UAE Digital Development Review Report – 2019

Towards Empowering People and Ensuring Inclusiveness

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I. Cluster One: National, Regional and International Strategic Frameworks

A. National digital strategies (The role of the government and all stakeholders (C1))

Overarching National Digital Strategy exists (like Digital Nation, Smart Nation, Digital Economy…etc.)	*Yes*
Name of the Strategy	UAE Vision 2021[1]
Year of adoption and latest update	*2014 and updated 2018*
Government agency in charge	*Name in English: Prime Minister Office* *Name in Arabic: مكتب مجلس رئاسة الوزراء*
Pace of implementation	*Excellent*
Description of progress made (about 150 words)	Vision 2021 is a long-term plan that aims to make the UAE one of the best countries in the world by the year 2021 when the UAE would celebrate the Golden Jubilee of its formation as a federation. H. H. Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai launched 'Vision 2021' in 2010, during a Cabinet meeting. The achievement of Vision 2021 is based on four pillars. They are: 1. United in responsibility: An ambitious and confident nation grounded in its heritage 2. United in destiny: A strong union bonded by a common destiny 3. United in knowledge: A Competitive Economy Driven by Knowledgeable and Innovative Emiratis 4. United in prosperity: A nurturing and sustainable environment for quality living In 2014, Sheikh Mohammed launched a seven-year National Agenda leading to Vision 2021. The National Agenda identifies six national priorities as the key focus of government strategy in the coming years.
Sectoral (ICT): ICT Sector strategy / plan exists	*Yes*
Name of the strategy / plan	ICT 2021 Sector Strategy / UAE Smart Government National Plan[2]
Year of adoption and latest update	*2014 and updated 2018*
Government agency in charge	*Name in English: Telecommunication Regulatory Authority*

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[1] https://www.vision2021.ae/en

[2] file:///C:/Users/hanya/Downloads/UAE%20TRA%20mGov%20Strategy%20en%20(5)%20(1).pdf

	Name in Arabic: الهيئة العامة لتنظيم قطاع الاتصالات
Pace of implementation	*Excellent*
Description of progress made (about 150 words)	The National Plan for UAE Smart Government Goals was initiated in 2014 in alignment with the national direction embodied in UAE Vision 2021, the UAE National Agenda, and the Information and Communications Technology (ICT) Sector Strategy,
Other Sectors: Digital Transformation strategy / plan exists (Digital Learning / Digital Health…etc. *(Repeat this section – 5 rows – as required)*	
Name of the strategy /Plan	UAE Centennial 2071[3] UAE Strategy for Artificial Intelligence
Year of adoption and latest update	*2017*
Government agency in charge	*Name in English:* UAE AI Council *Name in Arabic:* مجلس الإمارات للذكاء الاصطناعي
Pace of implementation	*Excellent*
Description of progress made (about 150 words)	The UAE has focused on engraving artificial intelligence through its main pillars being humans, security, experience, productivity, frontiers and foundation towards 'UAE Centennial 2071' to ultimately mark the UAE as the world's center of artificial intelligence. Accordingly, to accomplish such stamp, the UAE in 2017 launched the UAE Artificial Intelligence Strategy that embeds new AI technologies into exceling its socio-economic practices while assigned a minister of state to enhance the government performance by investing the latest technologies and tools of artificial intelligence and applying them in various sectors. The strategy will cover the following sectors: transport, health, space, renewable energy, water, technology, education, environment, traffic.

B. National Engagement in International and Regional Cooperation Initiatives (C11)

1. WSIS Follow-up

UAE, represented by the Telecommunications Regulatory Authority (TRA), has taken various steps towards supporting the outcome reports of the WSIS forums. This aimed to improving and enhancing the use of ICT in accelerating economic growth, social inclusion and environmental sustainability. UAE Leadership launched the 'UAE Centennial 2071', a long-term government plan aimed at setting the future generations up for success and prosperity in the five decades ahead, depending on non-oil resources. The aim is to ensure that government revenue is diversified by relying less on oil and focusing more on digital knowledge-based economy and advanced ICT.

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[3] https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/federal-governments-strategies-and-plans/uae-centennial-2071

The UAE has been a trendsetter for the WSIS since 2010 wherein it has been active in fulfilling the objectives of the action lines set by the WSIS. The UAE will continue its steps along with the WSIS through the planned years of 2018 up to the 2030 Agenda in which it advocates the transformation approach of development thus by recognizing the United Nation's Millennium Development Goals into Sustainable Development Goals that sets for the UAE a framework in shaping its national development strategies.

Throughout the past half-decade, TRA has partnered as both a visionary and a strategic partner in several WSIS forums.

The UAE Space Agency has won a 2019 WSIS Prize for its global efforts in partnership and sustainable development. he United Arab Emirates has been an ardent supporter in the field of International Space collaboration and Regional among the Gulf Cooperation Council (GCC) and Arab countries. These International & Regional collaboration initiatives have helped UAE to gain international recognition in the last decade in the space arena. These collaborations go beyond the steering of policy matters and chairing conferences and meetings, the UAE has had the honor of developing high national building capacity space programs by the successful partnership with potential and leading Administrations in the space sector. Furthermore, UAE has assisted the international space capacity building efforts of International Specialized Space Organization like United Nation Office of space Affairs, the UAE in a very short space of time has successfully partnered and build strong ties with more than 25 potential Global Members and International and Regional Organizations to find and set up regional capacity building initiatives in the Region[4].

Overall, the UAE WSIS success stories are published annually at the forum through digital and printed report identifying the major projects in addition to assess the impact on the SDG's and WSIS action lines.

UAE and the 2030 Sustainable Development Agenda

The United Arab Emirates has long been at the forefront of sustainable development. It is a concept that has been at the heart of the UAE's development agenda for many years and is a theme that runs through Vision 2021 for the Federal Government and the development plans of the local Emirates. This foresight enabled the country to be an advocate for and an active participant in the formulation of the 2030 Agenda for Sustainable Development and an early adopter of the Sustainable Development Goals that the global community ratified at the United Nations in September 2015.

In 2015, the UAE government merged its national statistics office and its council on competitiveness to create the Federal Competitiveness and Statistics Authority (FCSA) so that it could serve as a focal point for the implementation of SDGs. The FCSC endeavors to establish a robust governance framework for the collection and reporting of data and to use its experience in advising on competitiveness using data-driven approaches to guide policy for sustainable development in the UAE. The FCSA ensures that the UAE remains an active participant in the global statistical community and that data and evidence-based policy is given due attention both in the domestic policy discourse and in global discussions.

At the World Government Summit in Dubai, for two consecutive years, the UAE in partnership with the UN has organized "SDGs in Action", a unique global platform for discussions focused on implementation of SDGs. Furthermore, to highlight the importance of data and evidence-based policy in accomplishing the SDGs, and as a demonstration of this commitment, the FCSA has collaborated with the UN to host the UN World Data Forum in Dubai in 2018. The forum was a premier global event in consolidating cooperation and promoting awareness on data-issues affecting sustainable development.

On the National level, in January 2017, the UAE's National Committee on SDGs was formed by decree of the UAE Cabinet. Her Excellency Reem Bint Ebrahim al Hashimy, Minister of State for International Cooperation and Chairwoman FCSA, chairs the National Committee. FCSA, the Ministry of Cabinet Affairs and The Future, the Ministry of Foreign Affairs and International Cooperation and 12 other Federal-level government organizations are members of this committee that advises the national implementation plan for SDGs.

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[4] https://www.itu.int/net4/wsis/stocktaking/Prizes/2019/Champions?jts=B4JXX8&page=18#start

There is backend tool available for the National Committee for the SDG's including all the entities responsible for each goal and target in order for each entity to submit results based on the agreed upon frequency to be approved by a preconfigured workflow that is approved by the national committee.

Those numbers and statistics are available on the UAE SDG's portal[5] for the public.

2. *Other related Frameworks (other than WSIS)*

The UAE has been an ardent supporter of the regional collaboration among the GCC and Arab countries. These regional collaboration initiatives have helped the UAE to chair a number of regional groups and committees tasked with preparation towards major ITU Conferences such as WRC, WTSA, WTDC and PP. Moreover, the regional collaboration is beyond the steering of policy matters and chairing the conference preparatory meetings however, the UAE has had the honor of assisting the regional countries including Somalia, Palestine, Yemen and Sudan on matters related to spectrum monitoring, broadcasting regulations, international policy issues etc.

In May 2015, the TRA hosted the ITU Forum on Smart Sustainable Cities in Abu Dhabi, that was attended by ITU study groups and experts within the field of smart and sustainable cities. The two-day forum conclusively discussed a range of issues and topics divided into key focus areas and sessions, including the national experience in developing Smart Sustainable Cities, the use of ICT in transforming into Smart and Sustainable Cities, the infrastructure and key performance indicators of Smart and Sustainable Cities, and the different roles of private sector and stakeholders in this field. The forum was hosted as result of the UAE adoption of sustainable development strategies in the region wherein it launched the UAE Green Growth strategy making the UAE one of the leading countries in the field of green economy. The forum has also approved the roadmap of the Smart Sustainable Cities transformation in the Arab region based on the ITU guidelines and witnessed the signing of an agreement with ITU-TSB for lunching a pilot project towards positioning Dubai as first city in the world to apply smart city standards.

