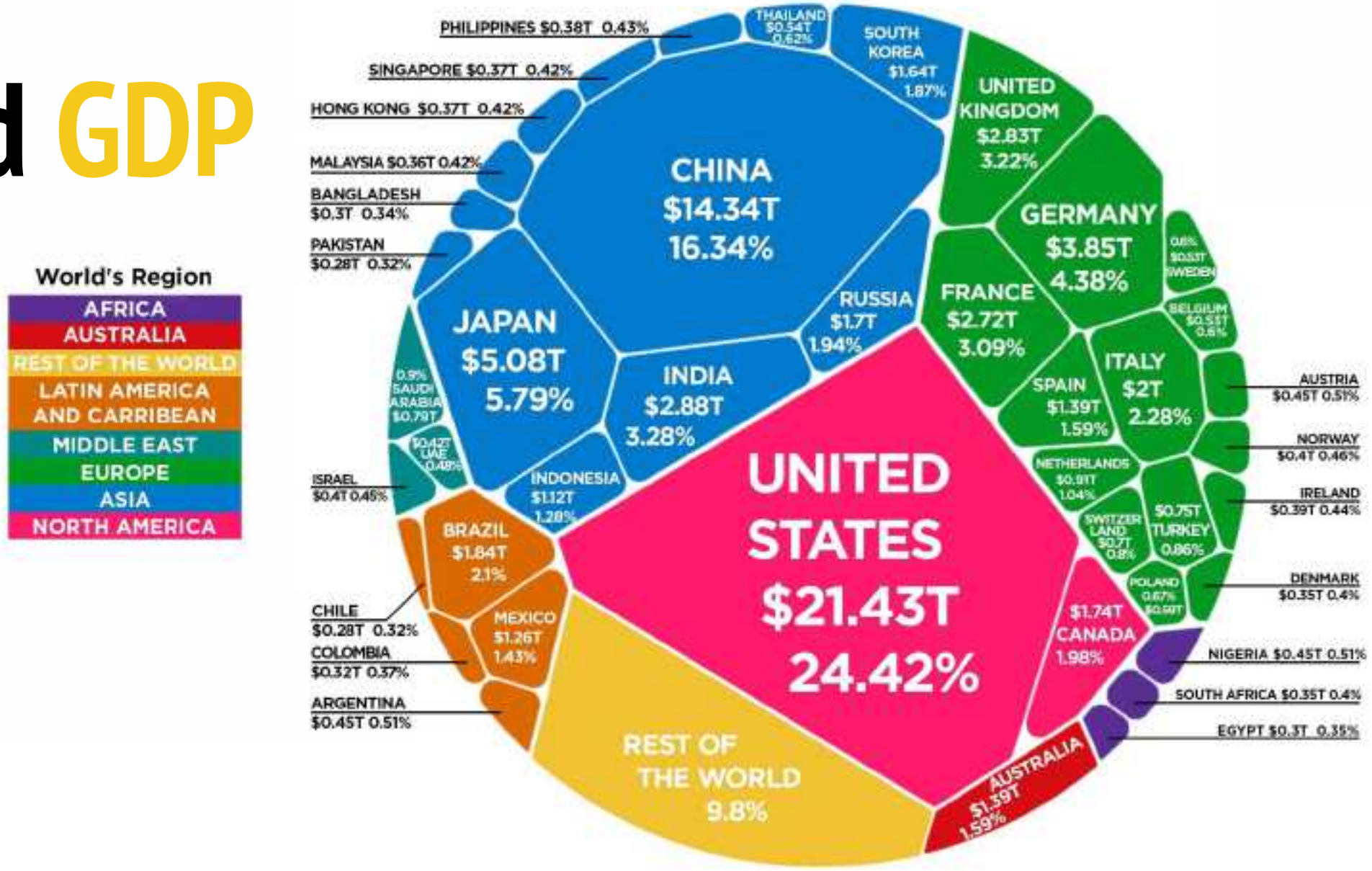
International Construction Management

Infrastructure & connectivity

Igor Martek

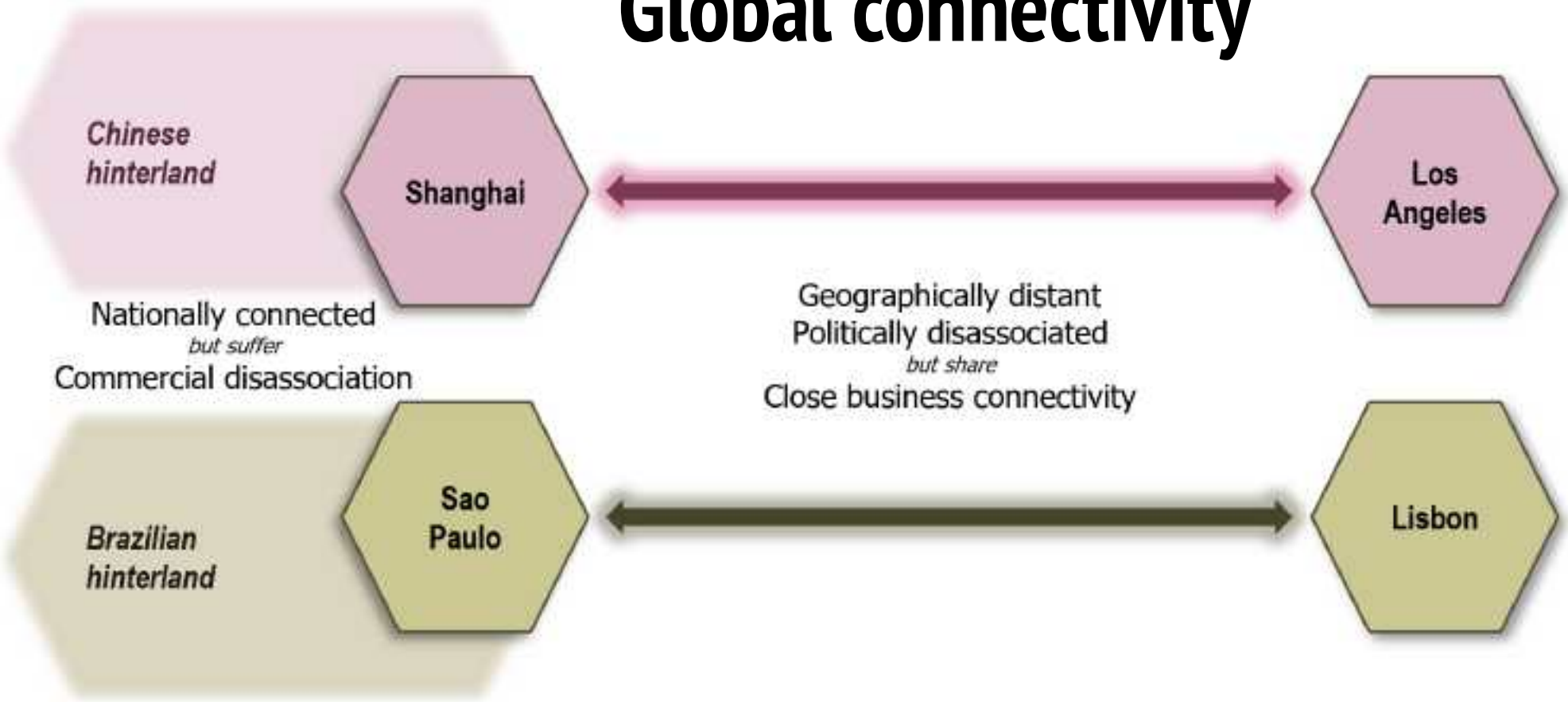
World GDP


World's Region
AFRICA
AUSTRALIA
REST OF THE WORLD
LATIN AMERICA AND CARRIBEAN
MIDDLE EAST
EUROPE
ASIA
NORTH AMERICA
PHILIPPINES $0.38T 0.43%
SINGAPORE $0.37T 0.42%
HONG KONG $0.37T 0.42%
MALAYSIA $0.36T 0.42%
BANGLADESH $0.3T 0.34%
PAKISTAN $0.28T 0.32%
ISRAEL $0.4T 0.45%
CHILE $0.28T 0.32%
COLOMBIA $0.32T 0.37%
ARGENTINA $0.45T 0.51%
THAILAND $0.54T 0.62%
SOUTH KOREA $1.64T 1.87%
UNITED KINGDOM $2.83T 3.22%
GERMANY $3.85T 4.38%
SWEDEN
BELGIUM $0.5T 0.6%
AUSTRIA $0.45T 0.51%
NORWAY $0.4T 0.46%
IRELAND $0.39T 0.44%
DENMARK $0.35T 0.4%
NIGERIA $0.45T 0.51%
SOUTH AFRICA $0.35T 0.4%
EGYPT $0.3T 0.35%
CHINA $14.34T 16.34%
JAPAN $5.08T 5.79%
INDIA $2.88T 3.28%
RUSSIA $1.7T 1.94%
FRANCE $2.72T 3.09%
SPAIN $1.39T 1.59%
ITALY $2T 2.28%
NETHERLANDS $0.91T 1.04%
SWITZERLAND $0.7T 0.8%
$0.75T TURKEY 0.86%
POLAND 0.67% $0.59T
$1.74T CANADA 1.98%
UNITED STATES $21.43T 24.42%
REST OF THE WORLD 9.8%
AUSTRALIA $1.39T 1.59%
BRAZIL $1.84T 2.1%
MEXICO $1.26T 1.43%
INDONESIA $1.12T 1.28%
0.9% SAUDI ARABIA $0.79T
$0.42T UAE 0.48%


Billions of dollars
NORTH AMERICA
LATIN AMERICA
ASIA
CIS
EUROPE
MIDDLE EAST
AFRICA
Intraregional trade:
4,100
1,100
70
Interregional trade:
1,030
500
300
100
20

Trade flows

Global connectivity



- International cities are more closely tied than to their hinterland

Global hubs

- Key tradables:
  - Goods
  - Services
  - Finance
  - People
  - Data

Rank[2]	Goods	Goods, services, people	Financial	People	Data and communication
1	Shanghai	Atlanta	London	New York	Frankfurt
2	Singapore	Beijing	New York	Los Angeles	London
3	Shenzhen	London	Hong Kong	London	Amsterdam
4	Hong Kong	Tokyo	Singapore	Hong Kong	Paris
5	Ningbo	Los Angeles	Tokyo	Toronto	New York
6	Busan	Dubai	Seoul	Paris	Los Angeles
7	Guangzhou	Chicago	Zurich	Miami	Miami
8	Qingdao	Paris	Toronto	Sydney	Stockholm
9	Dubai	Dallas/Fort Worth	San Francisco	Chicago	San Francisco
10	Tianjin	Hong Kong	Washington, DC	Singapore	Singapore
11	Rotterdam	Frankfurt	Chicago	San Francisco	Hong Kong
12	Port Klang	Jakarta	Boston	Melbourne	Tokyo
13	Kaohsiung	Istanbul	Geneva	Moscow	Moscow
14	Dalian	Amsterdam	Frankfurt	Houston	Milan
15	Hamburg	Guangzhou	Sydney	Dubai	Vienna
16	Antwerp	Singapore	Dubai	Riyadh	Washington, DC
17	Xiamen	Denver	Montreal	Washington, DC	Hamburg
18	Tanjung Pelepas	New York	Vancouver	Dallas	Beijing
19	Los Angeles	Shanghai	Luxembourg	Jeddah	Marseille
20	Long Beach	Kuala Lumpur	Osaka		Copenhagen
21	Laem Chabang	San Francisco	Shanghai		Brussels
22	Tanjung Priok	Bangkok	Qatar		Warsaw
23	Ho Chi Minh City	Incheon	Shenzhen		Shanghai
24	Bremen	Charlotte	Busan		São Paulo
25	New York	Las Vegas	Tel Aviv		Madrid

