AJSP
المجلة العربية للنشر العلمي
العدد السابع والثلاثون
تاريخ الإصدار: 2 – تشرين الثاني – 2021 م
www.ajsp.net
ISSN: 2663-5798

"The Impact of the Internal Audit for Quality Management System on Improving the Quality Management System in Companies that Obtained the ISO 9001/2015 Certificate in the Energy Sector in Sudan"

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Abstract:

The study aimed to identify the impact of the internal audit for quality management systems on continuous improvement from the point of view of the quality management system auditors in the companies which is work on the energy sector in Sudan, the problem of the study was that despite the application of the energy sector to the standard specification ISO 9001 for the quality management system, the levels of improvement without ambition compared to the efforts were being made to application of the quality management system, the study used a random sample of auditors in the five companies under the Ministry of Energy, where as the sample size was (38) internal auditors, The study used analytical descriptive approach, the study conducted to a group of results most notably that there is a statistically significant effect to for Internal audits on improve the quality system with a very high level of practice for internal auditing, and a low level of continuous improvement practice where there is an average level of practice on dimensions scale (planning, implementation, disposal) for a continuous improvement, and there is an impact on the internal audit axes (implementation, preparation and qualification) on continuous improvement, while the results of the analysis highlighted that there is no effect for the planning to the audit efforts on continuous improvement. Accordingly, the study recommends the necessity of attention to audit efforts with a focus on following up on cases of non-conformance in the system by activating the principal of accountability and motivation, working to practice all dimensions of the internal audit process in order to reflect positively on improvement efforts and not focusing on some domains at the expense of others, interest in qualifying auditors and equip them with appropriate statistical tools and methods.

Keywords: Internal audit, Continuous improvement, Energy sector.

Introduction:

Organizations have been in a constant rushing journey to show their leadership and distinction, sometimes by adopting global systems and standards, and at other times by obtaining international accreditation certificates, where the application of these systems to meet specific requirements, whether it has been placed within the framework of the internal organization of the institution or by the accreditation bodies, (Ben Shaloueh and others, 2013). During the nineties, the energy sector in Sudan witnessed a transforming in the application of quality, starting with the application of total quality in the year 1992 and then the transformation towards quality management systems ISO 2005-9001 at its time, where the specification of the quality management system ISO 9001 is imposed within the requirements of an internal audit system based on through which individuals are qualified to issue objective judgments on the applied system and its effectiveness, and then suggest areas and opportunities for improvement. However, the internal audit proposals may face a state of neglect or lack of focus due to the lack of effectiveness of the audit or the lack of focus of leaders on audit outputs in managers who see that the outputs of auditing is not important in a way that makes them focus their efforts and resources towards it, and the application of quality systems is not among their priorities (Aural & Hater, 2015).

As improvement focuses mainly on the necessity to make a continuous positive changes in the ways of accomplishing and achieving the service and the product in order to achieve the added value for stakeholders (Park, 2013), and thus works to reduce waste and make all operations effective and highly efficient. There for, it is an endless journey especially with the renewal and diversity of the requirements of the stakeholders in light of their search for luxury and perfection (Bester field, 2011) the matter which makes the organization facing The challenge of reducing cost and waste, and achieving quantitative and qualitative quality what it offers to its beneficiaries.

First: The problem of the study:

The study (Al-Khatib, 2003) indicates that the most important manifestations of institutional imbalance is the lack of appropriate evaluation mechanisms in institutions, whether in terms of planning, implementation or follow-up, which limits opportunities for improvement. The results of studies of the reality of companies operating in the field of energy in Sudan showed a number of aspects of (weak adherence to the requirements of the implementation of the requirements of the quality management system ISO 9001, except in the periods when there is an audit on the specific authority, and the workers do not review the documents and evidence of work in the event of They face problems related to work, with the audit not covering all activities, and therefore the study considers that these factors have hindered system improvement efforts) (Continuous Improvement Study 2014). In the same way the study of (Al-Adnay, 2007) indicates that institutions that apply internal audit as one of the requirements for obtaining international accreditation will outgrow organizational fragility because the institution does not obtain the total values of the audit, especially audit is not seen as an integrated part of the quality management system. Therefore, it is difficult to make improvements in the systems and methods of achieving outputs according to scientific and methodological bases as one of the requirements within the inputs of the management review meeting. ISO 9001-2015 Item 8A) by which a package of decisions and programs must be issued executive.

It is noted by tracking the internal and external audit reports of the accreditation bodies of companies operating in the energy sector issued by (BSI) company the diminishing of opportunities and areas for improvement (BSI,2011, 2012, 2014.2015, 2017) and the self-assessment report according to the European Excellence Model (EFQM (2015). He highlighted

a number of aspects related to the availability of opportunities for improvement that were not implemented, and perhaps this led the researcher to a direct question about the role of the internal audit in achieving the effectiveness of the quality system and improving its results. The problem of the study it is represented on the main question What are the impact and constraints of internal auditing For quality management systems in companies operating in the energy sector of improvement of the quality management systems from the point of view of quality management systems auditors?.

Second: Questions of the study

The study looking for the following questions:

1- What is the reality of planning, implementation and evaluation of the internal audit of companies operating in the energy sector in Sudan?

2- What is the reality of continuous improvement (planning, implementation, examination and disposals) for companies operating in the energy sector in Sudan?

3- Is there an impact of the internal audit of the quality management system on continuous improvement in companies operating in the sector energy in Sudan?

4. What is the contribution of the results and efforts of the internal audit to improving the system from the point of view of the study sample?

5. What extent obligation the companies of energy sector to implementation audits in accordance with the requirements of the ISO audit guiding specification 2015-19011?

6. Are there differences in the assessment and reality of internal audit due to the classification of the auditor (auditor, senior auditor, auditor trainee)?

7. Are there differences in the level of internal auditing of quality management systems duo to the difference in personal and organizational characteristics of the study sample?

Third: Study hypotheses:

1. There is a statistically significant effect at the level of significance (a = 0.05) for the quality processes for the internal audits on improving the quality system.

2. There is a statistically significant effect at the level of significance (a = 0.05) for the auditor's qualification level and his ability to improve the quality system.

