An aerial photograph of the Shanghai skyline, featuring numerous skyscrapers and the Huangpu River. The image is partially obscured by soft, white clouds, creating a misty atmosphere. The text is overlaid on the upper portion of the image.

Toward A Sustainability-Oriented University Tongji University, Shanghai

—A Brief Introduction of Shanghai
& Tongji Practice

WANG Xin, Ph.D., Associate Professor, Class 1 Registered Architect
Email: xin_wang@tongji.edu.cn

IESD, Tongji University, Shanghai, China



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- A brief introduction of Shanghai & Tongji Practice

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Where are we?

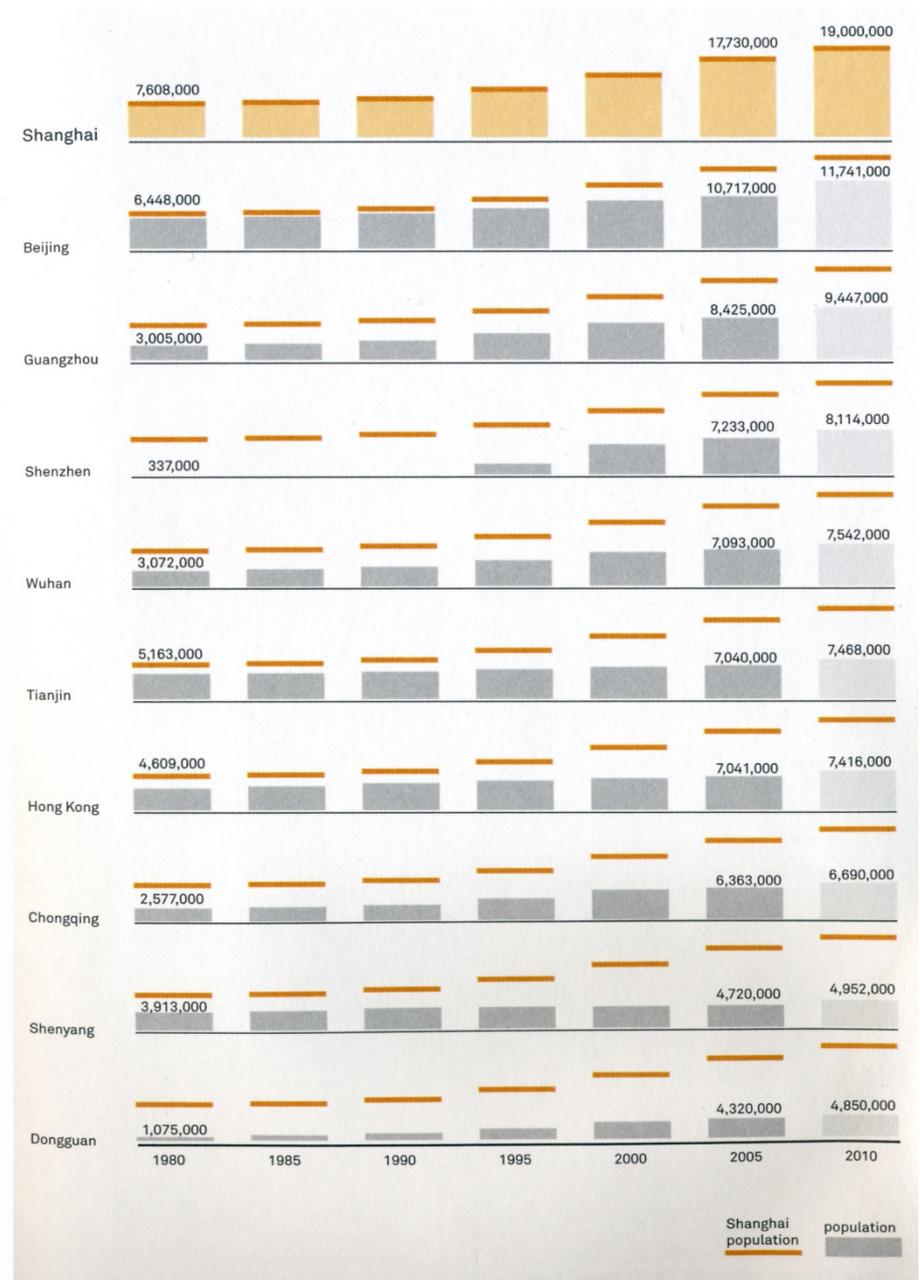
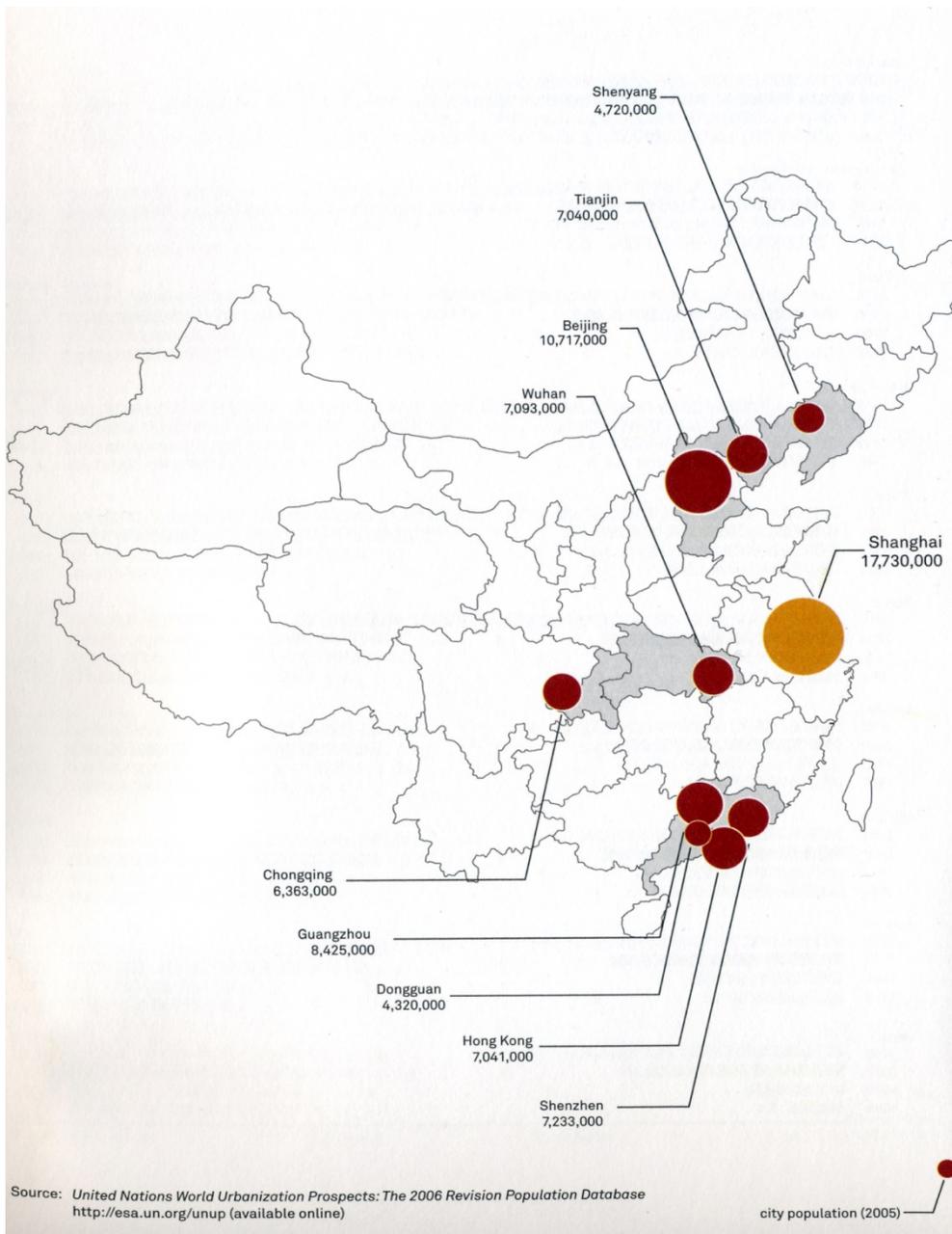
SHANGHAI

– the joint for Silk Road Economic Belt & 21st Century Maritime Silk Road



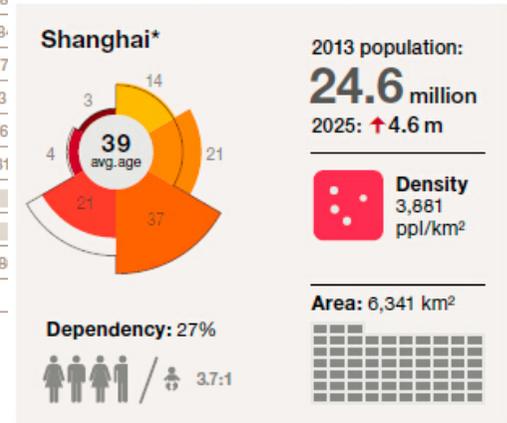
Location of Global Cities Shanghai & Asian Global Cities



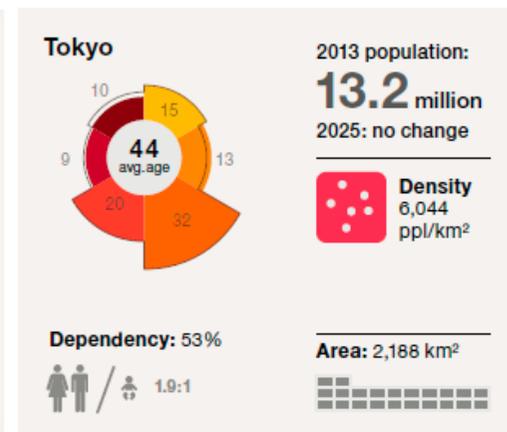
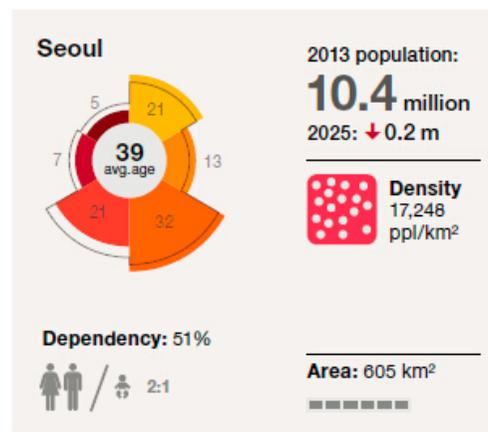
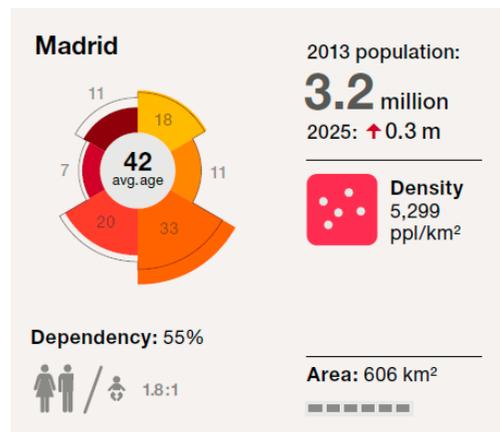


