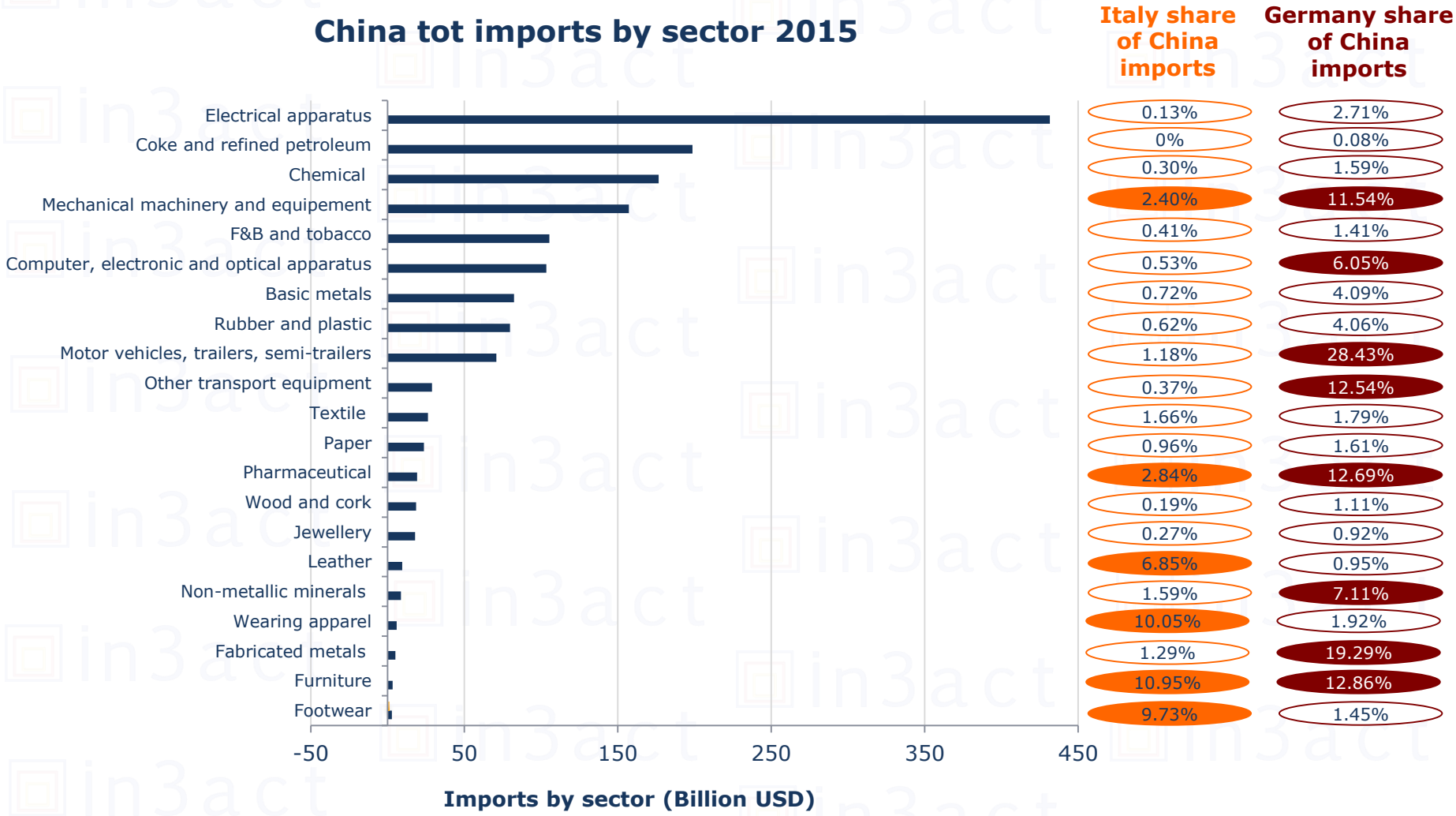
However, Italy has room for productivity improvement



