China Data Analysis & Research Hub

Geoinnovation and MNEs - Capitalizing on the Ingredients for a Century of Transformation

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Our Planet, Our Future
- Conclusions of the Nobel Prize Summit 2021

Nobel Peace Prize laureate Al Gore, Prof. Dasgupta at the Nobel Prize Summit, 26-28 April 2021

- The **notion that humanity is external to the biosphere** has allowed for models (...) to enable humanity to enjoy ever-growing GDP and thus consumption.
- This is no longer the case, and it has far-reaching implications for contemporary models of economic possibilities that many still work with and draw policy conclusions from (Dasgupta and Ramanathan 2014; Dasgupta 2021).
- **Narratives of hope for transformations towards sustainable futures are in demand.**
- **It will require trust building, cooperation, collective action, and flexible institutions** (Ostrom 2010; Westley et al. 2011).

The Summit:

https://www.nobelprize.org/events/nobel-prize-summit/2021/

The Whitepaper:
https://link.springer.com/article/10.1007/s13280-021-01544-8

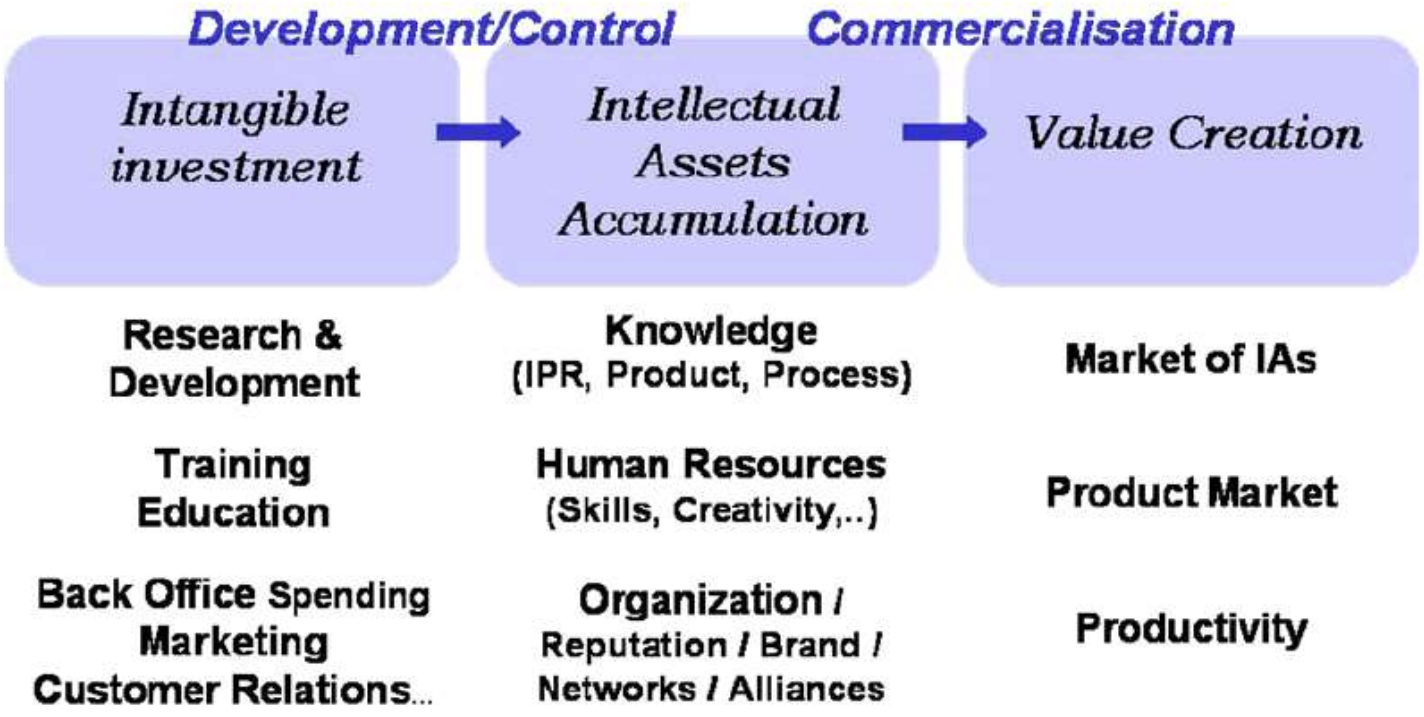
Setting the Stage

- Ingredients of and Prerequisites for Geo-innovation

Geo-Innovation
- Towards a Planetary Patriotism

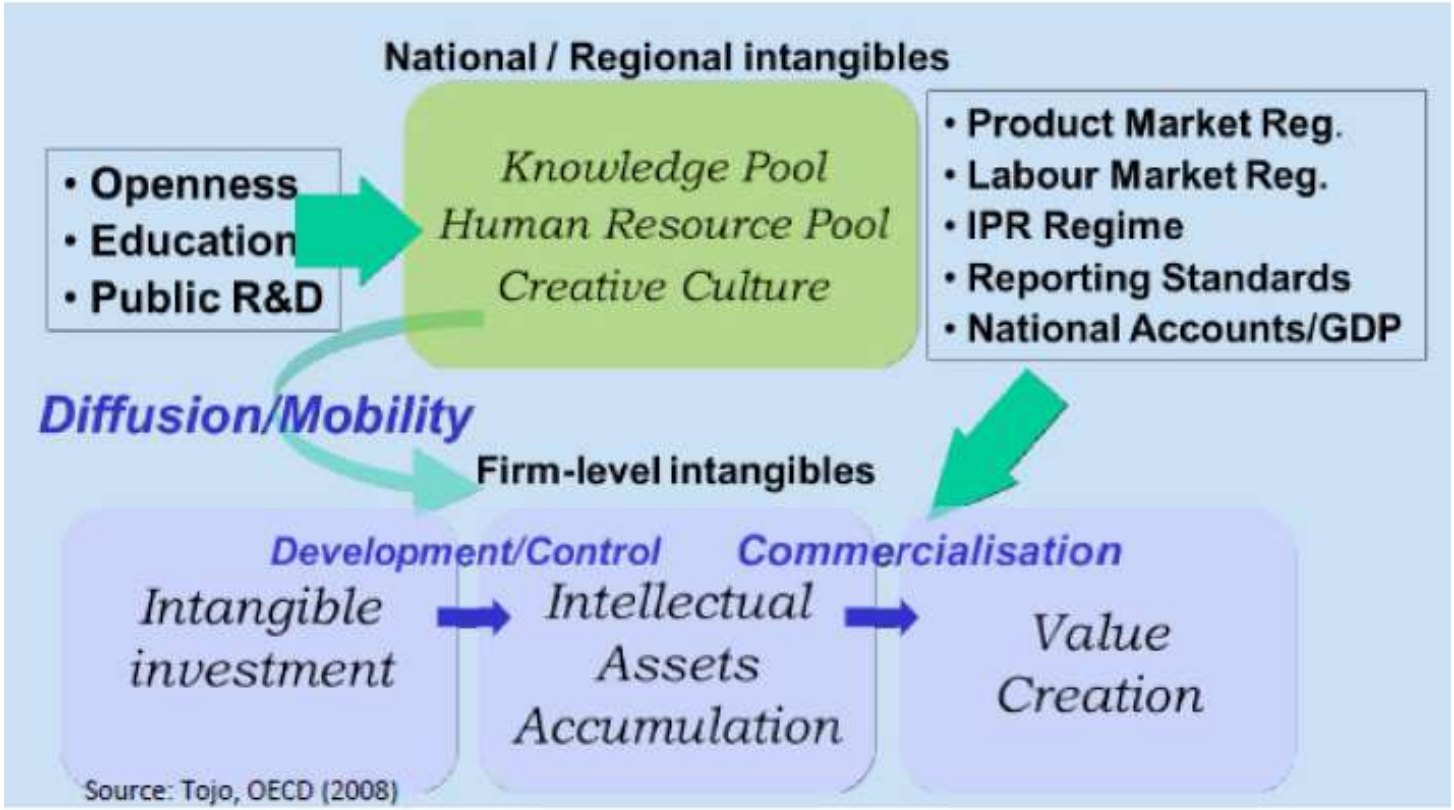
- **Geopolitics**: the analysis of the geographic influences on power relationships in international relations. Geopoliticians seek to understand how the industrial capabilities of transportation, communication, and destruction interacting with the largest-scale geographic features of the Earth would shape the character, number, and location of viable security units in the global international system.
- **Geoeconomics**: the use of economic tools to advance geopolitical objectives. One can think of geoeconomics as the interplay of international economics, geopolitics and strategy.
- **Geo-innovation**: the strategy-based collaboration of sovereign National Innovation Systems (NIS) including government institutions, universities & research organisations, MNEs (and their GVCs) and financial institutions/firms to nurture joint crossborder science, technology development and innovation as well as investments in tangible and intangible assets.

