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## Conference Paper

# Proactive Approach to the Deployment of 5G Technology: Insights from the UAE

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Proactive Approach to the Deployment of 5G Technology:  
Insights from the UAE

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**Abstract**

The task of introducing innovative 5G technology is an urgent one for digital development. This study perceives 5G technology from evolving global perspectives and provides a particular focus on its policy landscape in the UAE that includes state and other stakeholders. The paper starts with a literature review that underpins the various notions on this new wireless network, describes the stakeholders involved and highlights the preparations for launch. Based on a quick qualitative survey through interviews of three key personalities from three principal stakeholders (i.e. the Telecommunications Regulatory Authority [TRA] as the regulator, Etisalat as the service provider and Ericsson as the vendor) the paper assesses the views of the key stakeholders on the new 5G technology and their opinions concerning the nuances of its introduction. The analysis of the data presented demonstrates the high expectations placed on the 5G network and its capacity which is associated with some challenges that needs to be overcome primarily through collaboration and proactive approach. The purpose of this study is to determine which factors are considered by the state as ways of modernising the existing digital base in the UAE.

**Keywords:** 5G, network, initiative, technology, digital, introduction, TRA



## **1. Introduction**

The introduction of the modern means of communication is characterised by rapidity and using the latest developments in this field. High-speed computerised technologies provides an opportunity of not only practical but also comfortable work with the progress achievements, and every year, the representatives of the digital market offer the new ways of communication and data transfer. One of these technologies is the fifth generation wireless connection, abbreviated as 5G. Previous versions had undeniable merits; however, the updated system has not only better performance but also more advanced features. The introduction of this mechanism in the UAE, the country where much attention is paid to the development of the technology industry and updating the digital base, has several peculiarities. In particular, the government of the state represented by the Telecommunications Regulatory Authority as the ICT sector regulator in the UAE has established relevant committees that control the implementation of 5G in various sectors. Also, a specific roadmap has been drawn up, which presents a plan for the implementation of the program aimed at the gradual introduction of the innovative communication system. The research question is as follows: what contextual factors affect the proactive approach to 5G technology deployment in the UAE?

The purpose of this study is to evaluate the existing practices used by the UAE government to support the policy regarding the modernisation of the digital sphere and the introduction of a new communication system. As objectives, it is essential to describe the elements of the 5G roadmap and mandates of the UAE 5G committee, assess the status of implementation, evaluate the problems and prospects of the 5G initiative in general, and provide recommendations to the UAE from the standpoint of the state readiness for this new technology.

As a research approach, a qualitative analysis method was used. In order to receive the comprehensive picture of the current situation, questions for interviews were offered, and respondents' answers were assessed within the stated theme. A section on literature review is also presented, which is aimed at discussing the trends and mandates related to the implementation of the technology, as well as research gaps.

## **2. Literature Review**

A literature review on the introduction of the 5G technology in the UAE and the aspects of this practice is aimed at identifying current findings in this field and research limitations that need to be taken into account when planning work on developing an evaluation plan. Based on the current reports and facts, it is possible to determine which course of development government agencies follow and what practices they use to implement the proposed strategy for updating the sphere of wireless communications in the context of the proposed changes. The results of the review will allow finding out the outcomes of the work done and those aspects of the activities that deserve attention as the most problematic sectors of the implementation policy.

In their introductory editorial perspectives, Stephens et al. view technological innovations as a critical driver impacting the context of how future governments would operate and function. They also see future governments will take a more extensive look at the increasingly inter-connected world....to mapping out their plans for tomorrow (Stephens et al, 2019).

In the article by Ahmed et al. (2018), the authors give the general picture of the merits of introducing the 5G technology into the communications system and present possible schemes for operation by using this mechanism. According to the researchers, the capacity reached by such a network is sufficient to provide wireless and high-speed Internet access for a large number of users (Ahmed et al., 2018). In the context of the UAE, this principle is convenient and profitable since

the flow of tourists may grow due to increased digital opportunities, thereby increasing the country's profits.