Moreover, ICT Discovery Museum was built at the ITU Headquarters in Geneva with a 2 Million USD support from the UAE. The UAE Administration has not only been a sponsor but also has contributed to the design, theme and buildup of the Museum. This museum is a testament of global public-private partnership for sharing knowledge, expertise, international capacity building and sharing technological progress by giving insight into the future of ICT and reflecting on the proud road to the ICT development over the number of years.

II. Cluster Two: Infrastructure, Governance and Legal Environment Policy Areas

A. ICT Infrastructure (C2)

Infrastructure is central in achieving the goal of digital inclusion, enabling universal, sustainable, ubiquitous and affordable access to ICTs by all. It considers relevant services already in place in developing countries and in countries with economies in transition, to provide sustainable connectivity and access to remote and marginalized areas at national and regional levels.

1. *Market structure and regulatory landscape*

There are two licensees in the UAE, DU and Etisalat, that provides and operates mobile and internet services.

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[5] https://uaesdgs.ae/en

The existing network provides 100 % coverage for mobile services and 93% fibre coverage for landline internet services and connects 97% of households with Internet services

The provision/operation and sale of telecommunications services in the UAE requires an individual Telecommunications Licence. The TRA has as of today 2018 issued 10 licenses, hereof 2 GSM and fixed line services (mobile & internet), while the remaining 8 are for satellite, GMPCS, uplink transmission and tetra.

Telecom Service	Status of regulatory landscape	List all awarded telecom licenses
Mobile services	*Competitive*	2 (in addition to 1 satellite operator offering GMPC services)
Internet services	*Competitive*	2 (in addition to 2 satellite operators offering Internet services)

2. *ICT Infrastructure by Service Type*

Mobile phone services, internet services including fixed and mobile broadband, FTTH, Next Gen Wireless are all available in the UAE and provided by the 2 licensed operators DU and Etisalat.

The in-service ISPs in the UAE are:

- Etisalat Telecommunications Company, PJSC
- Emirates Integrated Telecommunications Company, PJSC.

Indicator	Value	Latest Year
Mobile phone penetration	210.9%	2017
Percentage of households with Internet access	96.94%	2017
International Internet bandwidth (bit/s) per Internet user	303,161 bits/s	2017
Percentage of the population covered by mobile networks		
- At least 3G	100%	2017
- At least LTE/WiMAX	99.64%	2017
Fixed-broadband subscriptions by speed tiers as a % of total fixed-broadband subscriptions		
- 256 Kbit/s to 2 Mbit/s	*142,765 (5%)*	2017
- 2 to 10 Mbit/s	*226,939 (8%)*	2017
- 10 Mbit/s or more	*2,392,126 (87%)*	2017

3. *ICT connectivity*

USO policy was issued in 2017 ensuring 10Mbit/s services to remote areas. TRA recognizes the importance of ensuring that consumers throughout the UAE have access to the same minimum set of services at the same

price regardless of their location. In practice, this means that all consumers in permanent dwellings should have access to services delivering basic voice, TV services and high-speed data packages of at least 10Mbps5.

Furthermore, Federal Network (FedNet) was launched to transform the UAE into a globally recognized mobile government that provides the best services to the people at any location, round the clock. In addition, FedNet is aligned with Vision 2021 that aims to make the UAE one of the best countries in the world by the year 2021[6]. FedNet is a high-speed connectivity infrastructure that connects all government entities on the federal and local levels and allows for data exchange through a government data bus. The initiative supports government services integration among all government entities at all levels. FedNet is based on IP Multi Homing protocol, so the network can have internet service from more than one operator/provider. FedNet is the first UAE government network to implement this protocol, which allow it to increase service availability and reduce access prices from the two competing providers. Moreover, TRA built/implemented IPV6 on FedNet to support the AI strategy and future shaping toward smart cities.

4. Internet Architecture

NGN and Fibre optic networks covering 93% of the UAE, in addition, WiFi hotspots, WiMAX services and 3G/4G mobile networks are available in the UAE.

The UAE has an excess of 12 submarine cables landing in various location in the UAE; 8 cables are controlled by Etisalat Telecommunications Company while Emirates Integrated Telecommunications Company controls 4 cables.

Moreover, there are two IXs in the UAE: Smarthub & Datamena. Where one IX is carrier neutral (operator has not yet wanted to connect to the other operator IX) and is offering the same services in the same open manner, meaning that customers and interested parties can see who is present and what capacity is being used, etc, likewise in Europe and other competitive countries. The other IX, Smarthub, is not operated in an open manner and fewer international carriers are connected to this IX, meaning that it is less competitive.

Due to the need for a neutral IX where all UAE operators (EITC and Etisalat) are connected, the TRA is looking at ways to either force both operators to connect to each other's IX or to create a third IX connecting the two.

5. Domain name management and adoption

TRA is the regulatory body and registry operator for the UAE ccTLD. TRA is responsible for the setting and enforcement of all policies with regard to the operation of the UAE ccTLD as well as overseeing the operation of the registry system. In line with international best practices, TRA uses the 'Registry - Registrar Model' to provide clarity of the roles within the industry and to provide competitive pricing, and service models for registrants. This contributed, through 23 accredited registrars, to increase electronic trade levels, where UAE achieves a leading position and ranking as the first in the Arab region in terms of the number of registered customers in the national domain.

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[6] https://u.ae/en/information-and-services/g2g-services/fednet#:~:text=Federal%20Network%20(FedNet)%20was%20launched,world%20by%20the%20year%202021.

Name of ccTLD registrar	*Telecommunications Regulatory Authority (TRA)*
URL of registrar	*https://www.tra.gov.ae/aeda/en/accredited-registrars.aspx*
Total Number of ccTLDs registered in the country for the years 2015, 2016, and 2017.	*2015: 181,400* *2016: 203,200* *2017: 211,600*

Realising the need and importance for Arabic language domain names, TRA launched the Arabic domain name "امارات." (dotEmarat) to enable Arabic speakers to make the most out of the internet and its various channels. UAE were among the first countries to have its Arabic domain names approved by ICANN in 2010. Now UAE has over 1600 Arabic domains registered under "امارات.".

B. Governance (C1 and C11)

1. Public/Private Partnership (PPP), Multi-Sector Partnership (MSP) and Role of Non-Governmental Organizations

The Prime Minister's Office directed the development of the UAE Vision 2021, whereby the UAE aims to be among the best countries in the world by the year 2021. Many stakeholders from private sector are extensively involved in the achievement of the vision and are part of the executive team.

Furthermore, TRA Digital Services Marketplace is an initiative that aims to enable the government entities with their initiatives through standard cloud services provided through the private sector. The platform links buyers from the government entities with sellers offering tested and proven solutions. Also, the initiative utilizes the resources and expertise in the private sector with significant reduction of cost per unit through economy of scale.

Moreover, multiple initiatives are taking place involving public sector players, like CBUAE, ADGM, DED, PMO, TRA, along with partners from the private sector. This includes initiatives like the fintech hub by ADGM and the government service bus by TRA.

Also, the government makes sure to initiate sessions to enable collaboration and exchange of best practices with different stakeholders like the World Government Summit. Committees have been established across the national level, GCC level, and the Arab level are also catering for such PPP initiatives.

2. Participation in Internet Governance activities

The UAE does not have a formal structured dialogue between stakeholders for Internet Governance subjects. Nevertheless, there are consultations between the Government and stakeholders on many subjects that involves Internet regulation, and this includes ICT businesses, ISPs, end users, ISOC chapter, domain name organizations. The consultations cover topics such as policies regarding trust services, Internet infrastructure, cloud computing, IOT, domain names and many others. ICT forum is one example where stakeholders have strong presence and actively participate in many policy matters that eventually influence the decisions. Referring to the consultation mechanisms, TRA actively promotes such events, processes and gatherings in many ways including traditional and digital media as well as through partners. TRA has many social media accounts that has hundreds of thousands of followers, in addition, TRA collaborates with social media influencers in this regard.

TRA participated in the Arab IGF forum and follows up on its activities. TRA was also involved in development of the Arab IGF review. On the global level, UAE participates in the IGF process and especially in the annual IGF event. UAE was also the co-facilitator of WSIS+10 in 2015.

In line with its strategic partnership with the Internet Corporation for Assigned Names and Numbers (ICANN), TRA hosted the ICANN's 60th meeting which was held in Abu Dhabi from October 28th until November 3rd, 2017. The ICANN's meeting is of great significance due to the organization's role in overseeing global domain names and all issues related to developing policies in this area with its ultimate goal being to set unified global standards for Domain Names System and ensure their stability and efficiency as well as root name service operation. The meeting attracted more than 2,500 senior experts, Internet specialists and government entities representatives from all around the world.

C. Legal environment, ethics and building trust (C2, C5, C6 and C10)

The provision of an enabling environment is crucial to mobilize resources and create a climate conducive to the acquisition and dissemination of ICT.

