

## THE IMPACT OF APPLYING TOTAL QUALITY MANAGEMENT STANDARDS ON IMPROVING THE OVERALL PERFORMANCE OF THE MINISTRY OF EDUCATION IN THE REPUBLIC OF SUDAN

### *O IMPACTO DA APLICAÇÃO DE PADRÕES DE GESTÃO DA QUALIDADE TOTAL NA MELHORIA DO DESEMPENHO GERAL DO MINISTÉRIO DA EDUCAÇÃO NA REPÚBLICA DO SUDÃO*

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**Abstract.** The main purpose of this study was the impact of applying total quality management standards on improving the overall performance of the ministry of education in the Republic of Sudan. The method of this study was descriptive-survey. The statistical population for this study was Ministry of Education employees, including managers, supervisors, and teachers in Sudan, and 126 people were selected as samples using a simple random sampling method. To measure total quality management the Pattanayak (2011) questionnaire, and to measure performance, the Mohaqqar et al., (2010) questionnaire were used. Their validity was content type, which was confirmed by experts. In order to assess the reliability of the questionnaires, Cronbach's alpha coefficient test was used and its amount was 0.82. In order to analyze the data, structural equation modeling test with Lisrel software was used. The results of the study showed that total quality management has a positive impact on the performance of education in Sudan.

**Keywords:** TQM, Education, Empowerment

**Resumo.** O principal objetivo deste estudo foi o impacto da aplicação de padrões de gestão da qualidade total na melhoria do desempenho geral do Ministério da Educação na República do Sudão. O método deste estudo foi descritivo-pesquisa. A população estatística para este estudo foi funcionários do Ministério da Educação, incluindo gerentes, supervisores e professores no Sudão, e 126 pessoas foram selecionadas como amostras usando um método de amostragem aleatória simples. Para medir a gestão da qualidade total, o questionário Pattanayak (2011) e para medir o desempenho, o questionário Mohaqqar et al., (2010) foram usados. Sua validade foi do tipo de conteúdo, que foi confirmada por especialistas. Para avaliar a confiabilidade dos questionários, o teste do coeficiente alfa de Cronbach foi usado e seu valor foi de 0,82. Para analisar os dados, o teste de modelagem de equações estruturais com o software Lisrel foi usado. Os resultados do estudo mostraram que a gestão da qualidade total tem um impacto positivo no desempenho da educação no Sudão.

**Palavras-chave:** TQM, Educação, Empoderamento

## 1. INTRODUCTION

The quality of education has once again come into focus around the world following the 2004 Universal Declaration of Human Rights by the United Nations Scientific and Cultural Organization (UNESCO) that the quality of education is generally declining in all countries (Cislighi & Heise, 2020). The quality of education means the appropriateness of all educational characteristics (inputs, processes, and outputs) and it has now become prevalent at the heart of every post-2015 education system around the world (Zajda, 2020). The move towards ensuring the quality of education has been accompanied by various educational interventions for reform purposes, which are essential in providing adequate knowledge and skills to young people as well as maintaining the economic and social growth of countries (Garira, 2015).

Overall, the provision of education has long been considered a public good and an important asset for society, regardless of the prevailing political and social conditions or societal developments (Kaiseroglou et al., 2023). Today, almost all those who seek development and reform everywhere in the world start with education (Sabori Khosro Shahi, 2010). Education

costs are a long-term investment that can lead to a high level of workforce productivity, which has a positive impact on GDP growth. Not only physical development, but also improving and promoting the level of education brings many indirect benefits to raising the level of society. This will improve various other aspects such as health, nutrition, hygiene, as well as the discipline of society. Therefore, education-related expenditures create economic externalities that can accelerate the country's economic development process (Sande, 2017).

