The Reality of Digital Management in Public Economic Institutions in the Sultanate of Oman in Light of Certain Variables

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Abstract: Objective: This study aimed to identify the reality of DM and the impact of demographic variables on DM in public economic institutions in the Sultanate of Oman. **Methodology:** The study employed a descriptive survey approach, and the questionnaire was selected as the primary data collection instrument. A total of 435 questionnaires were proportionally distributed among the targeted economic institutions. The data were analyzed using the Statistical Package for the Social Sciences (SPSS). **Results:** The results revealed that the level of digital management (DM) implementation, across its various dimensions, is high in public economic institutions in Oman. Additionally, the findings indicated that there were no statistically significant differences in the level of DM implementation attributable to the following demographic **variables:** gender, age, job level, and work experience, except for the educational level variable, where statistically significant differences favored holders of a general education diploma or below compared to those with bachelor's or postgraduate degrees. **Recommendations:** The necessity of adopting digital management practices among the economic institutions in Oman and globally among stakeholders and policymakers**. Conclusion:** This study confirms that digital management is widely applied in public economic institutions in Oman, with no significant differences across most demographic variables, except for educational level. These findings emphasize the significance of sustaining digital management practices through continuous training and supportive policies to ensure effective institutional digital transformation.

Keywords: Digital Management; Demographic Variables; Public Economic Institutions; Sultanate of Oman.

واقع الإدارة الرقمية في المؤسسات الاقتصادية العمومية في سلطنة عُمان في ضوء بعض المتغيرات

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ملخص: الهدف: هدفت هذه الدراسة إلى التعرف على واقع الإدارة الرقمية وتأثير المتغيرات الديموغرافية على الإدارة الرقمية في المؤسسات الاقتصادية العامة في سلطنة عمان. **المنهج:** وقد استخدمت الدراسة منهج المسح الوصفي، وتم اختيار الاستبيان كأداة رئيسية لجمع البيانات. تم توزيع ما مجموعه 435 استبيانًا بشكل متناسب بين المؤسسات الاقتصادية المستهدفة. وتم تحليل البيانات باستخدام الحزمة الإحصائية للعلوم الاجتماعية (SPSS). أظهرت النتائج ارتفاع مستوى تطبيق الإدارة الرقمية، بمختلف أبعادها، في المؤسسات الاقتصادية العامة في سلطنة عُمان. **أهم النتائج:** أشارت النتائج إلى عدم وجود فروق ذات دلالة إحصائية في مستوى تطبيق الإدارة الرقمية تُعزى إلى المتغيرات الديموغرافية التالية: الجنس، والعمر، والمستوى الوظيفي، والخبرة العملية، باستثناء متغير المستوى التعليمي، حيث كانت الفروق لصالح الحاصلين على دبلوم التعليم العام فما دون مقارنةً بحاملي شهادات البكالوريوس أو الدراسات العليا. **التوصيات:** ضرورة تبني ممارسات الإدارة الرقمية لدى المؤسسات الاقتصادية في سلطنة عمان والعالم لدى أصحاب المصلحة وصناع القرار. **الخاتمة:** تؤكد هذه الدراسة أن مستوى تطبيق الإدارة الرقمية مرتفع في المؤسسات الاقتصادية العامة في سلطنة عُمان، مع عدم وجود فروق ذات دلالة إحصائية تعزى لمعظم المتغيرات الديموغرافية باستثناء المستوى التعليمي. وتشير النتائج إلى أهمية الاستمرار في تبنّي ممارسات الإدارة الرقمية من خلال التدريب المستمر والسياسات الداعمة لضمان تحقيق التحول الرقمي المؤسسي بفاعلية.

الكلمات المفتاحية: الإدارة الرقمية، المتغيرات الديمغرافية، المؤسسات الاقتصادية العمومية، سلطنة عُمان.

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Introduction

Nowadays, the world has witnessed a comprehensive digital revolution that has radically transformed various fields, including management and work methods (Knell, 2021; Lestari *et al*., 2025; Omol, 2024). Digitization has become the foundation of local development, contributing to an operational vision that utilizes modern technologies such as artificial intelligence, cloud computing, and the Internet of Things (ICLEI, 2023; Kumar *et al*., 2024). In this context, DM is not merely a technical trend; it plays a specific role in helping organizations address the growing challenges of complex and dynamic work environments (Sacavém *et al*., 2025; Seppänen *et al*., 2024).