Moreover, a trustworthy, transparent and non-discriminatory legal, regulatory and policy environment constitutes an essential basis for cooperation between public and private sectors. The sensitivity and value of digital information and the need to protect it are increasing. This area tackles specific requirements regarding security and privacy, protection of personal data and confidentiality of information.

1. Legal and regulatory environment

The TRA is the statutory body responsible of the regulation of the telecommunications sector in the UAE. The TRA regulates the sector according to its mandate that is determined by the Telecommunications Law - Federal Law by Decree No. 3/2003 Regarding the Organization of Telecommunications and its amendments and according to State Policy.

Through the TRA´s Regulatory Framework we aim to create - where appropriate and needed - a set of regulatory instruments that will enable the UAE in reaching its objectives. The objectives of the TRA include ensuring adequacy and enhancement of Telecom and ICT services throughout the UAE; establishing and implementing a regulatory framework; and promoting the UAE as a regional ICT hub.

The TRA´s regulatory framework consists of various regulatory instruments. The Regulatory Framework includes among other:

- Consumer Protection (CPR-SPAM-ETC)
- Competition (Competition Safeguards)
- Licensing (License Regulations, License Framework, Templates)
- Interconnection (Interconnection Directives)
- Price Control (Regulatory Policy and Procedures)
- Cost Accounting
- Spectrum/frequency Authorization
- Type Approval
- Quality of Service
- Numbering
- Reporting (Obligations for Licensees to report)
- Land (Public Land property rights)
- Radiation (Radiation Limits)

When the TRA - with the corporation of the industry - identifies areas that need to be regulated in order to correct a competitive imbalance the TRA will consult with the relevant stakeholders, take their point of views into consideration when finalizing a regulatory instrument. Further to maintaining close dialog with the industry the TRA will investigating the need for regulation investigate best practices in other jurisdictions. The TRA will only regulate where appropriate and will where market forces are sufficient de-regulate and let the market regulate itself.

The pertinent regulatory framework also includes:

- Federal Law No.1/2006 on Electronic Commerce and Transactions, which applies to electronic records, documents and signatures that are relevant to electronic transactions and commerce.
- Federal Law No. 5/2012 on Combating Cybercrimes and its amendments according to Federal Law No. 12/2016
- Guidelines to website owners and internet services
- Prohibited content categories – TRA
- Data Dissemination and Exchange in the Emirate of Dubai
- Internet Access Management Regulatory Policy –TRA
- Ministerial Resolution No. 1/2008 regarding the Issuance of Certification Service Provider Regulations
- Federal Law No. 7/2002 on Copyrights and related rights
- Federal Law No. 17/2002 on Regulation and Protection of Industrial Property of Patents, Industrial Drawings
- Ministerial Resolution No. 11/1993 on Executive Regulation of Law No. 44/1992 on Regulation and Protection of Industrial Property of Patents, Drawings and Designs
- Federal Law No. 37/1992 on Trademarks

International Treaties and Conventions on Intellectual Property	Adopted (Y/N) or Observer	Year of Adoption
WTO	Yes	1996
Paris Convention	Yes	1996
PCT	Yes	1999
WCT	Yes	2004
Madrid Agreement	No	
Hague Agreement	No	
PLT	No	
TRIPS	Yes	1996

Cyber Laws	Available?	Law number	Year Passed
e-transactions law	*Yes*	Federal **Law** No 1/2006 **on Electronic Commerce** and Transactions	*2006*
e-signature law	*Yes*	Federal **Law** No 1/2006 **on Electronic Commerce** and Transactions	*2006*
e-payment	*Yes*	Regulatory Framework For Stored Values and Electronic Payment Systems (the "EPS	*2017*

		Regulations").	
e-commerce	*Yes*	Federal **Law** No 1/2006 **on Electronic Commerce** and Transactions	*2006*
Management of PKI available	*Yes*	Ministerial Resolution No. (1) of 2008 regarding the issuance of Certification Service Provider Regulations	

2. Privacy and Data Protection

There is no general federal data protection law in the United Arab Emirates (UAE) comparing to those applicable in Europe. There is also no single national data protection regulator.

There is a general right to privacy for citizens under the UAE Constitution. Article 31 of the Constitution provides for a general right of "freedom of corresponding through the post, telegraph or other means of communication and the secrecy thereof shall be guaranteed in accordance with the law". Most commentators agree that this gives rise to an individual's general right to privacy. However, that right is limited to citizens of the UAE who are reported to represent between 8% to 12% of the total population actually living in the UAE.

Furthermore, Article 378 of the Penal Code (Federal Law 3/1987) stipulates that the publication of any personal data that relates to an individual's private or family life is an offence.

Article 2 of the Federal Decree Law No. 5/2012[7] on Combating Cybercrimes prohibits unauthorized access to websites or electronic information systems or networks. It also imposes more severe penalties when such actions result in, among other things, the disclosure, alteration, copying, publication and republication of data (especially personal data). Also, Article 21 of law prohibits the invasion of privacy of an individual by means of a computer network and/or electronic information system and/or information technology without the individual's consent and unless otherwise authorized by law.

Moreover, TRA Consumer Protection Regulations, Version 1.3 (issued 10 January 2017) aims to ensure that the information of telecommunications subscribers in the UAE is protected. In addition, the Dubai Statistics Centre Law No. 28/2015[8] organizes the official collection and publication of statistical data in the Emirate of Dubai. It therefore only applies to this specific type of data and within to the Emirate of Dubai.

Furthermore, Dubai International Financial Centre (DIFC) has the following data protection legislation:
- Data Protection Law, DIFC Law No.1/2007[9], which was as amended by DIFC Law No. 5/2012[10] and DIFC Law No.1/2018[11].
- Data Protection Regulations, Consolidated Version No.3/2018.

The importance of the aforementioned law stems from the nature of The DIFC as a free zone and financial hub of Dubai. It hosts the Dubai stock exchange, a number of local offices of international banks and financial

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[7] https://wipolex.wipo.int/en/text/316910

[8] https://www.dsc.gov.ae/en-us/About-Us/Documents/2015_1400_Law%2028%20of%202015%20Concerning%20the%20Dubai%20Statistics%20Centre_Final.pdf

[9] https://www.difc.ae/files/7814/5517/4119/Data_Protection_Law_DIFC_Law_No._1_of_2007.pdf

[10] https://www.difc.ae/files/9514/5449/6834/Data_Protection_Law_Amendment_Law_DIFC_Law_No.5_of_2012.pdf

[11] https://www.difc.ae/files/6315/1739/9358/DIFC_Laws_Amendment_Law_DIFC_Law_No._1_of_2018.pdf

institutions, and service providers such as law firms. In this regard, the Office of the Data Protection Commissioner was established under the Data Protection Legislation as a neutral body to ensure the protection of all personal data in the DIFC.

The Dubai Healthcare City (DHCC) also has its own data protection system (Regulations No. 7/2013)[12].

Also, the Dubai Law No. 26/2015 on the Regulation of Data Dissemination and Exchange in the Emirate of Dubai (Dubai Data Law)[13] aims at ensuring the effective and secure sharing of data within the Emirate of Dubai, maximizing government opportunities and fostering innovation in the city.

It is also worth mentioning that the Regulatory Framework for Stored Values and Electronic Payment Systems (Digital Payment Regulation), issued by the UAE Central Bank in 2017[14], includes a number of restrictions on the way digital payment service providers store and process their users' data.

Regarding user education and awareness about online privacy and protection, the Cyber Blackmail campaign by TRA an Al Ammed Services aimed at educating users in the UAE on the risks and consequences caused by careless internet use and raising awareness on being cautious while sharing data on the web, especially with the remarkable growth and development of the online space locally with the use of modern technologies.

Several other campaigns have been conducted in forms of awareness sessions, workshops and seminars about information security in conjunction with the relevant government entities, private sector, academia and public.

3. *Countering misuse and preventing abuse of ICTs*

The Federal Decree Law No. 5 of 2012 on Combating Cybercrimes (Cybercrime Law) generally deals with the activities that would variously be described as hacking, identity theft and fraud. Article 2, as previously mentioned, prohibits unauthorized access to websites or electronic information systems or networks.

The TRA has issued several measures to combat spam messages through issuing its policy regarding spam in 2009. This policy includes enforcing particular requirements on SMS messaging services subscriber such as consent receipt, prohibitive SMS sending time and ensuring blockage of international and national spam messages by the local operators, In 2018, the international blocked spams reached above 57 million messages and nationally around 35,000 messages. The TRA has also enabled opening several channels to block and report spam messages by the operators and through TRA directly.

Cyber security awareness and education are two main elements in the country's strategy and long-term vision of developing a safer ICT community. This aims at enabling individuals to use different technologies related to information and telecommunications and at the same time monitoring and supervising major cyber safety issues that face businesses, individuals, students, among others, which are inherently linked/using with the ICT.

Dubai Police has launched ecrime.ae[15], an online platform that allows the public to report cybercrimes. This include suspicious emails, social media related issues, internet calls, hacking, online bullying, and cyber-extortion.