- ✓ There is an obvious strong correlation between VA and employment in manufacturing,
- ✓ Although Italy is the second in EU27 in total VA, its per capita VA is lower than expected,
- ✓ This implies opportunity for improving productivity at least by 20% for getting an alignment to avg Eu27 productivity,

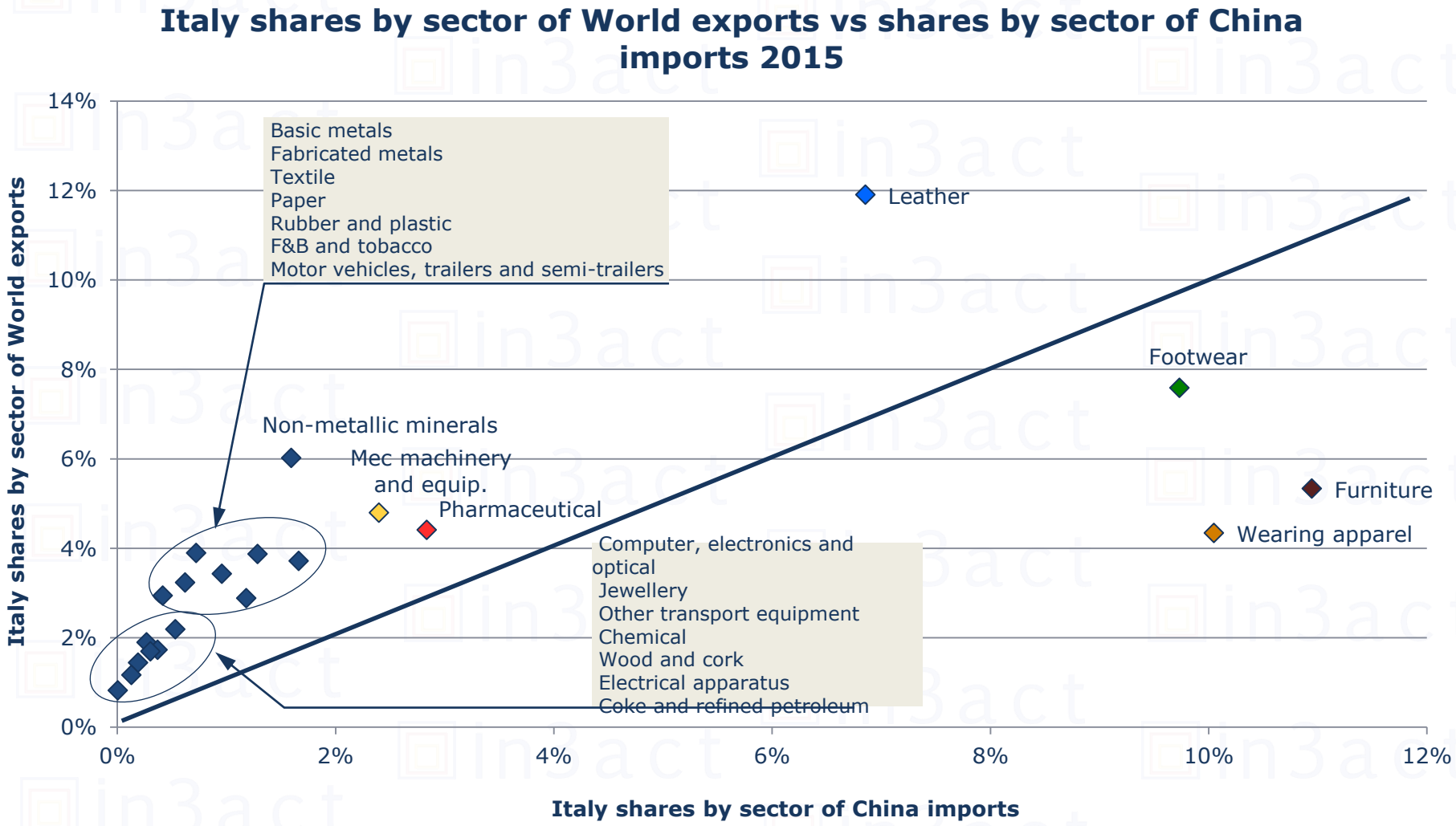
Source: Eurostat database, World Bank Database, In3act analysis

