Optional Sectoral Module
INFORMATION AND COMMUNICATION TECHNOLOGY

In a resilient city, the ICT industry is used strategically to guide economic growth, develop competitive industries and create jobs. The local government actively deploys ICT to improve public service delivery/accessibility, participation in decision-making, transparency and accountability (*inclusive*). A resilient ICT system continues to operate despite power outage or other disruptions (*robust and redundant*). The ICT networks and infrastructure is regularly assessed for level of vulnerability and capacity to deal with identified shocks (*reflective*). During disasters, sufficient funding is available for establishment of emergency communication centers and increased third-party communication services (*coordinated*).

TOPIC	GUIDING QUESTION	APPLICABLE RESILIENCE QUALITY	RELATIONSHIP TO RESILIENCE QUALITY
Institutional Capacity	**Does the city have a development strategy, and legal and regulatory framework for the ICT industry?**	**Robust**	**Cities that have a development strategy for the ICT sector are transparent about their objectives for the industry. A strong legal and regulatory framework creates confidence in the industry and helps manage risks for industry stakeholders, enabling the city to better leverage private sector involvement in ICT infrastructure development.**

Institutional Capacity	Are key ICT service providers well-coordinated in terms of management, planning, and emergency response? [Lens 3 – CRF 10]	Coordinated	Coordination among ICT service providers facilitates collaborative management of risks, rapid response during technology and infrastructure breakdown, as well as planning for future demand.
Institutional Capacity	Does the city have programs/ strategies for improving public service delivery, participation, transparency and accountability by use of ICT?	Robust	Local governments can use ICT to improve public service delivery/ accessibility, participation in decision-making, transparency and accountability (i.e. facilitating citizen feedback to governments and service providers).
Institutional Capacity	Does the city's emergency/ contingency planning incorporate use of communication and information management systems?	Robust	Emergency management information systems consolidate information about emergencies from different stakeholders and provide real-time information to responders. In an emergency situation, they are needed to ensure that emergency responders get information in time to respond appropriately.
Institutional Capacity	Does the city have access to or generate its own data on the built environment, and natural and man-made threats to the city? Is this information made available to the general public and the private sector? Are risk maps of the city generated collaboratively (i.e. through open mapping programs)?	Reflective; Inclusive	Ability to generate or access asset and hazard data allows the city to evaluate risk exposure. Having insight into risk information allows the general public and private sector to determine appropriate measures for minimizing own vulnerability to risks. Participatory mapping allows perceived vulnerabilities of affected communities to be channeled through to decision-makers via risk maps.

Institutional Capacity	Does the city have a surveillance system that monitors changes in major risks, including climate-sensitive risks (e.g. weather forecasting)? If yes, is the system linked to all the concerned departments/ agencies? Can the surveillance system provide early warnings (communication and response) about potential disasters? If yes, what percentages of inhabitants are covered by early warning systems?	Reflective; Robust	Regular monitoring of changes in risks, including those affected by climate change, allows for identification of appropriate mitigation measures. For effective use of risk information, the surveillance system needs to be linked to concerned department/ agencies. Surveillance systems that are able to disseminate disaster information in a timely manner can also act as early warning systems. Public safety is enhanced if all residents are informed early about potential hazards.
Finance	What are the funding sources for local government information management systems, communication services and applications? Do all city departments have funding available for upgrading their ICT?	Robust	Predictable funding for ICT investments and upgrading can be used to support local government management and service functions across departments.
Finance	To what degree is funding available for maintenance of ICT networks and infrastructure?	Robust	Availability of reliable funding for regular maintenance of ICT networks and infrastructure prevents degradation and ensures their continuous operation.
Finance	Does the city have funds set aside to support emergency communication, including increase in communication personnel, third-party system support etc., in the event of a disaster?	Redundant	In case of a disaster, the city's emergency communications centers should be able to engage additional service lines or/and additional emergency communications personnel to respond to the increasing demand. Third-party emergency communications services (e.g. cellular carrier's SMS network) may also need additional resources to operate at an adequate level.

Access	Does the city know the level of telecommunications connectivity among its population (e.g. % of population with access to telephone, broadband etc.)? Does the city have programs to scale up affordable access to ICT services and applications - including for women, disabled citizens, and disadvantaged communities?	Reflective; Inclusive	Connectivity mapping allows for introduction of targeted programs for scaling up access to ICT services among specific populations, industries and/or areas of the city. Improved ICT connectivity has a positive impact on economic growth, competitiveness, poverty reduction and accountability. Scaling up of affordable ICT services among the poor helps them access essential public (e.g., health and education) and private (e.g., market information) services.
Demand	Does the city have a demand facilitation strategy for increasing use of ICT services and applications? Does the city have programs/strategies to support ICT innovation across the economy – with a focus on job creation?	Robust	Awareness of the benefits of ICT can help increase demand of such services and applications. ICT can be used to develop competitive industries, accelerate growth, and promote job creation, notably for women and youth. An enabling environment for ICT innovation can be created through policy enablers and ICT training.
System Continuity	What proportion of government ICT applications and infrastructure critical to government continuity is exposed to hazards? (Exclude the applications and data which are routinely backed up and processable at a remote site in case of emergency.)	Robust	Identifying ICT applications and infrastructure that can cause discontinuity in government operation allows for improvement or replacement of high risk services for services with high reliability.

System Continuity	What proportion of communication assets (e.g. telephone networks, etc.) and communication user accounts is exposed to hazards? To what degree of hazard intensity can the communication services in the city remain functional?	Robust	Knowing the level of exposure to communication assets and user accounts per hazard type and intensity allows the city to identify communication system requirements for sustained communication during disaster events. In case of prolonged events, it is useful to know the total capacity of communication assets and services that can continue to function, as well as the coverage that can be achieved with these.
System Continuity	Does the local government have strategies for reducing exposure to ICT networks and infrastructure during disasters?	Robust	Placement of telecommunication cables underground (where technically possible) and central telecommunication offices in hazard free areas are some ways in which the government can reduce exposure to city's ICT networks and infrastructure, and thereby ensure continuity of telecommunication services during disasters.
System Continuity	Are the city's cell towers equipped with back-up power options? To what extent is communication infrastructure in the city coupled with electric grid infrastructure?	Redundant	To minimize impacts of power outages on telecommunication services, city's cell towers should have back-up power (e.g., generators, solar-powered battery banks, etc.). Decoupling of communication infrastructure from electric grid infrastructure can help prevent cascading impacts from failure in the electric grid.
System Continuity	Are alternative modes of information management and public communication explored for emergency situations?	Redundant	In case of disruptions in regular communication systems, the city will need to deploy alternative communication channels to communicate time-critical information to residents.

	Preparedness: **Does the city have an emergency operations center (EOC) and/or an emergency communication system? [Lens 3 – CRF 9]**	**Robust**	**Emergency management and response can be significantly facilitated with an EOC and/or emergency communication system for central control of respondents.**