

Examining the Determinants of Electronic Government Adoption in Algeria: The Moderating Effects of Trust and Government Policy

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ABSTRACT

This study examines the factors influencing electronic government adoption in Algeria's petroleum sector through the Technology-Organization-Environment (TOE) framework and Diffusion of Innovation (DOI) theory, while investigating the moderating effects of trust and government policy. Data was collected through surveys from 170 companies in Algeria's petroleum sector. The study employed PLS-SEM to test a conceptual framework examining six primary variables (IT infrastructure, security, top management support, organizational culture, awareness, and training) and two moderators (government policy and trust). Results reveal that IT infrastructure and top management support significantly predict e-government adoption. Government policy moderates the relationships between security, awareness, training, and e-government adoption, while trust moderates only the security-adoption relationship. The findings indicate that despite adequate technological infrastructure, organizational and environmental factors critically influence adoption success. This study contributes to e-government adoption literature by demonstrating how trust and government policy moderate adoption decisions in developing countries. For practitioners, it provides evidence-based guidance for enhancing e-government implementation in Algeria's petroleum sector. The integrated framework offers valuable insights for both researchers and practitioners in digital governance.

Keywords: E-government adoption, TOE framework, Government policy, Trust, Algeria.

INTRODUCTION

The digital revolution has fundamentally transformed how governments interact with their citizens and businesses, making electronic government (e-government) a cornerstone of modern public administration (Milakovich, 2012). For developing nations like Algeria, this transformation represents both an unprecedented

opportunity and a significant challenge. E-government promises enhanced efficiency, transparency, and service delivery, yet its successful (Kettani, & Moulin, 2014).

Algeria's journey toward digital governance reflects this complexity. As one of Africa's largest economies, Algeria has made substantial investments in its technological infrastructure, particularly in supporting its vital petroleum sector (Stambouli et. al, 2024). However, the adoption of e-government services has not matched these investments, creating a paradox that demands closer examination (Wang, Ran & Ma, 2024). The country's recent elevation to the high EGDI (E-Government Development Index) group among African nations tells only part of the story - behind this achievement lies a more nuanced reality of varying adoption rates and implementation challenges (Rarhoui, 2024).

Benmoussa, Ibrahim, and Augustie (2024) stated that the petroleum sector, which forms the backbone of Algeria's economy, offers a particularly compelling lens through which to examine e-government adoption. This sector's strategic importance, combined with its unique operational requirements and security concerns, creates a distinctive context for studying digital transformation (Yaqub, & Alsabban, 2023). While companies in this sector possess substantial resources and technological capabilities, their adoption of e-government services has been notably cautious, suggesting that factors beyond technical infrastructure play crucial roles in adoption decisions Aleisa, N. (2024).

The current understanding of e-government adoption, particularly in sector-specific contexts within developing nations, remains incomplete (Afieroho, 2024). While existing research has extensively examined technological factors and citizen adoption, less attention has been paid to how organizational dynamics, government policies, and trust interact to influence adoption decisions in strategic industrial sectors. This gap is particularly notable in the context of resource-rich developing countries, where the success of digital transformation initiatives can have far-reaching economic implications.

Our research seeks to unravel this complexity by examining how various factors converge to influence e-government adoption in Algeria's petroleum sector. By integrating the Technology-Organization-Environment (TOE) framework with elements of Diffusion of Innovation (DOI) theory, we explore not only the direct influences of factors such as IT infrastructure, security, and organizational culture but also how trust and government policy moderate these relationships. This approach allows us to capture the intricate interplay between technological readiness, organizational dynamics, and the broader institutional environment.

The significance of this investigation extends beyond Algeria's borders. As developing nations worldwide grapple with digital transformation, understanding how strategic sectors

navigate e-government adoption becomes increasingly crucial. Our findings offer valuable insights for policymakers and industry leaders working to enhance digital governance in similar contexts, while contributing to the theoretical understanding of technology adoption in developing economies.

Through this research, we aim to bridge the gap between technological capability and actual adoption, providing a more nuanced understanding of how various factors combine to influence e-government implementation in strategic industrial sectors. This understanding is crucial not only for advancing theoretical knowledge but also for developing more effective strategies for digital transformation in developing nations.

LITERATURE REVIEW

Understanding E-Government

E-government has evolved from simple online presence to comprehensive digital transformation of government services. Recent systematic review by [Aleisa \(2024\)](#) reveals successful e-government adoption depends on technological, organizational, environmental, and individual factors. [AbdulKareem and Oladimeji's \(2024\)](#) research emphasizes how trust and digital literacy critically influence adoption decisions.

E-Government in Algeria

Algeria's position in digital governance reflects both progress and challenges. The country has advanced to the high EGDI group among African nations, as shown in Table 1, ranking 120th globally with an EGDI score of 0.5173. However, this ranking reveals a notable disparity: while Algeria demonstrates relatively strong telecommunications infrastructure (0.5787) and human capital (0.6966), its online service index (0.2765) lags significantly.