Italy has very small shares of China import in almost all sectors, with only leather, clothing, furniture, footwear pharma and machinery above 2% …



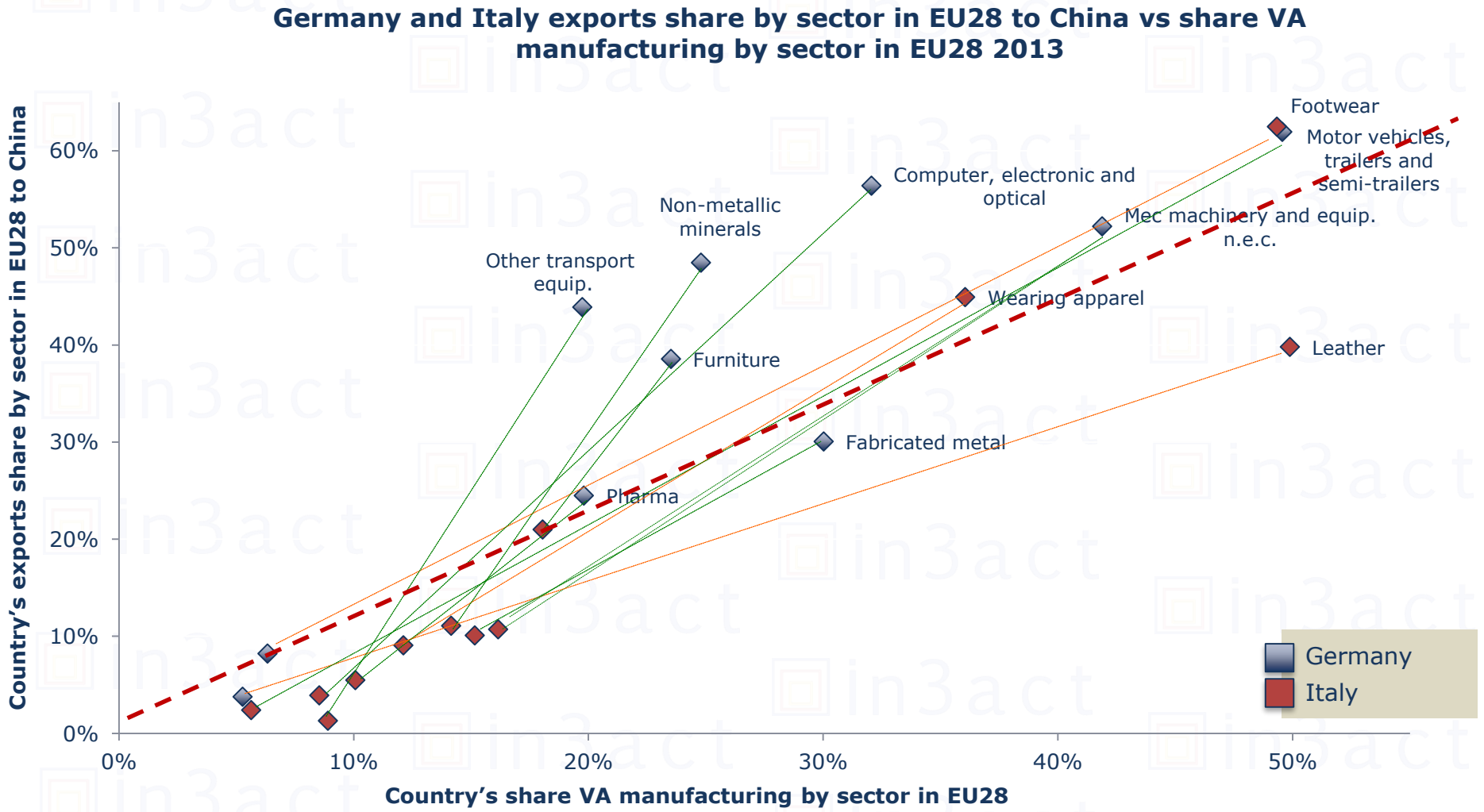
Source: International Trade Centre database, UN Comtrade statistics, In3act analysis