The Computer Emergency Response Team (aeCERT) also plays a vital role in spreading awareness among Internet users, both individuals and organizations, on various issues related to the security of cyber space. In

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[12] https://www.dhcc.ae/frontend/images/docs/10-Health%20Data%20Protection%20Regulation.pdf

[13] https://dlp.dubai.gov.ae/Legislation%20Reference/2015/Law%20No.%20(26)%20of%202015.pdf

[14] https://www.centralbank.ae/sites/default/files/2019-12/Regulatory-Framework-For-Stored-Values-And-Electronic-Payment-Systems-En....pdf

[15] https://www.dubaipolice.gov.ae/wps/portal/home/services/individualservicescontent/cybercrime

addition, the educational role played by aeCERT is part of the national campaign for cyber security awareness. This role will help in utilizing the innumerable benefits of the IT sector, while protecting internet users, thus ensuring a promising future for the UAE in the ICT sector.

4. *Use of electronic transactions and documents*

The UAE Pass app[16] is the first national digital identity and signature solution that enables users to identify themselves to government service providers in all emirates through a smartphone-based authentication. It also enables users to sign documents digitally with a high level of security. By downloading the app and creating an account on UAE Pass, the user will have a single digital identity across both local and federal government entities, in addition to various other service providers. The new app serves the UAE's government goals in realizing digital transformation and eliminating paper transactions.

The UAE Pass digital signature is already used in several initiative, such as Basher[17], an integrated e-service which enables investors to establish their businesses in the UAE within 15 minutes through a unified online platform. This platform is connected with federal and local government entities which provide commercial license services. The project is assigned to TRA to be achieved within one year in cooperation with 54 federal and local entities. The initiative saves 10 million waiting hours, 1011 tons of carbon dioxide and 45600 working hours, which can be allocated for innovation activities.

5. *Online and network security*

The UAE National Cyber Security Strategy (NCSS)[18] aims to secure national information and communications across the UAE. Set by the TRA, NCSS is based on five focus areas:

- Prepare and prevent: Aims to raise the minimum protection level of cyber assets and ensure compliance to the UAE's cyber security standards
- Respond and recover: Aims to develop incident and response management capabilities and improve threat neutralization capabilities
- Build national capability: Aims to inform and educate the public and workforce about cyber security and promote research in the field
- Foster collaboration: Aims to collaborate with international bodies to catalyze cyber security efforts nationally and internationally
- Provide national leadership: Aims to develop initiatives to guide the implementation of the National Cyber Security strategy.

TRA implemented additional policies to handle cyber security issues. These include[19]:

- The National Information Assurance Framework (NIAF): The framework aims to ensure a minimum level of information assurance (IA) capabilities within all the UAE's entities and establish a common approach that allows them to interact with each other with a sector and national perspective.

- Critical Information Infrastructure Protection Policy: The purpose of this policy is to identify and develop the necessary application programs to protect critical information infrastructure. The policy sets out key stages of applying risk reduction to critical information infrastructure.

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[16] https://u.ae/en/about-the-uae/digital-uae/the-uae-pass-app

[17] https://u.ae/en/information-and-services/business/bashr

[18] https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/federal-governments-strategies-and-plans/national-cybersecurity-strategy-2019

[19] https://tdra.gov.ae/userfiles/assets/vzjmlB3CM34.pdf

- National Information Assurance Standards (IAS): The Information Assurance Standards (IAS) cover a broader range of information protection and management aspects including business information continuity, disaster recovery, compliance, certification and accreditation. The standards consist of 2 main sets of security controls: administrative and technical. There are 188 controls distributed over 15 main areas and prioritized according to 4 groups.

Moreover, the aeCERT[20] was established by Resolution 5/89 of 2008 issued by the Ministerial Council for Services. The aeCERT was created to improve the standards and practices of information security and to protect the IT infrastructure in the UAE from risks and violations, in conformity with the TRA strategy that aims at supporting and ensuring a safer cyber space for the residents of the UAE, both nationals and expatriates.

Specifically, aeCERT's goals are:

- Enhance the cyber security law and assist in the creation of new laws.
- Enhance information security awareness across the UAE.
- Build national expertise in information security, incident management and computer forensics.
- Provide a central trusted point of contact for cyber security incident reporting in the UAE.
- Establish a national center to disseminate information about threats, vulnerabilities, and cyber security incidents.
- Foster the establishment of and provide assistance to sector-based Computer Security Incidents Response Teams (CSIRTs).
- Coordinate with domestic and international CSIRTs and related organizations.
- Become an active member of recognized security organizations and forums.

The aeCERT had successfully led and participated in numerous national awareness campaigns and initiatives in 2015. It is a member of the committees for 'Aqdar Intelligently,' an initiative for electronic awareness, and 'Together Against Electronic Extortion' campaign launched in line with Dubai Police's Al Ameen program.

Additionally, the team held round table meetings for aviation and bank sectors twice last year, took part in a series of seminars on e-crimes in Ajman and a workshop on cyber security in Dubai. The team's main focus last year was to expand its strategic partnerships in the UAE by signing seven Memorandums of Understanding (MOU) with local entities, bringing its current partnership agreements to 137.

Furthermore, the First Electronic Defense Line (FEDL)[21] is the forefront defense mechanism for the UAE Federal Government entities. Acknowledging that the compliance to security standards needs to be standard across all government entities, the TRA placed all necessary technical resources in order to establish one comprehensive solution to the security challenges facing the federal government entities. FEDL is considered a critical part of the holistic approach.

FEDL utilizes latest cyber security protection technologies and tools. The government entities benefit from the solid defense line that encompasses a number of security controls that includes network port-based protection through firewalls, protection against DDoS attacks, signature and behavior-based controls through Intrusion Prevention Systems and protection against Advanced malware or Advanced Persistent Threats (APT). Moreover, security expertise advice can be provided through FEDL's security professionals for controls concerning the entity at its end. Also, FEDL is linked to the aeCERT.

The Federal Government entities can extend their information security efforts through leveraging on FEDL capabilities:

- 24/7 x 365 days: Around the clock Security Operations Center.
- Skills: A team of highly qualified security professional.
- Technology: Latest cyber security technology and tools.
- Proactive: Proactive approach that anticipates problems before they happen.

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[20] https://tdra.gov.ae/aecert/

[21] https://marketplace.gov.ae/en/products/security-and-identity/first-electronic-defense-line

- Partnership: Strategic partnership with bodies in the government and private sectors.

III. Cluster Three: Digital Economy, Employment and Trade Policy Areas

A. Building the ICT Sector (C12)

Building the ICT sector requires public-private cooperation, in addition to the availability of many factors including investments and finance facilities, industry structure, and RDI capacities. The sector could include operators of telecommunications services, computer hardware manufacturing, software development, service provision, call centres, technical training, Web design and development, digital content development and Arabization, and providing technological solutions.

1. ICT Firms

a. Telecommunications Companies

There are two telecommunications operators, Emirates Telecommunications Corporation (Etisalat) and Emirates Integrated Telecommunications Company PJSC (du), are serving the UAE telecommunications sector. Both operators are licensed to provide public telecommunication services, which include landline, mobile phone, internet and satellite TV connections[22].

 Other licensed telecommunication service providers include:

- Media Zone Intaj FZ LLC and Al Maisan Satellite Communications Company are licensed to provide broadcast satellite transmission services.
- Nedaa is licensed to provide public access mobile radio services.
- Thuraya Telecommunications Company PrJSC is licensed to provide mobile communications by satellite in the UAE.
- Al Yah Satellite Communications Company is licensed to provide satellite and broadcasting satellite services in the UAE.

b. Content Firms (Local and national digital content development)

Nexa[23], a digital-first company in existence since 2005, has a team of copywriters who can create specialized content for business, whether videos, photography, articles or captions and short copy. Nexa create content and distribute it on behalf of their clients. This requires content planning and scheduling. Content can include eBooks, webinars, videos, podcasts, infographics, case studies, animations, slides, listicles, quizzes and digital magazines.

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[22] https://u.ae/en/information-and-services/infrastructure/telecommunications#:~:text=Two%20telecommunications%20operators%2C%20Emirates%20Telecommunications,serving%20the%20UAE%20telecommunications%20sector.

[23] https://www.digitalnexa.com/digital-marketing-services/digital-content-creation-and-distribution

c. **Software Companies**[24]

- IndiaNIC: working with Custom Software Development, Web Development, Ecommerce development, Mobile Apps Development, Enterprise Solutions with design led engineering practices.

- Unified Infotech: an award-winning technology company working with global Enterprises, SME's and forward-thinking Start-Ups as their end-to-end solution partners for custom-tailored software, web and mobile apps. Through a combination of smart planning, design thinking approach, and the latest technologies, we help our clients to accelerate their business efficiency.

- Cubix: a leading mobile app, games and enterprise software development company. Expert in development, customization, and integration of complex enterprise-level solutions, business intelligence analytics, advanced web and mobile solutions.

- Magneto: an award-winning eCommerce platform development company. Their core competencies lie in developing market-leading end-to-end eCommerce solutions. From creating strikingly beautiful web stores to innovative mobile applications, they use the agile methodology to develop industry-leading User Interfaces to deliver the perfect experience to the end-user.

