Hume Studies,
ISSN / eISSN 0319-7336 / 1947-9921
Publisher HUME SOCIETY, OCCIDENTAL COLLEGE,
DEPT PHILOSOPHY,LOS ANGELES, USA, CA, 90041
Volume 26-Issue 1-(2026)
DOI:https://doi-0004.org/6812/17869508118994

OPEN ACCESS

The role of e-government in improving the quality of public service in municipalities

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Received: 15/07/2025 ; Accepted : 09/01/2026 ; Published : 17/08/2026

Abstract

The aim of this study was to examine the role of e-government in improving public services in the municipality of the province of Médéa. A questionnaire was distributed to a sample of 45 administrators in the municipality, To analyze the data obtained, normal distribution tests, Pearson correlation coefficient, Cronbach's alpha coefficient to ensure the reliability of the questionnaire, means, standard deviations, percentages, frequencies, one-way ANOVA and simple regression were used. The study reached several conclusions, the most important of which is that there is a positive role of e-government in improving public service. It was also found that all members of the study sample, regardless of their gender and level of education, agreed on the importance of e-government as a mechanism for improving public service.

Keywords: e-government, public service, public organisation, information technology, municipality of Medea.

1. Introduction

Global experiences with e-government have demonstrated that technology alone does not guarantee increased access and participation; substantial technological changes are insufficient for transforming government operations online, A digital administration would remove the obstacles of time and distance that citizens face when interacting with public authorities, transforming these interactions into a more efficient service rather than a cumbersome bureaucratic process. Additionally, it facilitates greater citizen engagement in democratic institutions and political activities **(Bolgherini, 2007; Frías-Aceituno et al., 2014**). This has played a significant role in modernizing and implementing citizen-focused services by creating integrated policies and programs that enhance service delivery across local government **(Weerakkody et al., 2019)**. The integration of digital information and communication technologies into governmental frameworks and public service is often seen, perhaps overly optimistically, as a transformative solution for the 21st century. This approach is perceived as a means to revitalize democratic processes, lower expenses, and enhance the overall quality of public services **(Milakovich, 2021).** The development of e-government has been shaped by the ongoing interplay between technological innovations and societal transformations**(Shin et al., 2020).** Each governmental department faces constraints in addressing increasingly intricate social challenges, necessitating a shift towards more innovative solutions**(Shin et al., 2020).**

It is essential to consider various factors, including political culture, cognitive frameworks, administrative traditions, and unique national characteristics, as they significantly influence the success or failure of e-government initiatives(**Bolgherini, 2007**). Public managers in contemporary settings must possess a diverse array of skills and a comprehensive, up-to-date knowledge base encompassing several critical areas. These include performance management, the implementation of digital government initiatives, fostering collaboration, engaging in strategic planning, driving innovation, adopting lean government principles, and effectively managing personnel to enhance performance outcomes**(Hijal-Moghrabi, 2023).**

Over a decade since the implementation of e-government initiatives, the initial optimistic views regarding their swift influence on democratic quality have faced considerable examination. Although there was considerable anticipation that e-government would enhance transparency and foster greater democratic engagement, research findings have been varied.

Some investigations indicate that e-government has indeed facilitated improvements in transparency and accountability; however, it has not consistently resulted in notable increases in political engagement or significantly bolstered democratic processes. Conversely, the role of strategic monitoring in e-governance demonstrates that such tools can enhance organizational efficiency by allowing for proactive data monitoring and analysis, which in turn supports more informed decision-making(**Kasmi & Djalab, 2021**).

Nonetheless, the successful deployment of these mechanisms necessitates robust infrastructure and institutional capabilities. The implementation of e-government has led to considerable costs for governments; nonetheless, our examination of existing literature indicates that there is a scarcity of research focused on this particular topic (e.g. **Weerakkody et al., 2019)**.

The state's primary objective is to meet the needs of the general public to ensure the official functioning of this system. Every action taken must elicit a corresponding response, and this system is designed to guarantee public satisfaction and compliance(**Axelsson et al., 2013**). This initiative will significantly benefit not only the current generation but also those to come(**Saengchai et al., 2020**).Governments are increasingly recognizing the rising public demand for improved transparency and accountability, which can be achieved through more effective utilization of information and communication technology (ICT)(**Wirtz et al., 2018**). Wirtz et al (**2018**) refer to E-participation as the enhancement and evolution of public involvement in democratic and consultative processes, facilitated by information and communication technologies (ICT), especially the Internet. Its primary objective is to foster active citizenship by leveraging the latest technological advancements, thereby improving access to and opportunities for participation, which in turn contributes to a more equitable and effective society and governance.