DM practices are increasingly focused on identifying and adopting advanced concepts across organizations. These innovations are recognized as a strategic value in enhancing work processes and driving improvement (Al-Moaid & Almarhdi, 2024; Pereira *et al*., 2025). It also enhances administrative transparency and clarity of results, enabling tracking and predictability in clearly defining what will be achieved (Cosa & Torelli, 2024). Additionally, DM improves processes, enhances performance, reduces time, effort, and costs, and fosters a more organized work environment, developing the functions of administrative units and instilling the values of cooperation (Chen *et al*., 2025; Sakhri, 2026). Digital work plays a role in local performance and communication. The organization seeks to implement DM in its various dimensions (email, oversight, electronic planning, electronic organization, employee participation in improving local performance, communication, and accountability) (Atobishi *et al*., 2024a; Holopainen *et al*., 2023), thus, facilitating the improvement of data and laws, striving for quality work, communicating with customers, and achieving high results (Lane *et al*., 2023).

Through innovative approaches, e-companies deliver highly competitive digital services. They actively enhance operational efficiency within management institutions by strengthening information accessibility, authority, and transparency (Atobishi *et al*., 2024b). The results of the studies have revealed an operational weakness in prioritizing the application's importance, as well as the adoption of DM and its new technologies in support work, focusing on collaborative work, and transactions that contribute to the semi-peripheral delivery of services, and the completion of administrative tasks. Therefore, all these studies recommended the importance and necessity of joint work, and the participation of electronic or DM in all its work (Michelotto & Joia, 2024; Moser-Plautz & Schmidthuber, 2023; Wilson & Mergel, 2022). The United Nations (2018)'s report identified the obstacles to implementing e-administration at the Ministry of Education in the Sultanate of Oman, recommended providing appropriate financial support to cover all financial, human, administrative, and technical costs and requirements, and improving the infrastructure related to implementing e-administration at the Ministry of Education.

This is clear in the weakness in organizational awareness of the importance of applying and adopting DM and its innovative technologies in administrative work, and their focus on office work, transactions, and information, rather than semi-automation in service provision and administrative work completion. Therefore, studies recommended the importance and necessity of paying attention to the application and use of electronic or DM in all work they perform (Al Hasani & Husin, 2021; Al Sabbagh, 2024; Langseth *et*

al., 2023). This research primarily aims to study the reality of DM in public economic institutions in the Sultanate of Oman and the impact of demographic variables on DM in public economic institutions in the Sultanate of Oman. This is achieved through: (1) Determining the level of application of DM in its various dimensions (administrative requirements, financial requirements, human requirements, security requirements, and technical requirements) in public economic institutions in the Sultanate of Oman. (2) Verifying the existence of statistically significant differences in the level of application of DM attributable to the following demographic variables: (gender, age, educational level, job level, and practical experience).

The importance of this research lies in enriching the academic literature and research related to DM. It seeks to expand academic understanding of the application of digital tools in public economic institutions. The current research also sheds light on new aspects of this topic in the context of the Sultanate of Oman, contributing to the presentation of a scientific model applicable to other similar environments. Furthermore, presenting this practical framework enhances the ability of public economic institutions in the Sultanate of Oman to adopt and apply DM principles effectively. This aims to provide practical solutions that support the improvement of institutional performance in general and employee performance in particular by developing innovative strategies for digital transformation, enabling institutions to enhance their operational efficiency and achieve their strategic objectives.

Literature review

Several studies have demonstrated the importance of digital transformation in enhancing job performance across various sectors in different countries included the

Sultanate of Oman. For example, Al Sabbagh, (2024) studied the influence of digital transformation on employee mindsets within Oman's higher education sector. The author investigated how staff members perceive and adapt to the integration of digital technologies across teaching, learning, and administrative domains, aiming to identify the factors that shape their readiness and openness to digital change. The findings demonstrated a strong relation between employees' digital competencies, attitudes toward change, and perceived organizational support factors that collectively contribute to shaping digital mindsets. Additionally, the results further confirmed the significant impact of digital transformation initiatives on fostering employees' digital orientation in higher education institutions in Oman. Despite being limited to a single case study within a specific geographic context, the research provides a valuable foundation for future studies seeking to validate and expand upon these findings in comparable settings.

Within this framework Al Khaifi & Elgeddawy, (2025) explored the perspectives of the workforce at the Network and Programming Departments of the case organization in the Sultanate of Oman. The authors notably focused on how training, communication, leadership, and employee engagement enhance worker performance, as well as the elements that influence a business's perception. They demonstrated that combining artificial intelligence with training, communication, leadership, and employee involvement enhances worker performance. The study presents new possibilities for organizational performance research, despite being based in a single region of Oman, which may compromise the generalizability of the findings. They recommended that the organization enhance employee performance by adopting AI as part of its digital

transformation. The organization can enhance employee performance, increase employee involvement, improve proper communication, and provide the necessary skills and knowledge by adopting AI tools.