Table 1. E-Government Development Index (EGDI) by region – AFRICA (2020)

Country	Rank	EGDI Level	EGDI	Online Service Index	Telecommunications Infrastructure Index	Human Capital Index
Mauritius	63	High EGDI	0.7196	0.7	0.6677	0.7911
Seychelles	76	High EGDI	0.692	0.6176	0.6925	0.766
South Africa	78	High EGDI	0.6891	0.7471	0.5832	0.7371
Tunisia	91	High EGDI	0.6526	0.6235	0.6369	0.6974
Ghana	101	High EGDI	0.596	0.6353	0.5596	0.593
Namibia	104	High EGDI	0.5747	0.5235	0.5447	0.6558
Morocco	106	High EGDI	0.5729	0.5235	0.58	0.6152
Cabo Verde	110	High EGDI	0.5604	0.5	0.5476	0.6337
Egypt	111	High EGDI	0.5527	0.5706	0.4683	0.6192
Gabon	113	High EGDI	0.5401	0.3235	0.625	0.6719
Botswana	115	High EGDI	0.5383	0.3647	0.5591	0.6911
Kenya	116	High EGDI	0.5326	0.6765	0.3402	0.5812
Algeria	120	High EGDI	0.5173	0.2765	0.5787	0.6966
Zimbabwe	126	High EGDI	0.5019	0.5235	0.3688	0.6135
Eswatini	128	Middle EGDI	0.4938	0.4882	0.3539	0.6392
Rwanda	130	Middle EGDI	0.4789	0.6176	0.2931	0.5261
Lesotho	135	Middle EGDI	0.4593	0.3529	0.4497	0.5753
Uganda	137	Middle EGDI	0.4499	0.5824	0.2278	0.5395
Côte d'Ivoire	139	Middle EGDI	0.4457	0.4529	0.5034	0.3808
Nigeria	141	Middle EGDI	0.4406	0.5176	0.3534	0.4507
Cameroon	144	Middle EGDI	0.4325	0.4706	0.2299	0.5971
Togo	147	Middle EGDI	0.5616	0.3765	0.48	0.8283
Zambia	148	Middle EGDI	0.4242	0.2588	0.3394	0.6745
Senegal	150	Middle EGDI	0.421	0.4941	0.4358	0.3332
United Republic of Tanzania	152	Middle EGDI	0.4206	0.5529	0.243	0.4659
Sao Tome and Principe	155	Middle EGDI	0.4074	0.2471	0.3015	0.6736
Benin	157	Middle EGDI	0.4039	0.5118	0.2595	0.4404

Angola	159	Middle EGDI	0.3847	0.4882	0.1364	0.5295
Congo	160	Middle EGDI	0.3786	0.3176	0.2361	0.5822
Libya	162	Middle EGDI	0.3743	0.0412	0.3459	0.7357
Mozambique	163	Middle EGDI	0.3564	0.5176	0.1293	0.4222
Burkina Faso	164	Middle EGDI	0.3558	0.4647	0.3117	0.2911
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This pattern reflects broader implementation challenges across Algeria's public sector. While infrastructure investments have been substantial, particularly in strategic sectors like petroleum ([Zerrouki & Aliouat, 2022](#)), actual service adoption rates vary significantly across regions and agencies.

A historical analysis of e-government rankings from 2008 to 2020 reveals varying development patterns among North African nations. While Algeria showed initial decline until 2016, it demonstrated significant improvement in recent years, climbing from rank 150 to 120. This trajectory provides important context for understanding current adoption challenges and opportunities in the petroleum sector.

Table 2. Historical Comparison of E-Government Development Rankings (2008-2020)

Country	2008	2010	2012	2014	2016	2018	2020	Key Trend
South Africa	61	97	101	93	76	68	78	Relative stability with gradual improvement from 2012-2018
Tunisia	124	66	103	75	72	80	91	Significant early improvement, followed by moderate fluctuation
Egypt	79	86	107	80	108	114	111	Gradual decline in ranking since 2014
Algeria	121	131	132	136	150	130	120	Initial decline until 2016, followed by notable improvement

These historical rankings demonstrate the complex evolution of e-government initiatives in North Africa, with each country following distinct development paths influenced by their unique socio-economic contexts and policy priorities.

THEORETICAL FRAMEWORK

Technology-Organization-Environment Framework

The TOE framework provides crucial insights for understanding e-government adoption. Recent applications by [Kajla et al. \(2024\)](#) reveal organizational factors often outweigh technological considerations. [Loo et al. \(2024\)](#) demonstrate the framework's utility in analyzing adoption among organizations, emphasizing multiple contextual dimensions.