China's Ten largest Urban Agglomerations

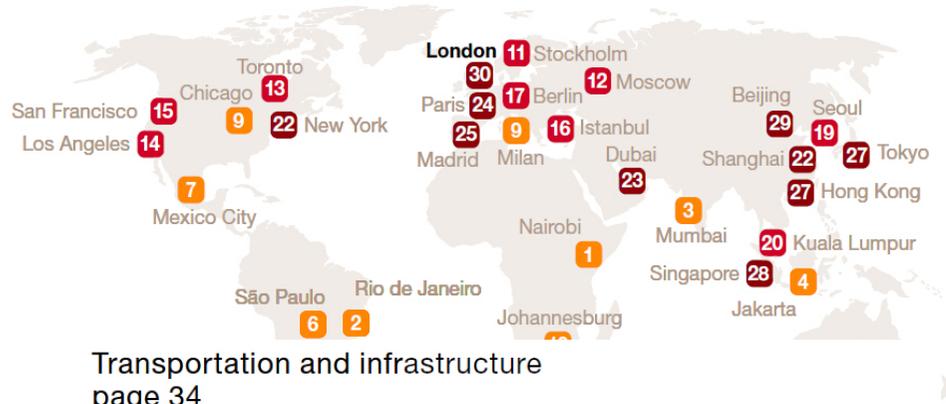
	Intellectual capital and innovation	Technology readiness	City gateway	Transportation and infrastructure	Health, safety, and security	Sustainability and the natural environment	Demographics and livability	Economic clout	Ease of doing business	Cost	Score
30 London	200	107	172	112	112	79	141	118	173	76	1,290
29 New York	186	98	137	95	110	89	119	114	194	93	1,235
28 Singapore	148	91	153	139	112	71	133	95	219	69	1,230
27 Toronto	190	73	98	118	130	106	123	90	182	105	1,215
26 San Francisco	195	96	109	89	113	112	136	92	167	102	1,211
25 Paris	204	75	143	114	108	116	128	107	142	59	1,196
24 Stockholm	192	105	96	111	132	121	126	77	158	73	1,191
23 Hong Kong	158	100	151	99	86	63	133	91	197	78	1,156
22 Sydney	181	71	119	80	130	121	142	82	146	81	1,153
21 Chicago	174	86	93	91	112	96	119	78	167	117	1,133
20 Berlin	162	74	113	107	128	116	135	64	134	95	1,128
19 Los Angeles	182	93	105	74	100	96	98	78	172	120	1,118
18 Tokyo	172	84	151	104	105	69	96	80	154	66	1,096
17 Seoul	161	107	125	115	79	61	67	80	141	100	1,090
16 Madrid	121	60	148	112	98	91	101	77	142	100	1,086
15 Dubai	98	57	141	105	91	37	108	73	142	100	1,086
14 Kuala Lumpur	75	62	131	103	53	55	80	76	142	100	1,086
13 Milan	117	58	93	91	103	84	91	81	142	100	1,086
12 Beijing	96	44	156	90	42	63	70	80	142	100	1,086
11 Shanghai	117	40	137	94	59	46	85	80	142	100	1,086
10 Moscow	106	52	97	101	32	96	77	80	142	100	1,086
9 Mexico City	94	28	88	98	52	71	63	60	142	100	1,086
8 Johannesburg	72	33	94	43							



PWC Global City Ranking 2014:
Madrid:15
 Seoul: 14,
 Tokyo: 13,
 Shanghai:20
 Beijing:19



City gateway
page 30



Economic clout
page 56



Transportation and infrastructure
page 34



Cost
page 64

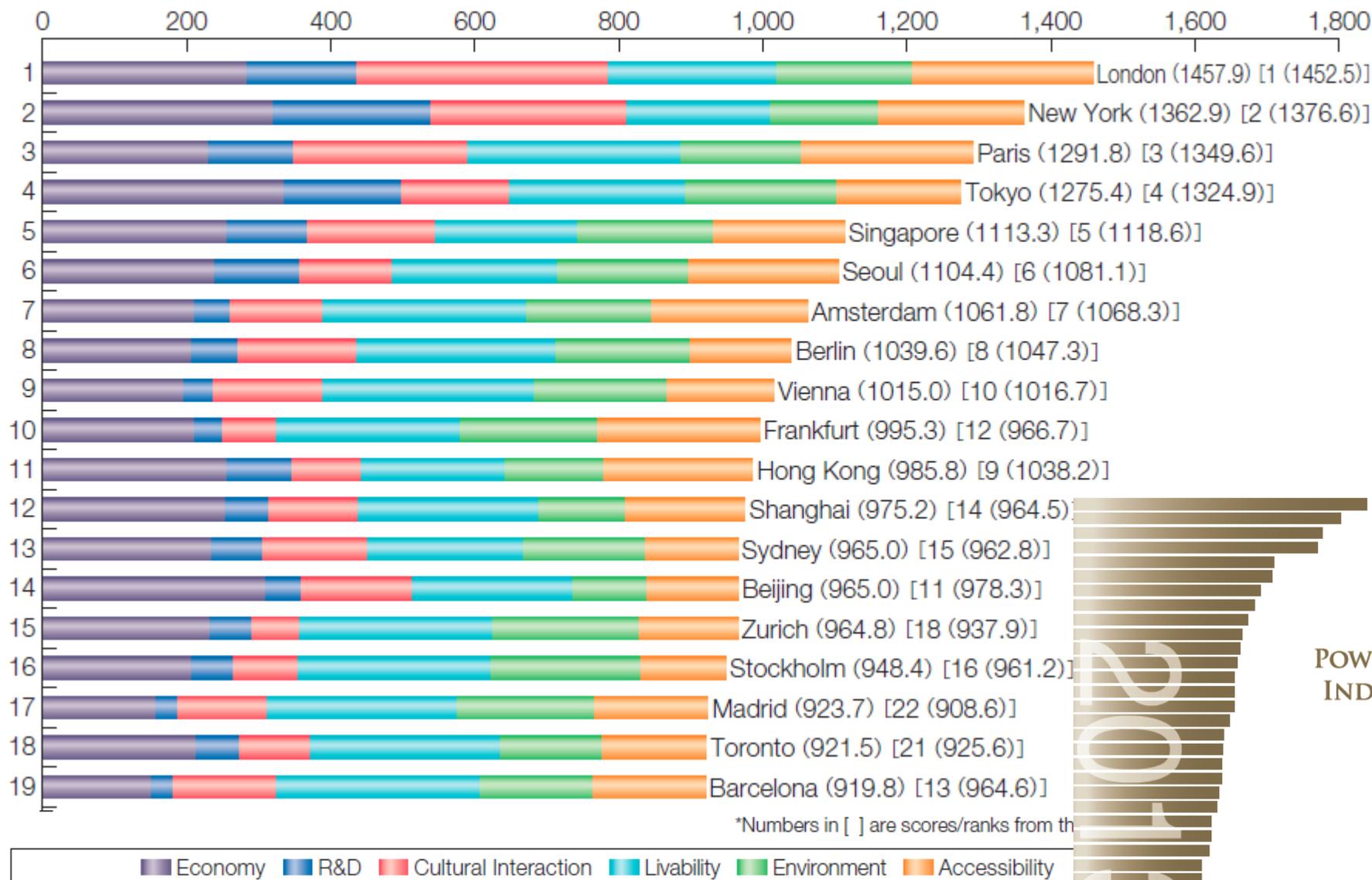


Sustainability and the natural environment
page 42



Cities of Opportunity 6

[GPCI-2013] Total score and rank by Functions



GPCI Ranking 2013:
Madrid:17, Barcelona:19
 Tokyo: 4, Shanghai: 12

Committee		
Supervision of Creating Rankings		
Chairman	Member	Principal Advisor
Halzo Takemasa Professor, Mie University The Center for the Social Security Research Institute Chairman, Institute of Urban Strategy, The Mori Memorial Foundation	Saekia Sasson Professor, Coastal University	Sir Peter Hall Professor, Central London University Chairman, College of Urban Planning
Member	Member	Member
Hiroo Ichikawa Professor and Chair, Graduate School of Architecture, School of Urban Planning, Mie University Senior Advisor of Policy, The Mori Memorial Foundation	Richard Bender Professor and Chairman, University of California, Berkeley	



