SA Journal of Human Resource Management
ISSN: (Online) 2071-078X, (Print) 1683-7584

The effect of transformational leadership on hospital sustainability in Jordan: The mediating reason of total quality management

Authors:
Noor Aldeen A.E. Alkhawaldeh[1]
Rohana B. Ahmad[1]
Azlinzuraini B. Ahmad[1]

Affiliations:
[1]Department of Management, Faculty of Business, Economics and Social Development, Universiti Malaysia Terengganu, Kuala Terengganu, Malaysia

Corresponding author:
Noor Aldeen Alkhawaldeh,
p5129@pps.umt.edu.my

Dates:
Received: 01 June 2025
Accepted: 05 Aug. 2025
Published: 11 Oct. 2025

How to cite this article:
Alkhawaldeh, N.A.A.E., Ahmad, R.B., & Ahmad, A.B. (2025). The effect of transformational leadership on hospital sustainability in Jordan: The mediating reason of total quality management. *SA Journal of Human Resource Management/SA Tydskrif vir Menslikehulpbronbestuur*, *23*(0), a3152. https://doi.org/10.4102/sajhrm.v23i0.3152

Orientation: Transformational leadership (TL) has a positive impact on achieving sustainability; however, little is known about the mediating impact of total quality management (TQM) in achieving sustainability in developing countries such as Jordan.

Research purpose: This study aims to investigate the impact of TL on sustainability and the mediating impact of TQM in Jordanian hospitals, namely, King Abdullah Hospital and Princess Basma Hospital.

Motivation for the study: Little is known about the mediating impact of TQM in achieving sustainability in developing countries such as Jordan, creating a need to explore this relationship.

Research approach/design and method: A validated questionnaire was distributed to 200 nurses, doctors, technicians and administrative staff using stratified random sampling. The data were analysed quantitatively using Smart-PLS 4 software and structural equation modelling (SEM).

Main findings: The results revealed that TL has a positive impact on hospital sustainability, with 45.9%. In addition, TQM was considered a partial mediator in this relationship. This indicates that TQM supports the impact of TL on sustainability by strengthening operational efficiency and quality-driven initiatives.

Practical/managerial implications: The study recommended that hospital administrators implement TL qualities and incorporate TQM frameworks to ameliorate long-term sustainability, operational efficiency and patient safety.

Contribution/value-add: The study concluded that TL promotes sustainability, whereas TQM serves as an effective mediator in promoting this relationship.

Keywords: transformational leadership; hospital sustainability; total quality management; Jordanian hospitals; structural equation modelling; Smart-PLS 4; operational efficiency.

Introduction

Leadership plays a critical role in managing the behaviours of employees, guiding and motivating them to embrace innovative and technological methods that are effective in achieving sustainability in various sectors: education, organisations, health care and hospitals. There are a variety of leadership styles that can be used by leaders, such as transactional, autocratic, bureaucratic, charismatic, situational and transformational. This study is concerned with transformational leadership (TL) because of its importance in achieving sustainability in the health care sector, which is the focus of this study, by ensuring long-term success, inspiring change and health care practices.

In health care, leaders are regarded as a key driver in organisational success (Honorata et al., 2024). Therefore, health care leaders adopt TL, which is defined as the role of the leader in motivating and inspiring followers to attain exceptional outcomes (Ren & Mavros, 2024).

In the Jordanian context, the health care sector is highly developed, earning recognition from the World Bank as the leading health care provider in the region and one of the top five globally (Department of Statistics 2018; Al Shamas, 2020). To remain competitive, Jordanian hospitals apply TL because of its benefits in improving the health care infrastructure as it

concentrates on motivating followers towards applying innovations that lead to sustainability (Department of Statistics 2018; Raoush, 2023). Within this context, sustainability is defined as the capacity to meet current needs without undermining the future generations' ability to meet their own needs (Hajian & Kashani, 2021).

Sustainability includes social, economic and environmental dimensions to guarantee long-term balance and viability (Azapagic et al., 2016). Social sustainability guarantees equal access to education, health care and resources while enhancing community well-being and human rights (Eizenberg & Jabareen, 2017). Economic sustainability concentrates on long-term fair wages, economic growth and resource allocation without leading to financial instability (Van Niekerk, 2020). Environmental sustainability seeks to reduce pollution, promote renewable energy and protect natural resources to preserve ecological balance for upcoming generations (Shaheen et al., 2022).

Sustainability is directly affected by TL. To support this claim, Šarotar Žižek et al. (2017) indicate that TL motivates and inspires individuals to embrace ethical decision-making, innovation and long-term strategic vision, which in turn leads to sustainability.

Another variable that mediately affects sustainability is total quality management (TQM), which means an ongoing enhancement approach that concentrates on organisational excellence, process efficiency and customer satisfaction (Jimoh et al., 2019). In addition, Ansah (2018) emphasises the importance of a strong, quality-driven culture in reducing waste, optimising resources, enhancing operational sustainability and ensuring long-term competitiveness.

Based on the foregoing, it can be argued that health care sustainability in hospitals can be achieved by TL and TQM. When it comes to Jordanian hospitals, little is known about the direct impact of TL on achieving hospital sustainability and the impact of TQM in mediating this relationship. The majority of the previous studies conducted in Jordan addressed the impact of TL on hospital sustainability (Raoush, 2023), overlooking the mediating impact of TQM in this relationship. Therefore, the researchers in this study aim to fill this gap in the literature by highlighting the direct impact of TL and the mediating role of TQM in achieving hospital sustainability in Jordan.

In light of the current limited evidence in relation to the impact of TL on hospital sustainability in Jordan and the mediating impact of TQM in this relationship, this study aims to fill the existing gap in relation to TL, hospital sustainability and TQM. To the best of our knowledge, few studies addressed the impact of TL on hospital sustainability and the mediating impact of TQM in this relationship (Honorata et al., 2024; Nasir et al., 2022; Ren et al., 2024). However, no study has examined this issue in a comprehensive framework focusing on both operational and strategic dimensions in the context of the Jordan health care sector. Thus, this study aims to provide answers to the following research questions:

- How does TL influence hospital sustainability in Jordan?
- To what extent does TQM mediate the relationship between TL and hospital sustainability in Jordan?

Literature review

Theoretical and conceptual background

Sustainability in Jordanian hospitals

Sustainability means meeting present needs without compromising future generations' ability to meet their own needs by balancing economic, social and environmental considerations (Hajian & Kashani, 2021).

The concept of sustainability is not considered as a static issue because of several reasons, including scarce resources, competitive global scenarios, climate conditions, insecure political instability, new innovative technologies, economic crisis and immediate increase in population (Demir et al., 2021). Sustainability is regarded as the ultimate goal of companies in general and health care in particular (Obaideen et al., 2022). To support this claim, Nasir et al. (2022) indicate that companies are concerned not only with achieving a high-performance level but also with sustaining the global market position while adapting and navigating unpredictable and emerging challenges.

Sustainability is divided into three dimensions, namely, economic, environmental and social (Andersson et al., 2022). Environmental sustainability suggests reducing pollution and conserving natural resources (Shaheen et al., 2022). Economic sustainability means decreasing the operational costs (Ekins & Zenghelis, 2021). Social sustainability entails improving the quality of care and health for individuals, along with reducing pollution (Obaideen et al., 2022). This study is concerned with social sustainability, which occurs at the health care level.

Marimuthu and Paulose (2016) define hospital sustainability as one of the most significant aspects that receives the utmost interest from health care professionals. To achieve sustainability, health care sector should measure its sustainable performance on a regular basis. To support this claim, Mehra and Sharma (2021) maintain that measuring the progress of sustainability in health care has a number of advantages that are manifested in enabling policymakers and managers to develop strategies, track progress, benchmark against other systems and establish improvement objectives.

