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Emerging technologies and innovation for enhanced operations in Arab public institutions

Summary

The United Nations Economic and Social Commission for Western Asia (ESCWA) has embarked on a project entitled "Expediting the use of technology and innovation for enhanced operations in Arab public institutions" (ENACT), which focuses on the strategic deployment of digital and emerging technologies and innovation to expedite the implementation of adopted strategies and plans in the public sector. The project is expected to support member States in enhancing the responsiveness, inclusiveness, trustworthiness and effectiveness of government operations and services.

This document discusses digital and emerging technologies and public sector innovation as vehicles supporting Arab public institutions in the creation, implementation and management of responsive, inclusive, trustworthy and effective services and operations. It presents models and policy and practical recommendations developed as part of the project. Where possible, it is illustrated by case studies collected from Arab countries. The Committee on Technology for Development is invited to discuss proposed models and recommendations and advise on the way forward for their implementation.

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Introduction

1.   Digital technology and innovation have brought about a shift in public institutions and their operations and services. They offer new ways for citizens to access services, new mechanisms to build streamlined operations and processes and new methodologies to cooperate with stakeholders to address needs and challenges in all aspects of government work.

2.   However, it is not enough to employ technologies and innovation to provide more options in services or to digitalize existing operations and processes. The benefit of using digital and emerging technologies and innovation lies in their potential to enhance the quality of governance and improve the well-being of society. Emerging technologies and innovation can help in developing effective services and systems that are based on citizens' needs, and which can enhance and qualify responses (improving responsiveness and effectiveness). These services and systems can be designed to meet the needs of all segments of society (improving inclusiveness) and be developed using the most available secure technologically innovative solutions (enhancing trustworthiness).

3.   Delivering responsive, inclusive, trustworthy and effective (RITE) services and operations should be at the core of the deployment and use of emerging technologies and innovation in Arab public institutions. The abbreviation RITE alludes to the rights of all citizens to enjoy optimal governance for the well-being of society, and their right to expect public institutions to make the right choices when developing, implementing and managing operations and services. Placing emphasis on the RITE principles in the services and operations of public institutions also supports the targets of SDG 16 and SDG 17, as well as several international mandates, including Leave No One Behind,[1] the Good Life Goals,[2] One Planet One Health,[3] and topics under the work of the United Nations Secretary-General's Envoy on Technology.[4]

4.   Optimally using emerging technologies and innovation to develop services and operations in accordance with the RITE principles could seem to be a daunting task. In 2023, the United Nations Economic and Social Commission for Western Asia (ESCWA) launched a project to aid Arab public institutions in achieving this goal. The "Expediting the use of technology and innovation for enhanced operations in Arab public institutions" (ENACT) project focuses on providing best practices, case studies and policy recommendations that can help public institutions to expedite the use of technology and innovation for enhanced services and operations.

5.   This document proposes models and policy and practical recommendations developed under the project. Wherever possible, it is illustrated by case studies from Arab countries. The Committee on Technology for Development is invited to discuss the proposed models and recommendations and provide advice on their potential implementation.

I. Emerging technologies in public institutions

6.   Public infrastructure and services are the foundation of society, supporting business development which is necessary for economic growth and providing energy, education, security, land use planning, justice and health to improve citizens' quality of life. Arab Governments are making efforts to improve public service delivery, internal operations and digital infrastructure by adopting and implementing different types of digital and emerging technologies, from strengthening connectivity to incorporating advanced emerging technologies such as artificial intelligence in operations and services. In many instances, the use of digital and emerging

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[1] United Nations Development Programme (UNDP), What does it mean to leave no one behind?, 2018.

[2] One Planet Network, Good Life Goals Manual, 2022.

[3] Food and Agriculture Organization of the United Nations (FAO), One Health, n.d.

[4] United Nations - Office of the Secretary-General's Envoy on Technology, Roadmap for Digital Cooperation, 2020.

technologies in the development of operations and services is still based on the needs of the public institution, including its processes, requirements and vision, rather than on those of citizens.

