HONG KONG JOURNAL OF SOCIAL SCIENCES

香港社會科學學報

最新第 62 期 (2023 年秋/冬季) Vol. 62 Autumn/Winter 2023

Open Access Article https://doi.org/10.55463/hkjss.issn.1021-3619.62.9

ICT Role in Public Institutions toward the Oman Vision 2040: Specialists' Perspectives

Asma Bani-Oraba

Sultan Qaboos University, Muscat, Sultanate of Oman

Received: August 6, 2023 ▪ Reviewed: September 5, 2023

▪ Accepted: October 10, 2023 ▪ Published: November 30, 2023

Abstract:
This study investigates the role of ICT in public institutions in achieving Oman's Vision 2040 by exploring specialties' perspectives. A 28-item quantitative, Likert-type attitude questionnaire was administered to 600 ICT specialists working in 34 governmental institutions, with items exploring experts' awareness (n=4), perceived importance (n=16), and challenges (n=6) relating to ICT importance in achieving the Vision. The findings indicate high awareness and perceived importance but also signal a strong perception that major challenges face the development of ICT in governmental institutions. No significant differences were found in relation to gender, but it was found that those with 1-5 years' experience had a stronger belief in the importance of ICT to achieve OV40 compared with those with over 21 years' experience, and those with 11–15 and 16–20 years' experience had stronger perceptions of the challenges to ICT use by governmental institutions to achieve the Vision. No significant experience-related differences were found regarding the awareness of OV40 priorities and indicators. This study highlights the importance of ICT in the achievement of the Oman Vision 2040 and the challenges faced that should be addressed regarding the development of ICT in governmental institutions. The results indicate the need for a coherent multi-stakeholder approach to the development of government ICT infrastructure and systems to empower ICT professionals to effectively contribute to the achievement of the national vision.

Keywords: ICT, public institutions, Oman Vision 2040, specialist.

信息通信技术在实现阿曼 2040 年愿景的公共机构中的作用：专家的观点

摘要：
这项研究通过探索专家的观点来调查信息和通信技术在公共机构中实现阿曼 2040 年愿景的作用。向在 34 个政府机构工作的 600 名信通技术专家发放了一份 28 项定量的利克特式态度问卷，其中包括探讨专家的认识（n=4）、感知的重要性（n=16）和与信通技术在实现愿景方面的重要性(n=6）。调查结果表明，人们高

Corresponding Author: Asma Bani-Oraba, Sultan Qaboos University, Muscat, Sultanate of Oman; email: baniorab@squ.edu.om

度认识到信息和通信技术的重要性，但也表明，人们强烈认为政府机构发展信息和通信技术面临重大挑战。在性别方面没有发现显着差异，但发现与具有 21 年以上经验的人相比，具有 1–5 年经验的人更相信信通技术对 实现阿曼愿景 40 的重要性，而具有 11–15 年和 16–20 年经验的人更清楚地认识到政府机构为实现愿景而使用信通技术所面临的挑战。在对阿曼愿景 40 优先事项和指标的认识方面，没有发现与经验有关的重大差异。这项研究强调了信息和通信技术在实现《阿曼 2040 年远景》方面的重要性，以及在政府机构发展信息和通信技术方面所面临的挑战。结果表明，需要对政府信息和通信技术基础设施和系统的发展采取协调一致的多方利益有关者办法，使信息和通信技术专业人员能够有效地为实现国家愿景作出贡献。

关键词：信息通信技术, 公共机构, 阿曼愿景 2040, 专家。

1. Introduction

National development plans embodied in visions are a common approach used to identify and accelerate socioeconomic progress through the adoption of a group of priorities to be achieved within a stipulated period. Many countries around the world have adopted national vision projects, such as the Singapore Green Plan 2030. In the Gulf Cooperation Council (GCC), the impressive socioeconomic development of the United Arab Emirates in recent years, as adumbrated in UAE Vision 2021, has inspired other important national initiatives, including Qatar Vision 2030 and Saudi Arabia Vision 2030, which guide massive public and private sector investment and commitment to drive progress. This paper explores the perceptions of public-sector ICT experts in relation to the achievement of Oman's Vision 2040 (hereinafter "OV40").

1.1. Literature Review

The literature has identified that the achievement of visions depends on several enabling factors, of which ICT represents a universal cornerstone in all stages, from initiation to long-term sustainability of desired changes. Numerous studies have demonstrated a strong correlation between ICT and the achievement of organizational goals (Gil-Padilla & Espino-Rodríguez, 2008; Hooi & Ngui, 2014; Kozuharov & Kozuharov, 2014; Rehman et al., 2020). Heiba (2011) pointed out that the achievement of national priorities requires extensive application of ICT among institutions and individuals within the society. This entails the achievement of ICT integration between public institutions, which is crucial to build a national framework within which to share information effectively to achieve technical objectives as well as national socioeconomic goals (Al-Helayyil et al., 2016).

The successful adoption and development of advanced ICT in public institutions empowers them to address internal and external problems, enhancing the competency of decision making, increasing productivity, diversifying and improving services, and increasing product quality (Abhanasi, 2012; Sturgeon, 2021). It also enhances competitiveness potential in various economic and social sectors (Bag et al., 2021), and supports strategic planning and alignment with operational plans to ensure achievement of national visions and specific goals (Siband & Ramrthan, 2017). In addition, it enables the management and addressing of different issues that face achieving goals at different stages of services and production, responding dynamically to facilitate troubleshooting and early remedial actions (Goepp & Avila, 2015). ICT enables institutions to deal with different developments and disruptions at the national and international levels (Coltman et al., 2015).

ICT also improves the quality of decision making by providing updated and accurate data with different alternative solutions and ways to achieve the goals (Neziraj & Shaqiri, 2018). It enables decision makers to forecast near- and far-future changes at the local and global levels that prevent facing issues and increase readiness to address them (Ming et al., 2021; Vivek, 2021). It also enhances employee productivity and optimum organizational resource deployment (Niebel, 2018), improving work environments and employees' productivity and loyalty, thereby reducing production costs associated with employee dissatisfaction or low morale (Cousins & Robey, 2021).

Based on extensive studies, ICT can make a fundamental difference and be a cornerstone for achieving national visions, and it has been instrumental in great progress toward the achievement of national visions in Kenya, Rwanda, Saudi Arabia, and Singapore. In Saudi Arabia, the largest country and economy in the GCC, ICT development has led to improved quality of public services, achieved integration between public institutions (Rashad, 2016), and also attracted investors for major national investment projects (Almaeena, 2016; Halligan, 2017). In Kenya, the development of ICT promotes e-commerce, industry, and the quality of services in public and private institutions (Colins College, 2019). In Singapore, ICT has been central to economic initiatives for decades (Goh, 1993), and it has enhanced socioeconomic development and standards of living (UN-OHRLLS, 2017). These cases clearly indicate the importance of having sufficiently developed ICT to achieve developmental visions, and some studies have found that some institutions and governments failed to achieve their plans due to a lack of advanced ICT (Chevez, 2010; Elmorshidy, 2013; Mithas & Rust, 2016; Porter & Siggelkow, 2008).