Within Jordanian hospitals, the sustainability wave has swept across various cities and countries worldwide, and its impact has drifted to health care in Jordan (Alhmoud & Arcan, 2020). Therefore, Jordanian hospitals are concerned with improving the sustainability of hospitals to encompass adequate health services coupled with patients' healing (Darwazeh et al., 2021). In doing so, hospital

managers establish facilities that adequately meet the demand levels (Darwazeh et al., 2021). In the Jordanian health care sector, sustainability aims to provide effective resource use, waste reduction and eco-friendly hospital designs to promote environmental well-being and patient health (Ahmad et al., 2019).

Total quality management

According to Permana et al. (2021), TQM is regarded as one of the common methods employed to manage the quality of services and products in a comprehensive manner. Total quality management is an integrated management philosophy that seeks to exceed or meet customer expectations by constantly enhancing the quality of services products and processes (Muchlish & Tjahyono, 2021).

Total quality management concentrates on improving the effectiveness of the responsiveness and the processes in meeting the requirements of the customer as part of the organisation's excellence objectives in attaining customer satisfaction (Ramlawati & Putra, 2018). Total quality management implementation consists of three stages, namely, preparation stage, planning stage and execution stage (Fitriani, 2019).

Total quality management has several advantages for both customers and organisations. These advantages are embodied in increasing customer satisfaction, improving the quality of services and enhancing the quality of the product (Permana et al., 2021).

Total quality management consists of three dimensions, namely, customer focus, continuous improvement and customer involvement (Damayanti, 2024). Firstly, customer focus means the practice of prioritising customer expectations and needs by delivering high-quality services and products, building long-term relationships and guaranteeing satisfaction (Ghodke, 2021). Secondly, continuous improvement is defined as constant effort to promote services, processes and products by implementing incremental changes, encouraging innovation and identifying inefficiencies to preserve competitiveness and high-performance (Lizarelli et al., 2023). Thirdly, customer involvement is defined as engaging customers in the process of quality improvement by understanding their preferences, incorporating their insights into service enhancement and product development, and gathering feedback (Haroun et al., 2022).

Transformational leadership style

Transformational leadership style includes four main elements, namely, idealised influence, inspirational motivation, intellectual stimulation and individualised consideration (Nassif et al., 2021). To clarify, Nassif et al. (2021) indicate that idealised influence includes leaders who act as ethical role models, promoting respect and trust from their followers. As for inspirational motivation, Kanat-Maymon et al. (2020) suggest that inspirational motivation indicates articulating a compelling vision that provides a sense of objective and leads aggregated efforts towards organisational objectives. The third element is intellectual stimulation, which prompts followers to embrace innovative approaches and to counteract current assumptions; thus, it fosters a culture of problem-solving and creativity (Bakker et al., 2023).

Transformational leadership has a variety of benefits that are manifested in enhancing employee motivation, fostering innovation and driving organisational change, which, in turn, leads to long-term success and sustainability (Begum et al., 2022). Within this context, Elsawy and Youssef (2023) define sustainability as the ability to meet current needs without compromising the ability of upcoming generations to meet their own needs, underscoring environmental, social and economic balance.

Transformational leadership theory (TDL) was proposed by Bass and Bass (1985). This theory focuses on the role of leaders in motivating and inspiring employees to attain organisational objectives by fostering continuous improvement, commitment and organisational objectives that are critical for hospital sustainability.

The rationale behind adopting this theory is attributed to several reasons. Firstly, transformational leaders promote a culture of continuous improvement and a shared vision. This aligns with TQM principles. The combination of TL and TQM has been a long-term focus of scholars because of their overlapping focus on continuous improvement, participatory decision-making and employee empowerment (Avolio & Bass, 2004; Sila & Ebrahimpour, 2005). Transformational leaders strategically create a common organisational vision and promote change-centred behaviours that enable the transfer of TQM principles, quality assurance and customer focus into everyday clinical and administrative practices (Asif et al., 2019; Berson & Linton, 2005). Secondly, TQM pillars are anchored in service quality, patient satisfaction and operational efficiency; transformational leaders promote these pillars via their impact on hospital staff. Thirdly, Avolio and Bass (2004) indicate that TDL) enhances sustainability and organisational resilience in health care institutions, which serves the purpose of this study about investigating the impact of TL on promoting hospital sustainability.

Variables and dimensions of the study

There are three variables in this study, namely, the independent variable TL, which encompasses idealised influence, inspirational motivation and intellectual stimulation; the mediating variable TQM, which involves customer focus, continuous improvement and employee motivation; and the dependent variable hospital sustainability, which includes social sustainability, environmental sustainability and economic sustainability.

Hypotheses development

The impact of transformational leadership and sustainability

Transformational leadership is commonly considered a main driver in achieving sustainable organisational outcomes across various sectors (Muralidharan & Pathak, 2018). The literature has consistently underscored its positive influence on improving performance, ensuring long-term organisational sustainability and fostering innovation. To elaborate, Nasir et al. (2022) carried out a study on the impact of TL on organisational sustainability in Pakistan. To this end, a questionnaire was distributed to ISO textile firms that were analysed using Smart-PLS measurement model and structural equation modelling (SEM). The study found that TL enhanced innovation performance as well as organisational sustainability.

Similarly, Honorata et al. (2024) conducted a study on the role of TL in enhancing the tele-health system as well as the safety performance sustainability in a university teaching hospital in Indonesia. To achieve this objective, a questionnaire was distributed to 334 administrative and personnel staff at three major university teaching hospitals, namely, Sebelas, Diponegoro National Hospital and Gajah Mada Hospital. The data were analysed quantitatively using Smart-PLS. The study found that despite the huge efforts to make long-term changes, conventional health care services continue to face challenges, such as patient safety concerns, limited sustainability, and leadership and governance issues. The study emphasised that strategic flexibility served as a reactive and proactive strategy for influencing long-term changes in the main aspects of a company, promoting innovation processes, which contribute to sustainable business growth.

Likewise, Ren et al. (2024) examined the impact of environmentally specific TL on sustainable practices on 264 employees recruited from a real estate company in China through the lens of conservation of resources (COR) theory. The study collected the data using a questionnaire that was analysed quantitatively using SPSS. The results revealed that environmentally specific transformational leadership (ESTL) has a positive impact on employee pro-environmental performance. This impact is observed in promoting environmental awareness, which is considered as a main mediator in driving sustainable workplace behaviours. Nevertheless, the ESTL's impact on pro-environmental performance is weakened by high levels of emotional exhaustion, stressing the need for organisations to enhance employee well-being to increase sustainability efforts. It can be argued from the above that TL has a positive impact on sustainability. Hence, a hypothesis is formulated to be propounded for investigation based on the state mentioned above:

H1: Transformational leadership has a significant positive impact on hospital sustainability in Jordan.

The impact of total quality management on the relationship between transformational leadership and sustainability

Organisational sustainability depends heavily on TL because of its ability to enhance employee engagement along with continuous improvement and innovation processes (Rahimi et al., 2020). Health care hospital sustainability demands leaders to develop practices that sustain ongoing viability and operational excellence while providing superior patient care (Nuru, 2024). Total quality management is considered one of the critical mechanisms that enhances this relationship, owing to the fact that TQM incorporates efficiency-driven strategies and continuous improvement to promote sustainability (Chen et al., 2020).