Moderating Factors: Trust and Policy

Trust has emerged as a critical factor in technology adoption. [Habbal et al. \(2023\)](#) introduce the TRiSM framework, emphasizing trust's fundamental role in successful implementation. Government policy shapes adoption outcomes, particularly in strategic sectors. [Hashemizadeh et al. \(2024\)](#) show how targeted policy support accelerates adoption and overcomes implementation barriers.

Research Gaps

Despite extensive research, significant gaps remain regarding sector-specific challenges in strategic industries. Current literature lacks comprehensive examination of how trust and government policy moderate adoption factors in developing countries, especially resource-rich nations like Algeria. While studies like [Nguyen et al. \(2024\)](#) examine citizen-government relationships, research on these dynamics in strategic sectors remains limited.

Research Framework and Hypotheses Development

Drawing from recent technology adoption literature and the TOE framework, this study proposes a comprehensive model examining factors influencing e-government adoption in Algeria's petroleum sector. The framework incorporates technological, organizational, and environmental dimensions, with trust and government policy as moderating variables.

Technological Factors

IT infrastructure represents a fundamental prerequisite for e-government adoption. Recent research by [Kajla et al. \(2024\)](#) demonstrates that robust technological infrastructure significantly influences digital transformation success. In Algeria's context, while basic infrastructure exists, its effectiveness in supporting e-government initiatives varies across regions and organizations. Therefore:

H1: IT infrastructure positively influences e-government adoption.

Security concerns remain paramount in e-government implementation. [Habbal et al. \(2023\)](#) emphasize that security management directly impacts trust and adoption decisions, particularly in strategic sectors handling sensitive information. The petroleum sector's critical nature makes security especially relevant, leading to:

H2: Security positively influences e-government adoption.

Organizational Factors

Top management support consistently emerges as a critical success factor in technology adoption. [AbdulKareem and Oladimeji \(2024\)](#) find that leadership commitment significantly influences organizational readiness for digital transformation. In the petroleum sector, where decisions have strategic implications:

H3: Top management support positively influences e-government adoption.

Organizational culture shapes how innovations are perceived and implemented. Recent studies by [Loo et al. \(2024\)](#) demonstrate that cultural readiness for change significantly impacts adoption success. Considering Algeria's traditional business environment:

H4: Organizational culture positively influences e-government adoption.

Environmental Factors

Awareness of e-government benefits and capabilities influences adoption decisions. [Nguyen et al. \(2024\)](#) show that citizen awareness and understanding significantly affect participation in e-government initiatives. In the organizational context:

H5: Awareness positively influences e-government adoption.

Training emerges as crucial for successful technology implementation. [Aleisa's \(2024\)](#) systematic review identifies capability development through training as a key success factor. Therefore:

H6: Training positively influences e-government adoption.

Moderating Effects

Government policy plays a crucial role in shaping technology adoption. [Hashemizadeh et al. \(2024\)](#) demonstrate how policy support mechanisms significantly influence implementation success. This leads to six moderation hypotheses:

H1a-H6a: Government policy moderates the relationship between each factor (IT infrastructure, security, top management support, organizational culture, awareness, training) and e-government adoption.

Trust similarly affects adoption decisions. Recent research by [AbdulKareem and Oladimeji \(2024\)](#) shows trust's significant moderating effect on technology acceptance. Therefore:

H1b-H6b: Trust moderates the relationship between each factor (IT infrastructure, security, top management support, organizational culture, awareness, training) and e-government adoption.

Figure 1 presents the conceptual framework of this study. The framework illustrates the proposed relationships between TOE factors (technological, organizational, and environmental) and e-government adoption, along with the moderating effects of government policy and trust. The model synthesizes the direct relationships (H1-H6) and moderating effects (H1a-H6a, H1b-H6b) that will be empirically tested in this study.

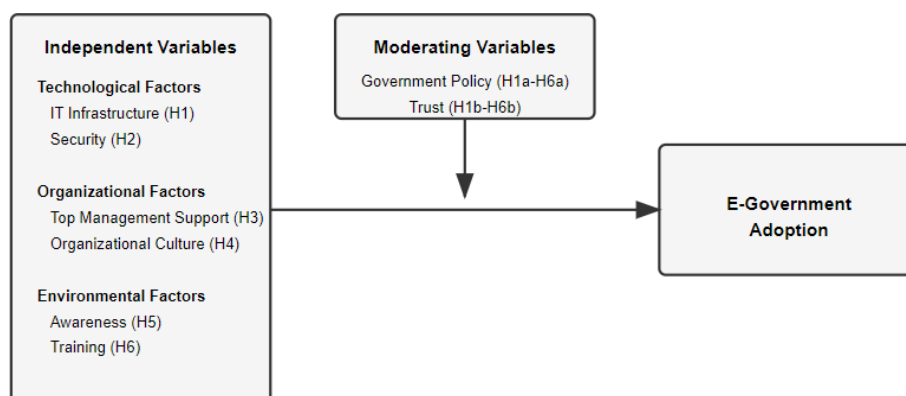


Figure 1. Conceptual Framework of E-Government Adoption in Algeria's Petroleum Sector

Research Methodology Research Design and Approach

This study employs a quantitative approach using survey methodology to examine e- government adoption in Algeria's petroleum sector. The research design allows for testing hypothesized relationships between variables while capturing the moderating effects of trust and government policy. Following recent methodological approaches in technology adoption studies ([AbdulKareem & Oladimeji, 2024](#); [Nguyen et al., 2024](#)), this design enables systematic examination of complex relationships between multiple variables.