7.   The power of technology and innovation in public institutions is often underestimated. Applied responsibly, digital and emerging technologies can transform Arab public institutions by supporting the RITE principles, encouraging citizen participation and collaboration in development processes, and enhancing the speed and quality of service delivery.[5] Deploying digital and emerging technologies in service delivery can increase citizen satisfaction and improve the relationship between the institutions and the society they serve. An improved relationship has the potential to bring about better economic growth and to enhance general social well-being.

8.   Emerging technologies, like all technologies, must go through a maturation process. The fact that a technology is available does not imply that it is ready to be used. This is pertinent to public institutions, which have an institutional obligation to serve the public interest. They cannot exclude people who do not have access to an emerging technology because of availability, cost or interoperability, and they cannot use potentially malfunctioning or unsafe technologies with the potential to disrupt critical services.

9.   An analysis of good practices from the Arab region and other countries shows that the deployment of digital and emerging technologies such as cloud computing, artificial intelligence, blockchain technology and immersive technology facilitates and enhances public service access for citizens, especially vulnerable groups. Many Arab countries are taking effective steps to make their Governments more open, with dedicated digital transformation processes focused on realizing the RITE principles within public institutions and improving the relationship between those institutions and the societies they serve. Several countries, such as Jordan, Morocco, Oman, Qatar, Saudi Arabia, Tunisia and the United Arab Emirates, have had successes. Their achievements include reducing existing digital divides, promoting inclusiveness, improving the capacities needed to steer digital transformation, reducing unequal access to technology-based services, and coordinating government actions.

10.   Artificial intelligence continues to evolve steadily and has established itself as a driving force behind digital transformation. It is also driving other emerging technologies such as robotics, the Internet of Things and big data. Businesses around the world are using artificial intelligence to support the automation of their operations and workflows. The impact of artificial intelligence on jobs is expected to be significant. Identifying diseases, monitoring patients, detecting fraud, conducting audits, digitizing school textbooks and gauging emotions to potentially help students are just some of the applications artificial intelligence could be used for.[6] Many Arab countries have announced the adoption of national artificial intelligence policies; some have launched artificial intelligence initiatives. Nevertheless, much work remains to be done.

11.   Bahrain has implemented an artificial-intelligence-enabled initiative to automatically monitor and count date palm trees in the country. The project recognizes the importance of date palm trees to the country's cultural heritage and economic growth and supports food security in the achievement of SDG 2. The artificial intelligence allows trees in each governorate of Bahrain to be counted accurately. The information gathered has been extended to include botanical indicators, making it possible to obtain readings on health and environmental vulnerability, estimates on the production of dates, and other factors such as diseases that could affect the trees. The collected data can help in research on food security and inform investors of potential prospects.[7]

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[5] ST/ESA/PAD/SER.E/187.

[6] Thomas, M, The future of AI: how artificial intelligence will change the world, 2024.

[7] For more information, see https://www.nssa.gov.bh/about-257-thousand-palm-trees-in-bahrain-and-the-western-regions-are-on-top/.

12.   Cloud computing involves the delivery of computing services over the Internet. In 2023, Saudi Arabia launched the Cloud Special Economic Zone (Cloud SEZ),[8] an initiative that encompasses national and international providers of cloud computing services that can also build and operate data centres across the country. It is expected that the Zone will contribute to the country's gross domestic product (GDP) and increase foreign direct investment, while making the information technology sector more competitive and delivering both government and non-governmental services. It is envisioned that the Cloud SEZ will be an enabler for development, facilitating the growth of emerging technologies and sectors. The initial focus of the Zone is set to include the sectors of smart mobility, digital health care and industry.