Geo-innovation calls for Strategic Investments in Intangible Assets on MNE- and Macro-Level



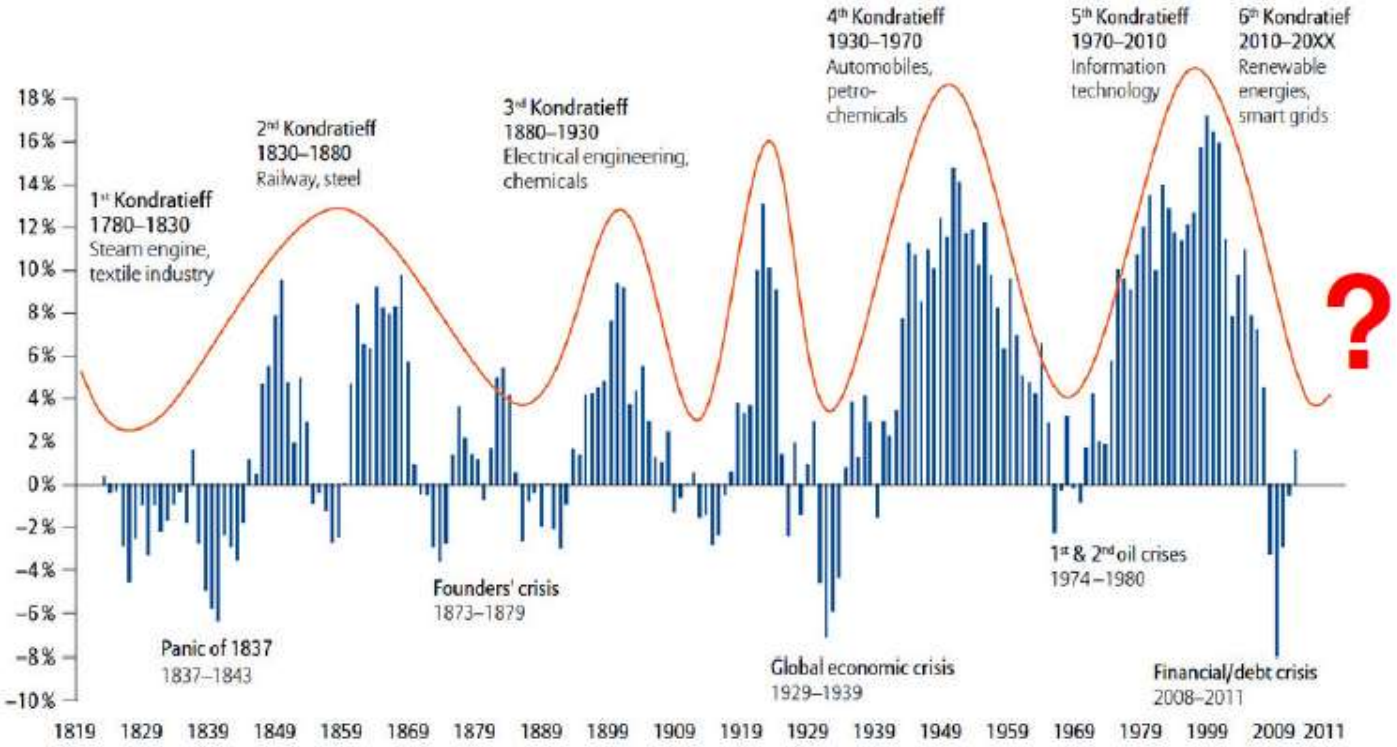
Source: Tojo, OECD 2008

Innovation driven Wealth Creation
- Prerequisites and Framework Conditions



Source: Tojo, OECD 2008

Global Structural Change
- our Sustainable and Smart Future



Source: Allianz Global Investors (2012), Shiller (2005)

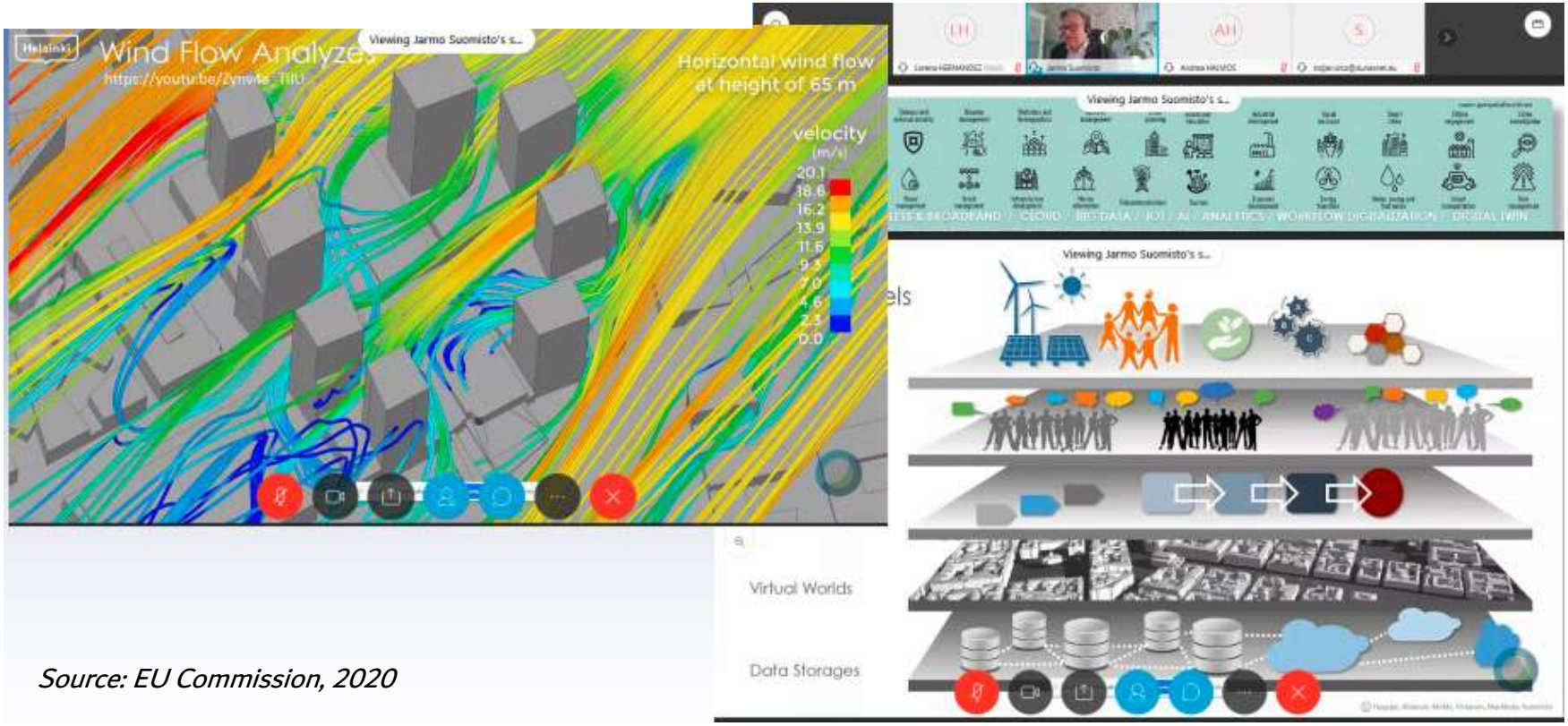
UN SDGs – a Framework for Solving the Grand Challenges of Mankind

