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737

Leadership performance evaluation of GCC women in middle and lower management in technology-based organizations: investigating economic influences

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Abstract

Purpose – Grounded in the individual differences theory of gender and information technology (IDTGIT), this study aims to examine the impact of economic factors on leadership performance of Gulf Cooperation Council (GCC) women in middle and lower management within technology-based organizations (TBOs). The economic factors considered include salary alignment with the cost of living, availability of resources and support, access to financing for projects and organization's financial stability.

Design/methodology/approach – A quantitative methodology is adopted, collecting data through two questionnaires using a five-point Likert scale and content-specific questions: one for GCC women leaders to capture economic factors and another for their subordinates to evaluate leadership effectiveness. A total of 404 paired responses are analyzed using descriptive statistics and multiple regression analysis.

Findings – The findings reveal that GCC women's leadership performance ranges from "limited" to "excellent," with a mean score of 3.294 on the five-point scale, reflecting a central tendency toward "moderate" performance. All examined factors, except organization's financial stability, show a significant positive impact on their leadership performance.

Originality/value – This study provides a novel perspective by quantitatively examining GCC women's leadership performance in TBOs, a context underexplored in the literature, while linking women's leadership performance to economic factors, thereby filling a critical research gap.

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Practical implications – This study provides practical insights for organizational strategies to enhance women's leadership performance through the lens of economic factors. In addition, it opens new avenues for future research on advancing women's leadership in the under-researched GCC context.

Keywords Access to financing, Availability of resources, Cost of living, Economic factors, GCC women leaders, Organization's financial stability, Technology-based organizations, Women's leadership performance

Paper type Research paper

1. Introduction

The Gulf Cooperation Council (GCC) countries have witnessed remarkable technological advancements, contributing significantly to the region's economic growth. Technology has become the foundational pillar of the majority of leading organizations in the region and has shaped their organizational structures and policies. Its integration has become a crucial benchmark for competitiveness, sustainability and performance improvement (Almehairbi *et al.*, 2022; Mosly, 2023). The GovTech Maturity Index, which evaluates the degrees of digital transformation maturity in government sectors across 198 nations, ranked the United Arab Emirates (UAE) in Group A (very high) among the world's premier nations, a unique distinction exclusively obtained by the UAE among Arab countries. Meanwhile, the remaining GCC countries were ranked in Group B (high) (Nii-Aponsah *et al.*, 2021). Furthermore, the UAE held a prominent position in the Technology and Innovation Report 2023. According to this report, the UAE was categorized as a member of the first group, achieving a ranking of 37 out of 166 countries in accordance with the Frontier Technologies Readiness Index. In contrast, Saudi Arabia was classified as 47, Kuwait 51, Bahrain 60, Oman 64 and Qatar 67 (UNCTAD, 2023).

Beyond technological advancements, the GCC countries have also developed policies and strategies to empower women across all domains (Al Khayyal *et al.*, 2021; Mosly, 2023). For instance, the UAE has established various entities to enhance gender equality and empower women in leadership roles. The first among these is the "General Women's Union," founded in 1975 as the national mechanism dedicated to women's empowerment and leadership in the UAE. Its vision is to enhance the pioneering role of women and achieve global benchmarks in various fields (General Women's Union, 2025). Another significant entity is the "UAE Gender Balance Council," which aims to narrow the gender gap across all government sectors and achieve gender balance in decision-making roles. Furthermore, "The UAE Women Leadership Program" is a vital program that holds a crucial role in preparing Emirati women for various leadership positions (Patterson *et al.*, 2021). Similarly, other GCC countries have carried out several reforms and empowerment initiatives for women's leadership (Mosly, 2023). These persistent efforts and impactful strategies have led to some favorable outcomes, as evidenced by the UAE's progress in global gender equality, securing the 71st position among 146 nations. Within the Middle East and North Africa region (MENA), it has achieved the top ranking. Meanwhile, Bahrain was ranked 113, Kuwait 120, Saudi Arabia 131, Qatar 133 and Oman 139 (World Economic Forum, 2023).

Despite progress, a persistent gender gap remains in the GCC labor force, with women's participation at 19.5%, significantly lower than the global average of 39.5%. Specifically, Kuwait exhibited the highest women's participation at 25%, followed by Bahrain at 21.8%, Saudi Arabia at 18.9%, the UAE at 18.3%, Oman at 16.9% and finally, Qatar at 16.1% (World Bank, 2022). The gender gap is evident in the representation of women across professional and technical occupations and in senior positions within both the government and private sectors (GCC Statistical Center, 2023). Although GCC women comprise over

50% of Science, Technology, Engineering and Mathematics (STEM) graduates, challenges persist in translating this education into employment opportunities, particularly at higher job levels (Alzaabi *et al.*, 2021; Mosly, 2023). For instance, Al Marzouqi and Forster (2011) drew attention to the escalating concern surrounding the insufficient representation of women in senior roles within the information technology (IT) sector in the UAE. This issue has global roots, with women's representation in leadership roles across 155 countries averaging 31%. A notable imbalance is evident in six professional and technical sectors, where significantly more men than women hold leadership roles: technology (24%), agriculture (23%), supply chain and transportation (21%), energy (20%), manufacturing (19%) and infrastructure (16%) (World Economic Forum, 2022). Despite the gender gap in leadership roles, women in leadership have made a transformative impact, demonstrating their potential to enhance the effectiveness of corporate boards (Khushk *et al.*, 2022). Research has found that female leaders build trust (Post *et al.*, 2019), excel in multitasking (Szameitat *et al.*, 2015), enhance financial performance (Martínez and Rambaud, 2019), foster greater innovation (Wu *et al.*, 2021), increase productivity (Lucia *et al.*, 2022), demonstrate strategic control over boards and reduce conflict levels (Nielsen and Huse, 2010).