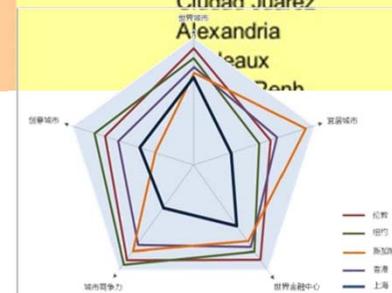
GLOBAL POWER CITY INDEX 2013

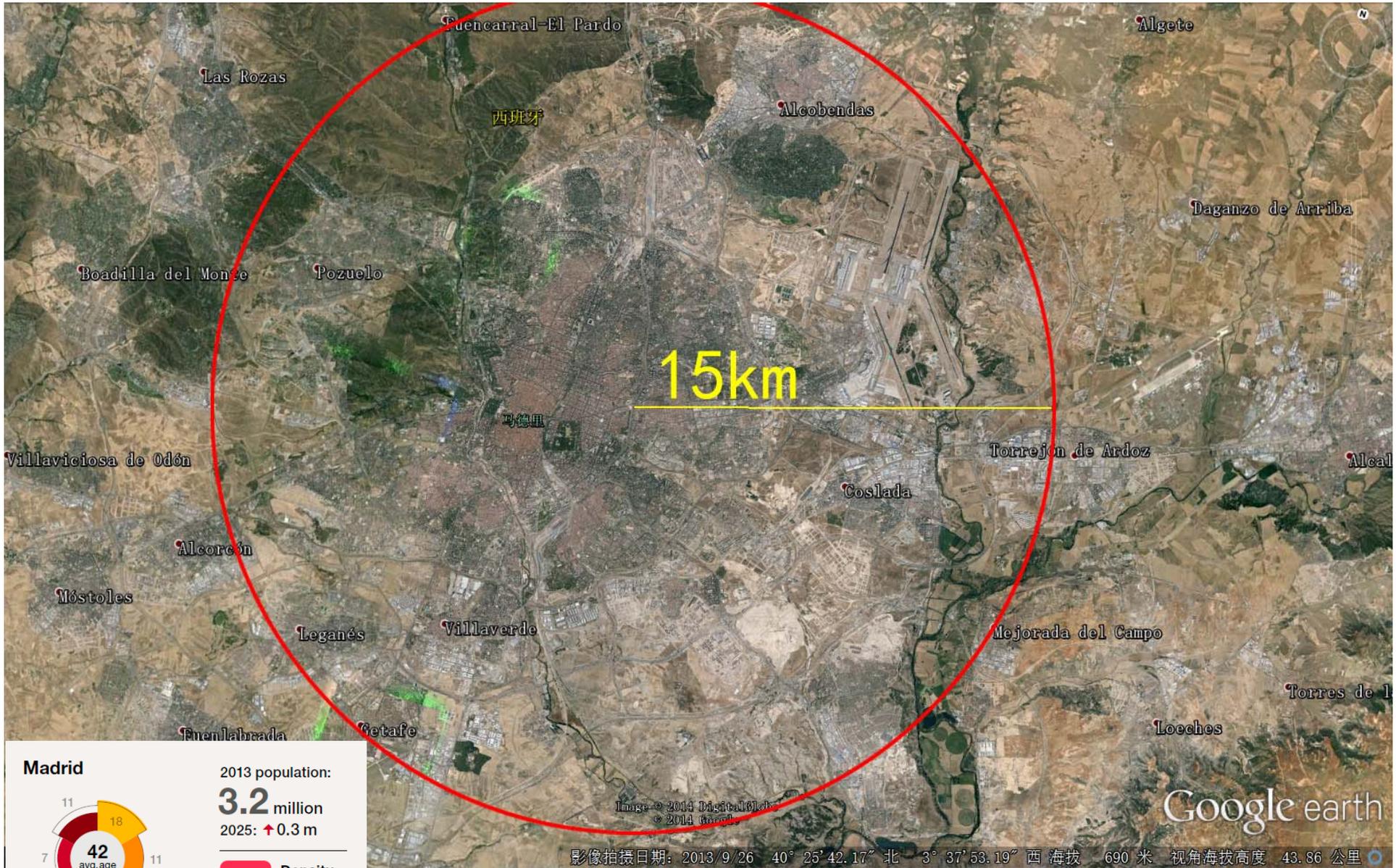


Alpha ++	Beta +	Gamma +	High sufficiency	Sufficiency
London New York	Bangalore Lisbon Copenhagen	Zagreb Lahore St Petersburg	Southampton Indianapolis Porto Alegre	Florence Pretoria Toulouse
Alpha +	Santiago Guangzhou Rome	Jeddah Durban Santo Domingo	Strasbourg Gaborone Chengdu	Arhus San Antonio Bremen
Paris Singapore Shanghai Tokyo Beijing Sydney Dubai	Cairo Dallas Hamburg Düsseldorf Athens Manila Montreal	St Louis Islamabad Guayaquil Baltimore San Salvador Cologne Phoenix	Richmond (Virginia) Pittsburgh (Pennsylvania) Tijuana Austin Qingdao Nassau Tegucigalpa	Nashville (Tennessee) Bologna Canberra Nagoya Sacramento Providence (Rhode Island) Luanda
Alpha	Philadelphia Tel Aviv Lima Budapest Berlin Cape Town Luxembourg Houston	Adelaide Bristol Charlotte (North Carolina) Georgetown (Cayman) Osaka Tampa	Lille Curitiba The Hague Hartford (Connecticut) Wroclaw Edmonton Lausanne Dhaka	Dalian Liverpool Jacksonville Puebla Kaohsiung Minsk Linz Tbilisi
Alpha -	Beta	Gamma	Nürnberg Lusaka Kampala Bilbao Douala Abidjan Salt Lake City Hangzhou Poznan Wellington Ottawa Dakar Queretaro Dresden Newcastle Skopje Nanjing Tirana Chongqing Belo Horizonte	Las Vegas Maputo Harare Cardiff Xiamen Birmingham (Alabama - US) Leon Port of Spain Penang Memphis (Tennessee) Aberdeen Abuja Hannover Surabaya Bern Halifax Ciudad Juarez Alexandria Beaux Beihai
Seoul Johannesburg Buenos Aires Vienna San Francisco Istanbul Jakarta Zurich Warsaw Washington Melbourne New Delhi Miami Barcelona Bangkok	Ho Chi Minh City Bogota Auckland Montevideo Caracas Riyadh Vancouver Chennai Manchester Oslo Brisbane Helsinki Karachi Doha Casablanca Stuttgart	Glasgow San Juan Marseille Guadalajara Leeds Baku Vilnius Tallinn Raleigh (North Carolina) Ankara Belfast San Jose (Ca) Colombo Valencia (Sp.) Cincinnati Milwaukee Muscat Ljubljana Nantes Tientsin		

GaWC Ranking 2012:

Madrid: Alpha, Barcelona: Alpha-, Tokyo & Shanghai: Alpha+





Madrid

2013 population: **3.2 million**
 2025: **↑ 0.3 m**

42 avg. age

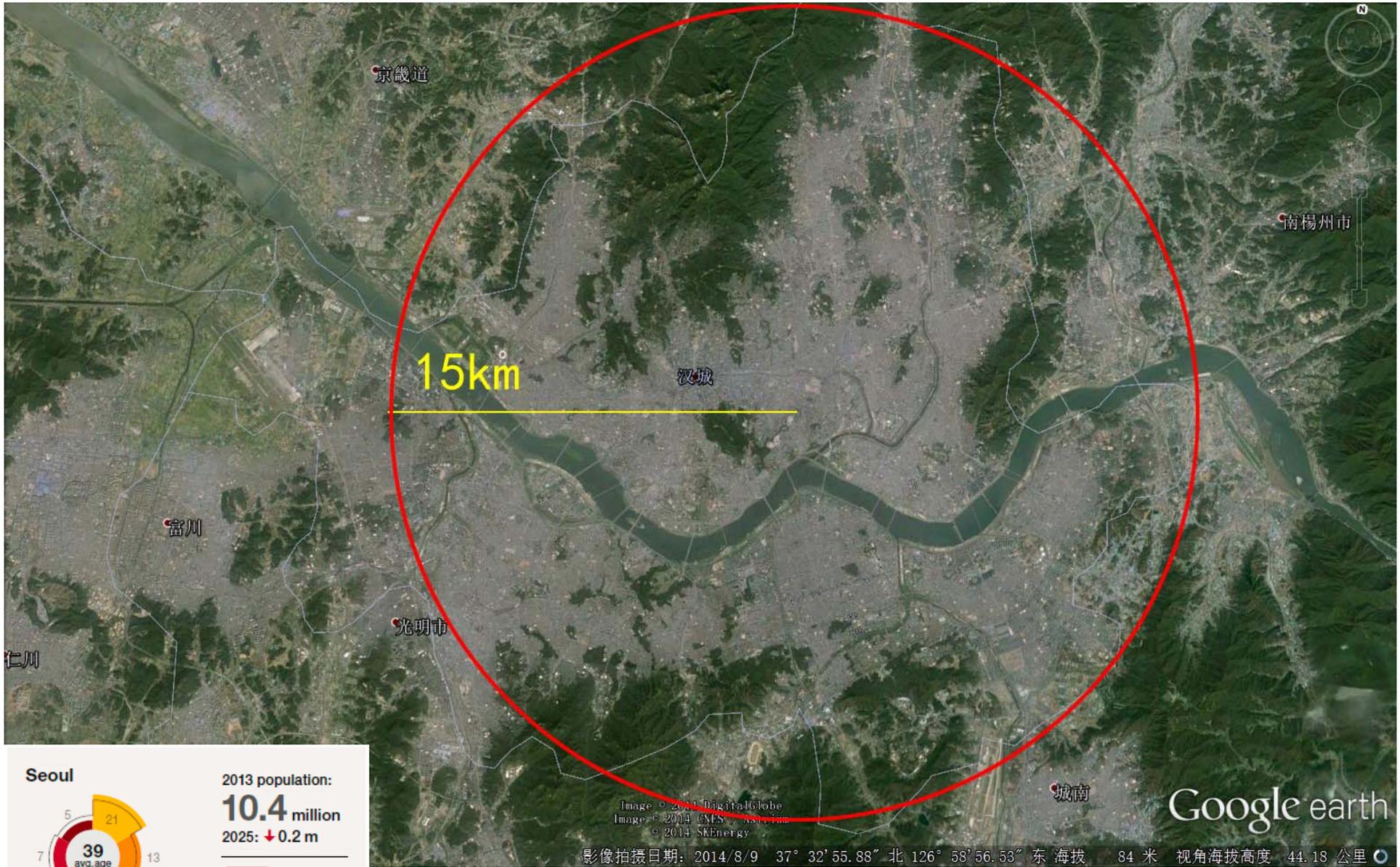
Density
 5,299 ppl/km²

Dependency: 55%

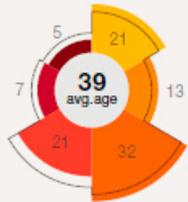
Area: 606 km²

1.8:1

影像拍摄日期: 2013/9/26 40° 25' 42.17" 北 3° 37' 53.19" 西 海拔 690 米 视角海拔高度 43.86 公里



Seoul



2013 population:
10.4 million
 2025: **↓0.2 m**

Density
 17,248 ppl/km²

Dependency: 51%

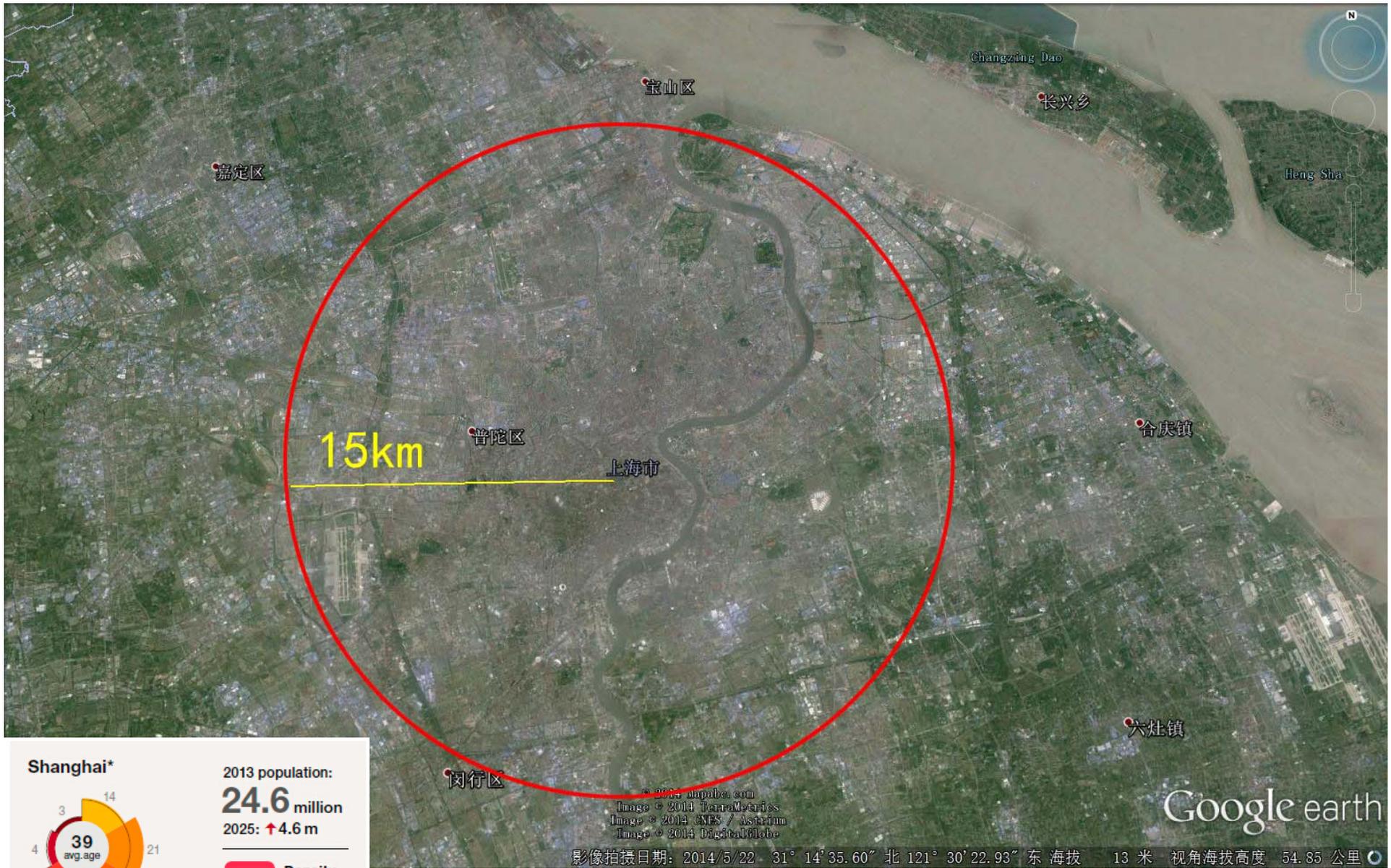


Area: 605 km²

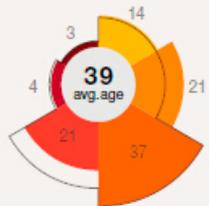


Image © 2014 DigitalGlobe
 Image © 2014 CNES / Airbus
 © 2014 SKEnergy
 影像拍摄日期: 2014/8/9 37° 32' 55.88" 北 126° 58' 56.53" 东 海拔 84 米 视角海拔高度 44.18 公里

Google earth



Shanghai*



2013 population:
24.6 million
2025: ↑4.6 m

Density
3,881
ppl/km²

Area: 6,341 km²

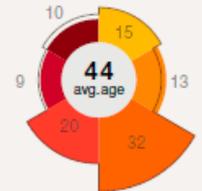
Dependency: 27%



© 2014 mapabc.com
Image © 2014 TerraMetrics
Image © 2014 CNES / Astrium
Image © 2014 DigitalGlobe



Tokyo



2013 population:
13.2 million
2025: no change

Density
6,044
ppl/km²

Dependency: 53%
1.9:1

Area: 2,188 km²

影像拍摄日期: 2014/3/16 35° 39' 40.83" 北 139° 45' 52.60" 东 海拔 5 米 视角海拔高度 40.26 公里

Google earth



Madrid

2013 population: **3.2 million**
 2025: **↑ 0.3 m**

42 avg. age

Density
 5,299 ppl/km²

Dependency: 55%
 1.8:1

Area: 606 km²

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
 © 2014 Google

影像拍摄日期: 2012/5/10 41° 22' 58.00" 北 2° 12' 40.73" 东 海拔 0 米 视角海拔高度 53.19 公里

Google earth

Area: 6,340.5 Km²

Center: 620 Km²

Population:

11.67 million [2014]

Density: 18,800/ Km²

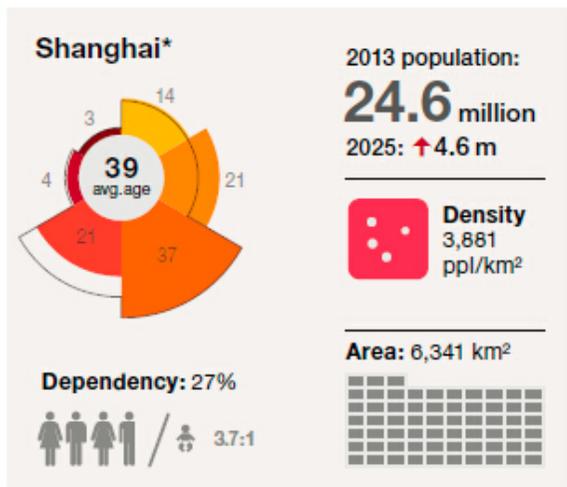
Area: 6,340.5 Km²

Population:

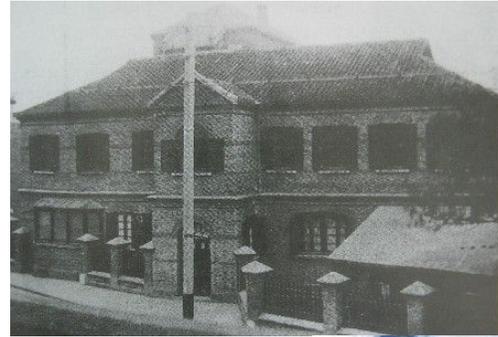
24.15 million [2014]

Density: 3,800/ Km²

Map of Great Shanghai Area (2007)



Established in 1907



Located in Shanghai



Mission: “A sustainability-oriented world-class university”



History



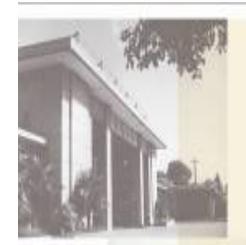
Tongji
1907
German Medical School



Tongji
1927
National Tongji University



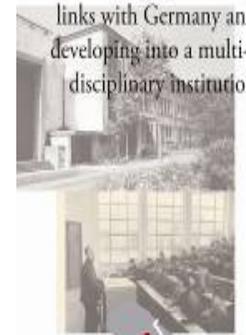
Tongji
1941
Displaced to Lizhuang, Sichuan Province; eventful days in the Anti-Japanese War



Tongji
1952
Nationwide Restructuring of higher education in China



Tongji
1978
Resuming traditional links with Germany and developing into a multi-disciplinary institution



Tongji
2007
Centennial Celebration

同舟共濟
繼往開來



Key Figures

38,000 Students(full time)

20,000 BA/BSc 10,000 MA/MSc 4,000 PhD

5,000 International Students (from **105** countries and regions)

250,000 Alumni

3,141 Teaching & Research Faculty and Staff

843 full professors, 1, 046 associate professors

481 Degree Programs

74 Bachelor's programs 263 Master degree programs

144 PhD programs 25 postdoctoral stations

10 Disciplines

science, engineering, medicine, economics, management,
humanities, law, philosophy, education, art