Source: Wong, UN ESCAP 2020

The EU Green Deal
- a Master Plan for Sustainable Transformation

Source: European Commission 2019

Metropolises and Communities
- in the Focus of sustainable and digital Transformation



Source: EU Commission, 2020

Next Generation Technology and Innovation Polices for the SDGs

POLICY AREA	TRADITIONAL	NEXT GENERATION
Institutions & Infrastructure	R&D facilities / Science parks	Incubators / Accelerators / Makerspaces
Financing STI	R&D as a % of GDP / FDI	Impact investing
Human Capital	STEM	Social entrepreneurship / Tech ethics
Inclusiveness	PHDs / Doctorates / Beyond triple-helix	Women & girls / Grassroots innovators
Innovation lifecycle	Early-stage exploration / Emerging tech	Later-stage deployment / Current tech
Approach	Curiosity-driven	Mission-driven

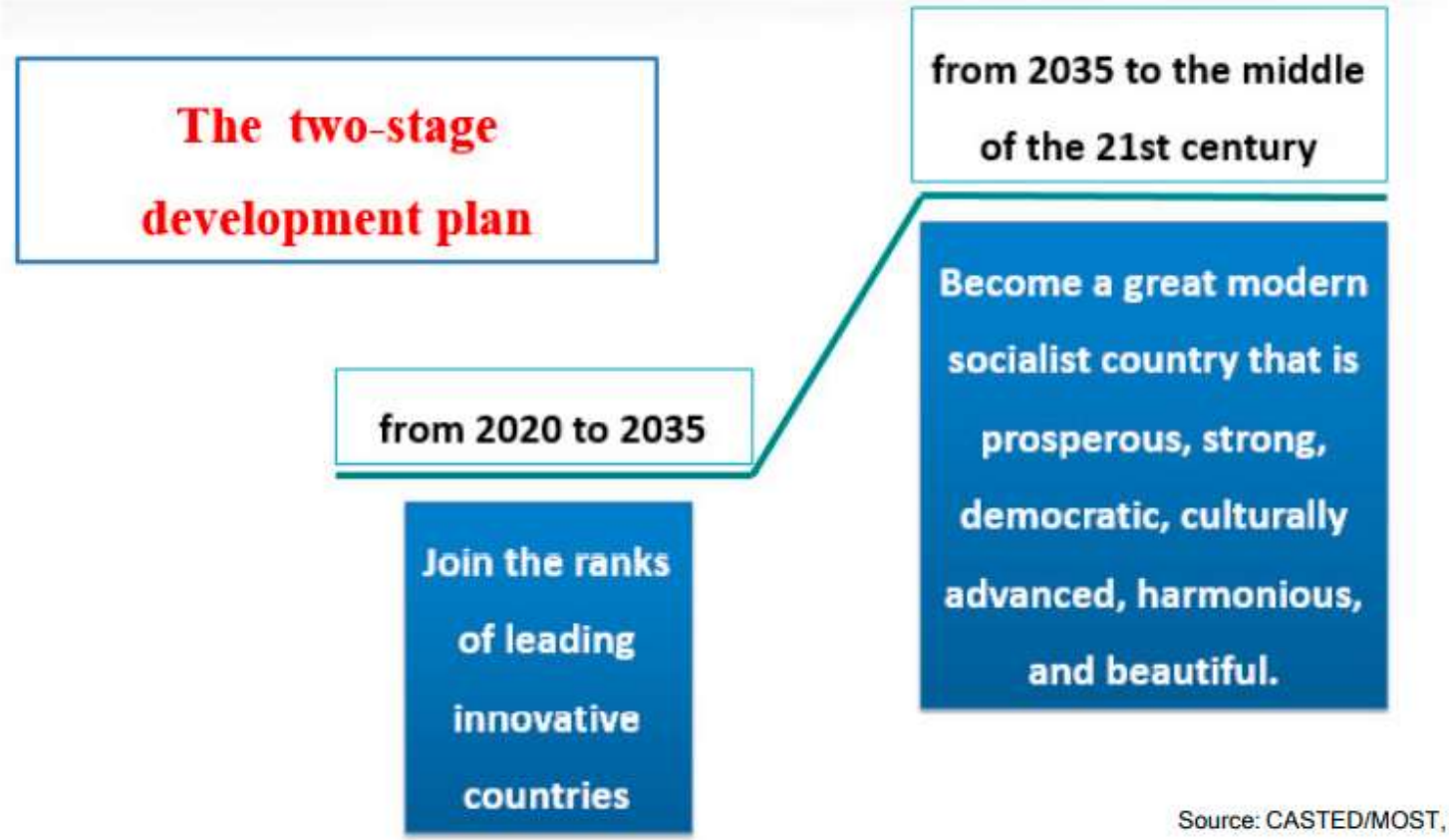
Source: Wong, UN ESCAP 2020

National and Regional Systems of Innovation
- PR China and Brainport Eindhoven (The Netherlands)

Chinese Government: the Evolutionary Direction of China‘s National Innovation System (MOST)