Quality education is highly needed in the era of globalization, as it is believed that a quality education system can train a workforce with high personality traits such as innovative, productive, skilled, competitive, flexible, and creative (Ismail, 2014). Education plays an important role in providing highly skilled human capital, economic growth, and the well-being of individuals and society, and improves decision-making ability and reasoning skills. These educational benefits help individuals make better decisions about their lives, including better choices about work, better risk assessments about deviant or criminal behavior, and better personal health choices. Various studies show that the quality of education has a positive and significant relationship with the benefits of education and economic growth, which are provided by government, household, and community expenditures within the framework of various policies aimed at achieving non-removable and non-competitive educational benefits (Mutuku & Korir, 2019).

Education is a fundamental element for the development and progress of societies. A quality education system ensures sustainable success by revealing the potential of individuals and society. Therefore, the continuous improvement of educational institutions and the management of quality are of great importance (Menteşoğullari, 2023).

In recent years, the issue of quality management has been seen as an important topic in educational systems (Seyfred and Ansman, 2018). Education management experts consider total quality management (TQM) as an important tool for the reconstruction of the educational system and for increasing its effectiveness (Shahmohammadi, 2018).

Total quality management has made significant progress in European countries, the United States, Japan, and the United Kingdom, increasing the quality of teaching and administrative efficiency. Despite a lack of resources and resistance to change in African countries such as Uganda and Nigeria, it has improved the quality of teaching and educational management (Geresoma & Hazarikab, 2024). Numerous studies have been conducted on the impact of total quality management in educational institutions and schools (Mukhopadhyay, 2020, Padró et al., 2020, Ahmed and Ali, 2016). Various researches have shown the impact of total quality management on organizational and individual outcomes. Total quality management has a positive impact on performance (Garcia-Bernal and Ramirez-Alson, 2015; Anil and Satish, 2019), competitive advantage (Ferdowsy et al., 2018), financial performance and profit achievement (Milovanovic, 2014), customer satisfaction (Sheikh-Elsam and Emamian, 2016), and improved social responsibility (Jalilvand et al., 2018; Abbas, 2020).

The Ministry of Education, like other ministries, suffers from weak overall performance and low feedback from existing development and modernization programs, which has negatively affected the achievement of the desired goals; and the general decline in the outputs of the educational process in the Republic of Sudan. Unfortunately, once it had been at the top of the list of excellence in previous periods. Perhaps this is due to a number of challenges that faced the implementation of these programs or to the weakness of the intellectual framework of these programs in terms of training or logistical support from administrative leaders or workers implementing them.

Given the importance of education performance for the future of societies, and given that no research has been conducted to date on the impact of total quality management on education performance in Sudan, the necessity of the present study was formed. Therefore, the main

purpose of this study is to determine the impact of total quality management on the performance of education in Sudan.

### **1.1.Organizational performance**

Organizational performance plays a very important role in the economy and is considered a useful tool in achieving economic growth and organizational benefits. In most organizations in the world, managers and leaders seek to improve and promote the performance of their organizations. Organizational performance is a general construct that refers to how organizational operations carried out. Everyone believes that due to the complexity of the business world, organizational performance not only improves financial matters, but also ensures the survival and non-financial immortality of organizations (Jafari et al., 2024). Organizational performance refers to the degree to which an organization meets its own needs and the needs of its stakeholders for survival. In addition, organizational performance has been referred to as a measure of how well an organization achieves its goals (Ajalli and Alizadeghan, 2024).

### **1.2. Total Quality Management**

Deming (1986) defined total quality management as organizational activities involving all individuals in the organization (managers and employees) including a fully integrated and comprehensive effort to improve quality at every level (Boni, 2012). Total quality management or total quality is an intelligent, calm, and continuous action that has a energizing effect on meeting the organization's goals and ultimately leads to customer satisfaction, increased efficiency, and increased competitiveness in the market. According to Kayank, total quality management is a holistic management philosophy that strives for continuous improvement in all functions of an organization (Kayank, 2003).