2.14 Billion RMB Research Budget

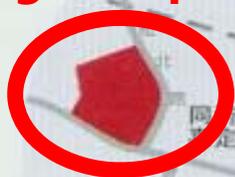
40% public and 60% industrial projects

校区分布

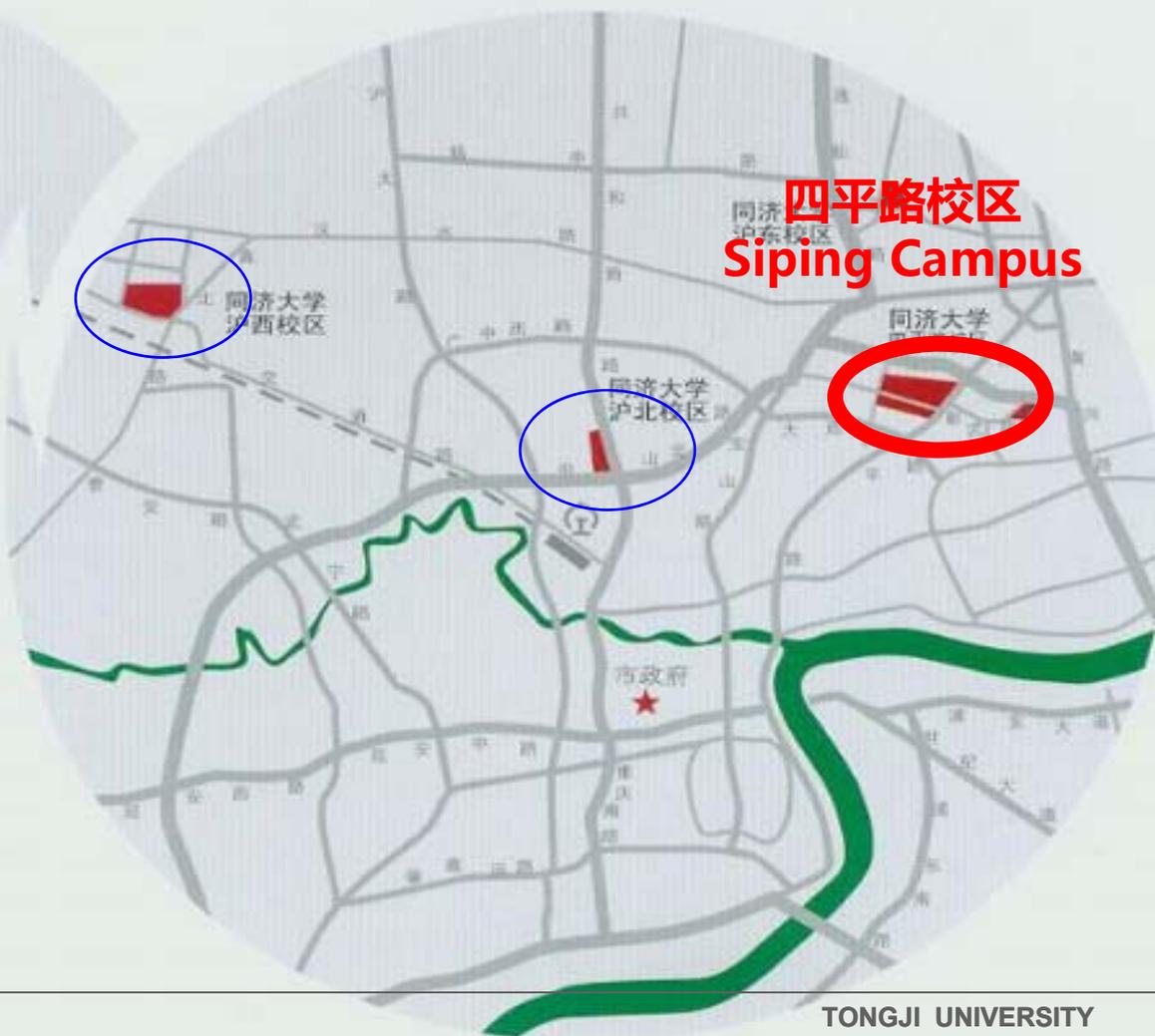
The maps of the university

四平路校区 (四平路1239号) / 嘉定校区 (曹安公路4800号) / 沪西校区 (真南路500号) / 沪东校区 (武东路100号) / 沪北校区 (共和新路1238号)

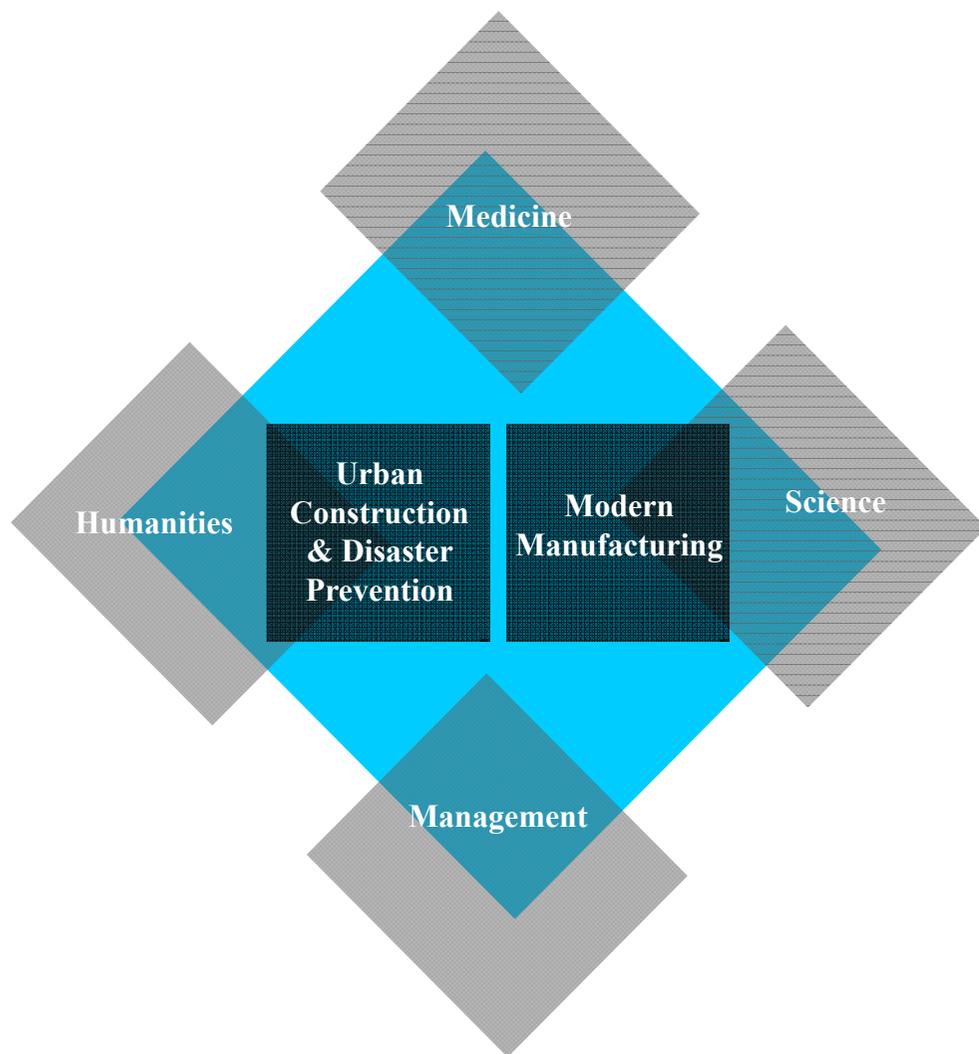
嘉定校区
Jiading Campus



四平路校区
Siping Campus



Top 10 disciplines in China



Discipline	Ranking
Civil Engineering	1
Urban Planning	2
Landscape	2
Environment Engineering	3
Architecture	3
Traffic and Transportation	3
Marine Science	3
Surveying and Mapping	4
Geophysics	5
Design	6
Management Science and Engineering	9
Geological Engineering	10
Stomatology	10

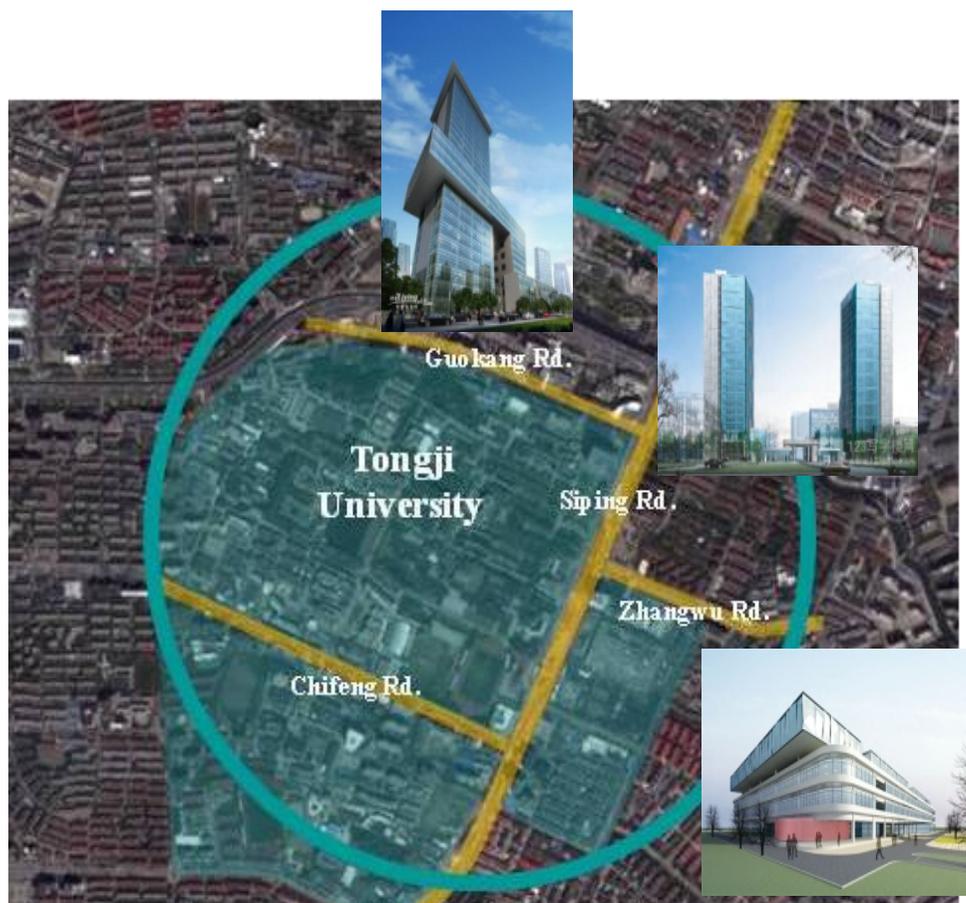
Social Service

Technical Support for National Projects

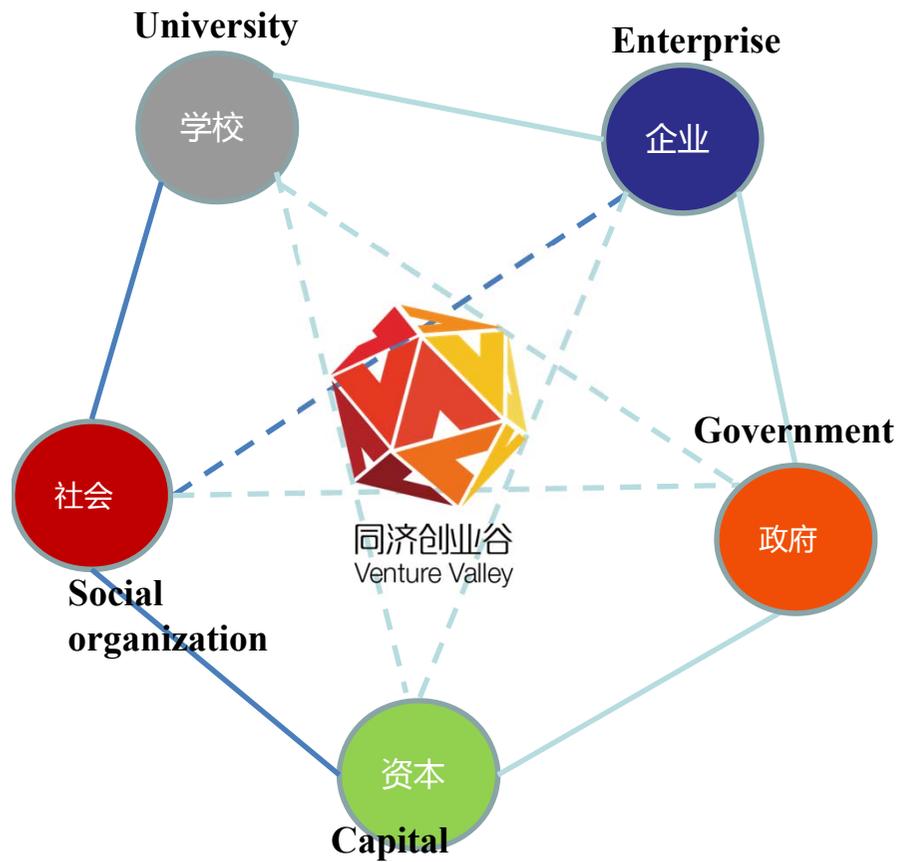
- **Master design for 2010 Shanghai Expo**
- Bird Nest of 2008 Peking Olympic Games
- Yangshan Deep-water Harbor
- Backbone for the innovation of China's Clean-energy vehicle development
- Large-scale biological processing of source water
-