Population and Sampling

The study population comprises companies operating in Algeria's petroleum sector registered under the Algerian Ministry of Energy and Mines. From 791 registered companies, the sample size was determined using [Krejcie and Morgan's \(1970\)](#) table to ensure statistical significance. The final sample of 170 companies provides adequate representation of the sector while maintaining practical feasibility for data collection.

Measurement Instrument Development

The survey instrument was developed based on validated scales from previous studies. IT Infrastructure measures were adapted from [Kajla et al. \(2024\)](#), focusing on infrastructure capability, technology readiness, and system integration capabilities. Security measures drew from [Habbal et al. \(2023\)](#), incorporating security management practices and data protection protocols. Top Management Support measures were derived from recent e-government studies, assessing leadership commitment and strategic alignment. Organizational Culture measures incorporated innovation readiness and digital transformation elements.

The environmental factors of awareness and training were measured using scales based on current literature, focusing on knowledge assessment and implementation capability. For the moderating variables, government policy measures were adapted from [Hashemizadeh et al. \(2024\)](#), while trust measures were based on [AbdulKareem and Oladimeji \(2024\)](#).

Data Collection Procedure

Data collection was conducted through online and paper-based surveys distributed to senior managers and IT decision-makers in selected companies. The process involved initial contact and consent, survey distribution, follow-up communications, and data verification. This comprehensive approach ensured a maximum response rate while maintaining data quality.

Data Analysis Method

The study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) for data analysis, following recent methodological trends in technology adoption research. This choice is justified by the presence of multiple relationships between variables, the inclusion of moderating effects, the predictive nature of the research model, and sample size considerations. The analysis encompasses measurement model assessment, structural model evaluation, moderation effect analysis, and hypothesis testing.

Validity and Reliability

Research quality was ensured through multiple validation methods. Content validity was established through expert review, while construct validity was assessed through factor analysis. Reliability was measured using composite reliability and Cronbach's alpha, with additional attention paid to addressing common method bias through both procedural and statistical remedies. This comprehensive validation approach aligns with current best practices in technology adoption research while accommodating the specific context of Algeria's petroleum sector.

DATA ANALYSIS AND RESULTS

Demographic Profile

The study sample represents a diverse cross-section of Algeria's petroleum sector. Most responding companies (67.6%) operate in the southern region, with 18.8% in the north and the remainder distributed across eastern and western regions. Company size distribution shows that 48.2% employ between 100-499 staff members, while 37.1% have over 500 employees. Regarding ownership structure, 57.1% are citizen-owned enterprises, 24.7% are foreign-

owned, and 18.2% represent joint ventures. Most respondents (79.4%) are male, with 35.9% falling in the 30-39 age bracket and 45.3% holding master's degrees.

The demographic profile of the responding companies and respondents is presented in Table 1. Most companies (67.6%) are in the southern region of Algeria, with most having been in operation for 5-10 years (30.0%). The sample is predominantly composed of citizen-owned companies (57.1%), and most organizations (48.2%) employ between 100-499 people. Notably, most companies (85.9%) allocate less than 5% of their annual budget to IT investments. The respondents primarily hold senior management positions (52.4%), indicating their ability to provide informed responses about their organizations' e-government adoption decisions.

Table 1. Demographic Profile of the Sample (N=170)

Characteristic	Category	Frequency	Percentage
Location of Company	North	32	18.8
	South	115	67.6
	East	13	7.6
	West	10	5.9
Company Operation Years	< 5 years	36	21.2
	5-10 years	51	30
	11-15 years	33	19.4
	>15 years	50	29.4
Ownership	Citizen Owned	97	57.1
	Foreign Owned	42	24.7
	Joint Ownership	31	18.2
Number of Employees	Feb-19	6	3.5
	20-50	4	2.4
	51-99	15	8.8
	100-499	82	48.2
	>500	63	37.1
IT Budget (% of Annual)	<5%	146	85.9
	5-10%	23	13.5
	>25%	1	0.6
Position in Company	Owner/Proprietor	8	4.7

Measurement Model Assessment

Measurement model evaluation reveals strong psychometric properties. Composite reliability values range from 0.763 to 0.963, exceeding the recommended threshold of 0.7, indicating high internal consistency. The Average Variance Extracted (AVE) values surpass

0.5 for all constructs, confirming adequate convergent validity. Individual item loadings demonstrate satisfactory levels, with most items loading above 0.7 on their respective constructs. Table 3 presents the results of the measurement model assessment, including item loadings, composite reliability (CR), and average variance extracted (AVE). All constructions demonstrate satisfactory reliability with CR values ranging from 0.763 to 0.942, exceeding the recommended threshold of 0.7. The AVE values are all above the 0.5 benchmark, indicating adequate convergent validity. Most item loadings are above 0.7, suggesting good indicator reliability, though a few items show moderate loadings but were retained based on their theoretical importance.