Agüero, Wenning, Zaki and Timm-Giel (2018) also consider the process of implementing the 5G technology in terms of common features. In spite of the fact that the work is not directly related to the UAE, the authors mention a number of discussions held in major world cities, including Abu Dhabi (Agüero et al., 2018). The specifications of these conferences provide for the analysis of the effectiveness of new technologies and protocols for their implementation under certain conditions that need to be created. Based on the work done, it has been found that in different regions, there are certain prerequisites and factors for the development of the 5G system, which requires the participation of the government and relevant assessment boards.

From the entire list of works selected for the review, the article by Basharat, Ejaz, Naeem, Khattak and Anpalagan (2018) completes a series of studies not directly related to the UAE. However, in their academic research, the authors argue that the comprehensive implementation of the 5G technology is a rather laborious task that requires the development of proper optimisation strategies (Basharat et al., 2018). Taxonomy should be thought out correctly so that all available resources could be implemented to cover necessary industries with the appropriate technology.

The report presented by Deloitte (2018) describes the current market competitive trends and innovative networks that are mandatory for the transition from 4G to 5G. In accordance with the provisions of this article, the growth in potential profits that the carriers of wireless communications may receive through the launch of the new system determines the struggle for the rapid implementation of the plan (Deloitte, 2018). Thus, the transition process is different in some countries, and the work required is also distinctive as shown on the examples of the USA, Germany, China and Japan.

According to Fettweis and Alamouti (2014), the technology under consideration is a critical step in the development of the wireless sphere. The authors argue that “5G cellular communication will be another paradigm shift that will redefine our future, impacting out societies in ways which cannot be foreseen” (Fettweis & Alamouti, 2014, p. 144). At the same time, the UAE’s role is considered the position of one of the Middle Eastern flagships in the process of introducing current changes. A number of areas are mentioned that can be improved through developments in the field of 5G communications – healthcare, politics, education, transport logistics, and other essential aspects of life.

FEV Consulting (2018) describes activities related to the implementation of the 5G technology in different areas of life and the standardisation of this process based on existing practices. The key focus is on the automotive and transport industries, but mobile technologies are also mentioned, and according to the report, significant advantages may be achieved in case of effective work (FEV Consulting, 2018). There is a background for innovation, and new horizons are open to researchers.

The official report submitted by GSMA (2017) lists the development plans of individual countries in the context of the 5G technology. According to this article, within the UAE, this project will be launched in 2020 (GSMA, 2017). Creating a pre-infrastructure requires for the updated version of the wireless connection to interoperate with other platforms, in particular, the Internet of things. As the creators of the report remark, there is some risk in the delivery of 5G, for instance, the threat of fragmentation and high competition; therefore, the importance of collaboration is noted (GSMA, 2017).

In the report by GSMA (2018a), the possibilities are evaluated that the 5G introduction may provide, and the concept of the Internet of things is considered, which is the system of

technologies interfacing with one another. The article also cites a number of spectrum positions that provide for interaction among the government, regulators and the representatives of the mobile industry (GSMA, 2018a). As one of the key points, the idea is given that the role of official boards is significant, and work at the national level requires the exchange of experience among all stakeholders.

A detailed report by GSMA (2018b) describes the essence of the 5G technology step by step, the features of its implementation, the conditions for deployment and its relevance. The factors affecting the introduction of the system in question include the current digital equipment, the willingness of the competent authorities to participate in the upgrade work and the availability of supporting resources (GSMA, 2018b). When applying these criteria to the UAE, it can be noted that in the country, the situation is favourable for presenting the 5G technology since a corresponding platform has already been prepared, and responsible regulators have been appointed.

