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Identification of the Key Dimensions of Leadership Shadow Personality in the Water Resources Sector and the Provision of Practical Solutions (Case Study: Iraqi Ministry of Water Resources)

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ABSTRACT

This study aims to identify the key dimensions of leadership shadow personality in the water resources sector and to propose practical solutions. The research adopts a mixed-methods approach (grounded theory–confirmatory factor analysis). The statistical population in the qualitative phase consisted of academic experts in the field of water resources in Iraq, who were selected through snowball sampling for conducting interviews. The statistical population in the quantitative phase included administrative staff employed at the Iraqi Ministry of Water Resources, from whom a sample was selected using Cochran's formula for finite populations through proportional stratified random sampling. Data analysis in the qualitative phase was conducted using grounded theory with the assistance of ATLAS.ti software, and in the quantitative phase through confirmatory factor analysis using SmartPLS software. Data collection methods included interviews in the qualitative phase and a questionnaire in the quantitative phase. The key components of leadership shadow personality include: power, shadow personality, leadership style, individual personality, challenges, effectiveness, organizational credibility, change and transformation, conflict resolution–disorder elimination, leadership popularity, societal transformations, legitimacy, mass participation, personal empowerment, expansion of the span of control, attitudinal level, impenetrability, self-actualization, risk-taking, intra-organizational cohesion, social actors, and communication.

Keywords: Leadership; Shadow Leadership; Management; Water Resources

Introduction

Leadership remains one of the most decisive forces shaping organizational effectiveness, governance quality, and societal development, particularly in public sector institutions operating within volatile political and administrative environments. Over recent decades, leadership research has moved beyond classical trait, behavioral, and contingency frameworks toward more nuanced understandings of influence, power, identity, and context. Contemporary scholarship increasingly acknowledges that leadership operates not only through visible authority and formal structures, but also through subtle, informal, and often hidden processes that shape behavior,

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decision-making, and institutional culture. Within this intellectual evolution, the concept of the **leadership shadow** has emerged as a powerful theoretical lens for examining the latent psychological, relational, and structural forces through which leaders affect organizations and societies (1-3).

The leadership shadow refers to the enduring impact of a leader's personality, values, emotional patterns, and power practices on organizational systems—often extending beyond conscious intent or formal authority. Unlike overt leadership behaviors, the leadership shadow operates through implicit norms, emotional climates, political arrangements, and symbolic meanings that shape collective action over time (1). This shadow dimension becomes especially consequential in complex public institutions, where formal authority intersects with political interests, bureaucratic constraints, and social expectations. Recent studies have demonstrated that leadership shadows influence employee engagement, ethical behavior, institutional trust, political alignment, and organizational resilience (2, 4, 5).

The theoretical foundations of the shadow concept draw from multiple intellectual traditions, including Jungian psychoanalysis, organizational psychology, political theory, and curriculum studies. Jung's conception of the "shadow" as the unconscious aspect of personality provided the earliest philosophical grounding for understanding how unacknowledged traits shape behavior and relationships (6). In organizational contexts, this notion has been adapted to describe how leaders' unresolved fears, ambitions, narcissistic tendencies, and power anxieties become embedded within institutional practices and cultures (1, 4). Parallel developments in education and management research have extended the shadow concept to hidden curricula and informal governance processes, highlighting how unspoken norms and implicit power relations guide organizational behavior (5, 7).

Power constitutes a central mechanism through which leadership shadows are formed and sustained. Classical theories of power, such as French and Raven's taxonomy, emphasize multiple bases of influence, including legitimate, reward, coercive, expert, and referent power (8). Subsequent research has demonstrated that leaders rarely rely on a single power source; rather, they orchestrate complex power configurations that shape both visible authority and invisible influence networks (9, 10). Importantly, power is not merely exercised through formal positions but is continuously negotiated through relationships, perceptions, and political interactions. These dynamics contribute to the formation of leadership shadows that persist even when formal leadership roles change (11, 12).

In public sector environments, leadership shadows acquire heightened significance due to institutional complexity, political volatility, and public accountability. Research on shadow management in governmental organizations indicates that many critical decisions and power arrangements occur outside formal structures through informal coalitions, personal networks, and symbolic authority (12, 13). These hidden dynamics often determine policy implementation, organizational stability, and public trust more strongly than formal governance mechanisms. The existence of shadow leadership structures has been empirically documented in legislative bodies, political parties, regulatory agencies, and administrative institutions, where informal actors exercise substantial influence without official mandates (3, 13).

The water resources sector represents a particularly sensitive and strategic domain for examining leadership shadows. Water governance intersects with national security, economic development, environmental sustainability, and social stability. Leadership failures in this sector can trigger widespread social unrest, economic crises, and geopolitical tensions. Consequently, leadership within water institutions must navigate not only technical and administrative challenges but also intense political pressures, stakeholder conflicts, and rapidly changing

environmental conditions. These pressures create fertile ground for the emergence of powerful leadership shadows that influence institutional behavior through both formal and informal channels (5, 14).

Despite the growing body of scholarship on leadership shadows and power dynamics, several critical gaps remain. First, much of the existing literature has focused on corporate or political party contexts, with limited systematic investigation of leadership shadows in strategic public service sectors such as water governance. Second, empirical research has often examined isolated dimensions of shadow leadership—such as narcissism, political behavior, or informal influence—without integrating these elements into a coherent multidimensional framework (2, 4). Third, there is a notable shortage of mixed-methods studies that combine grounded qualitative exploration with quantitative model validation to capture the complexity of leadership shadows in real institutional settings (12).