Total quality management has been proposed for companies as a comprehensive quality improvement approach with the aim of improving performance in terms of quality and innovation in the past two decades. This approach is the latest advancement in the field of management, in which all activities are carried out with the aim of optimizing customer satisfaction through continuous process improvement (Djojo & Lena, 2021). A large number of researchers have stated that the total quality management strategy is the potential of using tools to foster learning in companies and achieve competitive advantages for companies using total quality management. Various researches have been conducted in the field of total quality management. To evaluate total quality management, they have examined dimensions such as leadership, strategic planning, customer focus, analysis and information technology, people management, and process management. When initially implementing total quality management, top management must take on a leadership role and demonstrate a high level of commitment. Total quality management focuses on top management support and emphasizes employee participation in connection with continuous improvement (Babayi Aghdam et al., 2024).

Numerous studies have been conducted on the impact of total quality management in educational institutions and schools (Mukhopadhyay, 2020, Padró et al., 2020, Ahmed and Ali, 2016). The implementation of Total quality management has a good effect because it involves the entire school to focus on customers (Hussain et al., 2023). In the field of education, the implementation of TQM has been an effective strategy to increase the success of students and educational institutions (Menteşoğullari, 2023). TQM in education interacts with the environment, follows the needs of the environment, balances the factors affecting the school, is open to change, provides harmony between teachers, students, and staff in the school, establishes good relations, is democratic, understanding, has a broad perspective that is not a status quo and uses the resources available (Çimili Gök & Özçetin, 2022).

### 1.3. Total Quality and Performance Management

Wassan et al. (2022) showed that total quality management has a positive impact on the sustainability and performance of manufacturing industries. Fraihat et al., (2023) founds that there is a statistically significant impact of TQM on the performance of the surveyed startups. Isidore et al., (2023) founds that Total Quality Management have impact in organizational performance. Cosmina et al., (2020) founds that Total Quality Management have impact in organizational performance in SMEs. The results of Tajouri and Lakhali (2024) reveal that TQM has a direct and significant positive effect on OP and INN. Data analysis shows that there is a significant positive effect between TQM and OL, while OL positively influences OP and INN. Furthermore, the results illustrate a mediating effect of OL between TQM and OP and INN. The results reveal that large industries and SMIs show significant differences in the relationship, including the conceptual model. Megersa (2022) found that there is positive and statistically significant correlation between all TQM constructs and organization performance. Concerning regression analysis, the study found total quality management has positive and significant effect on organization performance. Sahu and Yadav (2018) examined total quality management in small and medium-sized manufacturing in India. Structural model testing confirms that total quality management is positively related to manufacturing performance. Al-Harashneh (2023) showed that there is a correlation between the application of the principles of total quality management in raising the level of organizational culture among faculty members in Jordanian public universities for the overall scale and its dimensions with the exception of the dimension of organizational beliefs. Jaber and Al-Sheikh (2024) showed that there is a statistically significant relationship between the mediating role of total quality in the relationship between training and performance, the study proved that there is a statistically significant relationship between total quality in affecting performance, and the study proved that there is a statistically significant relationship between total quality and training, and the study also proved that there is a statistically significant relationship between training and performance. The study proved that training mediates the relationship between total quality and performance. The following hypothesis is examined based on the findings of this study:

$H_1$ : Total quality management has a positive impact on the performance of Sudanese education.

## 2. METHODOLOGY

The method of this study was descriptive-survey. The statistical population for this study was Ministry of Education employees, including managers, supervisors, and teachers in Sudan, and 126 people were selected as samples using a simple random sampling method. To measure total quality management the Pattanayak (2011) questionnaire, and to measure performance, the Mohaqqar et al., (2010) questionnaire were used. Their validity was content type, which was confirmed by experts. In order to assess the reliability of the questionnaires, Cronbach's alpha coefficient test was used and its amount was 0.82. In order to analyze the data, structural equation modeling test with Lisrel software was used.