The current study focuses on Oman, who's Vision 2040 has been implemented on the ground since 2020. Oman's plan is highly ambitious and seeks to go beyond the modest progress made in the achievement of the preceding Vision 2020. The achievement of OV40

requires providing all potentials and enablers, one of which is developing ICT capacity and proficiency in public institutions. As explained above, extensive empirical studies have demonstrated that developed and advanced ICT fundamentally enable the achievement of socioeconomic visions and plans, but ICT *per se* is useless without effective adoption and operation by skilled professionals.

Oman's ICT profile is not encouraging, and some previous studies have shown challenges in enhancing the quality of ICT in public institutions (Al Azri et al., 2010; Al-Rahbi et al., 2012; Al-Busaidy & Weerabkkody, 2011; Mohammad & Sriram, 2015). In addition, the results of a survey conducted by the Oman National Center for Statistics & Information showed a lack of quality of public institutions' ICT (Announcing the results of a survey on individual satisfaction with e-government services, 2018). In addition, a United Nations (2020) report showed that Oman still ranks second-lowest among GCC states in terms of the e-government development index.

ICT is crucial in the achievement of all ten OV40 targets and the twelve associated core priorities, as displayed in Figures 1 and 2 (respectively) (Ministry of Finance, 2020). Education, learning, scientific research and national capabilities; health, citizenship, identity and national heritage and culture; wellbeing and social protection; economic leadership and management; economic diversification and fiscal sustainability; labor market and employment; the private sector, investment and international cooperation; development of governorates and sustainable cities; environment and natural resources; legislative, judicial and oversight systems; and governance of state's administrative bodies, resources and projects (Ministry of Finance, 2020).

Based on this milieu, the current study attempts to understand the role of ICT in Oman public institutions to achieve OV40 by answering the research questions and associated objectives adumbrated below.

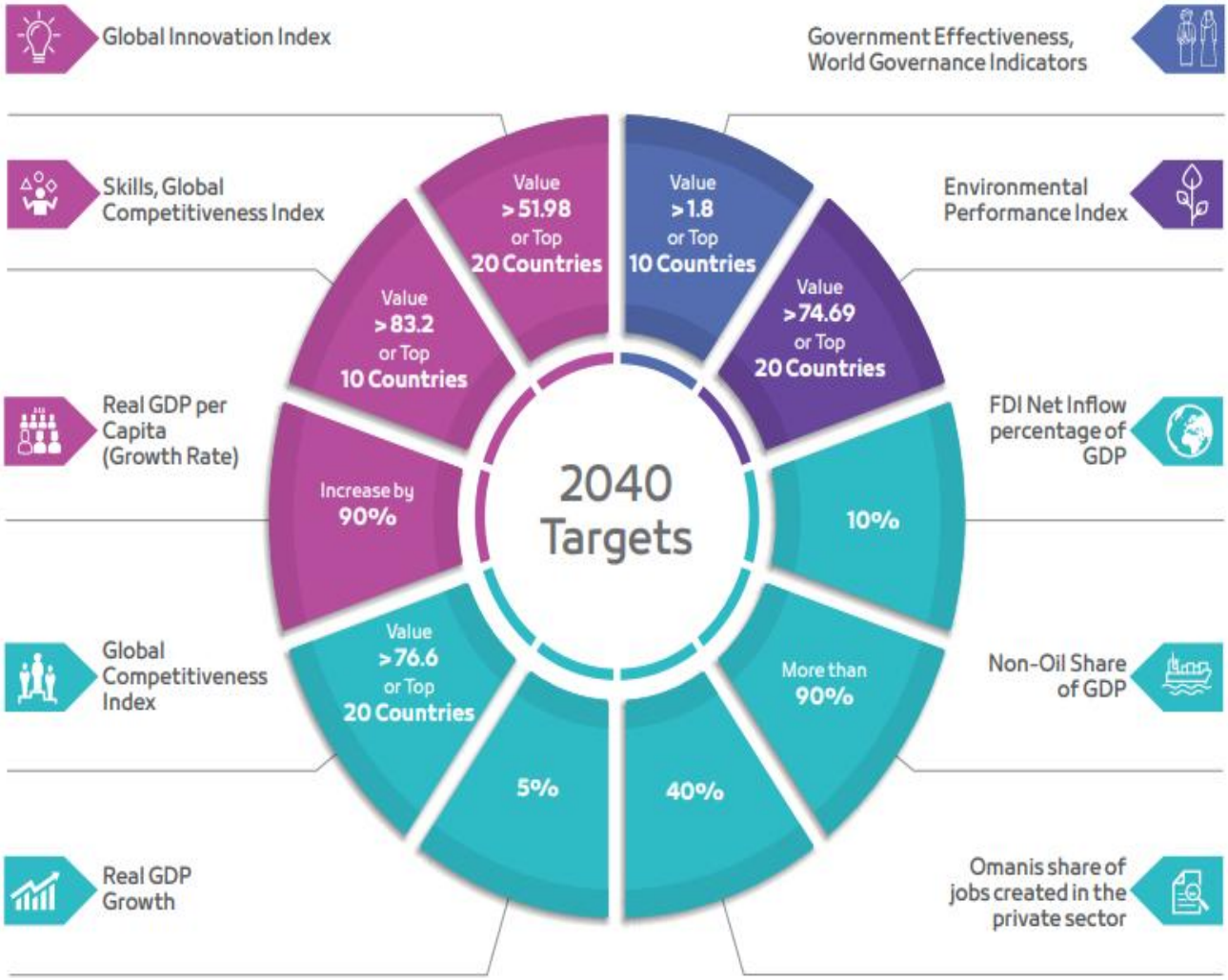

Figure 1. OV40 targets (Ministry of Finance, 2020)

Figure 2. OV40 national priorities (Ministry of Finance, 2020)

1.2. Research Questions

1. What is the extent of awareness of ICT specialists and decision makers of OV40?
2. What are the perceptions of ICT specialists and decision makers regarding ICT importance in governmental institutions in achieving OV40?
3. What challenges face ICT deployment in governmental institutions to achieve OV40?
4. Are there any significant differences in perceptions due to gender and experience?

1.3. Research Objectives

- Defining ICT specialists' awareness of OV40
- Identifying the perceptions of ICT specialists and decision makers regarding the importance of ICT in governmental institutions to achieve OV40.
- Identifying challenges facing developing ICT in governmental institutions to support the achievement of OV40.
- Identify any differences in experts' perceptions related to gender and experience.