Accordingly, the gender leadership gap in professional and technical sectors remains a critical aspect of broader gender disparities in the GCC and globally. This underrepresentation reflects a missed opportunity to leverage the leadership strengths of women, limiting overall economic potential. The GCC presents a unique socio-economic and organizational context for examining this issue, shaped by rapid technological advancement and increasing focus on gender equity. GCC's technology-based organizations (TBOs) play a central role in economic and infrastructure development, spanning both public and private sectors and driving innovation across diverse industries, including pharmaceuticals, aviation, communications, chemicals, manufacturing technology, telecommunications and research and development (R&D). However, TBOs remain underexplored in research with regard to women's leadership and are male-dominated at the management level, even though GCC women comprise the majority of STEM graduates. Existing studies on women's leadership have largely concentrated on examining gender-based variances in leadership traits and styles (e.g. Eagly *et al.*, 2003; Eagly and Carli, 2007; Eagly and Johnson, 1990; Judge *et al.*, 2002), and the impact of women's leadership on the organization's performance (e.g. Conyon and He, 2017; Liu *et al.*, 2014). Meanwhile, studies on factors leading to the lack of representation of women in leadership positions predominantly examined the impact of gender bias, stereotyping and discrimination against women (e.g. Eagly and Karau, 2002; Garcia-Retamero and López-Zafra, 2006; Heilman, 2001). This focus remains prevalent in more recent literature (e.g. Benco, 2024; Setyaningrum and Juansih, 2024; Tremmel and Wahl, 2023). Despite the rich body of literature on women's leadership, a significant gap exists in evaluating the actual leadership performance of women in specific roles and contexts. Furthermore, much of the existing research does not sufficiently explore factors beyond stereotypes and gender bias such as economic conditions that could significantly influence women's leadership performance. Considering the scarcity of research within this specific context, this study aims to contribute to closing this gap by evaluating the leadership performance of GCC women in middle and lower management positions within TBOs and examining the impact of economic factors on their leadership effectiveness. The economic factors studied are unique and rarely addressed, including salary alignment with the cost of living, availability of resources and support, access to financing for projects and organization's financial stability. This study not only promotes theoretical knowledge but also offers practical insights for policymakers seeking to create equitable and supportive environments for women leaders by enhancing

economic conditions. Furthermore, it paves the way for future research by encouraging the exploration of gender and leadership in emerging sectors and examining additional factors influencing women leaders' performance within the GCC context. The remainder of this paper is structured as follows: theoretical framework and hypotheses development, methodology, results and analysis, discussion and finally conclusion.

2. Theoretical framework and hypotheses development

2.1 Salary alignment with the cost of living and women's leadership performance

Individual differences theory of gender and information technology (IDTGIT) posits that women are not a homogeneous group and encounter diverse biases and barriers. It suggests that the gender gap in IT arises from the interplay of environmental influences, including cultural, economic, societal infrastructure and policy factors; individual influences, including personal characteristics and influences; and individual identity, encompassing personal demographics and the type of IT work (Trauth and Quesenberry, 2023). IDTGIT has identified economic factors as playing a pivotal role in shaping opportunities and challenges for women in the IT sector, with salary alignment with the cost of living serving as a key example of these economic factors. Maslow's Hierarchy of Needs offers a valuable framework for comprehending how salary alignment with the cost of living impacts women's leadership performance. It identifies physiological needs, such as shelter; safety needs, such as financial security; and esteem needs, such as equitable pay, as essentials, all of which highlight the importance of salary alignment with the cost of living to achieve these foundational needs (Maslow, 1943). By ensuring salary alignment with the cost of living, organizations enable women leaders to reduce financial stress and achieve self-actualization, allowing them to focus on innovation, strategic thinking and realizing their full leadership potential. Rosli *et al.* (2021) explored the impact of rising costs of living, including housing, transportation and self-education expenses, on salary alignment and its association with the prevalence of chronic heart disease (CHD) in Malaysia. The study identified a significant relationship between salary levels and CHD, highlighting the extent to which financial stress can be influential. Bandono *et al.* (2022) highlighted that salary significantly impacts employee performance, alongside factors such as work facilities and leadership style. Their analysis found that salary had the most dominant effect among the variables studied, emphasizing the importance of fair compensation.

Building on the preceding discussion, the hypothesis proposed is as follows:

H1. Salary alignment with the cost of living positively influences GCC women's leadership performance within TBOs.

2.2 Availability of resources and support and women's leadership performance

Availability of resources and support is a key example of economic factors identified in IDTGIT (Trauth and Quesenberry, 2023). The resource-based view theory emphasized that organizations possess unique resources, such as assets, capabilities, processes and knowledge, which, when effectively used, enable firms to implement strategies that enhance efficiency, effectiveness and long-term performance, helping them outperform competitors (Barney, 1991). Allison *et al.* (2023) demonstrated the critical role of technology as a resource in mediating the performance of female top managers. Their study highlighted that technology adoption, such as internet purchasing, improves operational efficiency, reduces transaction costs and enhances productivity. However, female top managers face challenges in adopting technology due to diverse social roles and perceived barriers, which contribute to lowering

their performance outcomes. The findings suggested that providing organizational support for technology resources, such as training, infrastructure and policies encouraging ICT adoption, can mitigate these challenges and enhance leadership effectiveness among female top managers. Similarly, Kiruthu *et al.* (2020) emphasized the key role of resource availability in influencing organizational performance, showing that it accounted for 53.6% of performance variance in small and medium enterprises. Therefore, access to adequate resources, including training opportunities, technological tools and organizational support is a crucial factor influencing leadership performance, particularly for women in TBOs, who often face stereotypes and cultural barriers. Building on the preceding discussion, the following hypothesis is formulated:

H2. Availability of resources and support positively influences GCC women's leadership performance within TBOs.

2.3 Access to financing for projects and women's leadership performance

Access to financing for projects is a key example of economic factors identified in IDTGIT (Trauth and Quesenberry, 2023). Tanveer *et al.* (2021) demonstrated that the effective utilization of financial resources significantly enhances a firm's financial performance. Their findings underscored how leadership style mediates the impact of financial resource utilization, with transactional leadership showing more immediate positive effects, while transformational leadership yields sustainable benefits over time. Notably, women tend to exhibit higher levels of both transformational and transactional leadership styles compared to men (Eagly *et al.*, 2003), suggesting that their leadership approaches may play a key role in the effective utilization of financial resources and consequently enhancing firms' financial performance. In addition, several studies revealed the positive impact of women's leadership on organizations' financial effectiveness (e.g. Luh and Kusi, 2023; Post and Byron, 2015; Martínez and Rambaud, 2019; Arioglu, 2020). This positive impact highlights women's ability in financial management, consequently indicating that greater access to financing can significantly improve their leadership outcomes. However, Allison *et al.* (2023) revealed that firms led by females often face greater challenges in securing project financing, which negatively affects outcomes including sales growth, employee growth and labor productivity. The findings highlighted that improved access to project funding empowers female leaders to implement strategic decisions, drive innovation and enhance overall effectiveness.