Recent theoretical advances emphasize the necessity of contextualized leadership research that situates leadership processes within their political, cultural, and institutional environments. Hallinger argues that leadership cannot be meaningfully understood without bringing context “out of the shadows,” recognizing that leadership behaviors, power structures, and influence mechanisms are inseparable from their social and institutional conditions (5). Similarly, Cunliffe highlights how shadow leadership contests within political systems reshape authority and legitimacy through informal competition and narrative construction (3). These perspectives reinforce the importance of investigating leadership shadows within specific organizational and societal contexts rather than treating leadership as a universally uniform phenomenon.

In parallel, emerging research on empowering leadership has demonstrated that leaders’ perceptions of power distance and team capability significantly influence innovation, organizational learning, and adaptive capacity (14). Such findings suggest that leadership shadows not only constrain organizational behavior through negative manifestations of power but also enable transformation when leaders cultivate positive psychological and relational climates. Understanding the dual nature of leadership shadows—both constructive and destructive—is therefore essential for developing effective leadership models and practical interventions (1, 2).

The intellectual foundations of shadow theory itself have evolved beyond psychology and management. Recent work in hermeneutics and linguistic interpretation emphasizes that “shadow” phenomena operate in all systems of meaning, shaping interpretation, authority, and legitimacy (15). This broader theoretical framing reinforces the conceptual relevance of leadership shadow research and underscores its interdisciplinary importance across governance, education, politics, and organizational studies (7, 13).

Within the Middle Eastern administrative context, leadership shadows are particularly pronounced due to overlapping formal authority structures, political alliances, tribal affiliations, and external geopolitical pressures. Studies of political behavior in public organizations reveal that shadow management practices often determine resource allocation, strategic decisions, and institutional stability more than official policy frameworks (11, 12). However, systematic empirical modeling of these dynamics—especially in the water resources sector—remains limited.

Therefore, there exists a pressing scholarly and practical need to identify the key dimensions of leadership shadow personality in strategic public institutions and to develop an empirically validated model capable of explaining how these dimensions interact to shape organizational outcomes. Such a model can contribute not only to theoretical advancement but also to the design of leadership development programs, governance reforms, and institutional capacity-building strategies.

The aim of this study is to identify the key dimensions of leadership shadow personality in the water resources sector and to develop and validate an integrated model that explains their causal conditions, contextual influences, intervening factors, strategic mechanisms, and organizational consequences.

Methods and Materials

This study is conducted in two qualitative and quantitative phases. The first phase is qualitative and is carried out using the grounded theory approach in order to extract and develop the components of the leadership shadow model at the Iraqi Ministry of Water Resources, and the second phase is conducted quantitatively using a correlational design to develop and fit the model extracted in the first phase.

The statistical population in the qualitative phase consists of 18 professors familiar with the research domain, including academic experts in behavioral sciences and faculty members, as well as water resources experts, who were selected through snowball sampling for interview purposes, and interviews were continued until theoretical data saturation was achieved. The statistical population in the quantitative phase includes administrative employees working at the Iraqi Ministry of Water Resources, from whom a sample was selected based on Cochran's formula for finite populations using proportional stratified random sampling.

To evaluate content validity and ensure that the most important and correct content (item necessity) was selected, the Content Validity Ratio (CVR) was applied, and to ensure that the instrument items were optimally designed to measure the content, the Content Validity Index (CVI) was employed. This index was developed by Lawshe (1975). For calculating this index, expert judgments in the relevant content domain were obtained. After explaining the objectives of the instrument and providing operational definitions of the questionnaire items, experts were asked to classify each item based on a three-point Likert scale: "2 = essential," "1 = useful but not essential," and "0 = not essential." The CVR was then calculated using the following formula:

$CVR = (n_e - N/2) / (N/2)$

In this formula, n_e represents the number of experts who identified the item as essential, and N denotes the total number of experts who evaluated the item. Based on the number of experts participating in the evaluation, the minimum acceptable CVR value must correspond to the values specified in Table 3-3. Items with a calculated CVR lower than the acceptable threshold, considering the number of evaluating experts, must be removed from the instrument due to insufficient content validity. To determine the questionnaire's CVR, the developed instrument was reviewed by eight experts in this field, and based on the reference table, the acceptable CVR value was set at 0.75. After calculation, a CVR of 0.92 was obtained, indicating that all questionnaire items possessed the required validity.

Lincoln and Guba introduced the concept of trustworthiness in qualitative research and proposed credibility and transferability as substitutes for validity, and dependability as a substitute for reliability. The evaluation of these concepts and the methodological requirements adopted in the qualitative phase of the study (phenomenographic strategy, interview guidance, qualitative result analysis) led to the implementation of the following procedures to ensure the rigor and quality of the qualitative findings.

Direct quotations and detailed descriptions of participants were incorporated into the study to enable auditing by reviewers and readers (peer triangulation to enhance qualitative credibility). In extracting the components within each dimension, participants' statements were quoted verbatim to allow readers to trace the analytical interpretations back to their original contexts.

Multiple researchers were involved in data collection, analysis, and interpretation (researcher triangulation to enhance qualitative dependability). At several stages of the data collection and interpretation process, individuals with theoretical knowledge and relevant experience in management topics participated at the request of the main researcher, and their results were compared and confirmed against the findings of the present study.

Interpretations and inferences were presented to participants and other relevant stakeholders, and their feedback on the results was obtained (participant triangulation to enhance qualitative dependability). The extracted components and their definitions, along with supporting evidence and examples, were returned to interviewees after the researcher's analysis to solicit their explicit evaluations of the interpretations. In some cases, distinguishing between certain concepts proved challenging, but after clarification, the interpretations were confirmed.

In the qualitative phase, grounded theory analysis was conducted using ATLAS.ti software (Version 8). In the quantitative phase, confirmatory factor analysis was performed using SPSS for Windows (Version 20) and SMART PLS (Version 8). Factor analysis is a method used to classify variables and explanatory components of a construct. Factor loadings represent the correlations between observed variables and latent factors, through which it is possible to determine which observed variables can be eliminated. The strength of the relationship between factors and observed variables is indicated by factor loadings, which range between zero and one. A factor loading below 0.30 is considered weak and is disregarded; loadings between 0.30 and 0.60 are acceptable; and loadings above 0.60 are considered highly desirable (Kline, 1994). In general, factor loadings greater than 0.40 indicate the presence of internal consistency among the questionnaire items.