2. Research Methodology

This study used a descriptive questionnaire approach to gather data, which is appropriate for collecting raw data and creating a structure that allows description of the characteristics of a targeted population (Creswell & Creswell, 2017; Shiu et al., 2009). Flowchart of the research is presented in Figure 3.

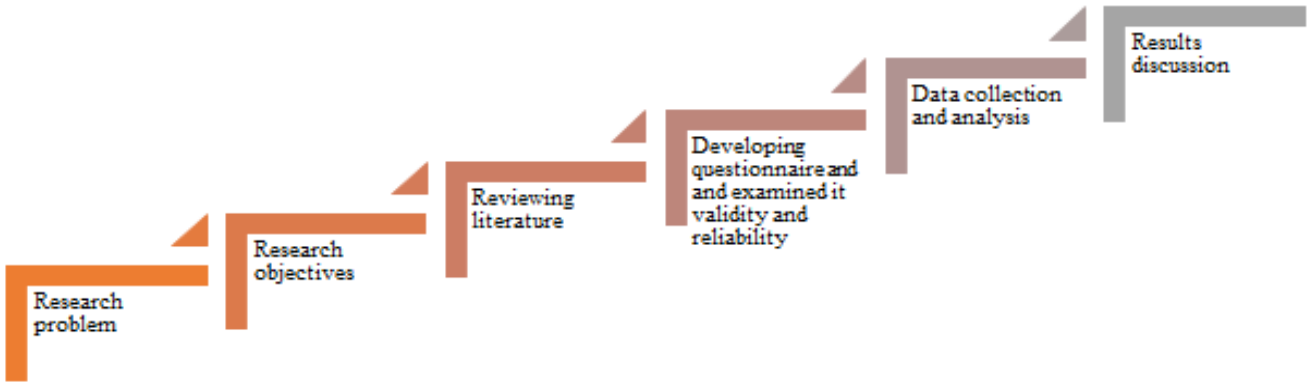

Figure 3. Study flowchart

2.1. Sample

The current study targeted a population of ICT technicians and decision-makers (directors and heads of department) in 24 ministries and 13 other governmental organizations in Oman, comprising a total population of 1004, as identified from official government directories.

The questionnaire was distrusted by the entire population, of whom 612 returned the survey forms; 12 were subsequently disregarded due to being incomplete, leaving a total study population of 600 experts, as displayed in Table 1. The sample has excellent gender representation, with 51% of participants being female, which facilitates the examination of gender as a potential variable affecting ICT experts' perceptions in this study.

Table 1. Sample distribution

Variables	Sub-variables	Frequencies	Total
Gender	Male	294	600
	Female	306	
Experience (years)	1-5	92	600
	6-10	179	
	11-15	171	
	16-20	113	
	21+	45	

2.2. Instrument

Data were gathered using a 28-item Likert-type attitudes questionnaire, which consisted of 24 items exploring experts' awareness (n=4), perceived importance (n=16), and challenges (n=6) relating to ICT importance in achieving the Vision. Questions were developed by the researcher on the basis of reviewed previous studies (Al-Busaidy & Weerabkkody, 2011; Al-Helayyil et al., 2016; Alshuaibi, 2017; Colins College, 2019; Heiba, 2011; Mithas & Rust, 2016; Mitić et al., 2021). A five-point Likert scale was used for responses (ranging from 1 = strongly disagree to 5 = strongly agree).

2.3. Validity and Reliability

The questionnaire was deemed valid after examination by a panel of judges from Sultan Qaboos University and ICT experts from different ministries. Very high reliability was indicated by Cronbach's alpha coefficient (.977).

3. Results

3.1. RQ1: What Is the Extent of Awareness of ICT Specialists and Decision Makers of OV40?

Table 2 shows the mean and standard deviation values of ICT specialists' awareness of OV40. The results indicate that they had an overall low awareness score (2.92), with middling awareness of the priorities and indicators of OV40 (3.10). They had low awareness of mechanisms of developing ICT and mechanisms of integration between public institutions in light of OV40, with mean scores of 2.89 and 2.87 (respectively).

Table 2. Mean and standard deviation values for specialist awareness of OV40

Awareness Dimension	Mean	SD
Awareness of OV40 priorities and indicators .1	3.10	1.06
2. Strategies for developing ICT in Oman's 10th five-year development plan	2.82	1.17
3. Mechanisms for achieving integration between public institutions	2.87	1.19
4. Mechanisms of developing ICT in light of OV40	2.89	1.22
Overall	2.92	1.057

3.2. RQ2: What Are the Perceptions of ICT Specialists and Decision Makers of ICT's Importance in Governmental Institutions in Achieving OV40?

Table 3 shows the mean and standard deviation values of ICT specialists' perceptions of the importance of ICT in achieving OV40. The overall score was middling (3.24), and the scores for specific items were generally clustered slightly above the neutral midpoint. The highest mean scores were 3.58 for "enhancement of security" and 3.55 for "privacy of information"; the lowest was for "analyzing institutional performance based on global competitiveness indicators" (2.99).

Table 3. Mean and standard deviation of ICT importance in achieving OV40

"Importance" Items	Mean	SD
5. Providing high-quality services to all customers and beneficiaries	3.58	.801
6. Enhancing the security and privacy of information	3.55	.996
7. Providing contentious services throughout weekdays	3.47	.935
8. Increasing productivity and improving the level of efficiency in the organization	3.35	.990
9. Achieving high institutional performance with minimal effort and costs	3.25	.918
10. Developing comprehensive and integrated databases	3.24	1.07
11. Providing high-quality data to support decision making	3.23	.941
12. Evaluate the institution's performance and achievement of its objectives	3.22	.977
13. Enhance the efficiency of monitoring and evaluating the achievement of institutions' plans	3.21	.993
14. Enhance the efficiency of monitoring and evaluating the achievement of employees	3.20	1.01
15. Enhancing the competitiveness of the institution	3.18	1.00
16. Achieving integration between different institutions to share database information	3.17	1.07
17. Achieving integration between different institutions to enhance the speed of service delivery	3.15	1.06
18. Allowing definition of institutional weaknesses and addressing them	3.12	.957
19. Analyzing the external environment to identify potential, opportunities, and threats	3.11	.959
20. Providing high-quality services to international beneficiaries	3.03	.997
21. Analyzing Institutional Performance Based on Global Competitiveness Indicators	2.99	1.06
Overall	3.24	.789

3.3. RQ3: What Challenges Face ICT Deployment in Governmental Institutions to Support the Achievement of OV40?

Table 4 shows the mean and standard deviation values of ICT specialists' perceptions regarding the challenges facing governmental institutions in developing their ICT to meet the requirements of OV40. The overall mean score for challenges (3.73) was notably higher than that for awareness (2.92) and importance (3.24). The most strongly perceived challenges were regarding governmental institutions sharing information and data (4.00), the high cost of developing ICT (3.91), and the impact of some leaders' mindsets hindering digital transformation (3.81).