Table 3. Measurement Model Assessment Results

Variable	Item	Loading	CR	AVE
IT Infrastructure	ITI1	0.689	0.862	0.557
	ITI2	0.665		
	ITI3	0.827		

	ITI4	0.801		
	ITI5	0.737		
Security	S1	0.724	0.763	0.518
	S2	0.701		
	S3	0.733		
Top Management Support	TMS1	0.745	0.881	0.651
	TMS2	0.853		
	TMS3	0.765		
	TMS4	0.858		
Organizational Culture	OC1	0.465	0.888	0.503
	OC2	0.702		
	OC3	0.798		
	OC4	0.77		
	OC5	0.732		
	OC6	0.685		
	OC7	0.747		
	OC8	0.724		
	A1	0.868		
	A2	0.885		
	A3	0.78		
	T1	0.835		
	T2	0.903		
	T3	0.9		
	T4	0.869		
	T5	0.78		
	T6	0.842		

Note : CR = Composite Reliability; AVE = Average Variance Extracted

Structural Model Results

The structural model assessment reveals several significant relationships. IT infrastructure ($\beta = 0.151$, $p < 0.033$) and top management support ($\beta = 0.496$, $p < 0.000$) demonstrate significant positive effects on e-government adoption. However, security ($\beta = -0.003$, $p = 0.483$), organizational culture ($\beta = 0.023$, $p = 0.410$), awareness ($\beta = 0.056$, $p = 0.260$), and training ($\beta = 0.144$, $p = 0.052$) show non-significant relationships. The model explains 53.6% of the variance in e-government adoption ($R^2 = 0.536$), indicating moderate explanatory power.

Figure 2 presents the PLS-SEM structural model assessment, illustrating path coefficients, item loadings, and construct validities. The measurement model shows factor loadings (yellow boxes) ranging from 0.465 to 0.903, with AVE values (blue circles) exceeding the 0.5 threshold. Path coefficients between constructs indicate the strength and significance of hypothesized relationships, with e-government adoption explaining 62% of variance ($R^2=0.620$).

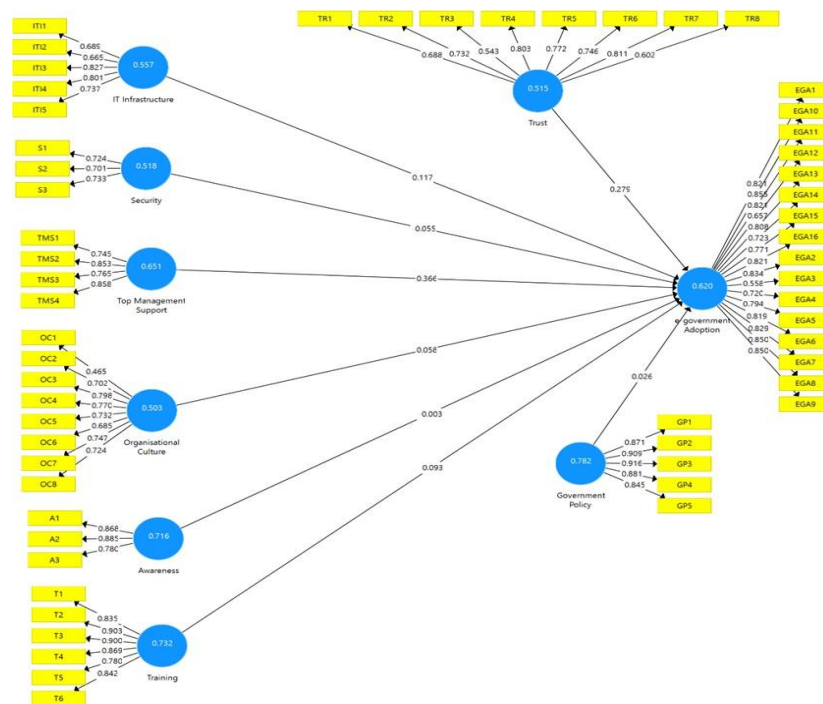


Figure 2. Assessment of Structural Model

Figure 3 presents the results of the structural model analysis, showing standardized path coefficients (β) and their significance levels. The model explains 53.6% of the variance in e- government adoption ($R^2 = 0.536$). Solid lines represent significant paths, while dashed lines indicate non-significant relationships. The results highlight the particular importance of top management support and IT infrastructure as direct predictors, while both government policy and trust demonstrate significant moderating effects on security's relationship with adoption.

