

E-RESILIENCE POLICY BRIEF SERIES

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E-RESILIENCE READINESS OF ICT INFRASTRUCTURE

Overview

The COVID-19 pandemic has accelerated the need for digital connectivity and transformation to mitigate the impact of economic slowdown, sustain well-being, and speed up e-resilience readiness, and build back better. Social distancing has generated higher demand for fast and reliable broadband connectivity to support the growing information flows. Since March 2020, data traffic has increased all over the world and surged the demand for broadband Internet connection to overcome economic lockdowns, while challenging the adaptive capabilities of underlying Information and Communications Technology (ICT) infrastructure.

“In the present crisis, connectivity needs to be prioritised as a foundation to ensure the continuation of critical services, enable digital literacy and promote social inclusion”¹.

The COVID-19 crisis has also placed a premium on digital platforms, applications, and skills such as online education, online medical services, digital financial services, including e-payments, and online shopping as the new normal.

While the future is increasingly more difficult to predict, we can reasonably determine that this trend is likely to last way beyond the pandemic.

In this connection, quality, stability and the resilience of ICT infrastructure and networks, the so-called “e-resilience”, in Asia and the Pacific appears as a more critical agenda in the pandemic and recovery phase.

As the third pillar of the Asia-Pacific Information Superhighway (AP-IS), e-resilience is defined as the ability of ICT systems to withstand and recover from and change in the face of an external shock.

ESCAP (2020)² views e-resilience from two lenses: **ICT for its own resilience** and **ICT for societal resilience**, which are interdependent and especially critical in times of crisis. Therefore, assessing and monitoring e-resilience from both lenses on a regular basis can help governments’ policy responses to present and future crises.

This Policy Brief provides a basic conceptual overview and recommendations of the policy responses on e-resilience in support of ICT infrastructure as a key component of crisis preparedness in the framework of the Asia-Pacific Information Superhighway (AP-IS).

Building Back Better with E-Resilience

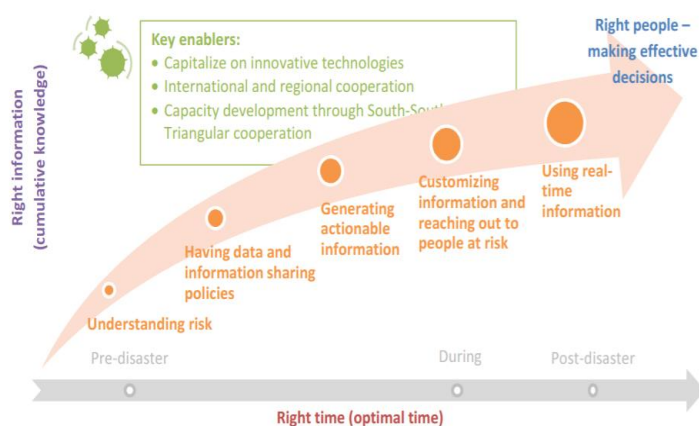
ESCAP proposes five essential steps and guiding principles to enhance e-resilience while delivering the right information, to the right people, at the right time

¹ “Report of the UN Secretary-General Roadmap for Digital Cooperation” June 2020. Available at: <https://www.un.org/en/content/digital-cooperation-roadmap/>

² United Nations, Economic and Social Commission for Asia and the Pacific, “Understanding E-Resilience for Pandemic Recovery in Asia and the Pacific”, working paper, 23 November 2020.

(see Figure 1 below). Given the key role that ICT plays across the different phases of disaster risk reduction and management, attention should be brought – after having understood the risk and information-sharing policies – on generating actionable information, customising that information and reaching out to people at risk, and finally using real-time information on building and strengthening e-resilience during the crisis, e.g. COVID-19 pandemic.

Figure 1: E-resilience guiding principles.



Source: ESCAP-E/ESCAP/CICTSTI(1)/5
https://www.unescap.org/sites/default/files/pre-ods/CICTSTI_5E.pdf

ICT Infrastructure Resilience and Societal Resilience: Forming an E-Resilience Monitoring Dashboard

The 3rd Committee of Information, Communications and Technology and Science, Technology, and Innovation (ICTSTI) in 2020 recognised that the coronavirus disease (COVID-19) pandemic has further demonstrated the importance of e-resilience and recommended to expand the regional multi-stakeholder collaboration to scale up broadband Internet capacities for the effective use of technological innovation and harness technology to address disasters and major challenges.