The main goals of e-government are to increase agency efficiency and offer benefits to citizens(**Axelsson et al., 2013)**. Since the year 2020, Algeria has undertaken significant efforts to enhance the accessibility of public services for its citizens. A key initiative in this regard has been the digitization of these services, which involves the optimization of administrative frameworks and the collaboration among various governmental and public institution units. This transformation is facilitated by the establishment of multiple digital platforms across different sectors.

Algeria's initiatives in e-government are integral to a wider reform agenda aimed at enhancing the accessibility and transparency of government services. This research could investigate particular e-government in municipalities in Algeria, analyzing their alignment with the expectations and satisfaction levels of citizens. Thus, the focus of our research is to investigate the degree to which the implementation of e-governance influences the improvement of public service delivery within municipal contexts.

Specific sub-questions arising from this primary research include To what extent are e-government methods currently being used in local government? To what extent does e-government improve the quality of public service delivery? In addition, do participants' perceptions of e-government as a tool for improving public services vary according to individual characteristics such as gender and educational level?

The development of e-government as part of the triple bottom line that includes economy, social affairs and environmental sustainability is the goal of many nations across the globe and not only Algeria. To attain this objective, Algeria should take advantage of the strengths and fast-growing digital advancement in order to improve services to its citizens. The results of this research can contribute important pointers regarding the effective implementation of e-government in improving public services.

2. Conceptual framework and hypotheses development

2.1. E-government

The technology employed in the creation of e-government systems appears to be quite comparable across the municipalities examined in our research. **(Frías-Aceituno et al., 2014**). According to the research conducted by Arendsen et al (**2014**), user acceptance models are fundamentally based on three key concepts: the personal responses of individuals to the utilization of information technology, their intentions regarding the use of such technology, and the actual engagement with information technology itself. The primary goal of implementing e-government initiatives is to effectively and transparently address the needs of the public, thereby fostering greater trust between citizens and the governmental framework. By offering readily accessible services, enhancing transparency and accountability, and streamlining operations, e-government facilitates the delivery of high-quality public services. This, in turn, boosts citizen trust and satisfaction, ultimately leading to an overall enhancement in the performance of the government system**(Saengchai et al., 2020).**. A good

number of e-government programs are unsuccessful especially because of inadequate execution and control**(Heeks, 2005).**

E-government is characterized as a framework that utilizes information technology to enhance public services while increasing efficiency, transparency, and citizen participation**(Heeks, 2005).** E-government represents a contemporary digital framework that leverages information and communications technology (ICT) to provide government services in a manner that is more efficient, transparent, and accessible. Its primary objective is to enhance governmental operations, lower expenses, and improve transparency and accountability. By facilitating easier access to government services for citizens, e-government aims to bridge the gap between the government and society (**Heeks**, 2005). Nevertheless, E-government signifies a transformation in the delivery of public services through the utilization of digital technology, closely linked to e-governance, which focuses on employing digital tools to enhance both internal and external administrative functions of government entities. E-governance involves the management of data, operations, human resources, and internal communications via digital platforms, aiming to boost efficiency and transparency. In municipal contexts, the convergence of e-government and e-government is reflected in the enhancement of services such as issuing building permits, providing water and electricity (**Ndou, 2004)**services, and managing complaints. E-government plays a vital role in streamlining bureaucratic processes, as it intersects with e-government to establish more effective communication channels between citizens and local authorities, thereby reducing transaction times and improving citizen satisfaction **(Heeks, 2005; Ndou, 2004).**