Previous empirical studies revealed that TQM considerably influences organisational performance and TL (Chen et al., 2020; Muchlish & Tjahyono; 2021; Rahimi et al., 2020). According to Chen et al. (2020), TQM directly affects executive ability and TL, followed by sustainable competitive advantage outcomes. Muchlish and Tjahyono (2021) established TQM as the primary element that enables the relationship between TL and sustainable competitive advantage, thus validating quality management principles as sustainability outcome mediators.

Rahimi et al. (2020) confirmed that TQM acts as a mediator that strengthens the relationship between TL and teacher performance. They proved that robust TQM practices enhance leadership effectiveness. Hospital institutions benefit from quality management principles to become sustainable by improving operational efficiency and resource optimisation as well as patient satisfaction.

Based on the reviewed studies, it is projected that TQM in Jordanian hospitals will mediate the relationship between TL and sustainability. The implementation of robust TQM practices enables the hospital leaders to promote patient care, improve overall hospital performance and decrease hospital errors, thus enhancing sustainability. Deriving from these statement, the following hypothesis is formed:

H2: Total quality management mediates the relationship between TL and hospital sustainability in Jordan.

Research design

Study approach

This cross-sectional study follows a descriptive and quantitative approach by relying on numerical data to describe the impact of TL on hospital sustainability and the mediating impact of TQM in enhancing this relationship.

Sample of the study

The study recruited 200 nurses, doctors, technicians and administrative staff of hospitals, namely, King Abdullah Hospital and Princess Basma Hospital. They were recruited using stratified random sampling by dividing the population

into several subgroups (strata) depending on particular traits and then randomly selecting the participants from each stratum to guarantee proportional representation, thereby improving the generalisability of findings (Campbell et al., 2020). The current sample demonstrated significant differences in occupational representation, with nurses making up about 30% of respondents and staff working in outpatient departments making up 36%. This disproportionality can only lead to role-based sampling bias, thus limiting the representativeness and, consequently, the generalisability of the findings to the broader group of hospital personnel.

Instruments of the study

In this study, the researcher used a questionnaire to measure the impact of TL on hospital sustainability and the mediating impact of TQM in this relationship. The questionnaire consisted of four sections; the first one measured the demographic profile of the respondents, including their gender, current position, years of experience, educational level and the department they work for. The rest parts measured each of TL, TQM and sustainable performance in the form of a seven-point Likert scale: (1) strongly disagree, (2) disagree, (3) somewhat disagree, (4) neutral, (5) somewhat agree, (6) agree and (7) strongly agree. The study used a validated questionnaire from the literature. To clarify, the study adopted Nasir et al. (2022) for measuring TL, Wang et al. (2012) for measuring TQM, and Ramírez-Altamirano et al. (2024) for measuring sustainable performance. Each instrument consists of 9 items that cover the dimensions of the study. To clarify, TQM covers customer focus, continuous improvement and employee involvement. As for sustainability, it addresses social, environmental and economic sustainability. The theory of TL is traditionally based on four dimensions that are interconnected, namely, idealised influence, inspirational motivation, intellectual stimulation and individualised consideration (Bass & Avolio, 1994). In this study, however, only three of these dimensions were focused on, leaving out individualised consideration. It was made necessary by the use of an instrument that was initially developed by Nasir et al. (2022) and operationalised TL using three main components. Even though this operationalisation is commonly used empirically, it arguably undermines construct validity as individualised consideration is not included. Future research is thus recommended to re-integrate all four dimensions so as to be closer to the full-range leadership model and to make the theory more robust. The total number of items in the questionnaire is 27 items. The study slightly modified the items to serve the purpose of the study. The reliability of the instrument was achieved by computing Cronbach's alpha coefficient for each construct. The instruments were based on previously validated studies, but additional statistical validation was carried out. Admittedly, self-administered questionnaires can also be biased in terms of interpretation variance and the bias of responses. If its score achieves 0.70 or higher, the instrument will be regarded as acceptable, meaning that the instrument is internally suitable and acceptable for further statistical analysis. Although the scales have acceptable internal consistency ($\alpha \geq 0.7$), round-robin reliability and disclosed face validity, the study failed to conduct confirmatory factor analysis (CFA) of the scales in the Jordanian setting. As construct validity may vary between samples, future researchers are encouraged to conduct local psychometric testing of such instruments to ensure that their factor structure and contextual relevance are correct (Byrne, 2010; Hair et al., 2014).

Data collection

The data were distributed to the managers and owners of Jordanian hospitals using Google Forms. The researcher allocated time for participants to fill out the questionnaire, i.e., 2 weeks were given to the respondents to answer the questionnaire to ensure they had sufficient time to provide thoughtful and accurate responses. In the modern research practice of health care, the use of online self-administered surveys is often considered instrumentally efficient and capable of wide participant access (Evans & Mathur, 2005). However, the self-reported Google Forms method of data collection provides the possibility of measurement bias, such as a social desirability effect and over-reporting of desirable behaviours. Behavioural and organisational literature is well established in this bias, as self-report measures are prone to social desirability and common method variance (Fisher, 1993; Jordan & Troth, 2020; Podsakoff et al., 2003). The internal validity of the results can be affected by these limitations and must be considered in the generalisation of the results.

Data analysis

The data were analysed using Smart-PLS 4 software, and SEM was used (Pallant, 2020). To summarise the study variables and demographic data, the study used descriptive statistics. The study assessed multicollinearity using the variance inflation factor (VIF) to guarantee no strong correlations among independent variables. To measure the explanatory power of the independent variable, the coefficient of determination (R^2) was used. The study assessed the predictive relevance (Q^2) blindfolding procedure to evaluate the predictive ability of the model. The study conducted hypothesis testing using *p*-values and *T*-statistics. The study applied variance accounted for (VAF) to identify the mediation impact of TQM. Such tools guaranteed the validity and reliability of the results.

Ethical considerations

Ethical clearance to conduct this study was obtained from the Universiti Malaysia Terengganu Research Ethics Committee (UMT REC) (No. UMT/JKEPM/2024/2Z9).

Results

Analysis of demographic characteristics

Table 1 shows the distribution of the sample according to its demographic characteristics.

Table 1 indicates that the percentage of male and female participants was similar, although females were more frequent, with 102 (51%). Furthermore, nurses represented the highest proportion of participants, with 60 (30%). In addition, the results showed that the highest proportion of participants had work experience ranging between 8 years and 10 years, with 54 (27%), while bachelor's degree holders were the most frequent, with 108 (54%). Regarding the department in which the participants work, employees in the outpatient and general medicine department were the most frequent, with 72 (36%).

Descriptive analysis of study variables

Table 2 presents the mean values and standard deviations (SD) for the variables and dimensions of the study.

Table 2 revealed the TL in Jordanian hospitals at a mediate level of respondents' agreements (mean = 4.73, SD = 0.66). Transformational leadership dimensions (idealised influence, inspirational motivation and intellectual stimulation) captured a mediate level of respondents' agreements (mean = 4.81, SD = 0.81; mean = 4.72, SD = 0.86; mean = 4.65, SD = 0.84, respectively). In addition, the sustainability captured a mediate level of respondents' agreements (mean = 4.73, SD = 0.55). The sustainability dimensions (environmental sustainability and social sustainability) captured a mediate level of respondents' agreements (mean = 4.64, SD = 0.84; mean = 4.46, SD = 0.86, respectively), while economic sustainability captured a high level of respondents' agreements (mean = 5.09, SD = 0.74). Moreover, TQM captured a mediate level of respondents' agreements (mean = 4.63, SD = 0.48). The TQM dimensions (continuous improvement and employee involvement) captured a mediate level of respondents' agreements (mean = 4.25, SD = 0.78; mean = 4.54, SD = 0.83, respectively), while customer focus captured a high level of respondents' agreements (mean = 5.10, SD = 0.68).