Langseth *et al*. (2023) applied New Institutional Theory to examine how entrepreneurial activities within support units drive digital transformation in Norwegian higher education. Their data were collected through qualitative interviews with college members and staff involved in developing fully online courses. The findings revealed that entrepreneurial initiatives played a central role in shaping the emerging social field of digital transformation. These innovators, situated within localized "pockets of innovation," facilitated progress by providing open digital platforms, pedagogical frameworks for online course design, and direct support for faculty conducted in online teaching. Also, the results confirmed previous research emphasizing that insufficient leadership support can hinder the success of digital transformation initiatives in higher education. The authors concluded by proposing a digital maturity model that offers valuable guidance for researchers and practitioners and supports entrepreneurial processes within online learning environments.

Al Hasani & Husin, (2021) the study reviewed the state of digital transformation within Oman's education sector, focusing on the key factors influencing its implementation and outcomes. The findings revealed that environmental conditions, human resources, financial capacity, and knowledge significantly affect the overall performance of digital transformation initiatives. Furthermore, the analysis highlighted a conceptual model demonstrating the complementary mediating effect between digital knowledge and digital transformation on technological performance. The study thus provides a theoretical foundation for understanding how knowledge and resource integration enhance digital transformation effectiveness in the Omani educational context.

Porkodi *et al*. (2023) emphasized that digitizing administration is a means of bringing administration closer to citizens. Their study recommended improving government services through digitization. However, it revealed that the local administration's digitization project failed to achieve its objectives due to weak technological infrastructure and a lack of awareness among citizens about the importance of technology.

Methodology

Through research and review of previous studies like the current study, the descriptive survey method was chosen for this study, as it is the most appropriate research method for the nature of the study topic. The descriptive survey method is a type of research method that focuses on describing and surveying a phenomenon by collecting and analyzing data, drawing conclusions about the phenomenon, and generalizing these conclusions. The descriptive method is characterized by its comprehensiveness in addressing studies, with a focus on gathering information on a specific topic within a specific framework. The results of descriptive studies often reveal further underlying problems that require further investigation. From this perspective, the descriptive method is critical in scientific research and indispensable in field research.

Sample and sampling technique

The research community for this study consists of employees in public economic institutions in the Sultanate of Oman. These institutions include Omantel, a leader in the telecommunications sector with approximately 3,000 employees; Petroleum Development Oman (PDO), the largest company in the oil sector with 10,000 employees; the Public Establishment for Industrial Estates (Madayn), responsible for developing and managing

industrial estates in the governorates and cities of the Sultanate, with 450 employees; and the Oman Food Investment Holding Company (INTAJ), which represents the food investment sector and employs 2,316 employees. This total research community is 15,766 employees. *This information was taken from the **National Centre for Statistics and Information in Oman.*** The selection of these institutions reflects the importance of the research in studying DM applications in various vital economic sectors, which contributes to providing scientifically significant results in developing the work environment and enhancing institutional efficiency in the Sultanate. The sample size was determined based on the Krejcie & Morgan (1970) approach, where 375 participants were chosen as the minimum sample size to ensure adequate statistical representation of the study population. To enhance the accuracy of the results and reduce the error rate, the sample size was increased to 435 participants, who were distributed proportionally among the economic institutions included in the study. The sample was distributed among the institutions as follows: (109) participants from Omantel, (104) participants from the Public Establishment for Industrial Estates (Madayn), (116) participants from Petroleum Development Oman (PDO), and (106) participants from Oman Food Investment Holding Company (INTAJ). The questionnaire was distributed to the research sample using a stratified random method to ensure representation of all job categories across the various institutions, which enhances the accuracy of the statistical analysis and contributes to the extraction of more reliable results.

Distribution of the study sample

In this research, the Distribution of the research sample according to the following demographic variables: gender, age, educational level, career level, and practical experience. Regarding the gender variable, males constitute the most significant proportion of the research sample, representing 80% with a total of 348 individuals, while females represent only 20% with a total of 87 individuals, reflecting a marked gender disparity in the sample. Regarding the age variable, those under the age of 30 years constitute 18.4% of the total sample, equivalent to 80 individuals. The age group between 30 and 40 years is the most represented, accounting for 42.5%, or 185 individuals. This is followed by those over the age of 40 years, which constitutes 39.1% of the sample, equivalent to 170 individuals. Regarding the educational level variable, the number of individuals holding a general education diploma or lower is 67, representing 15.4% of the total sample. In contrast, those who hold a higher diploma constitute 14% (61 individuals), while those who hold a bachelor's degree represent the largest percentage, at 44.8% (195 individuals). Those who hold postgraduate degrees, including master's and doctoral degrees, constitute 25.7% of the sample, representing 112 individuals. Regarding the job level variable, the research sample members were grouped by job level. (201) individuals hold executive management positions, representing (46.2%) of the total sample, while (207) individuals work in supervisory management positions, representing (47.6%). Only (27) individuals from the sample hold senior management positions, representing (6.2%). Finally, according to work experience, 20.5% of the participants (89 individuals) have less than (5) years of experience, while 15.9% of the participants (69 individuals) have experience ranging between 5 and less than 10 years. The largest group of the sample (40%) (174) individuals are those with experience ranging between 10 and 20 years. As for those with