… thus implying most of the sectors export towards China have room for significant improvement



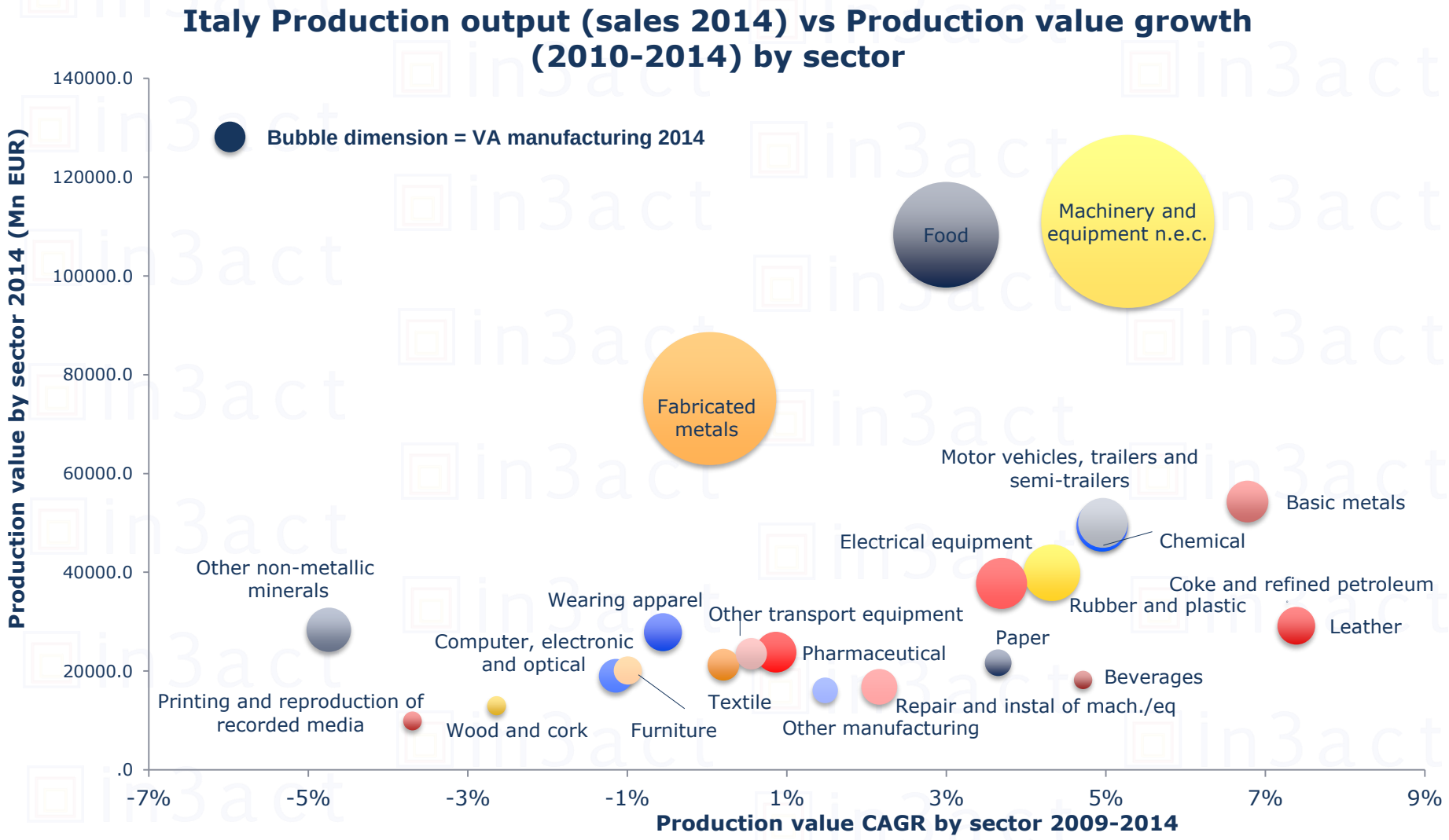
Source: International Trade Centre database, UN Comtrade statistics, In3act analysis