Sound measurement and improved coordination and information-sharing are best done together with guidelines on policies and actions that can help to mitigate the multiple digital gaps³.

The ability to properly measure e-resilience is a key component of successful disaster risk management and adaptation in the recovery period. Quantitative, indicator-based assessments can be applied to evaluate e-resilience by combining particularly relevant ICT and disaster risk reduction (DRR) related indicators of performance into a single composite dashboard.

ESCAP has identified four important inter-dependent entry areas⁴ that must be covered under the e-resilience dashboard at the national level (see Figure 2 further below):

- *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 current and future pandemics,
- *ICTs' role in data management* (gathering, analysis, and decision making) leads into actions and policies which influence disaster resilience and adaptability,
- *ICT infrastructure resilience is a physical foundation* for all the above.

During the force major circumstances, such as COVID-19, and during natural and anthropogenic disasters, the *Hazard & Exposure* dimension is viewed in a background for the above priority areas.

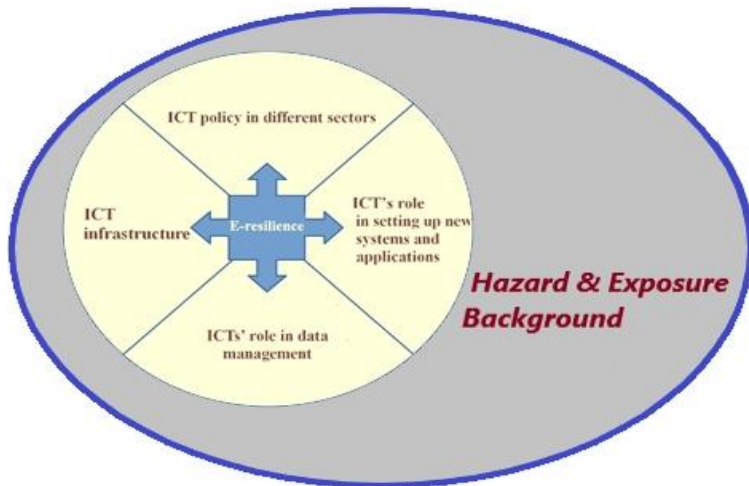
Specifically, the concept of “hazard and exposure” reflects the probability of the system to be exposed to specific disaster hazards for a particular country. It comprises of two categories: natural hazards, including earthquakes, floods, tsunamis, droughts, epidemics; and human-induced hazards like conflict risk. *Hazard & Exposure* is measured as The INFORM Risk Index, which is an open-source result of collaboration of the Inter-Agency Standing

³ “Report of the UN Secretary-General Roadmap for Digital Cooperation”, June 2020. Available at: <https://www.un.org/en/content/digital-cooperation-roadmap/>

⁴ United Nations, Economic and Social Commission for Asia and the Pacific, “Understanding E-Resilience for Pandemic Recovery in Asia and the Pacific”, working paper, 23 November 2020.

Committee Task Team for Preparedness and Resilience and the European Commission⁵.

Figure 2: E-resilience monitoring priority areas for indicator dashboard



Source: based on ESCAP working Paper “Understanding E-Resilience for Pandemic Recovery in Asia and the Pacific” 2020. Available at <https://www.unescap.org/resources/understanding-e-resilience-pandemic-recovery-asia-and-pacific#>

The 2020 ESCAP research⁶ shows that there is a rich choice of indicators with available data, capable to provide necessary assessments of e-resilience. ESCAP offers a new grouping of these indicators into a monitoring framework to enable a new practical and strategic assessment. In summary, the complexity and multidimensional nature of the e-resilience concept, dictates the careful choice of analytical approaches including sensible selection, formulation, and evaluation of available and suitable e-resilience indicators. All of this would affect the evidence-based decision making with reliable results.

From the perspective of the resilience of ICT infrastructure, indicators associated with ICT systems’ resilience and resilience engineering, such as mobile network coverage, fixed broadband access, robustness, redundancy, modularity, availability and state policies that support new technologies, would potentially be applicable for e- resilience monitoring.

From the perspective of ICT for societal resilience, indicators associated with national capacity for ICT use, information sharing, cyber risk management,

society-wide awareness, capacity-building, organisational adoption, use of relevant resilience frameworks (including standards, models and business continuity planning) and partnerships for innovation, can be considered to be among main contributing parameters.

