

EVALUATING SMART GOVERNMENT MATURITY: INSIGHTS FROM ABU DHABI GOVERNMENT

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ABSTRACT

The rapid advancement of smart technologies has significantly bolstered the government's capabilities for digital transformation. The integration of these technologies in various government functions is expanding, showcasing dynamic capabilities that have the potential to fully unlock the transition from digital to data-driven smart government. Despite the widespread acknowledgment of the importance of smart government services, there is a notable dearth of research in this area. Additionally, the existing e-government literature lacks a comprehensive criterion for evaluating smart government, serving as a single reference to guide governments in this transformative journey. Thus, the aim of this study is to fill these gaps in the literature. Results from this study reveal that Abu Dhabi government employs emerging technologies, including artificial intelligence, cloud computing, open-access government data, mobile applications, sensors, and social networking. The results of this paper are valuable as they included specific measures to assess smart government maturity.

KEYWORDS

Smart Government, E-government, Maturity Model, Digital Transformation, UAE

1. INTRODUCTION

Research on smart government is attracting more attention from scholars and growing exponentially. A recent systematic literature review study conducted by Abu-Shanab and Harb (2019) showed that topics like open government, smart cities, and analytics have recently been attracting more research. The concept of smart services is another form of innovation that will help in enhancing the living conditions of the urban people and the effectiveness of governance in the economies. With the enhanced integration with the citizens, a government will be able to effectively achieve the wellbeing of the entire community by enhancing the quality of the its public services.

A smart government can be defined as a government that uses modern innovative technologies, strategies, policies and business frameworks and models to tackle the environmental, financial and social challenges pose to the public or the public sector of the country (Jiang et al., 2020). Harsh and Ichalkaranje (2015) highlighted that smart governments use the power of “data” to improve and advance public services further such a government to enable an integrated, seamless service experience; to engage with citizens; to co-develop policies, and to implement solutions for the well-being of the community. Smart Government driving element for the development of

smart cities due to its policies, strategies and usage of innovative technology and IT services. Smart government can bring progress and prosperity in the country or state and develop smart cities (Anthopoulos, 2017).

While there is much to be gained from smart government initiatives, the vast majority of these projects are still in the conceptualization, pilot, or early development stages. In addition, smart government is still in its infancy; hence, research in this area is scant (Hujran et al., 2022; Hujran et al., 2021a). Smart services at local government level are radically different from e-government and federal government smart services (Chatfield and Reddick, 2019). Sensors, big data, machine learning, cloud and AI algorithms take public services back to street levels, away from Websites to address the real-world problems citizens face such as traffic congestion in the city, pot holes on the streets, garbage not picked up and disasters including the recent coronavirus infection. Here, citizen-to-government interactions are more complex and real through the use of service robots, drones, and IoT sensors in vehicles and vehicle-to-infrastructure such as traffic signals in the city. The UAE has launched several digital transformation initiatives over the few past years. This indicates that it has a clear vision and robust aspiration to achieve its goal of becoming a digital nation in the near future. However, critical analysis of the digital transformation strategies reveals that they sometimes overlap with one another. In addition, as noted, the UAE's global ranking has not risen in the UN EGDI since 2018 (United Nations, 2020). The current state of the UAE's e-government/smart government calls for research to explore why the country has not risen in its global e-government ranking since the past two years, notwithstanding its numerous digital transformation strategies. As the UN E-Government Survey calculates the indexes at a country level but does not show the index of each individual local government, this research will assess each of the Abu Dhabi public entities and assessed the maturity level of smart government services delivered by these entities, respectively. This micro-level analysis will identify whether a digital divide exists between the local governments of the UAE. The results will be noteworthy for Abu Dhabi policy makers to identify local government agencies that are lagging behind. Afterward, policy makers can direct their efforts to overcome any identified gaps and, accordingly, achieve uniform and consistent digital transformation. Joint efforts and unified understanding will add to the UAE's significant progress in digital transformation as it realizes its vision of becoming a smart country.

The literature identifies various e-government maturity models that offer different normative views concerning the progressive stages of e-government evolution, particularly with regard to e-government-service capability (Hujran et al., 2023). These models have been developed and adopted by academic researchers (Hujran et al., 2021a; Chatfield and Alhujran, 2009; Layne and Lee 2001; Hiller and Belanger, 2001; Moon, 2002; Reddick, 2004), IT consulting companies (Baum and DiMaio, 2000; Deloitte and Touche, 2001) and institutions (United Nations, 2020).