Among the merits of the report presented by Huawei Technologies (2013), it is necessary to mention the challenges that accompany the implementation of the 5G technology. According to the authors, to meet all the modern requirements and satisfy the needs of both the population and governing boards, such networks face significant complexities (Huawei Technologies, 2013). Nevertheless, specific drivers are cited, for instance, dynamic spectrum refarming. Therefore, based on the information obtained, it can be noted that the implementation initiative should take into account potential challenges and requirements, and the prospects for working in the UAE are positive due to the existing support base.

The developers of Huawei Technologies (2018) argue that it's the 5G-ready among all the GCC countries. Regarding its economic and technological potential, substantial progress has been

made in relation to the preparatory work, and, as all the conditions of implementation are properly implemented, the network will function successfully in 2020 (Huawei Technologies, 2018). Currently, the implementation status is at the preparatory stage, but all key procedures have been completed in order to launch the project successfully. As recommendations, from a short-term perspective, more attention should be given to strengthening network virtualisation and enhancing digital experience (Huawei Technologies, 2018).

Saad (2018) considers the general concepts and features of the innovative 5G technology in the context of the modern digital market. Based on the experience of previous studies, the author notes that the current algorithms used to implement all the provisions of high-speed wireless connections require an integrated approach to their organisation in order to avoid fragmentation (Saad, 2018). In other words, a phased and slow implementation may be fraught with the delay of essential functions. Therefore, within the digital sphere both the Middle East and other regions, the corresponding background should be prepared, and judging by the current findings in the UAE, its platform is favourable.

The official report submitted by the Telecommunications Regulatory Authority (2018) gives the infographic of the implementation of 5G technology in the UAE and, in particular, the roadmap. According to the article, in 2019, it is planned to use cases and organise operators and eco-system readiness, and in 2020, a comprehensive launch will be organised (Telecommunications Regulatory Authority, 2018). Major activities have already been carried out, and an implementation plan has been drawn up by responsible boards. The report confirms the aforementioned view that the UAE is the leading country of the GCC region in terms of the favourable environment for the implementation of 5G, and this fact proves that the correct

preparatory work has been performed in the state (Telecommunications Regulatory Authority, 2018).

The infographic presented by Qualcomm (2017a) displays the movement of individual countries towards the introduction of the 5G technology. Although this list does not include the UAE, it can be noted that the indicators of this state's development allow speaking about its digital base of sufficiently high quality. Detailed instructions are given regarding the required parameters that are essential for the efficient operation of the updated wireless network. In general, the text of the report confirms the readiness of the United Arab Emirates to launch 5G in various industries. In the context of Smart cities in the UAE, it is imperative to observe that 5G-type mobile technology is essential to support smart government initiatives (Abdelgaffar and Magdy, cited in Saif, Almuraqab N and Jasimuddin, S., 2017). The experiences of the UK and India are cases in point (Weerakkody and Dhillon, 2008; Saxena, 2017).

The article by Qualcomm (2017b) describes the merits of 5G and focuses on the commercial benefits achieved through the implementation of this technology. As the authors of the report remark, this network will significantly expand the opportunities of various spectrums, and its high-band indicators will help enhance the capacity in different spheres (Qualcomm, 2017b). The absence of the UAE in the list of the reviewed countries does not mean that the background of this country is weak for the effective implementation of the technology. Therefore, judging by the data presented on a national scale, local developments allow implementing all the planned ideas comprehensively.

### **3. Research Gaps**

Although much information regarding the specifics of the implementation of the 5G technology, including the UAE, is freely available, some peculiarities are not comprehensive enough. For instance, based on the objectives of this study, in all sources, information on the mandates of the UAE committee engaged in the network regulation is either insignificant or not available. It is a research gap since the evaluation of the regulatory board's activities is a valuable criterion for analysing the success of the implementation policy. Another limitation is the description of the UAE's readiness in comparison with other countries. In various reports reviewed, much information is given about major world powers, for instance, Russia, the USA, China, and some others. However, the UAE does not appear in such comparative tables, although the readiness of this country to implement the 5G system is high. These nuances should be analysed in detail in order to have an idea about the quality of the government's work and all the stakeholders regarding the upcoming innovation program.