TABLE 1: Socio-demographic profile of the study sample.

Demographic	Category	Frequency (*n*)	%
Gender	Male	98	49.0
	Female	102	51.0
Current job position	Doctor	49	24.5
	Nurse	60	30.0
	Administrative Staff	34	17.0
	Technician	41	20.5
	Other	16	8.0
Years of work in this hospital	Less than 1	18	9.0
	1–3	30	15.0
	4–7	47	23.5
	8–10	54	27.0
	More than 10	51	25.5
Highest level of education	High school diploma	9	4.5
	Diploma or Associate degree	43	21.5
	Bachelor's degree	108	54.0
	Master's degree	34	17.0
	Doctorate (PhD, MD, etc.)	6	3.0
Department	Emergency and Critical Care	11	5.5
	Surgery and Operation Theatre	24	12.0
	Outpatient and General Medicine	72	36.0
	Administration and Support Services	56	28.0
	Other	37	18.5
Total	-	**200**	**100.0**

PhD, Doctor of Philosophy; MD, Master's Degree.

Hypothesis testing

To test the study hypotheses, the researcher used the Smart-PLS 4 software and employed SEM. However, there are certain conditions that must be verified before conducting SEM, given as follows.

Linear relationships between the study variables and multicollinearity

It is necessary to test the level of multicollinearity and linear relationships between the study variables in the structural model, in order to ensure that the coefficients of the independent variables are unbiased because of high multicollinearity between the latent independent variables. Regarding SEM using Smart-PLS 4 software, multicollinearity issues arise when the VIF values are greater than 10, according to Miles (2014). When VIF values are between 1 and 5, it indicates an acceptable mediate correlation, and no intervention is required. However, no correlation exists when the VIF value is 1 (Hair et al., 2014). Table 3 presents the VIF values and the allowable variance factors for the independent variables in this study. The VIF values for variables ranged from 1.000 to 1.130, indicating the absence of linear multicollinearity among the independent variables.

TABLE 2: Descriptive analysis of study variables.

Variables	Dimension	Mean	SD	Level
Transformational leadership	-	4.73	0.66	Moderate
	Idealised influence	4.81	0.81	Moderate
	Inspirational motivation	4.72	0.86	Moderate
	Intellectual stimulation	4.65	0.84	Moderate
Sustainability	-	4.73	0.55	Moderate
	Environmental sustainability	4.64	0.84	Moderate
	Social sustainability	4.46	0.86	Moderate
	Economic sustainability	5.09	0.74	High
Total quality management	-	4.63	0.48	Moderate
	Customer focus	5.10	0.68	High
	Continuous improvement	4.25	0.78	Moderate
	Employee involvement	4.54	0.83	Moderate

SD, standard deviation.

TABLE 3: Variance inflation factor values.

Variables	VIF
Transformational leadership	1.000
Idealised influence	1.000
Inspirational motivation	1.000
Intellectual stimulation	1.000
TQM	1.130

TQM, total quality management; VIF, variance inflation factor.

Coefficient of determination (R^2)

It is also referred to as the coefficient of determination, which reflects the extent to which the independent variable explains the dependent variable. Its value ranges from 0 to 1, and the higher the coefficient of determination, the greater the explanatory power of the independent variable (Hair et al., 2017). As shown in Table 4, TL explains 45.9% of the variance in sustainability, and TL also explains 11.5% of the variance in TQM. This result indicates that TL does not explain a significant proportion of the variation in these two variables. The remaining percentage, which is 54.1% for the sustainability variable and 88.5% for the TQM variable, is explained by other factors besides TL, opening the door for researchers to include other factors and variables that may explain the variation in sustainability and TQM.

Predictive relevance (Q^2)

The predictive relevance index (Q^2) is a good criterion for evaluating the model's ability to predict real values using data that were not used in building the model. When the model is predictive, it indicates that the model has the ability to forecast future values based on current data (Akter & D'Ambra, 2011). When the value of this index is greater than 0, it indicates that the model has predictive relevance. If the value is zero or less, the model lacks predictive relevance (Esposito Vinzi et al., 2010). It is evident from Table 5 using the blindfolding option in Smart-PLS that the independent variable (transformational leadership) has the ability to predict the TQM variable by 0.097 and the sustainability variable by 0.125, indicating that the independent variable demonstrated predictive relevance, as the values of this index exceeded 0.

Figure 1 presents the structural model for testing the study hypotheses.

Results of testing the first hypothesis

H1: Transformational leadership has a significant positive impact on hospital sustainability in Jordan.

Table 5 shows the results of testing the first main hypothesis.

TABLE 4: Coefficient of Determination (R^2) and Predictive Relevance (Q^2).

Dependent variable	Independent variable	R^2 value	Q^2 value
Sustainability	Transformational Leadership	0.459	0.125
TQM	Transformational Leadership	0.115	0.097

Note: Partial mediation is not common for all paths. It applies specifically to the relationship between transformational leadership and sustainability through TQM. The Variance Accounted For (VAF) in this path was 55.1%, which falls between 20% and 80%, indicating partial mediation (Hair et al., 2014). The other direct paths (transformational leadership → TQM, and TQM → sustainability) were significant but did not involve mediation analysis, so the classification of "partial" does not apply to them.

TQM, total quality management.

TABLE 5: The results of testing the first hypothesis.

Paths	Original sample	Sample mean	SD	*T*-statistics	*p*	Decision
Transformational leadership ---> sustainability	0.167	0.182	0.068	2.452	0.014	Accepted

SD, standard deviation.

The results indicated that TL has a significant positive impact on hospital sustainability in Jordan, based on the 'T' value of 2.452 and the *p*-value of 0.014, which is less than 0.05. It is also clear from the results indicated in Figure 1 that the R^2 value is 0.459, which indicates that TL explains 45.9% of the stainability.

Results of testing the second hypothesis

H2: Total quality management mediates the relationship between TL and hospital sustainability in Jordan.