2. R and D, Innovation and Standardization in the ICT sector

The Center of Digital Innovation (CoDI)[25] supports creativity, innovation, and research involving the latest technologies as well as providing training on mGovernment services, ensuring quality in addition to consultancy services. Furthermore, the Center serves as a platform for enhancement and dissemination of knowledge and capacity building, while engaging with the public as well as the private and government sectors to ensure their active participation in mGoverrnment initiatives and projects.

Since its establishment, CoDI has been playing an active role in the UAE Government's mTransformation process, as one of the most important strategic initiatives in this context. The Center collaborates with various government entities for staff training in relation to the country's smart transformation process. Additionally, it helps government entities in developing mobile applications to ensure that these meet globally recognized quality standards before they become available in local iPhone and Android app stores.

CoDI also provides education and training support for university students by hosting interactive workshops in its headquarters TRA. Additionally, the Center offers self-learning modules accessible on its website. Students may study the materials on the website before having online exams and receiving the result on the same website.

On the private sector level, in 2018, Etisalat UAE has made a significant progress towards becoming a Digital Telco, aiming at becoming a digital solutions platform for our Business customers. Given the importance of Small and Medium Businesses (SMBs) in UAE and their role in driving innovation, Etisalat launched several initiatives that aimed at enriching the business ecosystem and creating a healthy environment for SMBs. Etisalat continue investing on Real Time Marketing initiatives to be able to provide their customers the right offer at the right time and we are introducing advanced analytics capabilities to so that the analytic insights and projections can be used automatically by other systems such as CRM.

Etisalat continued fostering open innovation with the launch of Etisalat Future Now. With three key pillars the Scaleups program, an IoT partner ecosystem and an Innovation Center, Future Now introduces new ways of innovating and collaborating with startups, IoT developers, Government entities, Enterprises, and their end users. The Scaleups Program of Future Now opens doors to tech startups and companies from across the globe

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[24] https://www.goodfirms.co/directory/country/top-software-development-companies/ae

[25] https://codi.ae/home

to accelerate their business in the UAE and partner with Etisalat to bring new solutions to the market. Through its IoT partnerships ecosystem, Etisalat invites developers and innovators ranging from IoT companies to talented university students, to build, test, and integrate their applications on Etisalat digital IoT platform. Showcasing the latest technology breakthroughs across all sectors, Future Now's Open Innovation Center is where visitors can experience how Etisalat Digital can drive digital transformation journeys. With more than 300 customer visits in 2018, the Open Innovation Center has become an essential asset for Government entities and Enterprises customers to understand how to embrace their journey into Digital Transformation to be able to compete in today's disruptive markets.

Moreover, this year Etisalat has established its Business Robotics Center of Excellence (RCoE) to use robotic process automation (RPA) and artificial intelligence (AI) to commence transition to cognitive business processes. This year has ended with more than 70 software robots in place performing 700,000 transaction. This has provided a firm footing to accelerate the production of robots for 2019. The growth of software robots will be accompanied by a business chatbot active on the SMB mobile app as well as the online portal. It is expected that significant volumes of SMB inquiries and some orders will be handled by the chatbot powered by Etisalat's cutting-edge artificial intelligence platform.

Furthermore, TRA implemented initiatives/projects to achieve "Leadership in smart technological infrastructure" and for "competitive digital economy" by developing "Strategy of Digital Transactions", and regulatory framework for e-commerce transactions based on international legislation assuring exchanges transparency and consumer protection and strengthen e-commerce transactions/records credibility. This contributed to UAE achieve leading position as First in "Arab-World in ecommerce" index, and fourth/seventh in global competitiveness indices "Connect with other companies via the Internet" and "Use of ICT for B2B transactions" respectively.

3. Government facilitation, Investments and Financing the ICT sector

No information available

B.   Economic Impact of the ICT Sector (C12++)

1. Contribution of ICT sector in the national economy

ICT revenues for the latest three years are as follows:

- 2015: AED 41,111 million
- 2016: AED 43,070 million
- 2017: AED 44,212 million

These figures represent the combined revenues of Etisalat (UAE revenues only) and du.

The TRA estimates that the 2017 contribution of the sector to GDP was around 9.3%, equivalent to AED 129 billion. These figures take into account estimates of the direct impact from licensees, upstream suppliers, downstream retailers, foreign direct investment, multiplier effects, and productivity gains within the economy enabled by the sector.

2. Trade in ICT goods and services, and ICT-enabled-services (e-Trade)

No available information

3. E-business

Online banking portals are available through all major banks. Also, e-commerce platforms are mature with the e-channel encouraged for most major outlets. Access to women for financial and e-business services is as equal as men with no segregation.

4. Employment in the ICT sector

The UAE government is expecting a high growth of UAE nationals in the workforce over the next 10 years driven by an increase in the demographic growth rate. In practice, this would require today's Emirati youth to have the necessary skills to join private sector and also requires the UAE government to support UAE nationals in honing and building their skills. One way of achieving this is by leveraging 'The Government Accelerators'. The latter is a platform for cross-sectoral government and private sector teams to address their challenges and achieve ambitious goals in a short period. The Government Accelerators focus on four areas: Setting national KPIs, developing policies, creating projects, and services.

For the ICT sector, the Ministry of Human Resources and Emiratization (MoHRE) set the national employment target and partnership with the public sector, namely the TRA, and the private sector, such as TECOM Group, Etisalat and Du telecommunications companies, to accelerate the employment in this sector. The outcome was positive, and the objectives were achieved according to the set-out employment targets pertaining to the ICT sector.

In November 2018, during the UAE Government's second annual meetings, MoHRE announced the National Employment Strategy 2031[26]. The strategy aims to support the government's efforts to build a knowledge-based economy by:

- empowering labor productivity and providing national human resources with the skills required for the labor market
- increasing the number of research and development (R&D) personnel
- promoting entrepreneurship
- promoting lifelong learning programs
- training on future skills and skill development programs
- focusing on attracting talent by enhancing knowledge and cultural diversity

The Strategy also seeks to increase participation of UAE's citizens in the labor market by enhancing women's participation and increasing Emiratization rates in value-added economic sectors such as: energy, communication, technology, transport, storage sectors, financial, health and educational sectors, artificial intelligence, space, digital transactions and advanced science.

It is expected that with the onset of the fourth industrial revolution, technological disruption will have an impact on the labour market and the risk of automation of various occupations. However, to cope with such risks and ensure flexibility of the labour market, the UAE places a great importance on ensuring that the UAE nationals are equipped with the right skills to succeed in the private sector. This includes national initiatives such as upskilling and re-skilling programs, training for jobs of the future and higher education reorientation programs.

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[26] https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/federal-governments-strategies-and-plans/the-national-employment-strategy-2031#:~:text=The%20strategy%20aims%20to%20support,research%20and%20development%20(R%26D)%20personnel

5. E-employment

Online job portals, mobile phone applications and social media platforms are all used as a means to locate employment opportunities.

- Tawteen Gate Portal[27]:
    - o In alignment with its vision and strategic goals, MoHRE seeks to boost the participation of the national human resources in the priority strategic sectors. The goal of the National Program for Emiratization (Tawteen) is to support UAE nationals to take up jobs in the private sector.
    - o Objectives of Tawteen Gate:
        - - Tawteen Gate provides a seamless, accessible, and smart e-platform that is built according to the world's best practices, to attract targeted candidates.
        - - Provides privileges and incentives to the private sector entities, registered with MoHRE, that support qualifying, training, and empowering of the national human resources.
    - o Services provided to a jobseeker:
        - - Nomination for vacancies announced on "Tawteen" Gate.
        - - Coordination with employers to attend interviews directly or attending open employment days at the Customer Happiness Centers in the UAE.
        - - Nomination for technical or specialized training and qualification programs.
        - - Use of vocational and job guidance sessions.
        - - Use of Absher Card benefits after employment in the private sector.

- Wajehni[28]:
    - o 'Wajehni' smart app is available on both Apple Store and Google's Play Store. MoHRE aims to connect students with summer jobs and internship opportunities. The app also provides support to academic institutions and counselors, in ensuring students' readiness to enter the job market. In addition, "Wajehni' offers private sector companies a platform to post internship opportunities and attract Emirati students.

- Initiatives by MoHRE:
    - o Labour Inspectors from the Labour Inspection Department have access to smart inspection (التفتيش الذكي) systems, enabling them to telework.
    - o Electronic Services / إدارة الخدمات الإلكترونية - Employees in this department utilize tablet devices, allowing them to telework.

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27 https://tawteen.mohre.gov.ae/

28 https://www.mohre.gov.ae/en/wajheni.aspx

IV. Cluster Four: Digital Transformation and Social Inclusion Policy Areas

A. Inclusive and Empowering Access to relevant information, knowledge, applications and Content (C3)

ICTs allow people, anywhere in the world, to access information, knowledge and content almost instantaneously, and so, empowers individuals, communities, and society at large.

This area aims to promote and increase access to relevant public domain information, knowledge, applications and content.

This action line (C3) as described by WSIS entails (a) Access to public official information, (b) Access to scientific knowledge, (c) Digital public libraries and archives, (d) ICTs for all initiatives, (e) Open source and free software, and (f) Public access to information.