### **4. Research Methodology**

The study feels it is necessary to develop an appropriate assessment methodology to explore and provide an insight of UAE efforts led by the TRA in relation to 5G technology deployment and how these efforts are evaluated by main stakeholders. The technique of assessment depends on the objectives of the study, and to reveal all the issues, it is essential to fulfil the objectives stated for this research problem. As the main research method, qualitative analysis was applied. The advantage of this principle is that with its help, it is possible to obtain reliable facts directly from stakeholders and make the comprehensive picture of a specific problem. According to Ahmed et al. (2018), opinions on the success of the introduction of the innovative wireless technology are the factors that contribute to the adaptation of the current innovation

programme and its adjustment if necessary. Until the 5G technology has not been launched, it is pointless to consider its features in a statistical ratio, which excludes the relevance of quantitative research. Moreover, based on the specifics of the topic under consideration, conversations with the target audience may provide information on various aspects of the work carried out, including both preparations for implementation and difficulties and prospects related to the introduction of the initiative. Therefore, the practice of qualitative research has enough advantages to apply it in this study.

Appropriate interview questions were developed to conduct interviews with the key stakeholders within the process. Accordingly, the UAE 5G committee representing three main players of the sector (regulator, service provider and 5G technology vendor) became the focal interest for interviews. The study interviewed the three following respondents: UAE 5G Initiative Manager at the TRA, Director Technology Standardization & Spectrum Management at Etisalat and Regional Manager Government and Industry Relations at Ericsson. These interviewees are thoroughly engaged over the introduction of the 5G technology. The points raised in the questions are related to the objectives of the study and are aimed at disclosing the stated topic. Along with the questions, respondent's answers are summarized, analytical conclusions is presented.

## **5. Study Results**

Seven semi-structured questions were presented during the interview sessions. The summary of answers to each of the seven questions are presented below:

- 1. Does an innovative 5G technology support program/initiative have an impact on various sectors of life, or will only mobile communications be affected?*

- It was indicated during these interviews that various aspects of life will benefit from the introduction of the 5G technology will be making possible billions of new connections and making those connections secure and instantaneous using different use cases and verticals, and not only in the mobile sphere but also in the transport, health, economic, political, logistic and other industries positive changes will be felt.

2. *Are the roadmap and the mandates of the UAE's 5G committee and working groups appropriately comprehensive to be proactive for technology deployment?*

- The respondents had positive views towards the roadmap and mandates, two responses specified that the roadmap was jointly developed by the three committees and then approved by the steering committee. The progress on the work at the committees has been remarkable and used as a model by other countries in the region. The view from the technology vendor added that main objectives of this collaborative work by the TRA through the committees was undertaken with the vision that 5G is different than 3G and 4G which were operator centric. 5G by its nature is collaborative and the demand aspect has to be developed alongside the supply of the service through infrastructure upgrade.

3. *Is the country well prepared for upgrading the main wireless network (cellular network) or is there much to do to achieve the desired level?*

- It was emphasized by all interviewees that in terms of readiness for the introduction of the new technology, the UAE is the most developed country in the GCC region, and its digital database allows implementing the 5G network successfully. The UAE operators are always ahead of the competition in upgrading the networks. Spectrum has already been allocated to both operators for deployment. A chunk of 100 MHz each has been

allocated in the 3.6-3.8 GHz range and both operators undertook trials of 5G and launched the commercial network in 2018. Nevertheless, further network expansion will depend also on the technology maturity, vendors readiness and development roadmaps.