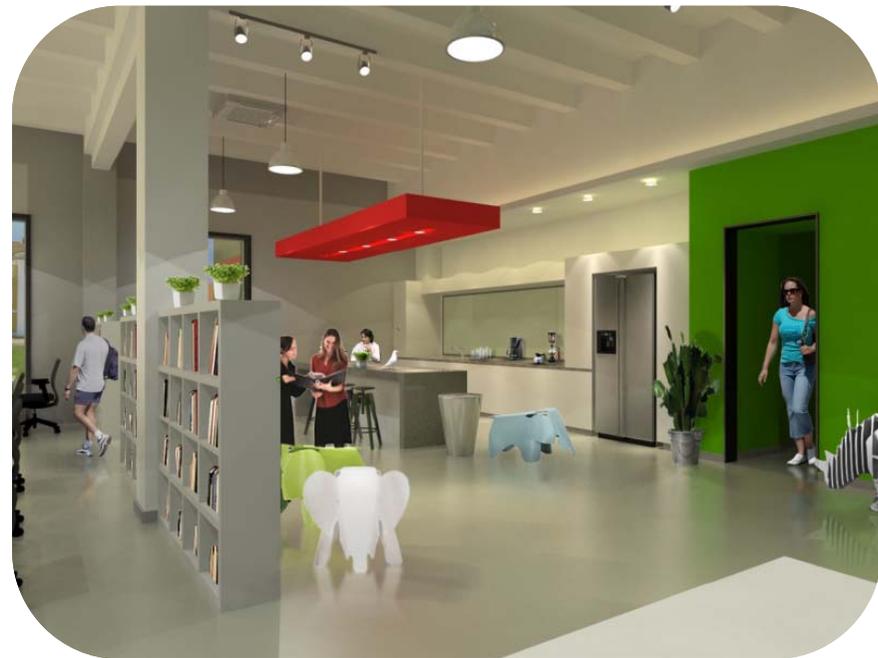
Tongji Knowledge-Economy Ring



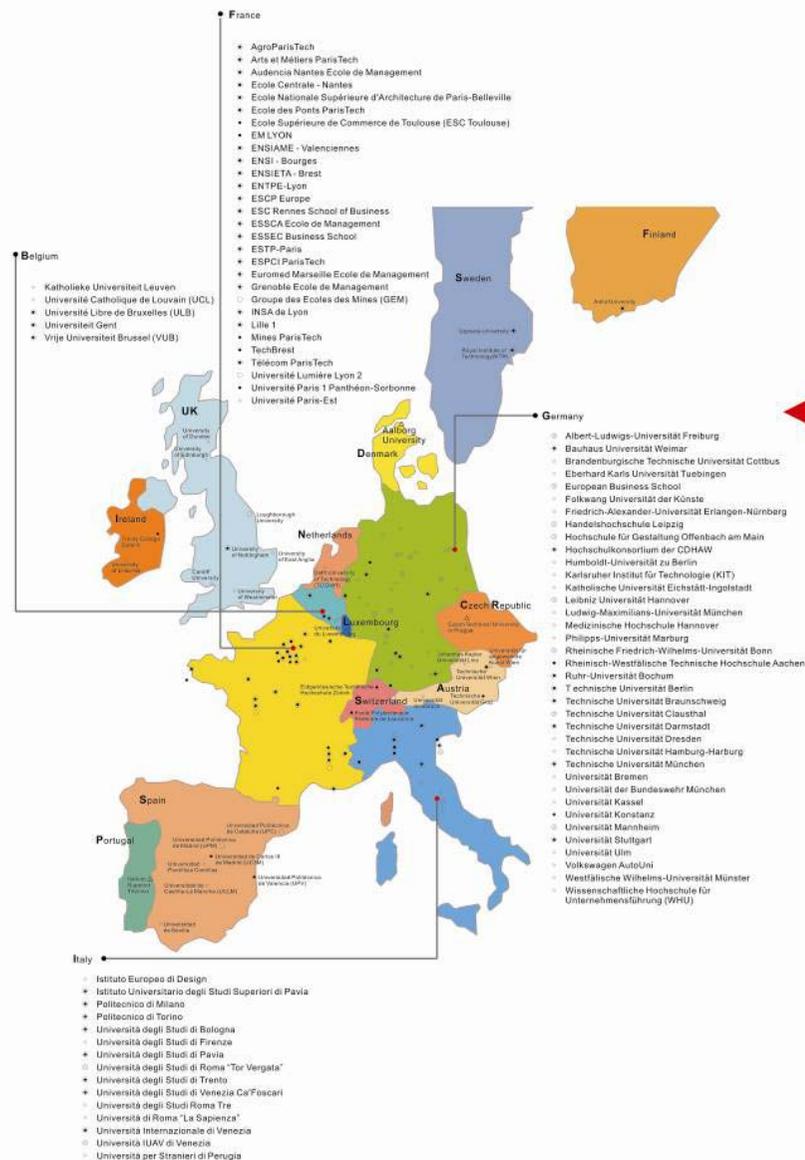
- The most effective design valley in China;
- 2.6 sq.km. core area;
- 20+ Billion RMB Sales Volume (2013);
- more than 30,000 employees;
- 1700+ enterprises.



Tongji Venture Valley



International Cooperation



- 8 International Cooperative Platforms
- 90+ Double Degree Programs
- 200+ International partners
- 380+ Courses taught in English
- 95 Joint PhD (2014)
- Joint Research
- Modular Professorship Program
- Junior Professorship Program
- ...

8 International Cooperative Platforms



**Sino-German College
for Graduate Studies (1998)**



**Sino-French Institute of
Eng. & Management (1999)**



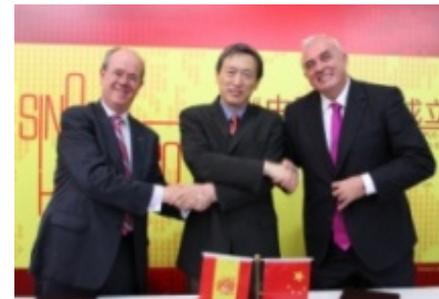
**Sino-German College
for Applied Science (2004)**



Sino-Italian Campus (2006)



Sino-Finnish Centre (2010)



Sino-Spanish Campus (2012)



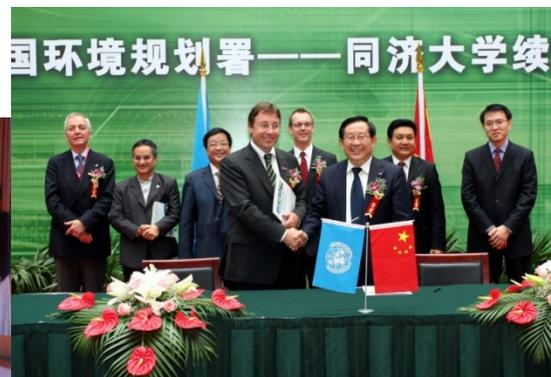
**UNEP-Tongji Institute
(IESD) (2002)**



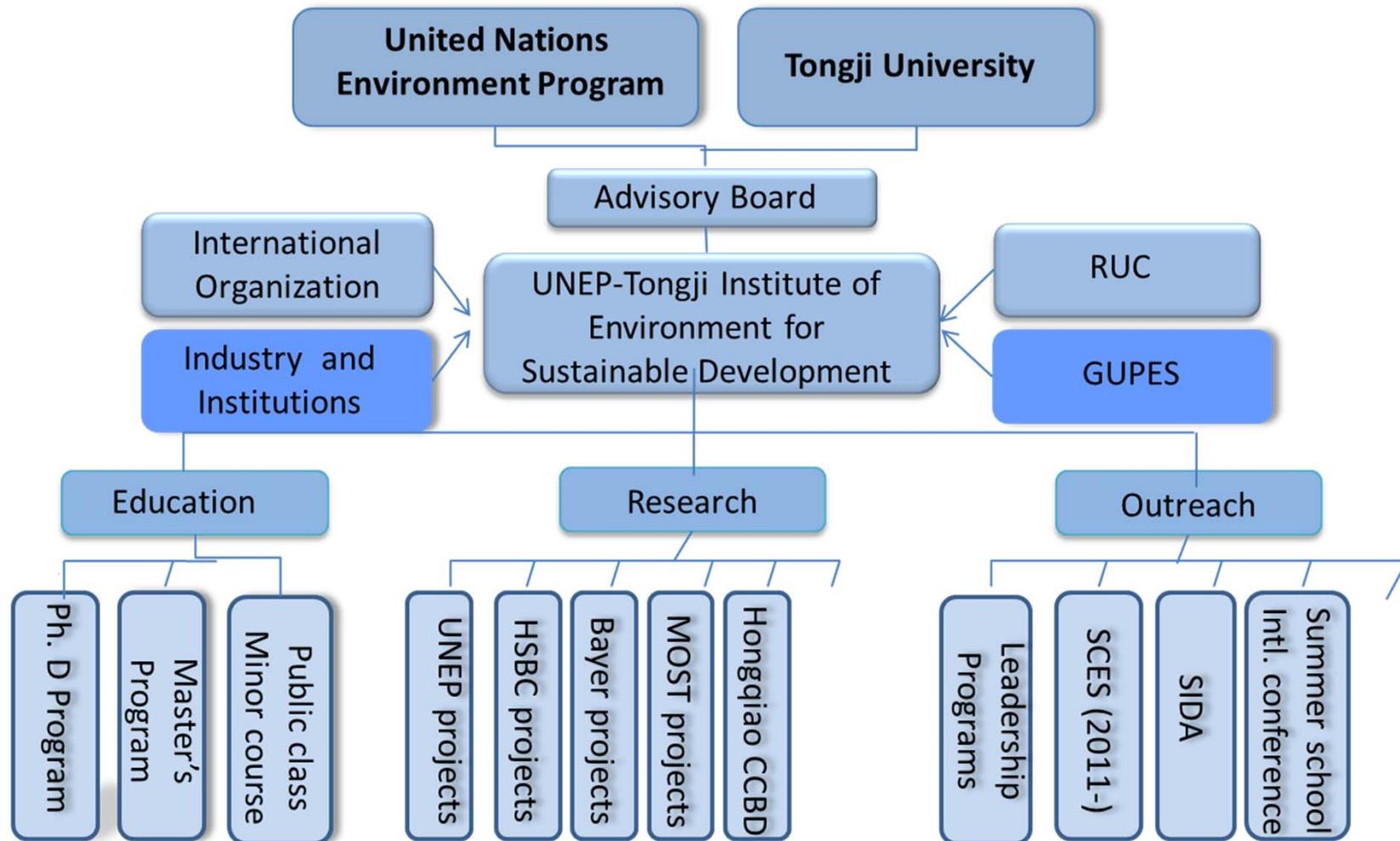
**UNESCO World Heritage
Institute (Shanghai) (2007)**

