LLOYD'S

Lloyd's City Risk Index

LLOYD'S

침수, 알고도 당했다 ›

LLOYD'S

What is the Lloyd's City Risk Index?

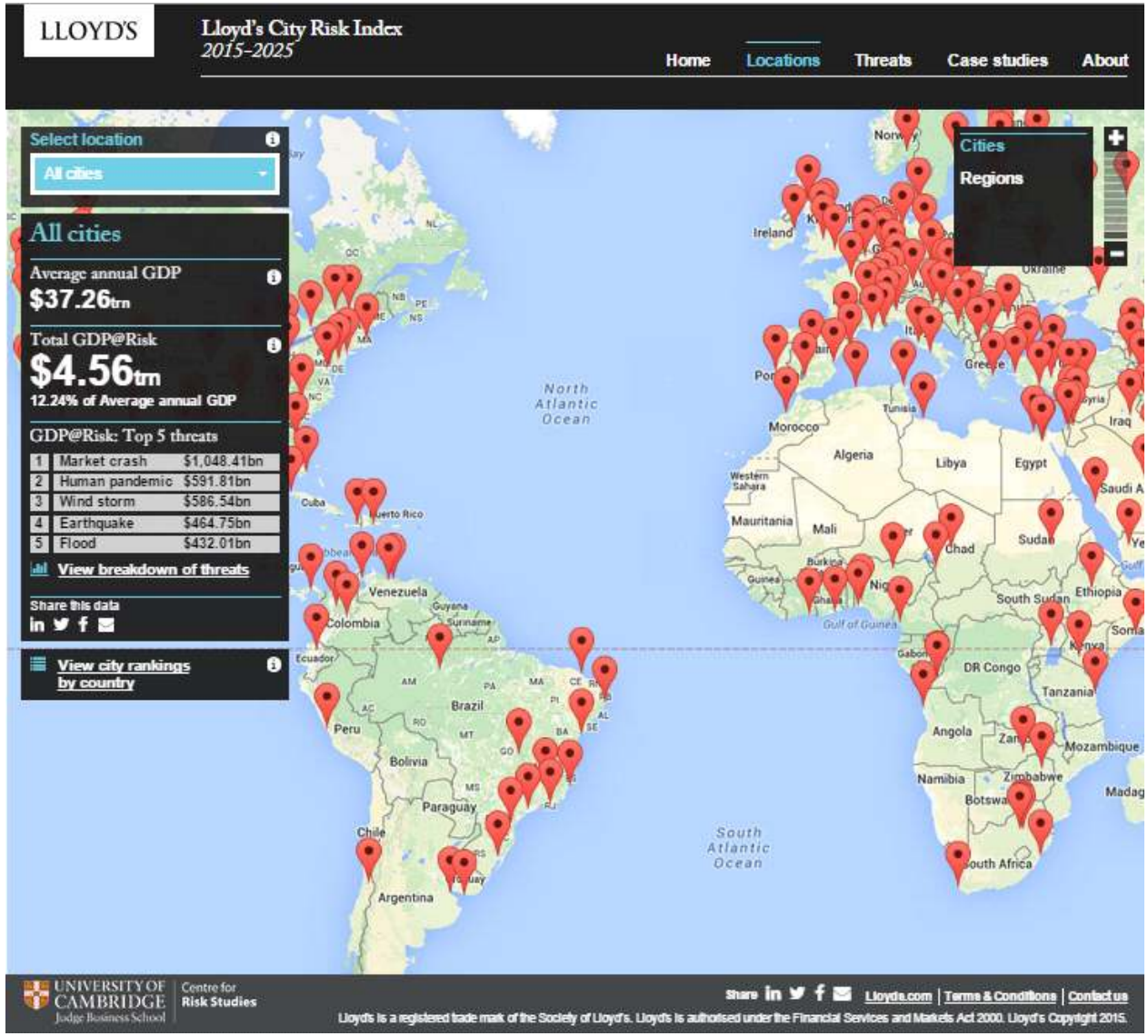
- The Lloyd's City Risk Index 2015-2025 is the product of a research partnership between Lloyd's and the Cambridge Centre for Risk Studies at the University of Cambridge Judge Business School
- It projects the possible economic impact on major cities of the most significant manmade and natural threats
- It uses a metric developed by Cambridge – GDP@Risk – this provides an expected loss figure, based on the likely scale and probability of a loss
- *It is a tool to help guide risk management discussions with your customers*

- It is not a predictor of individual or aggregated insurance claims
- The study does not consider costs associated with the loss of human life or the rebuilding of a city. Instead, it quantifies the loss of productivity following an event.

LLOYD'S

Geographical scope

- 301 cities worldwide
- 50 cities analysed in greater depth
- Downloadable city factsheets
- http://www.lloyds.com/cityriskindex/



LLOYD'S

A range of threat types

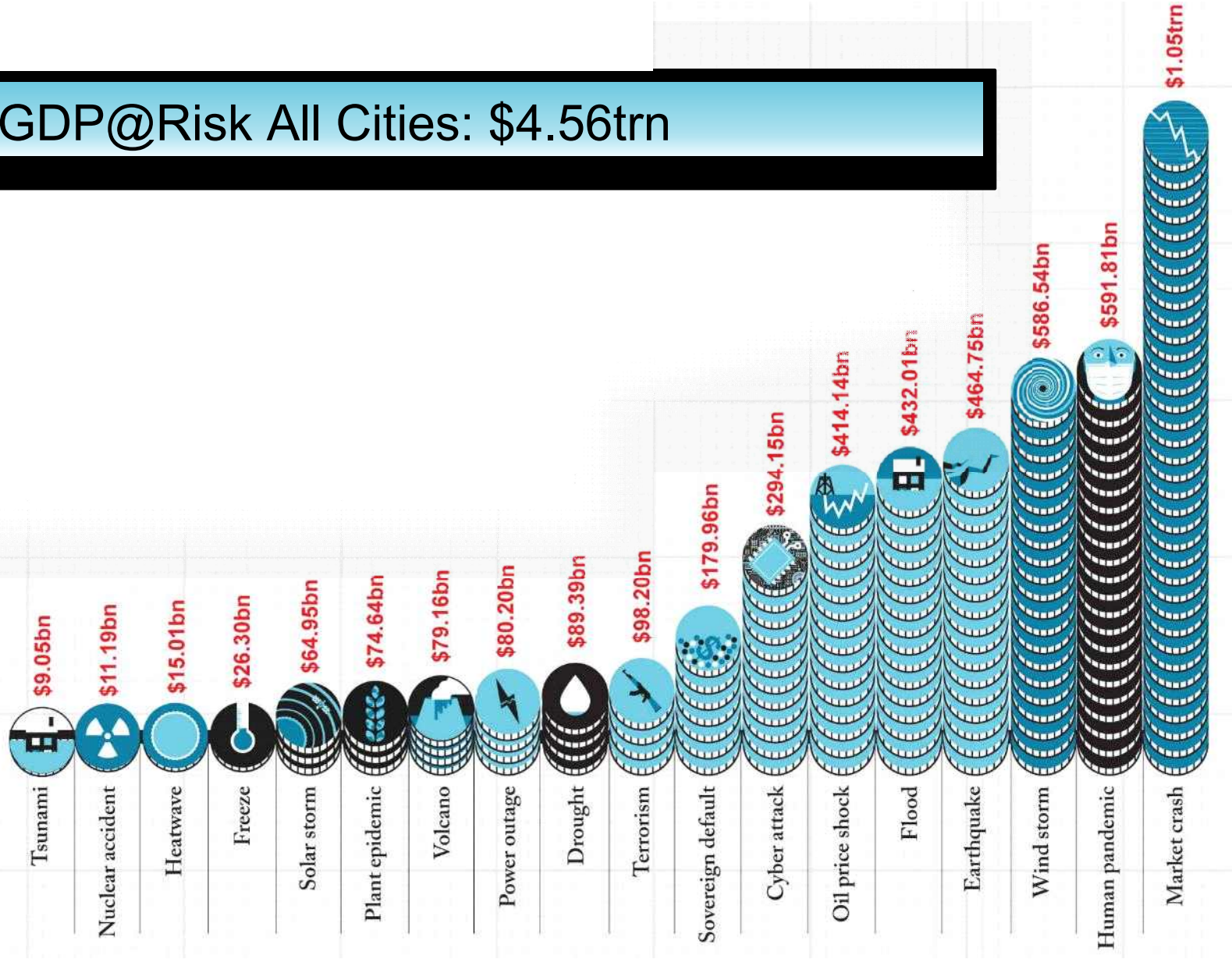
Three threat types:

- Manmade
- Natural
- Emerging

LLOYD'S

What are the biggest Risks facing cities globally?