Most recently, Hujran et al. (2021a) developed a new e-government maturity model with an additional maturity stage that reflects the use of smart government capabilities, the SMARTGOV maturity model. Based on this maturity model, this study has assessed the maturity level of smart government services delivered by the Abu Dhabi government.

2. METHODOLOGY

The following sub-sections present the evaluation criteria, the process of evaluation, and provide a discussion of the findings derived from the current study.

2.1. Evaluation Criteria

To evaluate and analyze smart government maturity in the Abu Dhabi public agencies governments, the researchers used Hujran et al (2021a) evaluation criteria for smart government maturity stage (see Table 1).

Table 1. Criteria for evaluating smart government

Evaluation Criteria
1. "Does the website/mobile app enable citizens to customize/personalize the public organization website/portal to mark their favorite/commonly used online services?"
2. "Are public services accessible via mobile devices?"
3. "Did the public organization launch its mobile application(s)?"
4. "Does the website/mobile app enable citizens to register and obtain a digital ID, i.e., username and password?"
5. "Does the website/mobile app enable citizens to use a single sign-on?"
6. "Does the website/mobile app enable citizens to verify output documents issued by the ministry?"
7. "Does the website/mobile app provide open data?"
8. "Does the website/mobile app provide evidence of online information or services in partnership with other government entities or agencies (that is, cross-agency information sharing)?"
9. "Is there any evidence that the e-services provided by public organization are included in other broad government applications?"
10. "Does the website/mobile app provide information on or evidence of online services in partnership with private sectors or civil society?"
11. "Does the website/mobile app provide information or declarations on General Data Protection? This information may include details on the storage of citizens' data, security of data, and entities who can access such data."
12. "Does the website/mobile app provide information about the transparency of service delivery (e.g., process length, track progress, delivery time lines, or maximum time limit)?"
13. "Does the website/mobile app provide live chat service?"
14. "Does the website/mobile app provide the Chatbot service?"
15. "Does the MOHAP's website/mobile app show evidence of using AI applications (i.e. the public agency may use AI for disease detection)?"
16. "Does the website/mobile app provide evidence of using robotics?"
17. "Does the website/mobile app provide evidence that the public organization uses or provides services through virtual/augmented reality?"
18. "Does the website/mobile app provide evidence that the public organization uses cloud computing technology?"
19. "Does the website/mobile app provide evidence that the public organization is sharing data and also is integrated with other government entities/agencies/ministries?"
20. "Does the website/mobile app provide evidence that the public organization allows other partners to connect directly to their database?"
21. "Are any of public services provided through or based on global positioning system (GPS), geographic information system (GIS), sensors, or radio frequency identification (RFID) (i.e., file or document tracking)?"
22. "Are any of public services provided through/based on Blockchain technology?"
23. "Does the website/mobile app provide evidence that the citizens can pay fees for health services, using digital currency (i.e., emCash)?"
24. "Are any of public services provided through the Internet of Things (IoT) technology?"
25. "Do any of public services provided use quick response (QR) codes (i.e., pay health bills by scanning QR codes)?"
26. "Does the website/mobile app enable citizens to suggest new e-services to be designed and delivered in the future?"
27. "Does the website/mobile app provide evidence related to the use of a 360-degree view of the citizen concept (i.e., pushes relevant, tailored information and services to citizens on the basis of profiles, needs, and expectations) and triggered services (i.e., recording new births by connecting

- data with hospitals. Citizens are no longer required to report new births).”
28. “Does the website/mobile app provide evidence that the public organization follows the Omni-channel approach?”
 29. “Does the website/mobile app provide health e-services specific to the following vulnerable groups: people with disabilities, poor, women, youth, and the elderly?”
 30. “Does the website/mobile app provide health e-services specific to: visitors, tourists, and residents?”

Source: Hujran et al. (2021a)

2.2. Evaluation Process

This qualitative study employed a comprehensive website content analysis to assess e-government/smart government maturity, which is largely used by a great number of e-government scholars (e.g. Hujran et al., 2021b; United Nations, 2020; Al-Hujran, 2012; Nitzsche et al., 2012; Pina et al., 2009; Chatfield and Alhujran, 2009; West, 2007).