Table 4. Mean and standard deviation for the challenges facing government ICT use (The author)

"Challenges" Items	Mean	SD
22. Some government institutions are reluctant to share their information and data	4.00	.977
23. High cost of developing ICT to meet the OV40 requirement	3.91	.957
24. The mindset of some leaders hinders digital transformation	3.81	1.07
25. Lack of knowledge among technicians and decision makers about the targeted indicators of OV40 regarding ICT	3.63	1.00
26. Lack of technical competencies to develop ICT	3.60	1.04
27. Poor digital skills among some technicians hinder their ability to deal with advanced technology	3.59	.996
28. Lack of knowledge among technicians and decision makers about the mechanisms to achieve indicators of OV40	3.57	.986
Overall	3.73	.789

3.4. RQ4: Are There Any Significant Differences in Perceptions due to Gender and Experience?

The t-test results shown in Table 5 revealed that there were no statistically significant gender-related differences in OV40-related awareness of priorities and indicators, perceptions of the importance of ICT, and perceptions of challenges facing developing ICT in public institutions.

The results shown in Table 6 indicate that there are significant experience-related differences in perceptions of ICT importance and challenges regarding ICT development to achieve OV40. Those with 1-5 years' experience had a stronger belief in the importance of ICT to achieve OV40 compared with those with over 21 years' experience, and those with 11–15 and 16–20 years' experience had stronger perceptions of the challenges to ICT use by governmental institutions to achieve the Vision. No significant experience-related differences were found regarding the awareness of OV40 priorities and indicators.

Table 5. T-test results for gender (The author)

	Gender	N	Mean	SD	t	df	Sig. (2-tailed)
Awareness	Male	294	3.0051	1.105	1.870	598	.062
	Female	306	2.8440	1.00	1.866	587.167	.062
Importance	Male	294	3.2807	.804	1.197	598	.232
	Female	306	3.2036	.774	1.196	594.360	.232
Challenges	Male	294	3.7629	.760	.927	598	.354
	Female	306	3.7031	.816	.929	597.451	.353

Table 6. One-way ANOVA results for experience (The author)

		Sum of Squares	df	Mean Square	F	Sig.
Awareness	Between groups	2.918	4	.729	.651	.626
	Within groups	666.830	595	1.121		
	Total	669.747	599			
Importance	Between groups	8.304	4	2.076	3.383	.009
	Within groups	365.127	595	.614		
	Total	373.431	599			
Challenges	Between groups	8.239	4	2.060	3.357	.010
	Within groups	365.034	595	.614		
	Total	373.273	599			

4. Discussion

The results showed that ICT specialists' level of awareness regarding OV40 was generally limited, which is remarkable considering their fundamental role in driving planned national progress, as discussed previously. This suggests a lack of involvement of these key stakeholders during the policy design phase, which is a common barrier to effective ICT use in e-government (Sánchez-Torres & Miles, 2017). This reflects a top-down management approach that is common in public and corporate governance in the GCC and MENA states. Although Hofstede Insights (2023) does not have specific data for Oman, the prevailing national culture of its GCC neighbors Qatar, Saudi Arabia, and the UAE exhibit high power distance (93, 72, and 74, respectively), suggesting cultures in which:

"People accept a hierarchical order in which everybody has a place and which needs no further justification. Hierarchy in an organization is seen as reflecting inherent inequalities, centralization is popular, subordinates expect to be told what to do, and the ideal boss is a benevolent autocrat" (Hofstede Insights, 2023).

Although the Hofstede (2001) model is not without its problems (Javidan et al., 2006), the general implication of a culture with a strongly top-down organizational decision-making structure is clearly

problematic when seeking to implement an executive-driven national vision with the requirement of strong commitment and buy-in by ICT experts and a robust and effective national ICT platform integrating concerned institutions. The disconnect between the outcomes envisioned by OV40 and the modest expectations and prognosis of the experts surveyed in this research are indicative that the latter were not appropriately involved in policy formulation and that the communication of the Vision to these grassroots public servants was not effective. This implies a lack of workshops, training, and awareness campaigns to introduce to all employees in the public institutions and to develop their knowledge and skills to enable each institution to develop its infrastructure and operations in alignment with the Vision.

The lack of appropriate consultation, workshops, lectures, and training resulted in middling or low awareness of mechanisms for developing ICT based on OV40 and how to build integrations between public institutions, such as developing databases that serve the achievement of OV40. Héroux and Munshi (2019) showed a correlation between employers' level of awareness of vision, strategies, and objectives and their productivity and initiatives. The results of this study support those of Siband and Ramarahan (2017), who found limited employee awareness of management-level vision and goals. Thus, it is essential to enhance Oman ICT specialists' awareness of OV40 to ensure their contribution to building a high-quality ICT that supports achieving OV40. Increasing employee awareness of organizational visions is essential to enable them to develop their institutions' ICT and achieve integration between different institutions and stakeholders (Al-Khasawneh, 2019; Ding et al., 2012; Samdantsoodol et al., 2017).

The results also showed that ICT specialists think that ICT can contribute only modestly to the achievement of OV40, which is commensurate with their relatively limited awareness (i.e., mediocre awareness logically undermined their perception of their potential contribution to achieving the Vision). However, this may also reflect the obstacles facing the current ICT profile of public institutions *per se*, which prevents them from playing a major role in achieving the Vision. Studies on ICT in Oman's public institutions consistently highlighted the need for fundamental development, noting low quality and limited products (Al-Azri et al., 2010; Al-Rabhi et al., 2012; Al-Busaidy & Weerabkkody, 2011; Elmorshidy, 2013).

This is also related to the findings that revealed that ICT specialists had strong perceptions of the challenges facing the development of ICT in public institutions. Oman's public institutions face a very critical issue in developing ICT concerning the low level of sharing data and information between themselves, which prevents building a national database. Without sharing data between stakeholders, it is not possible to build integrated and comprehensive databases that are transparent, accurate, and able to offer high-quality services (Ayedun et al., 2021; Samdantsoodol et al., 2017).

ICT challenges are also fundamentally related to the high cost of developing ICT and the prevailing instability in the global economy and for the GCC in recent years. It is difficult for Oman to provide lavish budgets for the purchase, maintenance, and updating of possibly unproven hardware and software solutions, as well as providing training and maintenance programs. However, the government needs to develop a coherent strategy to develop and finance ICT to achieve OV40, similar to the trajectory of Kenya, Saudi Arabia, Singapore, and Rwanda, which prioritized ICT investment in their budgets to achieve their national visions (Almaeena, 2016; Collins College, 2019; Goh, 1993; Halligan, 2017; Rashad, 2016; UN-OHRLLS, 2017). Furthermore, the results suggested that digital transformation in Oman faces resistance from some leaders, which may delay progress. Old leadership personnel tend to prefer existing legacy systems due to their proven functionality, as well as a tendency to be more cautious about the potential costs of new innovations. They may also lack the ability to develop their skills in using advanced technologies (in which case proper ICT training and reskilling should be provided) (Keld, 2018; Serest et al., 2008).