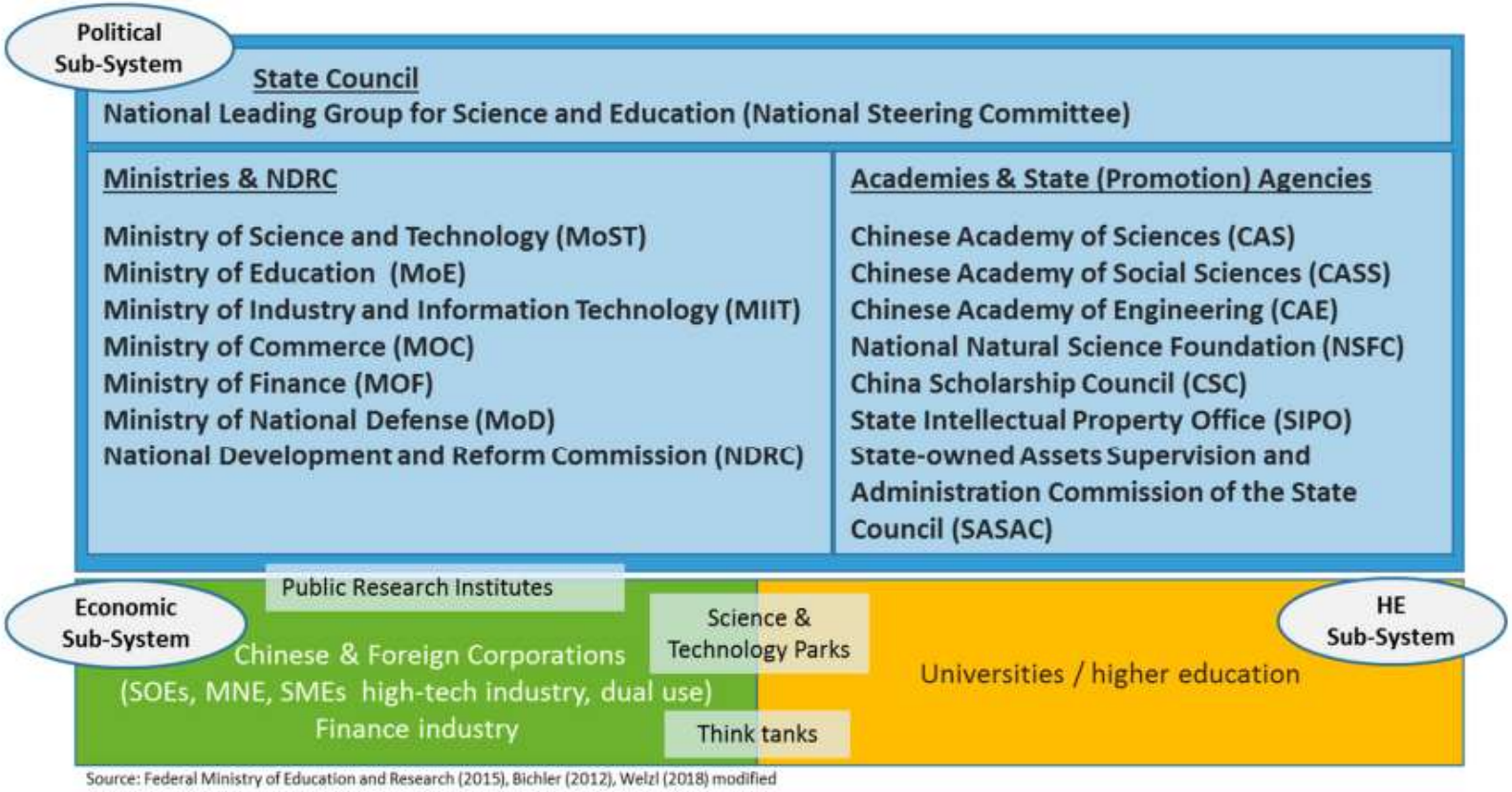
Source: CASTED/MOST, 2018

Chinese Government - the main Difference in the Claim and Strategic Execution (MOST)



Source: CASTED/MOST, 2018

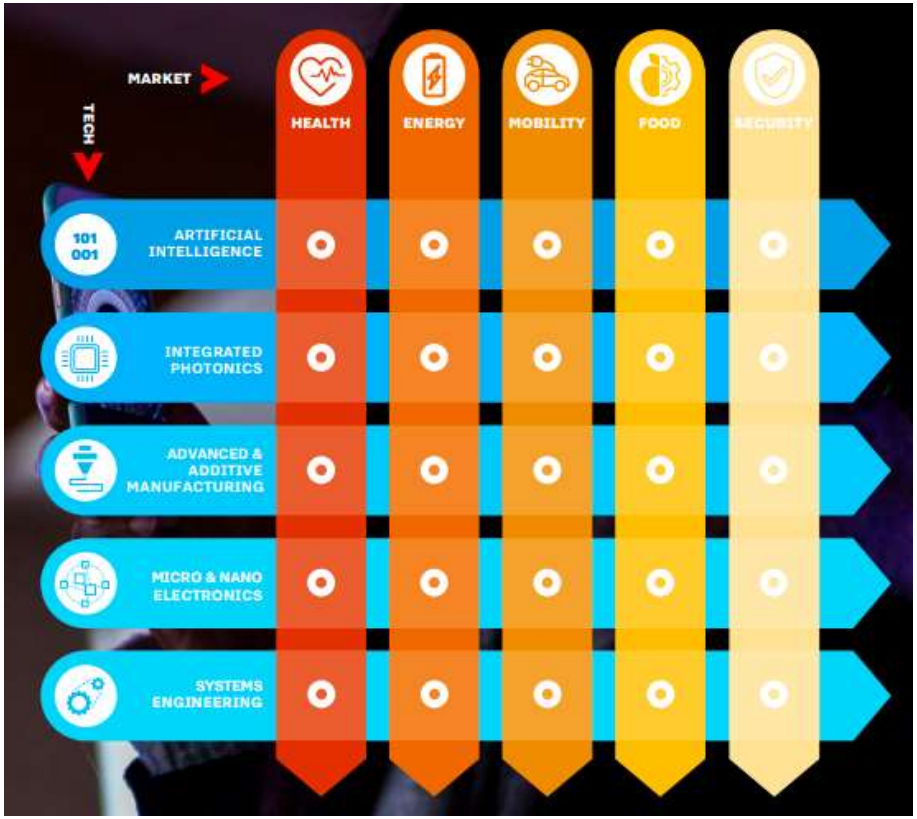
The National Innovation System (NIS) of PR China - Three-tier Structure, Sub-Systems & Main Players



Source: Federal Ministry of Education and Research (2015), Bichler (2012), Welzl (2018) modified

Seaport, Airport and Brainport
- the Three Pillars of Dutch Geo-innovation & Economy

Source:
Brainport
Eindhoven, 2010



Multinational Enterprises (MNEs)

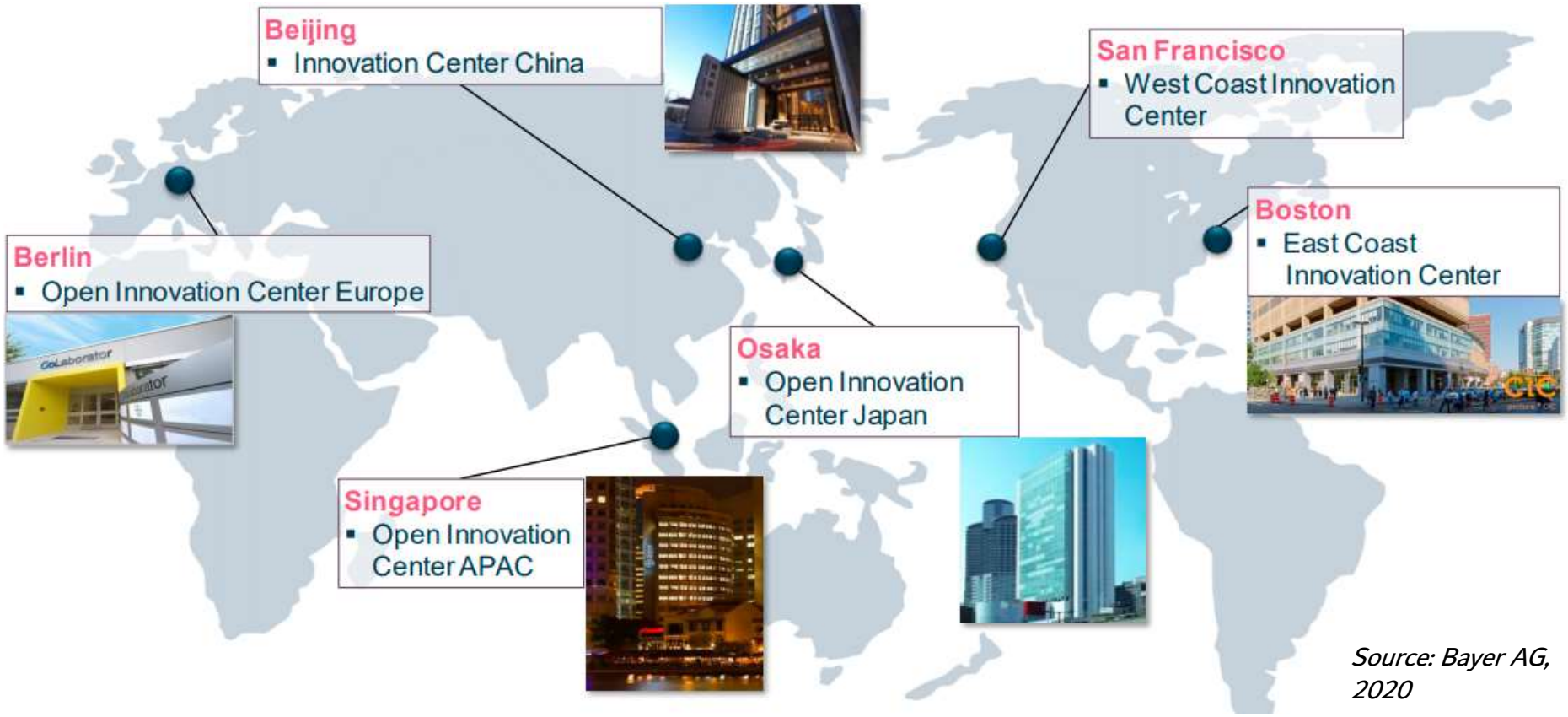
- Cases from Europe and China in the Context of Geo-innovation