E-government is evolving thanks to new ideas that enhance the delivery of government services and the efficiency of operations. A key concept in this evolution is 'open government,' which aims to foster transparency and encourage public engagement by making government data accessible to everyone, thus bolstering citizens' trust in their governing bodies**(Bertot et al., 2010).** Another significant development is 'predictive government,' which leverages artificial intelligence and big data analytics to foresee citizens' future needs and optimize resource allocation and Predictive Threat Intelligence in Government Networks **(Rodriguez & Costa, 2024; Thapa, 2019)**, Duan et al.(**2020**)John further contends that the predictive model serves as a valuable instrument for the government to comprehend the COVID-19 effects and inform public policy decisions. He emphasizes the critical role of accessible and real-time data

in enhancing the understanding of the pandemic's repercussions on both society and the economy. In terms of security, 'blockchain-based government' enhances the safety and reliability of governmental transactions, reducing the potential for corruption **(Dubey et al., 2020).** Furthermore, 'intelligent governance' also includes the application of technologies such as the Internet of Things, cloud computing, artificial intelligence, and Big Data in the management of cities and the provision of public services **(Koo, 2019)**... Lastly, 'participatory digital government' promotes collaboration between governmental entities and citizens to create effective local solutions **(Reddick, 2011)**.

E-government in Algerian municipalities serve as a crucial mechanism for enhancing the quality of public services and fostering better communication between citizens and local authorities. Notable applications include electronic systems designed to handle complaints and requests, which streamline interactions with local administrations and expedite response times. Numerous municipalities provide online portals that offer services such as certificate issuance, license renewals, and fee payments, thereby minimizing the necessity for in-person visits to government offices. Furthermore, e-payment options enable citizens to settle taxes online, alleviating congestion at physical locations. Geographic Information Systems (GIS) are being utilized to enhance urban planning efforts, while social media platforms are leveraged by municipalities to engage with citizens and share important information. Additionally, some municipalities are creating mobile applications to improve access to services. E-government initiatives promote community engagement through surveys, thereby boosting public participation. Ultimately, e-government contributes to better resource management through performance monitoring and reporting, marking a significant advancement towards increased efficiency and citizen satisfaction in Algeria.

2.2. Quality of public service

Service quality is characterized by the comprehensive evaluation of a service as perceived by customers. Sawant (**2016**) highlighted that when the service provided aligns with customer expectations, it is deemed to be of high quality. Moreover, it is not solely the quality of the service that matters; the consistency in delivering that quality is also crucial in meeting customer expectations. Parasuraman et al. (**1988**) define service quality as a comprehensive assessment that resembles an individual's attitude toward the service, and it is widely

recognized as a precursor to overall customer satisfaction(**Ramseook-munhurrun et al., 2010**).

Parasuraman and colleagues (**1985**) identified ten elements that define service quality within a conventional commercial reliability, responsiveness, competence, courtesy, credibility, security, access, communication, understanding, and tangibles. **In** a subsequent study in **1988**, they streamlined these ten elements into five key components that form the SERVQUAL scale: intangibles, responsiveness, reliability, assurance, and empathy. The SERVQUAL scale, along with its adaptations, has been widely utilized for assessing service quality**(Parasuraman et al., 1988**). The provision of public services is primarily directed towards individuals rather than industries, which renders these services especially susceptible to fluctuations in demand that arise from the cyclical nature of demographic shifts(**Walsh, 1991).**

Services, in contrast to physical products, are created and utilized simultaneously in the presence of both the customer and the service provider. The involvement of human interaction during the service delivery significantly heightens the likelihood of mistakes made by both employees and customers. These errors stem from intangible behavioral dynamics that are challenging to oversee or regulate effectively**(Ramseook-munhurrun et al., 2010).**

The importance of service quality in the public sector has become more pronounced with the advent of modern management approaches, such as contract-based management. The concept of quality in public services poses distinct challenges, largely arising from the information asymmetry that characterizes the relationship between service providers and their consumers**(Walsh, 1991).** For example, it was revealed that the Japanese car manufacturer Mitsubishi had concealed a significant number of complaints instead of addressing them over an extended timeframe. When effectively developed and utilized, service quality performance indicators have the potential to enhance organizational performance. However, if misapplied, they can be detrimental, negatively impacting the performance of teams or individuals within the organization **(Black et al., 2001**). The risk lies in the possibility that public services may be offered without consideration for the perspectives of the individuals they are intended to serve**(Aritonang, 2017).**

2.3.E-government in improving and quality of public service

Academic research has explored the subject of e-governance and the quality of public services from various perspectives, emphasizing both its advantages and obstacles. Bhuvana & Vasantha (**2022**)found that in India, e-governance has led to enhanced Satisfaction rural citizens by provides e-health care requirements.