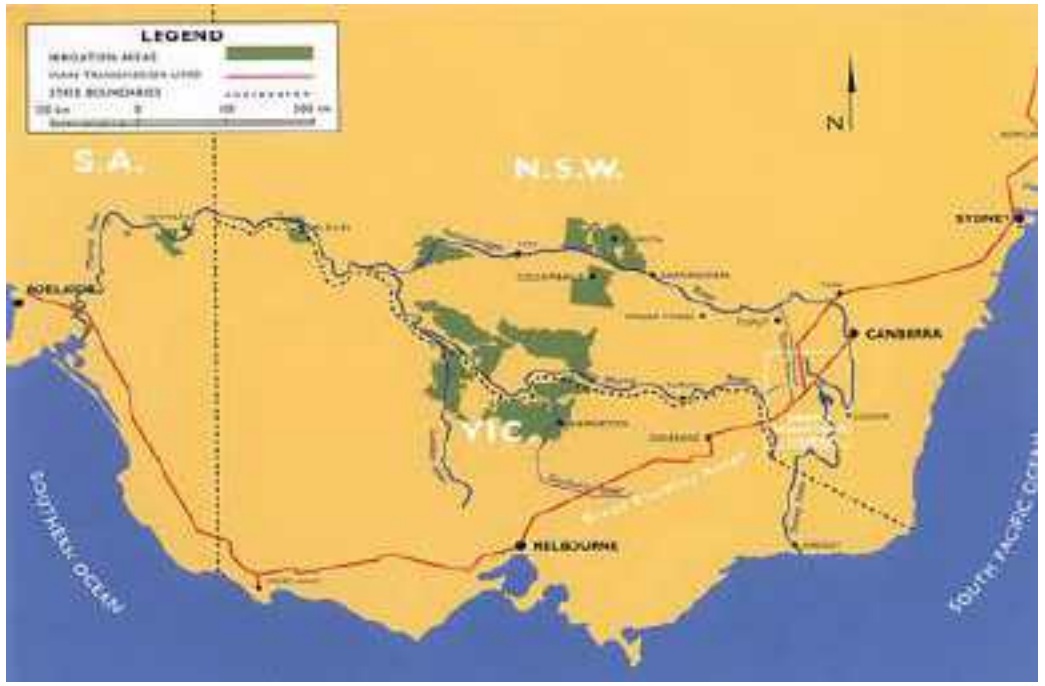
Australia

Infrastructure procurement philosophy

- Once guided by the ‘best that can be afforded’ philosophy
- Now driven by ‘user pay’ rationale

The Snowy Mountains Scheme

- Covers 7,780 km^2
- 25 years to complete
- 16 dams
- 7 power stations
- 145 km of tunnels
- 80 km of aqueduct



		Global urban competitiveness		GDP		GDP per capita		GDP per square kilometre		GDP growth		Patent application	
Cities	Economics	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Tokyo	Japan	0.92	3	1.00	1	0.64	69	0.37	19	0.09	472	0.27	41
Singapore	Singapore	0.76	8	0.25	14	0.44	157	0.28	31	0.36	172	0.05	183
Seoul	Korea	0.74	9	0.40	6	0.31	193	0.53	8	0.16	363	0.07	150
Hong Kong	China	0.74	10	0.33	7	0.39	181	0.24	47	0.28	239	0.05	177
Yokohama	Japan	0.68	21	0.20	17	0.44	160	0.36	22	0.15	387	0.41	16
Osaka	Japan	0.68	24	0.32	8	0.50	126	0.14	117	0.07	499	0.31	34
Shanghai	China	0.64	37	0.26	11	0.14	251	0.04	258	0.57	70	0.09	122
Taipei	China	0.63	38	0.11	42	0.33	190	0.21	60	0.11	443	0.18	75
Sydney	Australia	0.62	46	0.30	10	0.56	97	0.15	108	0.13	414	0.01	281
Nagoya	Japan	0.61	49	0.19	19	0.69	45	0.47	10	0.08	490	0.17	79
Beijing	China	0.59	59	0.20	16	0.10	287	0.01	375	0.56	71	0.08	130
Kawasaki	Japan	0.59	61	0.07	67	0.43	163	0.40	15	0.09	473	0.41	15
Sagamihara	Japan	0.58	70	0.04	149	0.45	148	0.35	23	0.16	364	0.32	31
Shenzhen	China	0.58	71	0.15	25	0.14	252	0.06	223	0.74	21	0.15	85
Chiba	Japan	0.56	82	0.05	100	0.47	134	0.16	95	0.09	476	0.37	23
Saitama	Japan	0.56	84	0.06	84	0.42	166	0.23	53	0.11	440	0.39	20
Kyoto	Japan	0.56	86	0.09	49	0.53	113	0.09	171	0.10	450	0.29	40
Melbourne	Australia	0.55	91	0.25	13	0.54	110	0.03	307	0.23	283	0.02	237
Macau	China	0.55	93	0.02	236	0.36	187	0.54	7	0.56	72	0.00	343
Brisbane	Australia	0.51	136	0.12	35	0.51	121	0.07	199	0.17	352	0.01	260
Canberra	Australia	0.44	229	0.03	205	0.67	53	0.03	295	0.18	336	0.01	292
Hobart	Australia	0.43	238	0.02	293	0.67	52	0.03	305	0.23	281	0.01	244
Adelaide	Australia	0.43	243	0.06	80	0.44	162	0.03	297	0.12	430	0.01	257

Australian cities competitiveness rankings

- State capitals prevail
- (Asia-Pacific region)

Limits of private investment

High speed rail

- Proposed early 1980s
- Serves 12m living in catchment
- Promotes regional growth, decentralization, and economic linkages
- Cost of $114 billion
- No public interest to invest

PPP procurement

- Selects projects on profit
- Carry no redundancies for growth
- Run assets into the ground
- Do not reinvest
- Cannot make rail projects viable

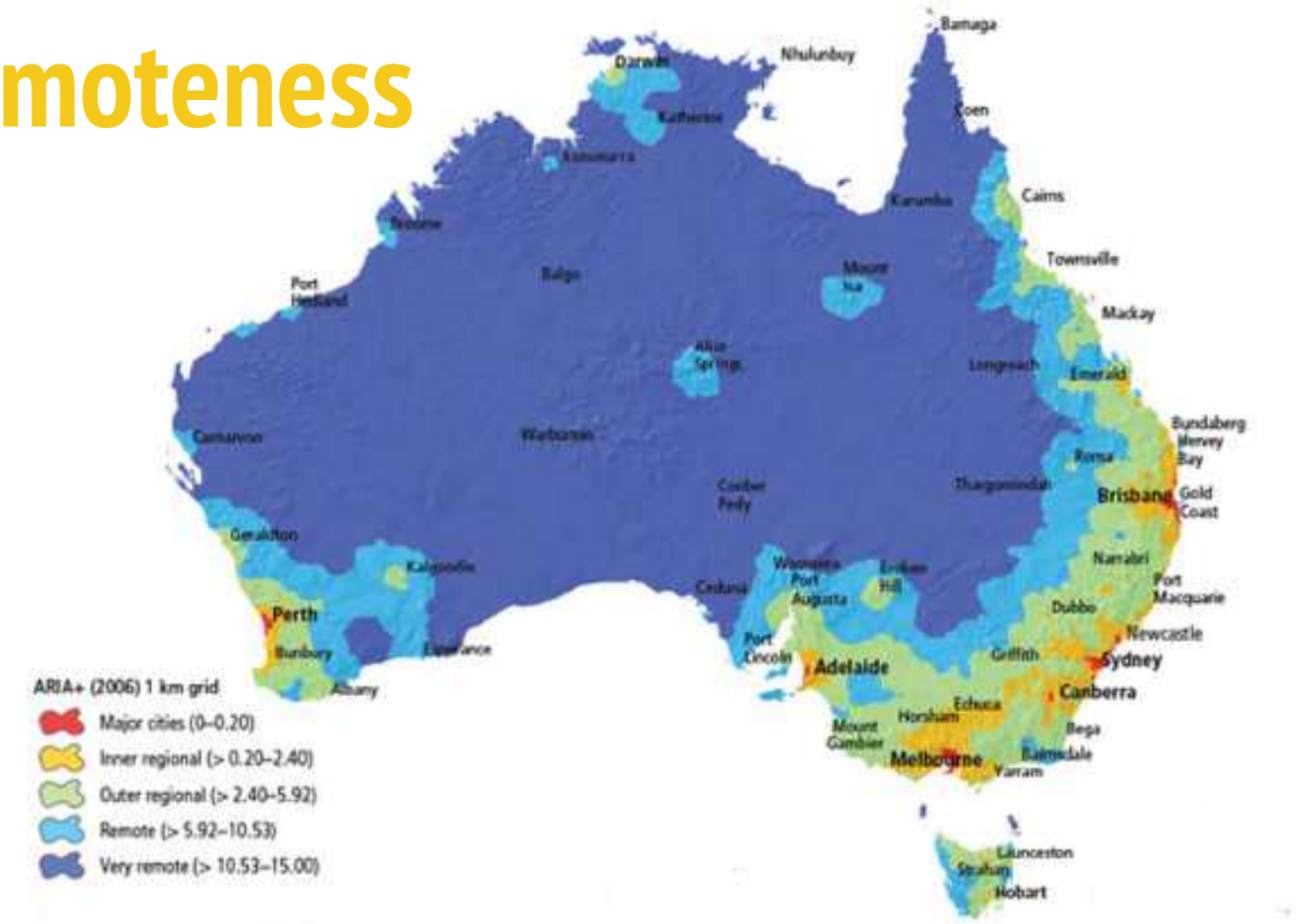
‘Infrastructure Australia Act’

- Introduced by Kevin Rudd’s government, in 2008
- Recognizes a national approach to infrastructure procurement
  - Long-term needs strategy
  - Integration of projects
  - Value transcends redeemable project returns
- Key findings:

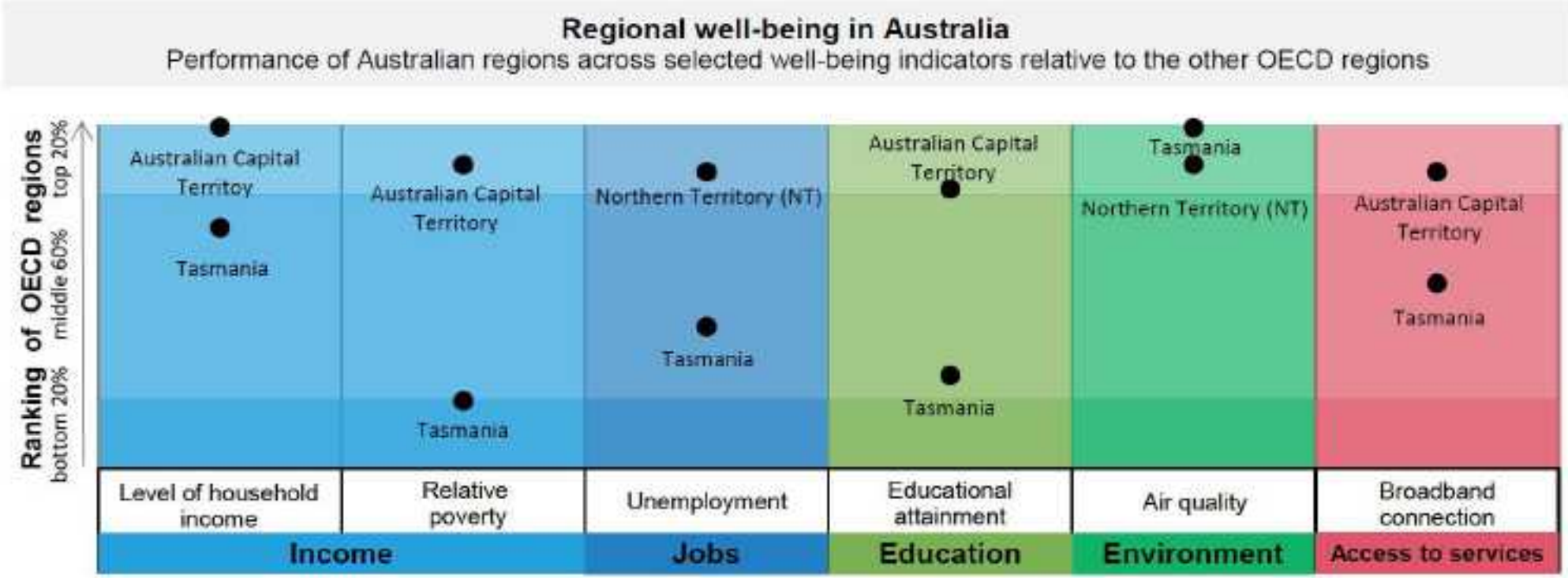
“…it is clear that expenditure on maintaining existing infrastructure and providing new infrastructure is well below what is necessary. As well, there is still a lack of strategic and coordinated infrastructure planning and prioritization across many infrastructure sectors.” (Infrastructure Report Card, 2010, p. 5)

Australian remoteness

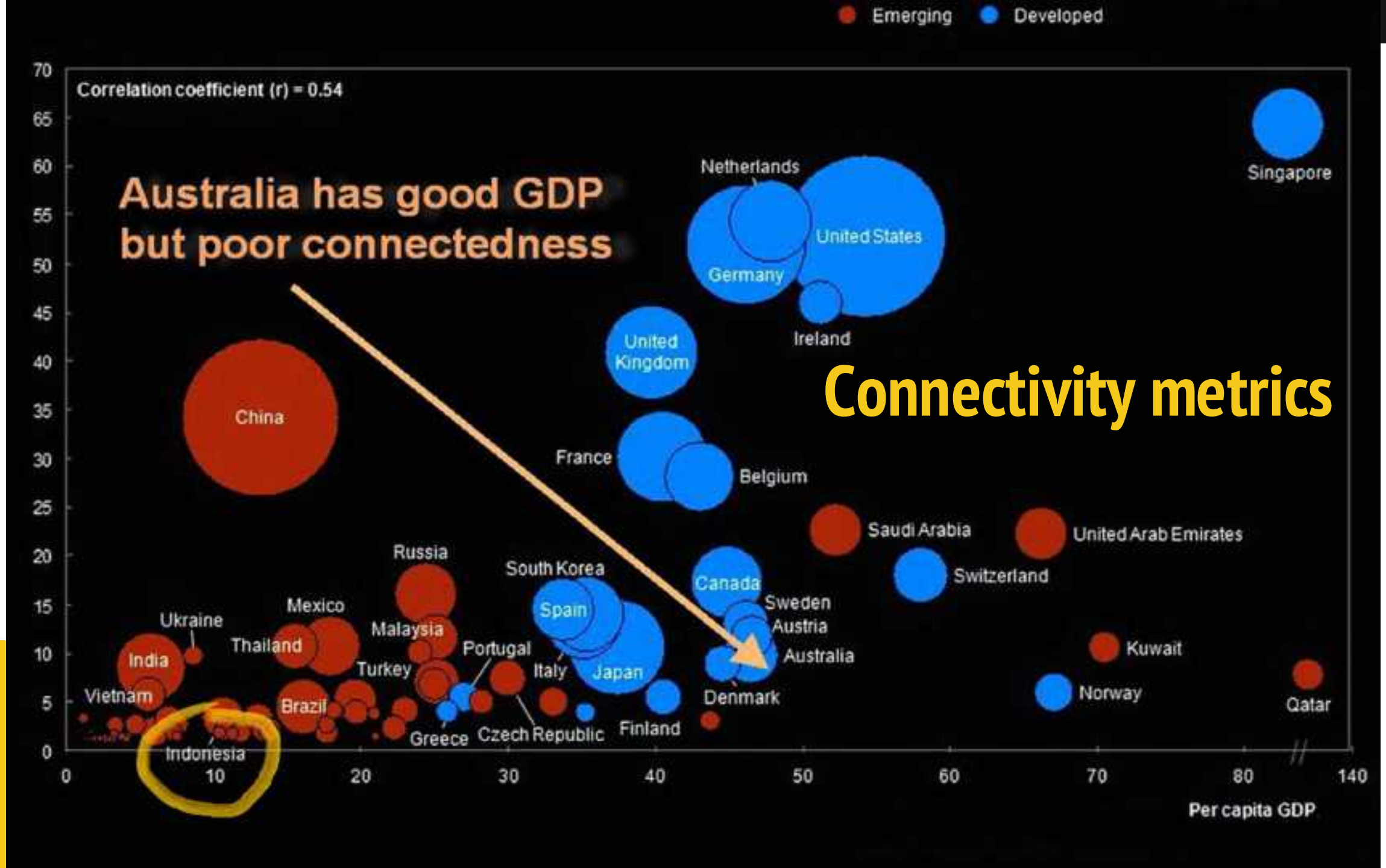
- ‘ARIA’ index, derived from transport factors



Regional wellbeing indicators



- Australia has the widest spread of inequalities in the OECD
- Tasmanian income is half that of the ACT; unemployment double


Emerging
Developed
Correlation coefficient (r) = 0.54
Australia has good GDP but poor connectedness
Connectivity metrics
Singapore
Netherlands
United States
Germany
Ireland
United Kingdom
China
France
Belgium
Saudi Arabia
United Arab Emirates
Switzerland
Russia
South Korea
Canada
Sweden
Austria
Spain
Mexico
Ukraine
Malaysia
Thailand
Portugal
Kuwait
India
Turkey
Italy
Japan
Australia
Vietnam
Brazil
Denmark
Norway
Qatar
Greece
Czech Republic
Finland
Indonesia
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
0
10
20
30
40
50
60
70
80
140
Per capita GDP

Australia's infrastructure report card

- States are overall adequate
- Sectors are more mixed, but overall adequate to good
- However, trajectory is downward

Rating scale

Letter grade	*Designation*	*Definition*
A	Very good	Infrastructure is fit for its current and anticipated future purposes
B	Good	Minor changes are required to enable infrastructure to be fit for its current and anticipated future purposes
C	Adequate	Major changes are required to enable infrastructure to be fit for its current and anticipated future purposes
D	Poor	Critical changes are required to enable infrastructure to be fit for its current and anticipated future purposes
F	Inadequate	Inadequate for current and anticipated future purposes

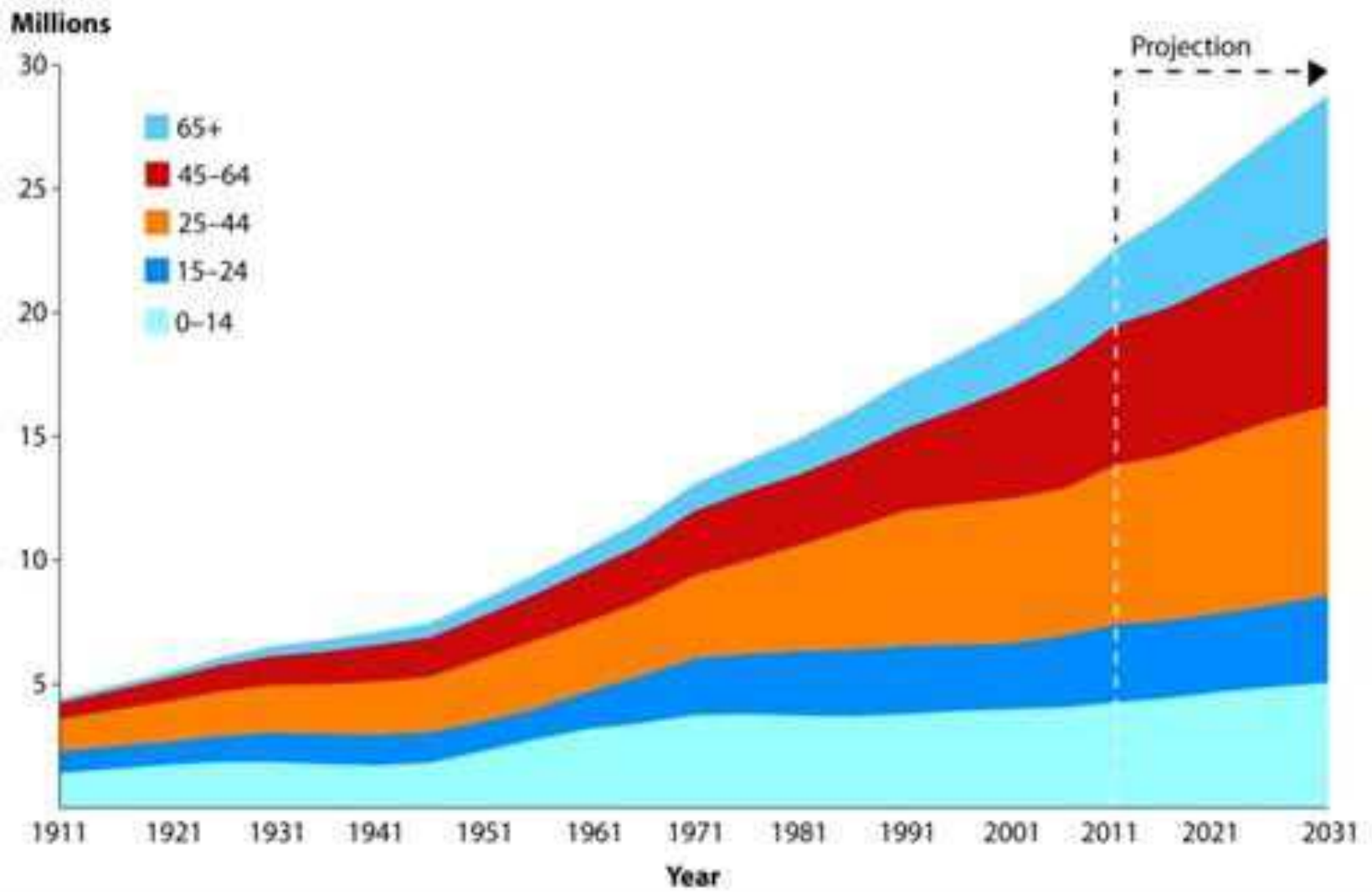
Rating results

Rating by sectors	
Roads	C
Rail	D+
Airports	B-
Ports	B-
Potable water	B-
Wastewater	B-
Stormwater	C
Irrigation	C
Electricity	C+
Gas	B-
Telecommunications	C