experience between 20 and 30 years, they represent 18.6% of the sample (81 individuals), while the percentage of those with experience exceeding 30 years does not exceed 5.1% (22 individuals). The research sample is summarized in Table 1.

Table (1): Distribution of the research sample according to different variables.

Variable	Level	Frequency	Percentage
Gender	Male	348	80%
	Female	87	20%
	Total	**435**	**100%**
Age	Less than 30	80	18.4%
	Between 30 and 40	185	42.5%
	More than 40	170	39.1%
	Total	**435**	**100%**
Educational level	High school	67	15.4%
	Diploma	61	14%
	Undergraduate	195	44.8%
	Postgraduate (M.Sc. and Ph. D)	112	25.7%
	Total	**435**	**100%**
Career level	Operational Management	201	46.2%
	Supervisory Management	207	47.6%
	Senior Management	27	6.2%
	Total	**435**	**100%**
Practical Experience	Less than 5 years	89	20.5%
	Between 5 and 10 years	69	15.9%
	Between 10 and 20 years	174	40%
	Between 20 and 30 years	81	18.6%
	More than 30 years	22	5.1%
	Total	**435**	**100%**

Measurement method of the reality of DM

This research relied on the questionnaire as the primary tool for data collection, due to its ability to provide accurate quantitative data that can be analyzed statistically, thereby contributing to the achievement of the research objectives. The questionnaire was carefully designed to include a set of axes that reflect the research variables. It included closed-ended questions prepared according to a five-point Likert scale (strongly agree, agree, moderately agree, disagree, strongly disagree). The following criteria were used to judge the results: (1 - 1.79) very low, (1.80 - 2.59) low, (2.60 - 3.39) medium, (3.40 - 4.19) high, (4.20 - 5) very high. This was to measure the participants' attitudes and opinions with a high degree of objectivity and accuracy. The questionnaire consisted of two main sections: Section One: Demographic Variables, which included a set of questions related to the demographic characteristics of the participants, such as gender, age, educational level, job level, and work experience, intending to analyze the impact of these factors on the research variables. The second section: DM focuses on measuring the level of application of DM through five main dimensions: administrative requirements, financial requirements, human requirements, security requirements, and technical requirements. Each of these dimensions was measured through (6) specialized paragraphs.

Psychometric properties of the research instrument: validity and reliability

The questionnaire's validity was verified to ensure its ability to accurately and objectively measure the research's targeted variables. Several methods were used to verify the tool's validity, most notably: (1) Face Validity: The questionnaire was presented to a group of 4 four experts and specialists in the field of management and statistical research. They reviewed the clarity of the items and their relevance to the research themes, and made comments on any necessary modifications to ensure measurement accuracy. (2) Content Validity: The questionnaire's comprehensiveness was confirmed, covering all key dimensions related to the research variables. The items were designed based on previous literature and relevant theoretical models, ensuring they adequately represent the research topic. The questionnaire's reliability

was verified to ensure consistency and accuracy in measuring the research variables, which guarantees the possibility of reapplying it and obtaining similar results. To achieve this, the researcher calculated Cronbach's alpha coefficient for each of the research axes, where the value of the overall reliability coefficient of the questionnaire reached 0.971, and the values of Cronbach's alpha coefficient for all variables and dimensions ranged between 0.888 and 0.912. The results in Table 2 indicate that the questionnaire exhibits a high degree of reliability for both variables and dimensions, making it suitable for statistical analysis in the actual study. According to statistical standards, a Cronbach's alpha value that exceeds 0.70 is considered acceptable, while values higher than 0.80 indicate a high degree of reliability.

Table (2): Cronbach's alpha coefficient to measure the reliability of the questionnaire.

