



**ESCAP**



MOVING FORWARD TOGETHER



**DECADE  
OF >>>  
ACTION**

# New Three Web-Based Tools

- **E-resilience Monitoring Dashboard**
- Smart Corridors Development Series
- Infrastructure Co-deployment Portal



**ICT & Development Section, IDD**





# E-resilience Monitoring Dashboard for Digital Foresight Planning

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## **ENE: East and North-East Asia**

China D.P.R. Korea Hong Kong Japan Korea (Rep)  
Macao Mongolia Russian Federation

## **RECI: Regional Economic Cooperation and Integration - Pilot Countries**

Kazakhstan Kyrgyzstan Mongolia

## **LDC: Least Developed Countries**

Afghanistan Bangladesh Bhutan  
Cambodia Kiribati Lao P.D.R. Myanmar, Nepal  
Solomon Islands Timor-Leste Tuvalu Vanuatu

## **LLDC: Land-locked Developing Countries**

Afghanistan Armenia Azerbaijan Bhutan Kazakhstan  
Kyrgyzstan Lao P.D.R. Mongolia Nepal Tajikistan  
Turkmenistan Uzbekistan

## **NCA: North and Central Asia**

Armenia Azerbaijan Georgia Kazakhstan Kyrgyzstan  
Russian Federation Tajikistan Turkmenistan Uzbekistan

## **PACIFIC: Pacific**

American Samoa Australia Cook Islands Fiji  
French Polynesia Guam Kiribati Marshall Islands  
Micronesia, Nauru New Caledonia, New Zealand Niue  
Northern Marianas Palau Papua New Guinea Samoa  
Solomon Islands Tonga Tuvalu Vanuatu

# Economic Groups



## **PACIFIC DEVELOPING: Pacific Developing**

American Samoa Cook Islands Fiji French Polynesia Guam  
Kiribati Marshall Islands Micronesia Nauru New Caledonia  
Niue Northern Marianas Palau Papua New Guinea Samoa  
Solomon Islands Tonga Tuvalu Vanuatu

## **PICS: Pacific Island Countries**

Fiji Kiribati Marshall Islands Micronesia (Federated States of)  
Nauru Palau Papua New Guinea Samoa Solomon Islands  
Tonga Tuvalu Vanuatu American Samoa Cook Islands  
French Polynesia Guam New Caledonia Niue  
Northern Mariana Islands

## **SA: South Asia**

Afghanistan Bangladesh Bhutan India  
Maldives Nepal Pakistan Sri Lanka

## **SEA: South-East Asia**

Brunei Darussalam Cambodia Indonesia  
Lao P.D.R. Malaysia Myanmar Philippines  
Singapore Thailand Timor-Leste Viet Nam

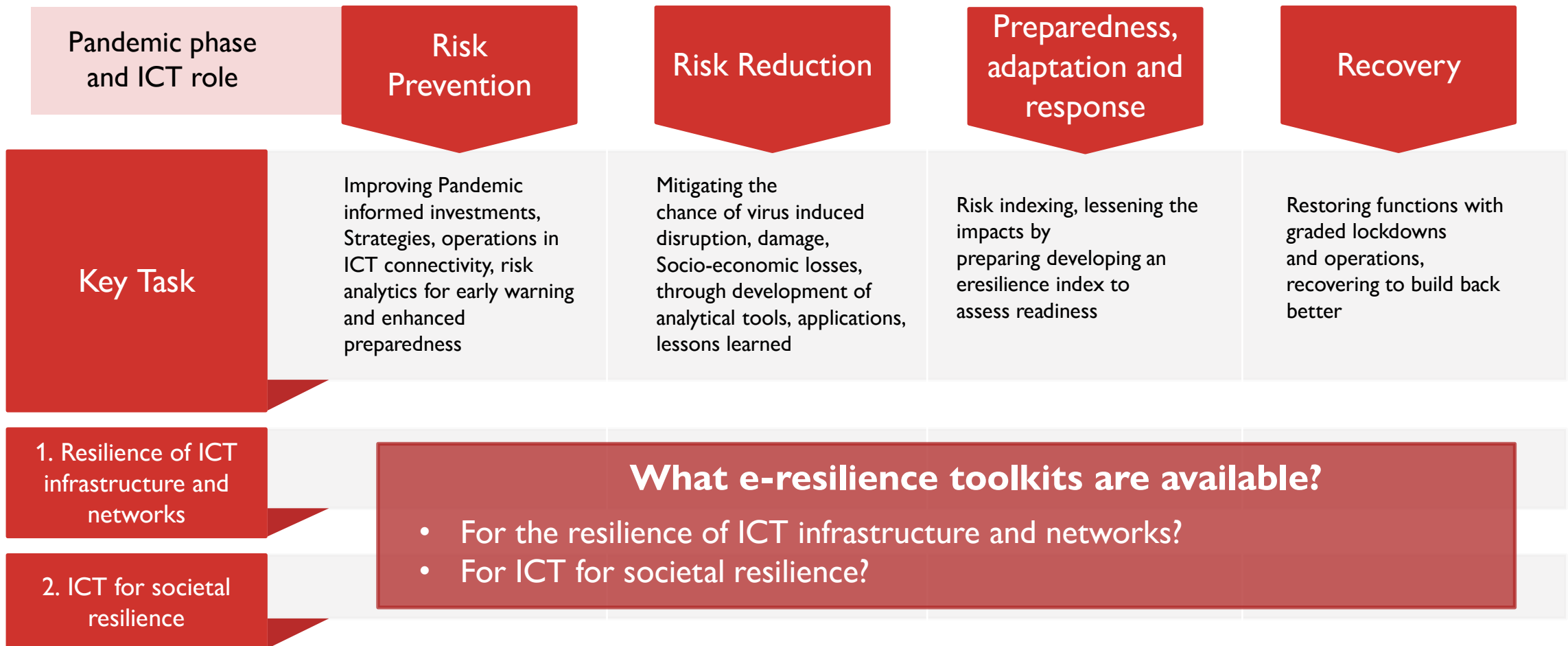
## **SSWA: South and South-West Asia**

Afghanistan Bangladesh Bhutan India Iran (I.R.)  
Maldives Nepal Pakistan Sri Lanka Turkey

## **SPECA: Special Program for the Economies of Central Asia**

Afghanistan Azerbaijan Kazakhstan Kyrgyzstan Tajikistan Turkmenistan Uzbekistan

# E-resilience framework from a pandemic management perspective



<https://drrgateway.net/e-resilience/about>

# E-resilience Monitoring Dashboard

## ICT policy in different sectors

build the foundation for e-resilience modelling

## ICT's role in setting up new systems and applications

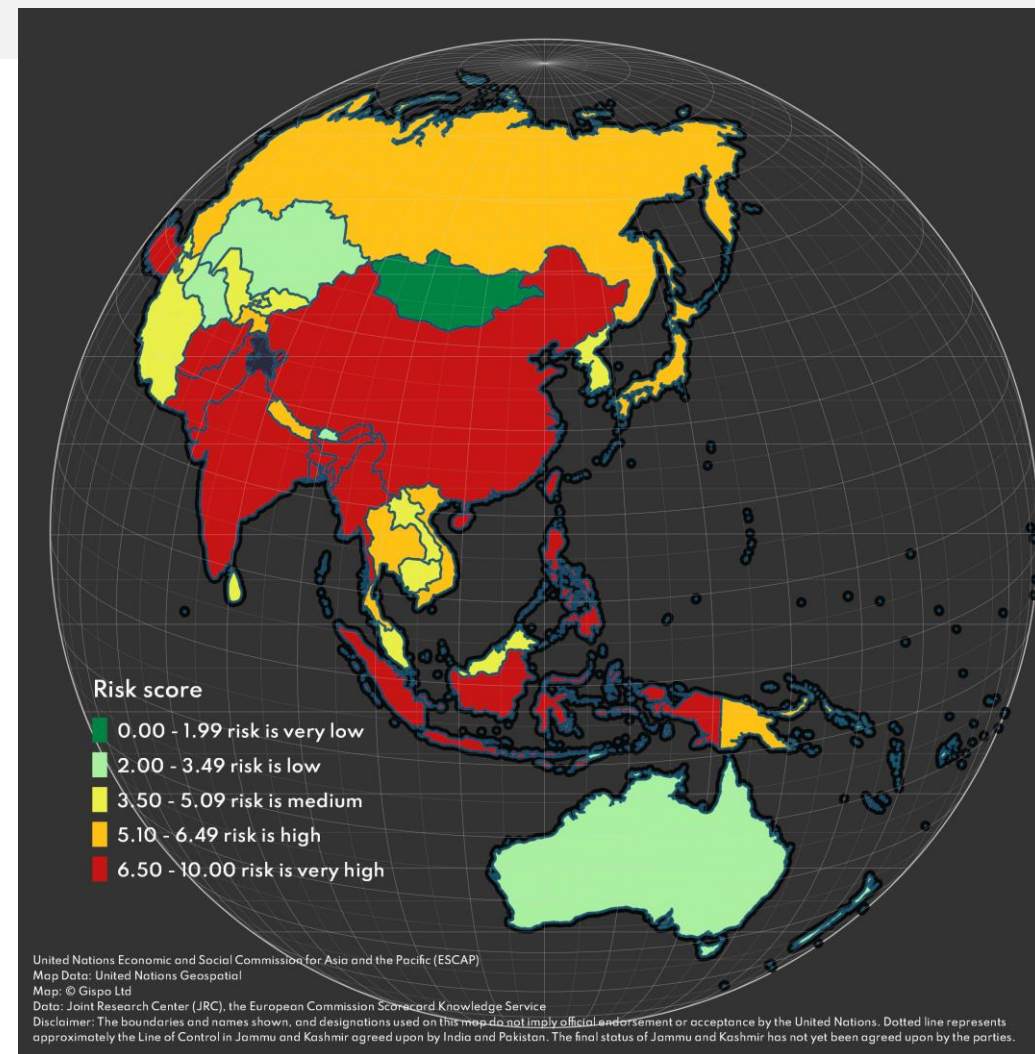
is important in e-adaptation and recovering from the pandemic