Rating by states & territories	
ACT	B-
NSW	C
NT	C+
QLD	C+
SA	C+
TAS	C
WA	C+
VIC	C

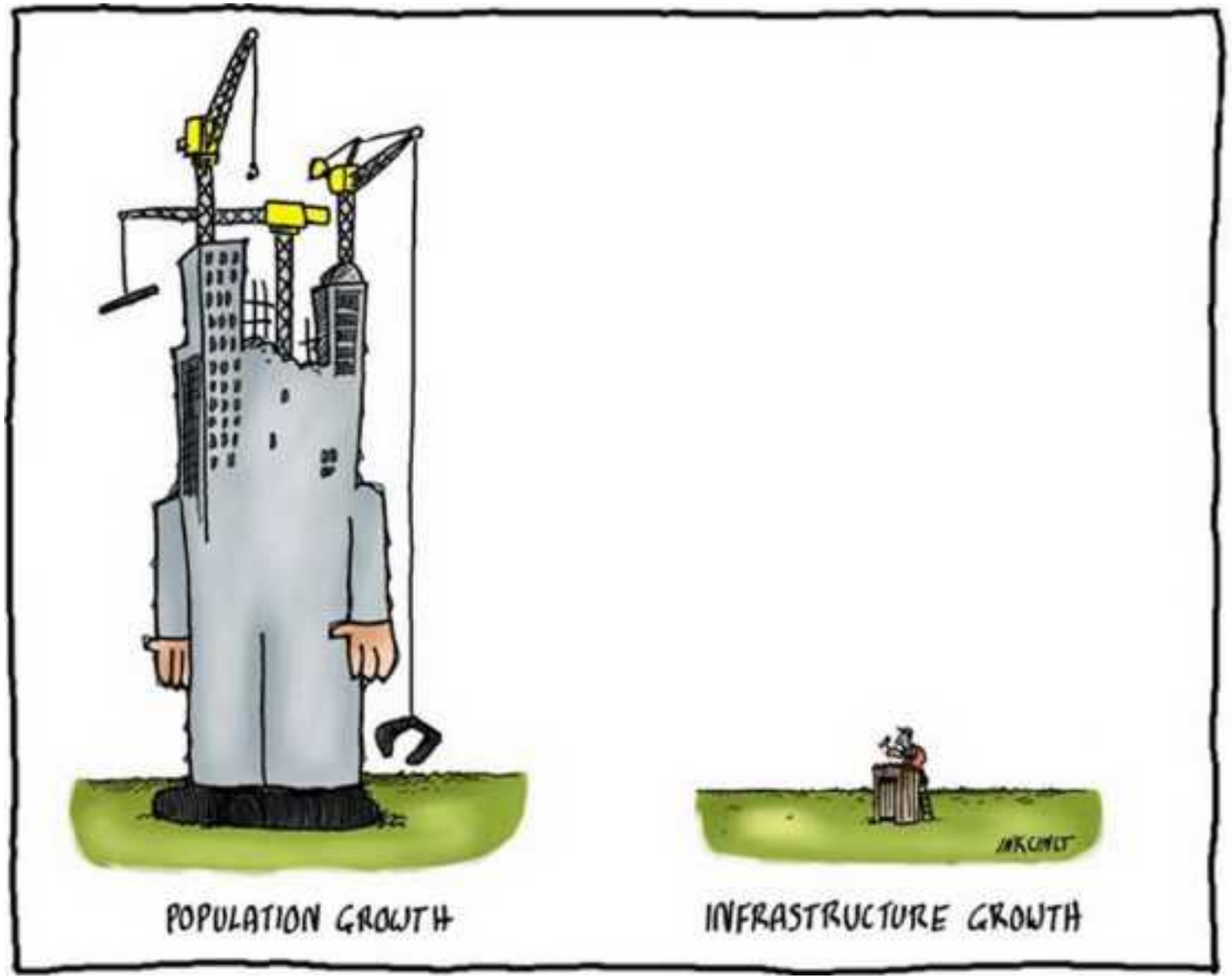
Australian population growth

- The fastest rate in the developed world



A looming problem

- Australia is set to weaken its economic vitality, and dilute living standards



Current state of infrastructure

- Australian Infrastructure Audit findings *(pooled from 350 studies)*
  - 1) – Australia's current rankings adequate:
    16th in transportation infrastructure
    20th in total infrastructure
  - 2) – Australia's future rankings set to drop significantly:
    Fastest growing population of any major country
    Infrastructure failing to meet growth rate
    Economy will falter as a result

Australia may jeopardize its position as a nation of exceptional living standards