1. Inclusiveness (access): Availability, Development, Affordability, and Adaptability

The Ministry of Community Development "MoCD" website includes rules & regulations related to children law, senior Emirates & social security groups which include the mentioned targeted groups. In addition, the website is designed to provide an easy access for people of determination and elderly. Open data platform and Madrasa are examples for such initiative.

MoCD website is also designed to provide an easy access for people of determination and elderly.

There are different channels for access through MoCD website, mobile application and customer service counters. MoCD provides social aid to 21 different categories and give to the beneficiary the enablement to have a decent life style includes access to the internet. MoCD also has published Emirates Code for people of determination to govern the services provided to that category. MoCD website provides ease of access to disabilities group through different tools like sign language provision, text to speech, Social media sign

2. Empowerment (use): Educational, Entertainment, Political Engagement, Economic Returns

a) **Purpose of Usage**:

> **Economic Engagement:** During the past period, the Ministry of Economy (MoE) has adopted concepts and mechanisms relative to benefitting from UAE's orientation on Open-data Policy, utilization of smart business tools, development of UAE's smart e-services, direct access to customers without the need for correspondence, and direct communication with MOE's employees, anytime and from anywhere (24/7). As such, MOE established regionally and globally leading platforms, which are considered the first of their kind compared to available platforms that display foreign trade data of countries. These leading platforms provide fast and accurate information and contain the important indicators needed by users.

Political Engagement: Since the foundation of the United Arab Emirates in 1971, the only formal participatory process that existed was the consultative assembly – named the Federal National Council (FNC) – which until 2006 was appointed by the rulers' courts in the seven emirates that comprise the UAE. Set up on December 2nd, 1971, the FNC's role was limited to proposing legislative amendments to the UAE cabinet. Technology was formally introduced into the process of public participation in the UAE back in 2006. The government introduced electronic voting as a technology-led mechanism for public participation in electing members of the FNC, the first e-voting experience in the region. At the time, the number of participants in the e-voting process though was limited to 6,596 citizens in a government selected 'electoral college'; a number which increased by twenty folds to 135,308 participants in the 2011 FNC election process in the UAE.

The e-voting approach was chosen by the government for several reasons. The decision making process on e-voting was articulated by different members of the national election committee (NEC): The NEC opted for the e-voting approach because it is an "easy to use," "most secure system for voting," "more transparent than the manual methods" and can "deliver the election results in a very short period of time."

Today, citizen engagement and e-participation are strongly acknowledged as vital processes enhancing government efficiency and sustainable development in the country. The UAE government has taken expedited steps towards engaging larger segments of the public by utilizing the ubiquitous ICT in the country. Recently, the UAE ranked 13th globally in the UN "e-participation index" which measures the process of engaging citizens through ICTs in policy and decision-making in order to make public administration and service provision participatory, inclusive, collaborative and deliberative.[29]

b) **Role of Stakeholders:**

Since 2007, the UAE government established a tradition of holding a periodic solitary gathering for the Cabinet, known generally as the "cabinet retreat". In this gathering, the Ministers have the opportunity to discuss various pressing subjects and review them away from the daily work pressures. The objective of the 'retreat' is to increase collaboration across government ministries, brainstorm critical issues and trigger innovative solutions in a less formal setting. The 'retreat' has always been supported and attended by some of the highest ranked government leaders. A UAE Cabinet retreat was scheduled to take place on the 8th and 9th of December 2013 in 'Sir Bani Yas Island'. The ministers were to debate hundreds of creative ideas for developing the health and education sectors in the country, two of the most critical public sectors.

On December 3rd 2013, a highly promoted call was issued by the UAE Prime Minister through traditional and online media venues where he called all citizens and residents in the country to join the "biggest ever" national brainstorming session in the world on the state of health and education sectors, urging them to generate innovative and fresh ideas. Most innovative and practical proposals received from the public were to be discussed at the high-level dedicated two-day 'Cabinet retreat' the week after. The public was encouraged to submit ideas, proposals and solutions to health and education challenges either directly via the official website of the Prime Minister or through dedicated email address that was created and shared widely with the public. The public was also invited to use their mobile phones to send video comments with their suggestions. Additionally, thousands of active social media users in the country were asked to tweet their ideas using designated hashtags in Arabic and English.

The key idea behind the brainstorming session was that the cabinet would benefit from engaging the public in a systematic way to enrich their discussions with new and innovative ideas. The organizers hoped that this

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[29] A detailed case study conducted by the MBR School of Government and published by UNDESA on the first round of e-voting for the FNC elections in the UAE is available here: Salem, F., & Jarrar, Y. (2007). Enhancing Trust in e-Voting through Knowledge Management: The Case of the UAE. In H. Qian, M. Mimicopoulos & H. Yum (Eds.), MANAGING KNOWLEDGE TO BUILD TRUST IN GOVERNMENT (pp. 165-178). New York: United Nations Department of Economic and Social Affairs (UNDESA): http://unpan1.un.org/intradoc/groups/public/documents/UN/UNPAN028460.pdf

would help the government assess the state of the health and education sectors and understand pressing public issues better based on first-hand public experiences, complementing expert advice and secondary research.

A dedicated team was formed within the UAE's Ministry of Cabinet Affairs and was entrusted with managing the first countrywide technology-led initiative to engage the public on two pressing issues: understanding the challenges in health and education services from the public perspective as well as seek creative solutions based on the public experiences. The team was tasked with collecting, analysing and categorizing the received proposals and ideas before submitting them to the Cabinet retreat for deliberation. Embracing a large overflow of information, there were two human-led shortlisting phases applied to the information, the first managed by the team receiving the submissions in the Ministry of Cabinet Affairs, and a second phase by a more involved team within the cabinet retreat. Ultimately, the response far exceeded expectations, with 50,000 participations received in the first three days of the campaign on 6th of December 2013. Based on the suggestions during the first days of the campaign, a decision was made by the organizers that selected members of the public representing different segments of the stakeholders in society are to take part physically in the retreat to share their ideas with the Cabinet. Teachers, doctors, nurses, parents, school administrators and students were invited. For example, Shamma Khalid, a student with special needs, was invited to attend the cabinet retreat in person and discuss ideas and proposals she posted in a video in response to the brainstorming call. The video provided a first-hand view on the challenges facing people with special needs in the education sector in the UAE.

By the last day of the brainstorming campaign on December 9th, 2013, there were 82,000 ideas and proposals received. Every single idea, proposal or participation was recorded in a special portal that was created internally to tally the public participation. The organizing team was collecting, categorizing, sampling and shortlisting the ideas and proposal received. These were categorized under five pillars for each of the two sectors. A detailed case study on the impact and outcomes of social media-driven public participation drive by the UAE government is detailed in a case study by the MBR School of Government.[30]

B. Capacity building on ICT4D/Digital Development (C4)

Everyone should have the necessary skills to benefit fully from the Information Society; therefore, ICT4D capacity building is essential. ICTs can contribute to:

- Achieving universal education worldwide, through delivery of education and training of teachers, particularly vocational and tertiary education in STEM;
- Offering improved conditions for lifelong learning, which consider the needs of both men and women, and enables people who are outside the formal education process to improve their professional skills.
- Engagement in social life, political participation, social cohesion.

The UAE government has pushed STEM (science, technology, engineering and mathematics) through educational reform as well as through national strategic measures such as the Advanced Sciences Agenda and the Fourth Industrial Revolution strategy. Educational reform starting with Abu Dhabi and then Dubai and the Northern Emirates has focused on integrating creativity and innovative thinking into school curricula. The national agenda and the UAE Vision have set goals for the UAE to be among the top 20 highest performing countries in PISA and the top 15 highest performing countries in TIMSS. Over the past decade, government agencies have organized numerous activities to support this agenda. For example, the Ministry of Education has launched multiple events to encourage students to partake in STEM activities including an annual national science fair named the National Science, Technology and Innovation Festival (NSTIF) and an Artificial Intelligence and Robotics series (AIR) which took place in late January of 2019. Since 2012, the Emirates

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[30] MBRSG. (2014). From Majlis to Hashtag: Engaging Citizens through Social Media - The UAE National Brainstorming Session. In F. Salem (Ed.). Dubai: MBR School of Government and Ministry of Cabinet Affairs – Available at:

https://www.mbrsg.ae/getattachment/0162a279-89b3-466b-bf1d-c9544b68fc3d/From-Majlis-to-Hashtag-The-UAE-National-Brainstorm

Foundation has been running "Think Science", an annual youth-focused program in partnership with the UAE Ministry of Education and Abu Dhabi Department of Education to develop knowledge in the fields of science, technology and innovation.

In April 2018, the UAE government launched the National Science Agenda 2031 which includes the Advanced Sciences Strategy 2021. The 2031 Agenda aims to utilize advanced sciences in the development and creation of solutions for the challenges of the future and to support the objectives of Vision 2031 and Centennial Plan 2071. The agenda highlights eight priorities for 2031 and 30 targets for 2021. The eight scientific priorities are[31]:

1. national capacity-building
2. promoting the sustainable energy sector
3. enhancing water security using advanced and clean technology
4. developing advanced scientific food security system
5. addressing health challenges in the UAE through a national scientific system
6. developing advanced industries sector
7. building a system of logistical support based on scientific studies and data
8. creating a strategic industry complex.