## 3. RESULTS

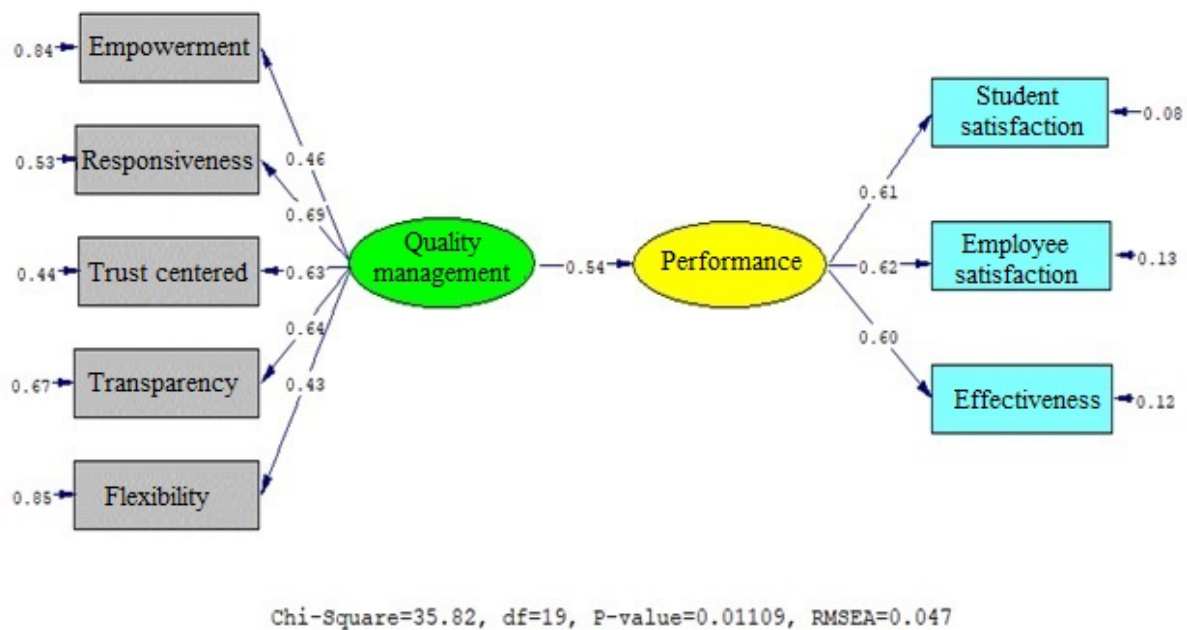
### 3.1. Descriptive Findings

Descriptive statistics indicators of mean, standard deviation, skewness, and kurtosis to describe each of the variables present in the conceptual model of the research, as well as the Kolmogorov-Smirnov test to measure the normality of the statistical distribution of the variables, are listed in Table (1).

**Table 1.** Descriptive statistics indicators of research variables and Kolmogorov-Smirnov test

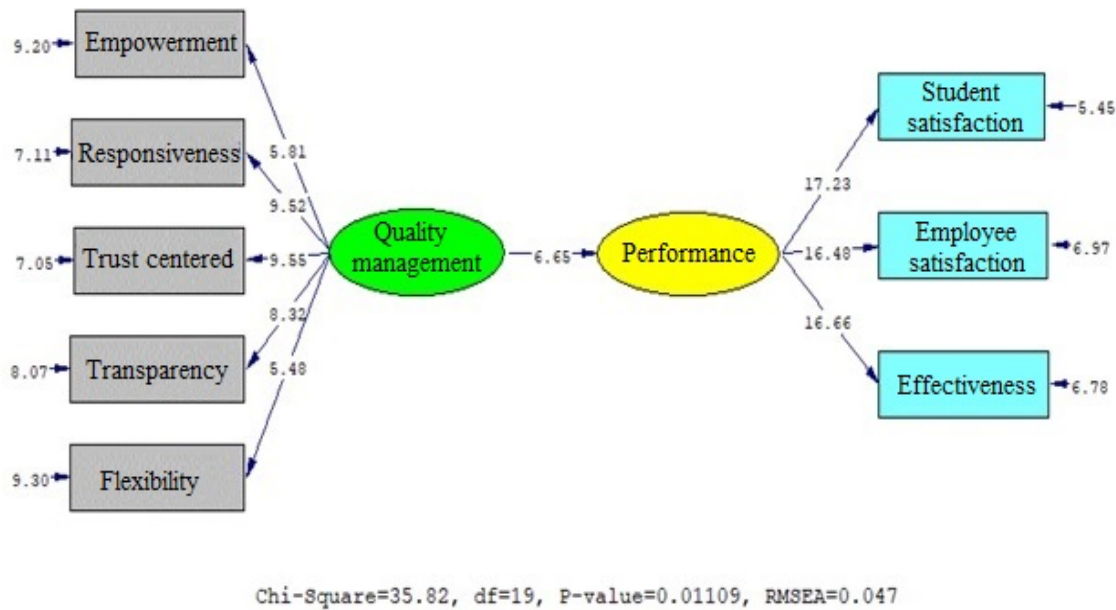
VARIABLE	M	Kurtosis	Skewness	SD	Z T	P
Employee Empowerment	16.94	3.652	0.329	1.229	0.990	0.165
Accountability	12.45	2.896	0.264	- 0.890	0.825	0.199
Trust-Based	17.75	4.731	0.983	1.663	1.031	0.093
Transparency	12.63	3.539	- 0.965	- 1.542	1.099	0.094
Flexibility	9.89	2.318	0.743	- 0.904	0.964	0.159
Quality Management	69.66	13.135	1.653	1.119	1.190	0.086
Organizational Performance	42.98	10.123	0.604	1.234	1.096	0.095

