

**INTERSESSIONAL PANEL OF THE UNITED NATIONS COMMISSION  
ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD)**

**Geneva, Switzerland  
25-26 October 2022**

Contribution by Oman

to the CSTD 2022-2023 priority themes on “Technology and innovation for cleaner and more productive and competitive production” and “Ensuring safe water and sanitation for all: a solution by science, technology and innovation”

**DISCLAIMER:** The views presented here are the contributors’ and do not necessarily reflect the views and position of the United Nations or the United Nations Conference on Trade and Development

## **VIEWS ON THEME 1: TECHNOLOGY AND INNOVATION FOR CLEANER AND MORE PRODUCTIVE AND COMPETITIVE PRODUCTION**

Oman has initial initiatives on technologies and investments approved by various entities to support innovation and keep leaping with the developments of the fourth industrial revolution. These initiatives are executed by providing effective applications that contribute to the finding of innovative solutions to enhance performance and increase efficiency in the fields of Artificial Intelligence, Blockchain, Internet of Things (IoT), Cloud Computing, Virtual Reality Applications, and other procedures that are considered a paradigm shift in supporting the advancement of entities performance. Oman now is ready to move into its next stage of smarter development that thriving culture of innovation that support rapid advances across society, the economy, and the environment.

Oman laws and legislations have given significant importance too to managing innovation and technological approaches. By the way of this, the National Center for Statistics and Information has recently issued the National Data Strategy (Decision No. 103 / 2022), aiming at enhancing the economic, social, cultural, and developmental benefits of data. As such, the strategy shall raise the level of data reliability, quality, and comprehensiveness. It enables the government to take balanced decisions, and contribute to creating a stimulating environment for smart solutions and smart cities. Further to that, fosters the exchange of data and setting up an appropriate mechanism for it to raise the productivity of the administrative apparatus units and other public legal persons, and government companies, and the efficiency of services related to utilities and basic services related to citizens, residents, and businessmen. It will also be making open data available to build a conscious knowledge society and support the digital economy approach and ensure the protection of confidentiality of the information and personal data. Moreover, from the perception of the artificial intelligence side, the royal decree 6/2022 promulgating the personal data protection law has been issued, lately.

Oman's National Innovation strategy aims to transform the national economy to be led by innovation rather than highly dependent on oil and gas by sponsoring an effective national innovation eco-system that meets the aspired socio-economic sustainable development that is aligned with global standards. And by enabling the environment via establishing readiness of digital services, facilitating research and development expenditure, ensuring government effectiveness and innovation leadership, and having coherent policies, enabling pillars through the need for an effective intellectual property system, putting in place adequate infrastructure and logistics. As such, encouraging innovation linkages and collaboration, innovation drivers which consist of entrepreneurial education, R&D and innovation capacity building, qualified workforce, knowledge transfer, leading private sector, and direct foreign investment, strategic pillars that contain human capital and economic diversification, while human capital is the key to economic diversification.

Taking the Sultan Qaboos University as an example for the Oman entities outlining cleaner, more productive, and competitive products on technology and innovation, the Internet of Things Laboratory at the university performs as a platform for developing different IoT applications in smart cities and finding smart solutions based on ICT and latest digital technologies. As such, the lab is aiming to transform the campus into a smart one and enhance the application of IoT technology in Oman.

The University has adopted artificial intelligence technologies in a number of medical projects, such as the use of artificial neural networks to diagnose obstructive sleep apnea, congestive heart failure, and

preeclampsia, an investigation of heart rate on the variability of patients in non-surgical ways, and a mobile healthcare system to monitor and diagnose a remote patient with sleep disorders through a wireless body area sensor network that provides all the necessary biomedical signals.

Moreover, a laser lab of high-efficiency solar cells was installed at the university to enable studying high-speed chemical and physical reactions occurring in one billionth of a second to help study the chemical and physical properties of new materials used in constructing modified semiconductors in solar cells.

Similarly, the Communication & Information Research Centre at the university has implemented many projects related to the fourth industrial revolution, such as a remote healthcare system for monitoring and diagnosis, smart urban water management, smart street, a vision-based navigation system using the robot application of deep learning techniques in the National Museum of Oman, neural networks for medical diagnosis depending on artificial intelligence technology, and Internet of Things in security and privacy aspects related to architecture and communication.

On the other hand, the million date palm plantation project is one of the important applications of the development and use of smart irrigation systems to achieve nutritional, economic, social, and environmental benefits. The farms of the project depend on the use of new technology to manage water resources, mitigate depletion and increase the date production process. They also depend on drones for pollination and early detection of diseases that may affect palm trees.