In this study, a qualitative analysis of the Abu Dhabi e-government/smart government development was performed. This involved conducting a comprehensive content analysis of Abu Dhabi’s public agency websites and mobile government applications to identify smart or intelligent services from a user-centric viewpoint. Basically, the analysis of the Abu Dhabi’s e-government focused on what functionalities and services are offered to users who access the public portals, websites, or mobile applications.

Before starting the evaluation process, the researchers conducted an online meeting of five technicians/experts to discuss the evaluation process and clarify the evaluation criteria. Next, the e-services of each public agency located in Abu Dhabi and all its divisions and subsidiaries were assessed using the criteria. As some of the criteria required the assessors to log in to the e-government system, the assessors located in the UAE obtained a SmartPass for each of them. A SmartPass allows users to access all Abu Dhabi e-government services using a single account. After the experts’ independent analyses, the researchers along with the five experts compared, discussed, and validated the evaluation results. In addition, the experts’ judgments were cross-validated using secondary data sources, including e-government rankings and the e-participation index published by the United Nations (2020).

2.3. Assessment Results

The study assesses Abu Dhabi governments’ websites/portals based on the 30 indicators representing the smart government services. Findings reveal that the Abu Dhabi government implemented smart government services by transforming a majority of its services into electronic or smart services. Smart government strategies of Abu Dhabi include the strategic steps and stances taken by the government of the UAE to achieve the smart government. This is not just a one-step process to change the government to just smartness with bringing change in one process or approach, knowledge management, innovations and technologies. Abu Dhabi launched the Mobile Government initiative to make the government services available to the people wherever they are 24/7. For example, the government launched the app called “AbuDhabiPolice”, to provide smart services to public. Some of the services included in the app are traffic violation, the location of police stations on the map, pay traffic fines and the renewal of driving licenses.

In addition, the empirical findings of this study provided support to the existence of open data initiatives in Abu Dhabi government. Therefore, the government is connected with multiple agencies as well as with the community. Moreover, the government websites/apps have articles

about robotics and artificial intelligence, but the implementation of AI related services is still on a limited basis. Furthermore, the results indicated that registered citizens could acquire digital ID cards, logins, and passwords although certain applications should meet the criteria for eligibility. The use of advanced technologies such as GPS, GIS, QR code and blockchain is observed. The findings of this research also indicated that Abu Dhabi e-services are accessible by vulnerable groups such as people with disabilities, poor, women, youth and the elderly as well as visitors, tourists and residents. However, the analysis does not provide evidence related to the use of a 360-degree view of the citizen concept or that the public organizations follows the omni-channel approach.

3. CONCLUSIONS

Qualitative analysis revealed that the Abu Dhabi government and its respective agencies utilized emerging technologies, such as AI, cloud computing, open-access government data, mobile apps, sensors, and social networking, to provide the public with intelligent, integrated, personalized, and interactive government services.

UAE in general and Abu Dhabi emirate in particular has set several strategies that aim to transfer the community towards the new technological era and fourth industrial revolution through strategical innovation. These strategies almost covered all aspects of citizen's/residents' life. Starting from day-to-day applications and ending with huge technological and green cities that once were considered as imagination on paper. UAE next visions are carried on innovation wings that will deliver the most desired outputs at highest end user satisfaction. Moreover, these disruptive changes that UAE is implementing nowadays are eventually leading to a totally different community culture that is wiser and more knowledgeable on how to use resources and capital with all its varieties. Furthermore, UAE is maintaining to a very high extent a level of great dynamically unstable mechanism of innovation diffusion. This indicates the existence of radical, incremental, and disruptive innovations. Last but not least, UAE now is witnessing a bright change in management where youth are taking the wheel in very high positions which indicates the healthy structure of the community, and the great effort that is put into transferring all dreams to reality. A transfer from being an oil dependent to an industrial, logistic, and commerce country that connects the whole world under the umbrella of happiness and tolerance. Future research may focus on measuring the perceived public value from citizen's and resident's perspectives. It is indeed significant to measure the value of such smart services from the perspective of citizens and residents to ensure that such investments are worthwhile and positive. Future research may also focus on measuring smart services at other emirates such as Dubai, Sharjah, Ajman etc. and conduct comparative studies across these emirates.