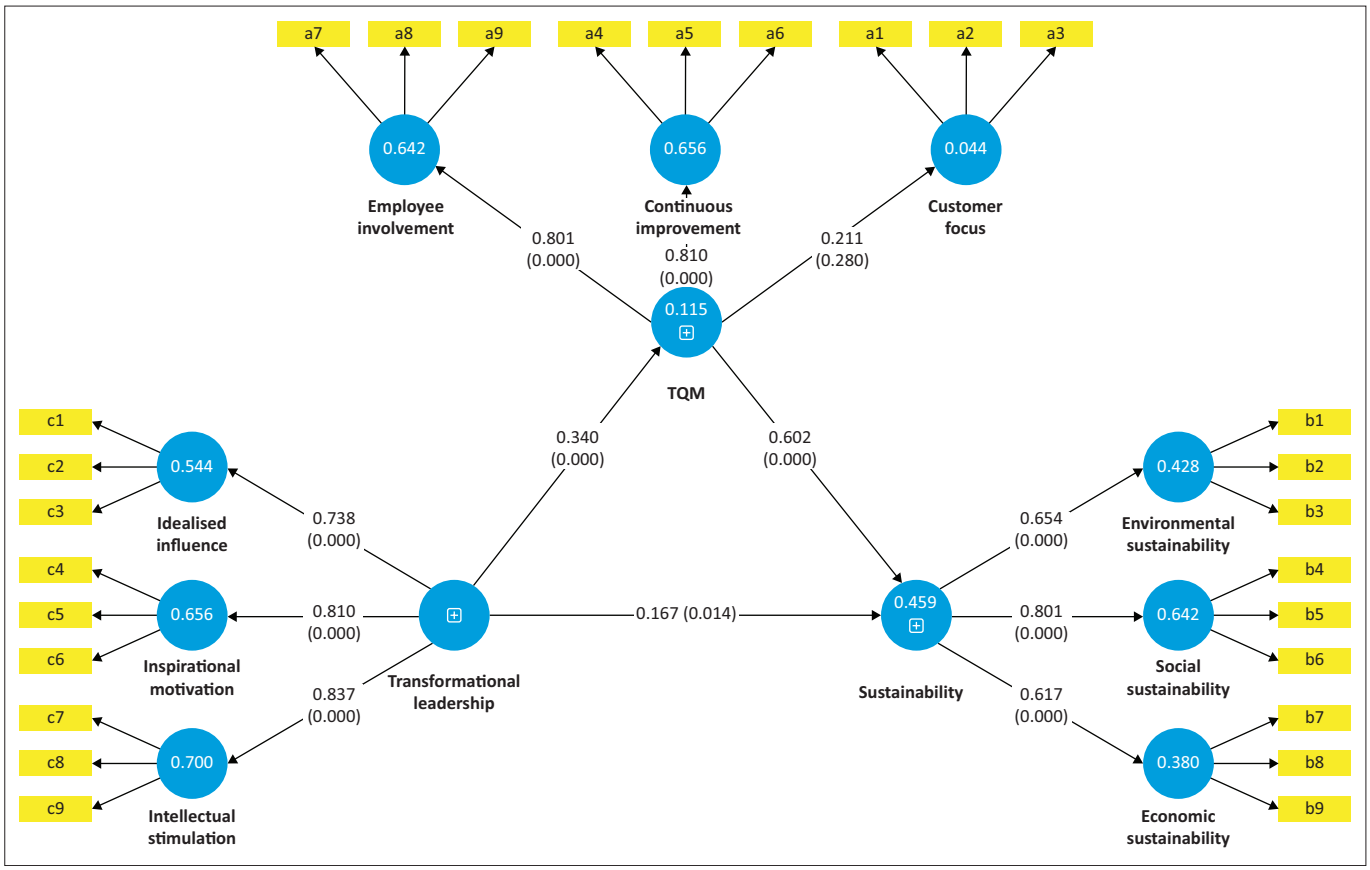
Table 6 shows the results of testing the second hypothesis.

Table 6 indicates that the value of the indirect effect of the mediator variable in the relationship between the independent and dependent variables was 0.205. This value is statistically significant, as the significance level of the test, which was 0.000, is less than 0.05, meaning that the indirect effect value is statistically accepted. In addition, the total effect value was 0.372. Table 6 also shows that the value of the indirect effect ratio from the total effect (VAF) was 55.1%, indicating a partial mediation effect of the mediator variable, as it falls between 20% and 80% (Hair et al., 2014). Therefore, the second hypothesis is accepted, which states: Total quality management mediates the relationship between TL and hospital sustainability in Jordan.

Discussion

The findings of the demographic results showed a nearly balanced gender distribution among respondents. However, females had a slightly higher representation compared to males, with a percentage of 51%. Such a result might demonstrate the growing increase of women in health care roles, especially in administrative and nursing positions. Moreover, the study found that the largest occupational group is nurses, with a percentage of 30%. This indicates their role in patient care and hospital operations. When it comes to working experience, the majority of participants (27%) had 8–10 years of experience. This suggests that the majority of the hospital workforce are mid-career professionals who have acquired significant expertise. Besides, 54% of the participants held a bachelor's degree. This aligns with the educational requirements for the majority of health care roles, especially in administrative and nursing functions. The majority of the respondents (36%) belonged to the outpatient and general medicine department. This could be a result of the fact that this department caters for a variety of patients, thus demanding substantial employees. Such a result demonstrates a workforce composition that balances gender, education and experience, reflecting the demands and structure of modern hospital contexts.

The study found that TL has a mediate level with a mean of 4.73 (SD = 0.66). The highest agreement goes for 'idealised influence', which is one of the TL dimensions, with a percentage of 4.81 (SD = 0.81). Inspirational motivation occupied the second rank with a percentage of 4.72 (SD = 0.86), followed by intellectual stimulation with a percentage of 4.65 (SD = 0.84). This indicates that hospital



TQM, total quality management.

FIGURE 1: Structural model for testing the study hypotheses.

TABLE 6: The results of testing the second hypothesis.

Paths	Effect	Direct effect		Indirect effect		Total effect	VAF	
		Effect value	Sig.	Effect value	Sig.		Effect size	Effect type
Transformational leadership ---> sustainability	Direct	0.167	0.014	-	-	0.372	0.551	Partial
Transformational leadership ---> TQM	Direct	0.340	0.000	-	-	-	-	-
TQM ---> sustainability	Direct	0.602	0.000	-	-	-	-	-
Transformational leadership ---> sustainability	Indirect	-	-	0.205	0.000	-	-	-

TQM, total quality management; VAF, variance accounted for; Sig, significance.

leaders motivate and inspire their employees. However, there is room for improvement in consolidating intellectual stimulation (Chebon et al., 2019).

When it comes to sustainability, the study found a mediate perception overall (4.73, SD = 0.55). The highest level is for economic sustainability, which accounts for 5.09 (SD = 0.74). This implies a stronger concentration on resource management and financial stability opposed to environmental, which corresponds to environmental and social with percentages 4.64 (SD = 0.84) and 4.46 (SD = 0.86), respectively. The increased economic scores can be indicative of the resource management priorities in the Jordanian hospitals under the financial constraints. On the contrary, the lower social sustainability scores might imply the necessity to reinforce equity, inclusiveness and medical personnel's well-being in health care provision. Such concentration on economic sustainability might result from the financial pressures faced by hospitals in meeting health care demands and managing operations (Dion et al., 2023).

In addition, TQM has a mediate level (4.63, SD = 0.48). The highest agreement is for customer focus (5.10, SD = 0.68). This reflects the hospital's emphasis on patient satisfaction. Nevertheless, both continuous improvement and employee involvement had a mediate level of agreement (4.25, SD = 0.78) and (4.54, SD = 0.83), respectively. This implies the pressing need for improving staff engagement in quality improvement initiatives. The study found that although TL has a positive impact on TQM and sustainability, Jordanian hospitals should improve strategies that ameliorate continuous improvement, intellectual stimulation, environmental and social initiatives to attain a more effective and balanced leadership impact (Hilton et al., 2023).

RQ1: How does transformational leadership influence hospital sustainability in Jordan?

The study found that the *T*-value of 2.452 and a *p*-value of 0.014 are less than 0.05, which supports the first hypothesis that TL has a significant positive impact on hospital sustainability. Possibly, the characteristics of transformational

leaders promote sustainability. To elaborate, they promote a shared vision, enhance employee engagement and encourage innovative problem-solving that are crucial for attaining sustainability in health care settings. In this regard, Bass and Bass (1985) indicate that transformational leaders motivate and inspire their followers by providing intellectual stimulation, compelling vision and acting as a role. They add that these features promote organisational silence and employee commitment. Similarly, Nasir et al. (2022) found that TL promotes organisational sustainability and performance. In the same vein, Honorata et al. (2024) showed that TL has a positive impact on safety performance and sustainability. Both studies highlight TL in guaranteeing long-term organisational sustainability by encouraging strategic flexibility, resilience and innovation in responding to health care challenges.