## ICT's role in data management

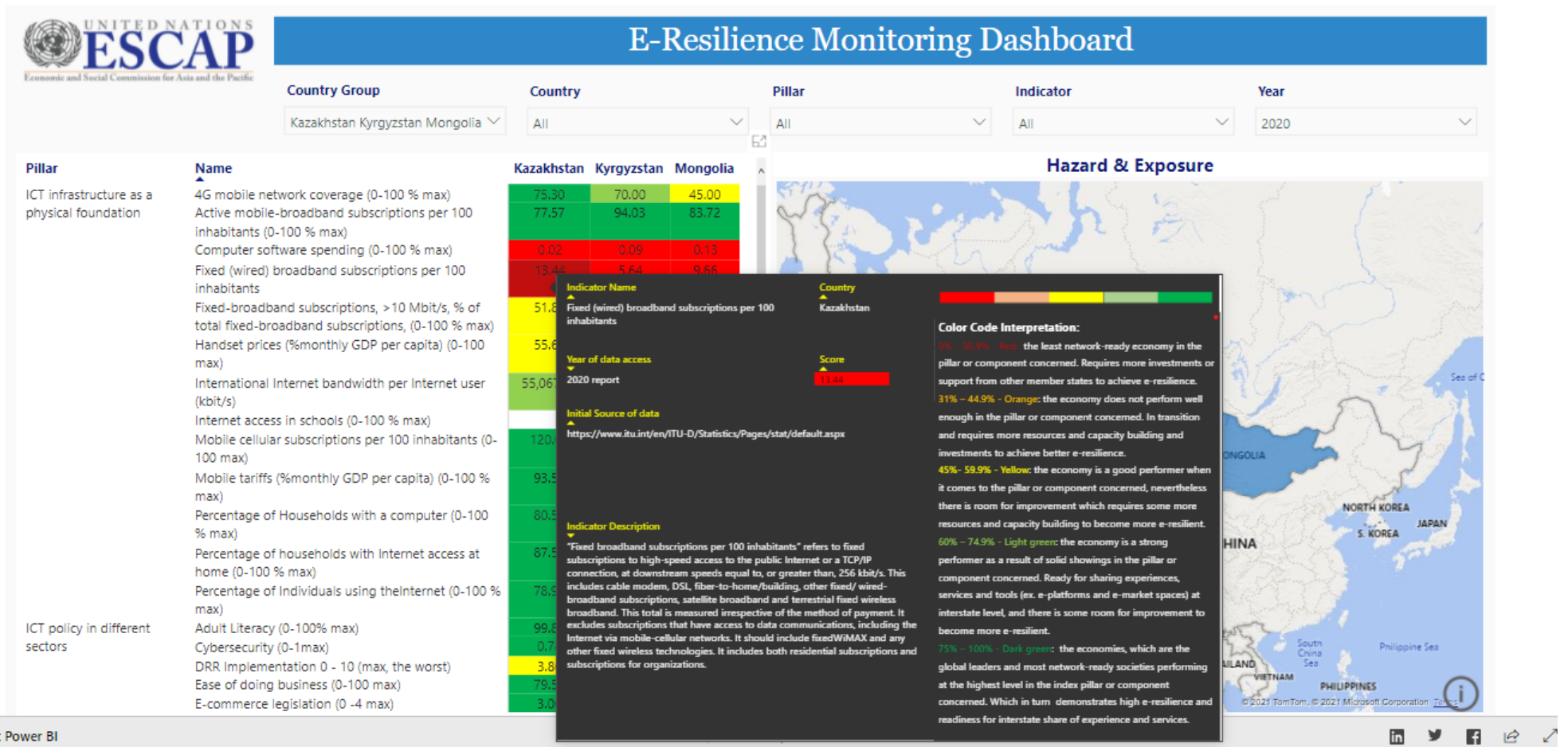
leads into actions and policies which influence disaster resilience and adaptability

## ICT infrastructure as a physical foundation

supports above pillars and accelerate the digital transformation for all



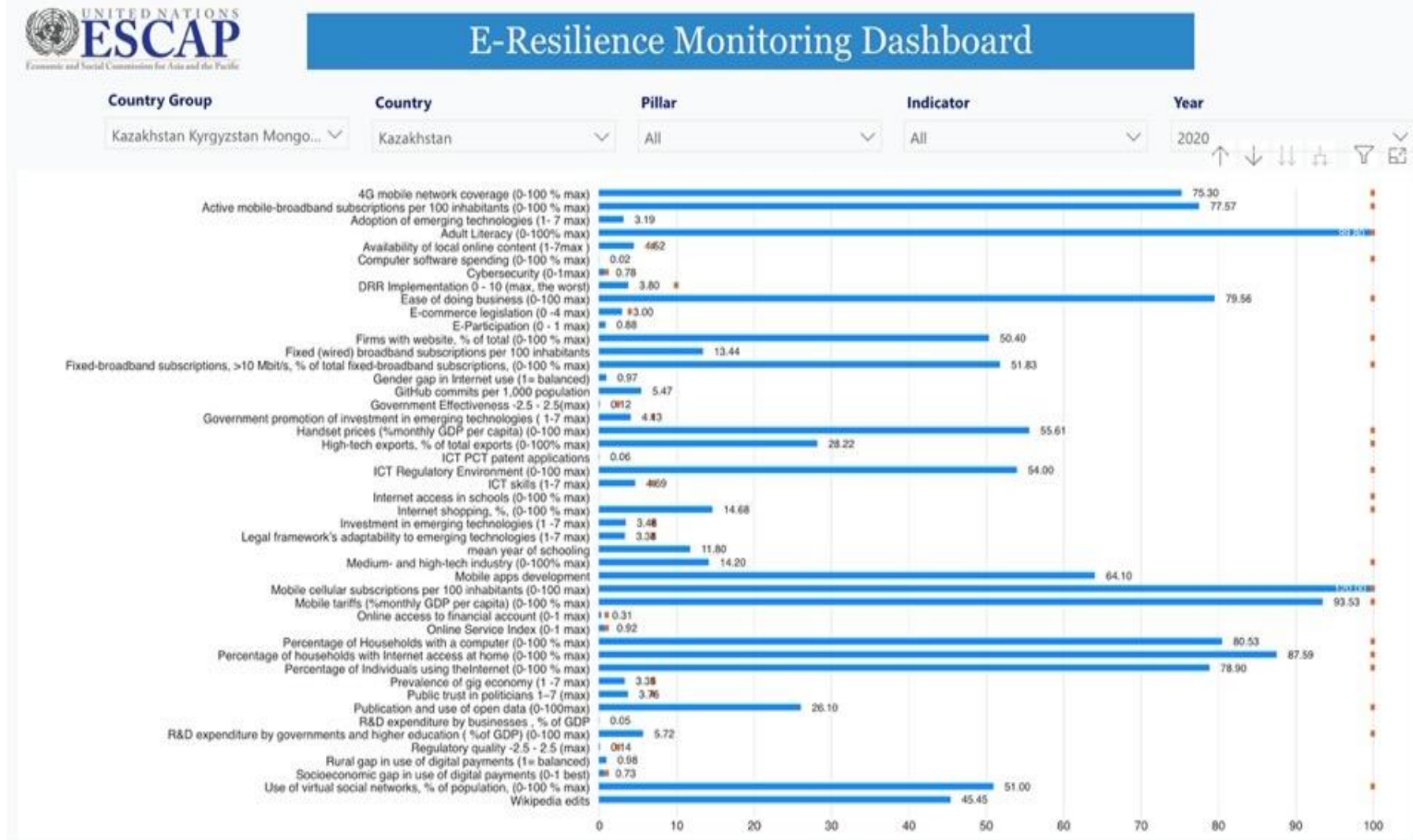
# E-RESILIENCE MONITORING DASHBOARD, Front Page