Variables and dimensions	Cronbach's alpha	Number of items
Administrative Requirements	0.900	6
Financial Requirements	0.897	6
Human Requirements	0.888	6
Security Requirements	0.912	6
Technical Requirements	0.912	6
DM Overall Stability Coefficient	0.971	30

Results and discussion
Determining the level of application of DM in its various dimensions

Hypothesis: P*ublic economic institutions in the Sultanate of Oman apply DM in its various dimensions (administrative requirements, financial requirements, human requirements, security requirements, and technical requirements) to a high degree*. The analysis of this hypothesis was based on statistical data represented by means and SD for each dimension of DM. Determining the level of application of DM in its various dimensions (administrative requirements, financial requirements, human requirements, security

requirements, technical requirements) in public economic institutions in the Sultanate of Oman was performed. Means and standard deviations (SD) were calculated for each dimension of DM as well as the DM variable as a whole. According to the results shown in **Table 3**, it was found that the degree of ownership of employees working in public economic institutions in the Sultanate of Oman is high in all dimensions of DM and the DM variable. The mean of ownership of administrative requirements by employees working in public economic institutions reached a value of 3.798 with a SD of 0.729. The mean of ownership of financial requirements by employees working in public economic institutions reached a value of 3.669 with a SD of 0.747. The mean of ownership of human requirements by employees working in public economic institutions reached a value of 3.718 with a SD of 0.754. The mean of ownership of security requirements by employees working in public economic institutions reached a value of 3.877 with an SD of 0.750. The mean of the possession of technical requirements by employees working in public economic institutions reached a value of 3.774 with an SD of 0.732, and the mean of the possession of DM by employees working in public economic institutions reached a value of 3.767 with an SD of 0.667.

Table (3): Mean and SD of the digital management dimensions and the digital management variable as a whole.

Dimensions	Mean	SD	Level
Administrative Requirements	3.798	0.729	High
Financial Requirements	3.669	0.747	High
Human Requirements	3.718	0.754	High
Security Requirements	3.877	0.750	High
Technical Requirements	3.774	0.732	High
DM Overall	3.767	0.667	High

The results indicate that the level of implementation of DM in its various

dimensions in public economic institutions in the Sultanate of Oman is high, reflecting these institutions' interest in providing the basic requirements for digital transformation. Several factors can explain these results. For Administrative Requirements, the public economic institutions in the Sultanate of Oman have established clear regulatory frameworks for implementing DM, such as adopting digital transformation plans and promoting a digital work culture within the institution. Creating frameworks is a crucial factor in determining the success of e-governance. Also, Jordanoski (2025) examined how regulatory maturity affects the creation and performance of digital government projects in Belgium, Estonia, and Singapore. It has been demonstrated that high digital governance performance is achieved when institutional coordination, technical infrastructure, and cohesive and enforceable legal frameworks are combined.

The financial Requirements dimension recorded the lowest mean compared to the other dimensions. This could be attributed to the financial challenges facing some institutions in financing digital transformation projects. Dafri & Al-Qaruty (2023) mentioned that there have been two significant worldwide financial crises in recent decades. The world economy as a whole was impacted by the financial crisis in 2008. In contrast, others entered during the recent COVID-19 pandemic. Both financial crises have deeply impacted the low mean Financial Requirements dimension. However, the relatively high mean reflects the Omani government's interest in funding and supporting digital infrastructure, which contributes to strengthening DM.

Human resources (HR) play a pivotal role in enhancing DM by serving as the strategic bridge between technological innovation and organizational culture. The results of the Human Requirements dimension indicated that economic institutions in the Sultanate of Oman

possess qualified human resources with the knowledge and skills necessary to handle digital transformation, while emphasizing the ongoing need to develop employee skills through ongoing training and qualifications to ensure the sustainable success of DM. As digital transformation reshapes workflows, communication, and decision-making, HR departments are responsible for cultivating the digital competencies required to navigate these changes effectively. This includes recruiting digitally literate talent, designing continuous learning programs to upskill existing employees, and fostering a culture of adaptability and innovation (Zhang & Chen, 2024). HR also ensures that digital tools are integrated in ways that support employee engagement, performance tracking, and collaborative work environments, thereby aligning human capital strategies with digital objectives. Through these functions, human resources not only support the technical implementation of digital systems but also ensure that the human element motivation, trust, and participation are embedded within digital management practices, ultimately driving sustainable organizational growth and resilience (Al-Zaqeba et al., 2025).