The results demonstrated a lack of awareness among ICT experts of global ICT competitive indictors targeted by OV40, which would axiomatically inhibit them from realizing the level of ICT development required to achieve the Vision. It is important to develop employees' awareness of institutionally targeted competitiveness indicators and mechanisms of their achievement (Bag et al., 2021; Ding et al., 2012).

As noted previously, the participants had approximately equal gender distribution (51% were females), rendering the sample highly useful for exploring potential gender differences. No significant gender-based differences were detected regarding the awareness of OV40, the importance of ICT in its achievement, and the challenges facing this role. This indicates that gender does not represent an issue regarding ICT's role in OV40, as both male and female professionals are exposed to the same work environment and have similar qualifications.

The results showed significant experience-related differences in perceptions of ICT importance and challenges regarding ICT development to achieve OV40, with a stronger belief in ICT's importance among those with less experience (1-5 years) and much lower confidence in its role among the most experienced personnel (with over 21 years' experience). Furthermore, stronger perceptions of challenges to public sector ICT deployment to detect the national vision were noted among those with 11–15 and 16–20 years' experience. No significant experience-related differences were found regarding the awareness of OV40 priorities and indicators.

5. Conclusion

This study reports that ICT specialists in Oman's public institutions have a middling awareness of OV40, which negatively affects their perceptions about the potential contributions of ICT to the achievement of the Vision. ICT readiness in public institutions faces several challenges that may hinder its intended role. Although gender does not significantly affect ICT experts' awareness and perception of OV40 and the role of ICT in its achievement, their level of experience is instrumental in their awareness of and belief in ICT's potential contribution, without less experienced personnel being more aware and optimistic. Based on the results, it is recommended to develop ICT specialists' awareness of OV40 and its indicators and about the mechanisms to develop ICT that meet achieving such indicators by involving them in the process.

The Vision has to be clearly communicated to these key stakeholders via workshops, seminars, lectures, and publications (e.g., distributing brochures) to inform more experienced personnel and senior leadership within institutions as well as ICT professionals in general. It would be useful to form a national executive committee to coordinate such efforts and oversee the practical implementation of OV40. This committee should actively consult and invite input and feedback from ICT experts to identify potential barriers and resources and troubleshoot problems during an early stage. In this way, the achievement of the national vision can be coordinated in a coherent manner across government departments, and it can be dynamic and responsive to realities on the ground.

This could also help optimally deploy national ICT investment (i.e., by asking ICT experts what they actually need in order to disseminate the Vision effectively in their departments). Failure to involve ICT professionals will result in disconnect between the ambitious national plans and the realities on the ground in public service departments. By adopting a more coherent and responsive strategy, public institutions in Oman can effectively wield ICT to strongly support and achieve OV40. The study raised the importance of ICT in the achievement of the Oman vision and the need to address all challenges that may limit such a role.

5.1. Limitations of the Study

The results of the current study are limited by the study sample, which includes decision makers, technicians, and other administrative staff. It is also limited to the content of the questionnaire.

Acknowledgement

The author would like to acknowledge all those who contributed to conducting this study, including the expert panel of judges from Sultan Qaboos University who validated the study questionnaire and the participating ICT experts from different ministries.

References

[1] ABHANASI, M. (2012). *The impact of supply chain practices on competitive advantage. A case study on Al Rajhi Cerement Company* [Unpublished master's thesis]. Albayat University Jordan.

[2] AL-AZRI, A., AL-SALTI, Z., & AL-KARAGHOULI, W. (2010). *The successful implementation of e-government transformation: A case study in Oman* [Paper presentation]. European, Mediterranean & Middle Eastern Conference on Information Systems, April 12–13, 2010, Abu Dhabi, UAE.

[3] AL-BUSAIDY, M., & WEERAKKODY, V. (2011). E-government services in Oman: An employee's perspective. *Electronic Government*, 8(2–3), 185–207. http://dx.doi.org/10.1504/EG.2011.039836

[4] AL-HELAYYIL, A., CLAPS, M., RAJAN, R., & SCHALLER, O. (2016). *Saudi Arabia Vision 2030: Envisioning a technology-led transformation – IDC's initial view.* International Data Corporation Central and Eastern Europe, the Middle East, & Africa. Retrieved from https://images.idc-cema.com/mail-image/1156030/cema41301016_saudi_arabia_vision_2030_idc_insight.pdf

[5] AL-KHASAWNEH, R. O. (2019). The role and importance of information technology in reducing the risks of information technology security in government units in the light of applying e-government governance. *Information and Knowledge Management*, 8(9), 1–7.

[6] ALMAEENA, K. (2016). Saudi Vision 2030 requires comprehensive implementation. *Saudi Gazette*. Retrieved from https://saudigazette.com.sa/article/161200/Saudi-Vision-2030-requires-comprehensive-implementation

[7] AL-RAHBI, Y., AL-HARRASI, S., & AL-WAHAIBI, S. (2012). *Technical factors affecting the adoption of e-government* [Master's thesis, Lund University]. LUP Student Papers. Retrieved from https://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=2799432&fileOId=2799445

[8] ALSHUAIBI, A. (2017). Technology has an important role in the implementation of Saudi Arabia's Vision 2030. *International Journal of Business, Humanities and Technology*, 7(2), 1–11.

[9] ANNOUNCING THE RESULTS OF A SURVEY ON INDIVIDUAL SATISFACTION WITH E-GOVERNMENT SERVICES [Editorial]. (2018). إعلان نتائج استطلاع حول رضا الأفراد عن الخدمات الحكومية الإلكترونية [Announcing the results of a survey on individual satisfaction with e-government services]. *Atheer*. Retrieved from https://www.atheer.om/archives/473327/

[10] AYEDUN, C. A., UTOM, J. A., OLUWUNMI, A., OMONIJO, D. O., & AKINJARE, O. A. (2021). Assessment of supporting facilities in selected private universities in Ogun State, Nigeria. *Journal of International Cooperation and Development*,

4(1), 26–47. https://doi.org/10.36941/jicd-2021–0002

[11] BAG, S., YADAV, G., DHAMIJA, P., & KATARIA, K. K. (2021). Key resources for Industry 4.0 adoption and its effect on sustainable production and circular economy: An empirical study. *Journal of Cleaner Production*, 281, 125233. https://doi.org/10.1016/j.jclepro.2020.125233

[12] CHEVEZ, N.V. (2010). *A unified strategic business and it alignment model a study in the public universities of Nicaragua* [Master's thesis, KTH Royal Institute of Technology]. KTH Publikationer. Retrieved from https://kth.diva-portal.org/smash/get/diva2:318799/FULLTEXT01.pdf

[13] COLINS COLLEGE. (2019). *Discuss the role of ICT in the achievement of Vision 2030*. Retrieved from https://colinscollege.com/discuss-the-role-of-ict-in-the-achievement-of-vision-2030/

[14] COLTMAN, T., SHARMA, R., TALLON, P., & QUEIROZ, M. (2015). Strategic IT alignment: Twenty-five years on. *Journal of Information Technology*, 30(2), 1–10. http://dx.doi.org/10.1057/jit.2014.35

[15] COUSINS, K., & ROBEY, D. (2015). Managing work-life boundaries with mobile technologies. *Information Technology & People*, 28(1), 34–71. https://doi.org/10.1108/ITP-08–2013–0155

[16] CRESWELL, J. W., & CRESWELL, J. D. (2017). *Research design: Qualitative, quantitative, & mixed methods approaches* (5th ed.). Thousand Oaks, CA: Sage Publications, Ltd.