# E-RESILIENCE MONITORING DASHBOARD, Page 2

## Bullet Chart





NCA

SPECA

ENEA

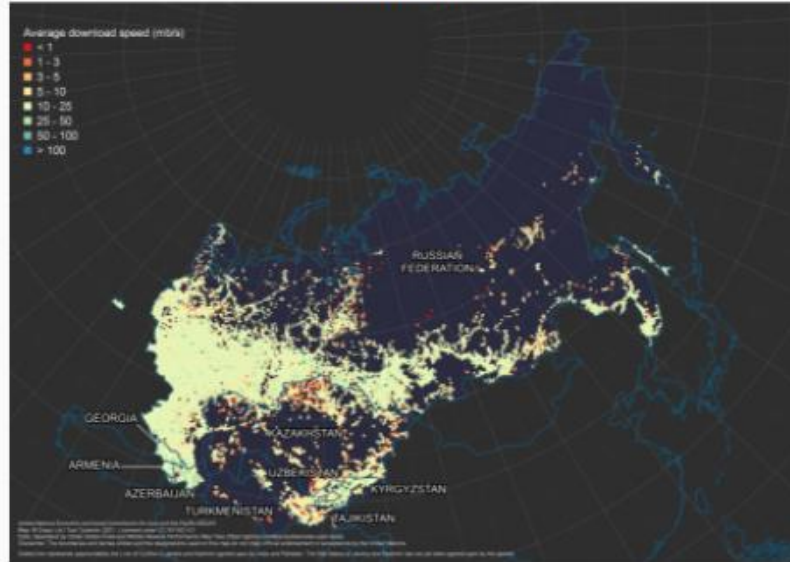
Pacific

SEA

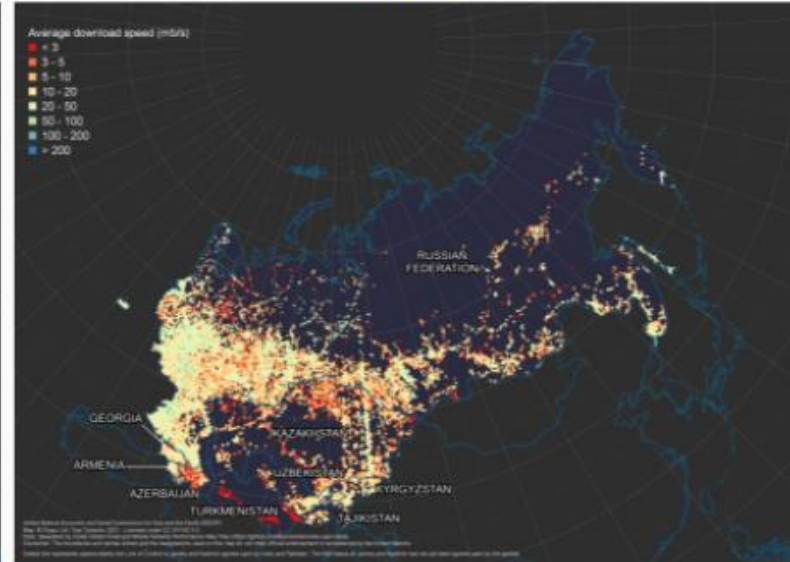
SSWA

LLDC

Mobile Grid



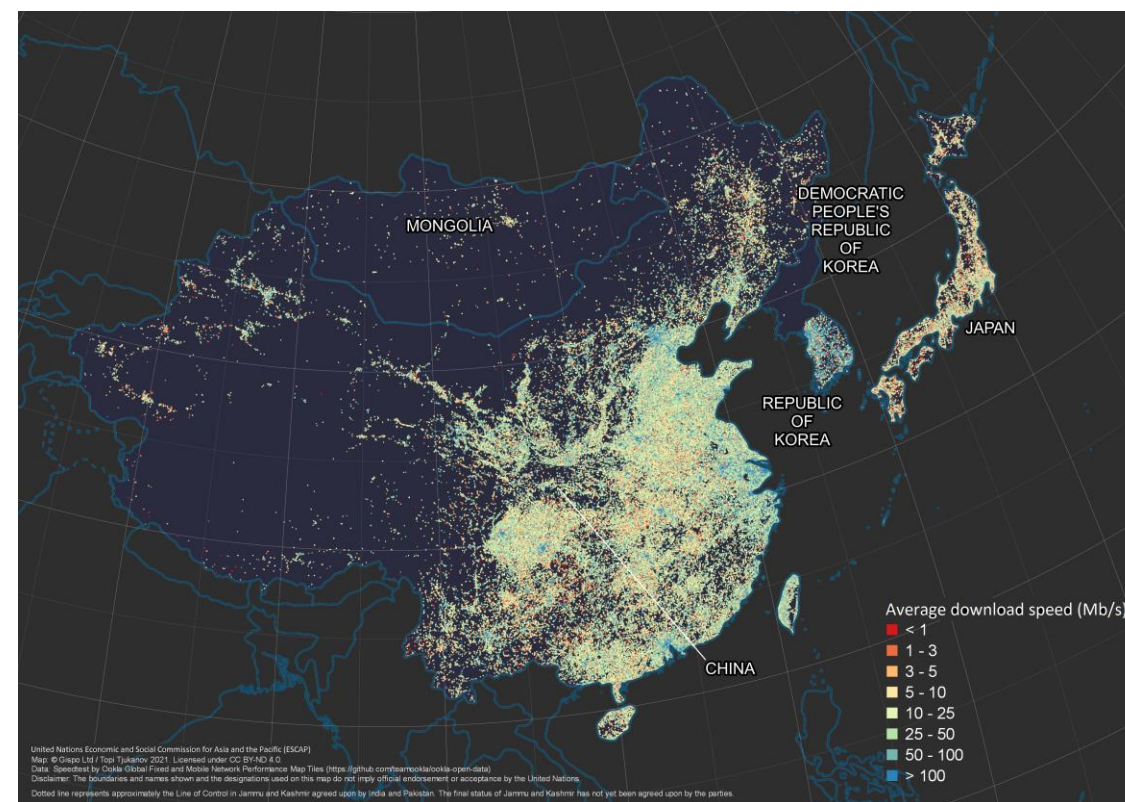
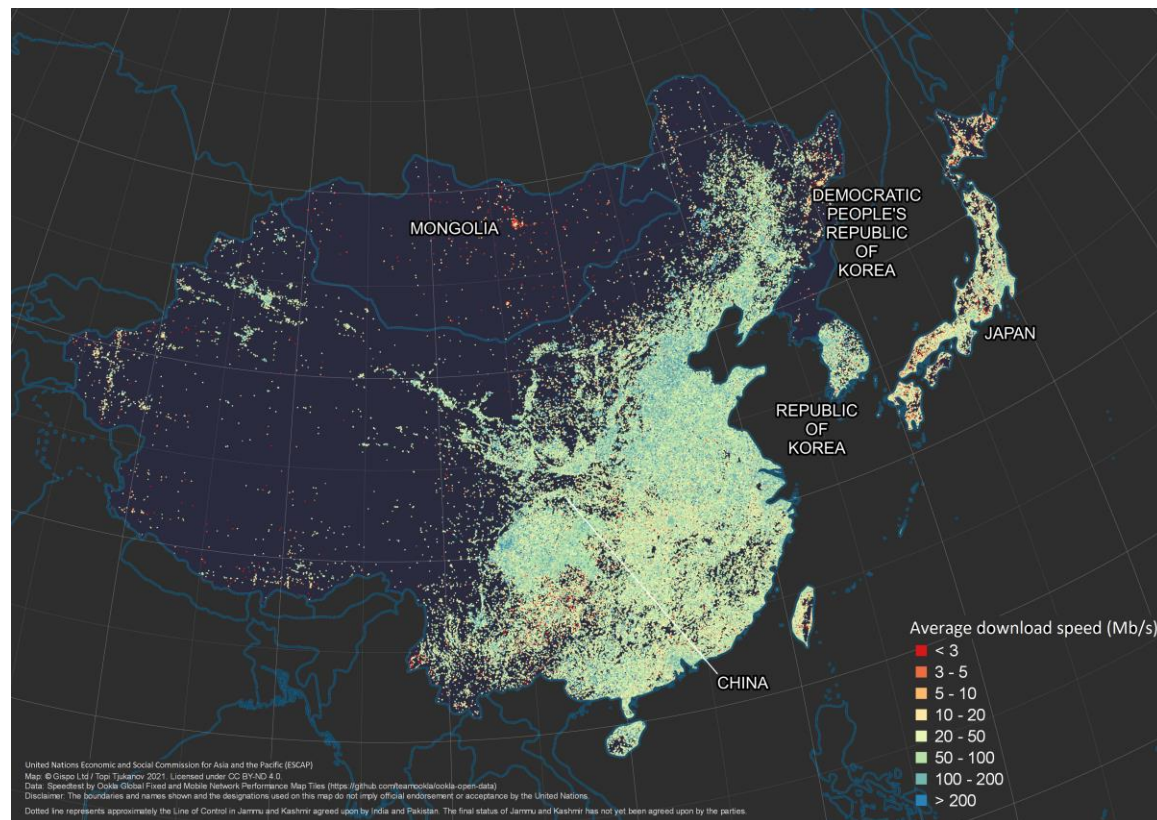
Fixed Grid



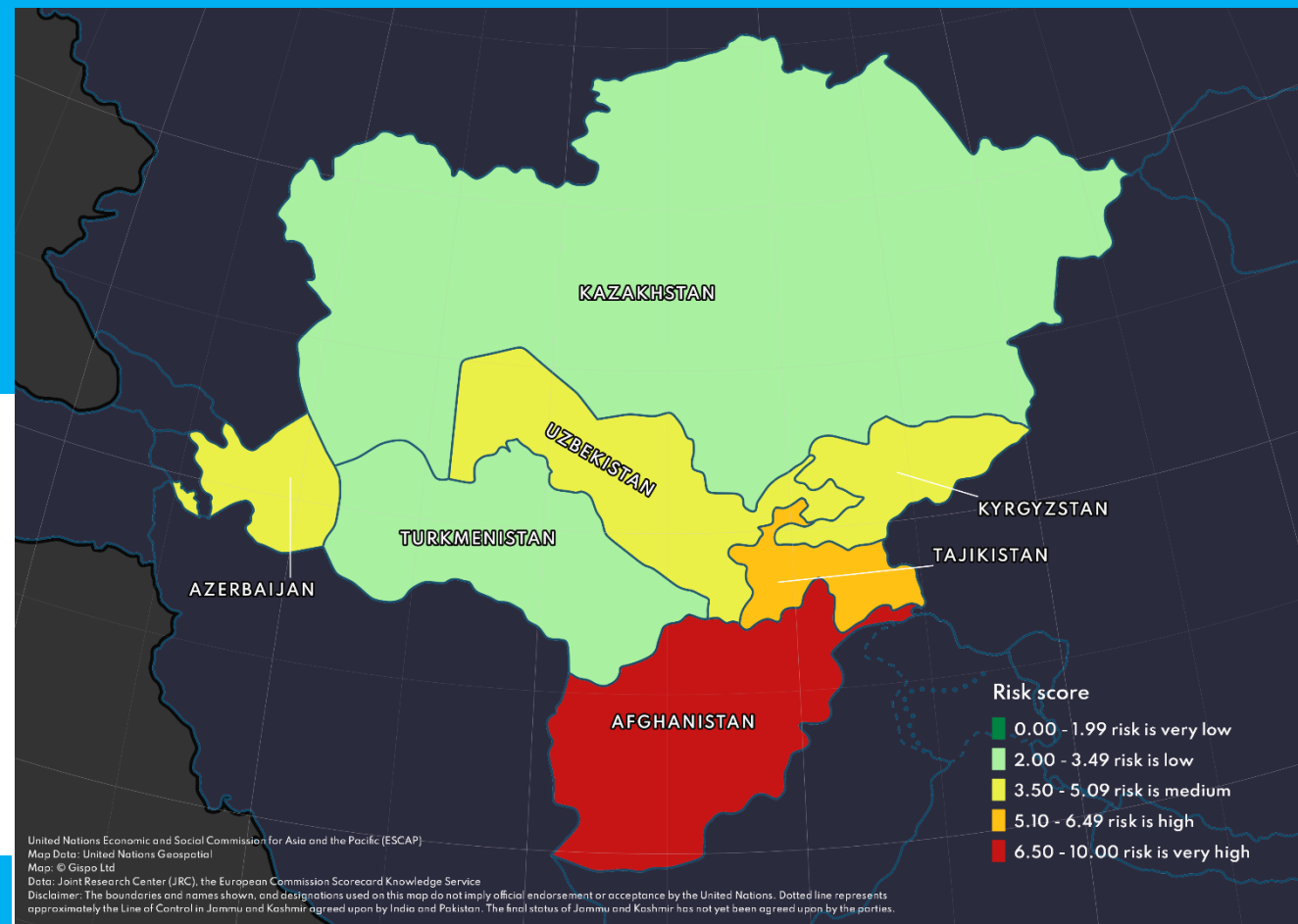
## Internet Speed Maps (3<sup>rd</sup> Page)