Total GDP@Risk All Cities: $4.56trn



LLOYD'S

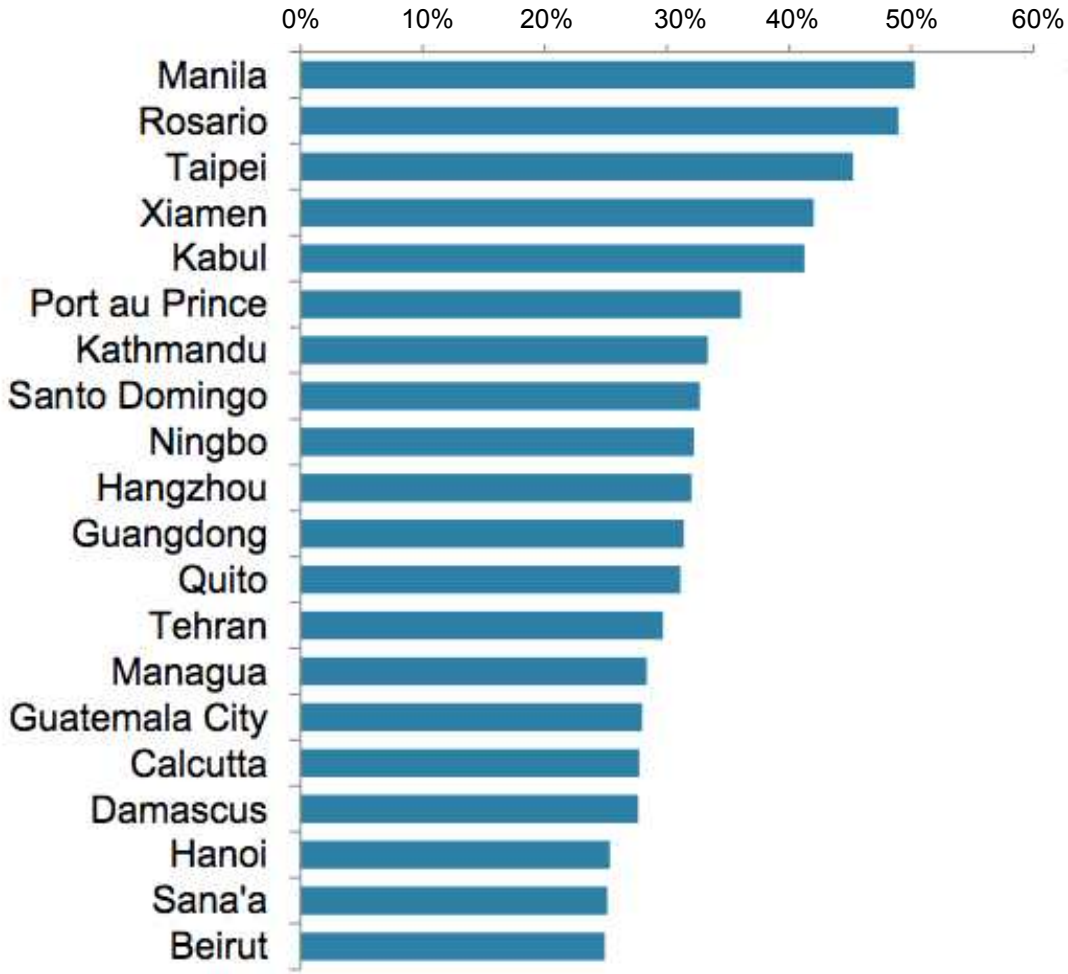
Highest GDP@Risk Cities

Nominal Vs % of average annual GDP

GDP@Risk: Top 20 cities

All threats

1	Taipei	$181.20bn
2	Tokyo	$153.28bn
3	Seoul	$103.50bn
4	Manila	$101.09bn
5	New York	$90.36bn
6	Los Angeles	$90.32bn
7	Istanbul	$82.50bn
8	Osaka	$79.32bn
9	Shanghai	$78.21bn
10	Hong Kong	$74.51bn
11	Lima	$69.36bn
12	Tehran	$64.14bn
13	Sao Paulo	$62.95bn
14	Mexico City	$60.74bn
15	Moscow	$55.77bn
16	Paris	$54.94bn
17	London	$53.43bn
18	Singapore	$51.11bn
19	Buenos Aires	$50.31bn
20	Jakarta	$48.23bn



LLOYD'S

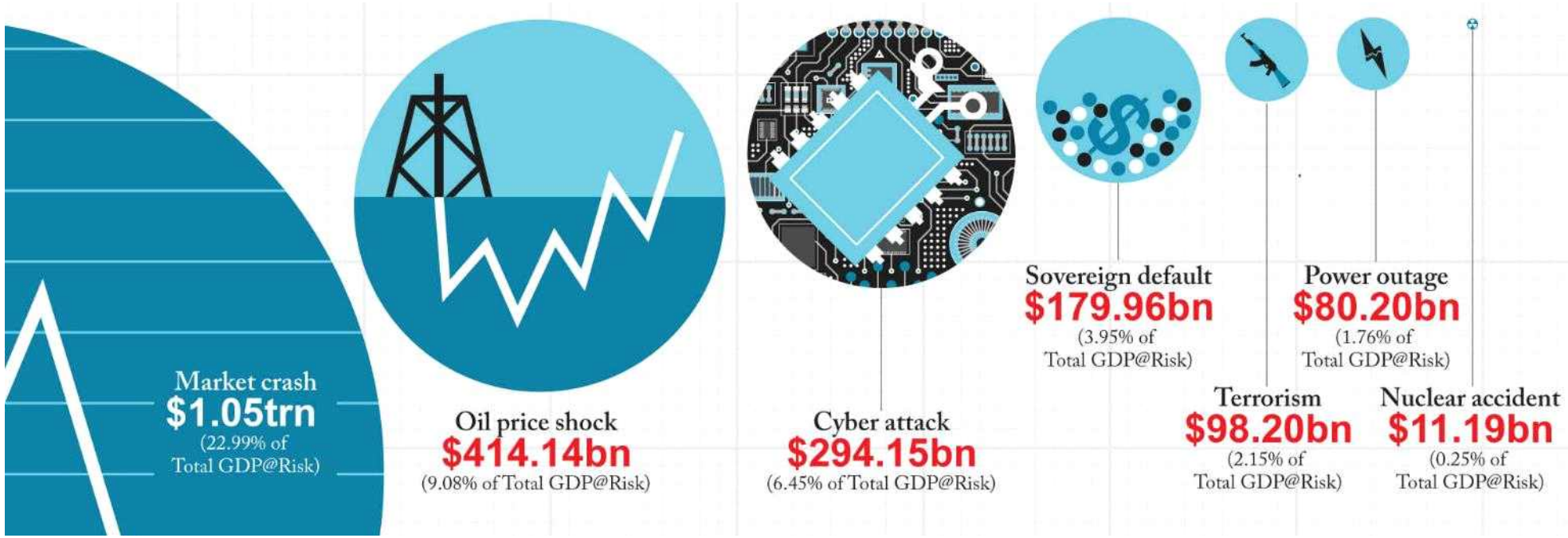
21 Asian cities are in top 50 cities with most GDP@Risk