China

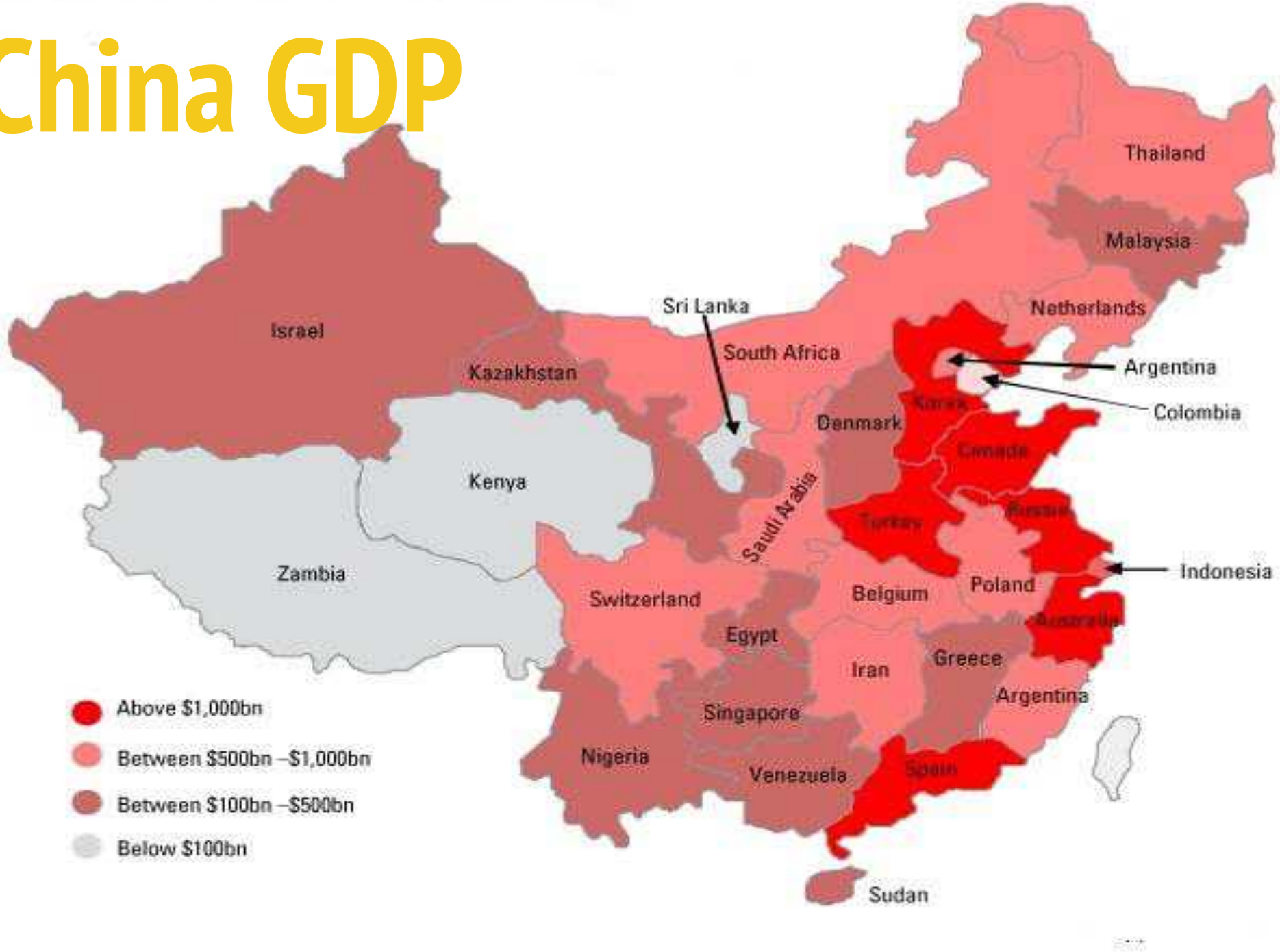
1.4 billion people

- One in five people live in China

Shanghai

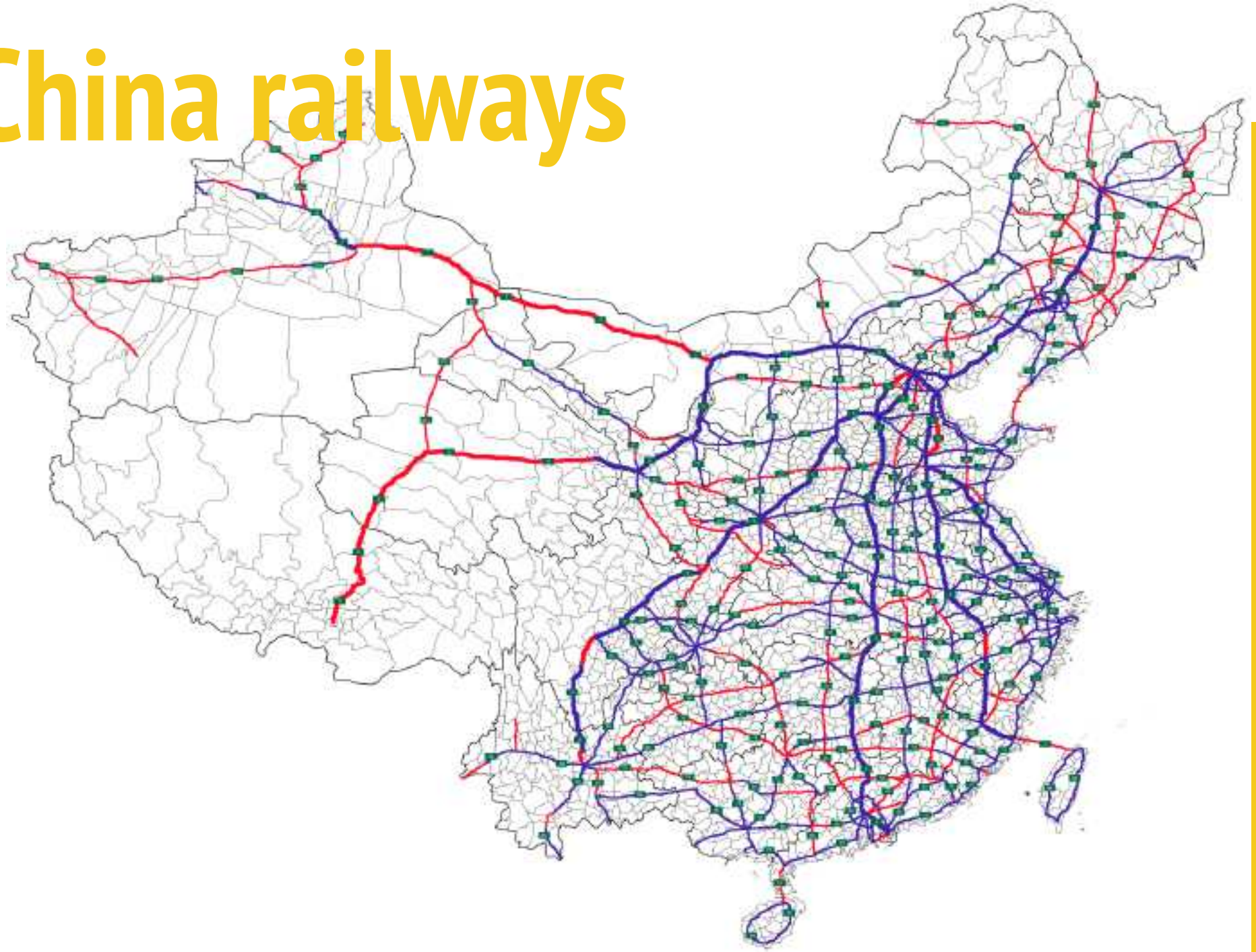
- Then and now

China GDP



- 2021 data

China railways



- Main lines

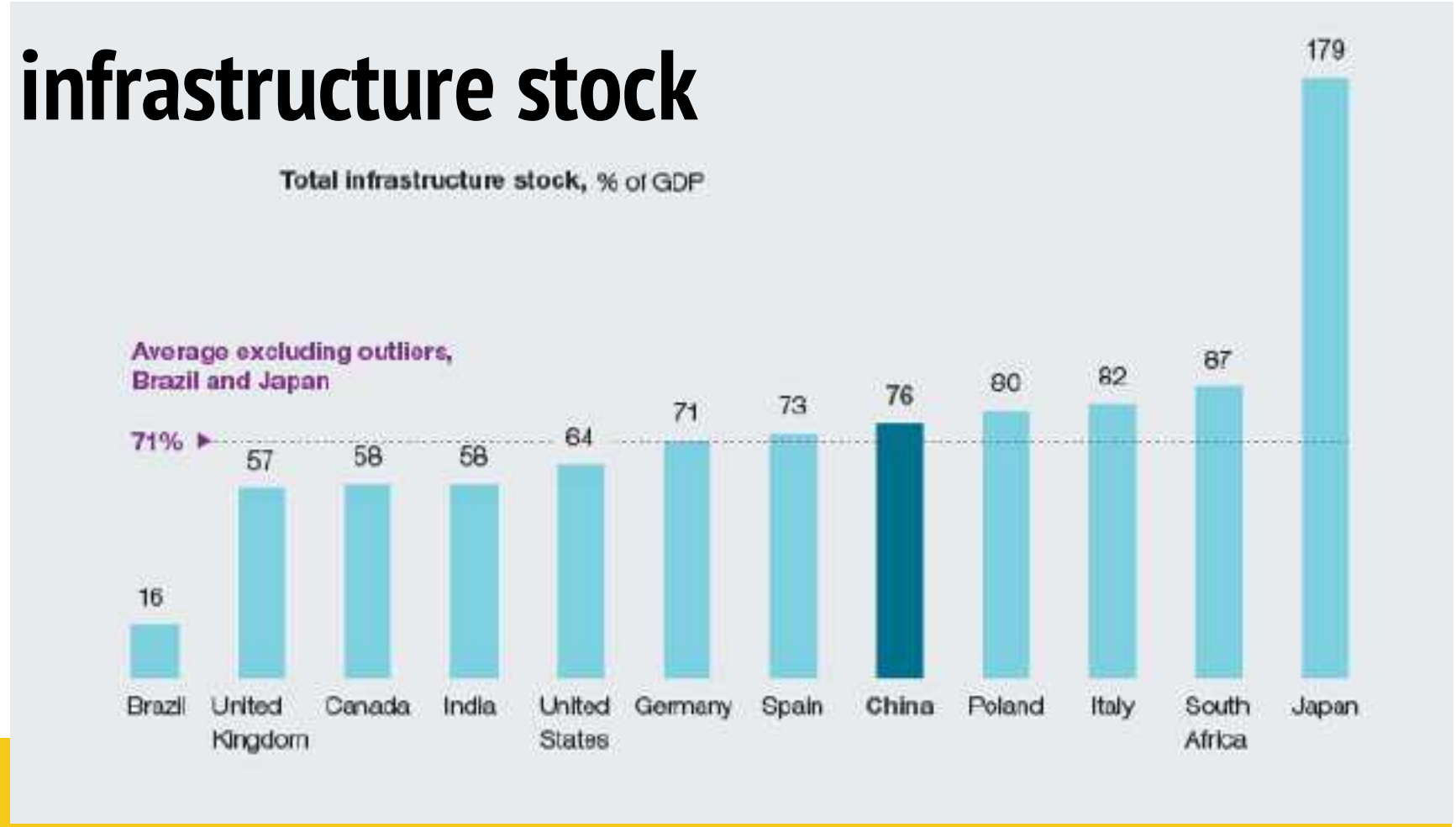
China's economic clusters

- Existing and emerging

China’s logistics corridors

- 7 channels connect production centers with export hubs

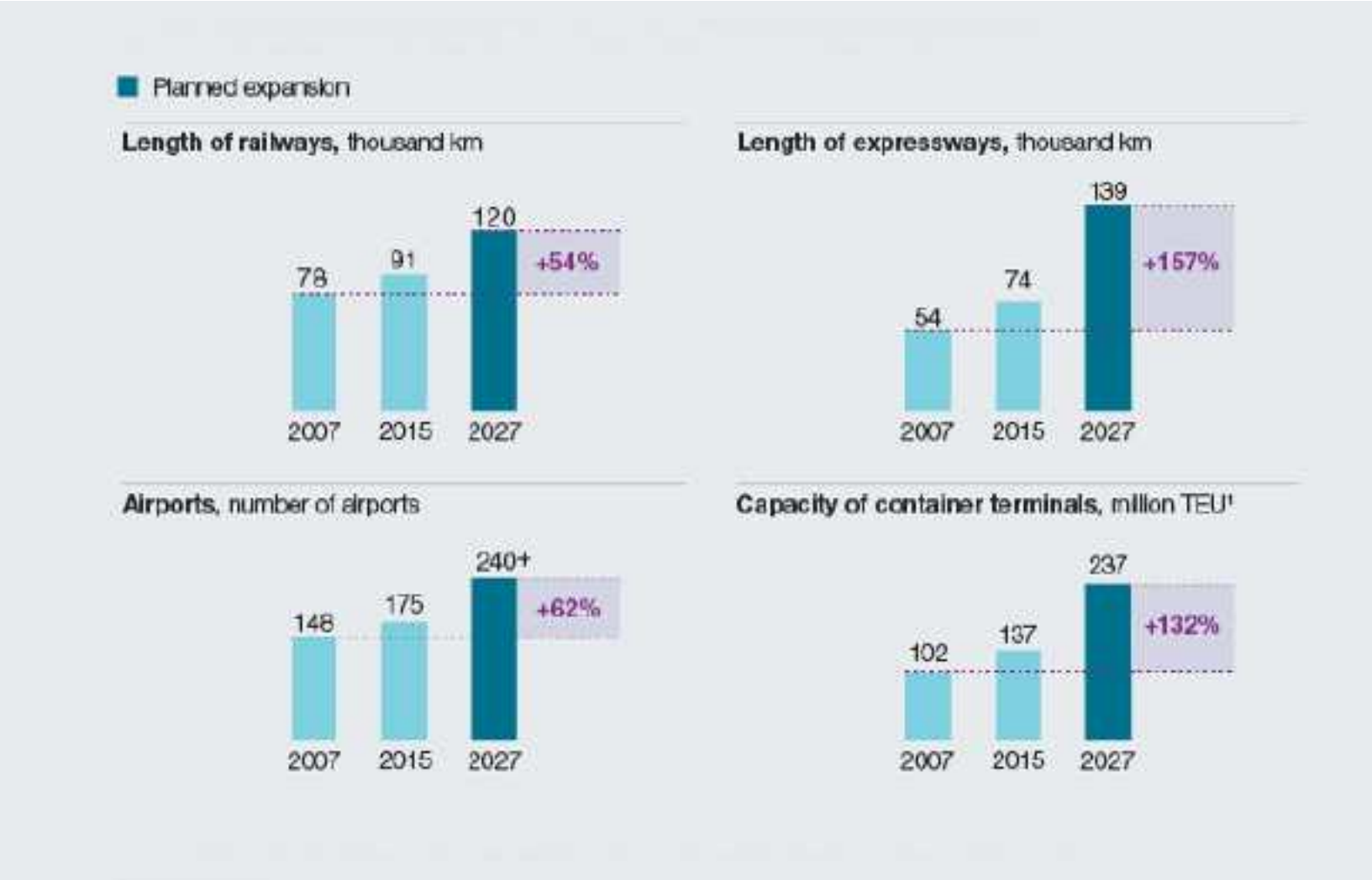
China's infrastructure stock

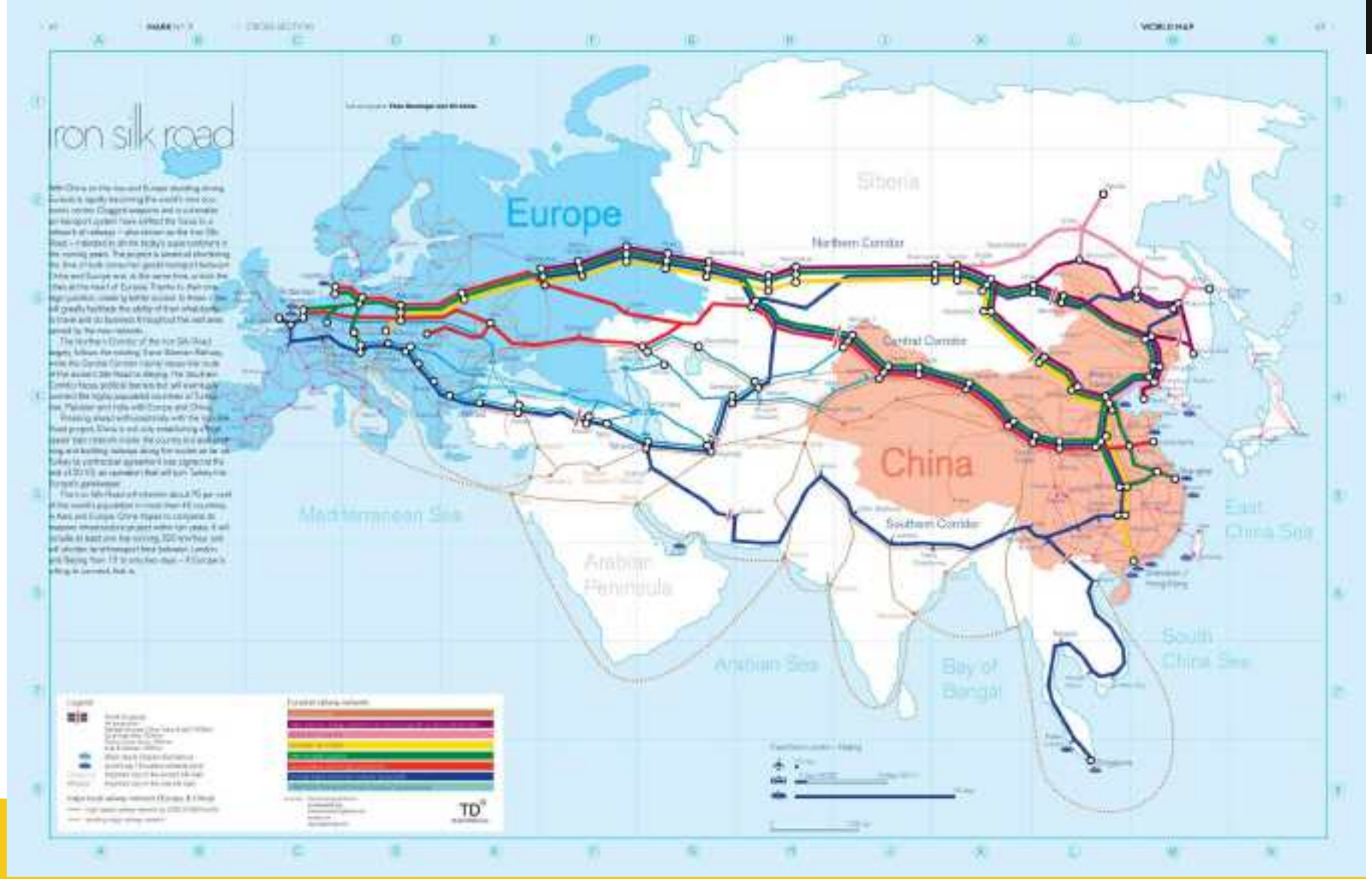


- Stock is above world average
- Yet China still rates as a developing nation

Planned expansion

- Railway
- Roadway
- Airports
- Container terminals

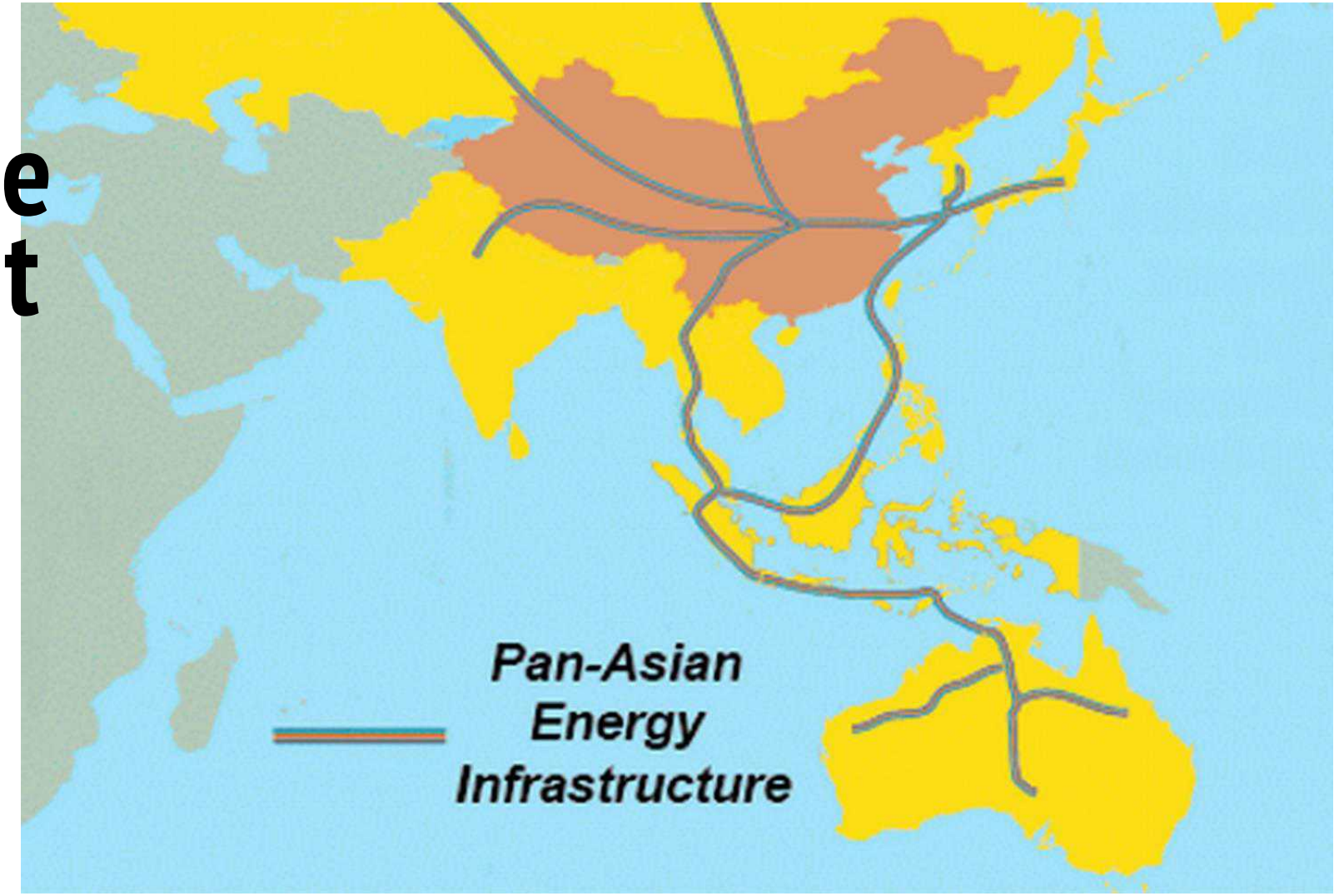


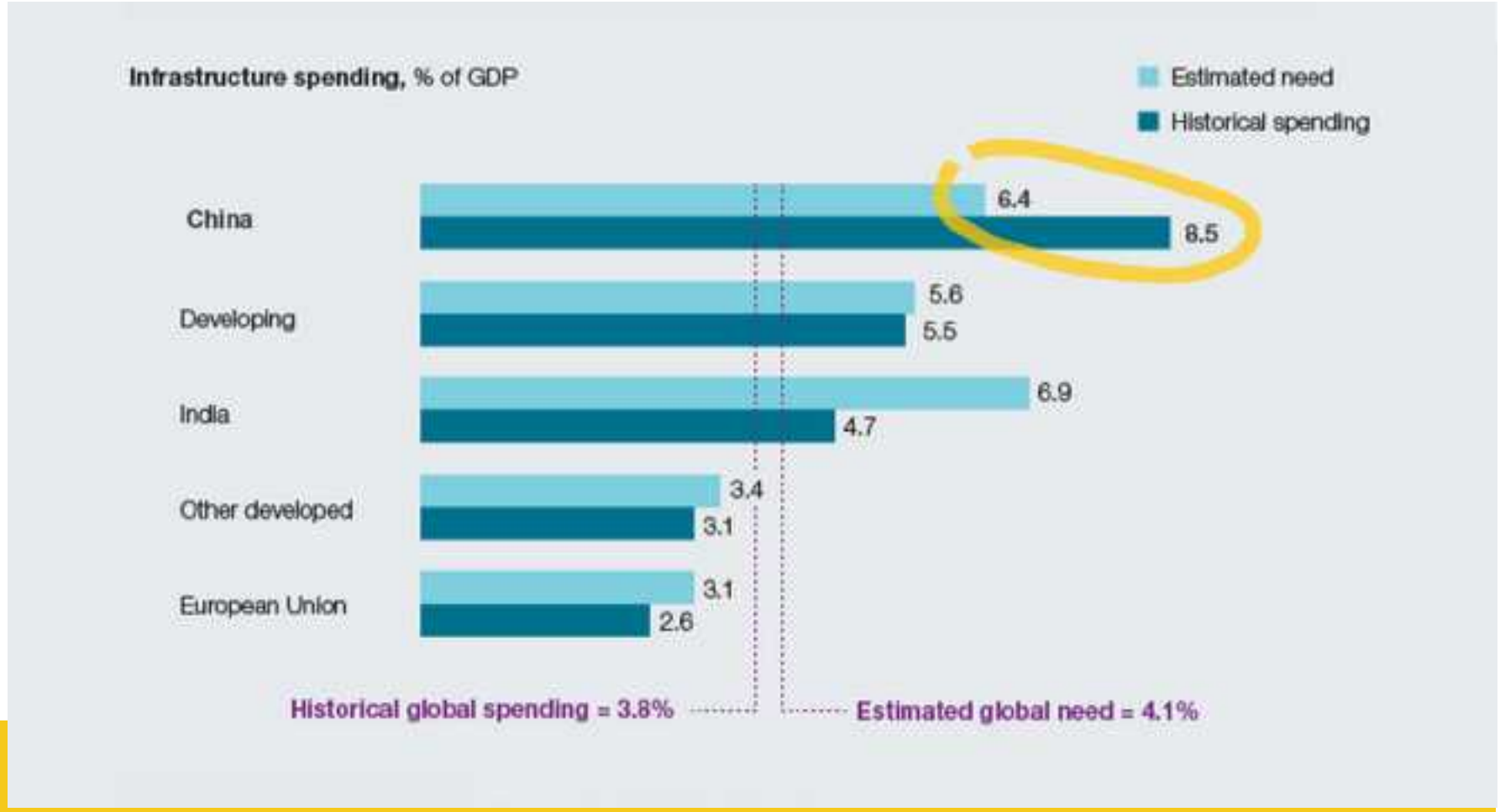


China's Belt and Road Initiative

Asian Infrastructure Development Bank

- Committed and potential members



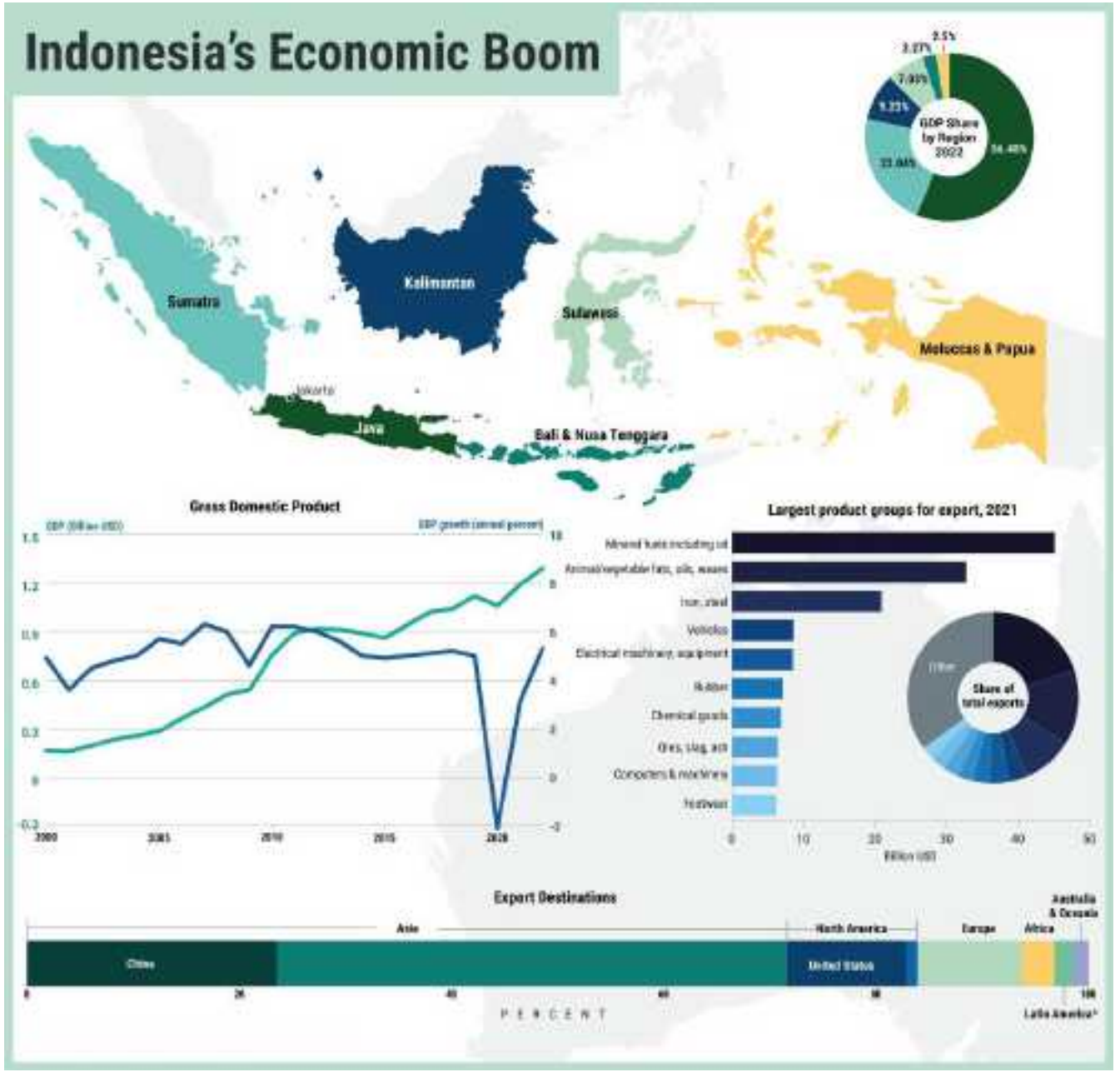


China's infrastructure spending exceeds need

Indonesia

Indonesian economy

- Agriculture and resource driven
- Centered on Java
- Asia focused



Current status

- Indonesian infrastructure audit
  - 1) – Economic growth is predicated on:
    - Strong institutions *(which are lacking but improving)*
    - Adequate infrastructure *(also lacking but improving)*
  - 2) – Indonesia's current position:
    - Ranked 50th out of 141 in global competitiveness *(falling from 45th place)*
    - Ranked 72nd out of 141 in infrastructure competitiveness