Accordingly, adequate funding for projects and initiatives is a crucial factor influencing leadership performance, especially for women in TBOs who frequently encounter stereotypes and cultural barriers. Building on the preceding discussion, the following hypothesis is formulated:

H3. Access to financing for projects positively influences GCC women's leadership performance within TBOs.

2.4 Organization's financial stability and women's leadership performance

An organization's financial stability is a key example of economic factors identified in IDTGIT (Trauth and Quesenberry, 2023). Tanveer *et al.* (2021) emphasized the important role of financial stability in achieving organizational goals. Maharani *et al.* (2024) highlighted that visionary leadership, supported by robust financial structures, contributes significantly to sustainability of microfinance institutions. These results underscored the crucial interaction between leadership effectiveness and organization's financial stability in

ensuring organizational success. Therefore, robust financial stability within an organization is a critical determinant of leadership efficacy, particularly for women in TBOs, where persistent biases often hinder access to equal opportunities and resources (Allison *et al.*, 2023). Building on the preceding discussion, the following hypothesis is formulated:

H4. An organization's financial stability positively influences GCC women's leadership performance within TBOs.

Figure 1 presents the conceptual model of this research, illustrating the hypotheses formulated for testing.

3. Methodology

3.1 Research design

This study used a quantitative research design comprising two main parts. In the first, GCC women in middle and lower management positions within TBOs provided data on key economic factors identified for hypothesis testing. In the second, their leadership performance was evaluated based on feedback from their subordinates. These two data sets were paired, and regression analysis was conducted to examine the relationship between economic factors and women's leadership performance.

3.2 Study population and sampling

This study targeted GCC women leaders working in middle and lower management within TBOs and their subordinates. To accurately identify the target population, TBOs and management levels were first defined. TBOs were rarely examined, particularly in the GCC region, despite their crucial role across economic and social domains. Ruiz-Jiménez and Fuentes-Fuentes (2020) identified sectors in which technology-based small and medium-sized enterprises operate. These sectors included pharmaceuticals, aviation, communications, office and computer equipment production, chemical industries, manufacturing technology, transportation-related equipment and material goods production, telecommunications and R&D activities. Following the scope identified by Ruiz-Jiménez and Fuentes-Fuentes (2020), TBOs considered in this study were from a diverse range of entities that rely on or use technological innovations across private and public domains in the GCC countries. Examples of these organizations include ADNOC, Omantel, Aramco, SAASST and Ooredoo (ADNOC, 2025; Aramco, 2025; Ooredoo Qatar, 2025; SAASST, 2025). In terms of management levels,

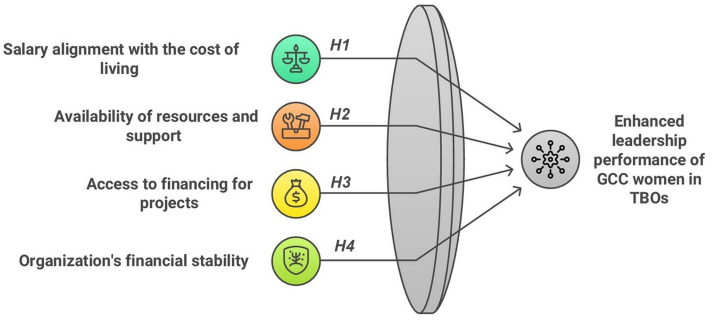

Figure 1. Research's conceptual model
Source: Authors' own work

middle management refers to the level between upper and lower management, responsible for implementing strategies, making decisions, facilitating communication, coordinating activities, managing resources, resolving disturbances and overseeing teams to ensure smooth operations within the organization (Rezvani, 2017). Examples include department heads, project managers, regional managers and branch managers. Lower management oversees frontline employees and handles daily operations. Examples include team leaders, foremen, supervisors and section officers.

To determine an appropriate sample size for a large or unknown population, Cochran's formula was applied using standard values: $Z = 1.96$ (95% confidence interval), $p = 0.5$ and $e = 0.05$ (Cochran, 1977), yielding a minimum required sample size of 385. A combination of purposive and snowball sampling techniques was used to accurately identify the target population (Etikan *et al.*, 2015; 2016). Initially, purposive sampling identified a small group of GCC women in middle and lower management roles within TBOs. They were asked to complete the section concerning economic factors and assign a unique code to themselves. Each GCC woman leader was then asked to recommend 1–2 subordinates reporting directly to her and share the unique code with them (codes containing at least three letters and four digits ensured proper matching). This process was crucial for evaluating her leadership performance from the perspective of those she leads. Subsequently, snowball sampling was implemented to expand the participant pool by encouraging the initial group to refer other eligible women leaders.

3.3 Data collection methods

Two questionnaires were used to collect data, primarily using a five-point Likert scale complemented by content-specific questions: one completed by GCC women leaders to capture economic factors, and the other by their subordinates to evaluate their leadership effectiveness. Google Forms was used to create electronic questionnaires, and modern communication tools were employed to enhance accessibility to the target sample. To minimize measurement error and ensure valid results, three common strategies were implemented. First, both questionnaires emphasized participants' anonymity and the confidentiality of their personal data by not requesting any identifying information, such as names. Participants were also assured that there were no right or wrong answers, as the purpose was to capture their honest perspectives with transparency and objectivity, free from bias. This approach helped reduce social bias and fear of transparent evaluation, encouraging more truthful responses. Second, a pre-test was conducted to identify and resolve ambiguous items in both questionnaires. Using a small sample similar to the study population, the questions were evaluated for clarity and relevance. This process ensured that respondents would interpret the questions as intended. Finally, the questionnaires were administered in Arabic – the native language of the target population – to ensure full comprehension by respondents.