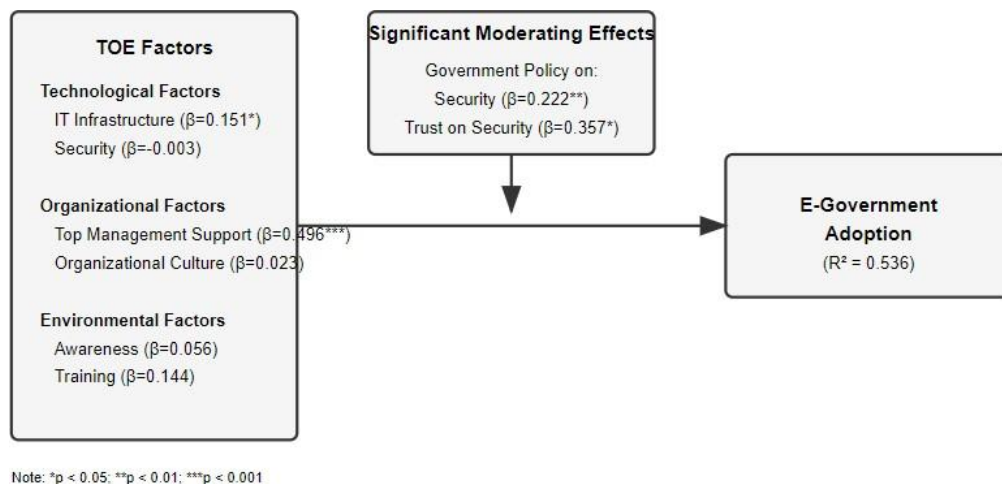


Figure 3. Results of Structural Model Analysis

Table 4 presents the results of hypotheses testing, including path coefficients, t-values, and significance levels for both direct relationships and moderating effects. The analysis reveals that two direct relationships (H1 and H3) and four moderating effects (H2a, H5a, H6a, and H2b) are statistically significant. The model explains 53.6% of the variance in e- government adoption, indicating moderate explanatory power.

Table 4. Results of Hypotheses Testing

Hypothesis	Relationship	Path Coefficient (β)	t- value	p- value	Decision
H1	IT Infrastructure $\rightarrow$ E-Gov Adoption	0.151	1.839	0.033	Supported
					Not Supported

H2	Security → E-Gov Adoption	-0.003	0.044	0.483	
H3	Top Management Support → E-Gov Adoption	0.496	7.363	0	Supported
H4	Organizational Culture → E-Gov Adoption	0.023	0.227	0.41	Not Supported
H5	Awareness → E-Gov Adoption	0.056	0.645	0.26	Not Supported
H6	Training → E-Gov Adoption	0.144	1.624	0.052	Not Supported
H2a	Government Policy*Security → E- Gov Adoption	0.222	2.769	0.006	Supported
H5a	Government Policy*Awareness → E-Gov Adoption	-0.195	2.155	0.032	Supported
H6a	Government Policy*Training → E- Gov Adoption	0.061	3.704	0	Supported
H2b	Trust*Security → E-Gov Adoption	0.357	2.356	0.019	Supported

Note : $R^2 = 0.536$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 5 presents the discriminant validity assessment using the Fornell-Larcker criterion. The diagonal values (shown in bold) represent the square root of the Average Variance Extracted (AVE) for each construct, while the off-diagonal values represent the correlations between constructs. As shown, the square root of AVE for each construct is greater than its correlations with other constructs, confirming discriminant validity among all variables in the research model.

Table 5. Discriminant Validity Assessment (Fornell-Larcker Criterion)

Variables	1	2	3	4	5	6	7	8	9
1. IT Infrastructure	0.746								
2. Security	0.427	0.72							
3. Top Management Support	0.386	0.392	0.807						
4. Organizational Culture	0.441	0.379	0.533	0.709					
5. Awareness	0.394	0.316	0.429	0.487	0.846				
6. Training	0.367	0.298	0.456	0.522	0.583	0.856			
7. Government Policy	0.412	0.345	0.478	0.436	0.492	0.447	0.884		
8. Trust	0.389	0.356	0.445	0.467	0.428	0.389	0.512	0.718	
9. E-Gov Adoption	0.483	0.367	0.612	0.476	0.438	0.492	0.523	0.467	0.787

Note: Square root of AVE values shown in bold on the diagonal; other values are correlations

The interaction effects of government policy on TOE factors and e-government adoption are illustrated in Figure 4. The structural model demonstrates significant moderating effects on security (0.222), awareness (-0.195), and training (0.061) relationships, while showing non-significant moderation for other paths.