Business process modeling, for instance, facilitates targeted enhancements and boosts the efficiency of public sector organizations by minimizing bureaucratic hurdles and redundant processes(e.g. **Lapuente & Van de Walle, 202**0). Nevertheless, a number of scholars have voiced skepticism about the effectiveness of these methodologies(**Psomas, 2020)**. Numerous academic studies have concentrated on government reforms aimed at enhancing the quality of public services, examining various organizational and administrative dimensions. Key reforms include the implementation of good governance principles, the promotion of transparency, and the adoption of technology to boost efficiency(**Lapuente & Van de Walle, 2020)**. Research by Arendsen et al (**2014**)E-government initiatives play a crucial role in alleviating the administrative load faced by businesses. By leveraging digital technologies, these initiatives streamline processes, enhance communication, and improve access to essential services, ultimately leading to a more efficient regulatory environment. This transformation not only simplifies compliance for businesses but also fosters a more conducive atmosphere for growth and innovation.

Saleh et al.(**2020**) revealed that the introduction of e-government initiatives led to a to increase government transparency and accountability in its departments in **KSA**. Steen and Bordeaux T. Liu et al (**2020**) and Palaco et al.(**2019**) found that public-private partnerships (PPPs) have significantly upgraded infrastructure and made public services more efficient and better aligned with the needs of citizens. Additionally, Shin et al. (**2020**) explored the effects of government innovation on public service quality, concluding that the integration of innovative practices within government organizations not only enhances service quality but also elevates citizen satisfaction. A transformation in public services is essential, Shin et al (**2020**) a novel e-government framework is suggested as a viable alternative to achieve sustainable development throughout society by fully digitizing all government services. This vision includes strategies focused on platform development, open data utilization, and training for human resources. In particular, enhancements are being implemented in infrastructure, the

expansion of human resources, the cultivation of ecosystems, and the overall improvement of public services.

Disparities in access to digital technology and the necessary skills to utilize it contribute to gaps in e-government services across various societal groups. Although governments are striving to adopt digital solutions to enhance public service quality, certain demographics, including the elderly, low-income individuals, and those in rural areas, often face challenges in accessing these services**(Sir & Bourn, 2012)**. Research by Furuholt & Kristiansen (**2007**)highlighted that insufficient digital infrastructure in rural regions has intensified these digital divides, adversely affecting equitable service delivery. Furthermore, Abu-Shanab & Khasawneh Morrison's (**2014**) and Sharma et al (**2016**) research pointed out the challenge of digital illiteracy, indicating that the inability to navigate the Internet further widens this gap, limiting access to e-government services for some citizens and fostering feelings of exclusion and inequality in their access to public services. Weerakkody (**2019**)identified that the variety of stakeholders engaged, along with the absence of suitable systems for information sharing and collaboration, presents significant obstacles to the effective delivery of local e-government services. A recent survey indicates that e-government initiatives significantly alleviate the administrative load faced by businesses(**Arendsen et al., 2014)**. The service quality dimensions have a statistically significant impact on citizens' satisfaction**(Psomas, 2020).**

In Algeria, Benaida (**2023**)presented an analysis contrasting e-services in Algeria with those in the UK, highlighting that Algeria holds the 120th position in Africa's Economic and Social Development Index, as reported in the most recent e-government survey by the United Nations.

Numerous studies have explored the influence of e-governance on the quality of public services from various international and regional viewpoints. Heeks (**2005**)highlighted those developing nations encounter distinct obstacles in their shift to e-governance, including inadequate digital infrastructure and insufficient training, which hinder the effectiveness of these systems. Saleh et al. (**2020**) examined the connection between e-governance and governmental transparency, asserting that the accessibility of online information can mitigate corruption and bolster accountability. In Eastern Europe, Sahur and Amiruddin (**2023**) identified that although digitalization has the potential to enhance the efficiency of public