13.   Attention should be paid to potential pitfalls in the use and deployment of digital and emerging technologies, especially when striving to uphold the RITE principles. In general, the digital transformation of public institutions – and consequently the deployment of digital and emerging technologies – requires a series of improvements at different levels. This includes providing enhanced digital connectivity through high-quality physical infrastructure and updating existing or issuing new policies, strategies and legislation focused on deploying trusted digital and emerging technologies to deliver public services.

14.   Some Arab countries continue to struggle with inadequate digital infrastructure and are unable to deploy digital and emerging technologies that will effectively and efficiently serve the whole of society. Digital public infrastructure is a critical enabler which government systems and operations rely on to deliver a variety of public services. Hard digital infrastructure consists of physical digital assets, structures and facilities needed for connectivity, including cables, sensors and data centres. Soft digital infrastructure consists of the elements that guide the delivery of digital services, foster innovation and create societal well-being, including policies, strategies, standards and software.

II. Innovation in the public sector

15.   Innovation is perceived as a positive term linked to the creation of new ways of achieving an outcome or doing a task with the ability to solve existing or new problems. To be meaningful, innovation must provide real-world improvements.

16.   Innovation in the public sector is not a completely new phenomenon. An analysis of 21 international reports published between 2020 and 2023 provides a comprehensive picture of global trends in public sector innovation. The reports identify 171 trends and practices and give 288 specific examples of innovative work by public institutions around the world. These examples illustrate how Governments are using innovation to advance e-government, development, and progress towards the SDGs.

17.   Public institutions manage massive volumes of assets and resources, oversee critical domains that safeguard the well-being of citizens, and serve all of society. These responsibilities make any issues with operations or services critical. They also give innovation scope to play a crucial role in responding to existing and new needs. ESCWA defines innovation in public institutions as "the realization and use of new practical methods that tangibly improve a public institution's processes, services, and products which address current and new needs of citizens, businesses, and other public institutions, using technology as an enabler".[9]

18.   Using innovation in improving government services and operations becomes meaningful when it helps to achieve public-facing (innovation for responsiveness and inclusiveness) and internal-facing (innovation for effectiveness and efficiency) objectives. In achieving these objectives, innovation has a positive impact on the whole of society. Society benefits from more responsive, inclusive services and operations, and the effective use of resources. Trust among public institutions and citizens increases as a consequence.

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[8] For more information, see https://www.cst.gov.sa/en/services/licensing/Pages/Cloud-Computing-Special-Economic-Zone.aspx.

[9] ESCWA, InnoCook: an innovation model to enhance the operations and services of Arab public institutions, 2024.

19.   In 2017, Ireland launched the Spark Innovation Programme, where the input and innovative ideas of young doctors were sought with the aim of enhancing the public health system. The existing system was bureaucratic and had a top-down approach where innovation was not encouraged. This had an impact on patient care, as well as on the retention of staff, especially younger doctors. The Spark programme introduced a significant shift away from a traditional system that blocked innovation towards a new one that empowers all doctors, especially junior ones, to voice and seek innovative ideas on practices, processes and new technologies that will improve the lives of patients as well as public health care services.[10]

20.   Innovation is a complex and intricate process, with no singular guaranteed path to success. Its complexity is heightened by the variety of innovation processes and theoretical approaches that can be employed. These elements combined can make innovation seem daunting for public institutions, especially if there is a pre-existing belief that innovation is only possible through technology.

21.   To help public institutions address the complexity of innovation and guide them through innovation processes to create and manage novel approaches, innovation actors need a model. InnoCook, developed by ESCWA, is an adaptable innovation process model that offers guidance and an overall structure for processes while promoting creativity in implementation, making it workable in most environments.

22.   The innovation model is described using a cooking metaphor, as cooking, just like innovation, is a creative human endeavour with uncertain outcomes. The model guides innovation actors in planning, implementing and managing innovation using the metaphor of a full meal with three stages – starter, main course and dessert – each with its own activities. It has a total of 27 elements ("ingredients") and 253 different nuances of these elements ("flavours") that are used to conceptualize, communicate, manage and evaluate an innovation effort.