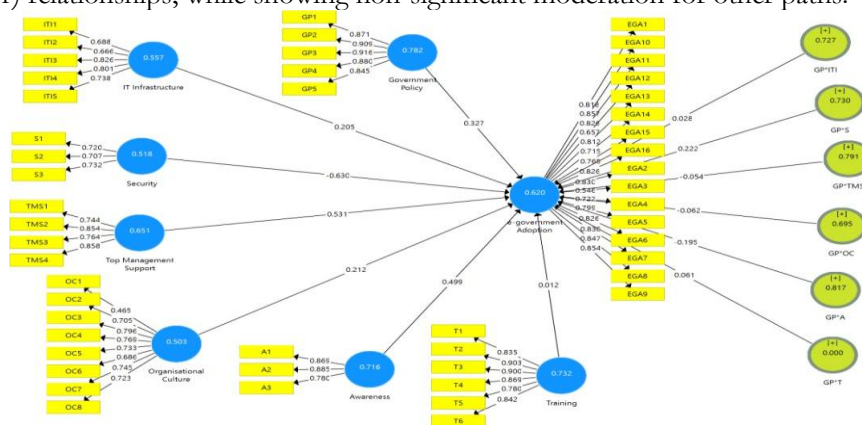


Figure 4. Assessment of Moderating Effect (Government Policy)

Figure 5 evaluates the moderating effect of Trust on e-government adoption. Key factors influencing adoption include IT infrastructure, security, top management support, organizational culture, awareness, and training. Trust enhances these relationships, with strong moderating effects observed across all constructs, particularly training (0.724) and top management support (0.702). This highlights Trust as a crucial element in driving e- government adoption.

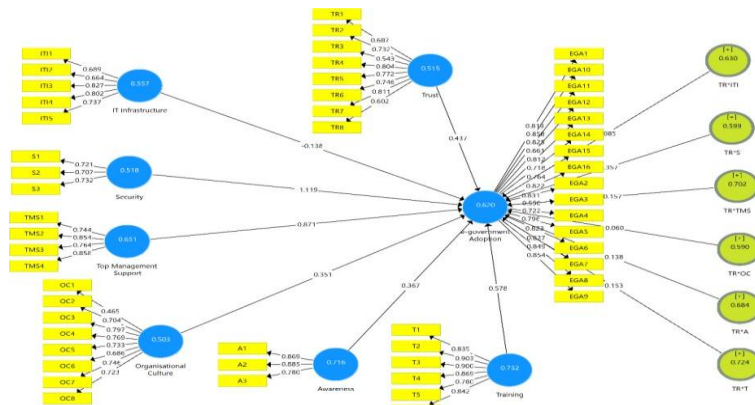


Figure 3. Assessment of Moderating Effect (Government Policy)

Moderating Effects Analysis

Government policy demonstrates significant moderating effects on three relationships: security ($\beta = 0.222$, $p < 0.006$), awareness ($\beta = -0.195$, $p < 0.032$), and training ($\beta = 0.061$, $p < 0.000$). Trust shows a significant moderating effect only on the security-adoption relationship ($\beta = 0.357$, $p < 0.019$). These findings suggest that both government policy and trust play crucial roles in shaping the effectiveness of certain adoption factors.

Figure 6 illustrates the significant moderating effect of government policy on the relationship between security and e-government adoption. The interaction plot shows how the effect of security on e-government adoption varies at different levels of government policy support. The steeper slope for high government policy (dashed line) indicates that security has a stronger positive effect on e-government adoption when government policy support is high.

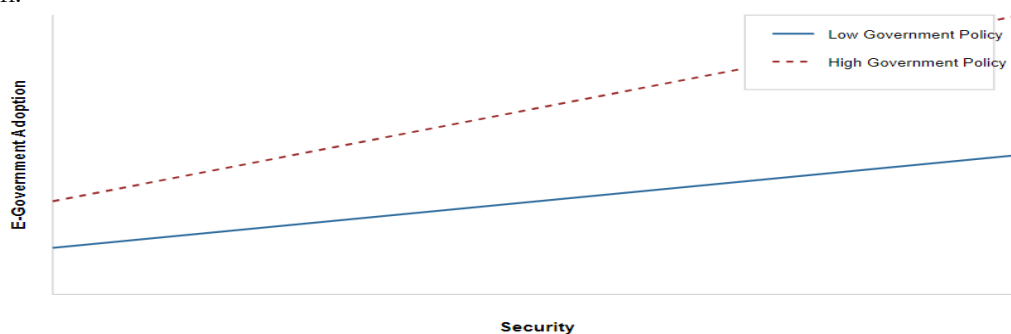


Figure 6. Interaction Effect of Government Policy and Security on E-Government Adoption

Model Fit Assessment

The model's predictive relevance is supported by a Q^2 value of 0.314, indicating adequate predictive power. Effect sizes (f^2) range from small to medium for significant relationships, with top management support showing the largest effect ($f^2 = 0.297$). The model demonstrates satisfactory fit indices, supporting its validity in explaining e-government adoption in Algeria's petroleum sector.