MNEs as Brainports
- Multinational Corporate Innovation Ecosystems

Management Culture	Corporate Culture	Networks & Relations	R&D, Innovation, Organisational change	Interdisciplinary Problem solving	Lifelong learning & Learning Organisation
diversity management (nationalities, gender diversity, fields of knowledge), managers as sponsors of employees	of trust and respect	international, national and regional; between industry, academia & public sector; between company locations	R&D and innovation intensity; capacity for continuous change	based on a variety of technologies and fields of knowledge	put into practice as a part of corporate culture and management approach

Source: Welzl, Infineon Technologies Austria, 2006

BAYER AG (BAYN:GR) global Network of Partnerships and Innovation Centers



Source: Bayer AG, 2020

BAYER Open Innovation Center China 2020 - Beijing, Shanghai

OIC-China, Beijing Office

OIC-China, Shanghai Office

Guangzhou (currently not covered) Big bay area

Current Partnerships with Bayer

Tsinghua University — Since 2009

Peking University — Since 2014

SIOC — Since 2016

110 Joint projects, **9** Joint Publications, **20** Joint Symposia

Source: Bayer AG, 2020

Features of Innovation Ecosystem in China

- Top universities e.g. Peking university, Tsinghua university, Chinese academy of Sciences.
- Booming biotechs fueled by VC funding and well established CRO players with capabilities in drug discovery.
- MNC clustering, establishment of open innovation centers especially in the Shanghai-Suzhou region.

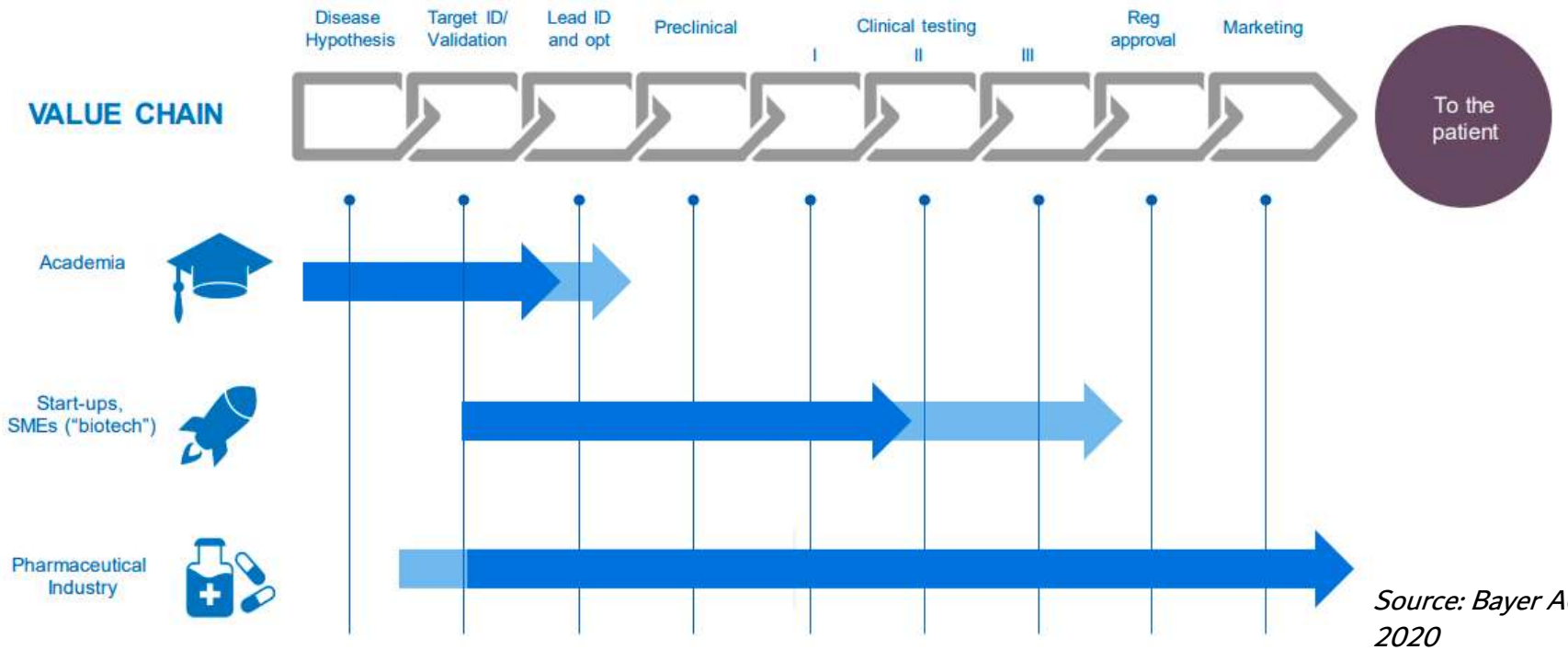
Ecosystem Engagement Strategy

Bayer Open Office Hours to engage researchers and to initiate new projects under current alliances and new connections to institutions in Shanghai.

Bayer-MassBio Mentorship program to reach out to early entrepreneurs and startups.

Exploring collaborations with venture capital funds.

International, external Partners contribute to Bayer‘s Innovation Value-Chain



Source: Bayer AG, 2020

Huawei‘s global Innovation Value Chain

Source: Huawei (2019)

Huawei‘s European R&D–Centers, Network Research Projects & Activities

200+ Research projects

150+ Academic institutions are partners

22+ Participation in H2020 projects.

ERI - European Research Institute

1. **1600+** employees, **400+** contractors, **80%+** recruited locally

2. **19** R&D centres in EU, Russia, Ukraine, Belarus and Israel, with ERI HQ based in Leuven

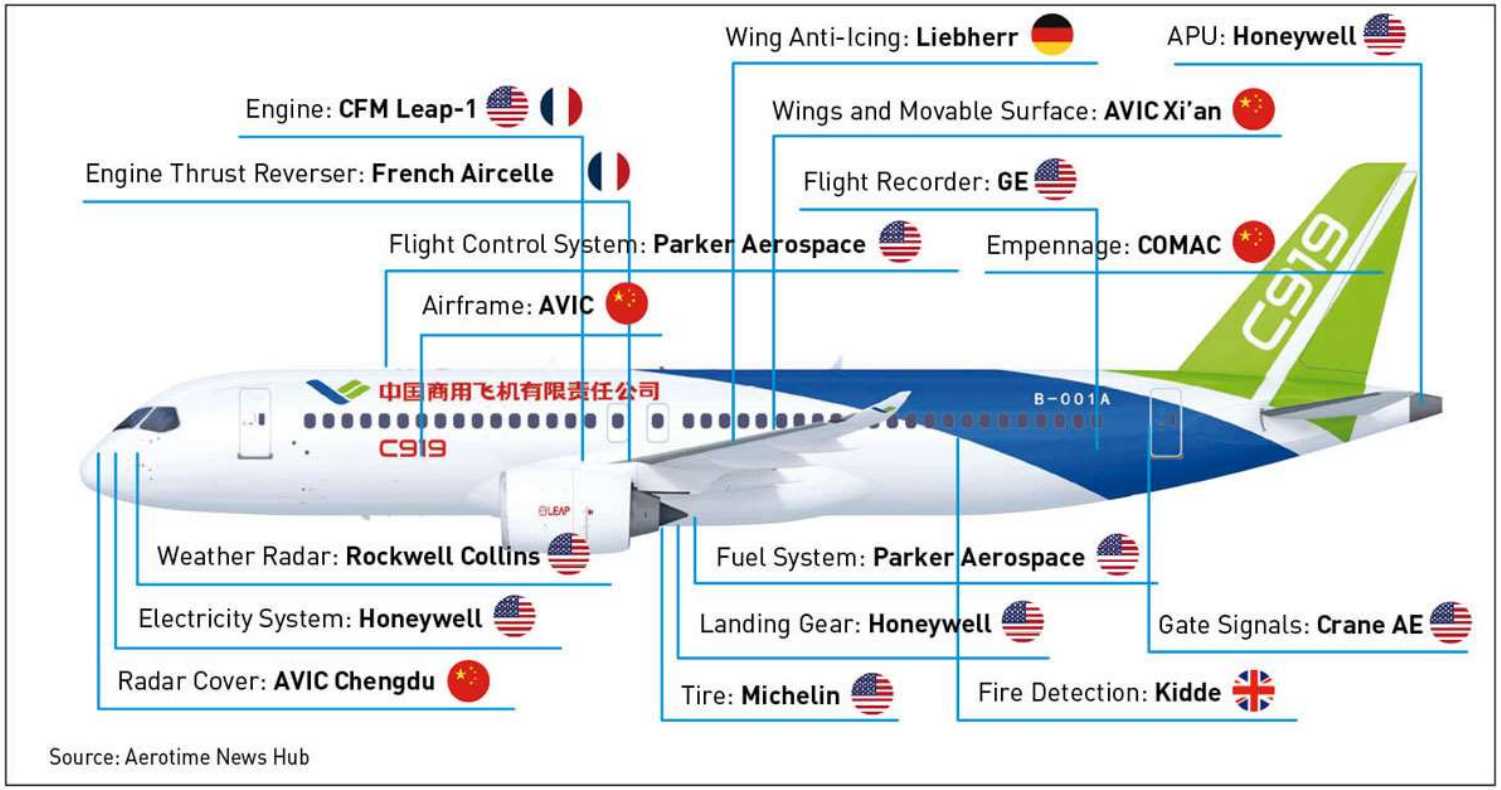
3. Munich Research Center is the largest European Huawei Research Center