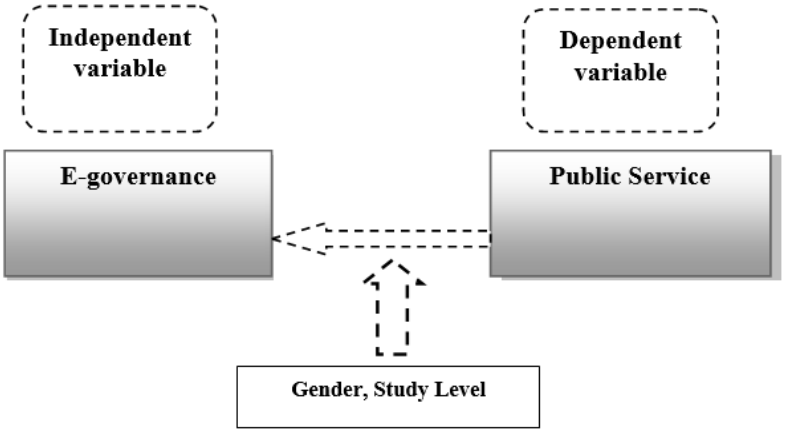
service delivery, addressing the digital divide related to ensuring data security and privacy presents a considerable obstacle to its full implementation. Conversely, Wirtz et al (**2018**) investigated how e-government influences innovation in service delivery, pointing out that the creative application of technology can greatly enhance the provision of public services. Collectively, these studies suggest that digital transformation is a complex, non-linear process that necessitates the integration of various elements, including technology, human resources, and infrastructure, to achieve enhanced public service quality.

3. Methodology

This section outlines the methodology employed for data collection, details regarding the questionnaire, and the approach taken for statistical analysis.

The study is designed to ascertain the reality of e-government and the extent of its contribution to improving the public service at the municipal level. The study population comprises administrative employees in the municipality. Due to the difficulty of reaching all employees, a sample of 70 employees was selected on an intentional basis. The questionnaire was distributed to this sample, and 47 questionnaires were retrieved. After the screening process, two forms were excluded, resulting in a final number of 45 valid questionnaires. Figure 01 illustrates the research framework along with the components that will be examined.

Figure 01: Study Model



Source: Prepared by researchers based on research data.

In this research, we employed the Likert scale as an ordinal measurement technique to assess the attitudes, opinions, and perceptions of individuals or groups regarding various social phenomena.

Table 1: Likert Pentameter Scores.

Opinion	Strongly disagree	Disagree	Neutral	I agree	Strongly agree
Icon	1	2	3	4	5
Wrightie average	From 1 to 1.79	1.80 to 2.59	2.60 to 3.39	3.40 to 4.19	4.2. to 5

Source: (Pimentel, 2010, p. 111)

4. Data analysis:

The data obtained from the questionnaires were subjected to a review and classification process using a statistical software program. The following methods were employed: a normal distribution test, a Pearson's correlation coefficient, and a Cronbach alpha coefficient to confirm questionnaire stability; arithmetic averages, standard deviations, percentages and frequencies; single graph analysis (one-way ANOVA); and a simple regression coefficient.

All analyses were conducted using SPSS 17.

5. Results

In order to confirm that the data follows a normal distribution, we used the Kolmogorov-Smirnov test to determine the appropriate statistical tests (parametric or nonparametric) depending on the significance level.

Table 2: Kolmogorov-Smirnov test results

Sig	Z value	Statement
0,988	0,448	The role of e-government in improving the quality of public service in municipalities

Source: SPSS17 Output (2017)

The data presented in the table above reveals a significance level (sig > 0.05), suggesting that the dataset adheres to a normal distribution. Consequently, it is appropriate to employ parametric tests for further analysis.

Table 3: Pearson's correlation coefficients for each statement with the total degree of the axis to which it belongs.

Item	Correlation coefficient	Sig	Ferry number	Correlation coefficient	Sig
X1	0,620	0,000	X6	0,506	0,000
X2	0,300	0,045	X7	0,651	0,000
X3	0,472	0,001	X8	0,732	0,000
X4	0,679	0,000	X9	0,655	0,000
X5	0,509	0,000	X10	0,608	0,000
E-government	0,945	0,000			
Y1	0,588	0,000	X6	0,648	0,000
Y2	0,717	0,000	X7	0,565	0,000
Y3	0,630	0,000	X8	0,711	0,000
Y4	0,553	0,000	X9	0,621	0,000
X5	0,797	0,000			
Public service	0,950	0,000			

Source: SPSS17 Output (2017).

The above table indicates that all statements are statistically significant at the 0.01 level, with a high degree of statistical significance. Consequently, no statements are deleted from the questionnaire or the analysis. This suggests that there is internal consistency between the statements on each axis, indicating that the statements on each axis are an accurate and consistent representation of their intended measurement.

Table 4: Results of the validity of structural consistency of the study axes.