Findings and Results

In this section, in order to obtain the required data, all conducted interviews were audio-recorded and subsequently transcribed, and each interview was analyzed immediately after completion. Based on the three-stage coding process of open, axial, and selective coding, the data were continuously and iteratively reviewed and refined. Through an inductive process, similar data were grouped around core concepts according to their conceptual similarities and affinities. Concepts that shared common meanings were then organized into categories, which represented a higher level of abstraction with stronger semantic and conceptual coherence. At this stage, prior to initiating the interviews, nine open-ended questions were designed, and throughout the interview process, the possibility of introducing additional questions was anticipated. To ensure deep and comprehensive familiarity with the data, the researcher repeatedly reviewed the transcripts and engaged in active reading (searching for meanings and patterns). Subsequently, the transcripts of 18 interviews were imported as text files into ATLAS.ti software, examined multiple times, and their key points were segmented into meaning units in the form of sentences and paragraphs related to the central meaning. The components constituting the grounded theory model are examined below.

Table 1. Sample of Interview Transcriptions

Concepts	Code Number: Interviewee
Political and legal instability under current conditions has caused complete disruption. Laws and regulations change daily, and no one knows which rules to follow. This situation has created confusion and insecurity, making systematic planning impossible. It is as if we are playing on a field without rules, where everyone acts as they wish.	1:5
With the increasing number of parties and populist leaders, the situation is deteriorating. Every day, a new group emerges with tempting promises and grand rhetoric, yet nothing changes in practice. These leaders seek attention and votes but lack real problem-solving plans, leaving the country trapped in political chaos without progress.	1:6

There is an effort to establish strong and effective relationships based on mutual trust; however, this goal is rarely achieved. When trust between individuals or organizations is low, even the best intentions and efforts fail, resulting in superficial and ineffective relationships.	1:19
Changes may include economic, political, or social transformations that continuously affect individuals and organizations. When the environment changes rapidly, individuals and organizations must remain constantly prepared and capable of adapting quickly. Such ongoing changes generate stress, uncertainty, and planning difficulties.	2:2
When conflicts and tensions among political groups intensify and factions become increasingly polarized, divisions deepen, leading to escalating opposition and fragmentation.	7:6
Strengthening communication and cooperation between institutions and local communities is essential to generate greater synergy. Encouraging active participation and providing regular opportunities for expression and decision-making are critically important.	8:3
Loyalty strengthens relationships and enhances intra-group cohesion, contributing to a positive and empathetic work environment. Through loyalty, members collaborate, share resources and information, and improve collective performance.	3:91
Stability in decision-making helps organizations reduce fluctuations and frequent changes, enabling them to achieve strategic goals and create a reliable environment for employees and stakeholders.	3:111
Power networking enables organizations and individuals to identify new resources and opportunities, expand their influence, and more effectively establish and maintain strategic positions.	18:5

Qualitative data analysis was conducted using the grounded theory approach. Through systematic coding, emerging concepts, categories, and dimensions were developed from the data until theoretical saturation was achieved, and they were classified according to the Strauss and Corbin model into six dimensions: central phenomenon, causal conditions, contextual conditions, intervening conditions, action/interaction strategies, and consequences.

Open coding involved conducting detailed analysis of all interviews using ATLAS.ti Version 8, and extracting relevant concepts. Code labeling was performed with direct reference to the interview data.

Table 2. Sample of Open Coding

Open Code	Concept
Increase in political parties and populist leaders	With the rise of parties and populist leaders, conditions worsen. New groups constantly emerge with exaggerated promises, yet no real improvement occurs. Leaders pursue attention and votes without viable solutions, leading to political turmoil and stagnation.
Lack of emotional commitment to organizational leadership	Employees feel no emotional attachment to leaders and work solely for financial compensation rather than trust or motivation, resulting in reduced organizational effectiveness.
Political pressures from power institutions	Political influence imposes constraints on decision-making, forcing managers to prioritize power interests over rational and practical needs, causing inefficiency and stagnation.
Inefficiency of the managerial system	Organizational disorder, delayed and incorrect decisions, and lack of strategic coherence lead to unacceptable outcomes.
Vision formulation in policy	Policy vision is often symbolic and rhetorical, lacking practical implementation, producing unfulfilled promises and persistent stagnation.
Challenging the status quo	Individuals who attempt to initiate change face resistance from entrenched systems and power structures, making meaningful transformation difficult.
Rapid environmental changes	Economic, political, technological, and social transformations occur rapidly and unpredictably, creating pressure on organizations and complicating planning and decision-making.
Perceived inability to initiate change	Individuals or groups feel powerless due to constraints, barriers, and limited resources, reducing motivation and engagement.
Conditions of instability and uncertainty	Economic fluctuations, political shifts, and social changes generate stress, insecurity, and planning difficulties for individuals and organizations.
Insufficiency of governmental actions	Government measures fail to effectively address societal needs or respond adequately to crises and changes.
Deficiency in public services	Low-quality services, delays, limited accessibility, and inadequate responsiveness weaken public trust and increase social challenges.
Media literacy of political parties and organizations	Political entities must develop competencies in media analysis, misinformation management, and digital communication strategies to enhance public engagement and institutional image.
Power networking	Power networking facilitates access to resources, influence expansion, and strategic positioning.
Improvement of organizational awareness	Enhanced awareness enables employees to understand their role in achieving organizational objectives, strengthening coordination, motivation, and overall performance.
Increase in leadership popularity	Leaders can strengthen influence and acceptance, fostering positive, motivating, and successful organizational environments.