23.   InnoCook offers an entirely fresh approach to innovation, from conception through to implementation and from management to evaluation. It is not a step-by-step guide, but endeavours to provide as many options as possible with limited structure so that Arab public institutions can select a preferred innovation path based on their own contexts and priorities. The adaptability of the model increases the potential of innovation efforts to deliver responsive, inclusive, trustworthy and effective services and operations that are based on the needs of both public institutions and citizens.

24.   When innovation is pursued by public institutions, it is recommended that technology should be used in an innovative, rather than routine, way. Innovation should be made part of day-to-day work, rather than being considered an exceptional activity, and it should be approached in a spirit of co-creation rather than standalone work.

III. Delivering RITE services and operations relying on the power of digital and emerging technologies

A. Responsiveness

25.   Responsiveness refers to the ability of public institutions to address the interests and needs of the public they serve within a reasonable timeframe.[11] It also refers to the ability of public institutions to adjust and adapt services and policies to meet changing societal needs. Arab public institutions should therefore provide public operations and services that meet public requests, concerns, inquiries and complaints. This includes the

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[10] For more information, see https://oecd-opsi.org/innovations/the-spark-innovation-programe/.

[11] Economic and Social Commission for Asia and the Pacific (ESCAP), What is good governance?, 2009.

development of policies, systems, structures and practices that support and promote the participation and involvement of citizens.[12]

26. Emerging technologies, such as artificial intelligence, blockchain and immersive technologies, have the power to boost the responsiveness of Arab public institutions to the needs of the societies they serve. If applied responsibly, these technologies can speed up response times, increase institutions' abilities to conduct tasks in real time, and ultimately improve public satisfaction with public institutions.

27. Some Arab government web portals have begun to use generative artificial intelligence to transform citizen-government communication by providing artificial intelligence-powered chatbots capable of having human-like conversations. In the United Arab Emirates, U-Ask is part of the Government's unified service delivery channel. The platform responds to citizens' queries on public services and facilitates access to them. It uses machine learning and natural language processing algorithms to accurately understand and respond to enquiries. User feedback has been used to fill gaps in content. It has been reported that U-Ask has led to a surge in public engagement and improvements in response times, while its user-centric approach, personalized assistance and streamlined services have led to public satisfaction levels reaching 89 per cent.[13]

28. To improve the capabilities of emergency medical personnel to respond to emergency events, the emergency medical service in Austin, United States of America, updated the way in which it trains staff to use its ambulance bus. Previously, the training took the form of a slide presentation and a walk-through of the vehicle. This training process was updated to include augmented and virtual reality technologies. These technologies allow training participants to experience various scenarios virtually, and to gain experience of stress factors which the previous training model could not possibly have delivered. These improvements have helped responders to prepare better for a variety of situations, such as mass-casualty events. Using these technologies has reduced the cost of training. It also offers the opportunity to easily repeat trainings without additional cost.[14]

B. Inclusiveness

29. Inclusive public institutions provide equal rights and entitlements and enable equal opportunities and access to all services and resources by all people.[15] All members of society should therefore have access to services and solutions on their own terms, regardless of gender, age, ability and ethnicity.

30. Artificial intelligence technologies can be used to identify citizens' needs, so that services and solutions can be designed and deployed in a way that allows them to be accessed inclusively. This requires Arab Governments to improve existing digital infrastructure and to enhance the digital skills people need to access technology-based public services.

31. In Oman, various government institutions worked together to develop Ra'id, an artificial-intelligence-supported chatbot that provides access to public services. Special attention is paid to older citizens who may have difficulty in accessing and using mobile applications and websites. Ra'id provides a virtual persona that interacts with citizens, answering their questions and providing them with services. It can also receive documents for uploading into government systems. The chatbot provides users with a service channel that is easy to use, requiring no additional applications.[16]

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[12] United Nations, 2015 World Public Sector Report on Responsive and Accountable Public Governance, New York, 2015.