City	Global Rank	% of GDP at Risk	Ranked #1, 2 or 3 Globally
Taipei	1	45%	
Tokyo	2	10%	
Seoul	3	16%	
Manila	4	50%	
Osaka	8	14%	
Shanghai	9	17%	
Hong Kong	10	12%	
Singapore	18	20%	
Jakarta	20	14%	
Mumbai	21	12%	

Key trends

Manmade threats are becoming increasingly significant

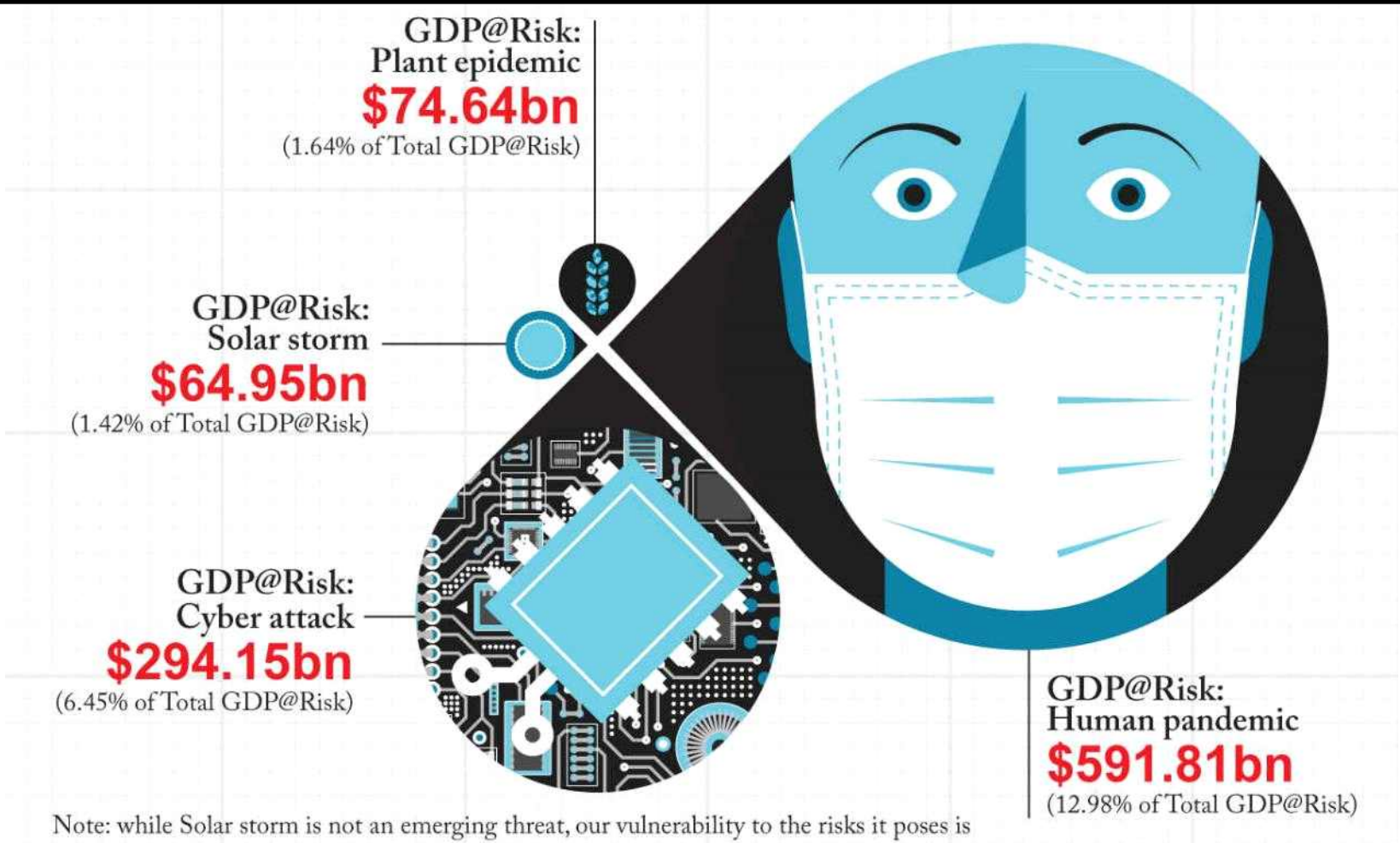
Total GDP@Risk: $2.13trn



Key trends

New or emerging threats are having a growing impact

Total GDP@Risk: $1.03trn



Note: while Solar storm is not an emerging threat, our vulnerability to the risks it poses is