    - Targeting 64% of project funding to be private by 2030 *(such as PPPs)*

Transportation infrastructure

- 2002

Railway infrastructure projects

High-speed rail

- First in southern hemisphere
- Links Jakarta – Bandung
- Max 350 km/hr
- China outbid Japan
- Cost - $5 billion
- 11% tunnels
- 38% viaducts

Whoosh

- *Waktu Hemat, Operasi Optimal, Sistem Hebat*
- *Timesaving, optimal operation, outstanding system*

Economic zones

- Six centers requiring dedicated infrastructure

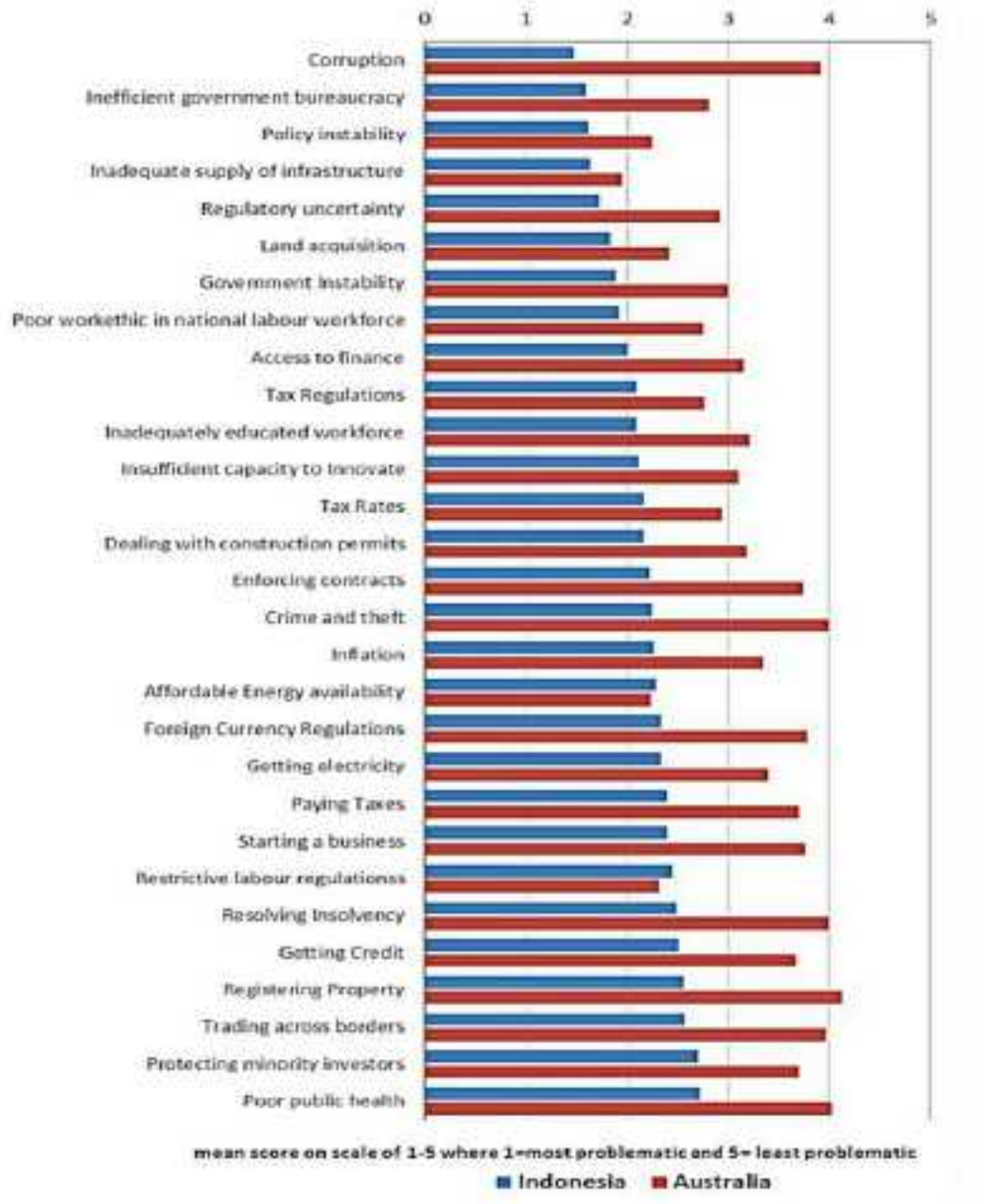
Business entities

- Registered with the Indonesian Construction Services Development Institute (LPJK)
  - 1) – Domestic:
    130,384 – National Public Companies
    6,134 – National Specialist Companies
  - 2) – Foreign:
    203 – Foreign General Companies
    194 – Foreign Investment General Companies
    13 – Foreign Investment Specialist Companies

Indonesia

Foreign firms with a presence

BAUER AG
BL Harbert International
Black & Veatch
Bouygues
CBRE
CTCI Corp.
China Aluminum International Eng'g Corp. Ltd.
China Communications Construction Group Ltd.
China Electric Power Equipment And Tech. Co. Ltd.
China Energy Engineering Corp. Ltd.
China Gansu Int'l Econ. and Tech. Coop. Co. Ltd.
China General Technology (Group) Holding Co. Ltd.
China Metallurgical Group Corp.
China National Chemical Eng'g Group Corp. Ltd.
China National Machinery Industry Corp.
China Nonferrous Metal Ind. For. Eng'g and Constr.