For Security Requirements, this dimension is the highest on mean which implies a strategic shift toward safeguarding organizational assets, ensuring data integrity, and maintaining trust in increasingly complex digital ecosystems in the Sultanate of Oman. As organizations adopt cloud computing, AI, and IoT technologies, the need for robust cybersecurity frameworks becomes increasingly critical, not only to prevent breaches and unauthorized access, but also to comply with regulatory standards and protect stakeholder confidence (Schneider, 2025). Eventually, Technical Requirements mean indicated the availability of an appropriate technical infrastructure that supports digital transformation (Twizeyimana

& Andersson, 2019). However, further development may be required to keep pace with the latest digital technologies and enhance integration between various systems. This enhances the credibility of the results and reduces the possibility of bias or fragmentation in responses. Based on the above, the first hypothesis can be accepted, as the results show that public economic institutions in the Sultanate of Oman apply DM to a high degree across all dimensions studied. This is a positive indicator of the maturity of the organizational and technical structure and supports the government's drive to promote the digital economy in accordance with Oman Vision 2040.

Verifying the presence of significant differences in the level of application of DM

Second Hypothesis Text: *There are statistically significant differences in the level of DM implementation attributed to the following demographic variables: (gender, age, educational level, job level, and work experience*). The results of the hypothesis test regarding the existence of statistically significant differences in the level of DM implementation based on demographic variables (gender, age, educational level, job level, and work experience) indicate that most of these variables did not show statistically significant differences, indicating that the implementation of DM is balanced and comprehensive across different employee categories.The statistical differences in the level of application of DM may be significantly influenced by the demographic variables: gender, age, educational level, job level, and practical experience. Gender was analyzed and the mean estimated using the T-Test, while ANOVA test was used to verify the significance of the differences attributed to the variables age, educational level, job level, practical experience. The homogeneity of the data was examined using the Lavene's test to verify the

homogeneity of the data. The homogeneity indicated that the levels of the independent variable (males and females) affect the sample members in the same way, and this does not lead to a change in homogeneity within each group of sample members. There was no statistically significant difference for the DM variable (F-value = 0.047, p-value = 0.829). Therefore, the results of the t-test for two independent samples will be used to determine the homogeneity of the data.

After conducting a t-test for two independent samples, Table 4 indicated no statistically significant differences at the significance level $\alpha \geq 0.05$ in the study sample's estimates of the independent variable "DM in public economic institutions in the Sultanate of Oman" based on the gender variable. The t-test value reached 1.524, with a statistical significance of 0.128. Therefore, there is no difference between males and females in the level of application of DM in public economic institutions in the Sultanate of Oman.

Table (4): T-test for gender variable.

Variable	Gender	Number	Mean	SD	t-value	p-value
DM	Male	348	3.791	0.665	1.524	0.128
	Female	87	3.670	0.672		

It can be concluded that the absence of differences between males and females in the level of DM implementation in public economic institutions in the Sultanate of Oman reflects an institutional approach based on equal opportunities and the adoption of standards of professional competence and merit. This is attributed to the unification of digital policies and procedures, the provision of equal opportunities for access to technology, the dissemination of equal training programs, and national trends that support digital transformation without gender discrimination, which fosters a comprehensive and practical digital work environment. These results may

not be comparable to those of other studies conducted in a different country. For example, Kose (2019) investigated the relationship between gender and the use of e-government services in Turkey. The author examined the factors influencing Turkish individuals' adoption of e-government, and probit regression models were estimated using data from household surveys. According to empirical research, there is an imbalance between genders in the utilization of e-government services. Turkish women are less likely than Turkish men to use e-government technologies. The likelihood that Turkish people will use e-government is positively connected with household income, education level, employment status, and internet usage frequency. Also, in Moldova, women fill 31% of ICT sector jobs and only 19% of digital professions. Also, households led by women have 11.7 percentage points lower computer + internet access than those led by men (United Nations in Moldova, 2019).

A descriptive analysis was conducted for the age-related dimension. To verify the statistical significance of the differences between the means of the independent variable, DM, for the study sample in the Sultanate of Oman, according to the age variable (less than 30 years, between 30 and 40 years, 40 years and older), a one-way ANOVA was employed. The homogeneity of the data was examined using Lavene's Test to verify the homogeneity of the data. The homogeneity test indicated that the levels of the independent variable age (less than 30 years, between 30 and 40 years, 40 years and above) affect the sample members in the same

way. This does not lead to a change in the homogeneity within a single group of sample members. The results of Levene's Test indicated that the homogeneity of the data is not statistically significant for the DM scale with respect to the age variable, F= (0.648), with a statistical significance of p-value = (0.523). Thus, the homogeneity of the data for the three groups was confirmed. After conducting an ANOVA test, Table 5 indicated no statistically significant differences at the significance level $\alpha \geq 0.05$ in the study sample's estimates of the DM variable according to the age variable. The F-value reached 0.201, with a statistical significance of 0.818 for the DM variable. This could be attributed to the lack of statistically significant differences in the research sample's estimates of the DM variable according to the age variable, indicating that the application of DM in public economic institutions in the Sultanate of Oman is not influenced by the age factor. This is attributed to the prevalence of digital culture among different age groups, as well as the availability of equal opportunities to acquire digital skills through ongoing training and qualification programs. This also reflects the success of institutions in standardizing digital practices and ensuring the integration of all employees into a unified digital work environment, regardless of their age. In 2023, the European Commission reported that young women in the EU possessed at least fundamental digital abilities at a higher rate than men. In contrast, the situation is reversed for those over 45, with a greater proportion of men and a growing gender disparity in senior age groups (European Commission, 2023).