LLOYD'S

Threat Analysis: Natural catastrophe risks

Asia is significantly underinsured against natural catastrophe & other perils

60%

of World Population

1/3

of Global GDP

1/2

estimated global economic cost of Nat Cats

US$53bn Annual Cost from Nat Cats

8 of 17 most underinsured countries in Asia

ASEAN: **3%**

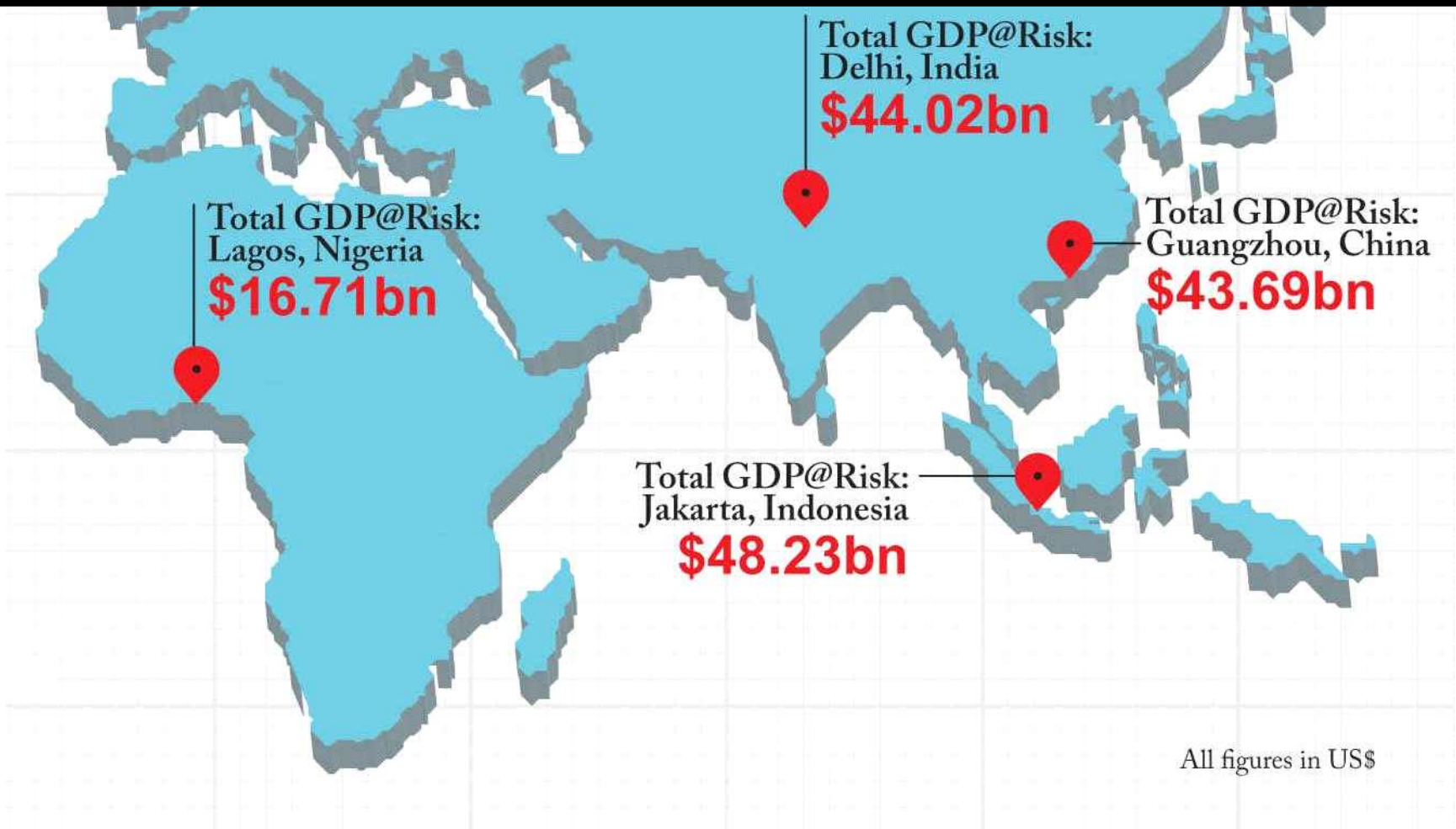
Global average: **5.4%**

2014 insurance penetration rates

Key trends

Emerging economies have the most to lose

Total GDP@Risk: $3.26trn



LLOYD'S

Asia's top five threats

$2.4 bn GDP@risk

53% of the total global GDP@Risk is in the Asia region

Top five threats across 93 cities

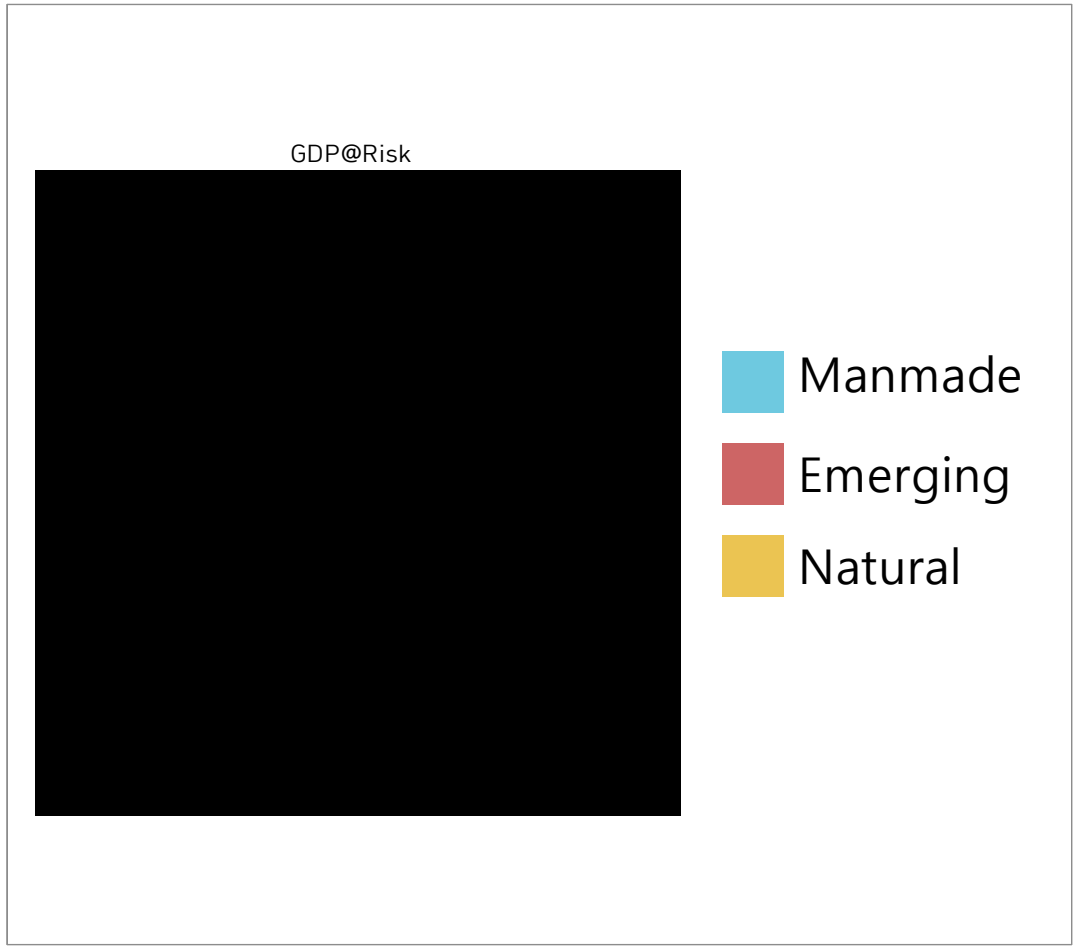
Wind Storm $527.7bn GDP@risk

Market Crash $**303.4bn GDP@risk**

Pandemic $**276.7bn GDP@risk**

Flood $**189.4bn GDP@risk**

Oil Price Shock $**168.8bn GDP@risk**



LLOYD'S

LLOYD'S

Lloyd's City Risk Index
2015-2025

Home | Locations | Threats

Seoul

Average annual GDP
$656.48bn

Total GDP@Risk
$103.50bn

15.77% of Average annual GDP

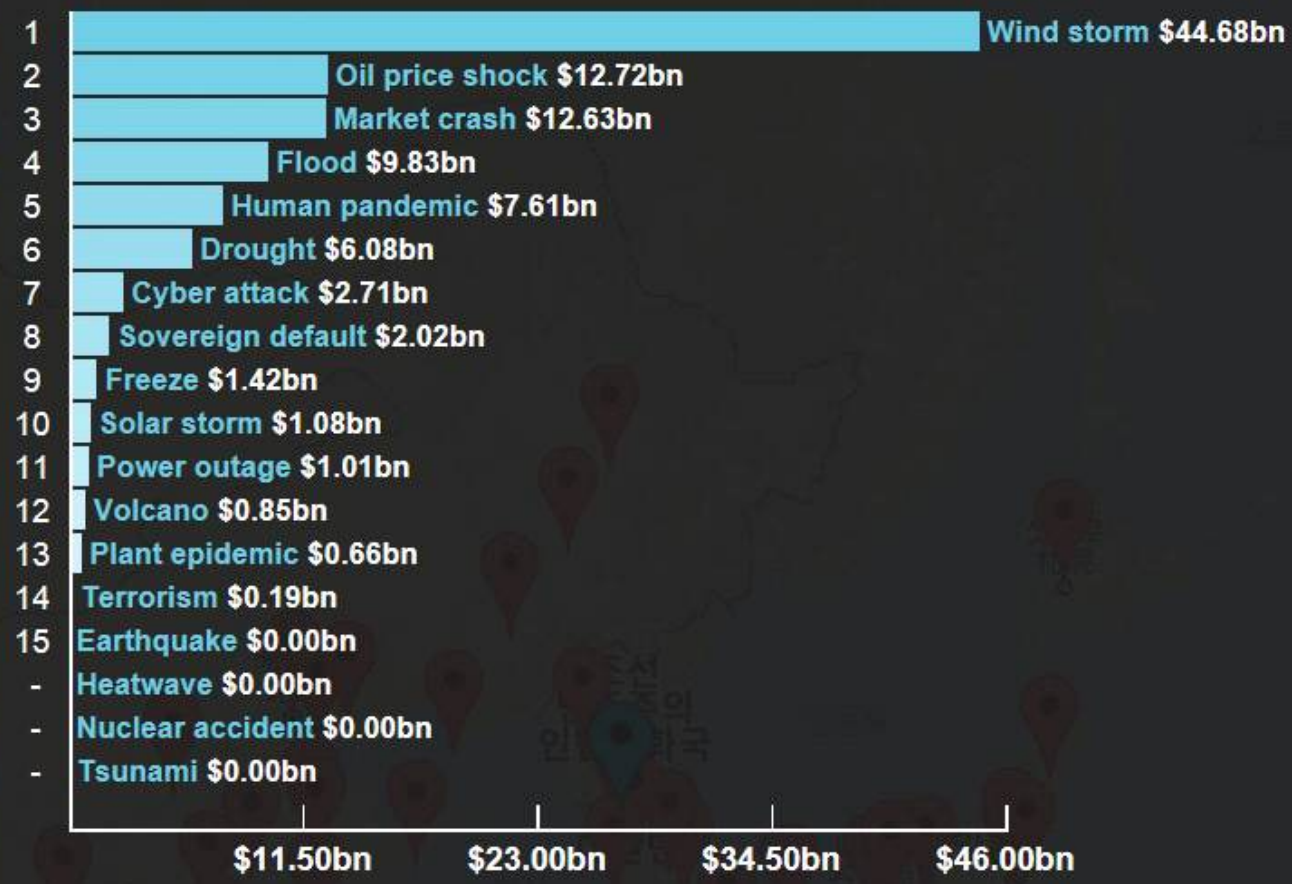
GDP@Risk: Top 5 threats

1	Wind storm	$44.68bn