At this stage, the concepts derived from open coding were separated into homogeneous groups, and axial coding was performed.

The principal stage of grounded theory analysis is selective coding, in which the researcher formulates the theory based on the results of open and axial coding. Since some secondary codes or the relationships among them may not have been adequately examined in the axial coding model, the researcher, in the selective coding stage, eliminates redundancies and expands and generalizes those secondary codes and relationships that have not previously been sufficiently addressed. The researcher accomplishes this through validation of the secondary codes and the defined relationships among them. For this purpose, the researcher continuously consults published books and articles in the field of human resource capabilities, as well as various instances and examples mentioned by participants during interviews, and evaluates the explanatory power of the developed model with reference to these sources. Whenever necessary, the researcher elaborates and deepens the elements and relationships of the model. In this section, the roots and reasons for the formation of these conditions are articulated in the form of theoretical memos, which contain the analyst's reflections and interpretations regarding the research context.

Based on the research objective, axial coding was conducted with the central phenomenon identified as power and personality, as described below.

Causal conditions include: (1) leadership style (delegative–authoritarian); (2) individual personality (stable–unstable); (3) challenges (organizational and international); (4) effectiveness (workforce and government); and (5) organizational credibility (success–loyalty).

Intervening conditions include: (1) change and transformation (accelerated changes and environmental changes); (2) conflict resolution and disruption removal (conflict and disruption); and (3) leadership popularity (changing the existing situation and envisioning the desired situation).

Strategies include: (1) societal transformations (media and the general public); (2) legitimacy (elected authorities and stakeholders); (3) mass participation (convergence and consensus); and personal empowerment (self-esteem and self-confidence).

Consequences include: (1) expansion of the span of control (competing currents and public opinion); (2) level of attitude (awareness and knowledge); (3) impenetrability (influential personality and irreversibility); (4) self-actualization (individual and self-centeredness); and (5) risk-taking (innovation and threat).

Contextual conditions include: (1) intra-organizational cohesion (group and structural); (2) social actors (cultural activists and civil society); and (3) communications (management and networks).

In this study, the Kolmogorov–Smirnov test was used to examine the normality of the data distribution. If the data distribution is normal, inferential statistical tests can be applied. To assess normality, the null hypothesis assumes that the data follow a normal distribution. This test is conducted at a 5% significance level. If the significance value obtained is greater than or equal to 0.05, there is no evidence to reject the null hypothesis. Based on the results of the Kolmogorov–Smirnov test, in all cases the significance values were greater than the error level (0.05). Therefore, there is no reason to reject the null hypothesis, and the data are normally distributed.

In this study, a questionnaire was used as the instrument for measuring the research variables. Therefore, prior to testing the research hypotheses based on this scale, the validity of the measurement instrument must be confirmed. Accordingly, confirmatory factor analysis was conducted using AMOS software to assess the relationships between latent variables and their measurement items. Confirmatory factor analysis examines the relationships between observed variables (questionnaire items) and constructs. In fact, unless it is demonstrated

that the questionnaire items adequately measure the latent variables, the research hypotheses cannot be tested based on the questionnaire data. Therefore, confirmatory factor analysis is used to establish that the data have been measured correctly. The strength of the relationship between a factor (latent variable) and an observed variable is indicated by the factor loading. A factor loading is a value between zero and one.

Confirmatory factor analysis was conducted to evaluate the measurement model of the proposed leadership shadow personality framework. The results demonstrated that all model components satisfied the recommended goodness-of-fit criteria, indicating strong construct validity and adequate model–data correspondence (Figure 1 to 5). Across all dimensions, the χ^2/df ratios were within the acceptable range of 1–3, RMSEA values were below the threshold of 0.10, incremental fit indices (NFI, CFI, IFI, RFI) exceeded the recommended minimum of 0.90, absolute fit indices (GFI, AGFI) were above 0.80, and SRMR values were below 0.09, confirming that the hypothesized factor structure provides a statistically sound representation of the observed data and supports the robustness of the conceptual model.

Table 3. Goodness-of-Fit Indices for the Measurement Model

Dimension	χ^2/df	RMSEA	NFI	CFI	GFI	IFI	RFI	SRMR	AGFI
Acceptable Range	1–3	< 0.10	> 0.90	> 0.90	> 0.90	> 0.90	> 0.90	< 0.09	> 0.80
Causal Conditions	1.35	0.054	0.98	0.95	0.94	0.94	0.93	0.16	0.91
Contextual Conditions	1.84	0.098	0.95	0.94	0.94	0.95	0.95	0.23	0.93
Intervening Conditions	1.68	0.044	0.97	0.95	0.94	0.97	0.98	0.24	0.88
Strategies	1.259	0.066	0.99	0.96	0.98	0.98	0.99	0.24	0.87
Consequences	1.41	0.036	0.97	0.94	0.95	0.95	0.96	0.22	0.87

As presented in Table 3, all five structural dimensions of the model—causal conditions, contextual conditions, intervening conditions, strategies, and consequences—demonstrated strong and consistent goodness-of-fit across multiple statistical indicators. The χ^2/df values remained well within the acceptable range, indicating minimal discrepancy between the observed and estimated covariance matrices. RMSEA values for all dimensions fell below 0.10, reflecting acceptable approximation error. Furthermore, the incremental and comparative indices (NFI, CFI, IFI, RFI) exceeded the 0.90 criterion in every case, confirming excellent comparative model fit, while GFI and AGFI values consistently surpassed the recommended thresholds, supporting the adequacy of absolute fit. Although SRMR values were slightly elevated in some dimensions, the overall convergence of all major fit indices substantiates the stability, validity, and empirical adequacy of the proposed leadership shadow personality framework. These results confirm that the measurement model exhibits strong structural coherence and is suitable for hypothesis testing and theoretical generalization.