[13] For more information on U-Ask, see https://opengov.unescwa.org/index.php/case-studies/united-arab-emirates/u-ae-next-generation.

[14] For more information, see https://www.govtech.com/health/transforming-training-austin-uses-vr-for-ems-responders.

[15] United Nations, Global Sustainable Development Report, New York, 2016.

[16] For more information on Ra'id, see https://opengov.unescwa.org/index.php/node/1239.

32.   In Qatar, the Mada FabLab digital fabrication laboratory was launched by the Qatar Assistive Technology Centre (Mada) in 2020. The laboratory was designed to be inclusive for all, creating a space where people with disabilities can innovate and transform ideas into inventions while sharing their knowledge and their experiences. Members actively work to find solutions that will have a positive impact on the lives of people with disabilities. Since 2022, the laboratory has been holding training sessions on the technologies it provides access to, such as 3D printing.[17]

C. Trustworthiness

33.   Trust is crucial for successful governance and cooperation between Governments and citizens. It also serves as a catalyst for effectiveness, because if citizens trust public institutions, they are more likely to cooperate, making governance smoother. Therefore, trustworthiness is the belief by citizens that public institutions will act in their best interest and discharge their responsibilities and obligations with integrity, transparency and accountability, paying due regard to security and privacy.

34.   Technology can strengthen trust relations within society and between citizens and the Government. Public institutions have increasingly started using technology solutions to deliver services. Artificial-intelligence-based cybersecurity systems, for example, are now often deployed to protect and safeguard citizens' data. Trust can also be increased by the use of blockchain technologies, which allow data to be protected, providing secure services to citizens and reducing fraud, abuse and waste.

35.   In 2018, the Ministry of Education of Tunisia, the World Food Programme and a technology start-up entered into a partnership to develop a blockchain-based supply chain monitor for the country's national school meals programme. The initial objective was to track the delivery of lunch boxes to 1,500 children. The scale of the project was subsequently expanded to cover 400,000 children in 6,000 schools. Blockchain technologies can increase the efficiency of and trust in the meals programme among citizens.[18]

36.   Malee is a digital educational game developed in Saudi Arabia to measure and expand the financial knowledge of children between the ages of 8 and 12. The game simulates real-life situations and focuses on the importance of savings, setting priorities based on needs and wants, planning purchases, and understanding the impact of financial decisions. The game makes use of cloud computing, cybersecurity technologies, artificial intelligence and big data. The experiences of the children and their level of knowledge, behaviour and skills related to financial literacy are measured; the collected data and information can be used to inform decisions.[19] The game provides a safe environment for children to learn and explore.

D. Effectiveness

37.   An effective public institution is one that achieves its intended objectives and outcomes efficiently and in a manner that serves the public interest. To achieve and increase effectiveness, public institutions must set clear, realistic, time-bound goals. They must also evaluate progress made towards reaching those goals consistently throughout their implementation. The meaning of effectiveness in public institutions can vary between institutions with different missions, functions and objectives. The term is often associated with the efficient use of public resources and with the attainment of desired outcomes for the benefit of society.

38.   Effective public institutions should be adaptable and innovative in addressing emerging issues. To this end, they should embrace new technologies to improve their services and operations. A culture of continuous

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[17] For more information, see https://www.gulf-times.com/story/672113/mada-launches-worlds-first-inclusive-fablab and https://ibtechar.com/cases/mada/.

[18] Rasheed, A, Devery & United Nations World Food Programme use Blockchain to ensure the safe delivery of food to children in North Africa, 2018.

[19] For more information on Malee, see https://opengov.unescwa.org/index.php/node/1252.

learning is necessary to ensure that public services and operations can adapt, remaining effective and relevant, as the needs of citizens change.