3.4 Sample obtained

Data collection occurred in September 2024, resulting in 404 completed responses for analysis (each response consisted of two parts: one part completed by a GCC woman leader and the other by one of her subordinates), while 30 incomplete responses were discarded. Table 1. presents detailed distributions of the sample, providing a comprehensive overview of the sample's diversity.

3.5 Variables measurement

3.5.1 Dependent variable (GCC women's leadership performance). The leadership performance scale for GCC women in middle and lower management within TBOs was

Table 1. Distribution of sample characteristics

Category	Sub-category	Actual count (*n*)	%
Subordinates' gender	Male	237	58.66
	Female	167	41.34
Subordinates' age	Under 25	47	11.63
	25–34	166	41.09
	35–44	141	34.90
	45–54	42	10.40
	55+	8	1.98
Age of female leaders	Under 25	8	1.98
	25–34	128	31.68
	35–44	178	44.06
	45–54	88	21.78
	55+	2	0.50
Complexity of technology work in TBOs	Very low complexity	16	3.96
	Low complexity	58	14.36
	Moderate complexity	148	36.63
	High complexity	144	35.64
	Very high complexity	38	9.41
Organization size	Large-sized	298	73.76
	Medium-sized	78	19.31
	Small-sized	28	6.93
Country representation	The UAE	118	29.21
	Saudi Arabia	50	12.38
	Qatar	66	16.34
	Oman	56	13.86
	Kuwait	60	14.85
	Bahrain	54	13.36
Management level of the evaluated leader	Lower management	172	42.57
	Middle management	232	57.43

Source(s): Authors' own work

developed based on effective leadership dimensions identified in prior studies (e.g. Barchiesi and Labella, 2007; Black, 2015; Oyinlade, 2006). These dimensions were adapted by modifying and adding items to create a unique scale tailored to the specific context of this study (see Figure 2). According to the developed scale, GCC women's leadership performance within TBOs was evaluated using 11 main criteria, each with one or more sub-criteria, rated by participants (i.e. subordinates of GCC women leaders) on a five-point Likert scale, where higher scores indicate stronger skill. The mean of Likert-scale responses was used to calculate overall leadership performance, assuming equal weighting across sub-criteria. This approach is commonly used to support statistical analysis and reflect score variation. While median scores were considered, the mean was preferred for consistency and comparability across responses. Hence, the leadership performance score for each leader was calculated by aggregating sub-criteria scores and dividing by their total number. This approach was applied to 404 responses, creating a data set named GCC women's leadership performance. The resulting mean was then categorized into performance levels to aid interpretation and present results more meaningfully. These were interpreted based on five score ranges:

(1) Scores between 1.00 and 1.99 were classified as "limited," indicating the leader was underdeveloped, lacked necessary skills and required significant improvement.

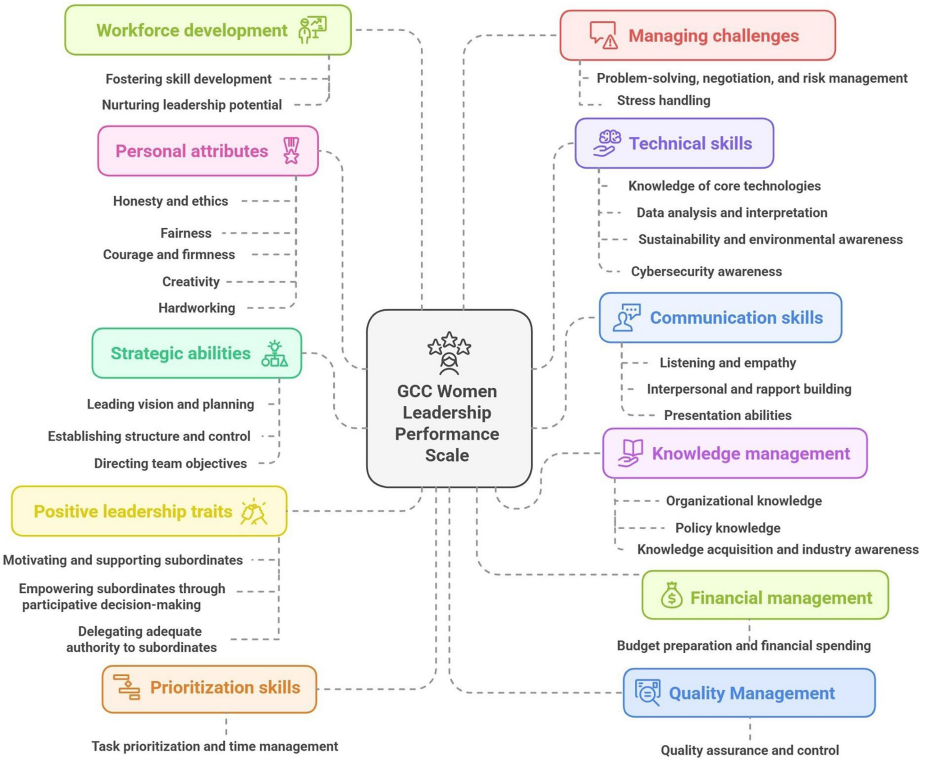

Figure 2. GCC women's leadership performance scale in TBOs
Source: Authors' own work

(2) Scores between 2.00 and 2.99 were classified as "fair," meaning the leader met basic requirements but still needed further growth.

(3) Scores between 3.00 and 3.99 were classified as "moderate," suggesting the leader had adequate skills but was not strong enough to be highly effective.

(4) Scores between 4.00 and 4.49 were classified as "proficient," reflecting above-average leadership performance with strong and consistently demonstrated skills.

(5) Scores between 4.50 and 5.00 were classified as "excellent," signifying exemplary leadership performance with outstanding capabilities.