Internet Speed Maps displays the mobile and fixed grid format of the seven country groups. Both types of the map displays the Average Download Speed. Navigate each country group through the sections above the map.

# Internet Speed Maps for North-East Asia

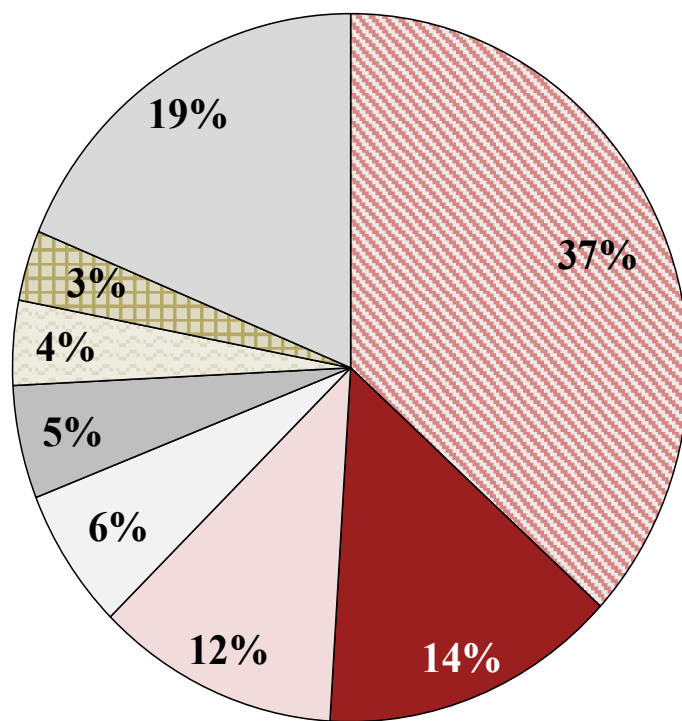


## Hazard Maps (4<sup>th</sup> Page)

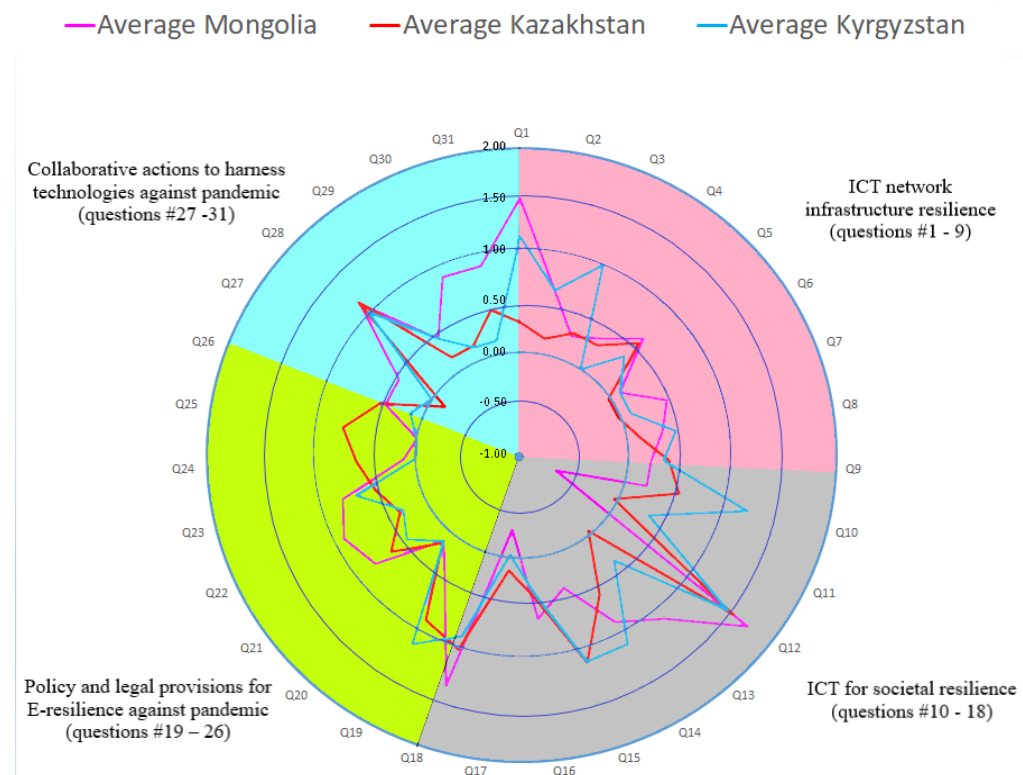


Hazard Maps display the risk score of each countries. The country groups can be selected on the left side of the map.

## Share of disasters in North and Central Asia\* by number of occurrences



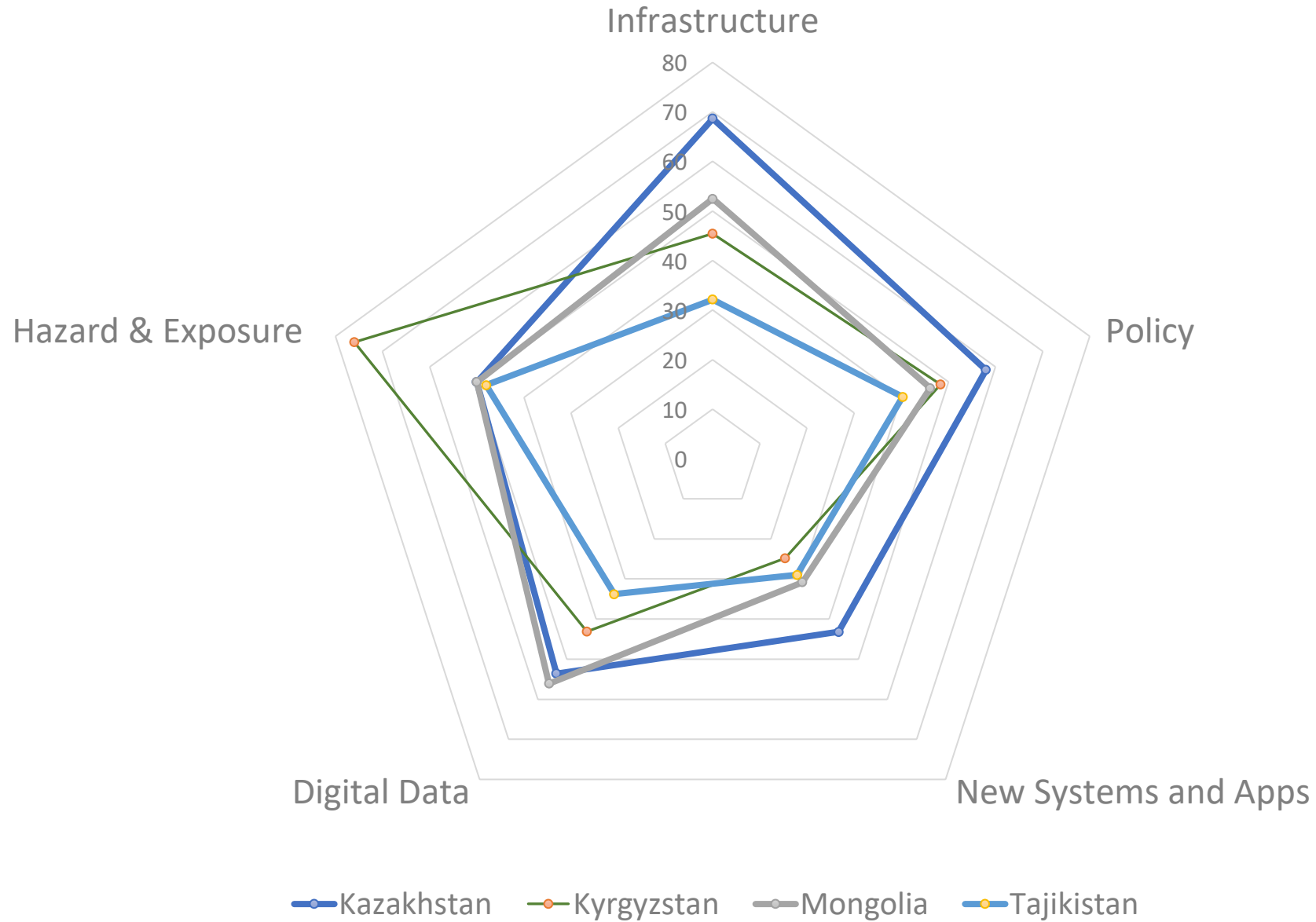
■ Flood 
 ■ Earthquake 
 ■ Landslide 
 ■ Storm 
 ■ Extreme temperature 
 ■ Drought 
 ■ Epidemic 
 ■ Others