All Italian sectors but Clothing, Footwear and Furniture are underepresented in terms of China import compared to Germany



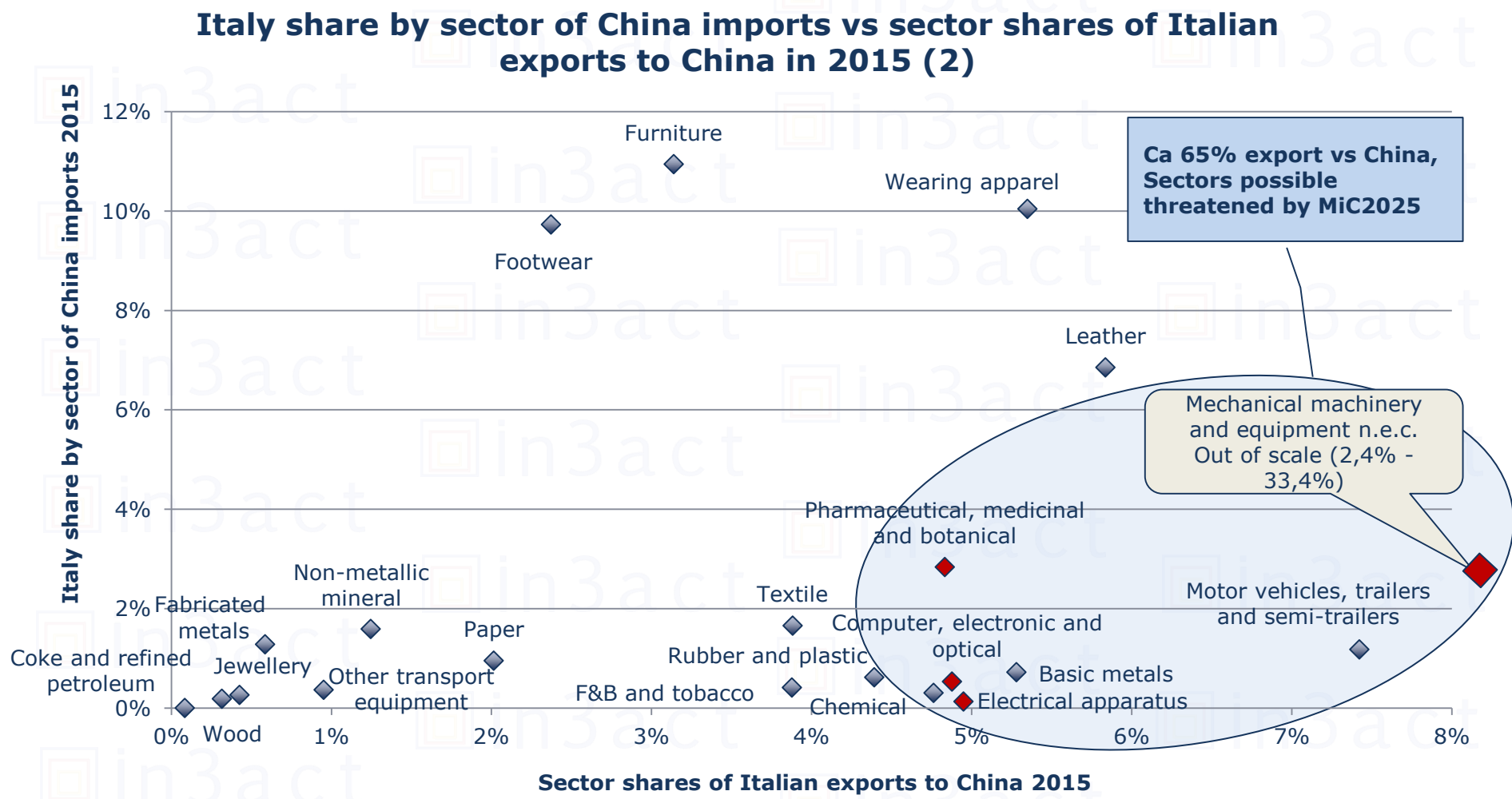
Source: Eurostat: Manufacturing statistics – NACE Rev.2, European Commission market data access database, In3act analysis