3.5.2 Independent variables (economic factors). The independent variables focus on economic influences, including salary alignment with the cost of living, availability of resources and support, access to financing for projects and organization's financial stability. Each variable was assessed using a single five-point Likert scale question answered by GCC women leaders. Participants rated their perceptions of salary alignment with the local cost of living, with responses ranging from "strongly disagree" to "strongly agree." The adequacy of organizational resources and support was evaluated on a scale from "very poor" to "excellent." Financial accessibility was measured based

on the ease of accessing funding for projects, with responses ranging from "very difficult" to "very easy." Finally, perceptions of organization's financial stability were assessed on a scale from "very unstable" to "very stable," capturing an overall perspective on financial health.

3.5.3 Control variables. This study included the following control variables: GCC countries, size of the organization, management level and the complexity of technological work in TBOs. These control variables were selected to account for variations in the sample while minimizing their direct impact on the study's primary relationships. Their inclusion helped ensure that the relationships between the independent variables and the dependent variable were not distorted by other factors. First, incorporating GCC countries as control variables in the regression analysis mitigated regional disparities. In addition, it enhanced the generalizability of the findings, ensuring that observed effects were not limited to specific contexts within the Gulf region. Second, larger organizations often have extensive resources and capabilities, enabling employees to develop numerous innovations and initiatives (Henderson and Cockburn, 1994). This suggests that larger organizations are likely to positively influence leadership performance. Therefore, including firm size as a control variable helped manage this influence and enhance the accuracy of the results related to the examined hypotheses. Similarly, for management level, higher-level managers may have greater access to resources and financing, which could also influence their outcomes. Finally, the complexity of technological work in TBOs, ranging from very low to very high, highlighted task variations within the study sample that may influence leadership performance outcomes. Similar studies have used firm size and technology intensity/complexity as control variables (e.g. Ruiz-Jiménez and Fuentes-Fuentes, 2020). In addition, country has been frequently used as a control variable in related studies (e.g. Allison *et al.*, 2023).

3.6 Data analysis

Data were analyzed using descriptive statistics to summarize sample characteristics and interpret the responses, as well as multiple linear regression analysis to assess relationships between the variables. The analysis was conducted using Excel and the Statistical Package for the Social Sciences (SPSS), version 26.

4. Results and analysis

4.1 GCC women's leadership performance (dependent variable)

The analysis of the GCC women's leadership performance data set yielded a mean score of 3.29 and a standard deviation of 0.84, indicating moderate variability in the sample. The skewness coefficient of –0.23 suggests a slightly left-skewed distribution, meaning most ratings were on the higher end of the scale, with a few lower scores. Based on the predefined performance categories, most scores clustered in the "moderate" range (38.12%), representing leaders with adequate but not highly effective leadership skills. Leaders in the "fair" range accounted for 28.96%, reflecting basic but underdeveloped leadership skills, while those in the "proficient" category made up 19.06%, demonstrating strong and consistent leadership capabilities. Only 5.94% of leaders reached the "excellent" level, signifying exemplary leadership performance, and 7.92% were classified in the "limited" range, indicating their significant leadership skills gaps.

Figure 3 presents the frequency distribution of GCC women across the five leadership performance categories.

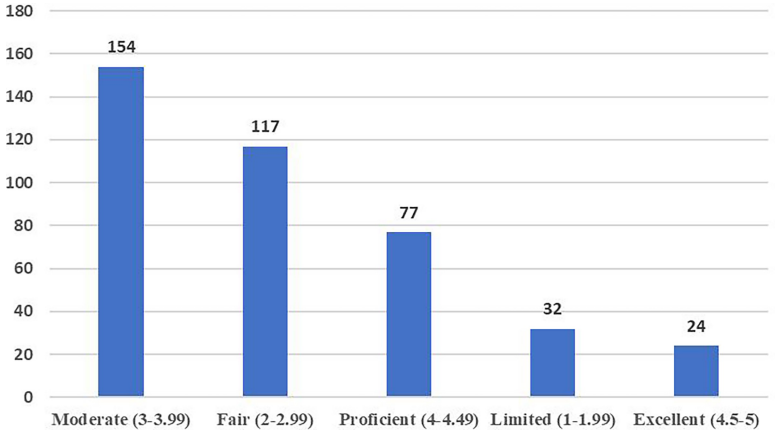

Figure 3. Distribution of GCC women's leadership performance across five evaluation categories
Source: Authors' own work

4.2 Economic factors (independent variables)

4.2.1 "Salary alignment with the cost of living" factor. The frequency distribution of GCC women leaders' responses regarding the alignment of their salary with the cost of living showed that the majority of respondents expressed agreement with the alignment, as indicated by the highest frequency (158 respondents). This was followed by those who held a neutral perspective (145 respondents). A smaller proportion of the sample disagreed with the alignment (73 respondents). The fewest respondents either strongly agreed (18 respondents) or strongly disagreed (10 respondents). Overall, the responses suggested a moderate level of satisfaction with salary alignment to the cost of living among the majority, with some notable concerns indicated by disagreement and strong disagreement.

4.2.2 "Availability of resources and support" factor. The frequency distribution of GCC women leaders' responses regarding the availability of resources and support within their TBOs showed that the majority of respondents rated this factor as "good" (162), followed by "adequate" (130). This was followed by a smaller group whose rating was "poor" (82), while only a few rated it as "excellent" (22). The least frequent response was "very poor," with just eight respondents. These results suggested that while a significant number of GCC women leaders perceive resources and support as sufficient, there remains room for improvement.

4.2.3 "Access to financing for projects" factor. The distribution of GCC women leaders' responses on the ease of accessing funding for projects showed that the largest group of respondents were neutral (120), followed closely by those who found access somewhat difficult (118). A smaller number rated it somewhat easy (98), while fewer considered it very difficult (62). The least frequent response was "very easy," with only 6 respondents. This indicates that while opinions are varied, many GCC women leaders face challenges in accessing adequate funding.

4.2.4 "Organization's financial stability" factor. The frequency distribution of GCC women leaders' responses regarding their organization's financial stability showed that the largest group of respondents rated their TBOs as very stable (172), followed closely by rating "somewhat stable" (170). A smaller portion of respondents provided a neutral perspective (50). A few rated their TBOs as "somewhat unstable" (8) or "very unstable" (4). These

results suggested that the majority of GCC women leaders perceive their TBOs as financially stable, with very few reporting significant instability.