**E-resilience readiness in RECI target countries, as of 3 July 2020**



# E-resilience Radar chart (pentagon) for 4 countries





# E-resilience Monitoring Dashboard for Digital Foresight Planning

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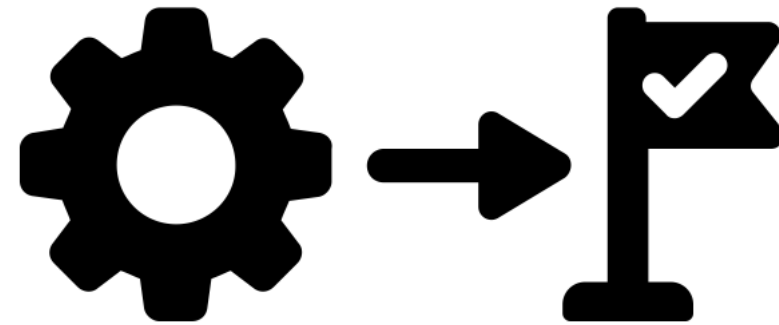
*Consultant,  
ICT and Development Section, ESCAP*



# Measuring E-resilience

Contents of the presentation:

- 1) Methodological notes
- 2) Country profiles



# Methodological notes (1/2)

# E-resilience background

- E-resilience is the 3<sup>rd</sup> pillar of Asia-Pacific Information Superhighway (AP-IS)
- Toolkit on e-resilience is aimed to support and accelerate the AP-IS 2022-2026 Action Plan
- E-resilience definition is as follows: “the ability of ICT systems to withstand, recover from and change in the face of an external disturbance”
- In practical terms, e-resilience was divided into 5 distinct pillars (more on the next slide)

# Pillars of e-resilience



## Infrastructure

Infrastructure is the backbone and the most crucial resource for e-resilience. It is a baseline enabler of the society to utilize ICTs for resilience to external threats.



## Policies

Policies influence e-resilience via building multi-stakeholder consensus on creating an enabling environment for ICT systems to be able withstand a blow and adapt to new conditions.



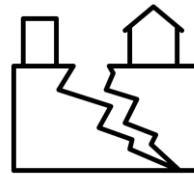
## New Systems and Apps

New systems and apps act as a proxy for the capacity of a society to innovate and create new forms of preparedness and response in the face of a crisis.



## Digital Data

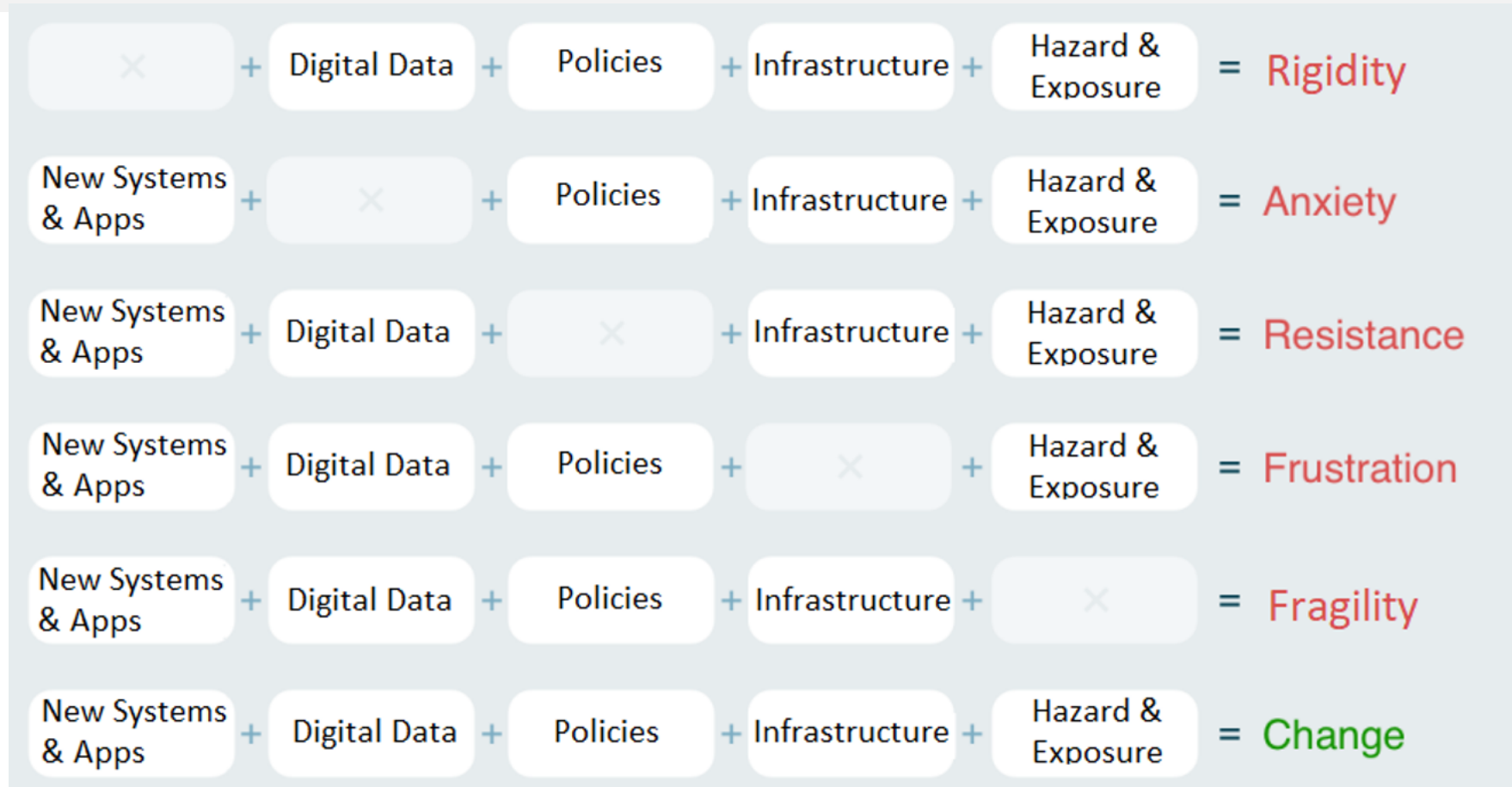
Digital data is the measure of the extent with which the society can utilize digital tools on a day-to-day basis, which today is indispensable for maintaining the normal way of life and avoiding economic downtime, while also providing valuable public response tools.



## Hazard & Exposure

Hazard & Exposure is showing how much attention the society puts on disaster resilience in all of its forms, be it preparedness, response or recovery.

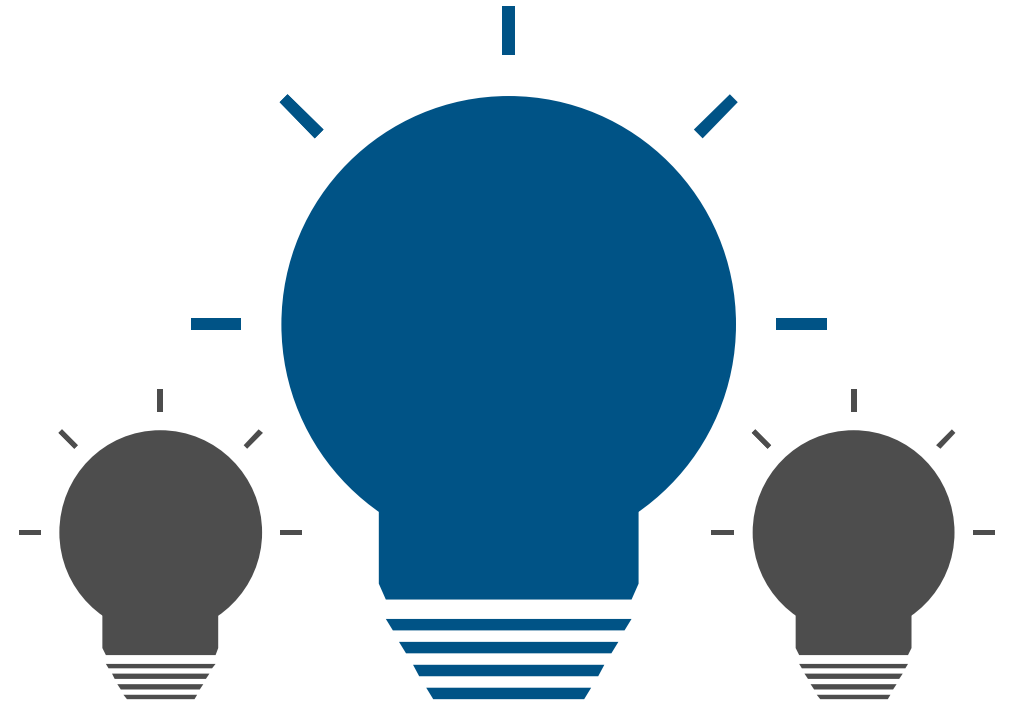
# Change framework reference model



Adapted from M. Lipitt (1987) "The Managing Complex Change Model" via E. Casali, IntenseMinimalism.com

# Main considerations

- Measurement is intended for self-review, and is not suitable for country comparisons
- Measurement to utilize existing indicators
- The idea is to create a starting point for future work involving partners with a clear and simple methodology
- The index is envisaged as an evolving tool, and it will change accordingly to the needs of the Member States



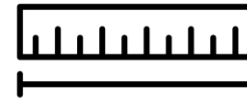


# Assembling indicators

Measurement utilizes existing indicators...