3. There is a statistically significant effect at the level of significance (a = 0.05) for the effectiveness of audit planning and the enhancement of areas and opportunities for improvement of the system.

4. There is a statistically significant effect at the level of significance (a = 0.05) for effectiveness of audit implementation enhancement of areas and opportunities for improvement of the system.

5. There is a statistically significant effect at the level of significance (a = 0.05) for effectiveness preparing for audit enhancement of areas and opportunities for improvement of the system.

6. There is a statistically significant effect at the level of significance (a = 0.05) for the level of evaluation the results of the previous audits and the auditor's motivation towards suggesting fields and opportunities for improvement of the system.

7. There are statistically significant differences in the reality of the internal audit of quality management systems according to the requirements of the guiding specification ISO 2018/9011 from the point of view of the study sample due to the variable (years of experience, gender, auditor description, level of academic of the auditor, the auditor's exact specialization, the number of audit training programs).

Fourth - the importance of the study:

Highlighting the importance of the study in its addition of knowledge and practicality that it provides to practitioners, decision makers, study bodies and Academic to development of the practical practice of internal auditing of quality management systems through two dimensions:

1. A cognitive dimension as an extension to supply the research and academic side with scientific outputs in the field of internal auditing of quality management systems, especially in light of the limited studies that dealt with the subject of internal auditing in accordance with the guiding specification for quality management systems ISO 2015/ 9011, with linking and measuring the impact of the internal audit topic to improvement efforts. Note that most studies talk about financial auditing and focus on the accounting aspect only, in addition to opening the door for researchers to address the topic, especially with the growing global trend towards obtaining international accreditation certificates and the increase in internal audit efforts in addition to bridging the knowledge gap on the subject of internal auditing of quality management systems in accordance with the requirements of the specification ISO 2015/9011 guidelines in the work environment in the public sector, as the topic did not receive sufficient attention from researchers.

2. Practical dimension through helping practitioners and planners to pay attention to the aspects of internal auditing of quality management systems and to address the aspects that limit its effectiveness, internal auditing and improvement according to a tight scientific approach that enhances the efforts of the decision makers to improve quality systems.

Fifth: Objectives of the study:

1. Recognizing the impact of internal auditing of quality management systems on improving quality systems from the point of view of system auditors quality in companies operating in the Ministry of Energy through the following:
2. Identifying the trends of quality system auditors regarding the effectiveness of the prevailing audit systems.
3. Recognize the impact of internal audit outputs on system improvement processes.
4. Identifying aspects, areas and opportunities for improvement of the internal audit process from the point of view of the study sample.
5. Recognize highlighting the obstacles to internal auditing of quality management systems from the point of view of quality system auditors in the companies which is operating in the Ministry of Energy.
6. Recognize on if there are differences in the level of internal auditing for quality management systems to due to the personal and organizational characteristics.
7. Introducing recommendations based on the outcomes of the survey to enhance the practice of internal auditing and continuous improvement.

Sixth: Limits of the Study:

Spatial limit: The energy sector companies in Sudan that have the international accreditation certificate ISO 2015/9011.
Human Limit: Internal auditors are employees who make objective judgments on a case the reality of the application of the quality management system.
Time limit: The year 2021.

Seventh: Terminology of the study:

Internal Audit for quality management system: A systematic, organized and independent process to obtain objective evidence, objectively evaluated for the purpose of verifying the fulfillment of the audit criteria to assess the actual application of the quality management system (ISO, 2018), And implements by a certified internal auditor.
Continuous improvement: It is a continuous search process of permanent for the best ways to increase the effectiveness and efficiency of operations in a way that develops the ability, motivation and ownership of individuals towards operations (Kadhim, 2011).
Auditor: A qualified person to perform audits of management systems.

Study literature

Firstly: Internal Audit:

1. The concept of internal audit for quality management systems:-

The internal audit of the quality management system is defined as an independent systematic examination process that allows identifying whether the activities and results related to quality are committed to the quality management regulations and that they are set correctly and allow the achievement of the planned objectives (Detrie.2001.P111). Another definition indicates that the internal audit is a documented systematic process that allows obtaining and evaluating evidence in an objective manner for the purpose of identifying the extent of compliance with auditing standards (Huberac,2001, p116). The internal audit is also defined as the collection and evaluation of information related to the quality system in order to identify cases of non-compliance with the system and then propose the implementation of appropriate improvements and takes the necessary corrective actions (Al-Adnani, 2007).

2. The principles of regular internal audit:

It means there must be an audit plan approved and agreed upon by the organization's leaders and the direction of planning and implementing audits according to checklists that take into account the importance and quality of activities and then implemented according to the approved specifications guidelines, which include all information related to the implementation of the audits and highlight the results of the audit with full clarification Non-conformities, system improvement opportunities, corrective and preventive actions necessary to address non-conformities, time limits for their treatment, and responsibility for follow-up and verification of the integrity of implementation. **Independence,** meaning that the audit team or the auditors are not directly related to or have any administrative affiliation with the audited entity (Al-Qirzaz, 2010, p. 11-12) with the auditor highlighting the behaviors that prove his impartiality and impartiality. **The objectivity of the evaluation,** it means that the following rational, sound, logical and fair method in reaching accurate conclusions through the use of evidence and the sound standard for issuing judgments and evaluations away from all doubts in the integrity and positioning of provisions. (ISO 19011, 2002, p0 3).

3. Objectives of an internal audit for quality:-

One of the requirements for the implementation of the ISO 9001 quality management system for companies that apply the standards specifications for the quality management system, and it also provides the management with objective evidence to assess the effectiveness and efficiency of the system (Mills,CA,1989,P14) and its ability to meet the requirements of developing the quality management system, continuous improvement and the organization's ability to keep pace with the requirements of Stakeholders and evaluate the effectiveness of the system design and its ability to achieve its objectives, and internal audit is an appropriate mechanism for evaluating current and potential performance using statistical tools to suggest

ISSN: 2663-5798

opportunities and areas for improvement Evaluate the effectiveness of a system that is considered Quality management (Krebs et Mougin, 2007, p160).