2	Oil price shock	$12.72bn
3	Market crash	$12.63bn
4	Flood	$9.83bn
5	Human pandemic	$7.61bn

View breakdown of threats

Download Seoul factsheet

Share this data



LLOYD'S

Select location

Busan

Busan

Average annual GDP

$86.02bn

Total GDP@Risk

$20.45bn

23.77% of Average annual GDP

GDP@Risk: Top 5 threats

1	Wind storm	$11.46bn
2	Flood	$1.91bn
3	Oil price shock	$1.67bn
4	Market crash	$1.65bn
5	Human pandemic	$1.00bn

View breakdown of threats

Download Busan factsheet

Share this data

Busan

GDP@Risk: All threats

$20.45bn

UNIVERSITY OF CAMBRIDGE | Centre for Risk Studies

Share Lloyds.com

LLOYD'S

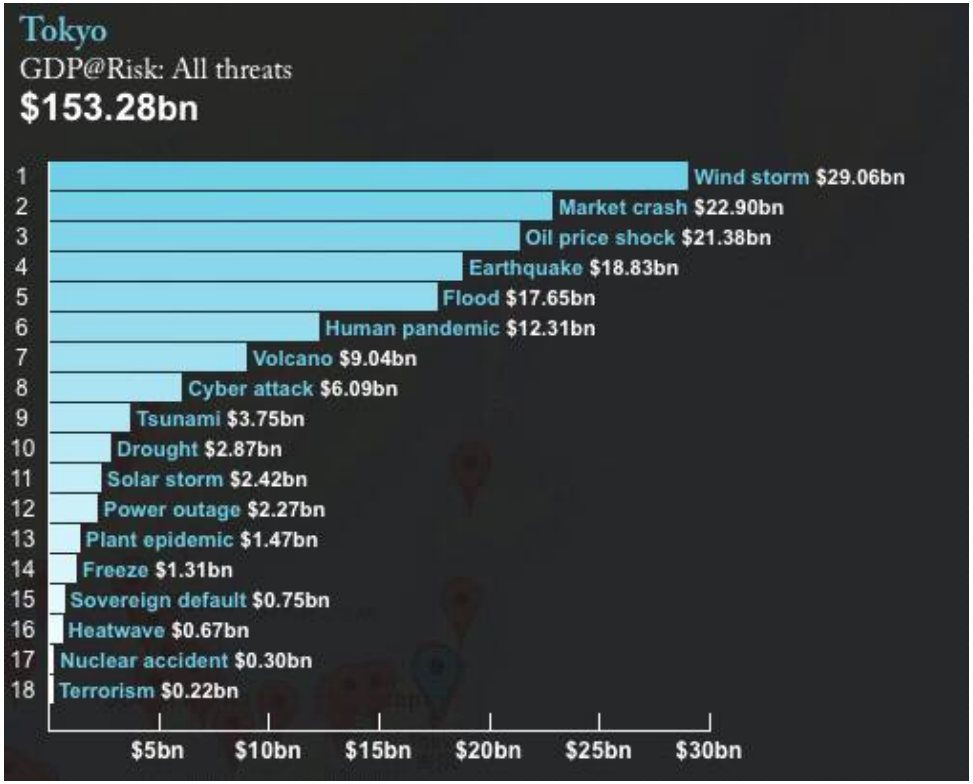
City Analysis of South Korea

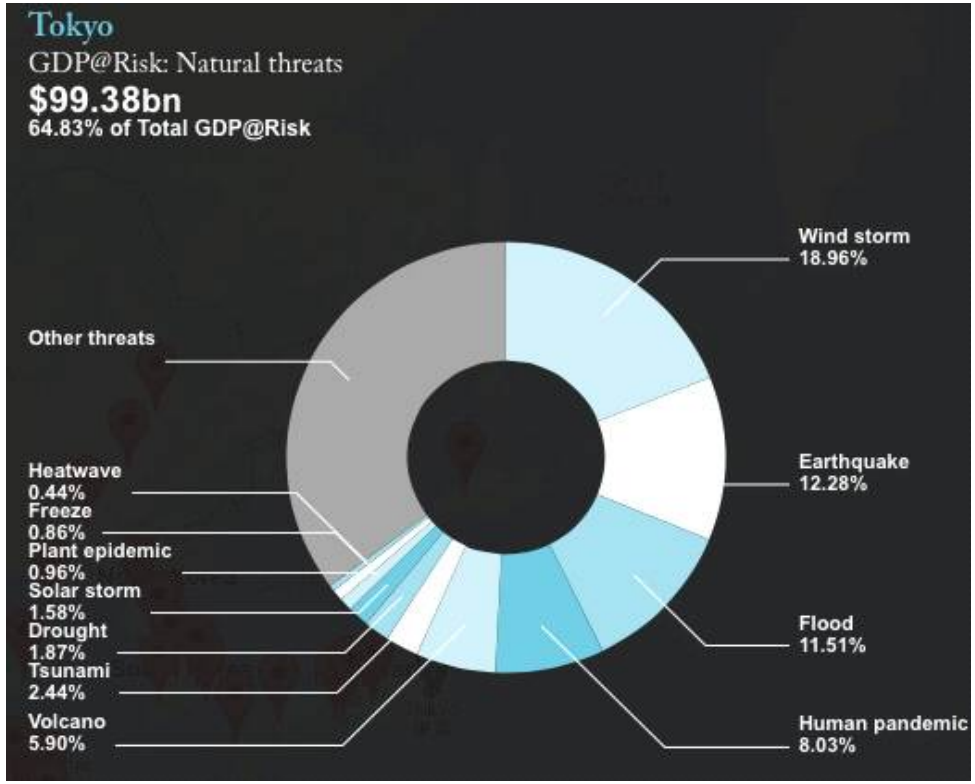
City	National Rank	Regional Rank	Global Rank	Total GDP@Risk (US$bn)	Share of ave annual GDP (%)	Top Threat & Share of GDP@Risk (%)
Seoul	1	3	3	103.50	15.77	Windstorm 43.17
Busan	2	18	62	20.45	23.77	Windstorm 56.06
Daegu	3	29	91	13.50	23.13	Windstorm 57.63
Incheon	4	33	116	10.59	15.64	Windstorm 43.52
Daejeon	5	35	125	9.86	21.07	Windstorm 63.29
Gwangju	6	37	136	8.66	20.97	Windstorm 63.60