... and there are some issues with that

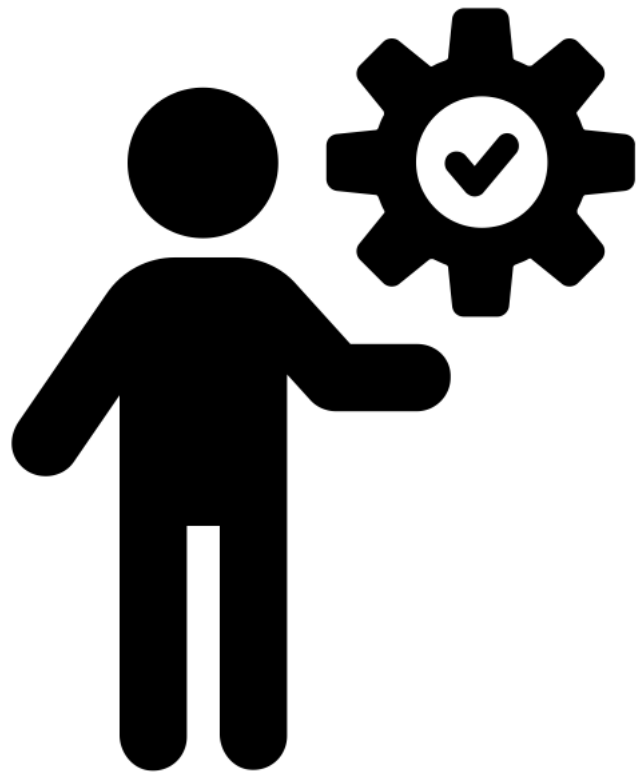
- Data consistency
- Measurement units are not the same
- Missing values
- Difficult to make sense of a multitude of different indicators



UNITED NATIONS  
E-GOVERNMENT  
SURVEY



# Assembling indicators



In response the following actions are proposed:

- Unify the data
- Perform normalization to one scale
- Deal with missing values
- Weight the indicators and calculate each pillar score
- Tell a story with the data – visualize the findings

# Unifying the data

- The dataset was updated with the newest data
- The original source of data was identified for each indicator
- Initially, the dataset was built on intermediary data. This was replaced, where possible, to include the data from a primary collection source (e.g. WEF Network Readiness Index -> ITU WTID)

| Country      | <i>Online Service Index (0-1 max)</i> | <i>GitHub commits per 1,000 population</i> | <i>Wikipedia edits per million pop aged 15-69</i> | <i>Availability of local online content (normalised)</i> | <i>Use of virtual social networks, % of population, (0-100 % max)</i> | <i>ICT skills (normalised)</i> |
|--------------|---------------------------------------|--|---|--|---|--------------------------------|
| Kazakhstan   | 0,92                                  | 4,04                                       | 45,4  | 45,15  | 51  | 66,29                          |
| Kyrgyzstan   | 0,65                                  | 2,39                                       | 28,7  | 68,48  | 39  | 41,58                          |
| Mongolia     | 0,53                                  | 1,75                                       | 38,00   | 42,60  | 68  | 39,32                          |
| Tajikistan   | 0,32                                  | 0,05                                       | 24,4  | 53,71  | 7   | 58,99                          |
| Turkmenistan | 0,17                                  |  |   |  | 1,2   |                                |
| Uzbekistan   | 0,78                                  |  | 23,7  |  | 9,6   |                                |

# Data normalization

- Global maximum and minimum values were identified for each indicator
- The values were normalized to a 0-100 scale via Min-Max method\*

**Formula to find the normalized indicator value  $X_i(nm)$ :**

$$X_i(nm) = \frac{(X_i - X_{min})}{(X_{max} - X_{min})} * 100$$

**Reverse Min-Max** (where higher values are worse):

$$X_i(nm) = \frac{(X_{max} - X_i)}{(X_{max} - X_{min})} * 100$$

Reference: OECD (2008) Handbook on Constructing Composite Indicators

| Economy       | High-tech exports, % of total exports |
|---------------|---------------------------------------|
| Hong Kong SAR | 65,57 = <i>Xmax</i>                   |
| ...           | ...                                   |
| ...           | ...                                   |
| ...           | ...                                   |
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| ...           | ...                                   |
| ...           | ...                                   |
| ...           | ...                                   |
| Mauritania    | 0 = <i>Xmin</i>                       |

# Weighting

- Weighting performed with equal weights (EW) assigned to each indicator.
- Based on weights of each indicator, a score for each pillar was calculated.
- Although the number of indicators is not the same in every pillar, this does not imbalance the index, as there is no single Index score.
- In future it might be beneficial to have a discussion on different weights assigned to indicators.



# Missing values

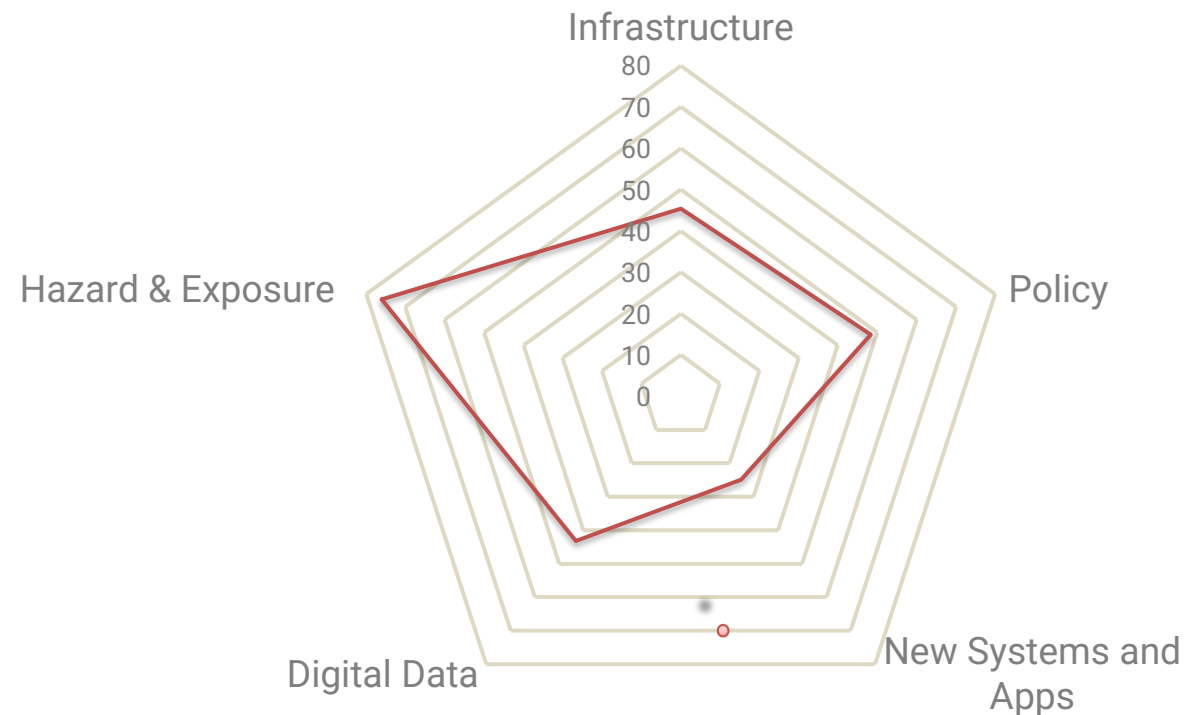


- We impute the missing values based on the *Missing-at-Random (MAR)* assumption.
- For missing data we use ***cold deck imputation***, replacing the values with the older available data for the same country.
- For the remaining data we check that all indicators have no more than 1 case missing per pillar, and then we use ***case deletion (complete case analysis)***, omitting the missing record in the calculation of the pillar score.
- This is enough for our pilot countries to have the complete set with no missing data.
- In future, a consideration should be given to other imputation techniques, such as ***hot deck imputation*** (imputing missing values with “similar” country data).



# Data visualization

- The resulting score for each pillar is visualized via a radar chart (pentagon).
- This visualization form allows readers to have a data-driven and informed discussions on “what the numbers show”.
- Simple visualizations provide to draw the important policy lessons and recommendations



# Future work considerations

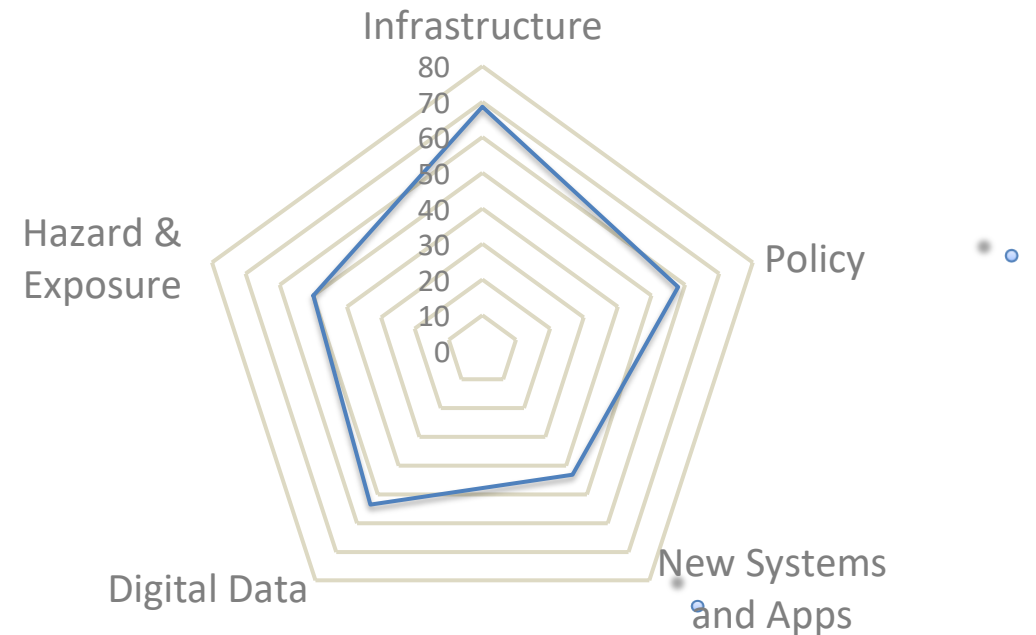
- Sunsetting/replacing indicators
- Review global Min-Max method with the potential ESCAP regional min-max?
- Outliers treatment (kurtosis and skewness analysis) for global data to avoid benchmarking outliers
- Missing values management. Possible solution – utilize the World Bank peer-country methodology to find median/average value for 5 peer countries with similar GDP and population (hot deck).
- Indicators weighting considerations