4. Problems relate to quality Audit:

Inadequate planning and adequate preparation for auditing, lack of clarity of audit goals and objectives, lack of objective qualification of auditors, weak auditor's interest and interaction with them and their belief in the importance of auditing and its ability to highlight areas and opportunities for improvement, lack of follow-up to internal audit outputs and lack of interest in them (Al-Adnani, 2007, p. 240).

Second: Continuous Improvement:

The concept of continuous improvement:

Continuous improvement is defined as availability of efforts and the permanent desire of the institution to achieve gradual improvement and fundamental in the processes, production and services. For continuous improvement success to be available the factors of time and suitable techniques ,databases and effective system of information allows for making decisions in a suitable time(Al-Wishahi,2003). Continuous improvement was been management philosophy aimed to process improvement and activities which is related to the machines, materials, individuals and cautiously production methods, it is a principal that focuses on hypotheses that the work is a series of tied steps lead to final findings and the improvement represents to quality concept (Al-Taie and Qatada,2008,194p). the organizations always needed to continuous improvement in their process, activities and it is production through continuous improvement and development not stopped as customer needs and it is expectations changing continuously and the external environment was been change by the time and then the organization must be improve and developed there production and process fit with change in external environment. In addition, the organization tries to continually improve and reduce defects in its products so that it can withstand the tough competition on market in which it operates. Where a set of improvement tools appeared from Juran's trilogy, Dameng development circle, kaizen and other methods(Besterfield et al.2011), specially continuous improvement is the basis of success for organizations, no matter how much control and leadership they reach, as stopping at a limit certain .Certain to improve will enable competitors to outrun you (Obeidat.1999).

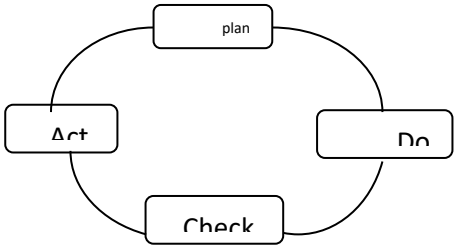
2. Improvement tools:

Continuous improvement is a management philosophy that aims to work on developing processes and activities related to machines, materials, individuals and methods of production consistently. And it is considered one of the methodological pillars that aim to access the full mastery of business through improvement in the production processes in the organization also the improvement efforts should not stop because there are always opportunities for improvement to be exploited. And to improve operations, there are multiple approaches, but the current study focuses on the entrance to the P.D.C.A session Deming and Schuhart, where the P.D.C.A session is considered one of the most important entrances which consist of the following stages:

Plans: It begins by presenting the essential plan to improve quality after defining the problem and collecting and analyzing the necessary data. DO Implement the improvement plan and ensure that it is successfully implemented.

Check: Results are measured and evaluated and whether or not there has been success in the improvement effort.

Act: If the results are satisfactory, this improvement plan is approved, but if the opposite occurs, the plan is modified or canceled and replaced with another one.



3. The relationship between internal auditing and continuous improvement:

Building systems depends mainly on the effectiveness of planning and implementation through prior identification of everything related to providing products and services and achieving the goals for which the organizations were established. Perhaps the cycle is long in the journey between planning and implementation. Moreover, the environment In which organizations work is not fixed, the desires of the beneficiaries are renewable and diverse, and the rates of competition are witnessing an increasing growth in both sides of prices and quality, and the conditions in which workers work are not fixed and their variables are overlapping and compounded, and the condition of machines and machines requires careful follow-up processes, which is imperative for institutions to establish a tight framework that guarantees It has good, speed and

accuracy in obtaining appropriate information on all aspects of the system from documented sources, and it has the ability to issue objective judgments to assess levels of effectiveness by qualified individuals and trainers, and then use and analyze the data to suggest and corrective deeds and improvement that enhances the effectiveness of the institution and enhances its ability to grow and continuity according to a scientific approach.

Third: previous studies:-

The researcher noticed - to the extent of his research in the literature - a limitation in studies that linked the two variables of the study, unless there are a group of studies that addressed the study variables individually, especially the subject of continuous improvement, despite the lack of studies linking the two study variables except That the researcher preferred the revenue of studies on its limitations variables and concepts that can be relied upon as one of the requirements for auditing and continuous improvement, and from that the researcher benefited from previous studies in drafting the theoretical framework, designing the questionnaire of the study, and discussing the results for the study, where previous studies are presented as follows:

Qassem's study(2021): Where the research aimed to demonstrate the importance of the internal audit process for the quality management system, as it is a mainly prerequisite for organization that apply the quality management system(ISO9001)to do, and since the researched organization is one of the organizations that has a certificate of conformity to the quality management system Therefore, the research aimed to study the correlation between the internal audit process of the quality management system in organizational performance, represented by the research community in the central Refineries company belonging to the Ministry of Oil.as for the research sample was selected(sector of mixing and packing containers) in the company because it is the only department in the company that has a certificate of conformity to the quality management system, and the researcher relied in his research on the method of case study method and the adoption of the company's documents as documented and approved data. The researcher has been using appropriate statistical methods to reached several conclusions most notably the absence of a correlation between the internal audit process of the quality management system and organizational performance for researched organization, the internal auditing process running according to a required management of standard measurements, the recommendations which is the researcher recommend for the company recommendation to attention with the internal audit process for quality management system as regarded a mainly prerequisite of the International Standard (ISO 9001) and attention to its outputs by providing a human resources which is own necessary personal qualifications and share them at especial training programs which is qualified them for doing the audit process doing and the necessity concerning. company's senior management to pay attention to periodic auditing through Careful the annual internal audit plan and according to the specified timetables, and increasing attention to the organizational performance indicator (conforming products to requirements) by following up on cases of non-conformity with requirementsand ensuring that they are not repeated and emphasizing full compliance with the standards and specifications set for products and using the principle of reward and punishment to achieve this .

***Advocacy Study (2020):** This study aimed to reveal the impact of the of a critical elements for continuous improvement represented in leadership support, process and set of processing focusing on customer at Sahab industrial City – Jordon the study uses the questionnaire which was analyzed by using the analytical descriptive qualitative method, simple and multiple regression methods which was concluded to positive impact for statistically significant, combined critical improvement elements and organizational performance of Sahab companies industrial.