Machinery and Food manufacturing sectors represent both the most relevant in sales, growth and VA



Source: Eurostat database, In3act analysis

About 65% of export to China could be threaten by the MiC2025 10 Strategic Sectors



Source: International Trade Centre database, In3act analysis

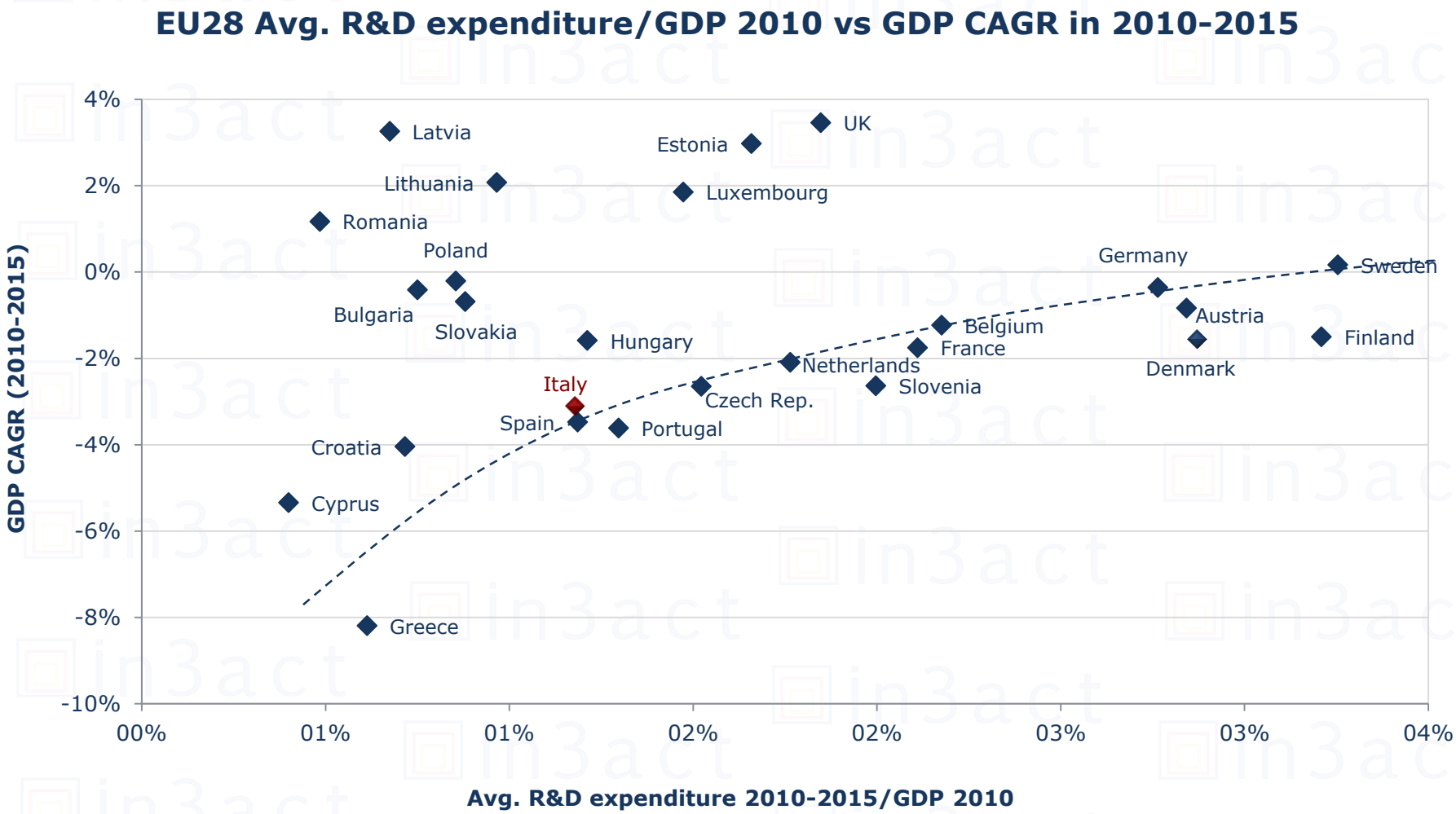
Also in terms of no. of patents by sectors, Italy is positioned far away from the big economies