As can be seen, the values of the skewness and kurtosis indices for the research variables are in the range (2, -2), This means that the statistical distribution of the variables is approximately normal and symmetrical in terms of skewness and kurtosis. In addition, the significance level of the Kolmogorov-Smirnov test is greater than the error level of 0.05 ( $P > 0.05$ ), meaning that the distribution of the research variables is normal with a 95% confidence level. Therefore, the prerequisite for normal data distribution is to use structural equation modeling (SEM) and path analysis models. The fitting of the research conceptual model in the LISREL software environment in the standard estimation mode (factor loading and standard path coefficient) and the test of significance of the paths (T-test) to test the main hypothesis of the research are shown in Figures (1) and (2), respectively.

**Figure 1.** Fitting the research conceptual model in standard estimation mode

In Figure (1), it can be seen that the factor loading of all observed variables (items or indicators) in each construct is greater than 0.5. Moreover, the standard path coefficient shows that the direct effect of total quality management on education performance is 0.54.





**Figure 2.** Fitting the structural model of the research in the T-test mode

In Figure (2), it can be seen that the values of the t-statistics for all factor loadings are greater than the critical value of 1.96 ( $t < 1.96$ ). This means that in each of the constructs, the factor loading values are significant at the 5% error level and none of the indicators (components) will be removed from the structural model. The estimation of the t-statistic values shows that the t-statistic values determined by the software are not between the two critical values of 1.96 and -1.96 ( $1.96 < t$  or  $1.96 > t$ ), meaning that the expected relationships between the variables in the presented conceptual model are significant at the 5 percent error level.

The most important fit indices for measuring the suitability of the structural and conceptual model fit, as well as the approximate acceptable range of each index, are listed in Table (2). As can be seen, the goodness-of-fit indices obtained by the LISREL software for measuring the suitability of the structural model are in the approximate acceptance range. This means that the data observed in the statistical sample under study largely conforms to the structural model of the research. In other words, the values of the goodness-of-fit indices obtained indicate the appropriate fit of the structural model of the research. It can be said that overall, the presented structural model is a relatively appropriate model and has the ability to explain the structural relationships between the variables present in the presented model.