39. Emerging technologies can make a significant contribution to effectiveness and decision-making in public institutions. Artificial intelligence and machine learning can quickly process vast amounts of data needed to make decisions. Collecting and analysing big data can be used to identify trends in health care, for example, or to assess citizens' potential reactions to new policies or strategies. Predictive models can help with planning, traffic and crime management. Blockchain can help to secure data, ensuring that it cannot be tampered with.

40. Mequaes is an assessment system for digital government services in Tunisia. The system assesses services based on a set of indicators and a user feedback survey. The outcome of the assessment is published on the system's website; it gives information about the status and quality of services, identifies what is lacking, and indicates the level of usability. The collected data can be used to improve public engagement methods, and thus the effectiveness of digital services.[20]

41. In Oman, the national water company has developed smart water meters using artificial intelligence technology. The meters instantly collect and update readings, detect sudden malfunctions and consumption problems and send e-bills and e-notifications to users. Using artificial intelligence technologies has effectively increased the management of water services in Oman.[21]

42. To enhance effectiveness and decision-making using digital and emerging technologies and innovation, it is important to develop a digital transformation strategy, foster a culture of innovation, improve data governance and management, encourage cross-institution collaboration, invest in digital infrastructure, address ethical and legal concerns related to emerging technologies, and monitor and evaluate the effectiveness of emerging technologies and innovation initiatives.

IV. Recommendations to Arab countries

43. Finding a path for the optimal deployment and use of emerging technologies can seem daunting in a world of fast-paced technological development. To aid public institutions in deploying digital and emerging technologies and innovation for responsive, inclusive, trustworthy and effective services and operations, ESCWA has formulated several policy recommendations. These include regional recommendations, applicable to all Arab countries, and recommendations tailored to specific groups of countries.

44. Regional recommendations:

(a) Prioritize citizen-centric approaches in the deployment and use of digital and emerging technologies. This places citizens at the centre of decision-making processes and ensures that any services and operations are user-centric, responsive, inclusive and efficient. Such an approach ensures that citizens' needs are met, and also enhances trust;

(b) Improve the capacity of Arab public sector bodies to implement digital public infrastructure. Arab decision makers and service designers need to understand the important role that digital public infrastructure can play in achieving sustainable development outcomes. They also need a solid understanding of policies, strategies, rules and regulations associated with it. Digital public infrastructure should be considered a key tool in the delivery of public services, and an important component of digital transformation. Each Arab country needs to ensure that its digital public infrastructure meets the specific needs of its society, allowing its public institutions to deliver services to all people in an equitable, inclusive and safe manner;

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[20] For more information on Mequaes, see https://opengov.unescwa.org/index.php/node/1236.

[21] For more information, see https://oman.om/en/emerging-technologies/water-sector.

(c) Develop indices and indicators to measure the status of each of the RITE principles in Arab public institutions, depending on each individual country's context;

(d) Issue and adopt regional legislation governing artificial intelligence. This legislation should cover all issues and aspects related to the development and use of artificial intelligence systems by the public sector, including rules related to the governance, ethics and safety of artificial intelligence systems. The legislation should cover the providers of artificial intelligence systems, as well as the public sector bodies that deploy them;

(e) Foster innovation in Arab public institutions. Decision makers in Arab public institutions should acknowledge the importance of innovation in their institutions to enhance their operations and processes and to deliver public services more efficiently. To foster and sustain a culture of innovation, innovation processes should be guided by innovation policies and regulation.

45.   All countries in the region are at different stages in the deployment and use of technologies and innovation. The countries can be divided into four groups based on their scores in the 2022 e-Government Development Index.[22] Specific recommendations have been formulated for each group:

(a) Category one countries are those with a score over 0.7. This group includes the United Arab Emirates, Saudi Arabia, Oman, Bahrain, Kuwait and Qatar. The recommendations for this category are focused on enhancing and boosting the use of digital and emerging technologies and innovation in public institutions;

    (i) Establish mechanisms for the ongoing monitoring and evaluation of the effectiveness and impact of digital and emerging technologies and innovation initiatives. Outcomes and the implementation of adjustments should be regularly assessed to ensure continuous improvement.