By contrast, Ren et al. (2024) found that TL was associated with increased emotional exhaustion among employees in the Chinese real estate sector. It can be argued that the importance of TL varies according to workforce well-being and organisational context, as inferred from these results. In a Jordanian hospital, the leaders' integration of TQM principles, including patient safety and operational efficiency, promotes the positive relationship between TL and sustainability.

Since transformational leadership (45.9%) accounts for the variance in sustainability, other factors are effective in defining hospital sustainability, namely, resource allocation, technological advancements and governmental policies. These factors can be investigated by future studies to provide a holistic picture of the aspects that lead to sustainability in Jordanian hospitals.

RQ2 To what extent does total quality management mediate the relationship between transformational leadership and hospital sustainability in Jordan?

Total quality management functions as a partial intermediary force connecting TL practices to sustainability outcomes in hospitals across Jordan. Statistical significance reaches $p = 0.000$ levels in this analysis, where the indirect effect measures 0.205. The VAF measurement confirms that TQM creates a pathway, which TL uses to affect sustainability improvements with 55.1% effectiveness. These findings could be justified by the fact that transformational leaders underscore quality-driven initiatives, innovation and continuous improvement that comply with the main principles of TQM, which, in turn, consolidate sustainable health care practices. According to Bass and Bass (1985), transformational leaders promote a shared vision, encourage organisational commitment and inspire employees, which are critical for embedding TQM principles into hospital operations. The TL indirectly promotes sustainability through TQM by fostering a quality-driven performance and a culture of excellence.

This finding is consistent with Muchlish and Tjahyono (2021) regarding the role of TQM as a mediator in the correlation between TL and sustainable competitive advantage by guaranteeing that quality management principles are inherited in organisational processes. Likewise, Rahimi et al. (2020) underscore this result, revealing that strong TQM practices promote the effectiveness of TL in enhancing sustainability outcomes and institutional performance. The empirical results prove that TL serves as a direct antecedent of sustainability, and TQM is a partial mediator. The findings therefore show that TQM, although still playing a role in the association between TL and sustainability, is not the only channel through which the effect is mediated. Other theoretically feasible factors, primarily organisational culture, leadership diversity and externally imposed regulatory limits, might play individual roles in the result of sustainability. The supplemental pathways point to the need for future studies to include moderating or parallel mediating variables that reflect the larger institutional and operational environments in which quality management practices are performed. Nevertheless, this finding is not compatible with Chen et al. (2020) concerning the extent to which TQM impacts sustainability, as their results recommended a stronger direct impact of TL on sustainability, in which TQM has a low mediating impact on this relationship. Such a discrepancy might result from the differences in institutional contexts in which Jordanian hospitals might have regulatory or structural challenges that decrease the full capacity of TL, which makes TQM a more important intermediary in driving sustainability outcomes.

The fact that TQM was identified as a partial mediator in the connection between TL and hospital sustainability suggests that other contextual or organisational factors can be involved in the strength and orientation of this relationship. Such variables are regulatory frameworks, institutional capacity, governance structures and resource allocation mechanisms, which all have the potential to be moderating factors influencing both practice and outcomes of leadership and quality management practices. By grounding this inference in institutional and contingency theory, the importance of studying the role of structural conditions in influencing leadership efficacy in different contexts is highlighted (Tsui et al., 2007). Although this study can compare its results with those of Chen et al. (2020) and Rahimi et al. (2020), a systematic comparative analysis of the results across the health care systems of other developing countries is necessary to ensure the external validity and contextual applicability of the proposed mediation model. Cross-contextual studies of this nature (through the use of multi-group SEM or mixed-methods) would contribute to a generalisable knowledge base of the interaction of TL with quality management systems to affect sustainability performance in the face of different institutional constraints.

Conclusion

This study investigates the impact of TL on sustainability and the mediating impact of TQM in this relationship. The

study recruited 200 employee nurses, doctors, technicians and administrative staff of hospitals, namely, King Abdullah Hospital and Princess Basma Hospital. The study adopts a questionnaire from the literature to achieve its objectives. The results revealed that TL has a significant impact on hospitals in Jordan. The study found that TQM plays a partial mediating role in such a relationship. The findings demonstrate that transformational leaders consolidate sustainability by enhancing employee engagement and a shared vision and incorporating quality-driven initiatives. The results indicated that TL constitutes 45.9% of the variance in sustainability. Also, the mediation analysis revealed a strong partial mediating role in such a relationship between TL and sustainability, with TQM explaining 55.1% of the total effect.

Although the study provides significant insight, its strictly cross-sectional nature complicates causal interpretation. Furthermore, the self-reported data provide possible biases that are associated with social desirability effects and common method variance, and they should be taken into account when interpreting the results. This limitation can be addressed in future studies by taking these factors, namely, governmental policies, technological advancements and resource allocation, into account. Moreover, it was demonstrated that economic sustainability is the dimension emphasised most, whereas the lowest score is associated with social sustainability. In the TQM model, the customer focus was the most highly perceived element, and continuous improvement had relatively low scores. Accordingly, the researcher recommends that hospital administrators implement leadership development programmes that underscore TL qualities. The targeted interventions that should be part of these programmes are workshops on ethical leadership, mentorship schemes and scenario-based training to build visionary and motivational skills. It is further recommended to incorporate TQM frameworks to promote patient safety and operational efficiency. Some of the quality improvement measures that may help to effectively implement TQM include continuous performance monitoring, root cause analysis and the involvement of front-line staff. Nonetheless, challenges such as change resistance, lack of adequate resources and fractured governance systems should be foreseen and mitigated in the implementation process.

The implications of the study expand to hospital management and health care policymakers. It indicates that sustainability efforts should not mainly depend on leadership practices; they should further integrate systemic improvements in organisational policies and quality management. This study contributes to the current literature by presenting empirical results on the interplay between TL, TQM and sustainability in the Jordanian health care context. It reinforces the role of leadership in driving quality-based sustainability initiatives. However, one of the main limitations of this study is its concentration on Jordanian hospitals, which could limit the generalisability of the results to other health care contexts with various organisational and regulatory structures. Moreover, the research was held in only two hospitals, and the sample structure shows an unreasonably high proportion of nurses (30%) and outpatient personnel (36%), which can influence the representativeness of the findings. Upcoming studies can expand this scope by exploring further variables affecting sustainability and comparing the results across various health care contexts. Regulatory, cultural and resource-based limitations that can impact the success of leadership and quality programmes in the health care industry should also be taken into account in future research.

It is also recommended that future research be performed to investigate contextual constraints in the Jordan health care setting, including institutional preparedness, regulatory constraints and economic barriers, which can mitigate the impact of these leadership and quality management practices on sustainability. In addition, the research is cross-sectional, which restricts the inference of causality. It is suggested that longitudinal studies be undertaken to evaluate the effects of TL and TQM on sustainability through time. External validity is also limited by the fact that only two hospitals in Jordan were chosen. Further research needs to address multi-site and cross-national comparisons in order to increase the strength of the results.

Acknowledgements

The authors would like to gratefully acknowledge the participation of the nurses, doctors and technicians and the support of the King Abdullah Hospital and Princess Basma Hospital for their contribution to this research

Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

The study was conceptualised and designed by N.A.E.A., who also supervised the overall research process. N.A.E.A. was also responsible for data collection and organisation. R.B.A. performed the data analysis and interpretation in addition to the supervision. A.B.A. contributed to the literature review and supervision of the manuscript. All authors participated in revising the manuscript critically for important intellectual content and approved the final version of the manuscript for submission.