Questionnaire Themes	Correlation coefficient	Sig

E-government	0,945	0,000
Public service	0,950	0,000

Source: SPSS17 Output (2017).

As evidenced by the above table, the correlation coefficients are statistically significant at a level of $p < 0.05$, indicating a relationship between the study axes and the total degree of resolution. Therefore, it can be concluded that the study axes are valid and have a strong relationship with the study objective.

To measure the stability of the study tool, we use the Cronbach alpha coefficient to ensure the stability of the study instrument, and the results were as follows:

Table 5: Cronbach alpha coefficient per axis and resolution.

Scales	No. Of items	Cronbach's alpha a
E-government	10	78.2
Public service	9	82.5
Overall questionnaire	29	89,1

Source: SPSS17 Output (2017).

The findings presented in Table 1 demonstrate satisfactory reliability, as indicated by Cronbach's alpha and composite reliability values that surpass the established threshold of 0.7, as noted by Nunally (**1978**). The Cronbach alpha coefficients for all three axes and the overall resolution are greater than 70%. This is consistent with the questionnaire's general stability coefficient, which was 89.1%. This suggests that the questionnaire is highly stable, in the sense that if it is disseminated to the same sample, the findings will be similar.

Table 6: Presentation of study sample characteristics.

Data		Frequency	Percentage %
Gender	Male	30	66,7

	Female	15	33,3
Study Level	Medium	3	6,7
	Secondary	24	53,3
	Academic	16	35,6
	Graduate studies	2	4,4
Total		45	100%

Source: SPSS17 Output (2017).

The data presented in the aforementioned table indicates a significant gender disparity within the study sample, with males constituting the majority. Specifically, there are 30 male participants, accounting for 66.7% of the total sample, in contrast to 15 female participants, which represents 33.3%. This notable difference highlights a predominance of males, likely influenced by the employment dynamics within the municipality. Furthermore, it is essential to consider the unique characteristics of the Medea community, particularly its reservation status. Regarding educational attainment, the table reveals that 53.3% of respondents have achieved a secondary education level, while 35.6% have completed their university studies. The intermediate education level is represented by 6.7% of the sample, and a smaller segment, 4.4%, holds a postgraduate degree. This distribution underscores the varying levels of educational achievement among the participants.

Table 7: Distribution of the answers of the sample surveyed on the axis of the reality of the application of e-government at the municipal level.

Items	Mean	SD	T	Sig	level	Rank
The municipality has advanced devices to apply e-government	3,22	1,24	1,201	0,236	Neutral	4
The municipality has internet access.	3,53	0,840	4,249	0,000	I agree	1
The municipality has a website responsible for providing information to citizens.	2,91	1,01	0,585-	0.561 0	Neutral	7
The municipality has advanced information systems that will save and retrieve information at any time.	3,08	1,08	0,550	0.585 0	Neutral	6
There is a fast and powerful intranet	2,57	,910	3,090-	0.003	Neutral	10

network at the municipal level.				0		
The municipality uses some ready-made programs to perform its work.	3,42	1,09	2,581	0.0130	I agree	2
Human resources in the municipality possess experience and skill in the field of information technology.	2,66	1,26	1,773-	0.0830	Neutral	9
The existence of an administrative unit at the organizational level responsible for strengthening and promoting the use of the Internet and networks within the municipality.	2,80	1,23	1,086-	0.2840	Neutral	8
The municipality has a system for information protection and security.	3,35	1,15	2,072	0.0440	Neutral	3
The existence of regulatory and legislative texts in line with the mechanisms of work of e-government.	3,15	1,12	0,926	0.3600	Neutral	5
Overall	3,07	0,642	0,766	0.448	Neutral	

Source: SPSS17 Output (2017).

Note: SD: Standard deviation.

Through the responses of the individuals shown in Table 07, we find that the paragraphs of the axis of the reality of e-government application at the municipal level obtained a moderate degree of agreement with an arithmetic mean of 3.07 and a standard deviation of 0.64, where the arithmetic means of its paragraphs ranged between (2. 57 - 3.53), and this result can be explained by the existence of awareness among the staff of the importance of e-government, and at the same time indicates the existence of obstacles to implementation, such as lack of training or lack of the necessary infrastructure.

Table 8: Distribution of the responses of the sample surveyed on the axis of the reality of public service at the level of the municipality of Medea.