*** Mona study (2019):** The study aimed to highlight the role of the internal audit of the quality system in activating the mechanisms of continuous improvement in the institutions that apply quality management systems by applying to the Jordanian SCAEK Cement Industry Company, as one of the ISO9001-certified institutions, The study relied on the questionnaire and through analysis it became clear SCAEK company uses internal audit as one of the methods that enables it to improve the performance of operations through good planning and implementation of internal audits, which made the leaders of institutions use the result of audit as an input to control operational processes.

Abdul Rahman study(2018): Where the study aimed to measure the impact of improvement on the overall performance of the organization. The study concluded that there is a significant effect of continuous improvement on the overall of the organization; the study recommended the need to pay attention to continuous improvement, strengthen its efforts, and provide its requirements.

***Al-Jabi study(2018):** Where the quality examines the reality of the actual application of the standard iso2008-19011 in one of the companies of the Iraqi Ministry of Oil, and the problem lies in search the reality of commitment to the actual application of the standard according to the standards stipulated in the indicative specification for auditing, where the study concluded that the company does not comply with the terms and standards of auditing as indicated in the specification, where the application approaches the international standard 88%.

*** Al-Qahtani study (2017):** The study aimed to identify the mechanisms of improvement at King Khalid University according to the (balding) model, where the study included a sample of (136) from the university team, as it confirmed that

the tools used in the study that the use of improvement tools and the actual practice of applying the tools differ accordingly. Experience level and Job and human differences for the study sample individual.

*** Al-Barwari study (2008)**

Entitled Continuous Improvement Techniques and Organizational Performance, where the study aimed to apply continuous improvement techniques and their impact on performance, taking into account the dynamic change witnessed by the environments of institutions.

Commenting on previous studies:

It is clear through the presentation and analyses of previous studies that they dealt with are interested in the subject of continuous improvement. However, the current study is modern of its kind in linking between the improvement variables and the internal audit of the quality management system ,where this study marked from previous studies by its search on the subject of internal auditing of the quality management system in accordance with the requirement of the guiding standard ISO 2015-19011,and the society of the current study is characterized by being looking at a segment that is fully aware and aware of all aspects and areas of auditing and continuous improvement, which requires obtaining information and results of a degree of career and professionalism. As for the temporal aspect, it noted that the study is relatively recent, as it researches the effectiveness of the application of the specification after its latest issuance.

The practical side of the study

Study methodology and procedures

Study Methodology: The study aimed to identify "the impact of internal auditing of quality management systems on improving the quality management system in companies that obtained the ISO 2015/9011 certificate". This study was relied mainly on the descriptive analytical method, which Al-Ash'ari defines as that" the description of the study targets the objective quantitative and qualitative description of a social phenomenon", or a group of interrelated phenomena together through the use of different data collection tools, which makes the study phenomenon or phenomena clear and grant it, and give it a realistic identification stage and questions about it. (Al-Ash'ari, 2013, p. 118).

Theoretical and Medal Study Sources

1. **Secondary sources (theoretical):** This included books and scientific periodicals that dealt with their merits and theoretical content the impact of internal auditing of quality management systems on improving the quality management system in companies that obtained the ISO 9001/2015 certificate; in addition to that refer to reports, seminars, conferences and previous relevant studies subject of the study.
2. **The field method (applied)**: It relied on the field survey by polling the opinions of the study sample by taking an appropriate sample by means of an electronic questionnaire that included the main and secondary axes and dimensions of the study.
3. **Study community:** The current study community consists of all qualified quality management system auditors in companies affiliated with the Ministry of Energy during the year 2021.
4. **Study sample:** Since the comprehensive survey method requires time, effort and cost, and in short for it, the researcher took an appropriate sample from the study community by means Google Survey, where the study sample amounted to (38) individuals, which is considered an appropriate sample size for the current research according to what It was mentioned by " Uma Sakaran, 2016, p264" that the sample size, whose number of items ranges between 30 to 500 items, is appropriate for most studies and research. , and to analyze the data of the study sample, the researcher encoded it with the statistical package for social science known(SPSS), and then analyzed and interpreted its results in order to answer the study's questions and achieve the goals that it seeks to achieve.

Size of the community and the study sample

Auditors by company	Study community	number of responses	ratio
Distribution	45	23	51%
Thermal generation	11	3	27%
German obstetrics	13	4	31%
Transport	15	8	53%
Total	83	38	46%

3. Characteristics of the study sample: The surveyed study sample is characterized by the following demographic characteristics:

Table (1) the frequency and relative distribution of the most prominent characteristics of the study sample (n = 38)

Variable	Categories	Repetition	Ratio
The company	Distribution	23	60.5
	Thermal generation	3	7.9
	Hydrogenation	4	10.5
	Transport	8	21.1
Qualification	Bachelor's	28	73.7
	PhD	10	26.3
Experience in internal audit	5 years or less	7	18.4
	6 - 10 years	15	39.5
	11 -15 years	12	31.6
	16-20 years	3	7.9
	More than 21	1	2.6
Job classification	Auditor	12	31.6
	chief auditor	19	50.0
	trainee auditor	7	18.4
Specialization	Administrative	19	50.0
	Other	19	50.0
Number of training programs for continuous improvement	less than 2	5	13.2
	More than 3 and less than 7	11	28.9
	More than 8 and less than 11	7	18.4
	11 or more	15	39.5

It is clear from the statistical indicators of frequencies and percentages that the majority (60.5%) of the study sample is distribution companies, (21.1%) are transport companies, (10.5%) are generation companies, (7.9%) are thermal generation companies. In terms of academic qualifications, it is clear that the majority (73.7%) of the study sample from bachelor's degree holder and (26.3%) are from PHD holders. With regard to the experience of the study sample in internal auditing, it is clear that (39.5%) have experience between 6 to 10 years, (31.6%) have experience between 11 to 15 years, (18.4%) have experience from 5 years or less, (7.9%) have experience between 16 to 20 years. In terms of classification, the study sample distributed among 50% of the administrative departments, 50% of other departments. In terms of the number of training programs for continuous improvement, the statistical indicators show that (39.5%) have 11 or more training programs, (28.9%) between 3-7 training programs and (13.2%) have received less than two training programs.