**Table 2.** Estimation of fitness indices to measure the suitability of the research structural model

INDEX	Approximate acceptance range	Estimated amount
Minimum Discrepancy Of Confirmatory Factor Analysis/Degrees Of Freedom (CMIN/DF)	Less than 3	1.88
Root Mean Square Error of Estimate (RMSEA)	Less than 0.05	0.047
Comparative Fit Index (CFI)	0.8 to 1	0.97
Incremental Fit Index (IFI)	0.8 to 1	0.96
Goodness of Fit Index (GFI)	0.8 to 1	0.93
Modified goodness-of-fit index (AGFI)	0.8 to 1	0.90

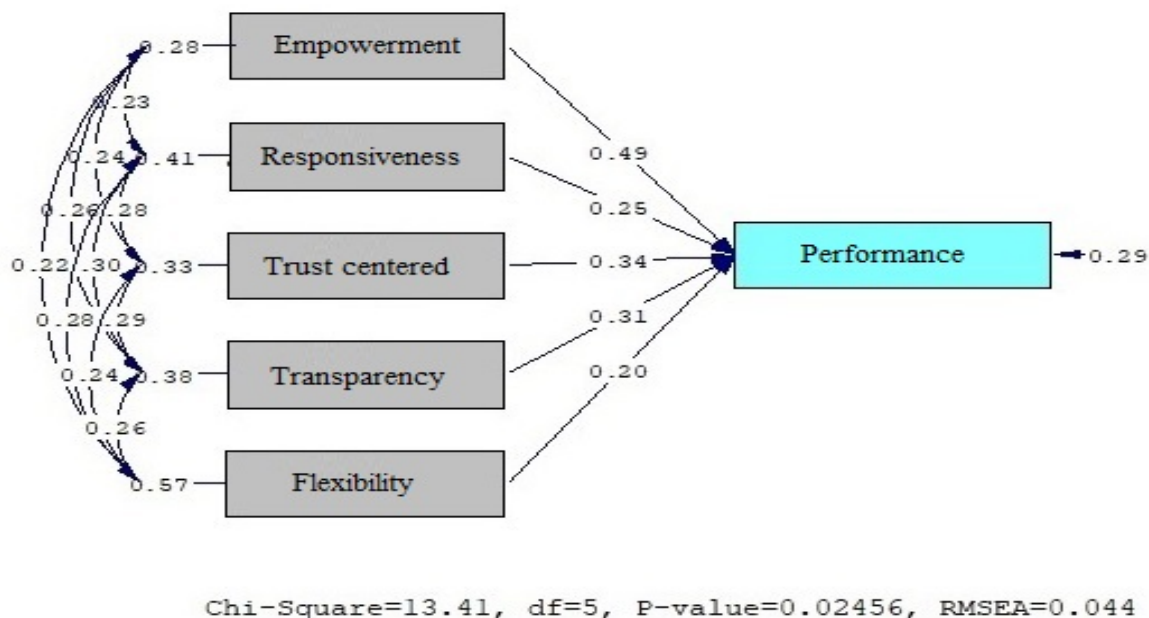
The results of parameter estimation in structural equation modeling to test the main hypothesis based on Figures (1) and (2) are given in Table (3). As can be seen, the standard coefficient of the path of the impact of comprehensive quality management on education performance is 0.54. The value of the t-statistic obtained (6.80) is greater than the critical value of 1.96 ( $t > 1.96$ ).

This means that the impact of comprehensive quality management on the performance of Sudanese education is positive and significant at the 5 percent level of error. With an increase in total quality management by one standard deviation, the performance of Sudan's education system changes positively by 0.54 standard deviations. The value is 0.29, meaning that 29 percent of the variance or changes in education performance are directly explained by total quality management. Therefore, the main hypothesis of the research is confirmed with 95% confidence.