The use of drones has been one of the very effective leaps in utilizing technology to facilitate better performance. In agriculture, and steered by engineers and farmers, drones are used to farm high-quality crops in a shorter period with high rates of success. A group of Omani researchers came up with a new method to pollinate palm trees by mixing pollen with water and then spraying it on palm pollen using drones. In comparison with the traditional methods of sprouting, a single worker can only sprout six palm trees per hour; instead, drones can pollinate about a thousand palm trees per hour with higher quality. Drones are also used in monitoring agricultural operations, growing the best and most productive crops, and collecting data to monitor the vegetation index of crops and protect the crops from any potential hazard that might affect their growth.

From the banking and retail perspective, the national ePayment Gateway is an operational component of the eGovernment infrastructure as it ensures a secure online payment process. It allows online payment for shopping and services for the public as it accepts all types of debit and credit cards. The easy and secure payment process helps to increase the number of customers, save administrative costs and reduce queueing at the physical counters. Currently, the ePayment Gateway provides new services including the payment of traffic fines, internet, and landline telephone bills, mobile bills, and electricity bills. As such, currently, blockchain technology has been used in the fields of diagnosing finance, banking, e-commerce, and import and export. As a result, Blockchain Solutions & Services and Oman Blockchain Club were established, following in the footsteps of some countries in creating special centers to manage the trade processes based on blockchain technology and seeking a rapid adoption of this technology for its great economic returns.

Furthermore, Oman Oil Company has launched the first service station energized by solar power. Similarly, Petroleum Development Oman (PDO) is exploiting emerging digital technologies and agile ways of working

in innovative and transformative ways as part of its newly created digitalization function. Examples of the business problems currently being solved with these exciting technologies include automating workflows that were once impossible to be automated using Robotic Process Automation, bringing experts closer to problems in the field using Industrial Mobility solutions, predicting when equipment will fail before traditional methods using Artificial Intelligence, remote & automated inspection of far-off equipment and pipelines using Drones and Artificial Intelligence.

The Institute of Advanced Technology Integration (IATI), under the Ministry of Higher Education, Research & Innovation establishes a culture of innovation and entrepreneurship in the fields of research and science and functions as an intermediary between the industry and business sector and the academic sector in Oman to develop scientific researches into innovative technologies and marketable products as well as to create a stimulating environment to conduct researches that will help the Sultanate meet market demands and tackle current challenges in water, renewable energy and oil and gas sectors. Likewise, Innovation Park Muscat is another initiative under the Ministry that aims at encouraging scientific research, innovation, and collaboration between various sectors. It provides an access to various facilities and services to create an environment that motivates innovators and entrepreneurs and companies to develop amazing ideas in the sectors of energy, food and biotechnology, health, water, and environment sectors.

## **VIEWS ON THEME 2: ENSURING SAFE WATER AND SANITATION FOR ALL: A SOLUTION THROUGH SCIENCE, TECHNOLOGY AND INNOVATION**

As part of adapting the best practices of ensuring the sustainability of resources in Oman, the Leaks Diction System was created in 2020 by Oman National Energy Centre to reduce the amount of waste in water resources to a minimum. In cooperation with Oman Water & Wastewater Services Company to National Energy Centre developer and implemented dedicated for Oman Water & Wastewater Services Company water network systematic flow of processes that use data to detect any leakage, linked to the actual use points of water networks and reported through the Oman Water & Wastewater Services Company (Meter Data Management System).

The project showed a significant reduction of 15% in water waste at the first phase of implementation and it is improved with the immediate enhancements that Oman Water & Wastewater Services Company made based on the alarms raised by the system. The implementation of this project was through national capabilities and with consideration of the variant topography and climate of the country.

Besides, Oman Water & Wastewater Services Company applies the measurement through smart meters, which request no human intervention, to collect the data on water usage all over the Sultanate to support the use of data in new smart solutions.

One of the national initiatives as part of the research and innovation award is the strategic program for water research, which aims at supporting the projects that seek to secure reusable water sources to be used for irrigation and develop new methods of water treatment that do not involve the use of chemicals harmful to the environment. Its ultimate goal is to increase agriculture productivity, expand green spaces, and reduce water loss to more than 50%. In its second round, the program awarded several projects such as Biological Treatment, Smart Irrigation, Smart Tank, and Grey Water Filtration.