1. Indicators of validity and reliability of the study questionnaire:

Pearson's internal stability: to verify the indicators of the internal stability of Pearson and the extent of the correlation of the content of each dimension with the general concept of the questionnaire. The researcher restored to calculating the Person correlation indicators between degree and dimension by the total degree of the questionnaire, and the results are included in the tables next:

Table No. (2) The internal stability of the Pearson correlation for the dimensions of the study questionnaire

Internal audit axis		
NO	Dimension content	Correlation with the total degree
1	Planning for internal audit	**0.74
2	Preparing to audit	**0.72
3	Execution of the audit	**0.84
4	Follow up on audit results	**0.89
5	Qualification of auditors	**0.74
The second axis continuous improvement		
1	Planning	**0.95
2	Execution	**0.84
3	Examination	**0.84
4	Disposal	**0.84

The correlation is statistically significant at the level of significance 0.01**

By extrapolating the statistical indicators of Pearson's correlation between each dimension and the total degree of the questionnaire. The correlation coefficients range from (0.72** to 0.95**), all of which are statistically significant correlation coefficients at the level of significance (0.01). (**), which confirms that the dimensions of the study questionnaire are true to what it was designed to measure.

1.Indicators of stability a Cronbach:

To check the stability of the study questionnaire dimensions, the researcher calculated the indicators and a Cronbach's, this and the following table includes

The most important indicators of stability of the dimensions of the study scales:

Table (3) shows the indicators of a Cronbach's sub-dimensions and the total score of the questionnaire.

Internal audit axis			
N	Dimension content	Correlation with the total degree	
1	Planning for internal audit	0.80	
2	Preparing to audit	0.77	
3	Execution of the audit	0.82	
4	Follow up on audit results	0.83	
5	Qualification of auditors	0.78	
The second axis is continuous improvement			
1	Planning	0.95	
2	Execution	0.94	
3	Examination	0.97	
4	Disposal	0.97	
	The resolution as a whole	0.96	

It is clear from the statistical indicators of Table (3) that the values of a Cronbach over the sub-dimensions ranged between (0.77 to 0.97) as a whole, reaching a value of 4 Alpha Cronbach (0.96), all of which are values > 0.60, which confirms the stability and clarity of the a dimensions statements, where (Gouda Mahfouz, 2009, p.43) stated that the stability is reliable and statistically acceptable if its value is (<0.60), and accordingly the researcher concludes that the dimensions of the study questionnaire are characterized by consistency and stability and that it will give the same results if it is applied in Similar environment in terms of time and place.

Results of the study hypotheses and discussion and interpretation:

To test the study hypotheses (1-7), the researcher restored to using simple regression analysis to identify the effect of each independent sub-variable of the audit axis on the dependent variable (improvement).

The results of the first hypothesis:

Which stated that' **there is a statistical significant effect at the level of significance (a=0.05) for the quality of internal audit processes on improving the quality system"** and to test the hypothesis of the study, the researcher restored to procedure simple regression between the audit variable as a whole and the improvement variable as a whole, and the results are included in the following table:

Table (4) shows the effect of the independent variable (internal audit) on the dependent variable (continuous improvement).

Independent variable	Dependent variable	R correlation coefficient	Impact Ratio R^2	F. Value	Indication	T .value	Indication	Hypothesis
Internal auditing	Continuous development	0.692	0.478	33.12	0.000	5.75	0.000	Acceptable

Figure (1) Path analysis model for the impact of internal audit on continuous improvement

It is clear from the regression indicators of the effect of the internal audit variable on the improvement variable in the table (4) and figure (1) are the following results:

1. There is significant statistical significance of the simple regression model between the internal audit variable in the continuous improvement variable based on the value (F) (33.12), which is statistically significant at the level of significance (0.05>0.000) for the impact of internal audit on continuous improvement.
2. The correlation coefficient between the independent variable (internal audit) and the dependent variable (continuous improvement) is (R = 0.692), which means that (69.2%) of the internal audit procedures have a positive correlation with the continuous improvement processes.
3. The total impact of internal audits on continuous improvement is (0.478), which means that an increase in the level of internal audits by one degree leads to an increase in the level of continuous improvement by (47.8%). And the value of (T) (5.75) is statistically significant at the level of significance (0.05>0.000) on the effect of internal auditing on continuous improvement.
4. The rest of the effect of (52.2%) on continuous improvement processes is attributed by the researcher to variables outside the scope of the current study. And the researcher attributes the impact of internal auditing on continuous improvement processes to a number of reasons, the integrity of the audit, the qualification of auditors, the ability to issue substantive provisions and contribute to suggesting solutions .Follow-up the implementation of areas and opportunities for improvement.

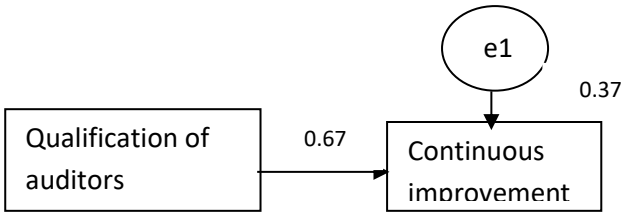
2. **The results of the second hypothesis:** which states that "**there is a statistically significant effect at the level of significance (a = 0.05) for the auditor's qualification level and his ability to suggest areas and opportunities for improvement of the system".** The table highlights the results of the simple regression analysis between the auditor qualification variable and whole improvement variable, which were as follows:

Table (5) shows the effect of the independent variable (qualification of auditors) on the independent variable (continuous improvement)

independent variable	dependent variable	R coefficient of correlation	Impact Ratio R^2	F. value	Indication	T. value	Indication	Hypothetical
Auditor qualification	continuous improvement	0.608	0.369	21.08	0.000	4.59	0.000	Acceptable

Figure (2) Path analysis of the impact of auditor qualification on continuous improvement

ISSN: 2663-5798



It is clear from the regression indicators of the effect of the qualification of auditors variable on the improvement variable. Table (5) and Figure (2) the following results:

1. Similarly, there is significant statistical significance of the simple regression model between the auditor qualification variable in the continuous improvement variable based on the value (F) (21.08), which is also statistically significant at the level of significance (0.05> 0.000) on the effect of auditor qualification on continuous improvement.
2. . The correlation coefficient between the independent variable (qualification of auditors) and the dependent variable (continuous improvement) is (R = 0.608), which also means that (60.8%) of the procedures for qualification processes of auditors are positively related to the processes of continuous improvement.