4.3 Regression analysis

4.3.1 Correlation matrix. Table 2 presents the correlation matrix, offering an overview of the relationships among the independent variables and between these variables and the dependent variable – GCC women's leadership performance. In this matrix, all Pearson's correlation coefficients between independent variables were below 0.8, indicating no multicollinearity concerns (Senaviratna and Cooray, 2019). In addition, Pearson's correlation coefficients between the independent variables and the dependent variable served as a critical indicator for understanding both the direction and significance of the relationships under investigation. They showed that salary alignment with the cost of living, availability of resources and support, and access to financing for projects have significant, strong positive relationships with GCC women's leadership performance (correlations above 0.5 at $p < 0.01$), while an organization's financial stability suggested a statistically significant moderate positive impact on GCC women's leadership performance (correlation equal to 0.440 at $p < 0.01$).

4.3.2 Multicollinearity check. Multicollinearity was assessed using tolerance and variance inflation factor (VIF) values. All VIF values were below 3, and all tolerance values exceeded 0.1 – both well within acceptable limits – indicating no multicollinearity concerns among the independent variables. In addition, Pearson's correlation coefficients among the predictors were all below 0.80, further confirming that multicollinearity was not a threat. The predictors were thus sufficiently independent for a valid interpretation of the regression results.

4.3.3 Normality check. The normality of the dependent variable was assessed using the Shapiro–Wilk and Kolmogorov–Smirnov tests, both of which indicated some deviation from normality ($p \leq 0.05$). Normal Q–Q and detrended Q–Q plots also showed mild deviations from normality, particularly at the distribution tails. However, given the large sample size ($n = 404$), the central limit theorem justifies the use of parametric regression. To further support this conclusion, the distribution of regression residuals appeared approximately normal – bell-shaped and closely aligned with the overlaid normal curve – supporting the validity of the regression analysis (see Figure 4).

4.3.4 Linearity check. Linearity between each independent variable and the dependent variable was assessed using scatterplots. While the strength of relationships varied, all independent variables demonstrated sufficient linearity to proceed with regression analysis. The R^2 values ranged from 0.193 to 0.571, indicating some predictive value across the independent variables. These results support the application of linear regression.

Table 2. Correlation matrix

Variable	1	2	3	4	5
1. Salary alignment with the cost of living	1	0.689**	0.665**	0.498**	0.656**
2. Availability of resources and support		1	0.780**	0.470**	0.756**
3. Access to financing for projects			1	0.378**	0.742**
4. Organization's financial stability				1	0.440**
5. GCC women's leadership performance					1

Note(s): **$p < 0.01$ (two-tailed)
Source(s): Authors' own work

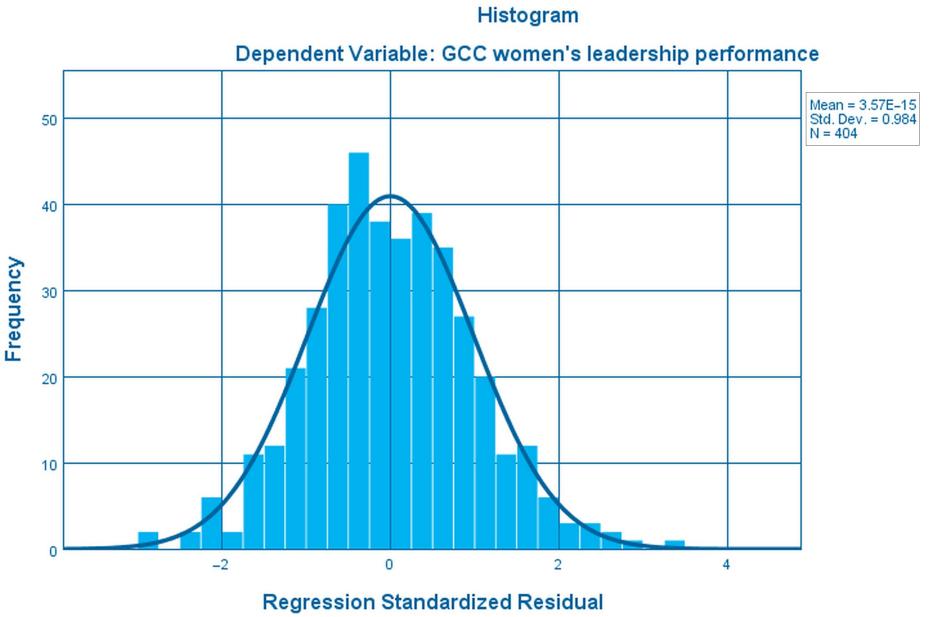

Figure 4. A histogram of the regression standardized residuals for GCC women's leadership performance

Source: Authors' own work

4.3.5 Homoscedasticity check. Homoscedasticity was assessed using a scatterplot of regression standardized residuals against predicted values. The residuals appeared randomly scattered, with no clear pattern, indicating that the assumption of homoscedasticity was satisfied (see Figure 5).

4.3.6 Model summary. Multiple linear regression was conducted, with the dependent variable being GCC women's leadership performance. The independent variables included salary alignment with the cost of living, availability of resources and support, access to financing for projects and the organization's financial stability. Control variables comprised GCC countries (UAE, Oman, Qatar, Bahrain, Kuwait and Saudi Arabia), management level (middle and lower), size of the organization (small, medium and large) and complexity of technological work in TBOs (very low, low, moderate, high and very high). The GCC countries, management level and size of the organization were treated as categorical variables, while the complexity of technological work was an ordinal variable coded numerically from 1 to 5. To incorporate categorical control variables into the regression model, dummy coding was applied.