LLOYD'S

City Analysis: Tokyo

GDP@Risk





LLOYD'S

City Analysis: Osaka

LLOYD'S

Lloyd's City Risk Index
2015–2025

Home | Locations | Threats | Case studies | About

Select location

Osaka

Osaka

Average annual GDP
$584.59bn

Total GDP@Risk
$79.32bn

13.57% of Average annual GDP

GDP@Risk: Top 5 threats

1	Wind storm	$18.45bn
2	Flood	$13.83bn
3	Market crash	$9.11bn
4	Oil price shock	$8.51bn
5	Cyber attack	$7.57bn

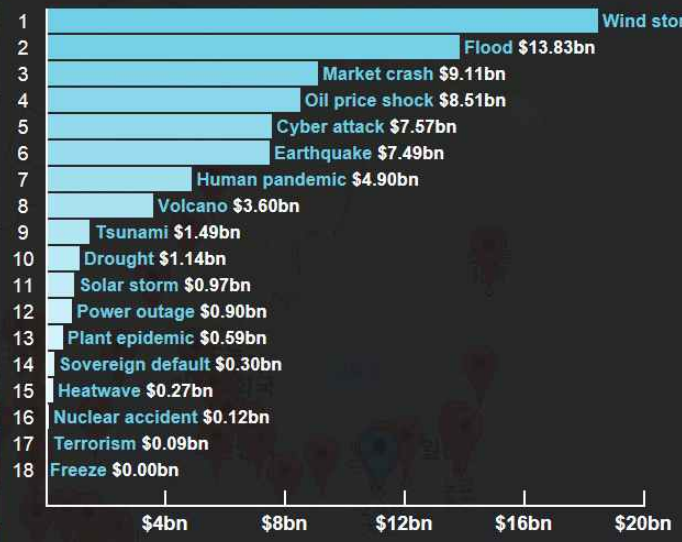
View breakdown of threats

Download Osaka factsheet

Share this data

Osaka

GDP@Risk: All threats
$79.32bn



Cities

Regions

UNIVERSITY OF CAMBRIDGE Judge Business School | Centre for Risk Studies

Share | Lloyds.com | Terms & Conditions | Contact us

Lloyd's is a registered trade mark of the Society of Lloyd's. Lloyd's is authorised under the Financial Services and Markets Act 2000. Lloyd's Copyright 2015.

LLOYD'S

Territorial Summary: Japan

City	National Rank	Regional Rank	Global Rank	Total GDP@Risk (US$bn)	Share of ave annual GDP (%)	Top Threat & Share of GDP@Risk (%)
Tokyo	1	2	2	153.28	10.44	Windstorm 18.96
Osaka	2	4	8	79.32	13.57	Windstorm 23.26
Nagoya	3	15	46	26.91	11.03	Windstorm 17.94
Yokohama	4	25	81	15.08	14.30	Flood 16.55
Fukuoka	5	36	130	8.80	11.24	Windstorm 28.07
Kobe	6	41	151	7.60	13.41	Windstorm 23.60
Sapporo	7	43	166	6.73	10.94	Market crash 14.25
Hiroshima	8	44	172	6.46	13.38	Windstorm 23.59
Sendai	9	45	181	6.23	12.99	Flood 18.20
Kawasaki	10	47	195	5.26	13.62	Flood 17.36
Kyoto	11	48	198	5.15	11.28	Windstorm 17.54
Saitama	12	54	230	3.20	10.98	Windstorm 18.03
Chiba	13	55	241	2.62	10.78	Windstorm 18.36

LLOYD'S

Australasia

$88.57bn GDP@risk
7.72% of Annual GDP

Top five threats across 8 cities

Market Crash $42.98bn GDP@risk

Cyber $14.12bn GDP@risk

Pandemic $9.05 GDP@risk

Flood $6.68bn GDP@risk

Drought $1.92 GDP@risk

LLOYD'S

South East Asia

$300.20bn GDP@risk
17.71% of Annual GDP

Top five threats across 15 cities

Wind Storm $68.29bn GDP@risk

Market Crash $60.80bn GDP@risk

Pandemic $30.74bn GDP@risk

Earthquake $30.06bn GDP@risk

Flood $22.48bn GDP@risk

LLOYD'S

Central and South Asia

$263.03bn GDP@risk
14.51% of Annual GDP

Top five threats across 18 cities

Pandemic $49.87bn GDP@risk

Market Crash $37.74bn GDP@risk

Flood $36.28bn GDP@risk

Earthquake $30.09bn GDP@risk

Terrorism $26.39bn GDP@risk

LLOYD'S

East Asia

$1.47tn GDP@risk
15.38% of Annual GDP

Top five threats across 59 cities

Wind Storm $445.68bn GDP@risk

Market Crash $212.66bn GDP@risk

Pandemic $206.63bn GDP@risk

Flood $135.46bn GDP@risk

Oil Price Shock $130.83bn GDP@risk

LLOYD'S

Threat Analysis: Terrorism

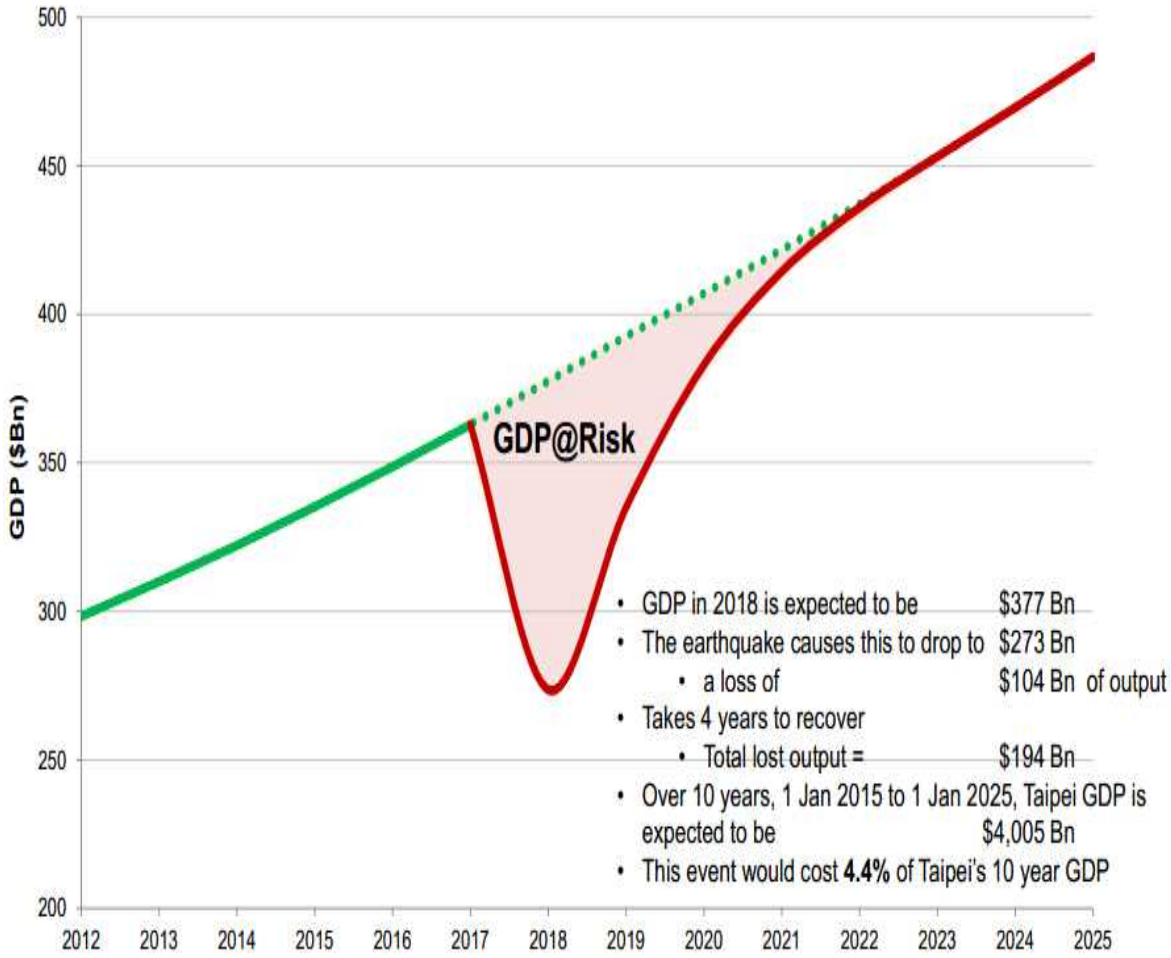
- $98.20bn of GDP@Risk to 2025
- More than 2/3rds of this is in just 20 cities
- GDP@Risk predominantly in the Middle East due to incidents plus local asset value
- Globally, Afghanistan, Iraq, Nigeria, Pakistan, India and Syria have more incidents than anywhere else.
- In 2014, 32,685 people were killed, an 80% increase on 2013
- Terrorism cost $52 billion in 2014
- 9/11 was Lloyds's single biggest loss in its 300 year history