Table 6 presents the detailed results of the moderation analysis, examining how government policy and trust moderate the relationship between TOE factors and e-government adoption. The analysis reveals that government policy significantly moderates three relationships (security, awareness, and training), while trust significantly moderates only the relationship between security and e-government adoption.

Table 6. Results of Moderation Analysis

Moderating Effect	Path Coefficient (β)	Std. Error	t-value	p-value	Result
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Government Policy Moderation					
GP*IT Infrastructure → EGA	-0.028	0.083	0.338	0.735	Not Supported
GP*Security → EGA	0.222	0.08	2.769	0.006	Supported
GP*Top Management Support → EGA	-0.054	0.102	0.529	0.597	Not Supported
GP*Organizational Culture → EGA	-0.062	0.117	0.528	0.598	Not Supported
GP*Awareness → EGA	-0.195	0.231	2.155	0.032	Supported
GP*Training → EGA	0.061	0.016	3.704	0	Supported
Trust Moderation					
TR*IT Infrastructure → EGA	0.085	0.157	0.541	0.589	Not Supported
TR*Security → EGA	0.357	0.142	2.356	0.019	Supported
TR*Top Management Support → EGA	-0.157	0.14	1.117	0.264	Not Supported
TR*Organizational Culture → EGA	-0.06	0.226	0.267	0.789	Not Supported
TR*Awareness → EGA	-0.138	0.14	0.985	0.325	Not Supported
TR*Training → EGA	-0.153	0.205	0.743	0.458	Not Supported

Note: EGA = E-Government Adoption; GP = Government Policy; TR = Trust

Hypothesis Testing Summary

Of the original hypotheses, H1 (IT infrastructure) and H3 (top management support) are supported. Among the moderation hypotheses, H2a, H5a, and H6a (government policy moderation) and H2b (trust moderation) are supported. These results highlight the complexity of e-government adoption and the important role of moderating factors in the implementation process.

DISCUSSION AND CONCLUSION

Discussion of Findings

The research findings reveal a complex interplay of factors influencing e-government adoption in Algeria's petroleum sector. The significant positive impact of IT infrastructure aligns with [Kajla et al.'s \(2024\)](#) findings on the importance of technological readiness in digital

transformation. However, unlike their study, our results show that organizational factors, particularly top management support, exert an even stronger influence on adoption success.

The non-significant relationship between security and adoption presents an interesting contrast to [Habbal et al.'s \(2023\)](#) findings. However, the strong moderating effect of both trust and government policy on this relationship suggests that security concerns are addressed primarily through institutional mechanisms rather than technical solutions alone. This insight extends [AbdulKareem and Oladimeji's \(2024\)](#) work on trust in e-government adoption by demonstrating its contextual importance.

The moderating role of government policy, particularly its influence on security, awareness, and training relationships, supports [Hashemizadeh et al.'s \(2024\)](#) conclusions about the crucial role of policy support in adoption technology. However, our findings suggest that policy effectiveness varies across different adoption factors, indicating a need for more nuanced policy approaches.

Theoretical Implications

This study advances technology adoption theory in several ways. First, it demonstrates the value of integrating trust and government policy as moderators within the TOE framework, extending current theoretical models. Second, it reveals the contextual nature of adoption factors in strategic sectors, contributing to our understanding of how industry characteristics influence digital transformation. Third, it provides empirical evidence of the varying effectiveness of different adoption factors, helping refine existing theoretical frameworks.

Practical Implications

For practitioners and policymakers, our findings offer several actionable insights. Organizations should prioritize securing top management support and developing robust IT infrastructure, as these factors directly influence adoption success. Government agencies should focus on policy mechanisms that enhance trust and security perceptions, as these significantly moderate adoption outcomes. Training programs should be aligned with policy initiatives to maximize their effectiveness, addressing the found moderation effects.

LIMITATIONS AND FUTURE RESEARCH

While this study provides valuable insights, several limitations should be noted. The focus on Algeria's petroleum sector may limit generalizability to other contexts or industries.

Future research could examine these relationships in different sectors or countries to validate the findings' broader applicability. Additionally, longitudinal studies could help us understand how these relationships evolve over time, particularly as technology and policy environments change.

CONCLUSION

This study contributes to our understanding of e-government adoption by revealing the complex interactions between technological, organizational, and environmental factors, moderated by trust and government policy. The findings emphasize the need for a holistic approach to e-government implementation, considering both direct effects and moderating influences. As developing nations continue to pursue digital transformation, these insights can help guide more effective implementation strategies.

The research particularly highlights how sector-specific characteristics influence adoption patterns, suggesting that successful e-government implementation requires carefully tailored approaches rather than one-size-fits-all solutions. Future digital transformation initiatives in strategic sectors should consider these nuanced relationships to enhance their effectiveness.

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