4. *What are the most likely prospects for the introduction and development of the 5G technology in the UAE, and what recommendations can be given to its developers at this stage?*

- There was a consensus by all responses that if all the provisions of the implementation plan are realised, wireless communication in the UAE will reach a new level, and a significant number of areas will benefit from increased productivity. Operator representative highlighted that business cases and profit opportunities will be game changers for the development pace which will required the regulatory flexibility by the government. The initiative manager mentioned that there was a study which forecasts that the 5G-enabled solutions will present a 10-year cumulative USD60 billion revenue opportunity for ICT providers in the UAE. The biggest vertical projected is the smart city. This study has also identified more than 20 different 5G services that could improve people's lifestyles and contribute to the UAE economy. The recommendations for improvement is to expand across all key verticals, avoid fragmentation and achieve consolidation through collaboration and coherent communication among all players.

5. *In your opinion, what are the main challenges faced when working on the UAE 5G initiative?*

- There was a shared view that the main challenge is that not many 5G business cases and revenue streams are there yet. The technology is not widely available commercially due to the standards development and status of spectrum to be decided by November 2019 at WRC-19. The user terminals will also become available by 2019. Therefore convincing the stakeholders to plan their applications on a network that is projected to bring certain features is the key challenge. It was also specified that harmonization for spectrum, standards and certifications will impact the economies of scale for launch of a new service. It is indicated by the answer that the decision makers in the UAE are eager to fulfil the vision for being in the lead for 5G deployment.

6. *What are the existing/anticipated impediments in fulfilling the technical and other requirements impinging on the 5G networks early deployment?*

- Interviewees have indicated that complexities will always arise, in particular, the difficulty of combining all the spectra into a single whole and a prerequisite for avoiding fragmentation in order to achieve the highest quality possible implementation, the view by representatives from operator and vendor was that these challenges will differ from one market to another due to different aspect such as availability of resources, costs of building the network and technical challenges associated with small cells and backhauling. Initiative manager added challenges of handset availability, number of connected devices, cybersecurity and data privacy.

7. *Please make recommendations to overcome such challenges as listed in question 5 and 6.*

- The list of recommendation provided by the representatives included the following: pro-active approach, collaborate and bring all stakeholders together, finding the optimum use cases, new business models through network slicing, update regulatory

frameworks, participate to accelerate standards development, regional harmonization for economies of scale and incentivize deployments.

## **6. Interpretation of Results**

Based on the key members' answers, the current initiative of introducing the 5G technology as a key wireless network in the UAE is successful at this stage of implementation with enormous anticipated impacts on various sectors and life aspects including the mobile communications. Since the launch date and roadmap of the initiative were determined, key players were able to participate with their inputs to the works of the UAE 5G committee. This proactive approach of UAE helped in increasing the country's readiness by providing the necessary resources such as the spectrum. The participation of the responsible committee is also observed because the officials are aware of the problems and prospects for introduction, and conclusions on the possible consequences are proposed in order to implement the plan successfully. However, there is still a room for improvement and to look to the aspects of business cases and flexibility in regulations. In general, the results of the work conducted by the authorities correspond to the facts that are offered in the media and prove the effective engagement of all stakeholders.

## **7. Future Implications**

In case of the continuing the successful implementation of the 5G technology in the UAE, various sectors will benefit significantly due to the convenience and availability of information, as well as data transfer speeds. The recommendation to further develop this approach by UAE touched upon different areas such as top use cases, new business models, updated regulatory frameworks, harmonization for economies of scale and incentivize early deployments. Also, as a recommendation for further research, more attention can be paid to results of implementation when

the technology get mature enough and its influence on the country's international rankings related to ICT.

## **8. Conclusion**

The introduction of a modern and high-tech wireless connection 5G network is an urgent and relevant task in the UAE, and following specific techniques and principles of implementation may help to realise the potential of the innovation program to the maximum. In accordance with the purpose of the study, the work of the government and relevant authorities is analysed, and all objectives are covered. The readiness of the United Arab Emirates to implement 5G is high which was a result of the proactive approach taken by UAE aiming to make the 5G network ready 2020 in parallel with hosting the mega event of Expo2020. Based on the literature review, it is clear that the theme of updating wireless network components is topical, and the successful development of these technologies contributes to positive changes in various industries.

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