Source: Huawei (2019)

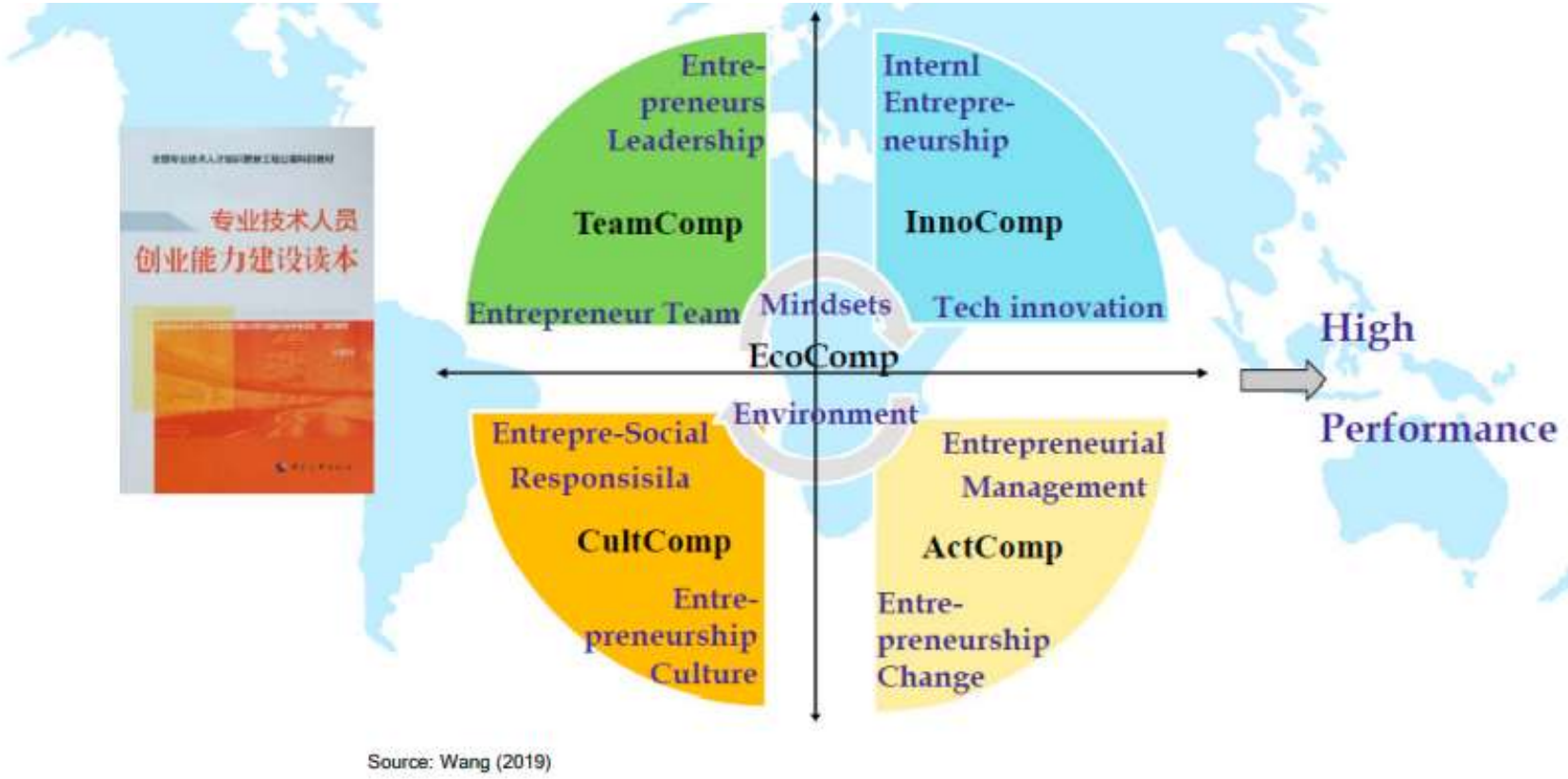
Research Activities

5G & Wireless
Optical Communications
Data Communications
Photonics
Cyber security & Privacy
Quantum Technologies
Semiconductors
Thermal Technologies
AI/ML/CV
RF IC
NFV/SDN
Cloud/Big Data
Aesthetics
User experience

Comac C 919 International Components
- Geo-Innovation & GVC in the Aerospace Sector



Novel Corporate Management Techniques in China Supporting Geo-Innovation



Source: Wang (2019)

A Case of Geo-innovation

- Italy‘s Sino-Italian Strategy for Cooperation in STI with PR China

A Case of Geo-Innovation I
- 400 years of Sino-Italian Knowledge Exchange

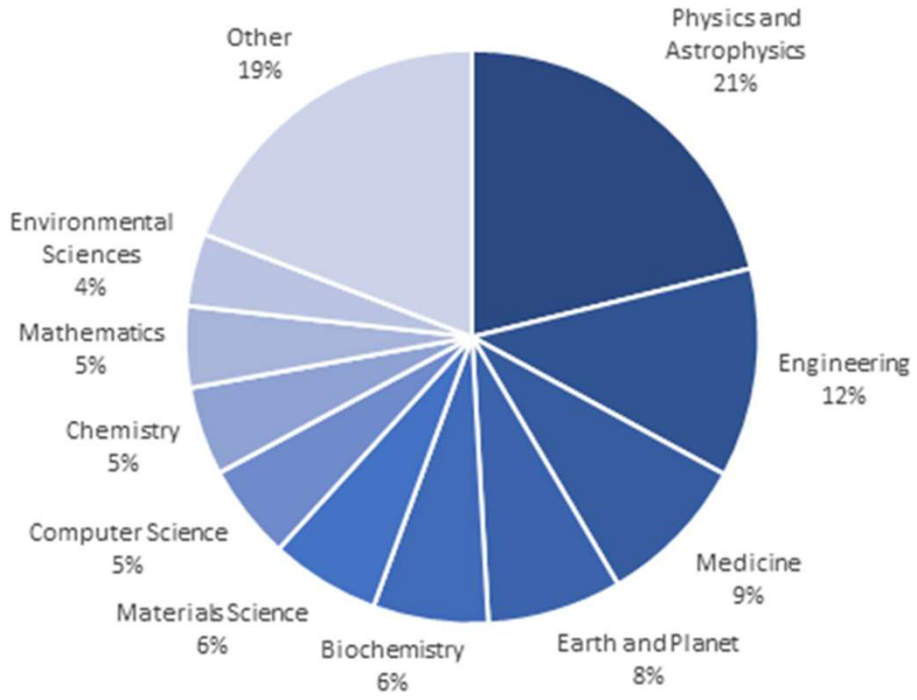
The monument of Matteo Ricci (Li Madou) and Xu Guangqui in Shanghai

- Sino-Italian knowledge exchange and mutual learning date back to Father Matteo Ricci, a Jesuit priest and scholar. Born in Macerata, Italy, in 1552 **Ricci entered China in 1583**.
- Called Li Madou by the Chinese he can be seen as a symbol of early bridge building between China and Europe introducing an evidence-based approach. Thanks to his high mathematical, astronomical and geographical knowledge, he stimulated the interest of Chinese intellectuals about Western knowledge.
- **By translating some classical texts of Confucian philosophy into Latin and describing Chinese culture in his works, Matteo Ricci also introduced China to Europe.**
- In 1602 he would publish his map of the world in Chinese that introduced the existence of the American continents to Chinese geographers. Called the “Map of 10,000 Countries of the Earth” it showed the Pacific Ocean and China at the centre. Together with the Chinese mathematician Xu Guangqui he published the first Chinese edition of Euclid's Elements (幾何原本) in 1607.