GDP@Risk: Top 20 cities
Terrorism

1	Mumbai	$7.94bn
2	Kabul	$6.69bn
3	Moscow	$6.02bn
4	Baghdad	$5.88bn
5	Jakarta	$4.27bn
6	Riyadh	$4.24bn
7	Tehran	$2.59bn
8	Lima	$2.54bn
9	Bogota	$2.45bn
10	Jeddah	$2.40bn
11	Delhi	$2.23bn
12	Cairo	$2.11bn
13	Istanbul	$2.05bn
14	Izmir	$1.98bn
15	Kano	$1.82bn
16	Damascus	$1.77bn
17	Karachi	$1.77bn
18	Ibadan	$1.70bn
19	Doha	$1.49bn
20	Khartoum	$1.43bn

GDP@Risk calculation example

Characteristic scenario 'B' earthquake hits Taipei in 2018



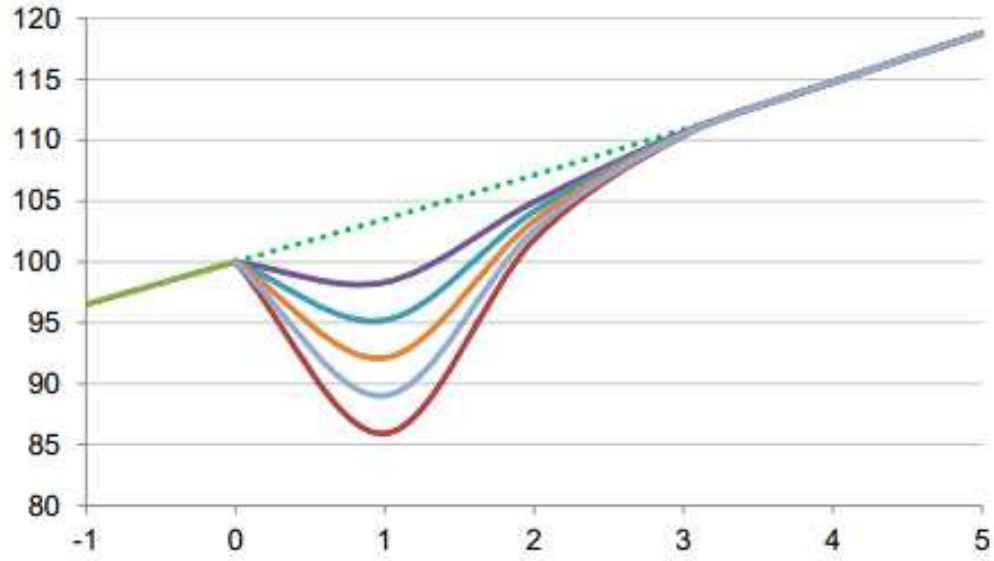
The GDP reduction analysis considers:

- Supply shock
  - Destruction of physical infrastructure
  - Disruption to work activity
  - Flight of capital
  - Inability to supply export markets
- Demand shock
  - Public morale and confidence
  - Share price reductions & loss of private capital
  - Import reductions
- Govt emergency response
- Inflation and increased cost of inputs
- Vulnerability and resilience

LLOYD'S

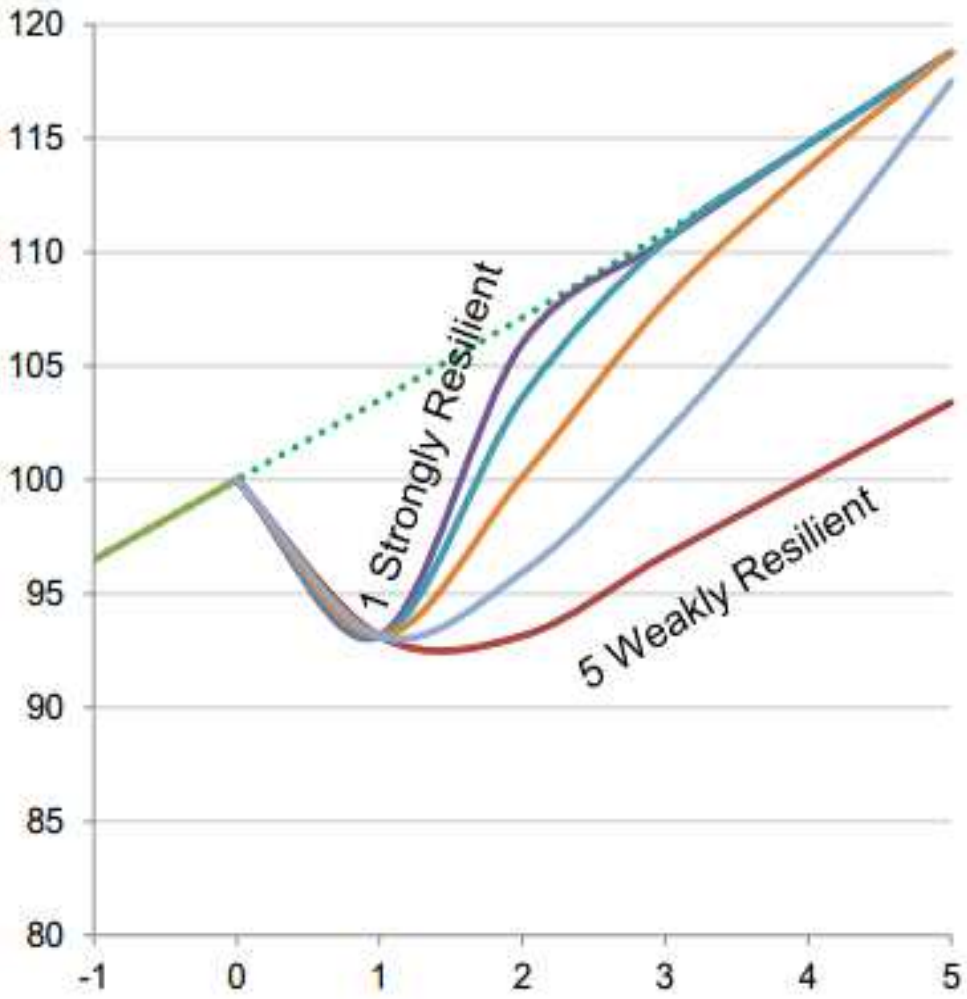
Vulnerability

	Small	Medium	Large
1 Very Strong	97.0%	95.0%	80.0%
2 Strong	95.0%	85.0%	70.0%
3 Moderate	90.0%	75.0%	60.0%
4 Weak	80.0%	68.0%	50.0%
5 Very Weak	75.0%	50.0%	40.0%