Funding information

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Data availability

The data supporting this study's findings are not publicly available because of the presence of potentially identifying or sensitive participant information. However, the data can be accessed from the corresponding author, N.A.E.A., upon reasonable request.

Disclaimer

The views and opinions expressed in this article are those of the authors and are the product of professional research. They do not necessarily reflect the official policy or position of any affiliated institution, funder, agency or publisher. The authors are responsible for this study's results, findings and content.

References

Ahmad, M.I., Daradkeh, J., Malkawi, M., & Al Delaimy, W.K. (2019). Challenges in environmental health research and sustainability in a less developed country: A case study from Jordan. *Current Environmental Health Reports, 6*, 327–337. https://doi.org/10.1007/s40572-019-00248-2

Akter, M.S., D'Ambra, J., & Ray, P. (2011). An evaluation of PLS based complex models: The roles of power analysis, predictive relevance and GoF index. In *Conference Contribution*. University of Wollongong. Retrieved from https://hdl.handle.net/10779/uow.27704838.v1

Al Shamas, R.M. (2020). *Evaluation of sustainability standards in hospital design: Case study in Jordan*. Master's thesis, Isra University, Isra University Repository.

Alhmoud, S.H., & Arcan, E.F. (2020). Improving interior environmental quality using sustainable design in Jordanian hospital bedrooms. *European Journal of Sustainable Development, 9*(3), 443–443. https://doi.org/10.14207/ejsd.2020.v9n3p443

Andersson, S., Svensson, G., Molina-Castillo, F.J., Otero-Neira, C., Lindgren, J., Karlsson, N.P., & Laurell, H. (2022). Sustainable development – Direct and indirect effects between economic, social, and environmental dimensions in business practices. *Corporate Social Responsibility and Environmental Management, 29*(5), 1158–1172. https://doi.org/10.1002/csr.2261

Ansah, S.K. (2018). *An integrated total quality management model for the Ghanaian construction industry*. University of Johannesburg.

Avolio, B.J., & Bass, B.M. (2004). *Multifactor leadership questionnaire (TM)*. Mind Garden, Inc.

Azapagic, A., Stamford, L., Youds, L., & Barteczko-Hibbert, C. (2016). Towards sustainable production and consumption: A novel decision-support framework integrating economic, environmental and social sustainability (DESIRES). *Computers & Chemical Engineering, 91*, 93–103. https://doi.org/10.1016/j.compchemeng.2016.03.017

Bakker, A.B., Hetland, J., Olsen, O.K., & Espevik, R. (2023). Daily transformational leadership: A source of inspiration for follower performance? *European Management Review, 41*(4), 700–708. https://doi.org/10.1016/j.emj.2022.04.004

Bass, B.M., & Avolio, B.J. (Eds.). (1994). *Improving organizational effectiveness through transformational leadership*. Sage.

Bass, B.M., & Bass Bernard, M. (1985). *Leadership and performance beyond expectations* (Vol. 25, No. 3, pp. 481–484). New York, NY: Free press.

Begum, S., Ashfaq, M., Xia, E., & Awan, U. (2022). Does green transformational leadership lead to green innovation? The role of green thinking and creative process engagement. *Business Strategy and the Environment, 31*(1), 580–597. https://doi.org/10.1002/bse.2911

Berson, Y., & Linton, J.D. (2005). An examination of the relationships between leadership style, quality, and employee satisfaction in R&D versus administrative environments. *R&D Management, 35*(1), 51–60. https://doi.org/10.1111/j.1467-9310.2005.00371.x

Byrne, B.M. (2010). *Structural Equation Modeling With AMOS: Basic concepts, applications, and programming* (2nd ed.). Routledge.

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020). Purposive sampling: Complex or simple? Research case examples. *Journal of research in Nursing, 25*(8), 652–661. https://doi.org/10.1177/1744987120927206

Chebon, S.K., Aruasa, W.K., & Chirchir, L.K. (2019). Influence of individualized consideration and intellectual stimulation on employee performance: Lessons from Moi Teaching and Referral Hospital, Eldoret, Kenya. *IOSR Journal of Humanities and Social Science, 24*(7), 11–22. https://doi.org/10.30845/ijbss.v10n7p14

Chen, R., Lee, Y.D., & Wang, C.H. (2020). Total quality management and sustainable competitive advantage: Serial mediation of transformational leadership and executive ability. *Total Quality Management & Business Excellence, 31*(5–6), 451–468. https://doi.org/10.1080/14783363.2018.1476132

Damayanti, A. (2024). Perum Damri managerial performance: The role of customer focus and continuous improvement. *Public Management and Accounting Review, 5*(1), 47–60. https://doi.org/10.61656/pmar.v5i1.124

Darwazeh, D., Clarke, A., & Wilson, J. (2021). Framework for establishing a sustainable medical facility: A case study of medical tourism in Jordan. *World, 2*(3), 351–373. https://doi.org/10.3390/world2030022

Demir, A., Budur, T., Omer, H.M., & Heshmati, A. (2023). Links between knowledge management and organisational sustainability: Does the ISO 9001 certification have an effect?. *Knowledge Management Research & Practice, 21*(1), 183–196. https://doi.org/10.1080/14778238.2020.1860663

Department of Statistics. (2018). *Jordan statistical yearbook*. Department of Statistics.

Dion, H., Evans, M., & Farrell, P. (2023). Hospitals management transformative initiatives; towards energy efficiency and environmental sustainability in healthcare facilities. *Journal of Engineering, Design and Technology, 21*(2), 552–584. https://doi.org/10.1108/JEDT-04-2022-0200

Eizenberg, E., & Jabareen, Y. (2017). Social sustainability: A new conceptual framework. *Sustainability, 9*(1), 1–16. https://doi.org/10.3390/su9010068

Ekins, P., & Zenghelis, D. (2021). The costs and benefits of environmental sustainability. *Sustainability Science, 16*, 949–965. https://doi.org/10.1007/s11625-021-00910-5

Elsawy, M., & Youssef, M. (2023). Economic sustainability: Meeting needs without compromising future generations. *International Journal of Economics and Finance, 15*(10), 23–31. https://doi.org/10.5539/ijef.v15n10p23

Esposito Vinzi, V., Chin, W.W., Henseler, J., & Wang, H. (2010). *Handbook of partial least squares: Concepts, methods and applications*. Springer.

Evans, J.R., & Mathur, A. (2005). The value of online surveys. *Internet Research, 15*(2), 195–219. https://doi.org/10.1108/10662240510590360

Fisher, R.J. (1993). Social desirability bias and the validity of indirect questioning. *Journal of Consumer Research, 20*(2), 303–315. https://doi.org/10.1086/209351

Fitriani, F. (2019). Persiapan total quality management (TQM) [Preparation for total quality management (TQM)]. *Adaara: Jurnal Manajemen Pendidikan Islam, 9*(2), 908–919. https://doi.org/10.35673/ajmpi.v9i2.426

Ghodke, M.V.A. (2021). Role of TQM in improving customer satisfaction. *National Journal of Research in Marketing, Finance & HRM, 6*(2), 129–151.

Hair, J.F., Jr., Hult, G.T.M., Ringle, C.M., Sarstedt, M. (2014). A primer on partial least squares structural equation modeling (PLS-SEM). Sage Publications. ISBN: 978-1-4522-1744-4. 307 pp. *European Journal of Tourism Research, 6*(2), 211–213. https://doi.org/10.54055/ejtr.v6i2.134

Hair, J.F., Jr., Hult, G.T.M., Ringle, C.M., & Sage. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage.