A Case of Geo-Innovation II
- The Sino-Italian strategic Collaboration in STI

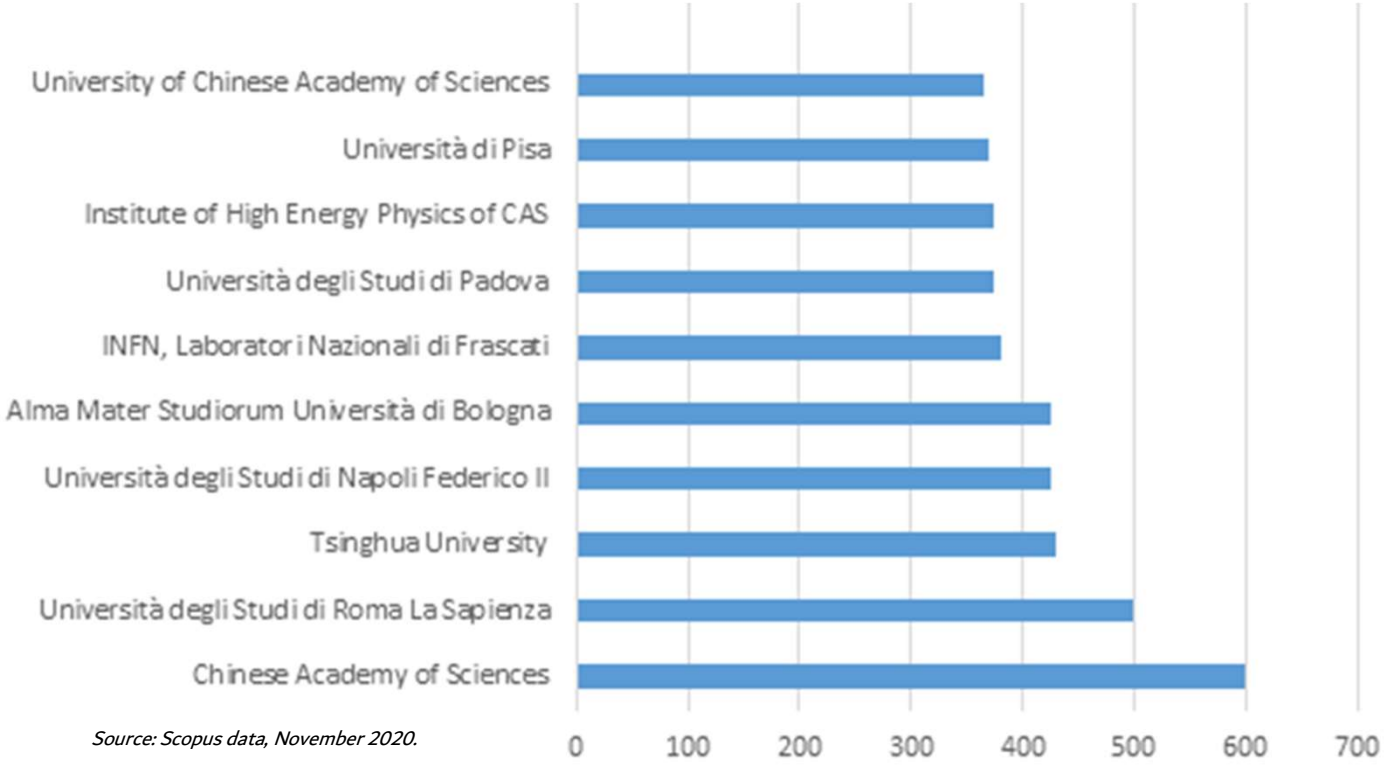
- **1978** *Intergovernmental Cooperation Agreement on Science and Technology (S&T)* between Italy and China
- **1984** *Cooperation Protocol on Science and Technology related to Space* was signed
- **1987** *Cooperation Protocol for Science and Technology* on technology transfer and S&T exchange between institutions and universities
- **1998** in Beijing the Italian Republic and People's Republic of China signed the *Framework Agreement on Science and Technology*
- **2010** the first *Three-Year Action Plan on Economic Cooperation* agreement was signed
- **2013** inter-ministerial agreement adopted by the Italian Government was signed to create the China-Italy Science, Technology & Innovation Program
- **2010-2021** Italy and China signed three Executive Protocols on bilateral cooperation agreements in the thematic fields of science, technology and innovation.

Sino-Italian Joint Publications by subject, 2019 (composition in %)



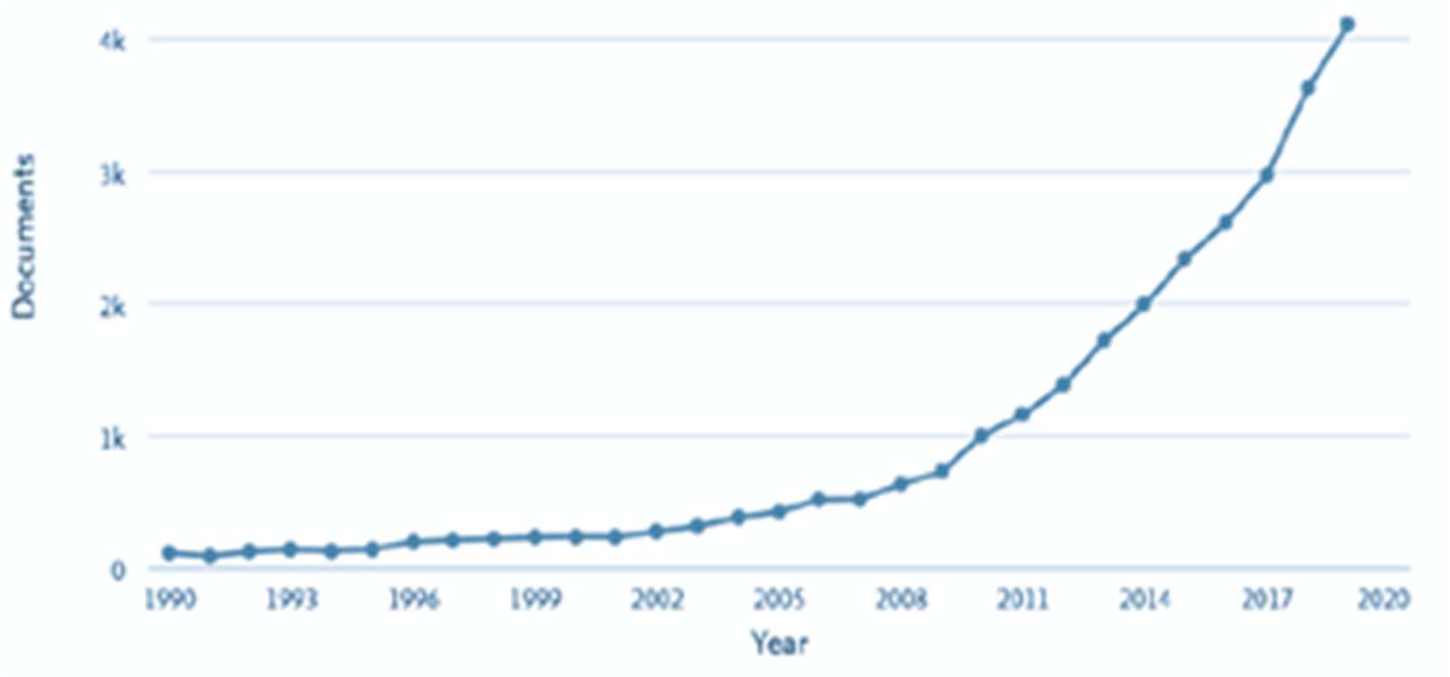
Source: Scopus data, November 2020.