3. The total impact of auditor qualification processes on continuous improvement is (0.369), which means that an increase in the level of auditor qualification processes by one degree leads to an increase in the level of continuous improvement by (36.9%). And the value of (T) (4.59) is statistically significant at the level of significance (0.05>0.000) on the effect of qualifying auditors on continuous improvement.

4. The rest of the effect of (63.1%) on continuous improvement processes is attributed by the researcher to variables outside the scope of the current study. The researcher links the impact of qualifying auditors on continuous improvement processes to a number of reasons, including Sufficient knowledge of statistical tools and methods for quality and the ability to possess management, planning and implementation skills for audit process.

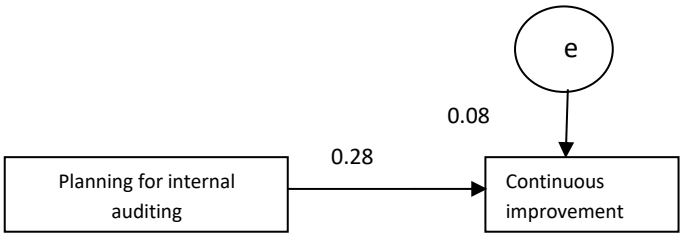
3. The results of the third hypothesis: which states that **"there is an effect and a statistically significant effect was found at the level of significance (a = 0.05) for the effectiveness of audit planning and the enhancement of areas and opportunities for improvement of the system".**

The table highlights the results of the simple regression analysis between the audit planning variable and the improvement variable as a whole, which were as follows:

Table (6) shows the effect of the independent variable (planning) on the dependent variable (continuous improvement)

independent variable	dependent variable	Correlation coefficient R	Impact Ratio R^2	F.value	Indication	T.value	Indication	Hypothesis
Planning for internal auditing	continuous improvement	0.284	0.08	3.149	0.084	1.775	0.084	rejected

Figure (3) Path analysis of the impact of internal audit planning on continuous improvement



It is clear from the regression indicators of the effect of the planning for internal auditing on continuous improvement variable.

In Table (6) and Figure (3) the following results:

1. The absence of significant statistical significance for the simple regression model between the internal audit planning variable in the continuous improvement variable based on the value of (F) (3.149) And it is not statistically significant based on the calculated significance level (0.05> 0.084) on the effect of auditor qualification on continuous improvement.
2. The correlation coefficient between the independent variable (planning for internal audit) and the dependent variable (continuous improvement) is (R = 0.284), which indicates the procedures of internal audits processes are not strongly related to continuous improvement processes.

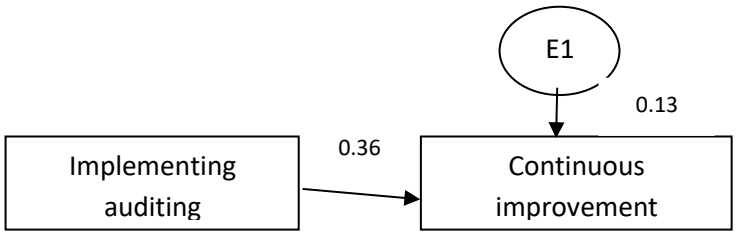
3. The total impact of the internal planning processes on continuous improvement does not exceed (0.08). which means that the increase in the level of internal audit planning processes by only one degree leads to an increase in the level of continuous improvement by(8%) and the Value(T)(2.775) is not statistical significant based on the calculated significant level(0.05<0.084)on the impact of internal audit planning on continuous improvement.

4. The results of the fourth hypothesis: which states that "**there is a statistically significant effect at the level of significance (a = 0.05).For the effectiveness of audit implementation and enhancing areas and opportunities for improvement of the system**. The table highlights the results of a simple regression analysis between the audit implementation variable and the improvement variable as a whole, which were as follows:

Table (7) shows the effect of the independent variable (audit implementation) on the dependent variable (continuous improvement)

independent variable	dependent variable	R correlation coefficient	Impact Ratio R^2	F.value	Indication	T.value	Indication	Hypothesis
Implementation of audit	continuous improvement	0.356	0.126	5.209	0.028	2.282	0.028	acceptable

Figure (4) Path analysis of the impact of implementation on continuous improvement



It is clear from the regression indicators of the effect of the Implementation of audit variable on the improvement variable. Table (7) and Figure (4) **show the following results:**

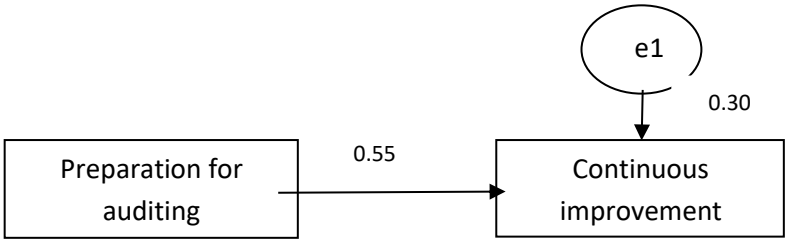
1. The presence of significant statistical significance for the simple regression model between the Implementation of audit variable on continuous improvement variable based on value (F) (5.209). Which is also statistically significant at the level of significance (0.05> 0.028) on the effect of Implementing auditing on continuous improvement.
2. The correlation coefficient between the independent variable (Implementing auditing)and the dependent variable (continuous improvement) is (R = 0.356), which means that (35.6%) of the procedures of implementing auditing processes related to continuous improvement processes are positively related to the processes of continuous improvement.
3. The total impact of the implementing auditing processes on continuous improvement exceeds (0.126). which means that the improvement on the level of implementing auditing by only one degree leads to an increase in the level of continuous improvement by (12.6%) and the Value(T)(2.282) is a statistical significant at the level of significance (0.05>)in effect of the implementing audit on continuous improvement.
4. The remaining percentage of the effect of (87.4%) in continuous improvement processes is attributed by the researcher to variables outside the scope of the current study. The researcher links the impact of low audit implementation in continuous improvement processes to high impact of preparation on improvement, as previously mentioned in the paragraphs preceding this paragraph.