**Table 3.** Results of parameter estimation in structural equation modeling to test the main research hypothesis

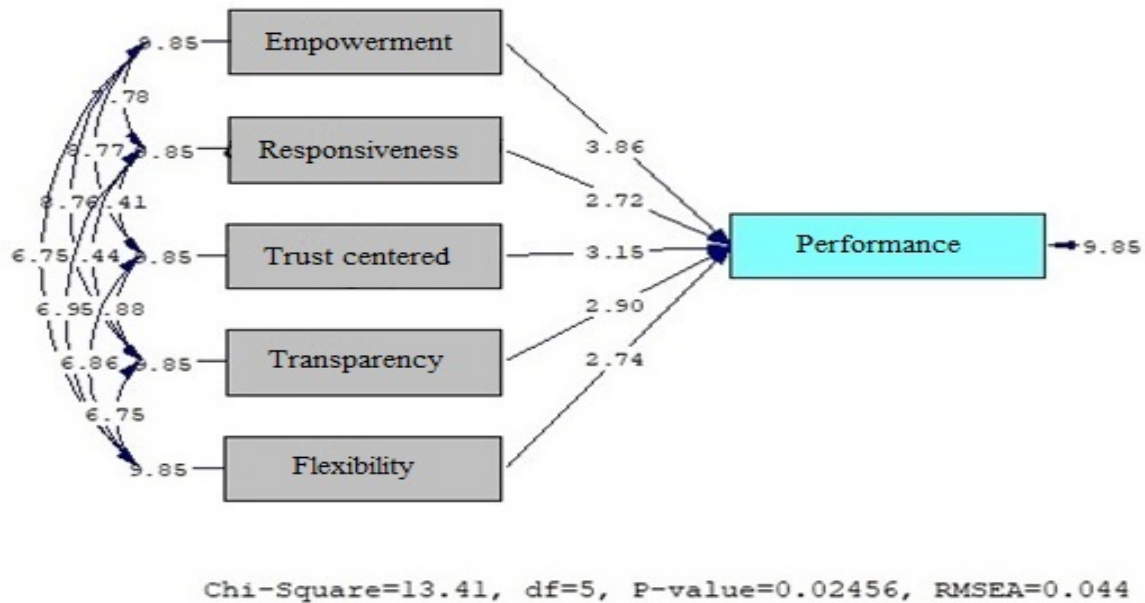
PATH	Standard path coefficient	t	R <sup>2</sup>
The direct impact of total quality management on education performance	0.54	6.65	0.29

The path analysis model fitting in the LISREL software environment in the standard estimation mode and the path significance test (T-test) to test the research sub-hypotheses is shown in Figures (3) and (4), respectively.



**Figure 3.** Fitting the path analysis model in standard estimation mode

In Figure (1), it can be seen that the direct effect of employee empowerment, accountability, trust-based, transparency, and flexibility on education performance is 0.49, 0.25, 0.34, 0.31, and 0.20, respectively.



**Figure 4.** Fitting the path analysis model in T-test mode

In Figure (2), it can be seen that the values of the t-statistics for all paths in the path analysis model are greater than the critical value of 1.96 ( $t < 1.96$ ). This means that the expected relationships between variables in the path analysis model are significant at the 5 percent error level.

The most important fitness indices for measuring the suitability of the path analysis model, as well as the approximate acceptable range of each index, are listed in Table (4). As can be seen, the obtained goodness-of-fit indices are within the approximate acceptance range.

**Table 4.** Estimation of fitness indices to measure the suitability for the research analysis path model

INDEX	Approximate acceptance range	Estimated amount
Minimum Discrepancy of Confirmatory Factor Analysis/Degrees of Freedom (CMIN/DF)	Less than 3	2.68
Root Mean Square Error of Estimate (RMSEA)	Less than 0.05	0.044
Comparative Fit Index (CFI)	0.8 to 1	0.98
Incremental Fit Index (IFI)	0.8 to 1	0.97
Goodness of Fit Index (GFI)	0.8 to 1	0.94
Modified goodness-of-fit index (AGFI)	0.8 to 1	0.92

Based on the estimated parameters, the research sub-hypotheses are tested. For each path, the obtained value for the t-statistic is compared with the critical values of 1.96 and -1.96. If the values calculated by the software are between the two numbers mentioned, the desired path is not significant at the 5 percent error level (95 percent confidence). Otherwise, the desired path is significant at the 5% error level (95% confidence). The results of parameter estimation in the fitted path analysis model to test the sub-hypotheses based on Figures (3) and (4) are given in Table (5).