REFERENCES

- [1] Abu-Shanab, E., & Harb, Y. (2019). E-government research insights: Text mining analysis. *Electronic Commerce Research and Applications*, 38, 100892.
- [2] Al-Hujran, O., Al-Debei, M. M., & Al-Lozi, E. (2014). Examining eDemocracy adoption intention for digital society: An integrative model. In *The eighth international conference on digital society* (pp. 39-47).
- [3] Al-Hujran, O. (2012). An assessment of Jordan's e-government maturity: a user-centric perceptive. *International Journal of Electronic Governance*, 5(2), 134-150.
- [4] Baum, C., & Di Maio, A. (2000). Gartner's four phases of e-government model. Gartner Group, Report No. TU-12-6113.
- [5] Chatfield, A. T., & Reddick, C. G. (2019). A framework for Internet of Things-enabled smart government: A case of IoT cybersecurity policies and use cases in US federal government. *Government Information Quarterly*, 36(2), 346-357.
- [6] Chatfield, A. T., & Alhujran, O. (2009). A cross-country comparative analysis of e-government service delivery among Arab countries. *Information Technology for Development*, 15(3), 151-170.
- [7] Deloitte and Touche (2001). The citizen as customer. *CMA Management*, 74(10), p.58.
- [8] Harsh, A., & Ichalkaranje, N. (2015). Transforming e-government to smart government: A South Australian perspective. *Advances in Intelligent Systems and Computing*, 1, 9-16.
- [9] Hiller, J. S., & Bélanger, F. (2001). Privacy strategies for electronic government. *E-government*, 200, 162-198.
- [10] Hujran, O., Alarabiat, A., & AlSuwaidi, M. (2023). Analysing e-government maturity models. *Electronic Government, an International Journal*, 19(1), 1-21.
- [11] Hujran, O., Al-Debei, M. M., Al-Adwan, A. S., Alarabiat, A., & Altarawneh, N. (2022). Examining the antecedents and outcomes of smart government usage: An integrated model. *Government Information Quarterly*, In press
- [12] Hujran, O., Alarabiat, A., Al-Adwan, A. S., & Al-Debei, M. (2021a). Digitally Transforming Electronic Governments into Smart Governments: SMARTGOV, an Extended Maturity Model. *Information Development*.
- [13] Hujran, O., Alsuwaidi, M., Alarabiat, A., & Al-Debei, M. (2021b). Embracing Smart Government During the COVID-19 Pandemic: Evidence from the United Arab Emirates. *PACIS 2021 Proceedings*. Dubai, United Arab Emirates, pp. 1-11.
- [14] Jiang, H., Geertman, S., & Witte, P. (2020). Smart urban governance: an alternative to technocratic "smartness". *GeoJournal*, 1-17.
- [15] Khasawneh, M. H. A., Hujran, O., & Abdrabbo, T. (2018). A quantitative examination of the factors that influence users' perceptions of trust towards using mobile banking services. *International Journal of Internet Marketing and Advertising*, 12(2), 181-207.
- [16] Layne, K., & Lee, J. (2001). Developing fully functional E-government: A four stage model. *Government information quarterly*, 18(2), 122-136.
- [17] Moon, M. J. (2002). The evolution of e-government among municipalities: rhetoric or reality?. *Public administration review*, 62(4), 424-433.
- [18] Nitzsche, P., Pistoia, A., & Elsässer, M. (2012). Development of an Evaluation Tool for Participative E-Government Services: A Case Study of Electronic Participatory Budgeting Projects in Germany. *Administration & Public Management Review*, 18, 6-25.
- [19] Pina, V., Torres, L., & Royo, S. (2009). E-government evolution in EU local governments: a comparative perspective. *Online Information Review*, 33 (6), 1137-1168.
- [20] Reddick, C. G. (2004). A two-stage model of e-government growth: Theories and empirical evidence for US cities. *Government information quarterly*, 21(1), 51-64.
- [21] United Nations (2020). E-Government Survey 2020: Digital Government in the Decade of Action for Sustainable Development. Retrieved from [https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2020-Survey/2020%20UN%20E-Government%20Survey%20\(Full%20Report\).pdf](https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2020-Survey/2020%20UN%20E-Government%20Survey%20(Full%20Report).pdf)
- [22] West D. M. (2007). *Global E-Government 2007*. Retrieved from <http://www.insidepolitics.org/egovt07int.pdf>.
- [22] Gizem, Aksahya & Ayese, Ozcan (2009) *Coomunications & Networks*, Network Books, ABC Publishers.

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