For the control variable GCC countries, the UAE was selected as the reference category, resulting in five dummy variables: Saudi Arabia (coded as 1 for Saudi Arabia and 0 otherwise), Qatar, Kuwait, Oman and Bahrain, each similarly coded. For the management level, the middle level served as the reference category, producing a single dummy variable coded as 0 for middle management and 1 for lower management. For the size of the organization, medium-sized was used as the reference category, leading to two dummy variables: one indicating large-sized organizations (coded as 1 for large-sized and 0 otherwise) and the other indicating small-sized organizations (coded as 1 for small-sized and 0 otherwise). Medium-sized organizations were

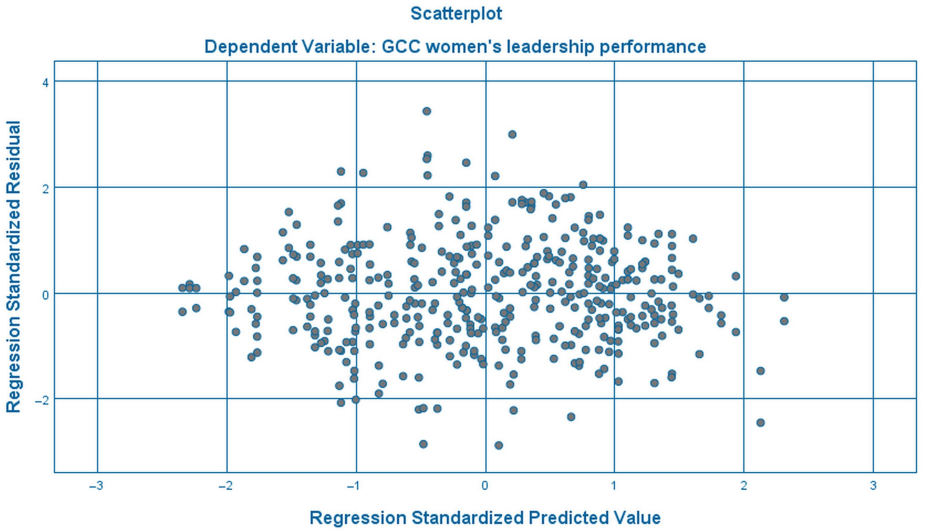

Figure 5. Scatter plot of regression standardized residuals vs. predicted values for linear regression model
Source: Authors' own work

Table 3. Model summary

R	R^2	Adjusted R^2	Std. error of the estimate	R^2 change
0.830	0.689	0.678	0.474	0.812

Source(s): Authors' own work

represented when both dummy variables were 0. Table 3 presents the model summary. The model had an R value of 0.830, indicating a strong positive correlation between the predictors and GCC women's leadership performance. The R^2 value of 0.689 suggested that approximately 68.9% of the variance in GCC women's leadership performance was explained by the model, which reflected strong model performance. The adjusted R^2 of 0.678 was slightly lower due to the adjustment for the number of predictors, which helped prevent overfitting. The standard error of the estimate was 0.474, which was relatively small, suggesting that the model's predictions are fairly close to the actual values. Finally, the R^2 change value of 0.812 demonstrated a substantial improvement in the model's explanatory power, indicating the significant contribution of the predictors.

A backward stepwise regression was conducted to refine the model by removing non-significant economic predictors, while all control variables were retained as specified in the original model. The final model included three significant economic predictors: availability of resources and support ($B = 0.307$, $p < 0.001$), access to financing for projects ($B = 0.211$, $p < 0.001$) and salary alignment with the cost of living ($B = 0.193$, $p < 0.001$). The organization's financial stability was excluded due to lack of statistical significance. The adjusted R^2 of the refined model (0.679) was nearly identical to that of the full model (0.678), supporting its parsimony and robustness.

Table 4. ANOVA

Source	Sum of squares	df	Mean square	F	*p*
Regression	193.526	13	14.887	66.316	0.000
Residual	87.547	390	0.224		
Total	281.073	403			

Source(s): Authors' own work

4.3.7 ANOVA. ANOVA was used to test the overall significance of the regression model. Table 4 presents the ANOVA results of this study, indicating that the model significantly explained the variance in GCC women's leadership performance, as observed by $F = 66.316$, $p < 0.001$.

4.3.8 Regression coefficients and interpretation. Table 5 presents the regression coefficients for the constructions of the model. First, the significant factors impacting GCC women's leadership performance were as follows:

- Salary alignment with the cost of living had a significant positive relationship with GCC women's leadership performance ($p < 0.001$), suggesting that greater alignment contributed to an improvement in leadership performance by 0.193 ($B = 0.193$).
- Availability of resources and support had a significant positive relationship with GCC women's leadership performance ($p < 0.001$), indicating that increased resources available for women leaders in their TBOs enhanced their leadership performance by 0.307 ($B = 0.307$).
- Access to financing for projects had a significant positive relationship with GCC women's leadership performance ($p < 0.001$), indicating that easier access to financing for women leaders improved their leadership performance by 0.211 ($B = 0.211$).

Second, the factor of an organization's financial stability was non-significant for GCC women's leadership performance ($p = 0.121$). As for the control variables, GCC region-specific dummy variables – Bahrain ($p = 0.001$) and Saudi Arabia ($p = 0.006$) – indicated

Table 5. Regression coefficients

Predictor	*B*	Std. error	*β*	*t*	*p*
(Constant)	0.514	0.191		2.688	0.007
Salary alignment with the cost of living	0.193	0.041	0.205	4.743	0.000
Availability of resources and support	0.307	0.048	0.336	6.383	0.000
Access to financing for projects	0.211	0.042	0.266	5.094	0.000
Organization's financial stability	0.062	0.040	0.060	1.555	0.121
Lower management (dummy variable)	−0.124	0.064	−0.074	−1.944	0.053
Small-sized organizations (dummy variable)	0.031	0.114	0.010	0.276	0.783
Large-sized organizations (dummy variable)	0.015	0.064	0.008	0.231	0.818
Oman (dummy variable)	0.034	0.082	0.014	0.412	0.681
Qatar (dummy variable)	−0.050	0.076	−0.022	−0.660	0.510
Bahrain (dummy variable)	0.272	0.083	0.111	3.258	0.001
Kuwait (dummy variable)	−0.073	0.079	−0.031	−0.922	0.357
Saudi Arabia (dummy variable)	0.237	0.086	0.093	2.766	0.006
Complexity of the technological work in TBOs	0.093	0.028	0.107	3.277	0.001

Source(s): Authors' own work

significant regional effects. Both had significant positive coefficients, suggesting that being from these countries was associated with higher GCC women's leadership performance compared to the reference group, the UAE. On the other hand, GCC region-specific dummy variables for Oman, Qatar and Kuwait showed no significant impact on GCC women's leadership performance at the 0.05 significance level. Management level and size of the organization were not statistically significant, suggesting they did not have a strong influence on GCC women's leadership performance. The complexity of the technological work in TBOs showed a significant impact on GCC women's leadership performance ($p = 0.001$).