5. for the results of the fifth hypothesis: which states? **"There is a statistically significant effect at the level of significance (a = 0.05) for the effectiveness of preparation for auditing and the enhancement of areas and opportunities for improvement of the system"**. The table highlights the results of the simple regression analysis between the variable of preparation for auditing and the variable of improvement as a whole, which were as follows:

Table (8) shows the effect of the independent variable (Preparation for auditing) in the dependent variable (continuous improvement

independent variable	dependent variable	R coefficient of correlation	Impact Ratio R^2	F.value	Indication	T.value	indication	Hypothetical
Preparing for audit	Continues improvement	0.548	0.30	15.46	0.000	3.93	0.000	Acceptable

Figure (5) Path analysis of the impact of audit preparation on continuous improvement



It is clear from the regression indicators of the effect of the Preparation for auditing variable on the continuous improvement variable.

Table (8) and Figure (5), the following results are found:

1.The presence of significant statistical significance for the simple regression model between the variable preparation for auditing on the continuous improvement variable based on the value (F) (15.46), which is statistically significant at the level of significance (0.05>0.000) on the effect of preparation for implementation in continuous improvement.

2. The correlation coefficient between the independent variable (preparation for auditing) and the dependent variable (continuous improvement) is (R=0.548), which means that (45.8%) of the procedures of preparation for implementation processes have a positive correlation with continuous improvement processes.

3. The total impact of the processes of preparation for the audit on continuous improvement is (0.30), which means that the improvement in the level of preparation for implementation by one degree leads to an increase in the level of continuous improvement by (30%). And the value of (T) (3.93) is a statistical function at the level of significance (0.05>0.000) on the effect of preparing for auditing on continuous improvement.

4. The rest of the effect of (70%) on continuous improvement processes is attributed by the researcher to variables outside the scope of the current study. The researcher links the impact of preparation for auditing in continuous improvement processes to a number of reasons, as each department has systems, work documents and operating manuals that belong to it. Therefore, the preparation is better for the stage before the audit is implemented, which requires the audit team is informed and determines the most important areas and focuses on them, which is directly related to the effectiveness of the audit and its reflection on continuous improvement efforts.

6. the results of sixth hypothesis: which states**" there is an effect and statistical significant was found at the level of significance (a=0.05) for the level of follow-up of the results of previous audits and the auditor's motivation toward suggesting areas and opportunities for improvement of the system".**

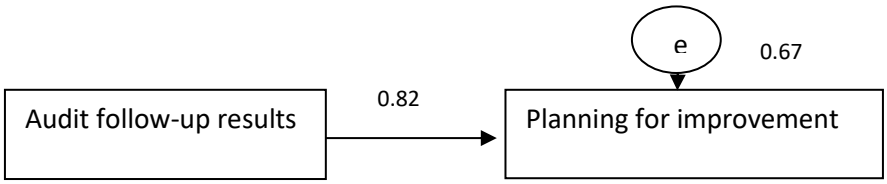
Table highlights the results of the simple regression analysis between the variable of following up on audit results and the variable of continuous improvement as a whole, which were as follows:

Table (9) shows the effect of the independent variable (following up on audit results) on the dependent variable (continuous improvement)

Independent variable	dependent variable	R Correlation coefficient	Impact Ratio R^2	F.value	Indication	T.value	indication	hypothetical
following up on audit results	Continuous improvement	0.816	0.665	71.61	0.000	8.46	0.000	Acceptable

Figure (6) Path analysis of the impact of follow-up on audit results on continuous improvement

ISSN: 2663-5798



It is clear from the regression indicators of the impact of follow-up on audit results on the continuous variable Table (9) and Figure (6) have the following results:

1. The presence of significant statistical significance for the simple regression model between the variable of follow-up audit results in the continuous improvement variable based on the value of (F) (71.61), which is statistically significant at the level of significance(0.05>0.000)on the impact of follow-up audit results on continuous improvement.
2. The correlation coefficient between the independent variable (follow-up audit results) and the dependent variable (continuous improvement) is (R=0.816), which means that (81.6%) of the procedures for follow-up audit results are positively related to continuous improvement process.

3. The total impact of follow-up audit results on continuous improvement is (0.665), which means that improvement in the level of follow-up audit results by one degree leads to raising the level of continuous improvement by (66.5%), and that the value of (T) (8.46) is statistically significant at the level of significance (0.05>0.000) on the effect of follow-up audit results on continuous improvement.

4. The rest of the effect of (33.5%) on continuous improvement processes is attributed by the researcher to variables outside the scope of the current study. The researcher links the impact of follow-up to audit results in continuous improvement processes to a number of reasons: The stage of preparation for auditing requires the auditing of the results of previous audits and what has been done about them. And since the follow-up emphasizes the need to implement the previous recommendations, it gives greater opportunities and motivation to find other areas of opportunity for improvement.

7. the results of the seventh hypothesis: **(There are significant differences Statistics of the reality of internal auditing for quality management systems in accordance with the requirements of the guiding specification ISO 2018/9011 from the point of view of the study sample due to the variable (years of experience, description of the auditor, the auditor's academic level, the auditor's specialization, the number of audit training programs)**. To test this hypothesis, the researcher resorted to use one-way analysis of variance, and the results are included in the following tables:

Table (10) one-way analysis of variance for the significance of the differences depending to the variable years of experience in auditing

Contrast source	Set of squares	degree of Freedom	Average squares	F. value	indication	Hypothesis
Between groups	932.4	4	233.1	1.45	0.24	rejected
within groups	5305.1	33	160.8			
Total	6237.5	37				

It is clear from the statistical indicators for one-way analysis of variance according to the variable years of experience around the reality of internal audit, that there are no statistically significant differences in the average responses of the study sample based on the level of Calculated significance (0.05< 0.240).

Table (11) one-way analysis of variance for the significance of the differences according to the auditor's description variable

Contrast source	set of squares	degree of Freedom	Average squares	F. value	indication	Hypothesis
Between groups	3.305	2	1.653	0.009	0.991	Rejected
within groups	6234.195	35	178.12			
Total	6237.5	37				

It is clear from the statistical indicators for one-way analysis of variance according to the variable auditor description around the reality of internal audit, that there are no statistically significant differences in the average responses of the study sample based on the level of Calculated significance (0.05<0.991).