Items	Mean	SD	T	Sig	level	Rank
Information technology provides electronic services at the right time and place.	2,95	1,08	-0,274	0.7850	Neutral	6

Providing services in an electronic manner contributes to respecting the confidentiality and privacy of individuals.	2,95	1,20	-0,247	0.8060	Neutral	7
The services provided are characterized by diversity and speed of delivery.	2,97	1,15	-0,129	0.8980	Neutral	5
The portal – the website – on the Internet contributes to the presentation and provision of information and thus rationalize and facilitate services.	2,86	1,19	-0,746	0.4590	Neutral	8
E-government contributes to improving the principle of transparency in the provision of services.	3,28	1,17	1,643	0.1080	Neutral	2
E-government facilitates the process of obtaining official documents.	3,75	,85	5,915	0.0000	I agree	1
The municipal administration is working to convert the paper assets in the archives into digital content stored in the computer.	3,13	1,17	,7580	0.4520	Neutral	4
E-government helps to reduce the mental and mental effort expended by employees in accomplishing their administrative tasks and thus providing more effective services.	3,24	1,28	1,279	0.2080	Neutral	3
Coordination between the various departments of the municipality is carried out through the Internet in order to facilitate the services provided.	2,64	1,26	-1,887	0.0660	Neutral	9
Overall	3,09	0,75	0.8170	0.4180	Neutral	

Source: SPSS17 Output (2017)
Note: SD: Standard deviation.

From the responses of the individuals shown in Table 8, we can see that the paragraphs of the axis e-government contributions in improving public services received a moderate degree of approval with an arithmetic mean of 3.09 and a standard deviation of 0.75, where the arithmetic means of its paragraphs ranged between (2.64 - 3.75), and it is noteworthy that most of the arithmetic means of this axis ranged between (2.64 - 2.97), 64 - 2.97). These arithmetic means indicate that there is a low level of agreement among employees about the

contribution of e-government to improving public services, and therefore we conclude that the application of e-government at the local government level has not reached the required level that would have a positive impact on its performance.

Table 9: Results of regression variance analysis to confirm the validity of the model for testing the impact of e-government on improving the public service.

Contrast source	Sum of squares	*Df*	Average squares	F	Sig
Regression	15,697	1	15,697	74,373	0,000
Error	9,075	43	0,211		
Total	24,773	44			

Source: SPSS17 Output (2017).

The results of the above table demonstrate that the model is an effective tool for testing the second main hypothesis. The calculated value of F was 74.373, which is a function at a significant level less than 0.05. Therefore, we can conclude that the model is valid for testing this hypothesis, which was tested using a simple regression method to ascertain the relationship between the dependent and independent variables. The most significant results are summarised in the following table:

Table 10: Regression analysis test results for the role of e-government in improving the public service.

Prototype	R	B	Std. error	T	F	Sig
(Constant)	0.796	0,235	0,338	8.624	74.373	0.000
E-government		0.930	0,108			

Note: R^2=0.634; public service; Source: SPSS17 Output (2017)

The data presented in Table 10 reveals a significant effect at the 0.05 level of significance regarding the role of e-government in the enhancement of public service. This assertion is supported by the computed F value of 74.373 and a T value of 8.624, both of

which exhibit a significance level of 0.000, well below the established threshold. Such findings suggest that e-government plays a crucial role in the improvement of public service within the municipality of Medea at the 0.05 significance level. Furthermore, the correlation coefficient of R = 0.796 indicates a robust relationship between the two variables examined. e-government is responsible for 63.4% of the variance observed in public service. Given these results, it is reasonable to affirm the validity of the alternative hypothesis, which posits that "e-government significantly contributes to the enhancement of public service in the municipality of Medea at the 0.05 significance level." Consequently, the regression equation for the model can be articulated mathematically as Y = 0.235 + 0.930(x).

To detect differences, T Test, arithmetic averages and standard deviations were used, as shown in the following table:

Table 11: T test results for gender variable

Variable	Gender	N	Mean	SD	T	Sig
E-government	Male	30	2,98	0,68	1,341-	0,246
	Female	15	3,25	0,51		
Public service	Male	30	3,05	0,70	0,449	0,861
	Female	15	3,16	0,84		

Source: SPSS17 Output (2017)

Based on table 11, the probability value (sig) associated with the t-test for the first and second axis above the significance threshold of 0.05. This results in the acceptance of the null hypothesis, which argues that there are no statistically significant differences in the research sample's perspectives on e-government as a mechanism for enhancing public service attributable to the gender variable at the significance level of 0.05.