G20 ranking of no. of registered patents by sector (2013)

	#1	#2	#3	#4	#5	Italy's position
Biotechnology	US	Japan	Germany	China	Korea	10th
ICT	US	Japan	China	Korea	Germany	10th
Nanotechnology (2012)	US	Japan	Korea	Germany	France	13th
Medical technology and pharmaceuticals	US	Japan	Germany	China	Korea	9th
Environmental management and technology	Japan	US	Germany	China	Korea	9th
Other registered patents	Japan	US	Germany	China	Korea	8th

Source: OECD Statistics, In3act analysis

On top of East EU countries, EU15 ones present a significant correlation between R&D investment and GDP growth



* no data for Ireland and Malta

Source: World Bank Database, Eurostat database, In3act analysis

MiC2025 implies both Opportunities and Threats for foreign countries and MNCs, to be carefully analyzed for getting prepared to get advantages …

Italy Strengths vs MiC2025

- **Flexibility and adaptation** capabilities vs German "rigidity",
- **Creativity** in designed solutions, solutions tailored to specific needs,
- **Very advanced technologies/solutions** in the "drawer", not only from SMEs,
- **Quality and customized manufacturing**,
- **Long heritage/experience**, efficiency of resources allocation, global competitiveness, premium products/services,
- **High specific know-how along the value chain** of the manufacture sector,
- **High quality study/solutions provided by universities and research centers**,
- **Worldwide leadership in some of the MiC2025 10 strategic sectors and 9 strategies,**
- **Worldwide leadership in sectors not directly involved by MiC2025 (**e.g. fashion, furniture).

Italy Weaknesses vs MiC2025

- **Superficial/misunderstanding of MiC2025,**
- **Lack of significant number of large companies** in general. Italian manufacturing represented by a myriad of SMEs**,**
- **Lack of significant number of leading large companies in China,**
- **Missing/unclear Industrial Strategy for the short, medium and long term,**
- **Biased historical consideration of China** as not an opportunity but rather a threat**,**
- **Lack of understanding of business opportunities in China from Italy,**
- **Too low level of R&D Investments,** both at Gov and company levels**,**
- **Low manufacturing productivity,**
- **In general, "Short term" vision** and perspectives both a public and firm levels,
- **Overall centralization of decision power in Italy**, lack of local management autonomy in China within firms.