[17] DING, M. J., KAM, B. H., & LALWANI, C. S. (2012). Operational routines and supply chain competencies of Chinese logistics service providers. *International Journal of Logistics Management*, 23(3), 383–407. https://doi.org/10.1108/09574091211289237

[18] ELMORSHIDY, A. (2013). Aligning IT with business objectives: A critical survival and success factor in today's business. *Journal of Applied Business Research*, 29(3), 819–828. http://dx.doi.org/10.19030/jabr.v29i3.7783

[19] GIL-PADILLA, A. M., & ESPINO-RODRÍGUEZ, T. F. (2008). Strategic value and resources and capabilities of the information systems area and their impact on organizational performance in the hotel sector. *Tourism Review*, 63(3), 21–47. https://doi.org/10.1108/16605370810901562

[20] GOEPP, V., & AVILA, O. (2015). An extended strategic alignment model for technical information system alignment. *International Journal of Computer Integrated Manufacturing*, 28(12), 1275–1290. https://doi.org/10.1080/0951192X.2014.964774

[21] GOH, T. (1993). Taguchi methods: Some technical, cultural and pedagogical perspectives. *Quality and Relibility Engineering International*, 9(3), 185–202. https://doi.org/10.1002/qre.4680090306

[22] HALLIGAN, N. (2017). Legislating Saudi Arabia's Vision 2030 transformation. *Arabian Business*. Retrieved from https://www.arabianbusiness.com/politics-economics/legislating-saudi-arabia-s-vision-2030-transformation-661110

[23] HEIBA, F. (2011). The strategic relationship between technology and the success of the national development programs: The case of Egypt. *International Journal of Humanities and Social Science*, 1(2), 191–195.

[24] HÉROUX, H., & MUNSHI, F. A. (2019). Designing of Eid Al-Adha Qurban Meat Stock Information System to optimize its distribution. *IOP Conference Series: Materials Science and Engineering*, *662*(2), 022016. http://dx.doi.org/10.1088/1757-899X/662/2/022016

[25] HOFSTEDE INSIGHTS. (2023). *Country comparison tool*. Retrieved from https://www.hofstede-insights.com/country-comparison-tool?countries=qatar*%2Csaudi+arabia*%2Cunited+arab+emirates*

[26] HOFSTEDE, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations* (2nd ed.). Thousand Oaks, CA: Sage Publications, Ltd.

[27] HOOI, L. W., & NGUI, K. S. (2014). Enhancing organizational performance of Malaysian SMEs. *International Journal of Manpower*, 35(7), 973–995. https://doi.org/10.1108/IJM-04-2012-0059

[28] JAVIDAN, M., HOUSE, R. J., DORFMAN, P. W., HANGES, P. J., & SULLY DE LUQUE, M. S. (2006). Conceptualizing and measuring cultures and their consequences: A comparative review of GLOBE's and Hofstede's approaches. *Journal of International Business Studies*, 37, 897–914. https://doi.org/10.1057/palgrave.jibs.8400234

[29] KELD, P. (2018). E-government transformations: Challenges and strategies. *Transforming Government: People, Process and Policy*, 12(1), 84–109. http://dx.doi.org/10.1108/TG-06-2017-0028

[30] KOZUHAROV, S., & KOZUHAROV, N. (2014). Information systems for business planning. Information systems in accounting and audit. *SINTEZ*, 2014, 595–599. http://dx.doi.org/10.15308/sinteza-2014-595-599

[31] MING, T., TENG, W., & JODAKI, S. (2021). A model to investigate the effect of information technology and information systems on the ease of managers' decision-making. *Kybernetes*, 50(1), 100–117. https://doi.org/10.1108/K-10-2019-0712E

[32] MINISTRY OF FINANCE. (2020). *Oman Vision 2040*. https://www.mof.gov.om/pdf/Vision_Documents_En.pdf

[33] MITHAS, S., & RUST, R. T. (2016). How information technology strategy and investments influence firm performance: Conjecture and empirical evidence. *MIS Quarterly*, 40(1), 223–245.

http://doi:10.25300/MISQ/2016/40.1.10

[34] MITIĆ, S., POPOVIĆ, J., POŠTIN, J., ĆILERDŢIĆ, V., & SZABÓ, L. (2021). Information technology as an indicator of the level of organizational performance. *Journal of Engineering Management and Competitiveness*, 11(1), 29–41. http://dx.doi.org/10.5937/jemc2101029M

[35] MOHAMMAD, A. S., & SRIRAM, B. (2015). Major challenges in developing a successful e-government: A review on the Sultanate of Oman. *Journal of King Saud University*, 27, 230–235. http://doi.org/10.1016/j.jksuci.2014.04.004

[36] NEZIRAJ, E., & SHAQIRI, A. B. (2018). The impact of information technology in decision making process of companies in Kosovo. *Informatologia*, 51(1–2), 13–23. https://doi.org/10.32914/i.51.1–2.2

[37] NIEBEL, T. (2018). ICT and economic growth: Comparing developing, emerging and developed countries. *World Development*, 104, 197–211. https://doi.org/10.1016/j.worlddev.2017.11.024

[38] PORTER, M., & SIGGELKOW, N. (2008). Contextuality within activity systems and sustainability of competitive advantage. *Academy of Management Perspectives*, 22(2), 34–56. http://dx.doi.org/10.5465/AMP.2008.32739758

[39] RASHAD, M. (2016). Saudis await Prince's vision of future with hope and concern. *Reuters*. Retrieved from https://www.reuters.com/article/us-saudi-plan/saudis-await-princes-vision-of-future-with-hope-and-concern-idUSKCN0XL0B2

[40] REHMAN, N., RAZAQ, S., FAROOQ, A., ZOHAIB, N. M., & NAZRI, M. (2020). Information technology and firm performance: Mediation role of absorptive capacity and corporate entrepreneurship in manufacturing SMEs. *Technology Analysis and Strategic Management*, 32(9), 1049–1065. http://dx.doi.org/10.1080/09537325.2020.1740192

[41] SAMDANTSOODOL, A., CANG, S., YU, H., EARDLEY, A., & BUYANTSOGT, A. (2017). Predicting the relationships between virtual enterprises and agility in supply chains. *Expert Systems with Applications*, 84, 58–73. https://doi.org/10.1016/j.eswa.2017.04.037

[42] SÁNCHEZ-TORRES, J. M., & MILES, I. (2017). The role of future-oriented technology analysis in e-Government: A systematic review. *European Journal of Futures Research*, 5, 15. https://doi.org/10.1007/s40309–017–0131–7

[43] SEREST, H., FAYYAZI, M., & ASI, N. (2008). *E-management: Barriers and challenges in Iran* [Unpublished doctoral dissertation]. Allameh Tabatabai University.