Furthermore, the agenda aims to develop four enablers which are:

1. economic information services
2. a coherent scientific community
3. a supportive technology
4. an entrepreneurship in science and technology.

1. ICT in Education and Training (including e-Learning)

1. Basic literacy

No information available

2. Primary and secondary education

No information available

3. Higher education

No information available

4. Training and other forms of education

No information available

2. Targeted Training programmes (for capacity building on the use of ICT4D)

The Ministry of Community Development (MOCD) provides training courses for Women, Youth, People with Disability Elderly and support NGOs for the same purpose. The major issue facing these efforts is the lack of awareness about the training courses.

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[31] Further detailed information is provided in the comprehensive report on STEAM education in the UAE by the MBRSG: https://www.mbrsg.ae/home/research/education-policy/the-steam-dilemma-advancing-sciences-in-uae-school.aspx

C. ICT applications (C7)

ICT thematic applications can support sustainable development, in the fields of public administration, business, education and training, health, and employment, within the framework of national e-strategies. The ICT applications could be back-office applications, Web-based or mobile applications.

1. E-Government

The adoption rate of ICT tools in the public administration increased in the last three years. It was a big challenge for the Government to move the public from using manual services to online services, all government departments worked very hard to simplify the e-services so that everyone can use it easily.

Government departments reached the public by using different tools like marketing, gamification and customer support 24/7, which helped increasing the adoption rate. The adoption rate for the last 3 years as below:
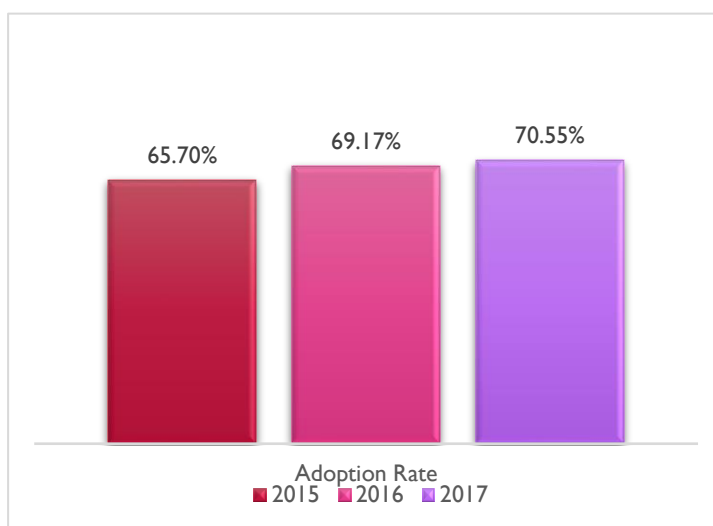
Computerizing Public Administration

In May 2013, the UAE initiated an ambitious roadmap to move from eGovernment to mGovernment within two years. Sheikh Mohammed had announced a new 'government vision of the future' following a meeting with government officials. The target was set at 100% of priority services should be online on both channels; website and mobile.

His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai, tweeted: "The Government of the future works 24/7 and 365 days a year. A successful government is one that goes to the people and does not wait for them to come to it".

In 2015, UAE has achieved a remarkable rate of mobile governance, 96.3% of the UAE government's most important 337 services providing day-to-day services have made the smart transition to m-Government and m-Services.

UAE's transition from eGovernment to mGovernment reveals that the biggest 41 government departments succeeded in achieving the shift to m-Services within 730 days and the most important change that has been taken place over two past years was the change of mentality, the culture of government services and the archaic definition. Today, delivery of services no longer relies on buildings and thousands of employees, but on advanced systems and innovative minds. As of today, the transformation rate increased to 98.18%

Total number of G2G services is around 367 services, 90 services are classified as priority services, 80% of the services are online with more than 90% adoption,

There are different national projects which brings all these services together under one umbrella, all federal governments and most of the local governments have participated in projects like Fednet, Smart Pass and GSB (Government Service Bus). All these projects help to link and integrate local and federal governments, as follows:

- **Fednet**
  The mission of FedNet is to provide a secure and effective common infrastructure for government services integration on both local and federal levels.

- **GSB**
  It supports federal and local government entities in providing a number of their services through activating the electronic linkage and the smooth data exchange between the entities systems, which would facilitate the service provision to the customer without having to move from one government entity to the other. In the same time, it serves the government policies in establishing a linking platform for an integrated government

- **Smart Pass**
  Smart Pass project allows using unified data entry for online government transactions. Every person would have a unified ID number that could be used for facilitating e-transactions for local and federal government entities

Total number of G2C services is around 1527 services, 292 services are classified as priority services, 97% of services are online with 71% adoption.

Every government has its own portal; UAE has around 39 federal portals, each government has different channels to provide it services like:

- Online Services (website)
- Mobile Service (Mobile Apps, Mobile Website)
- Online through business centres available in the government office
- Online through IVR
- Online through Kiosk
- Online through CRM
- Manual through customer services in the government offices
- Manual through third party business offices

In addition, all online services are delivered by using the following channels:

- Email (of the output of the service is Document)
- Courier Delivery to Address
- Pick up from government's customer service

Total number of G2B services is around 1331 services, 164 services classified as priority service. As mentioned above, local and federal governments linked together through different national projects like Fednet, smart Pass and GSB.

Moreover, UAE has announced the launch of the first phase of the "'Bashr" initiative, one of the most important strategic initiatives implemented and developed through close and constructive cooperation with all local and federal government departments and entities involved in licensing economic activities in the UAE. This initiative aims to promote UAE's competitiveness in doing business by allowing starting a business in simple, fast steps taking no more than 15 minutes.

In addition, the Ministry of Economy have made a lot of progress in this regard, Key e-services and smart e-platforms launched by the Ministry of economy are as follows:

- Trade Relations Dashboard
- Trade Map
- Foreign Direct Investments Dashboard
- Trade Information Gateway
- UAESME Mobile App
- e-service of the International Patent Registration Centre (ICRP)
- Certificates of origins for providing origin of national product
- Foreign company registration
- Trademarks registration
- Agencies registrations
- Industrial licence renewal

Computerizing customs processing

Many processes have been computerized and transferred to digital since 2013. For more information, refer to local custom authorities[32].

Computerizing taxation and revenues management systems

The UAE recognises the use of electronic and/or digital invoicing[33]. Federal Law No. 1 of 2006 on Electronic Commerce and Transactions applies to electronic records, documents and signatures that relate to electronic transactions and commerce and gives a legal recognition on their use. The law establishes uniform rules, regulations and standards for the authentication and validity of electronic communications, including electronic invoicing and the use of electronic signatures. Under the law, government departments may:

- accept the filing, submission, creation or retention of documents in the form of electronic records;
- issue any permit, licence, decision or approval in the form of electronic records;
- accept fees and other payments in electronic form;
- put out tenders and receive bids relating to government procurement by electronic means.

Federal Decree Law No. 8 of 2017 on VAT (PDF, 1 MB) also recognises tax invoice in both forms: written and/or electronic.

Please also refer to the Tax Authority website[34].

Digitizing Information

Government departments has gone a long way in digitalizing the old information and make it available online. Almost 80% of old data has been digitalized, its available in different formats which is readable by machines like CVS, PDF, WORD. The Government also created Bayanat portal[35]. The UAE official Open Data Portal provides enhanced open data systems for public use. The portal reflects the government intention to enhance sustainable communities based on participation and transparency, eing keen to promote the concept of digital

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[32] https://fca.gov.ae/en/Home/Pages/default.aspx

[33] https://u.ae/en/information-and-services/business/digital-invoicing

[34] https://www.tax.gov.ae/en

[35] https://bayanat.ae/en

knowledge economy. The homepage of the portal lists the data sets it includes as follows: economy, education, society, technology, transportation, environment, government, health and infrastructure. The Federal Competitiveness and Statistics Authority (FCSA) is responsible for managing and updating this data portal. It supports all UAE institutions and individuals, as well as international partners, across all sectors.

Engaging with all citizens

In the UAE, engaging with all citizens is through digital participation which is applied through several channels. Some of them are mentioned below.

- Sharik.ae
  The UAE Government has dedicated a section for eParticipation on its federal portal "Government.ae.", this section can also be accessed through a separate link (http://sharik.ae). The section contains consultations, blogs, forum, polls and a platform to share innovative ideas.

- Crowdsourcing
  For the first time in the history of the UAE, the UAE Government applied the concept of crowdsourcing to enhance the content of the federal portal "Government.ae.". The campaign was started in June 2018 and by the end of November 2018, where 124 topics were added to the portal based on customer requirements.

- Feedback features on government websites
  Almost all government websites in the UAE have features to gather feedback from their users.

- Social media
  Almost all leaders of the UAE, including the ministers of state have a presence on social media. Through their accounts, the leaders regularly post their thoughts and bring about an interaction with the public.

- Annual meetings
  H.H. Sheikh Mohammad bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai holds annual meetings to discuss the future of the UAE in a post-oil era and that which will be built on knowledge, economy, artificial intelligence, blockchain and open data.