Main Institutions Contributing to Sino-Italian Research (based on number of joint Publications, 2019)



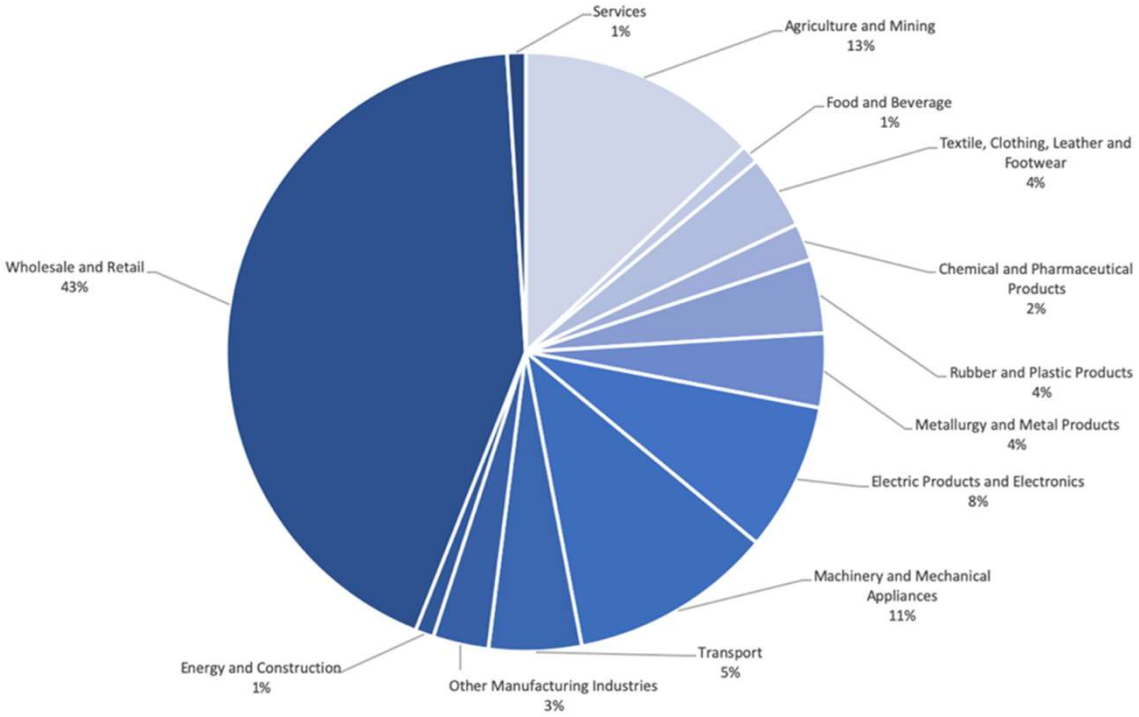
Source: Scopus data, November 2020.

Sino-Italian Scientific Collaboration (Number of Publications) – Exponential Growth since 2010



Source: Scopus data, November 2020.

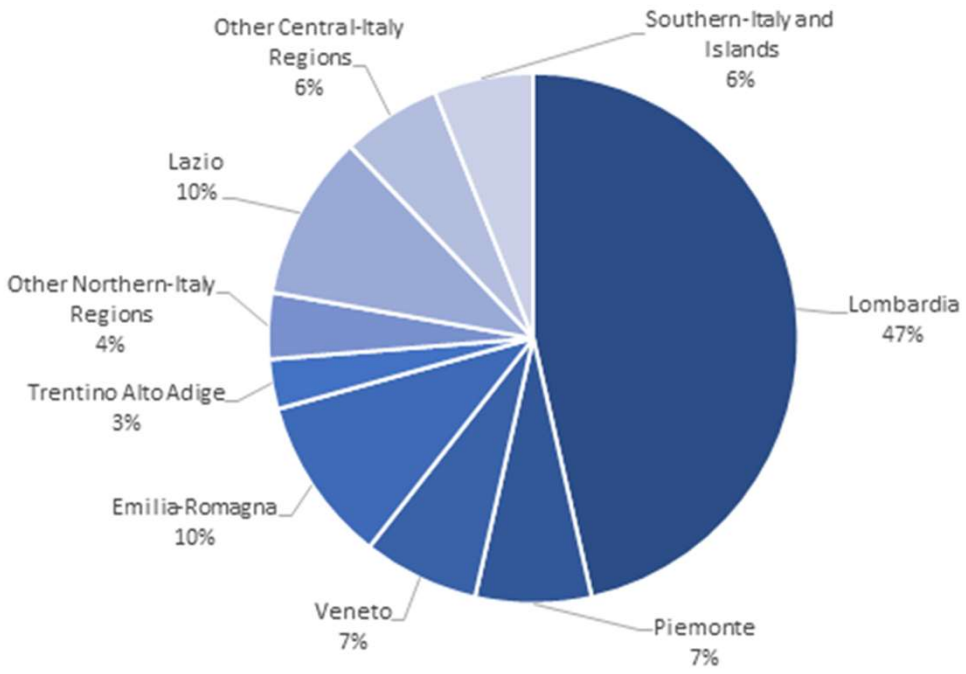
Italian-owned Companies in China by Sector of Activity, 2019 (in %)



Source: Author's own elaboration using data from the XII Annual Report, Italy-China Foundation, 2021.

- Majority of companies are in **wholesale and retail** (43%)
- **Agriculture and mining companies** (13%)
- **Machinery and mechanical appliances** (11%)
- **Electric products and electronics** (8%)

Regional Distribution of Italian Companies owned by Chinese Investors, 2020 (in %)



Source: XII Annual Report, Italy-China Foundation, 2021.

- When considering the regional distribution of FDI flows from China to Italy, **77% out of the total were focused in Northern Italy, with more than half of it in Lombardy alone**
- The Italian **Manufacturing sector** alone attracted **25% of total Chinese investments**, followed by another 18% in construction and utilities

A Case of Geo-Innovation
- Italy's Strategic Cooperation with China in STI

Forthcoming CDA-Publication:

Sampaolo, Gianluca, Mihaela Roibu, Monica Lovito, Simone Padoan, Francesca Spigarelli, Ping Lv and Faxin Teng 2021. "A Case of Geo-Innovation in the 21st Century - Italy's Science, Technology and Innovation Partnership with China" CDA Systemic Country Insights (SCI) Publication Series, edition 1/2021, Vienna: China Data Analysis & Research Hub (CDA).

http//:www.cda-hub.eu

Thank you!

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About CDA

Following our motto "Ex Sapientia Lux" CDA is dedicated to act as an independent, non-partisan and non-profit Sino-European brainport (think tank). With systemic and systematic research and analyses we strive to contribute to a peaceful bridge-building between Europe (the West) and China in the coming decades. We follow this goal performing academic studies, organising international conferences, webinars and expert events as well as facilitating and contributing to bi-/multilateral business projects between Europe and China. CDA understands itself as an international hub of academics, professional experts from business and governance as well as institutions engaged in bi-/multilateral research and collaborative projects. Throughout our activities, research and collaborative projects we are dedicated to contribute to facilitating Sino-European dialogue and collaboration against the backdrop of the Grand Challenges of mankind addressed in the UN Sustainable Development Goals (SDGs). The success of CDA's vision will reflect the willingness of colleagues, experts and institutions in China, Europe and even beyond to contribute their scientific knowledge, professional experience and networks to make planetary patriotism and geo-innovation a reality.