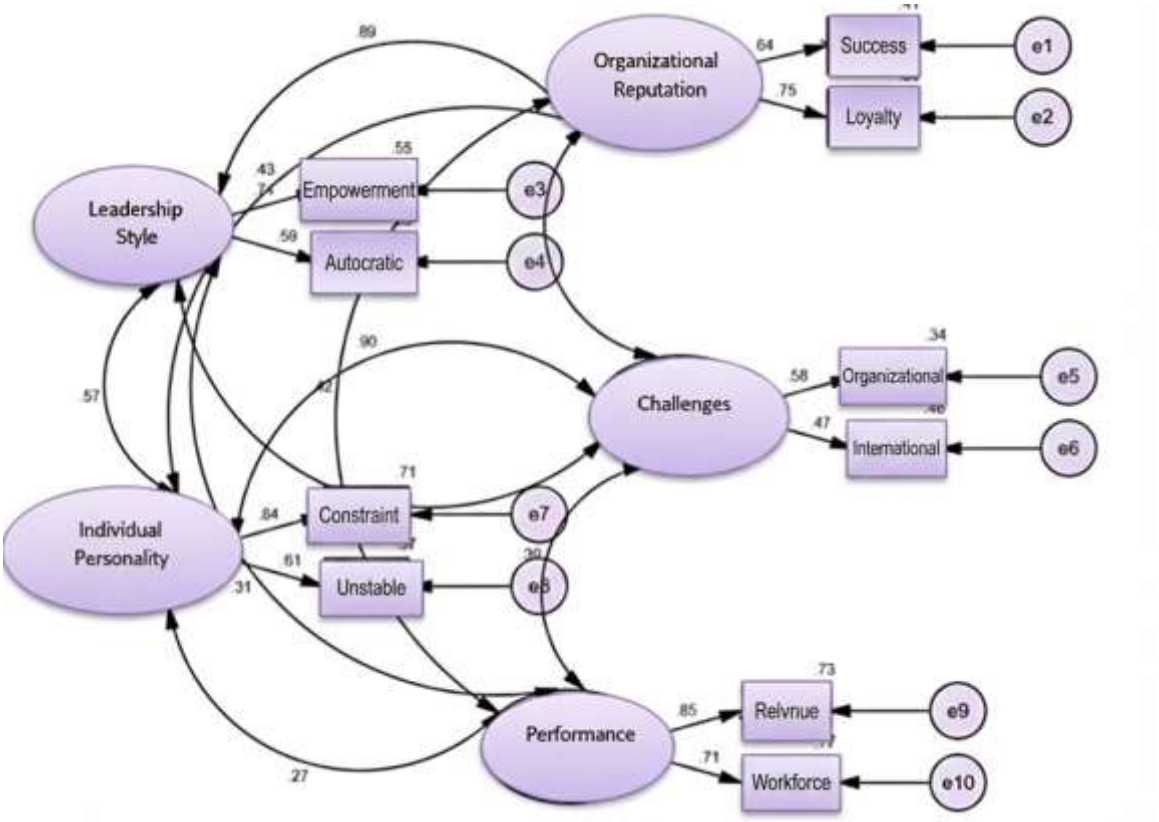

Figure 1. Factor Loadings of the Causal Conditions Variable

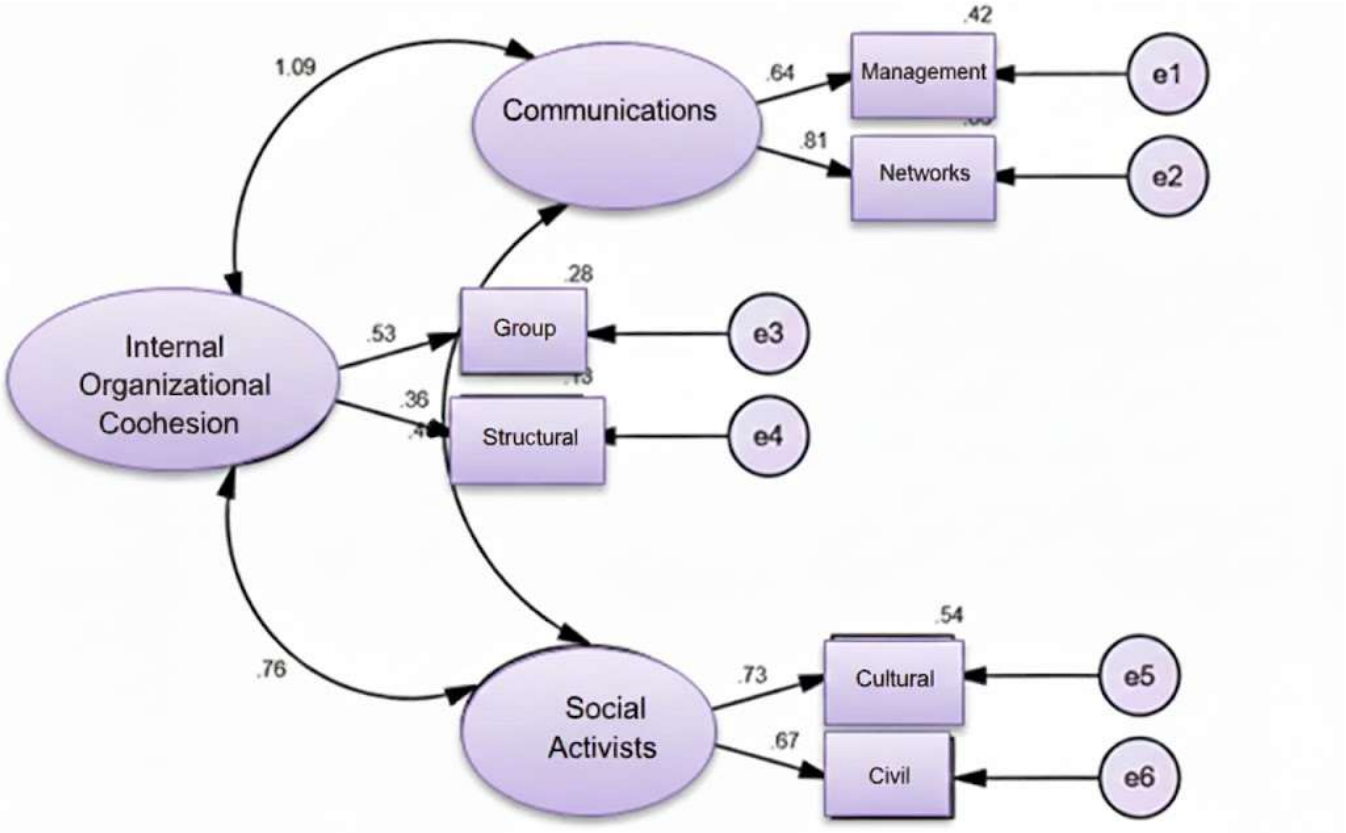

Figure 2. Factor Loadings of the Contextual Conditions Variable

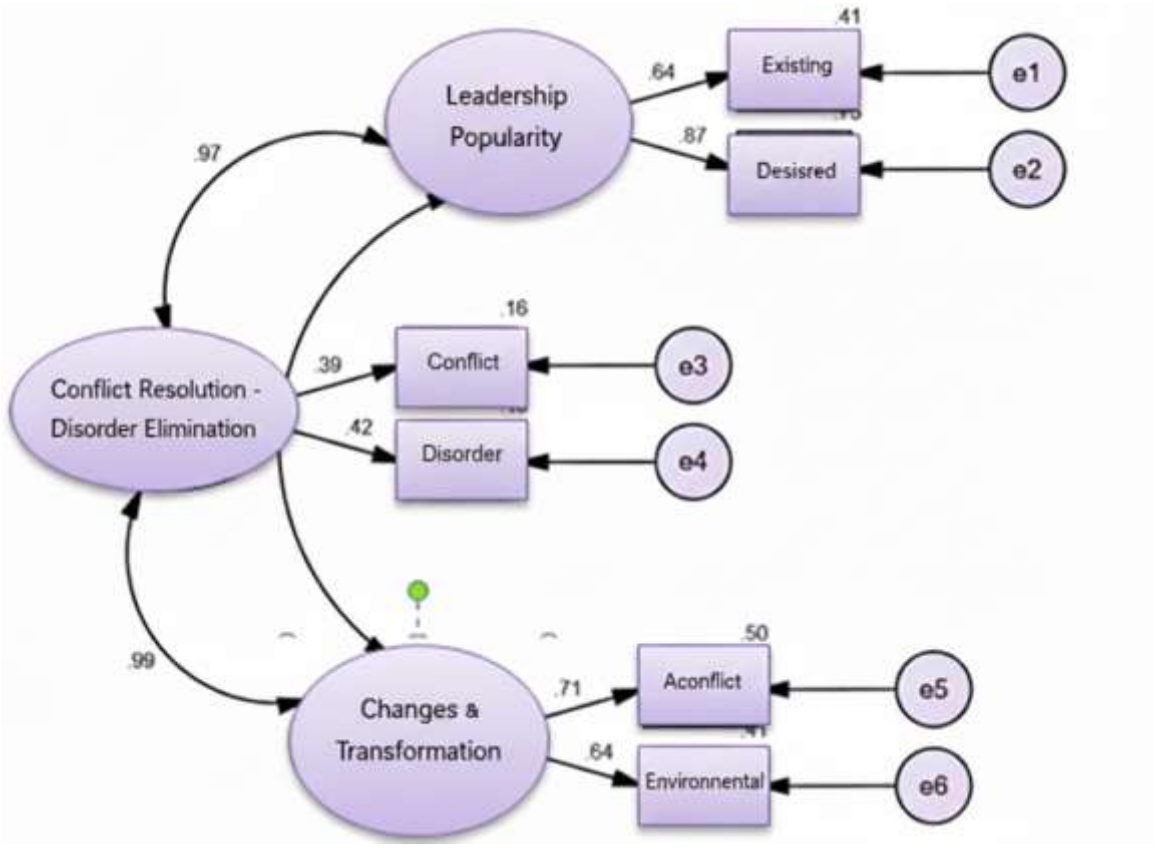

Figure 3. Factor Loadings of the Intervening Conditions Variable

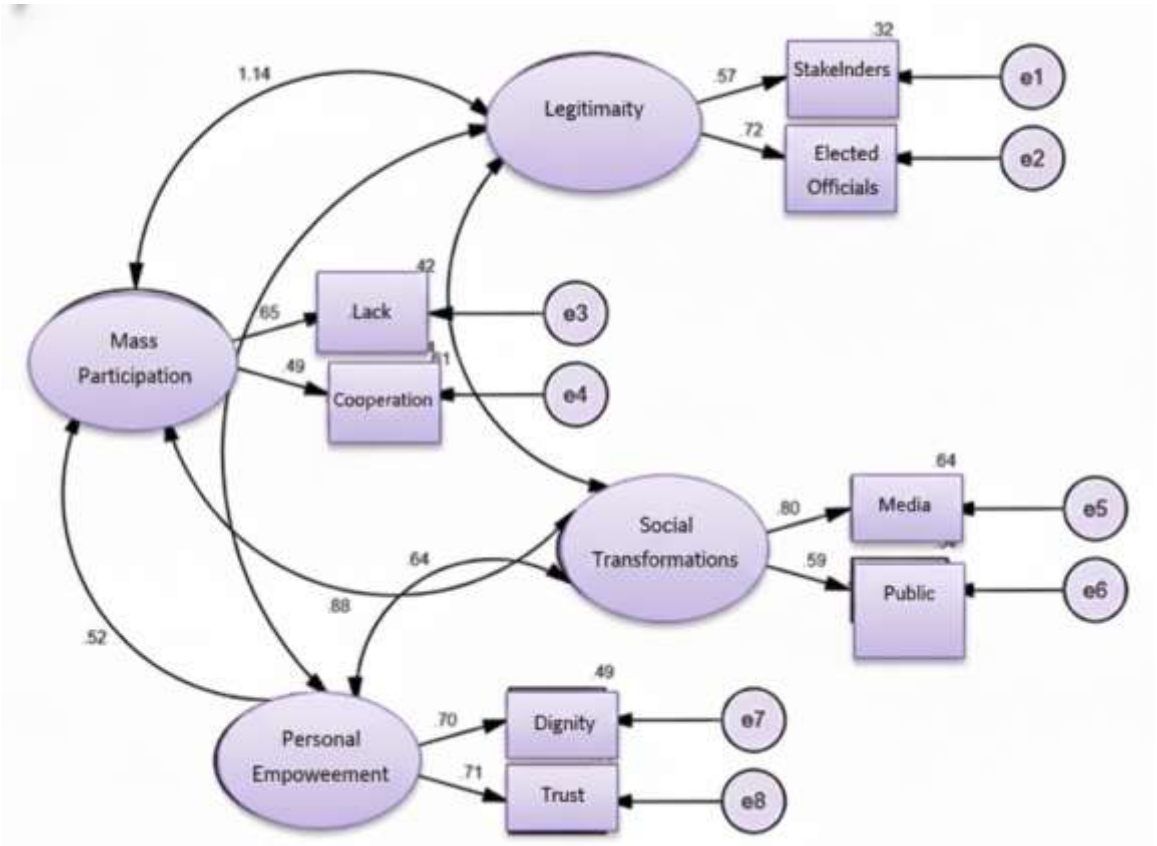

Figure 4. Factor Loadings of the Strategies Variable

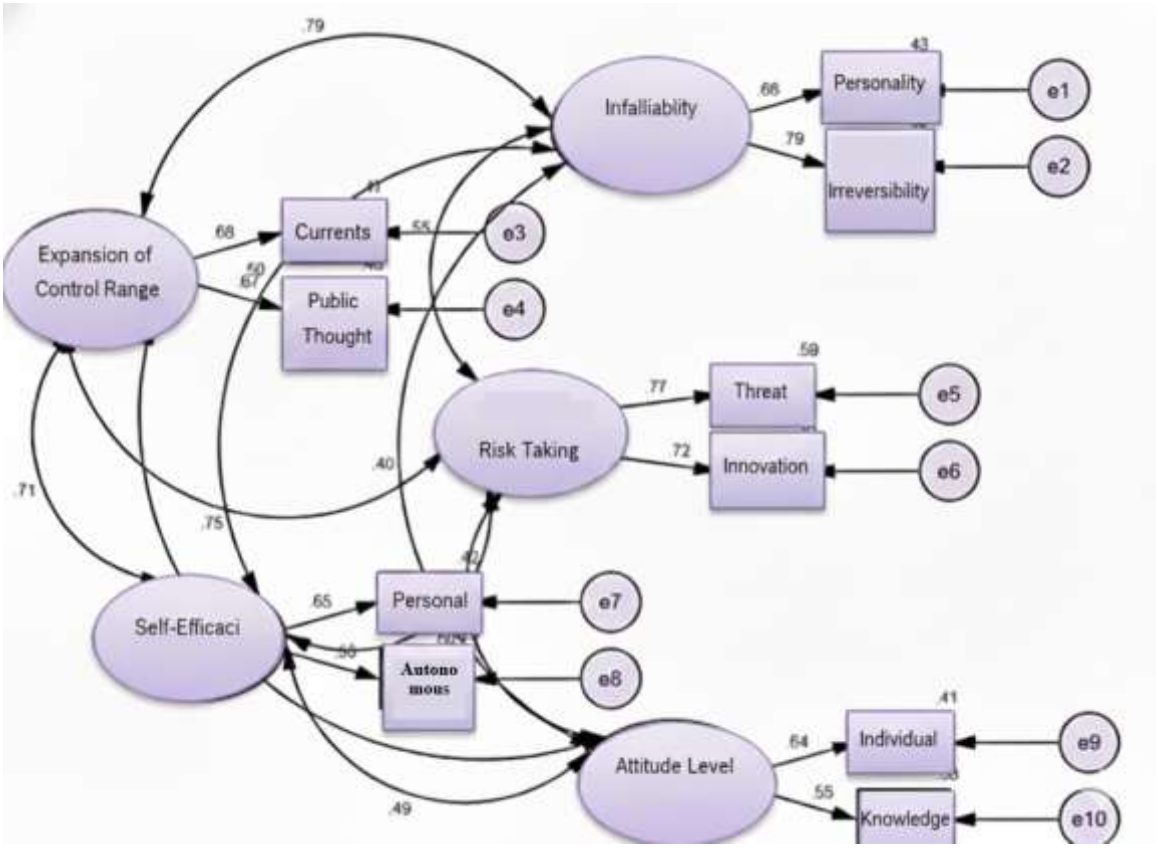

Figure 5. Factor Loadings of the Consequences Variable

Discussion and Conclusion

The present study sought to identify and model the key dimensions of leadership shadow personality in the water resources sector and to examine their structural relationships through a mixed-methods approach. The results of the qualitative phase, validated through confirmatory factor analysis in the quantitative phase, reveal a coherent and multidimensional framework in which leadership shadow personality is shaped by a constellation of causal conditions, contextual conditions, intervening conditions, strategic mechanisms, and organizational consequences. The goodness-of-fit indices across all model components confirm the empirical robustness of the proposed framework and indicate that the extracted structure provides a statistically sound representation of leadership shadow dynamics in the Iraqi Ministry of Water Resources.