Hajian, M., & Kashani, S.J. (2021). Evolution of the concept of sustainability. From Brundtland report to sustainable development goals. In C.M. Hussain & J.F. Velasco-Muñoz (Eds.), *Sustainable resource management* (pp. 1–24). Elsevier.

Haroun, A., Ayaad, O., Al-Ruzzieh, M.A., & Ayyad, M. (2022). The role of total quality management in improving patient experiences and outcomes. *British Journal of Healthcare Management, 28*(10), 1–8. https://doi.org/10.12968/bjhc.2021.0082

Hilton, S.K., Madilo, W., Awaah, F., & Arkorful, H. (2023). Dimensions of transformational leadership and organizational performance: The mediating effect of job satisfaction. *Management Research Review, 46*(1), 1–19. https://doi.org/10.1108/MRR-02-2021-0152

Honorata, R.D.P., Suparno, S., & Emiliana, S.P. (2024). Transformational healthcare leadership in improving tele-health system and safety performance sustainability in University Teaching Hospitals. *Academic Journal of Interdisciplinary Studies, 13*(3), 267–278. https://doi.org/10.36941/ajis-2024-0079

Jimoh, R., Oyewobi, L., Isa, R., & Waziri, I. (2019). Total quality management practices and organizational performance: The mediating roles of strategies for continuous improvement. *International Journal of Construction Management, 19*(2), 162–177. https://doi.org/10.1080/15623599.2017.1411456

Jordan, P.J., & Troth, A.C. (2020). Common method bias in applied settings: The dilemma of researching in organizations. *Australian Journal of Management, 45*(1), 3–14. https://doi.org/10.1177/0312896219871976

Kanat-Maymon, Y., Elimelech, M., & Roth, G. (2020). Work motivations as antecedents and outcomes of leadership: Integrating self-determination theory and the full range leadership theory. *European Management Review, 38*(4), 555–564. https://doi.org/10.1016/j.emj.2020.01.003

Lizarelli, F.L., Toledo, J.C.D., Gambi, L.D.N., & Gonçalves, C.L. (2023). Continuous improvement behaviors and impacts on innovation. *The TQM Journal, 35*(2), 366–388. https://doi.org/10.1108/TQM-07-2021-0205

Marimuthu, M., & Paulose, H. (2016). Emergence of sustainability-based approaches in healthcare: Expanding research and practice. *Procedia – Social and Behavioral Sciences, 224*, 554–561. https://doi.org/10.1016/j.sbspro.2016.05.438

Mehra, R., & Sharma, M.K. (2021). Measures of sustainability in healthcare. *Sustainability Analytics and Modeling, 1*, 1–15. https://doi.org/10.1016/j.samod.2021.100001

Miles, J. (2014). *Tolerance and variance inflation factor*. Wiley.

Muchlish, M., & Tjahyono, M.E.S. (2021). Influence of TQM on increasing sustainable competitive advantage with transformational leadership as a mediation variable. *International Journal of Research in Business and Social Science, 10*(8), 100–106. https://doi.org/10.20525/ijrbs.v10i8.1473

Muralidharan, E., & Pathak, S. (2018). Sustainability, transformational leadership, and social entrepreneurship. *Sustainability, 10*(2), 1–22. https://doi.org/10.3390/su10020567

Nasir, A., Zakaria, N., & Zien Yusoff, R. (2022). The influence of transformational leadership on organizational sustainability in the context of industry 4.0: Mediating role of innovative performance. *Cogent Business & Management, 9*(1), 1–31. https://doi.org/10.1080/23311975.2022.2105575

Nassif, A.G., Hackett, R.D., & Wang, G. (2021). Ethical, virtuous, and charismatic leadership: An examination of differential relationships with follower and leader outcomes. *Journal of Business Ethics, 172*, 581–603. https://doi.org/10.1007/s10551-020-04491-8

Nuru, H.A. (2024). *Leadership strategies for sustainable organizational performance in small and medium healthcare businesses*. Doctoral dissertation, Walden University, Walden University Repository.

Obaideen, K., Shehata, N., Sayed, E.T., Abdelkareem, M.A., Mahmoud, M.S., & Olabi, A.G. (2022). The role of wastewater treatment in achieving sustainable development goals (SDGs) and sustainability guideline. *Energy Nexus, 7*, 1–19. https://doi.org/10.1016/j.nexus.2022.100112

Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS*. Routledge.

Permana, A., Purba, H.H., & Rizkiyah, N.D. (2021). A systematic literature review of Total Quality Management (TQM) implementation in the organization. *International Journal of Production Management and Engineering, 9*(1), 25–36. https://doi.org/10.4995/ijpme.2021.13765

Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., & Podsakoff, N.P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *The Journal of Applied Psychology, 88*(5), 879903. https://doi.org/10.1037/0021-9010.88.5.879

Rahimi, M., Rahman, A., Yusoff, M., Nor, M., Lail, J., Wahab, A., & Suliman, A. (2020). The Relationship between educational transformational leadership and teacher quality at secondary school: Total quality management as mediator. *Universal Journal of Educational Research, 8*(12), 6369–6377. https://doi.org/10.13189/ujer.2020.081202

Ramírez-Altamirano, D.A., Sánchez-Medina, P.S., Díaz-Pichardo, R., & Suárez-Barraza, M.F. (2024). Transformational environmental leadership and corporate social responsibility as triggers of competitive advantage and sustainable performance in environmentally certified companies in Mexico. *Sustainability, 16*(20), 1–22. https://doi.org/10.3390/su16208884

Ramlawati, & Putra, A.H.P.K. (2018). Total quality management as the key of the company to gain the competitiveness, performance achievement and consumer satisfaction. *International Review of Management and Marketing, 8*(5), 60–69.

Raoush, A. (2023). Transformational leadership impact on innovative behaviour as perceived by healthcare workers in private hospitals in Jordan. *Cogent Business & Management, 10*(3), 1–16. https://doi.org/10.1080/23311975.2023.2265606

Ren, Q., Li, W., & Mavros, C. (2024). Transformational leadership and sustainable practices: How leadership style shapes employee pro-environmental behavior. *Sustainability, 16*(15), 1–13. https://doi.org/10.3390/su16156499

Šarotar Žižek, S., Mulej, M., & Veingerl Čič, Ž. (2017). Results of socially responsible transformational leadership: Increased holism and success. *Kybernetes, 46*(3), 400–418. https://doi.org/10.1108/K-06-2016-0129

Shaheen, F., Lodhi, M. S., Rosak-Szyrocka, J., Zaman, K., Awan, U., Asif, M., Ahmed, W., & Siddique, M. (2022). Cleaner technology and natural resource management: An environmental sustainability perspective from China. *Clean Technologies, 4*(3), 584–606. https://doi.org/10.3390/cleantechnol4030036

Sila, I., & Ebrahimpour, M. (2005). Critical linkages among TQM factors and business results. *International Journal of Operations & Production Management, 25*(11), 1123–1155. https://doi.org/10.1108/01443570510626925

Tsui, A.S., Nifadkar, S.S., & Ou, A.Y. (2007). Cross-national, cross-cultural organizational behavior research: Advances, gaps, and recommendations. *Journal of Management, 33*(3), 426–478. https://doi.org/10.1177/0149206307300818

Van Niekerk, A.J. (2020). Inclusive economic sustainability: SDGs and global inequality. *Sustainability, 12*(13), 1–19. https://doi.org/10.3390/su12135427

Wang, C.H., Chen, K.Y., & Chen, S.C. (2012). Total quality management, market orientation and hotel performance: The moderating effects of external environmental factors. *International Journal of Hospitality Management, 31*(1), 119–129. https://doi.org/10.1016/j.ijhm.2011.03.013