China Nuclear Engineering Corp. Ltd.
China Railway Construction Corp. Ltd.
China Railway Group Ltd.
China State Construction Engineering Corp. Ltd.
China Triumph International Engineering Co. Ltd.
DL E&C Co. Ltd.
Daewoo Engineering and Construction Co. Ltd.
Danieli & C. O.M. SpA
Dongfang Electric Corp.
Exyte GmbH
Fluor
GS Engineering & Construction
Grupo ACS/Hochtief
Hebei Construction Group Co. Ltd.
Hyundai Engineering & Construction Co. Ltd.
Hyundai Engineering Co. Ltd.
Jan De Nul Group (Sofidra SA)
Jianglian Heavy Industry Group Co. Ltd.
Jiangxi Water and Hydropower Constr. Co. Ltd.
Kajima Corp.
Kinden Corp.
Larsen & Toubro Ltd.
Lotte Engineering & Construction Co. Ltd.
Maire Tecnimont SpA
Nantong Construction Group Co. Ltd.
Norinco International Cooperation Ltd.
Obayashi Corp.
POSCO Engineering & Construction
Penta-Ocean Construction Co. Ltd.
Power Construction Corp. of China
SK Ecoplant
Samsung C&T Corp.
Samsung Engineering Co. Ltd.
Sener Grupo de Ingeniería SA
Shandong Electric Power Eng'g Consulting
Shanxi Construction Investment Group Co. Ltd.
Shenyang Yuanda Aluminum Indus. Eng'g Co. Ltd.
Shimizu Corp.
Sinoma International Engineering Co. Ltd.
Sinosteel Equipment & Engineering Co. Ltd.
Sumitomo Mitsui Construction Co. Ltd.
TBEA Co. Ltd.
Taisei Corp.
Takenaka Corp.
Tianyuan Construction Group Co. Ltd.
Toyo Engineering Corp.
VINCI
Zhejiang Construction Investment Group Co. Ltd.
Zhongding International Engineering Co. Ltd