Table (5): One-way ANOVA test for demographic variables.

Independent Variable (DV)	Source	Sum of Squares (SS)	Degrees of Freedom (df)	Mean Square	F-value	p-value
Age	Between groups	0.179	2	0.09	0.201	0.818
	Within groups	192.906	432	0.447		
	Total	193.085	434			
Educational Level	Between Groups	3.505	3	1.168	2.656	0.048
	Within groups	189.581	431	0.44		
	Total	193.085	434			

Independent Variable (DV)	Source	Sum of Squares (SS)	Degrees of Freedom (df)	Mean Square	F-value	p-value
Career Level	Between groups	0.712	2	0.356	0.800	0.450
	Within groups	192.373	432	0.445		
	Total	193.085	434			
Experience	Between groups	1.156	4	0.289	0.647	0.629
	Within groups	191.93	430	0.446		
	Total	193.085	434			

At the significance level ($\alpha \geq 0.05$)

To verify the statistical significance of the differences between the means according to educational level (General Education Diploma and below, Higher Diploma, Bachelor's, Postgraduate Studies (Master's, Doctorate), a one-way ANOVA was employed. Table 5 shows the descriptive analysis of the sample by educational level. The homogeneity of the data was examined using Levene's Test to verify the data's homogeneity. The homogeneity test indicated that the levels of the independent variable, educational level (General Education Diploma and below, Higher Diploma, Bachelor's, Postgraduate Studies (Master's, Doctorate) affect the sample members in the same way. This does not lead to a change in

homogeneity within each group of sample members. The results of Levene's Test indicated that the homogeneity of the data was not statistically significant for the DM scale with respect to the educational level variable, F = (1.662), with a statistical significance of p-value = 0.175. Therefore, the homogeneity of the data for the four groups was confirmed. After conducting the ANOVA, the F-value reached 2.656, with a statistical significance of 0.048 for the DM variable. To identify the pairwise differences between the means of the variables that have statistical significance, post-test comparisons were used using the (LSD) method, as shown in Table 6.

Table (6): Dimensional comparisons using the LSD method.

Variable	Educational Level	Mean Difference	p-value	Direction of Differences
DM	High school	0.125	0.289	No differences
	Diploma	0.243	*0.010	Diploma
	Postgraduate	0.240	*0.020	Postgraduate
	Undergraduate	0.118	0.224	No differences
	Postgraduate	0.115	0.276	No differences
	Postgraduate	-0.003	0.966	No differences

The previous table shows statistically significant differences at the significance level ($\alpha=0.05$) between the study sample (General Education Diploma and below), the study sample (Bachelor's), and the study sample (Postgraduate Studies). The differences consistently favored those with a General Education Diploma and below. Meanwhile, the results indicated no statistically significant differences between the study sample (those with a General Education Diploma or below) and the study sample (those with a Higher Diploma). Furthermore, there were no statistically significant differences between the study sample (Higher Diploma and below) and

the study sample (Bachelor's and Postgraduate Studies). It could be concluded that the presence of statistical significance between those with a General Education Diploma and below, compared to those with a Bachelor's and Postgraduate Studies, indicates a difference in their level of appreciation for DM. The differences favored the less educated (those with a General Education Diploma and below). This may be due to differences in cognitive backgrounds and approaches to digital technologies. Employees in this category may be more reliant on digital systems in their daily tasks to compensate for the knowledge gap or enhance their operational efficiency.

The results in Table 5 show the descriptive analysis of the sample by job position. Before answering this second question related to the job level variable, the homogeneity of the data was examined using Lavene's Test to verify the homogeneity of the data. The results of Levene's Test indicated that the homogeneity of the data was not statistically significant for the DM scale with respect to the job level variable (F = 2.666), with a p-value of 0.071. Thus, the homogeneity of the data for the three groups was confirmed. After conducting an ANOVA test, there was no statistically significant differences in the study according to the job level variable. The F-value reached (0.800), with a statistical significance of (0.450) for the DM variable. The study results did not agree or differ from any previous study, as no previous study aimed to verify the existence of statistically significant differences in the DM variable attributable to the job level variable. As a result, there were no statistically significant differences in the study sample's estimates of the DM variable according to the job level variable in public economic institutions in the Sultanate of Oman. This is attributed to the standardization of digital policies and procedures within the institution, which ensures that all employees benefit, regardless of their job level. This homogeneity may also result from equal opportunities to acquire digital skills.