Conclusions and Recommendations

These critical factors from the e-resilience concept, should be taken into consideration as a basis for policy discussion and recommendations as important contributors to enhancing resilience of ICT infrastructure and networks in member countries.

Strengthened ICT infrastructure and improved access to Internet, in turn, would ease the response and societal resilience to possible future crises, as for example, future global pandemics, and ensure a smooth post-crisis recovery phase.

Both aspects would create a different spectrum of approaches to inform the countries’ ICT development frameworks forward.

- **Assess and Strengthen the ICT Infrastructure**

Accelerating investments in next generation infrastructure networks is recommended while promoting the awareness of the benefits and opportunities of innovative approaches, including the cost-effectiveness of co-deployment of fibre-optic cables along passive infrastructure networks such as road and energy.

Fibre-optic cable (FOC) infrastructure, which is the backbone and middle-mile network, is both an essential component of the digital infrastructure network and an enabling driver to reap the benefits of the digital economy and society, which, at the same time, can strengthen e-resilience to overcome unexpected crises, including COVID-19 pandemic.

However, ICT policy and decision makers across the globe face the perennial challenge of how to develop the seamless fibre-optic cables network with enough redundancy in a cost-efficient manner. The high costs associated with deployment of FOC, mostly attributing to civil works and payments for right-of-way, are often passed onto users. It often leads to unaffordable Internet connectivity and broadband

⁵ More information available at: <https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Risk>

⁶ Ibid.

services in countries with special needs and economies in transition. In response, some measures have been proposed to lower the construction and maintenance costs; one of the prominent measures is *co-deployment of FOC along passive infrastructure*: highways, railways and electricity grid.

- **Enabling Legal, Regulatory, Policy Frameworks**

Governments are increasingly putting the digital transformation at the forefront of their policy agenda and devoting more attention to emerging digital technologies. To accelerate digital transformation, *national digital strategies*, coordinated at the highest levels of government, need to mainstream DRR and resilient ICT into national policies and plans. In this regard, the recent Korea's 'New Digital New Deal Strategy' could be one reference.

Countries should review and update relevant regulations related to digitalisation by incorporating e-resilience principles into policies and legislation; create more conducive legal environment for digitalization, including provision of incentives for investments in research and innovation; and pay careful attention to cybersecurity matters.

E-resilience has become an essential must. Since 2020, ESCAP has been developing the "E-resilience monitoring dashboard", which aims to provide member States with a holistic approach to their e-resilience profile through its four pillars, supporting policy development for the way forward⁷. To achieve this objective, improving data management and statistics monitoring and/or reporting at national level is a pre-condition for a fully functional and instrumental e-resilience dashboard.

- **Learn and Share Good Practices and Create Enabling E-Resilience Partnerships.**

- ✓ Countries need to deepen and extend *regional collaboration* to scale up broadband Internet capacities for effective use of technological innovation, especially in the fight against COVID-19.
- ✓ There is a need to continue *knowledge-sharing* and *capacity building* practices on effective ICT

policies and applications to enhance the response to COVID-19 and future crises.

- ✓ Countries need to continue strengthening *institutional and human capacities* on digital technologies for development and practicing of a new normal that supports the approach of resilience of the whole society.
- ✓ Governments may need to promote and support the creation of local contents in local languages, upgrading the education curricula, including both the formal educational system and lifelong learning, basic and digital literacy, critical thinking ability and digital media use skills for all citizens, including vulnerable sections, and closing the digital gap.
- ✓ Strengthening connectivity has allowed many businesses and individuals to adapt to the COVID-19 crisis and has proved its potential for adapting to possible future crises. Governments may consider promoting and encourage the Small and Medium Enterprises (SMEs) to leverage Internet in their daily activities, evolve websites and sales and supply through web channels.

Launched by the ESCAP resolution 73/6 in 2017, the Asia-Pacific Information Superhighway (AP-IS) initiative aims to increase the availability and affordability of broadband connectivity across Asia and the Pacific through four pillars: (1) physical infrastructure development; (2) Internet traffic and network management; (3) promoting e-resilience and (4) broadband for all. The AP-IS Policy Brief Series is designed to deliver key messages emanating from the analytical research conducted by the ESCAP secretariat and AP-IS partners for member countries' informed decision making. For more information and contact, please send e-mail to escap-ids@un.org. More information is also available at our website: <http://www.unescap.org/our-work/ict-disaster-risk-reduction/asia-pacific-information-superhighway>

Access the Gateway on
www.drrgateway.net



⁷ Ibid.