5. Discussion

The findings of this study indicate that GCC women's leadership performance in TBOs ranges from limited to excellent, with an average rating of moderate. Rather than reinforcing traditional gender-based assumptions that portray women as technically incompetent (Fleischmann *et al*., 2016) or unsuited for leadership (Samuel and Mokoaleli, 2017), the findings suggest that women's leadership performance in the TBOs is heterogeneous and shaped by contextual factors – not by inherent deficiency. The variation in GCC women's leadership performance highlights that outcomes are influenced by factors beyond gender alone, emphasizing the diversity of women's leadership outcomes within the same professional context. This result aligns directly with the IDTGIT, which posits that women are not a homogeneous group, as they encounter diverse biases and barriers, with the gender gap in IT stemming from the interplay of environmental influences, individual traits and identity (Trauth and Quesenberry, 2023). Furthermore, the emergence of excellent leadership outcomes, even within male-dominated organizational environments, challenges the assumption that gender alone is a meaningful predictor of leadership capability or limitation. This is supported by Demaiter and Adams (2009), who found that successful women in IT leadership positions demonstrated clear competence and resilience, contradicting stereotypes of female inadequacy in technical leadership roles.

Regarding the tested hypotheses, *H1*, *H2* and *H3* are supported, highlighting the importance of economic factors in fostering women's leadership performance. Specifically, salary alignment with the cost of living (*H1*), the availability of resources and support (*H2*) and access to financing for projects (*H3*); all have statistically significant positive impacts on GCC women's leadership performance. These findings align with the IDTGIT, which identifies economic factors as pivotal in shaping opportunities and barriers for women in IT (Trauth and Quesenberry, 2023). However, *H4*, which hypothesizes a positive influence of an organization's financial stability – another key example of economic factors – is rejected. This suggests that an organization's financial health alone does not guarantee support for women's leadership without targeted equity measures or initiatives.

To further interpret these findings, it is helpful to consider the relative strength and implications of each predictor in the model. Among the significant predictors, availability of resources and support had the strongest influence ($B = 0.307$), followed by access to financing ($B = 0.211$), salary alignment with the cost of living ($B = 0.193$) and complexity of technological work ($B = 0.093$). Bahrain ($B = 0.272$) and Saudi Arabia ($B = 0.237$) also showed significant positive effects among the control variables, suggesting that women leaders in these countries may benefit from more progressive policies, institutional support or cultural shifts that promote gender inclusion and distinguish these contexts from others in the GCC. In contrast, organization's financial stability, management level and organizational size were not significant, indicating that broader structural attributes may be less critical than tangible, targeted support. These results emphasize that both practical organizational supports – such as access to resources, financing and fair compensation – and favorable

regional contexts, as seen in Bahrain and Saudi Arabia, play critical roles in enhancing women's leadership performance in TBOs.

6. Conclusion

This study provides valuable insights into GCC women's leadership performance in middle and lower management within TBOs, focusing on the impact of economic factors on their leadership effectiveness. The findings indicate that leadership performance among GCC women spans from "limited" to "excellent," with a general trend toward moderate levels. Key economic factors, including salary alignment with the cost of living, availability of resources and support and access to financing for projects, were found to have statistically significant positive impacts on GCC women's leadership performance. These findings offer both theoretical and practical implications. Theoretically, the study contributes to the limited body of research on women's leadership in the GCC by empirically linking economic conditions to leadership effectiveness. Practically, the results inform organizational strategies and policymakers by highlighting the need for targeted economic and structural interventions to foster a more inclusive and empowered leadership environment – such as equitable compensation aligning with cost of living, improved support systems and expanded financial access – to improve women's leadership outcomes. Moreover, the demonstrated capacity of many GCC women to perform effectively in leadership roles – despite structural challenges – supports institutional trust in their ability to lead advanced TBOs. This encourages greater gender diversity in leadership and shifts the attribution of leadership performance away from inherent gender traits toward modifiable external factors, such as economic and organizational conditions.

Several limitations should be acknowledged. While purposive and snowball sampling helped identify targeted participants, it may limit the generalizability of findings due to non-random recruitment. In addition, this study examined how organizational economic conditions relate to women's leadership performance but did not assess personal attributes or identity factors such as ambition, risk tolerance or educational attainment. Women with stronger personal attributes may be more likely to pursue leadership roles and perform well once in them, and these unmeasured factors could have influenced the relationships observed in this study. Finally, the study assumed that sub-criteria in the leadership performance scale are equally weighted, and the mean was used to compute overall scores. This approach may overlook variations in the relative importance of individual criteria.

Future research should consider a broader range of economic factors impacting women's leadership, including funding for gender diversity programs, health-care benefits, childcare support and family benefits. Studies could also integrate individual-level variables such as educational attainment to better understand how personal and organizational factors jointly influence leadership outcomes. In addition, expanding the study to include top management levels and a wider range of sectors could offer deeper insights into the complex interplay between economic factors and women's leadership performance.

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Author contributions

Mariam Mohamed Alhmoudi: contributed to the conceptualization, methodology, investigation, formal analysis of the study and led the writing – original draft preparation;

Hamad Sulaiman Rashid: contributed to the conceptualization and provided supervision; played a key role in writing – review and editing.

Ethics statement

Data were collected via electronic questionnaires. Participants were informed about the study's purpose and assured that no personally identifiable information was requested, guaranteeing the anonymity of their responses. They were also informed that their perspectives would be securely stored with access restricted to the authors and used exclusively for the purposes outlined in the study. Participation was entirely voluntary, with no associated risks, and participants could withdraw at any time without consequences. Completion and submission of the questionnaire were regarded as implied informed consent.

Data availability

The data set generated and/or analyzed during the current study is available from the corresponding author upon reasonable request.

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