ENVIRONMENTAL EDUCATION AND EDUCATION ON SD

- 1978 Department of Environmental Engineering
- 1982 College of Environmental Engineering
- 1998 College of Environmental Science and Engineering
- **2002 UNEP-Tongji Institute of Environment for Sustainable Development (IESD)**



IESD – organization & structure



IESD Advisory Board



Mr. Guangdao Wang
Director of
Commission of
environment and
resources, Congress



Mr. Achim Steiner
Under secretary
of UN,
Executive of
UNEP



Prof. Gang Wan
Minister of
Science and
Technology



Mr. Xiaoqing Wu
Vice Minister of
Environmental Protection



Mr. Guoguang Zheng
Director National
Administration of
Meteorology



Prof. Gang Pei
President of
Tongji



Prof. Qidi Wu
Former Vice
Minister of
Education



Prof. Jiang Wu
Vice President of
Tongji



Mr Zhou Zongmin
Director of
Foreign Affairs
Bureau, Xinhua
News Agency



Mr Kaveh Zahedi
Regional Director for
Asia and Pacific, UNEP



Ms Celina Chew
President of Bayer
Greater China

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Prof. Meng Wei
academician of China



Prof. Jianmin Xu
academician of China



Ms. Jiarong Zhao
Director of Environment and
Resources, NDRC



**Mr. Surendra
Shrestha**
Director of
Resource and
Mobilization, UNEP

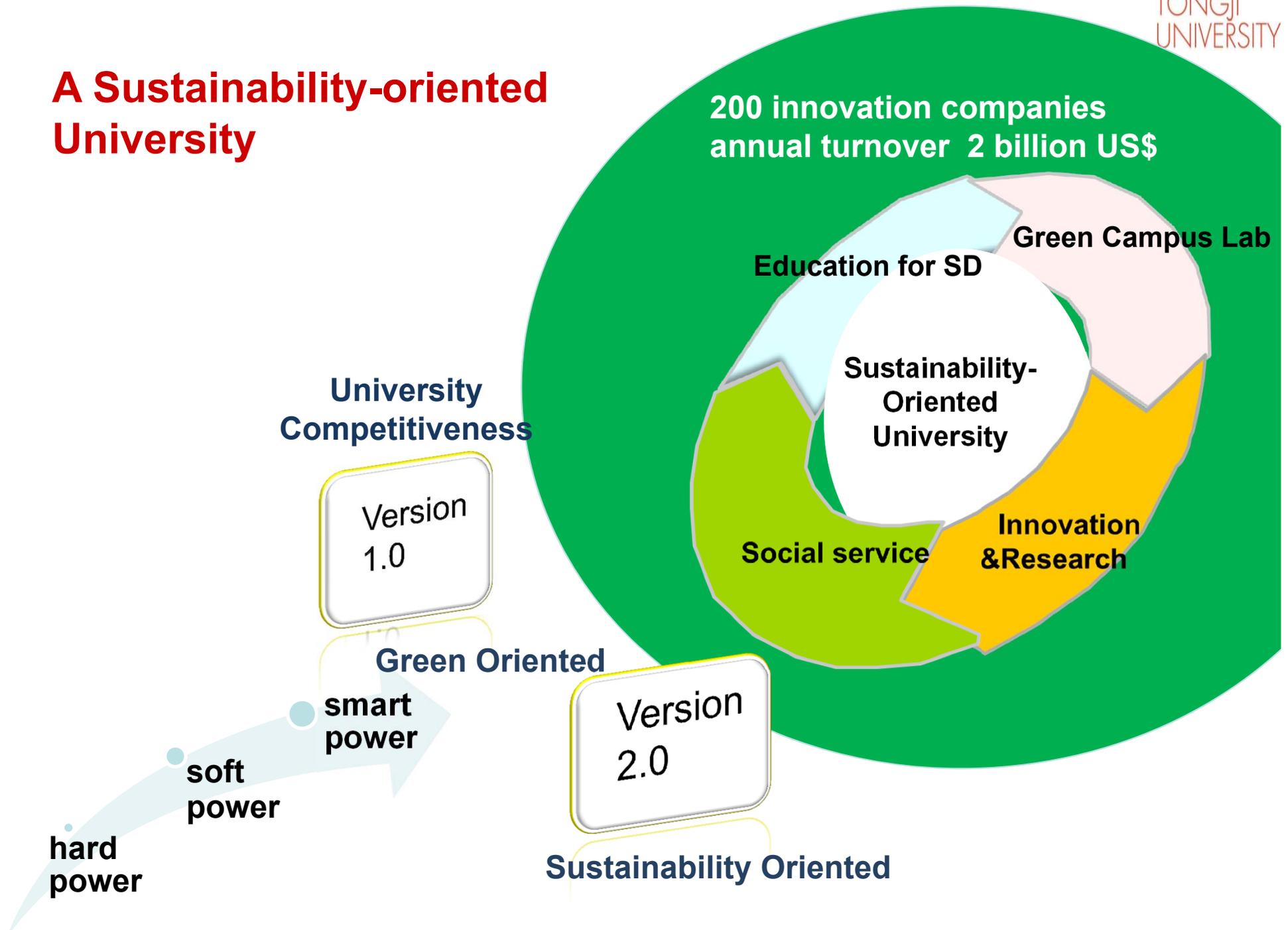


Prof. Dai Xiaohu
Dean of College of
Environment and
Engineering



Prof. Fengting Li
Deputy of IESD and
college of Enviroment

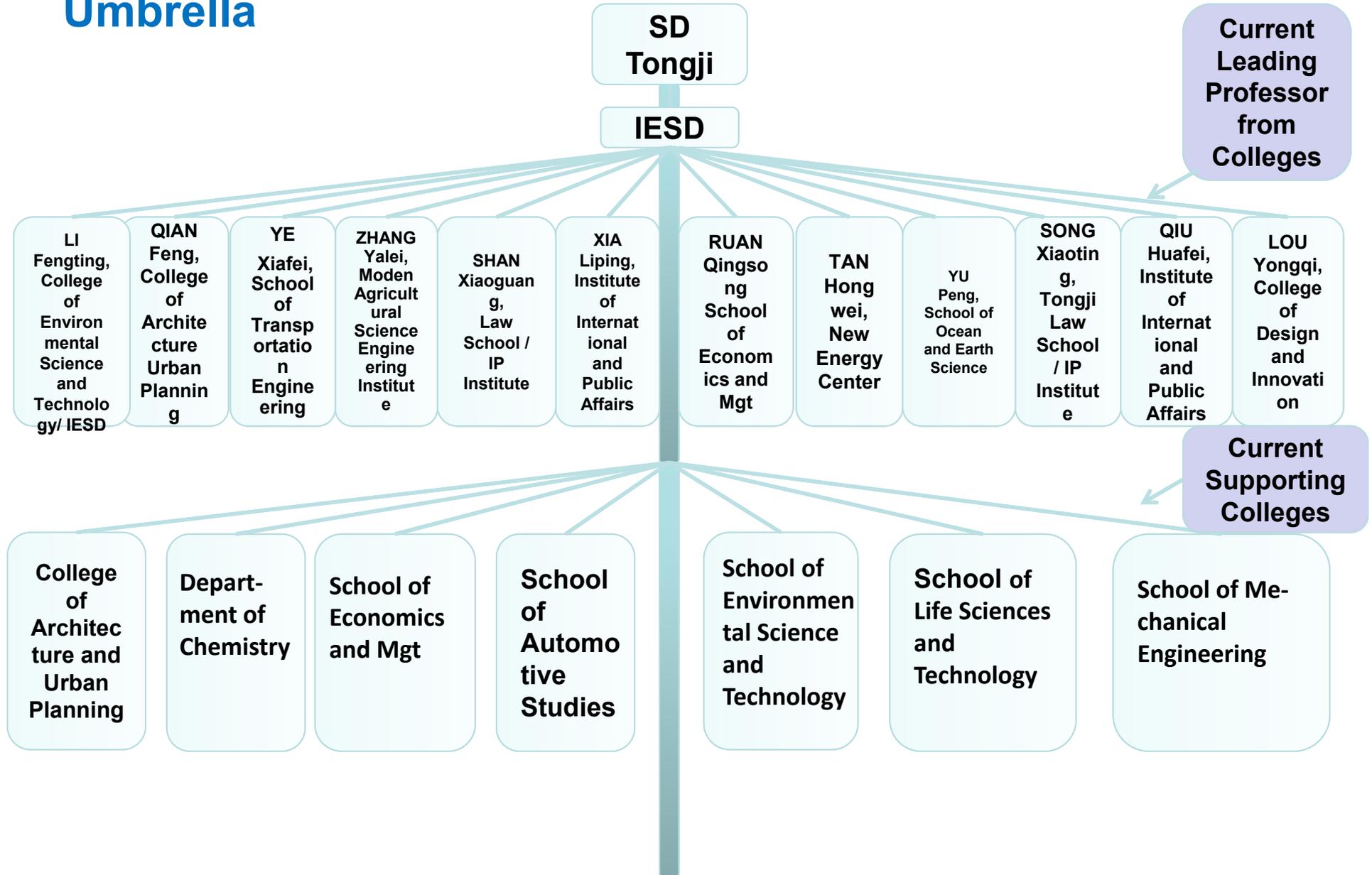
A Sustainability-oriented University



Expanding the green campus network to 200 Chinese Universities



PROSPECTS-Tongji Sustainable Development Umbrella



EDUCATION

International Education Programs

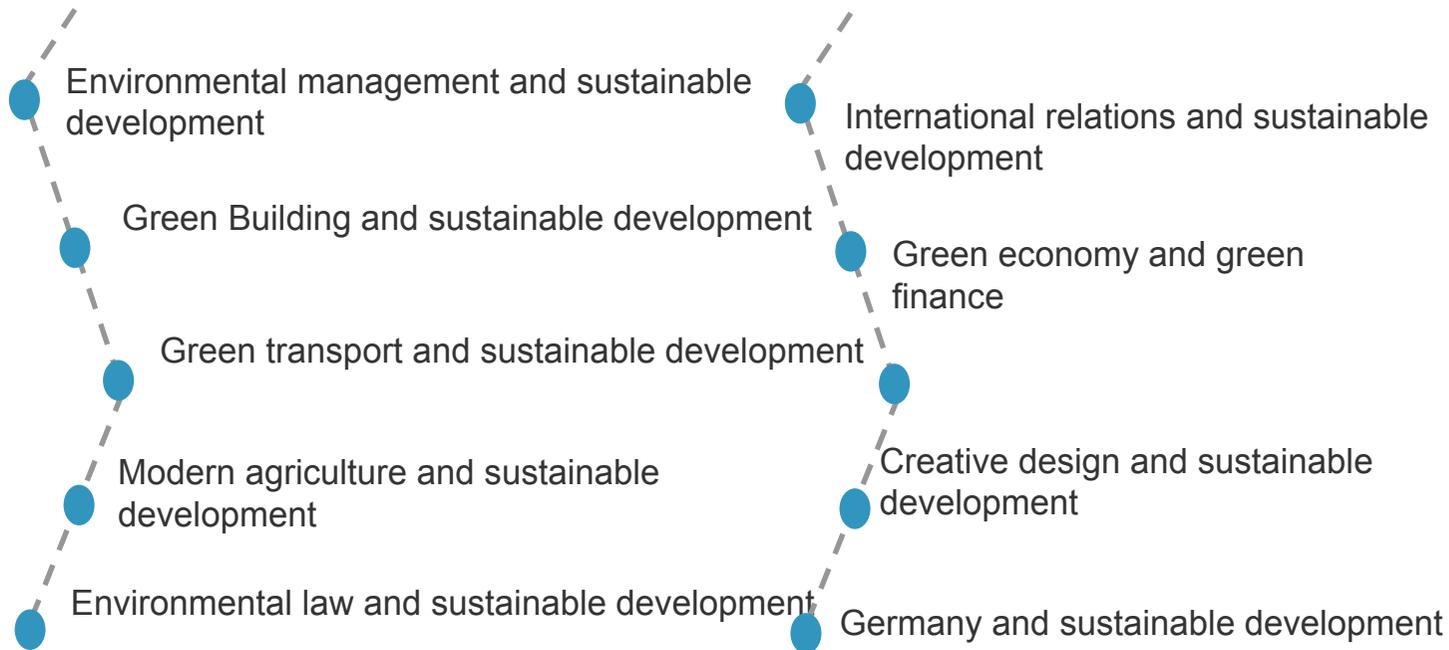
International Master Program in Environment Management and Sustainable Development

International Master Program in Environment Engineering

International Ph.D Program in Environment Management and Sustainable Development

Sustainable Development Education

- **EDUCATED** 10 Ph.D. candidates from 8 schools of the interdisciplinary major in “Environment and Sustainable Development”;
- **DESIGNED** a minor in sustainable development for all the TJ students



Summer School

- Europe
- Japan
- Korean
- African countries