To determine the presence of statistically significant differences between the means according to practical experience (less than 5 years, 5 years and less than 10 years, 10 years and less than 20 years, 20 years and less than 30 years, and 30 years and more). The homogeneity test indicated that the categories of the practical experience variable affect the sample members by the exact mechanism, and this does not lead to a change in homogeneity within each group of sample members. The results of Levene's Test indicated that the homogeneity of the data was not statistically significant for the DM scale with respect to the practical experience variable (F = 0.861), with a p-value of 0.488. Thus, the homogeneity of the data for the five groups was confirmed. After conducting an ANOVA test, the results showed no statistically significant differences in the study samples of the DM variable based on the practical experience variable. The F-value reached 0.647, with a statistical significance of 0.629 for the DM variable. The lack of statistically significant differences in the adoption and implementation of DM is not affected by the length of experience of employees in public economic institutions in the Sultanate of Oman. This may be due to the widespread use of digital systems within institutions, which have become an essential part of the daily work environment for all employees, regardless of their years of experience. This reduces the impact of time differences in practical experience on the level of adoption and utilization of digital technologies.

Conclusion, Implications, and recommendations

Based on the above, the hypothesis was rejected for most variables (gender, age, job level, work experience), while it was accepted only for the educational level variable. This indicates that educational level influences individuals' perceptions of digital governance implementation, while other factors do not produce statistically significant differences.

Implications for Research

Future research should build upon this study by examining organizational and cultural factors that may influence perceptions of digital governance, such as leadership style, institutional readiness, and change management practices. Longitudinal studies could also explore how perceptions evolve over time as digital initiatives mature. Comparative analyses between public and private sectors or

across Gulf Cooperation Council countries would provide deeper insights into contextual determinants of digital transformation success.

Implications for Practitioners

For policymakers and practitioners, these findings highlight the importance of prioritizing educational initiatives and targeted digital upskilling programs. Ministries and public agencies should align digital transformation policies with human capital development to ensure effective adoption. Encouraging participatory evaluation platforms and strengthening digital infrastructure especially in underserved regions will enhance citizen engagement and service quality. Moreover, fostering collaboration with advanced digital nations such as Denmark, Singapore, and Estonia can provide valuable models for sustainable transformation.

Recommendations

– The Ministry of Transport and Information Technology, as the entity responsible for the digital transformation project in the Sultanate of Oman, should benefit from the experiences and expertise of advanced countries in digital government development, such as Denmark, Singapore, and Estonia. This should be achieved by studying their successful models in developing digital infrastructure, providing e-government services, and enhancing human capital. This will contribute to accelerating the pace of digital transformation in the Sultanate and enhancing the efficiency of government performance.

– Establish a participatory platform for evaluating digital government services, allowing citizens to directly evaluate the performance of government digital services and submit suggestions or vote on improvements, thus enhancing interaction and continuous development of services.

– Adopting a digital transformation policy as a condition of government contracts by obligating companies contracting with the government to include digital elements (such as tracking systems, digital reports, and interactive portals) in the projects they implement, to accelerate digitization across sectors.

– Launching a Digital Transformation Ambassadors Program in schools and universities. The program aims to train a group of students from educational institutions to act as representatives and ambassadors to spread the culture of digital transformation among their colleagues and the local community, with support from government agencies.

– Establishing a national fund for investment in digital transformation to finance government and private digital projects and support innovation in areas such as artificial intelligence, cybersecurity, and emerging technologies, with a focus on projects with economic and social impact.

– The Omani government should adopt a comprehensive national participatory approach in developing strategies related to digital transformation, by engaging stakeholders from various sectors: government, private sector, and civil society. We should be cautious about announcing any strategic plans before they are fully mature, to ensure the quality of outcomes, align them with national reality, and avoid issuing incomplete visions that could affect the effectiveness of implementation and the credibility of the country's digital direction.

– Networks and communications represent the backbone of digital transformation. The Omani government must strengthen telecommunications infrastructure and expand high-speed internet coverage to ensure effective support for digital transformation, particularly in rural areas.

This will help enable institutions and individuals to gain equal access to digital services and maximize their benefits.

– Conduct intensive courses, including programs, workshops, and seminars targeting all administrative levels, on the elements of DM and its role in improving job performance in public economic institutions.

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