- Cabinet retreats
  Sheikh Mohammed also regularly holds cabinet retreats. He believes the casual and leisurely atmosphere will help the leaders and officials to think beyond boundaries and come up with strategies and initiatives that aim to make the UAE the best country in the world.

Name of Authority in Charge of ICT in Public Administrations	*English Name: Telecommunications Regulatory Authority* *Arabic Name:* الهيئة العامة لتنظيم قطاع الاتصالات *URL: www.tra.gov.ae*
Name of e-Government authority	*English Name: Telecommunications Regulatory Authority* *Arabic Name:* الهيئة العامة لتنظيم قطاع الاتصالات *URL: www.tra.gov.ae*
Number of implemented government e-services	*289*

Number of planned government e-services	*Each entity has its own yearly planned as per their strategic plan especially e-transformation*

Ministry of Finance (MoF) uses the eProcurement system which automates the whole purchase cycle until the completion of fees payment process. The system enables suppliers to participate online in tenders and auctions submitted by the UAE's ministries and federal entities. It allows suppliers to follow up on purchase orders and submit digital invoices[36]. More can be found under AdvancedProcurements[37].

URL of e-government portal: *(https://www.government.ae)*		
Information	General	*Yes*
	Laws	*Yes*
	Directories	*Yes*
Services	Static Info	*Yes*
	Downloadable Forms	*N/A*
	Interactive	*N/A*
e-payment		*N/A*
Online account		*N/A*
Bilingual		*Ar/En and translation to all other languages*
Citizen Participation	Blogs	*Yes*
	Polls	*Yes*
Social Media	Facebook	*Yes*
	Twitter	*Yes*
	LinkedIn	*Yes*
	YouTube	*Yes*
	Other	*Yes Instagram*
Additional Services	RSS	*Yes*
	Web Statistics	*Yes*
	Search	*Yes*
Mobile version	Support for smartphone/tablet	*Yes*
	Dedicated App (iOS or Android based)	*Yes*
Other features		

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[36] https://u.ae/en/information-and-services/business/digital-invoicing

[37] https://www.mof.gov.ae/ar/mservices/Corporate/isupplier/Pages/AdvancedProcurement.aspx

2. E-health

Regarding the availability and accessibility to the world medical knowledge with relevant content, UAE makes the following available to the public:

- MOHAP online health awareness resource
- MOHAP social media channels
- Community programs
- GCC/Local Mass media campaigns
- Patient education materials at PHC centres

The national programs that address and promote "Sexual and reproductive health" are as follows:

- Maternal and child health programs
- Pre-marital literacy kit
- Healthy Pregnancy kit
- Social media awareness for some issues eg. HIV/AIDS, screenings

The concept of Telemedicine is in place and there is a plan to pilot "telemedicine enabled disease management program." The pilot will be for one month of five patients. This project will save a tremendous amount of money and improve the patients' lives significantly through identifying these diseases before they further deteriorate into expensive AE visits and improving adherence and compliance is critical and shall be accomplished and quantified.

In addition, for underserved areas and vulnerable populations, UAE have homecare visits where three equipped vans are in use. Homecare services include a team of healthcare providers visiting the patients for follow ups. Homecare system implementation is in the RFP phase and the Ministry of Health and Prevention (MOHAP) has started to look at different stakeholders.

Moreover, two MOHAP hospitals has achieved the Healthcare Information and Management Systems Society (HIMSS) level 6 and the rollout for the others is planned.

Patient Care Management

MOHAP has implemented a Health Information System called "Wareed"[38] which includes most of the clinical and ancillary solutions for patient care. 'Wareed' is a unique federal step designed to link all MOHAP hospitals through one common platform which is currently managing patient information and delivering the full spectrum of public healthcare services in accordance with global best practices. 100% of MOHAP hospitals and around 82% of Primary Health Centres are using "Wareed" system. It includes the following healthcare services: registration, health information management, physician power chart, nursing power chart, pathology and MDI, pharmacy, surgery, emergency, blood bank, SMS gateway for appointments, BMDI (Bedside Medical Device Interface), dietary, dental, cardiology, integration with radiology and PACS , and birth and death systems.

Digital Record Keeping

Patients' records are accessible across MOHAP facilities and all information are saved in the datacentres. Patient information is also available through patient portal platform. Patient Smart Portal is a secure web-based services for the patient to use, in which they will have a real-time access to view their latest health care information. The portal can be accessed from any platform and smart devices at anytime and anywhere.

Patient portal features includes viewing real time health information, as the below:

- Results of latest lab tests

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[38] https://u.ae/en/participate/consultations/consultation?id=1127

- Allergies
- Documents (e.g. discharge note)
- Immunization schedule
- Health issues status
- Medication
- Radiology reports
- View future appointments and direct appointment booking.
- Messaging Health care facilities

Pharmaceutical Management

PharmNet is a solution within Wareed system that manages medication administration, dispense, reconciliation, and point-of-care. This eliminates duplication and increases patient safety and care team communication by placing data only once in a central. Key benefits are:
- Access more patient information
- Monitor patients around the clock with knowledge-driven alerts
- Share information directly with other caregivers
- Provide a continuous pathway for patient care delivery
- Support point-of-care medication storage, inventory and administration
- Produce fill lists and medication administration records automatically or on demand
- Work more closely with patients through mobile access and automated clinical-decision support

In addition, UAE has implemented the bedside medication closed loop, where the nurse will use the handheld device and Medication Administration Wizard (MAW) to administer medications. Nurse will scan the Wrist Band to identify the patient and then the list of medication tasks within defined time frame will be displayed. Next, scan the barcode from Medication Label. If all the criteria match, scanned task will be having check mark next to it and it is ready to sign. If there are any mismatch with task details and scanned medication, row will be highlighted and need intervention from nurse to fill the details as required.

Furthermore, MOHAP and Ministry of Interior (MoI) have jointly worked on the Controlled Drug Platform to manage and monitor controlled medications, semi-controlled medications and narcotics across the seven emirates. It provides a centralized digital platform that the various institutions will use for prescribing and dispensing CM, SCM and Narcotics. The platform will generate a wealth of statistical data and reports, periodically generated from the various functionalities offered. The Unified Controlled Medication platform upon completion will be internationally aligned with Hospital Information Management System.

The Controlled Medication Unified platform will have the flexibility to adapt and integrate with all the existing electronic applications such as Cerner and Epic used by medical bodies across UAE, allowing for a high adoption rate by institutions. The core function of the Controlled Medication Unified Platform is designed to allow prescribers to send patient prescriptions to pharmacists electronically for dispensation. Whilst also capturing the relevant data for producing reports and dashboards. This process will decrease prescribing and medication errors, allowing for a more streamlined process

Also, Wareed System is integrated with the inventory system, where the medications are managed in terms of counts and expiry dates.

Databases for National Healthcare

MOHAP Health Information System is used as a database for other healthcare organizations in UAE, such as the Ministry of Presidential Affairs (MOPA) and Al Jalila Hospital. Initial discussion on National Unified Medical Record took place among all UAE healthcare organizations and there are regular meetings on the process and procedures.

Wareed System include a high alerting functionality in order to save patients' lives and decrease the errors. Such alerts are:

- Sepsis Alert
- Ebola Alerts
- MEWS, PEWS, MEOS
- Duplicate medication order alerts
- Duplicate Lab and Radiology order alerts

V. Cluster Five: Culture and Media Policy Areas

A. Cultural identity and linguistic diversity (C8)

No information available

B. Media (C9)

1. Media diversity, independence and pluralism

No information available

2. The media and its role in the Information Society

No information available

3. Convergence between ICT and the media

The convergence of television, Internet and telephony (triple play) is applied by the telecom providers Etisalat and Du in the form of integrated services.

4. Social Media in the Arab World

The UAE society has one of the highest penetration rates in the region with regards to social media usage. According to the Arab Social Media Report by the Mohammed Bin Rashid School of Government (MBRSG), the UAE is by far among the two countries with highest penetration rates of Facebook accounts, with almost 95% in 2017, with 20-points lead over the next countries in the rank in the region. The UAE also has the highest penetration rates in terms of LinkedIn usage in the region, and among the top 5 in usage of Instagram and Twitter.[39]

Due to its high penetration, social media has been used heavily by almost all UAE government agencies to interact with the public, deliver services and drive engagement. The usage by these government agencies range from communication purposes (e.g. informing the public about services, updates and providing customer support) to big data analysis (e.g. sentiment analysis, satisfaction and happiness measurement, etc.), among other uses. On the political level, social media has also been used heavily in election campaigns by candidates

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[39] MBRSG. (2017). Social Media and the Internet of Things: Towards Data-Driven Policymaking in the Arab World - Potential, Limits and Concerns. In F. Salem (Ed.), 7th Arab Social Media Report (2017 ed., Vol. 7). Dubai, MBR School of Government – Full report available at: https://www.mbrsg.ae/home/publications/research-report-research-paper-white-paper/arab-social-media-report-2017.aspx

and the public in the Federal National Council elections. On the commercial side, social media has been heavily institutionalized by businesses in commercial services, including retail, marketing, sales, financial services among others.