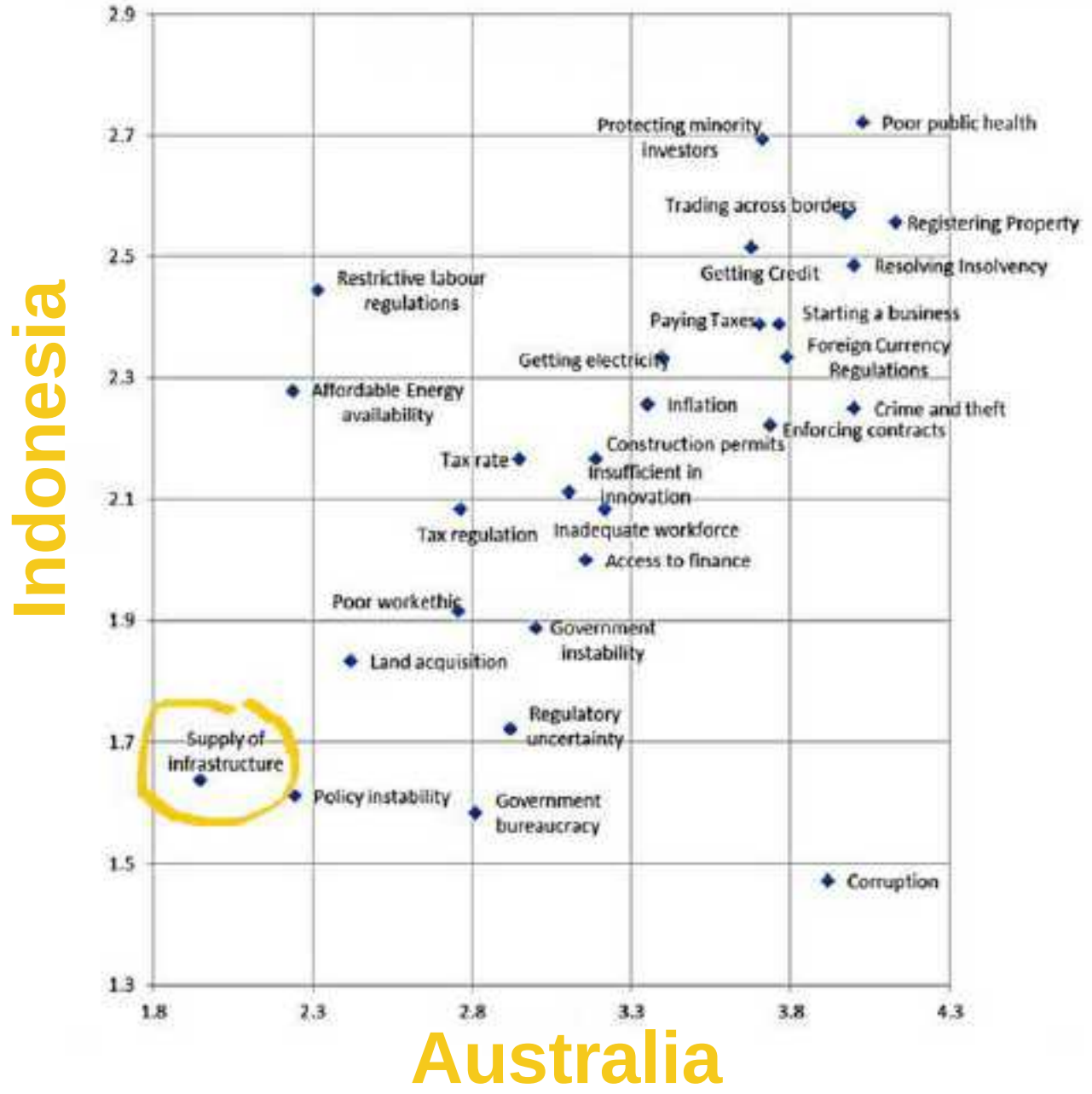


Obstacles preventing investment

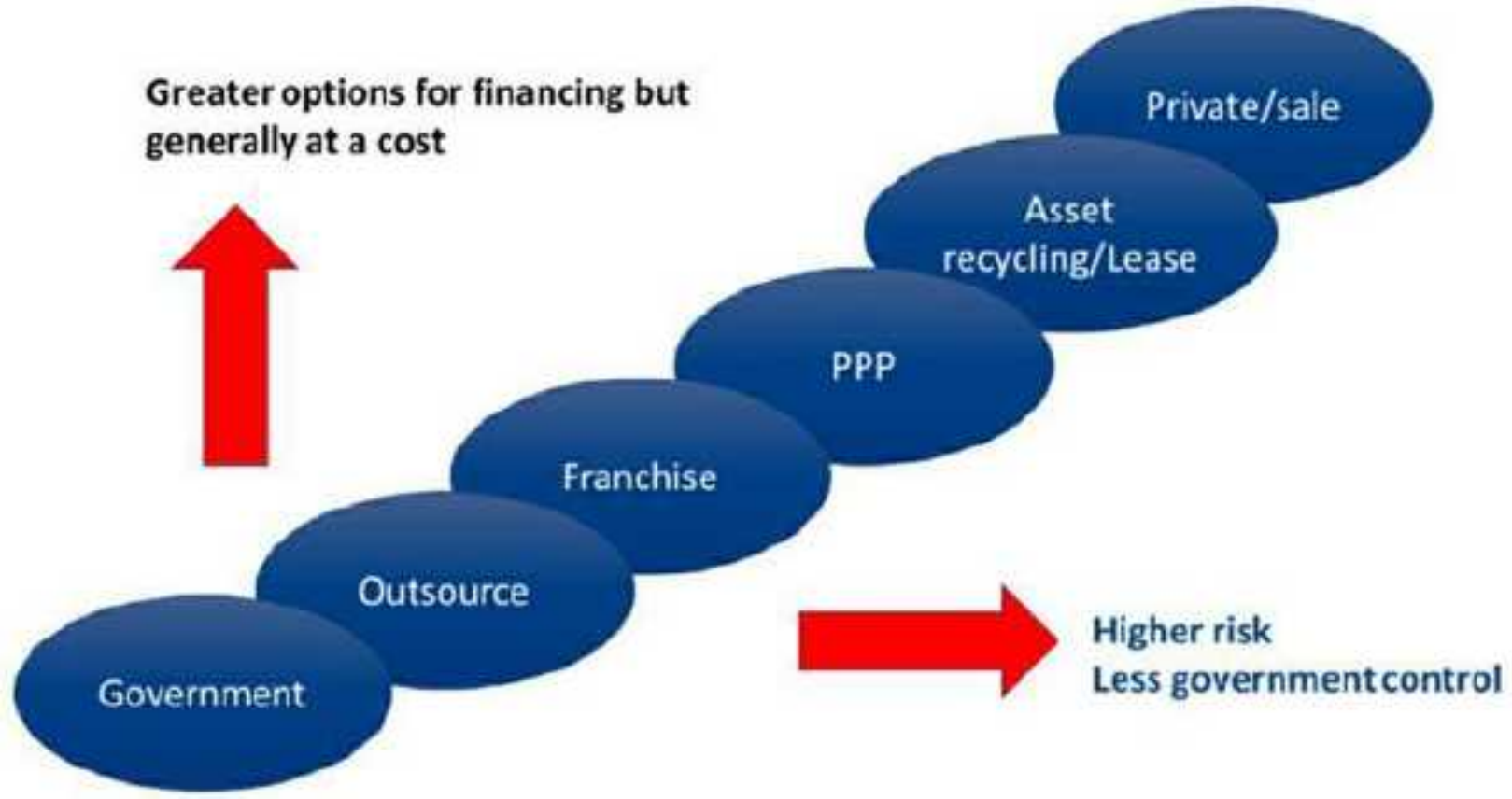
- INDONESIA: Corruption followed by lack of infrastructure rank highly
- AUSTRALIA: Lack of infrastructure is the greatest disincentive

Barriers to doing business

- Poor infrastructure is a most serious detractor in both Australia and Indonesia



Project financing options



- Government control vs Financing cost (project cost)

INDONESIA	Not at all effective / ineffective	Neither effective or ineffective	Effective / highly effective	n
Direct government finance (from budget/bonds)	6.3%	40.6%	53.1%	32
Government agency finance	9.4%	34.4%	56.3%	32
Indonesian bank finance	3.1%	21.9%	75%	32
International bank finance	10%	43.3%	46.6%	30
Foreign government / International government finance	17.2%	34.5%	48.3%	29
Direct inter-country grants or loans	17.2%	27.6%	55.1%	29
World bank	6.5%	32.3%	61.3%	31
Asian Development bank	6.5%	38.7%	54.9%	31
Private port operator finance	0%	38.7%	61.3%	31
Third party logistics operator finance	6.5%	38.7%	54.8%	31
Direct company facilitation	6.3%	31.3%	62.5%	32
Asset recycling: leasing or sale	13.8%	48.3%	37.9%	29
Asset sale	29.1%	45.2%	25.8%	31
Franchise	27.5%	34.5%	37.9%	29
Lease	29.1%	29%	42%	31
Public private partnerships (PPP)	3.3%	26.7%	70%	30
PPP Government guaranteed	0%	26.7%	73.3%	30
Viability gap funding (funding provided to meet shortfall/deficiency of funds for infrastructure project funding)	3.3%	36.7%	60%	30

Relative effectiveness of funding mechanisms

- Indonesian bank finance – 75%
- Government guaranteed PPPs – 73%
- Standard PPPs – 70%

Conclusion

- **Australia:**

Lack of infrastructure is leading to economic stagnation, particularly of the rural interior, sharpening social disparity

- **China:**

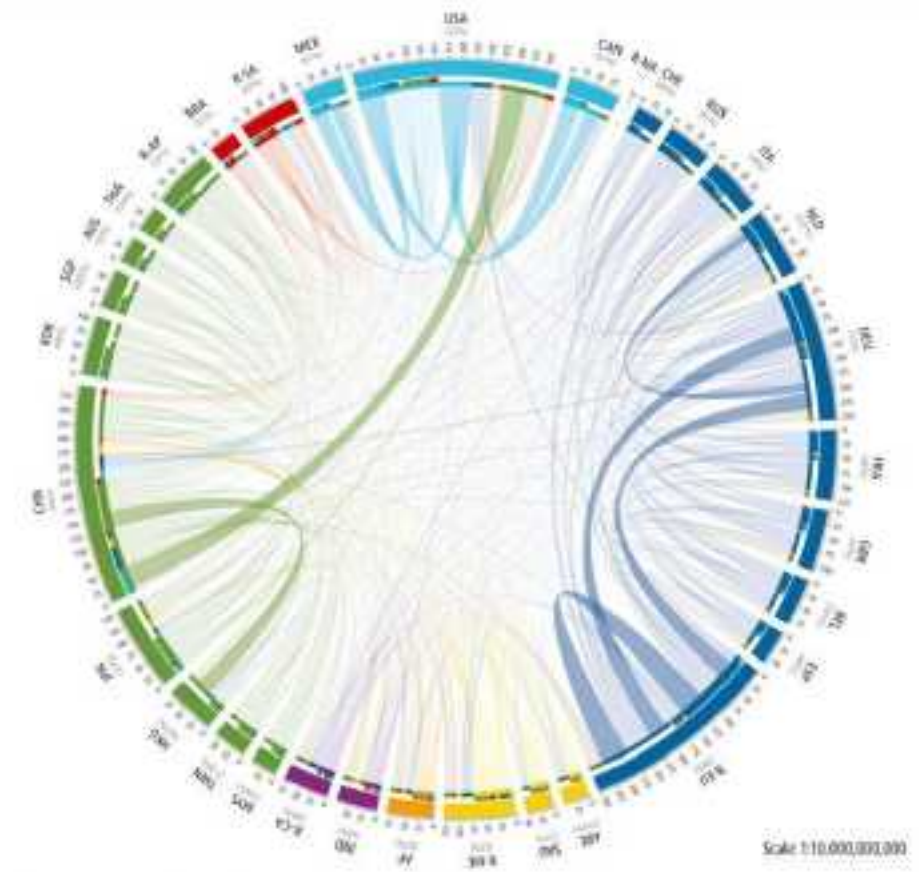
Oversupply of infrastructure has drained financial resources, limiting income stream from investment

- **Indonesia:**

Infrastructure is needed, but only possible with private sector investment, which cannot engage without government support

Trade connectedness

- Sector length = Trade volume
- Linkage thickness = Trade destinations



Region	Label	Name
North America	MEX	Mexico
	USA	United States
	CAN	Canada
	R-NA	Rest of North America
Europe	CHE	Switzerland
	RUS	Russian Federation
	ITA	Italy
	NLD	Netherlands
	DEU	Germany
	FRA	France
	GBR	United Kingdom
	BEL	Belgium
	ESP	Spain
	R-EU	Rest of Europe
Middle East & North Africa	ARE	United Arab Emirates
	SAU	Saudi Arabia
	R-ME	Rest of Middle East & North Africa

Region	Label	Name
Sub-Saharan Africa	AF	Sub-Saharan Africa
South & Central Asia	IND	India
	R-CA	Rest of South & Central Asia
East Asia & Pacific	MYS	Malaysia
	TWN	Taiwan (China)
	HKG	Hong Kong SAR (China)
	JPN	Japan
	CHN	China
	KOR	Korea, Republic
	SGP	Singapore
	AUS	Australia
	THA	Thailand
	R-AP	Rest of East Asia & Pacific
South & Central America, Caribbean	BRA	Brazil
	R-SA	Rest of South & Central America, Caribbean

Infrastructure investment

Thank you