[44] SHIU, E., HAIR, J., BUSH, R., & ORTINAU, D. (2009). Marketing Research. First edition. Berkshire: McGraw- Hill Education.

[45] SIBANDA, M., & RAMRATHAN, D. (2017). Influence of information technology on organization strategy, *Foundations of Management*, 9(1), 191–202. http://dx.doi.org/10.1515/fman-2017-0015

[46] STURGEON, T. J. (2021). Upgrading Strategies for the digital economy. *Global Strategy Journal*, 11(1), 34–57. https://doi.org/10.1002/gsj.1364

[47] UNITED NATIONS. (2020). *E-Government Survey 2020: Digital government in the decade of action for sustainable development, department of economic and social affairs*. New York, NY: United Nations.

[48] UN-OHRLLS. (2017). *Leveraging investments in broadband for national development: The case of Rwanda and Senegal.* Retrieved from https://www.un.org/ohrlls/sites/www.un.org.ohrlls/files/leveraging-investments-in-broadband-for-national-development-2017.pdf

[49] VIVEK, K. (2021). Impact of Information Technology (IT) on management accounting and financial accounting. *Journal of Contemporary Issues in Business and Government*, 27(3), 875–883.

参考文:

[1] ABHANASI, M. (2012)。供应链实践对竞争优势的影响。拉吉水泥公司案例研究 [未发表的硕士论文]。约旦阿尔巴亚特大学。

[2] AL-AZRI, A., AL-SALTI, Z., 和 AL-KARAGHOULI, W. (2010)。电子政务转型的成功实施：阿曼的案例研究[论文介绍]。欧洲、地中海和中东信息系统会议，2010 年 4 月 12 日至 13 日，阿联酋阿布扎比。

[3] AL-BUSAIDY, M., 和 WEERAKKODY, V. (2011)。阿曼的电子政务服务：员工的视角。电子政府，8(2–3), 185–207. http://dx.doi.org/10.1504/EG.2011.039836

[4] AL-HELAYYIL, A., CLAPS, M., RAJAN, R., 和 SCHALLER, O. (2016)。沙特阿拉伯 2030 年愿景：设想技术主导的转型——国际数据中心的初步观点。国际数据公司中欧和东欧、中东和非洲。摘自 https://images.idc-cema.com/mail-image/1156030/cema41301016_saudi_arabia_vision_2030_idc_insight.pdf

[5] AL-KHASAWNEH, R. O. (2019)。电子政务治理下信息技术在降低政府单位信息技术安全风险中的作用和重要性。信息和知识管理, 8(9), 1–7。

[6] ALMAEENA, K. (2016)。沙特 2030 年愿景需要全面实施。沙特公报。摘自 https://saudigazette.com.sa/article/161200/Saudi-Vision-2030-requires-comprehensive-implementation

[7] AL-RAHBI, Y., AL-HARRASI, S., 和 AL-WAHAIBI, S. (2012)。影响电子政务采用的技术因素[硕士论文，隆德大学]。卢普学生论文。摘自 https://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=2799432&fileOId=2799445

[8] ALSHUAIBI, A. (2017)。技术在沙特阿拉伯 2030

年愿景的实施中发挥着重要作用。国际商业、人文与技术杂志, 7(2), 1–11。

[9] 公布电子政务服务个人满意度调查结果[社论]。(2018)。阿瑟尔。摘自 https://www.atheer.om/archives/473327/

[10] AYEDUN, C. A., UTOM, J. A., OLUWUNMI, A., OMONIJO, D. O., 和 AKINJARE, O. A. (2021)。对尼日利亚奥贡州选定私立大学的配套设施进行评估。国际合作与发展杂志, 4(1), 26–47. https://doi.org/10.36941/jicd-2021–0002

[11] BAG, S., YADAV, G., DHAMIJA, P., 和 KATARIA, K. K. (2021)。采用工业 4.0 的关键资源及其对可持续生产和循环经济的影响：实证研究。清洁生产学报, 281, 125233. https://doi.org/10.1016/j.jclepro.2020.125233

[12] CHEVEZ, N.V. (2010)。统一战略业务及其调整模型在尼加拉瓜公立大学的研究[硕士学位论文，瑞典皇家理工学院皇家理工学院]。瑞典皇家理工学院出版商。摘自 https://kth.diva-portal.org/smash/get/diva2:318799/FULLTEXT01.pdf

[13] COLINS COLLEGE. (2019)。讨论信息通信技术在实现 2030 年愿景中的作用。摘自 https://colinscollege.com/discuss-the-role-of-ict-in-the-achievement-of-vision-2030/

[14] COLTMAN, T., SHARMA, R., TALLON, P., 和 QUEIROZ, M. (2015)。它战略调整：二十五年过去了。信息技术学报, 30(2), 1–10. http://dx.doi.org/10.1057/jit.2014.35

[15] COUSINS, K., 和 ROBEY, D. (2015)。使用移动技术管理工作与生活的界限。信息技术与人, 28(1), 34–71. https://doi.org/10.1108/ITP-08–2013–0155

[16] CRESWELL, J. W., 和 CRESWELL, J. D. (2017)。研究设计：定性、定量和混合方法（第五版）。加利福尼亚州千橡市：圣人出版有限公司。

[17] DING, M. J., KAM, B. H., & LALWANI, C. S. (2012)。中国物流服务提供商的运营惯例和供应链能力。国际物流管理杂志, 23(3), 383–407. https://doi.org/10.1108/09574091211289237

[18] ELMORSHIDY, A. (2013)。让它与业务目标保持一致：当今企业生存和成功的关键因素。应用商业研究杂志, 29(3), 819–828. http://dx.doi.org/10.19030/jabr.v29i3.7783

[19] GIL-PADILLA, A. M., 和 ESPINO-RODRÍGUEZ, T. F. (2008)。信息系统领域的战略价值、资源和能力及其对酒店行业组织绩效的影响。旅游评论, 63(3), 21–47. https://doi.org/10.1108/16605370810901562