**Table 5.** Results of parameter estimation in structural equation modeling to test research hypotheses

Path	Standard path coefficient	t	R <sup>2</sup>
The impact of employee empowerment on education performance	0.49	3.86	0.240
The impact of accountability on education performance	0.25	2.72	0.062



The impact of trust-based approach on education performance	0.34	3.15	0.116
The impact of transparency on education performance	0.31	2.90	0.096
The impact of trust-based approach on education performance	0.20	2.74	0.040

As can be seen, the standard coefficient of the path of the effect of employee empowerment, accountability, trust-based, transparency and flexibility on education performance is 0.49, 0.25, 0.34, 0.31 and 0.20, respectively. The values of the t-statistics obtained are greater than the critical value of 1.96 ( $t > 1.96$ ). This means that the impact of employee empowerment, accountability, trust-based, transparency, and flexibility on education performance is positive and significant at the 5% level of error. By increasing employee empowerment, accountability, trust-based, transparency, and flexibility by one standard deviation, the level of education performance changes positively by 0.49, 0.25, 0.34, 0.31, and 0.20 standard deviations, respectively. The value shows that employee empowerment, accountability, trust-based, transparency, and flexibility directly explained 24, 6.2, 11.6, 9.6, and 4 percent of the variance or changes in Sudanese education performance, respectively. Therefore, the research's sub-hypotheses are confirmed with 95% confidence.

#### 4. DISCUSSION AND CONCLUSION

In today's rapidly changing world, the strategic importance of institutional quality management is growing. It is critical that our schools, workplaces, and individuals embrace quality in order for it to become the essence of society. Total quality management is one of the approaches proposed and implemented to improve the quality both inside and outside the organization and to ensure the organization's continued existence.

The main purpose of this study is to determine the impact of total quality management on the performance of education in Sudan. The results of the study showed that total quality management has a positive impact on the performance of education in Sudan. This is consistent with the findings of other researchers such as Wassan et al. (2022), Fraihat et al., (2023), Isidore et al., (2023), Cosmina et al., (2020), Tajouriand and Lakhal (2024), Megersa (2022), Sahu and Yadav (2018), Al-Harashseh (2023) and Jaber and Al-Sheikh (2024).

Also, the results of the study showed that employee empowerment, accountability, trust-based, transparency, and flexibility has a positive impact on the performance of education in Sudan. This is consistent with the findings of other researchers such as Wassan et al. (2022), Fraihat et al., (2023), Isidore et al., (2023), Cosmina et al., (2020), Tajouriand and Lakhal (2024), Megersa (2022), Sahu and Yadav (2018), Al-Harashseh (2023) and Jaber and Al-Sheikh (2024).

So, the following suggestions are made based on the results of the data analysis:

- The Ministry's senior management shall designate an administrative body responsible for developing quality and excellence programs.
- The Ministry's senior management shall establish scientific standards for evaluating employee performance and achieving professional and organizational development.
- The administrative leadership of the Ministry shall establish a department or division specialized at research and development in order to provide the necessary resources for those purposes.
- The administrative leadership in the Ministry should work to spread more of the culture of quality among employees to enable them to perform their work with high quality and efficiency.
- The Ministry's senior management should use more methods to motivate and reward creative employees.

- In addition to the migration of the teaching staff Emphasizing the importance of caring for service recipients through the effective application of the quality management system in order to achieve the state's policies aimed at preventing the migration of cadres from students to study in Arab and Western universities.
- It recommends that researchers and scientists in the Republic of Sudan intensify scientific research for the degree of application of the principles of total quality and its relationship to raising the level of loyalty among faculty members at Sudanese universities. The mediating role of total quality in the relationship between developing performance and achieving beneficiary satisfaction, applying total quality methodologies and their importance in developing the performance of the Ministry of Education in Sudan.
- It recommends establishing strategic partnerships with regional and international non-profit institutions to provide the necessary funding to develop the ministry's administrative system and develop training programs to raise the efficiency of the administration and those responsible for education in Sudan.
- It also recommends the necessity of involving stakeholders from clients and employers to formulate effective strategies and implement them according to the needs of the local and global labor market with regard to the outputs of the Ministry of Education in Sudan.

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