- **Understand MiC2025** deeply in detail and conceive a thorough strategy to tackle it,
- **Dramatically increase R&D investments** both at public and private level
- **Sell technology/solutions/equipment with a base in China, not necessarily production, for the not-10-strategic industrial sectors** and across 9 strategies,
- **Assume a system leadership role within "green manufacturing",** the only MiC2025 strategy not directly affecting competition with made-in-china productions,
- **Strongly evaluate production localization for the 10 Strategic Sectors**,
- **Gain market shares in China and out-of-China** taking advantage of overall prices/costs increase of made-in-china products to,
- **Re-localize in Italy productions localized in China** in the past just for the sake of achieving a cost-leadership,
- **Attract/incentivize investment for not-10-Strategic Sectors**,
- **Vocational training in operation excellence**.

Only a well structured, focused, detailed program to be tackled at Government level can be able to catch all opportunities for Italian System

Qualitative for discussion

Possible Italian Approach	Description	Considerations
Bottom-up, opportunistic	Inform the system, leave Companies/Associations to take their action and tackle single/sparse opportunities adapting to the MiC2025 evolutions	- Easiest and less resources intensive, - Very "natural" for Italian System, - **Very low possibilities to catch all opportunities/defend from threats.**
Top-down, Systemic detailed Approach	Structure a detailed Sino-Italian cooperation agreement schema at Governments level, detail specific action programs for Italian Companies/Associations involvement	- Program to be structured at Government level with strong coordination among stakeholders (MAE, MISE, ICE, Embassy, CCIC, Confindustria, Associations, etc.), - **High possibilities to catch business opportunities/defend from threats.**
Top-down/bottom-up, Systemic guiding Approach	➢ General agreements at Government levels with generic cooperation statements, ➢ Leave single Sectors/Associations/Companies to structure their own programs.	- Could be the natural un-coordinated Italian approach, - Very generic and unfocused Gov agreements wouldn't imply expected benefits, - **Low possibilities to catch all opportunities/defend from threats.**

Italy, as a "system", should conceive and deploy a well structured course of actions to properly manage MiC2025 …

Qualitative for discussion

Preliminary recos to Italian Government and Institutions

Italian Government	Other Italian Institutions (In China and Italy)	Italian Chamber of Commerce in China
- **Deeply understand the actual perspectives of MiC2025**, - **Promote/facilitate MiC2025 publicity** across the Industrial community, - **Conceive and design a comprehensive and thorough strategy for Italy vs MiC2025**, - **Proactively open discussion tables with MIIT and NDRC** for shaping a Gov to Gov MiC2025 Cooperation framework aimed at maximizing the advantages for Italian economy while reducing threats, - **Increase R&D investment in the MiC2025 10 strategic sectors**, both public and private, - **Design specific ad-hoc plans for Italian industrial sectors directly/indirectly involved within MiC2025**.	- **Deeply understand the actual perspectives of MiC2025**, - **Promote/facilitate MiC2025 publicity** across the Industrial community, - **Carry out specific programs by MiC2025 involved industrial sectors**, - **Cooperate to responsibly share MIC2025 across industries** in Italy, - **Design and carry out specific cooperation programs with all Chinese institutions** involved within MiC2025 (MOST, MOFCOM, NAMSAC, MEP, MOF, etc.).	- **Deeply understand the actual perspectives of MiC2025**, - **Promote/facilitate MiC2025 publicity** across Italian Industrial community in China, - **Produce a comprehensive set of documents for members** able to clearly explain what MiC2025 is, how to exploit opportunities, how to defend from threats, - **Organize the first sino-italian Forum on MiC2025** in cooperation with Gov, Embassy, ICE and all other Italian Institutions, - **Provide preliminary advising and consulting** to CCIC members, - **Proactively promote and assist Government in addressing "systemic" approaches** to Chinese counterparts, - **Promote and participate to MiC2025 publicity** in Italy.

… avoiding to be overpowered by Col. Nicholson syndrome!

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we make your business grow

Thank You

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