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Table 12: Results of variance analysis for educational level variable.

Variable	Source of variance	Sum of squares	*df*	F	Sig
E-government	Between Groups	0,470	3	0,363	0,780
	Within Groups	17,698	41		

	Total	18,168	44		
Public service	Between Groups	2,482	3	1,522	0,223
	Within Groups	22,290	41		
	Total	24,773	44		

Source: SPSS17 Output (2017).

The data shown in the table reveals that the calculated F values for the first and second axes were 0.363 and 1.522, respectively. These statistics were judged to be significant at a level beyond 0.05, which supports the adoption of the null hypothesis. This hypothesis claims that "there are no statistically significant differences in the perspectives of the study sample regarding e-government as a means to enhance public service, attributed to the variable of educational level at the significance level of 0.05." Based on the prior findings, it can be stated that there are no statistically significant variations in the research sample's perspectives on e-government as a tool for enhancing public service when considering personal characteristics such as gender and educational level at the 0.05 significance level. Consequently, this promotes the acceptance of the null hypothesis while rejecting the alternative hypothesis.

6. Discussion and Conclusions

E-government represents a novel approach to communication with citizens through various electronic networks. It is based on the effective utilisation of diverse devices, equipment and information and communication technology programmes with the objective of enhancing government performance, minimising the burden of routine procedures on citizens and providing services and information in an accessible and beneficial manner, thereby leveraging the vast digital resources. The implementation of e-government is not without challenges, the most notable of which include illiteracy, inadequate infrastructure, and a lack of public awareness regarding the significance of e-government.

We have analyzed the relationship between e-government and public service. Following the same line as others studies (Pham et al., 2023; Weerakkody et al., 2019). we have highlighted the complex and multidimensional nature of e-government. Our study provides partial evidence to support the relationship between a municipalities e-government and its public service. This evidence gives initial empirical support to the important role ICT plays public service (e.g. Kingman-Brundage, 1991; Lee et al., 2003).

The respondents are quite favorable towards the use of e-government techniques at municipal units. Nevertheless, this application does not attain the required extent, hence affecting negatively the services rendered to the citizens.

Studies indicate that e-government plays a significant role in improving the quality of public services in Medea Municipality, as the results of a study on a sample of individuals showed that there is a positive impact of e-government on improving public services, and this conclusion was reached at the significance level (0.05). This reflects the importance of adopting digital technologies in public administration to improve efficiency and speed of service delivery.

However, the same study showed that there were no statistically significant differences in the respondents' opinions about e-government as a mechanism to improve public services, with regard to personal variables such as gender or educational level at the significance level (0.05). This result indicates that the orientation towards e-government may be generally accepted by different population groups, regardless of differences in gender or educational level.

Regarding the gender variable, no statistically significant differences were observed in the respondents' views on the impact of e-government on improving public service at the significance level (0.05). This may indicate that both genders view e-government as equally important in terms of improving public services.

As for the educational level variable, the study did not show statistically significant differences in the sample's views on e-government as a mechanism to improve public services. Individuals of different educational levels seem to agree that the implementation of e-government can contribute to improving public service, which indicates that technological knowledge may not be a barrier to citizens' acceptance of this digital transformation in public administration.

These findings support previous studies that indicated that e-government contributes to improving the efficiency and transparency of public services and helps reduce the gap between citizens and government, which increases user satisfaction and enhances trust in the administrative system. However, there are also some studies that suggest that the implementation of e-government may face challenges related to technological infrastructure

or digital gaps between different segments of society, which may affect the extent to which all groups benefit equally.

The objective of streamlining administrative processes is to promote the successful execution of e-government initiatives, necessitating collaborative efforts among various governmental bodies. A critical component in realizing this objective is the establishment of effective coordination among municipal departments, which plays a vital role in expediting the seamless exchange of information across different sectors. Furthermore, the availability of skilled personnel proficient in information technology is essential for the successful deployment of e-government systems. Consequently, it is imperative to prioritize the development of specialized training programs aimed at enhancing the competencies of municipal staff in utilizing e-government strategies and tools, thereby ensuring optimal efficiency and effectiveness in service delivery to the public.

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7. References

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