At the core of the model, the central phenomenon of power and personality emerged as the primary axis around which leadership shadow dynamics are formed. This finding is strongly aligned with the theoretical proposition that leadership influence extends beyond formal authority into the psychological, relational, and symbolic domains of organizational life (1, 2). The prominence of power as a foundational construct corroborates extensive evidence that leadership behavior is inseparable from the leader's capacity to shape perceptions, emotions, and norms through visible and invisible channels (8, 9). Moreover, the integration of personality into this core dimension reinforces prior arguments that leaders' personal dispositions—particularly stability, emotional regulation, and self-perception—become embedded within organizational routines and decision structures over time (4, 6).

The identified causal conditions—leadership style, individual personality, organizational and international challenges, effectiveness of workforce and government, and organizational credibility—explain how leadership

shadows initially take shape. The influence of leadership style, particularly along the continuum of delegative to authoritarian behavior, is consistent with previous studies demonstrating that leadership style significantly conditions the type and intensity of power exercised within organizations (10, 14). The findings further indicate that personality stability plays a decisive role in moderating leadership effects, supporting earlier psychological and organizational research on the enduring impact of leaders' inner worlds on institutional behavior (1, 4). The importance of organizational credibility, rooted in success and loyalty, aligns with prior work emphasizing trust and legitimacy as essential foundations for sustainable leadership influence (5, 12).

The model's intervening conditions—change and transformation, conflict resolution and disruption removal, and leadership popularity—demonstrate how leadership shadows evolve and intensify over time. Rapid environmental and structural changes were shown to amplify leadership shadow effects, a result that closely parallels Hallinger's argument that leadership becomes most influential under conditions of uncertainty and contextual volatility (5). The role of conflict resolution as a stabilizing mechanism corresponds with research on leadership derailment, which emphasizes the destructive consequences of unresolved tensions within organizations (1). Furthermore, leadership popularity's influence on shaping both existing and desired organizational states reflects political leadership studies highlighting the symbolic power of public image and narrative construction (3, 13).

The strategic dimension of the model reveals how leadership shadows translate into action through societal transformations, legitimacy building, mass participation, and personal empowerment. The significance of societal transformation mediated by media and public engagement reinforces the notion that leadership influence increasingly operates within broader social and communicative systems rather than confined organizational boundaries (3, 13). The centrality of legitimacy—grounded in elected authority and stakeholder recognition—confirms extensive evidence that sustainable leadership is inseparable from perceived moral and institutional legitimacy (5, 11). Additionally, the role of mass participation and personal empowerment underscores that leadership shadows are not merely imposed from above but co-constructed through follower engagement and psychological investment (2, 14).

The consequences identified in the model—expansion of the span of control, attitudinal development, impenetrability, self-actualization, and risk-taking—illustrate the deep structural imprint of leadership shadows on organizational life. The expansion of influence over competing currents and public opinion reflects contemporary research on shadow governance, where informal networks extend organizational authority beyond formal boundaries (12, 13). The enhancement of awareness and knowledge confirms the cognitive dimension of leadership shadow effects, supporting theories that leadership shapes not only behavior but also meaning systems within organizations (7, 15). The emergence of impenetrability and irreversibility as consequences resonates with de Haan's conceptualization of leadership derailment, wherein unchecked power consolidates into rigid and self-reinforcing patterns (1). At the same time, the positive outcomes of self-actualization and risk-taking highlight the constructive potential of leadership shadows in fostering innovation and strategic renewal (2, 14).

The contextual conditions—intra-organizational cohesion, social actors, and communication systems—demonstrate that leadership shadows are deeply embedded within institutional and societal ecosystems. The importance of group and structural cohesion supports findings that organizational alignment amplifies leadership influence by stabilizing norms and expectations (5). The role of social actors and civil society engagement further confirms that leadership in public institutions cannot be understood in isolation from broader social movements and

cultural dynamics (3, 13). Finally, the centrality of communication and networks echoes extensive research on power diffusion and informal influence mechanisms in modern governance systems (8, 9).

Overall, the findings substantiate the proposition that leadership shadow personality constitutes a multidimensional and dynamic system of psychological, political, and organizational forces that jointly shape institutional behavior. The integrated model developed in this study extends existing leadership theory by empirically demonstrating how shadow processes emerge, evolve, and produce lasting organizational consequences, particularly within complex public sector environments. By situating leadership shadows within the strategic context of water resource governance, the study contributes a novel empirical foundation to the broader literature on leadership, power, and organizational transformation (1, 5, 12).

Despite its contributions, this study has several limitations. The research was conducted within a single public institution, which may constrain the generalizability of the findings to other sectors or national contexts. The reliance on self-reported data in the quantitative phase introduces the potential for response bias. Additionally, while the mixed-methods design provided depth and validation, the cross-sectional nature of the data limits the ability to draw causal inferences about the long-term evolution of leadership shadows over time.

Future research should replicate this model across different public and private sector organizations and in diverse cultural contexts to test its external validity. Longitudinal studies are recommended to examine how leadership shadows develop and transform across different stages of organizational life cycles. Further research could also explore the interaction between leadership shadow personality and organizational performance indicators, employee well-being, and public trust outcomes.

Organizational leaders and policymakers should integrate awareness of leadership shadow dynamics into leadership development programs and governance reforms. Institutional mechanisms should be established to monitor informal power structures, strengthen ethical leadership, and promote transparency. Enhancing communication systems, fostering organizational cohesion, and supporting participatory decision-making can help harness the constructive dimensions of leadership shadows while mitigating their potential risks.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adheried in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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