[20] GOEPP, V., 和 AVILA, O. (2015)。用于技术信息系统调整的扩展战略调整模型。国际计算机集成制造杂志, 28(12), 1275–1290. https://doi.org/10.1080/0951192X.2014.964774

[21] GOH, T. (1993)。田口方法：一些技术、文化和教学观点。国际质量与可靠性工程, 9(3), 185–202. https://doi.org/10.1002/qre.4680090306

[22] HALLIGAN, N. (2017)。为沙特阿拉伯的 2030 年愿景转型立法。阿拉伯商业。摘自 https://www.arabianbusiness.com/politics-economics/legislating-saudi-arabia-s-vision-2030-transformation-661110

[23] HEIBA, F. (2011)。技术与国家发展计划成功之间的战略关系：埃及案例。国际人文社会科学杂志, 1(2), 191–195。

[24] HÉROUX, H., 和 MUNSHI, F. A. (2019)。设计宰牲节古尔班肉类库存信息系统以优化其分配。眼压会议系列：材料科学与工程, 662(2), 022016. http://dx.doi.org/10.1088/1757-899X/662/2/022016

[25] 霍夫斯泰德的见解. (2023)。国家比较工具。摘自 https://www.hofstede-insights.com/country-comparison-tool?countries=qatar*%2Csaudi+arabia*%2Cunited+arab+emirates*

[26] HOFSTEDE, G. (2001)。文化的后果：比较各国的价值观、行为、机构和组织（第二版）。加利福尼亚州千橡市：圣人出版有限公司。

[27] HOOI, L. W., 和 NGUI, K. S. (2014)。提高马来西亚中小企业的组织绩效。国际人力资源杂志, 35(7), 973–995. https://doi.org/10.1108/IJM-04-2012-0059

[28] JAVIDAN, M., HOUSE, R. J., DORFMAN, P. W., HANGES, P. J., 和 SULLY DE LUQUE, M. S. (2006)。概念化和衡量文化及其后果：地球和霍夫斯泰德方法的比较回顾。国际商业研究杂志, 37, 897–914. https://doi.org/10.1057/palgrave.jibs.8400234

[29] KELD, P. (2018)。电子政务转型：挑战与策略。政府转型：人员、流程和政策, 12(1), 84–109. http://dx.doi.org/10.1108/TG-06-2017-0028

[30] KOZUHAROV, S., 和 KOZUHAROV, N. (2014)。用于业务规划的信息系统。会计和审计信息系统。辛特兹, 2014, 595–599. http://dx.doi.org/10.15308/sinteza-2014-595-599

[31] MING, T., TENG, W., 和 JODAKI, S. (2021)。研究信息技术和信息系统对管理者决策便利性影响的模型。控制网络, 50(1), 100–117. https://doi.org/10.1108/K-10-2019-0712E

[32] MINISTRY OF FINANCE. (2020)。阿曼 2040 年愿景。摘自 https://www.mof.gov.om/pdf/Vision_Documents_En.pdf

[33] MITHAS, S., 和 RUST, R. T. (2016)。信息技术战略和投资如何影响公司绩效：猜想和经验证据。管理信息系统季刊, 40(1), 223–245. http://doi:10.25300/MISQ/2016/40.1.10

[34] MITIĆ, S., POPOVIĆ, J., POŠTIN, J., ĆILERDŢIĆ, V., 和 SZABÓ, L. (2021)。信息技术作为组织绩效水平的指标。工程管理与竞争力杂

志，11(1), 29–41. http://dx.doi.org/10.5937/jemc2101029M

[35] MOHAMMAD, A. S., 和 SRIRAM, B. (2015)。发展成功电子政务的主要挑战：阿曼苏丹国回顾。沙特国王大学学报，27, 230–235. http://doi.org/10.1016/j.jksuci.2014.04.004

[36] NEZIRAJ, E., 和 SHAQIRI, A. B. (2018)。信息技术对科索沃公司决策过程的影响。信息学，51(1–2), 13–23. https://doi.org/10.32914/i.51.1–2.2

[37] NIEBEL, T. (2018)。信息通信技术与经济增长：发展中国家、新兴国家和发达国家的比较。世界发展，104, 197–211. https://doi.org/10.1016/j.worlddev.2017.11.024

[38] PORTER, M., 和 SIGGELKOW, N. (2008)。活动系统内的情境性和竞争优势的可持续性。管理学院的观点，22(2), 34–56. http://dx.doi.org/10.5465/AMP.2008.32739758

[39] RASHAD, M. (2016)。沙特人满怀希望和担忧地等待着普林斯对未来的愿景。路透社。摘自 https://www.reuters.com/article/us-saudi-plan/saudis-await-princes-vision-of-future-with-hope-and-concern-idUSKCN0XL0B2

[40] REHMAN, N., RAZAQ, S., FAROOQ, A., ZOHAIB, N. M., 和 NAZRI, M. (2020)。信息技术与企业绩效：吸收能力与企业创业精神在制造业中小企业中的中介作用。技术分析与战略管理，32(9), 1049–1065. http://dx.doi.org/10.1080/09537325.2020.1740192

[41] SAMDANTSOODOL, A., CANG, S., YU, H., EARDLEY, A., 和 BUYANTSOGT, A. (2017)。预测虚拟企业与供应链敏捷性之间的关系。专家系统与应用程序，84, 58–73. https://doi.org/10.1016/j.eswa.2017.04.037

[42] SÁNCHEZ-TORRES, J. M., 和 MILES, I. (2017)。面向未来的技术分析在电子政务中的作用：系统回顾。欧洲期货研究杂志，5, 15. https://doi.org/10.1007/s40309–017–0131–7

[43] SEREST, H., FAYYAZI, M., 和 ASI, N. (2008)。电子管理：伊朗的障碍和挑战[未发表的博士论文]。阿拉梅·塔巴塔拜大学。

[44] SHIU, E., HAIR, J., BUSH, R., & ORTINAU, D. (2009). 市场研究。第一版。伯克希尔：麦格劳-希尔教育。

[45] SIBANDA, M., 和 RAMRATHAN, D. (2017)。信息技术对组织战略的影响，管理基础，9(1), 191–202. http://dx.doi.org/10.1515/fman-2017-0015

[46] STURGEON, T. J. (2021)。数字经济升级战略。全球战略杂志，11(1), 34–57. https://doi.org/10.1002/gsj.1364

[47] 联合国. (2020)。经济和社会事务部《2020 年电子政务调查：可持续发展行动十年中的数字政府》。纽约州纽约：联合国。

[48] 联合国人权高专办. (2017)。利用宽带投资促进国家发展：卢旺达和塞内加尔的案例。摘自 https://www.un.org/ohrlls/sites/www.un.org.ohrlls/files/leveraging-investments-in-broadband-for-national-development-2017.pdf

[49] VIVEK, K. (2021)。信息技术(它)对管理会计和财务会计的影响。商业和政府当代问题杂志，27(3), 875–883。