Tongji Students visited University of Barcelona in Oct, 2014.



Graduates



Global University Partnership on Environment and Sustainability (GUPES) initiated by UNEP in Tongji

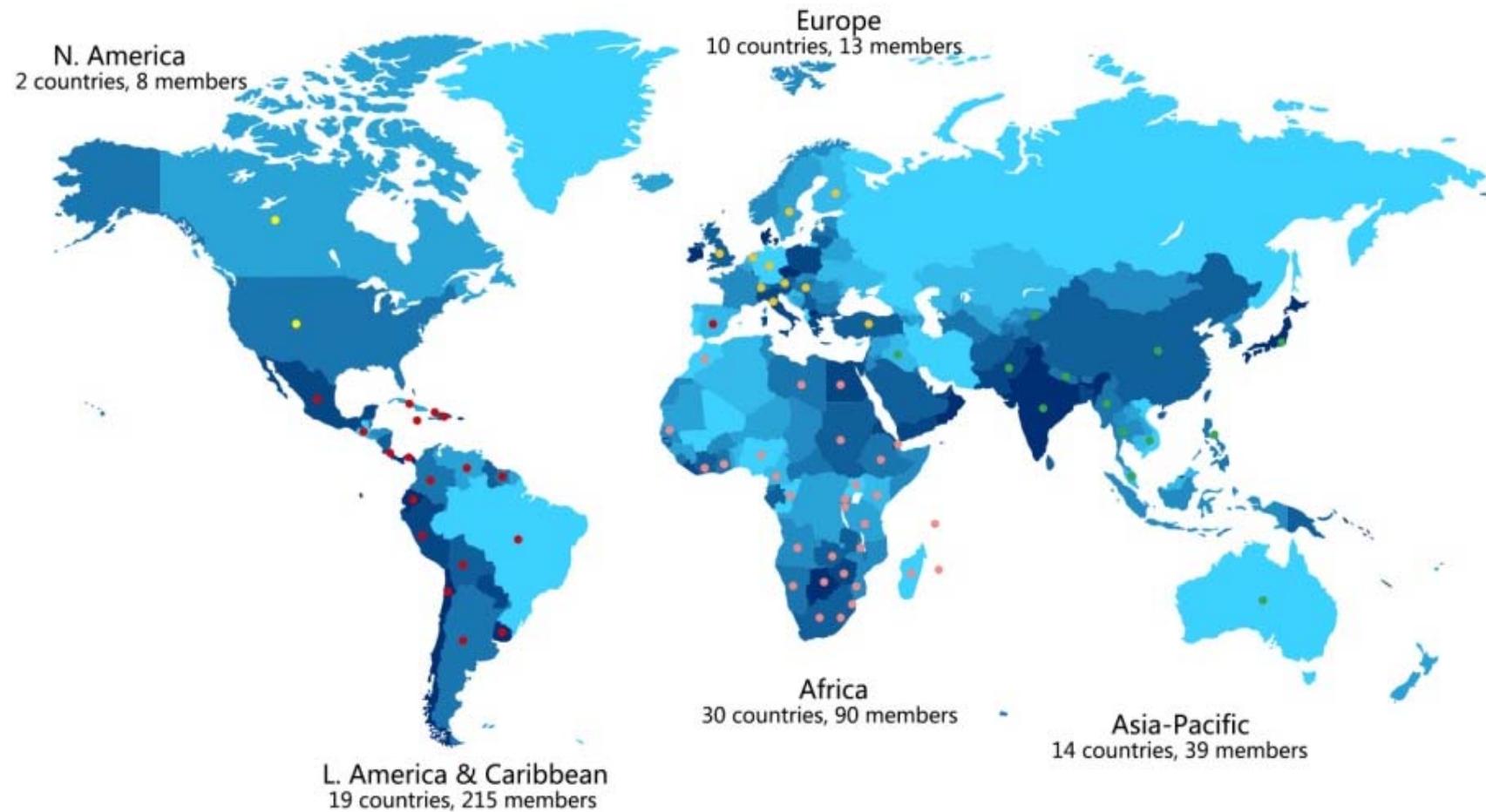


GUPES has been established in 2010 and WU Jiang, Vice President of Tongji University was re-elected as the president in 2012. The Secretariat has been set up in IESD.



GUPES Members Distribution by Continents

Over 520 members from over 75 countries.



RESEARCH

114 national and municipal projects with a total of USD 10 million by the 20 fellow professors of IESD



China Meteorological Administration Key Lab of Shanghai Urban Responses to Climate Change



- Tongji University and **China Meteorological Administration** signed MoU in 2011.
- 6 experts from Shanghai Meteorological Administration
- 6 experts from Tongji.

China-U.S. Innovation Center for Energy and Environment

established with focus on emission control, climate change, clean energy technological development



Shanghai Key Lab of Chemicals Analysis, Risk Assessment and Management



IESD

- In response to UNEP work priority on chemicals and China's Twelfth-Year-Plan on environment;
- Interdisciplinary approach
- Assessment of chemicals risk; usage and disposal of chemicals;

Bayer-Tongji Chair for Sustainable Development

- **SCHOLARSHIPS** 10 Tongji students awarded the Bayer scholarships
- **RESEARCH PROJECTS**
 - Study on Shanghai Emissions Trading System
 - Waterborne PU Synthetic Leather
 - Low carbon development strategy of Shanghai towards a green economy
- **Awareness** Bayer-Tongji Sustainable Development Workshop on future of learning



International Student Conference on Environment and Sustainability 2014



UNEP celebrity partner calls for reducing carbon footprint during WED



Symposium on Energy Transition and Climate Change



Case Exhibition on Youth Projects of Sustainable Development



Global Youth Tongji Declaration

Other Flagship Activities

Asia-Pacific Leadership Programme on the Environment and Sustainable Development

UNEP-UN-Habitat Capacity Building Workshop on Planning for a Sustainable City

SIDA International Training Programme on the Environment for Sustainable Development