# Country profiles (2/2)

# Country profile: Kazakhstan

Kazakhstan shows a solid performance across all pillars of e-resilience

Particular forte is infrastructure and policy, while there is a room for improvement regarding new systems and apps





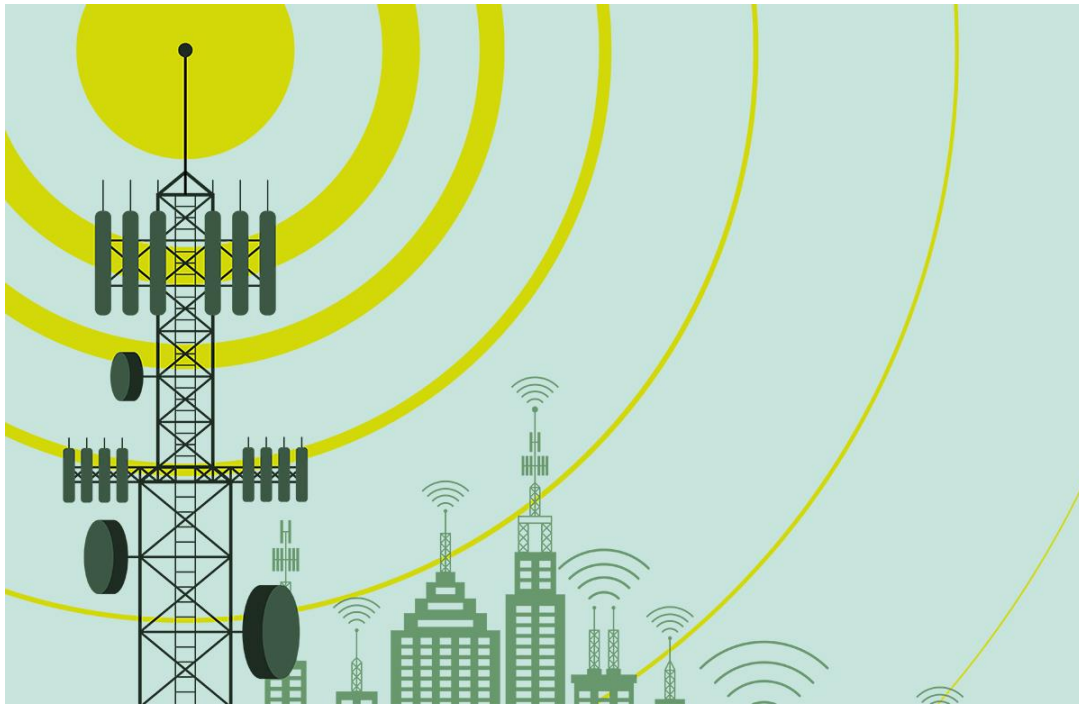
# Infrastructure

## Strengths:

- Among 6 individuals residing in the Kazakhstan there are 5 internet users
- More than 83% of Kazakhs actively use mobile broadband
- Kazakhstan is one of the global leaders in terms of affordability of mobile tariffs

## Potential bottlenecks and proposed actions:

- Support the domestic computer software development industry





## New Systems and Apps

### Strengths:

- Number of apps developed relative to the population size
- Government support for investment in emerging technologies

### Potential bottlenecks and proposed actions:

- Strengthen the trust of consumers to shop online
- Research the reasons behind relatively low volume of companies utilizing websites



## ICT Policy

### Strengths:

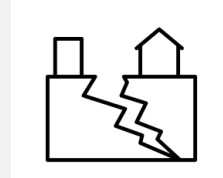
- Great attention to the ease of doing business, general education support,
- Government takes proactive approach to cybersecurity policies

### Potential bottlenecks and proposed actions:

- Provide incentives for the network operators and webmasters to deploy modern encryption (trusted TLS/SSL certificates)
- Provide financial support for national R&D



## Digital Data



## Hazard & Exposure

### Strengths:

- Powerful and popular e-government systems
- High level of ICT skills among population

### Potential bottlenecks and proposed actions:

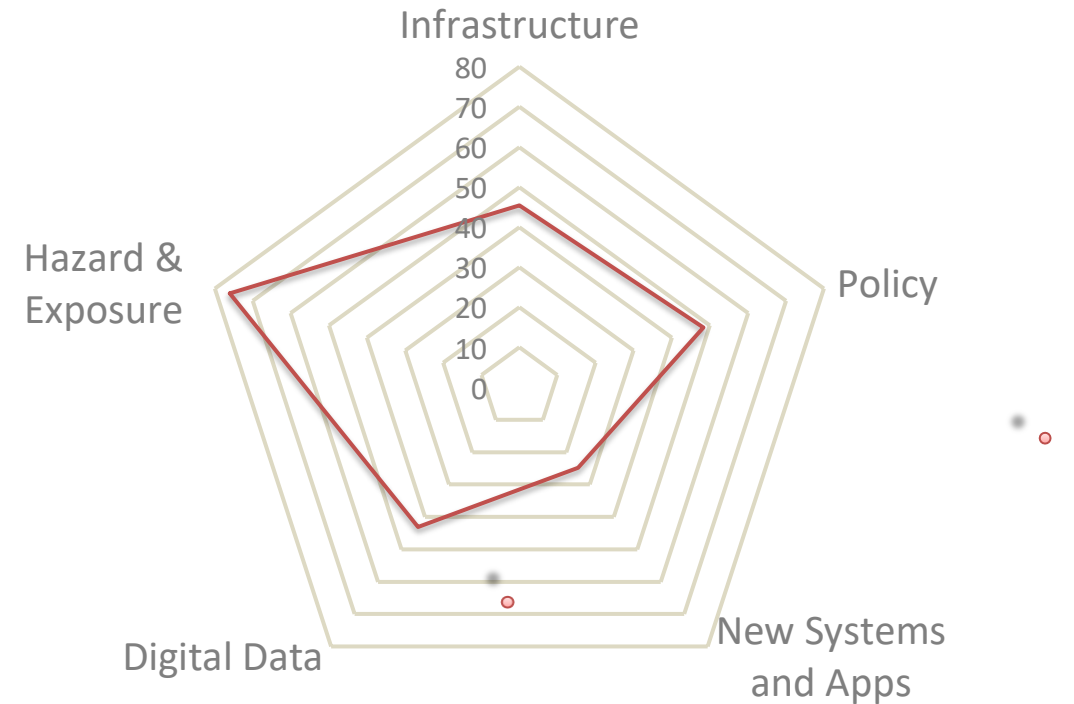
- Promote using open data
- Incentivize the creation of locally relevant content online
- Ensure healthy inflow of ICT professionals

- Kazakhstan shows mediocre Hazard & Exposure scores, highlighting the need to give more attention to the disaster risk reduction
- Participate in the regional and global initiatives, including the activities under the Sendai Framework for Disaster Risk Reduction.
- Leverage Kazakhstan overall strong ICT systems performance for the purposes of managing preparedness, withstanding the blow, and building back better from disasters

# Country profile: Kyrgyzstan

Kyrgyzstan scores high on Hazard & Exposure, and has relatively solid scores on policy.

There is room for improvement in terms of infrastructure, digital data, and particularly in regards to the new systems and apps.







# Infrastructure



## Strengths:

- There are more than 100 mobile cellular subscriptions per 100 inhabitants
- Kyrgyzstan enjoys more than 85% 4G mobile network coverage

## Potential bottlenecks and proposed actions:

- Fixed broadband subscriptions and households with computers at home are relatively rare
- Lower the costs of mobile and fixed broadband relative to household incomes



## New Systems and Apps

### Strengths:

- One in four companies have a website
- Significant number of apps developed per person

### Potential bottlenecks and proposed actions:

- Strengthen the trust of consumers to shop online
- Promote the adoption of new and emerging technologies



## ICT Policy

### Strengths:

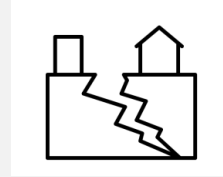
- Great attention to the ease of doing business
- Relatively developed ICT regulation

### Potential bottlenecks and proposed actions:

- Develop national cybersecurity policies
- Ensure that national legislation allows flexibility (for example, technological neutrality) to foster new and emerging technologies, and the related business models



## Digital Data



## Hazard & Exposure

### Strengths:

- Relatively progressive e-government systems
- Great attention and availability of the local content online