- Physical vulnerability includes assessment of the quality of buildings and the compliance with construction codes, such as seismic codes
- Flood vulnerability considers water damage loss by economic sector
- Cyber vulnerability considers the reliance on IT and its criticality for the city's economic output
- Financial vulnerability considers connectivity and impact from a financial crisis
- Pandemic vulnerability includes healthcare index assessment by the World Health Organisation

Resilience



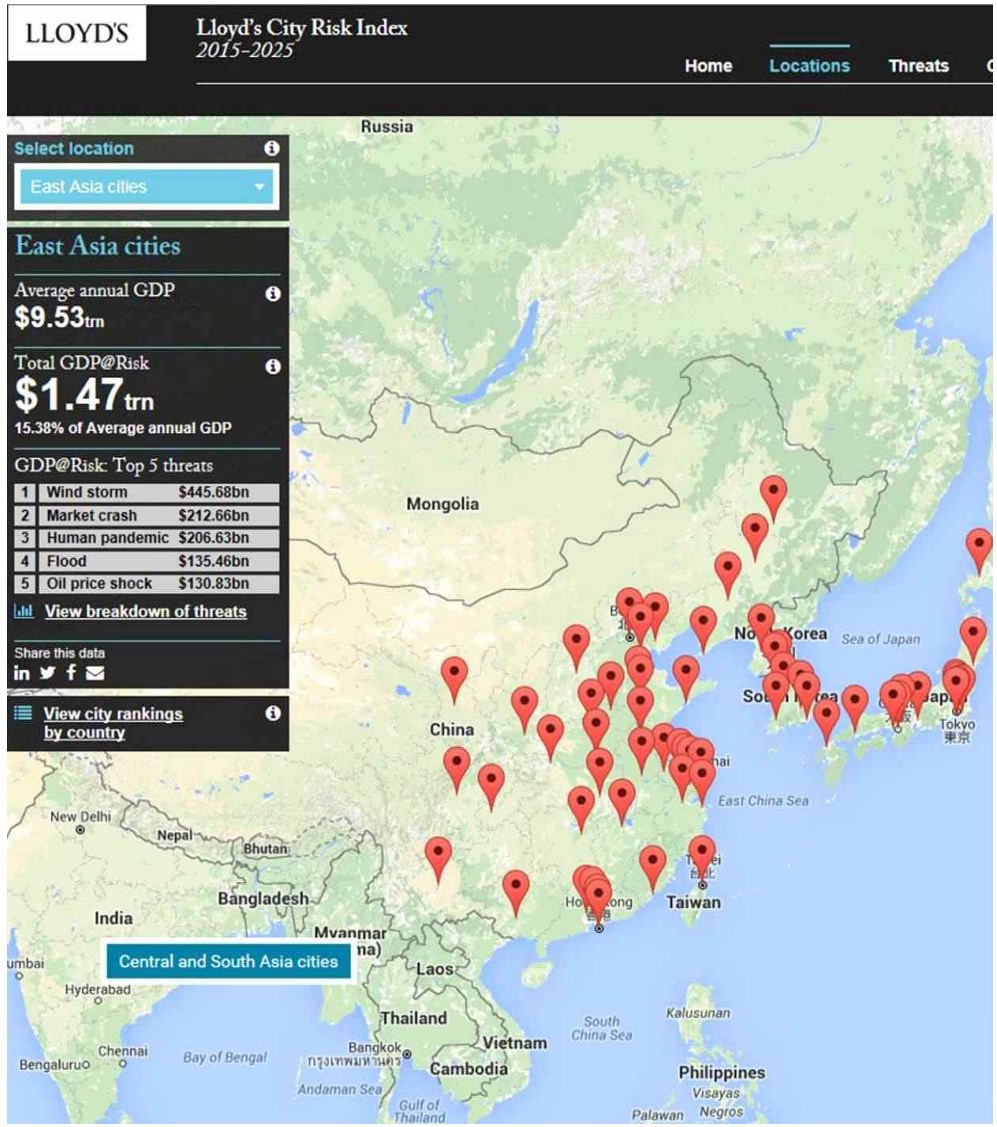
- The speed of recovery of the city is influenced by its social and economic resilience
- The resilience classification (1-5) for cities is based on the following four factors
  1. Governance
  2. Social coherence
  3. Economic strength
  4. Infrastructure
- Resilience of the city determines how long the recovery process takes
- Recovery is calibrated from precedent studies of economic recovery after disaster

LLOYD'S

Helping business and government to build resilience

The Lloyd's City Risk Index:

- Highlights where resilience can be improved
- Helps identify exposures in a company's global footprint or a city's economy
- Stimulates further discussion on risk mitigation, adaptation and transfer



The benefits of building resilience

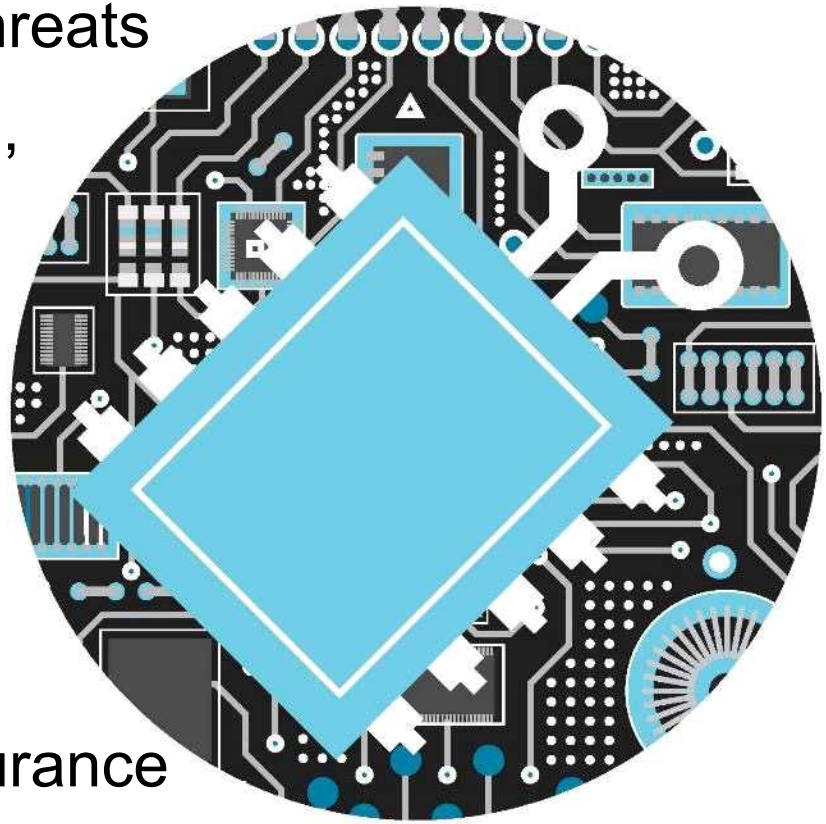
Half of total GDP@Risk can be protected by improving all aspects of cities' infrastructure and crisis management

Contribution of insurance:

- Improves the sustainability of an economy
- Leads to greater rates of growth
- De-risks governments and business
- Takes the financial burden of recovery off the taxpayer

Lloyd's insurance cover

Lloyd's offers specialist insurance products to support cities/businesses from various threats



- **Natural perils** – earthquake, windstorm, flood, tsunami, volcanic eruption…
- **Energy** – renewable energy insurance
- **Financial** – trade credit insurance, warranty & indemnity insurance
- **Cyber attack** – liability insurance (data privacy risks), business interruption insurance
- **Political** – terrorism insurance, political violence insurance, kidnap & ransom insurance, political risks & trade credit insurance

LLOYD'S

Next steps

The insurance industry must:

- Innovate
- Collaborate
- Communicate

Please go online and explore the Lloyd's City Risks Index at www.lloyds.com

at http://www.lloyds.com/cityriskindex

FIDENTIA