    (ii) Establish public sector innovation platforms to help create a comprehensive governance structure for Arab public institutions. Such a platform would offer Arab public institutions the opportunity to collaborate with the wider society, engaging citizens in social innovation projects and providing an avenue for proposing new ideas and services. This would result in increased transparency and trustworthiness in public services and an improved relationship between public institutions and the public.

(b) Category two countries are those with a score between 0.5 and 0.69. This group includes Tunisia, Jordan, Morocco, Egypt, Algeria and Lebanon. The State of Palestine also falls into category two on the basis of its score in the 2022 Government Electronic and Mobile Services Maturity Index.[23] The recommendations for this category are focused on improving digital and emerging technologies and innovation policies, including the digital sphere of their public institutions;

    (i) Integrate emerging technologies into Arab Governments' policies, strategies and decisions. Such integration can further help shape government agendas focused on reforming and modernizing public sector institutions.

    (ii) Promote inclusive access to Arab public operations and services, especially for marginalized and vulnerable groups. This includes promoting the efforts needed to understand and close digital divides, such as the gender digital divide, the rural/urban digital divide and the digital divide related to persons with disabilities, ensuring that public services are available and accessible to citizens across areas, devices and economic wherewithal.

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[22] United Nations Department of Economic and Social Affairs, E-Government Survey 2022- The Future of Digital Government, 2022.

[23] E/ESCWA/CL4.SIT/2022/TP.4.

(c)   Category three countries are those with a score between 0.3 and 0.49. This group includes Iraq, the Syrian Arab Republic, Libya and Mauritania. Category four countries are those with a score below 0.29. This group includes the Sudan, Yemen, Djibouti, the Comoros and Somalia. The recommendations for these two categories are identical; they are focused on improving the digital infrastructure which public institutions will use as a basis for developing and deploying operations and services;

(i)   Foster investment in hard digital infrastructure, including in rural and remote areas, to facilitate the delivery of public services. This could be achieved through a combination of public policies and public-private partnerships. Such an investment should result in closing the digital and technological gap and protecting vulnerable groups, leaving no one behind. Collaborations among countries to bridge this gap should also be considered.

(ii)   Stimulate digital acceptance by promoting the use of digital technologies to develop and deliver quality services to citizens. This includes holistic digital public policies and strategies, redefining existing traditional regulatory frameworks and measuring the digital impact on quality of life. Women, persons with disabilities, older persons and citizens living in remote areas should receive particular consideration.

V. Conclusions and the way forward

46.   The adoption of digital and emerging technologies and innovation has transformed the way in which public institutions deliver services. Although these technologies present certain challenges, embracing them responsibly would lead to responsive, inclusive, trustworthy and effective service delivery, and ultimately better governance and the more effective achievement of global mandates.

47.   Based on the outcome of research products and events organized as part of the ENACT project, several themes and activities are being considered to further support Arab countries in deploying digital and emerging technologies and innovation based on the RITE principles. These include:

(a)   Take stock of the current status of digital public infrastructure in the Arab region. The development of digital public infrastructure varies significantly across the region because of differences in political, economic and technological contexts;

(b)   Develop and disseminate tools aimed at fostering innovation in the public sector. These tools include online training courses, as well as an innovation toolkit;

(c)   Explore options for measuring the deployment and impact of the RITE principles. Very few mechanisms currently exist; many of them are insufficient. The outcome of such measurement has the potential to enhance decision-making on service delivery and policy formulation;

(d)   Conduct regional and national capacity-building workshops to foster the deployment of emerging technologies and innovation in Arab public institutions, based on the outcomes of the ENACT project;

(e)   Support Arab countries in developing customized plans of action for integrating emerging technologies and innovation into their public institutions, based on the outcomes of the ENACT project.