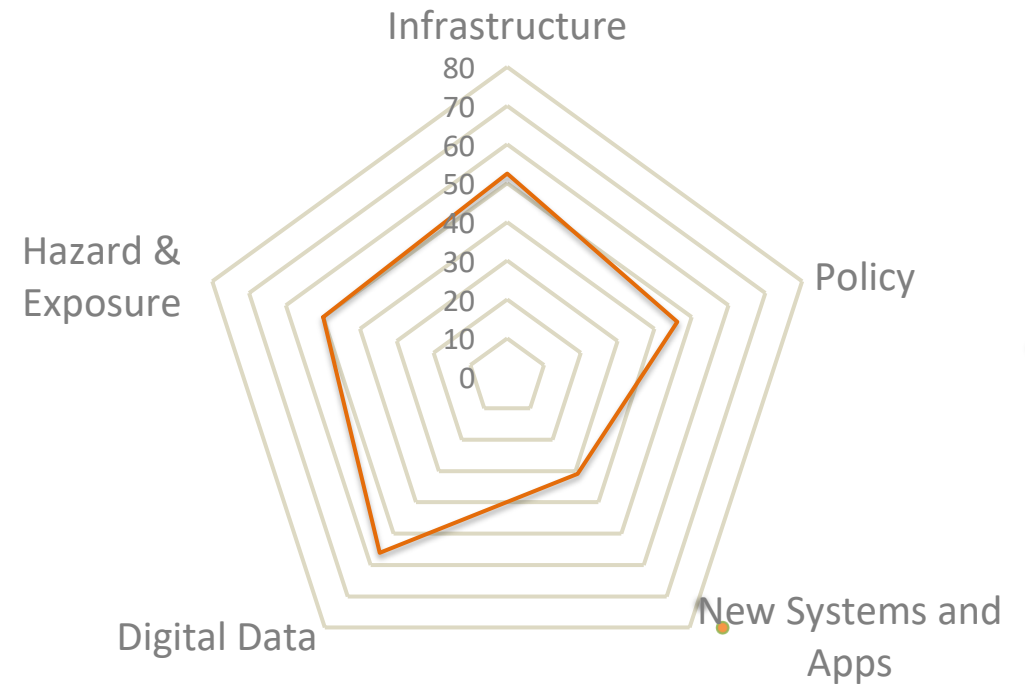
### Potential bottlenecks and proposed actions:

- Support education of ICT professionals
- Ensure penetration of basic ICT skills among the population

- Kyrgyzstan score relatively high on Hazard & Exposure pillar, which showcases the national focus to ensure social resiliency during crisis.
- It is crucial to continue the efforts in the direction of strengthening ICT systems capacity to withstand the blows, and to utilize modern technologies to recover and build back better

# Country profile: Mongolia

Mongolia has middle-of-the-pack scores across the pillars, with an exception of the relatively low scores for the new systems and apps





# Infrastructure



## Strengths:

- More than 65% of the population aged 15 and above are using the Internet
- More than half of the broadband subscriptions have more than 10 Mbit/sec data rate

## Potential bottlenecks and proposed actions:

- Continue to improve the coverage of 4G networks across the country



## New Systems and Apps

### Strengths:

- Developed medium- and high-tech industry
- Number of companies with a website

### Potential bottlenecks and proposed actions:

- Strengthen the trust of consumers to shop online
- Research the needs of the companies to utilize websites
- Expand government measures to support investment in emerging tech



## ICT Policy

### Strengths:

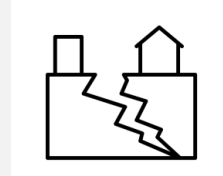
- E-commerce legislation present
- Relatively developed ICT regulation

### Potential bottlenecks and proposed actions:

- Develop national cybersecurity policies
- Support national R&D activities
- Enhance trust in public policies



## Digital Data



## Hazard & Exposure

### Strengths:

- Balanced gender profiles of Internet use
- Rural population is using digital payments
- 45% of population aged 15 and above used the Internet to access bank account in the past year

### Potential bottlenecks and proposed actions:

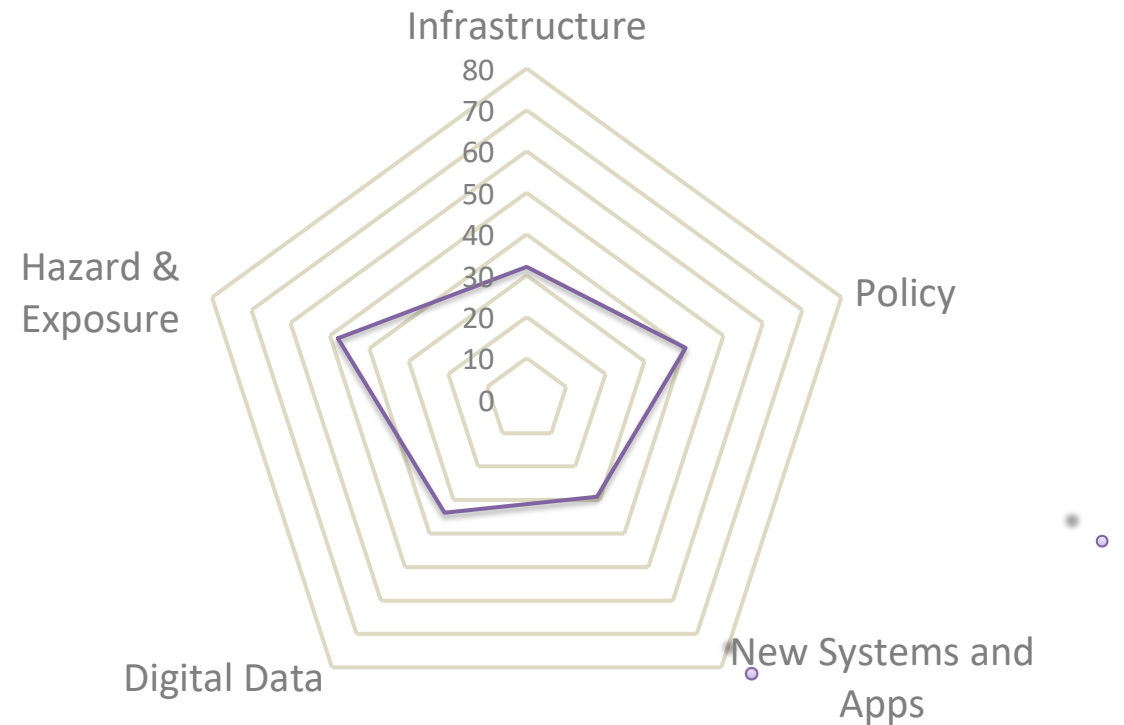
- Develop and expand e-government services

- Mongolia shows mediocre Hazard & Exposure scores, highlighting the need to give more attention to the disaster risk reduction
- Participate in the regional and global initiatives, including the activities under the Sendai Framework for Disaster Risk Reduction.



# Country profile: Tajikistan

Tajikistan scores relatively low across the board, with some positivity across the Hazard & Exposure pillar





# Infrastructure

## Strengths:

- There are more than 100 mobile cellular subscriptions per 100 inhabitants
- More than 80% of the country is covered by 4G networks

## Potential bottlenecks and proposed actions:

- It is crucial to reduce the mobile tariffs, which remain very high relative to household incomes
- Incentivize the consumers to utilize broadband for economic benefit





## New Systems and Apps

### Strengths:

- Government gives a lot of attention to promoting emerging tech
- At least partially as a consequence, both emerging tech adoption and the investments into emerging tech are relatively high

### Potential bottlenecks and proposed actions:

- Ensure that the technology adoption and the associated benefits are distributed fairly in the society



## ICT Policy

### Strengths:

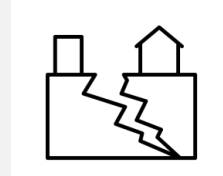
- General education
- Relative trust for public policies

### Potential bottlenecks and proposed actions:

- Develop modern ICT regulation
- Adopt national cybersecurity policies
- Ensure legal framework's adaptability to emerging technologies



## Digital Data



## Hazard & Exposure

### Strengths:

- High level of ICT skills among population
- Rural population is using digital payments

### Potential bottlenecks and proposed actions:

- Develop and expand e-government services
- Promote e-participation of all population, regardless of position/wealth/gender etc.

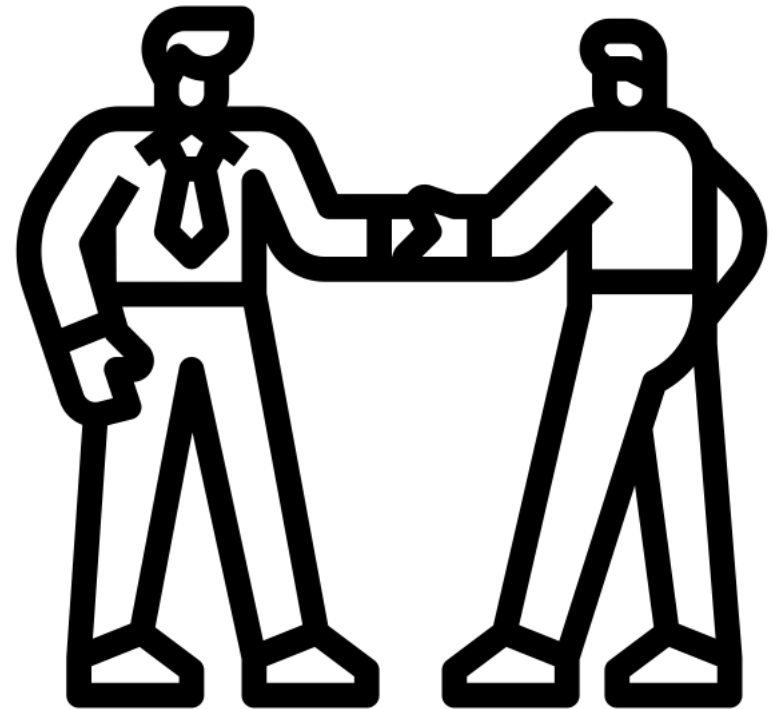
- Tajikistan shows mediocre Hazard & Exposure scores, highlighting the need to give more attention to the disaster risk reduction
- Participate in the regional and global initiatives, including the activities under the Sendai Framework for Disaster Risk Reduction.
- Build national ICT capacities with the e-resilience in mind

# Partnerships for success

We **invite all interested parties** to contribute to this work, to share ideas and needs, to gradually improve and make this index more mature, and more tailored to specific needs of our countries.

You can participate by sharing your opinion, helping to collect the data on a national level, telling a co-worker about this initiative or writing an academic review.

Your perspectives and good will create a broad consensus necessary for change. With your support we hope to create a good navigation device on the road to an e-resilient Asia-Pacific.





UNECE



# THANK YOU

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