Table (12) one-way analysis of variance for the significance of the differences according to the variable of the educational qualification

Contrast source	set of squares	degree of Freedom	Average squares	F. value	indication	Hypothesis
between groups	3.393	1	3.393	0.02	0.0889	Rejected
within groups	6234.107	36	173.17			
Total	6237.5	37				

Similarly, it is clear from the statistical indicators for one-way analysis of variance according to the variable educational qualification around the reality of internal auditing, that there are no statistically significant differences in the average responses of the study sample based on the level Calculated significance (0.05<0.889).

Table (13) one-way analysis of variance for the significance of the differences according to the exact specialists of the auditor

Contrast source	set of squares	Degree of Freedom	Average squares	F.value	indication	Hypothesis
Between groups	181.289	1	181.289	1.078	0.306	Rejected
within groups	6056.211	36	168.228			
Total	6237.5	37				

Also, It is clear from the statistical indicators for one-way analysis of variance according to the variable the exact specialists of the auditor around the reality of internal auditing, that there are no statistically significant differences in the average responses of the study sample based on the level Calculated significance (0.05<0.306).

Table (14) one-way analysis of variance for the significance of the difference according to the number of audit training programs

Contrast source	set of squares	Degree of freedom	Average squares	F, value	Indication	Hypothesis
Between groups	185.871	3	61.957	0.348	0.791	Rejected
within groups	6051.629	34	177.989			
Total	6237.5	37				

Also it is clear from the statistical indicators of for one-way analysis of variance according to the variable number of audit training programs on the reality of internal auditing , that there are no statistically significant difference in the averages of the study sample responses based on the calculated significance level (0.05<0.791).

8. To answer the question about the reality of practicing the dimensions of internal auditing and continuous improvement from the point of view of the study sample surveyed, the arithmetic averages and standard deviations were calculated, and then specify the degree of practice was determined based on simulated averages of the pentagonal scale which are follows:

1-1.79 very low practice
1.80-2.59 low practice
2.60-3.39 medium practice
3.40-4.19 high practice
4.20-5 very high practice

Based on that, the researcher restored to calculating the arithmetic mean and standard deviations as shown in the following table

Table (15) arithmetic averages and standard deviations on the degree of practicing the dimensions of internal auditing and continuous improvement

The first axis: internal audit					
N	Dimension content	Arithmetic mean	Standard deviation	Level of practicing	Order of importance
1	Planning for internal audit	3.74	1.00	High	3
2	Preparing for the audit	3.99	0.91	High	2
3	Executing the audit	4.21	0.74	Very high	1
4	Follow up results audit	3.64	1.08	High	5
5	Qualification of auditors	3.72	0.99	High	4
The second axis : continuous improvement					
	Dimension content	Arithmetic mean	Standard deviation	Level of practicing	Order of importance
1	Planning	3.09	1.12	Middle	3
2	Execution	3.07	1.18	Middle	4
3	Examination	3.40	1.22	High	1
4	Act	3.26	1.26	middle	2

It is clear from the statistical indicators of the arithmetic averages and standard deviations of the degree of practicing the dimensions of internal auditing and continuous improvement, the following results:

1/8 Internal Audit:

1. There is a very high level of practice on the scale of the internal audit axis with regard to audit implementation, with an Arithmetic average (4.21 out of 5) and a standard deviation (0.74).

2. There is a high level of practice on a scale of dimensions (audit planning, audit preparation, follow-up of audit results, qualification of auditors) with arithmetic averages ranging from (3.99 to 3.64 out of 5).

2/8 Continuous improvement:

3. There is a high level of practice on the scale of the examination axis with an arithmetic average (3.40 out of 5) and a deviation Standard (1.22).

4. There is a medium level of practice across the dimensions (planning, implementation, action) of continuous improvement with arithmetic averages that ranged from (3.26 to 3.07 out of 5).

As the table highlights the following table:

1. The statistical indicators of standard deviations, all of which exceed the value (0.90<), indicate that there is a high contrast between the views of the study sample surveyed around the reality of practicing internal audit dimensions and continuous Improvement.

2. The low level of continuous improvement practice, despite the high level of internal audit practice, may be due to the lack of effective recruitment of internal audits to affect the same percentage in continuous improvement processes, or it may practice some of its items well with no interest in practicing other items. To the same degree of efficiency.

Discuss the results and recommendations of the study

First: the results:

1. There is a very high level of practice for internal auditing.
2. Where the dimensions of internal auditing are practiced in accordance with the requirements of the guiding specification for auditing ISO (2018-19011) according to the order (audit implementation, audit preparation, audit planning, auditors qualification and then follow-up to the results of audit) respectively.

3. Internal audit is highly practiced in accordance with the requirements of the guiding specification for internal auditing for a management system Quality ISO (ISO-19011-2018)

4. It is noted that the level of continuous improvement practice is low, although the examination of improvement efforts is carried out at a high level.

5. The presence of a statistically significant of the internal auditing in continuous improvement.

6. It is noted that (69.2%) of the internal audit procedures are positively related to the continuous improvement processes.

7. It is noted that the increase in the level of internal audits processes by one degree leads to raising the level of improvement Continuous (47.8%).

8. The presence of a statistically significant significance for the qualification of auditors in continuous improvement, meaning that (60.8%) of the procedures for qualifying auditors processes are positively related to the processes of continuous improvement.

9. It is noted that the increase in the level of qualification of auditors by one degree leads to an increase in the level of continuous improvement by (36.9%)

10. It is noted that there is no significant statistical significance between internal audit planning in continuous improvement, and it indicates the procedures of internal audit planning processes are not strongly related to continuous improvement processes

11. The results of the analysis indicate that there are no statistically significant in the level of internal auditing of quality management systems that can be traced back to the difference of a variable (years of experience, auditor description, auditor's academic level, auditor's specialization, number of audit training programs).

Third- Study Recommendations:

1. Since the results of the study indicate that there is a very high level of practice for internal auditing according to the arrangement (audit implementation, audit preparation, audit planning, auditor qualification and then follow-up audit results), the study emphasizes interest to audit efforts with a focus on following up non-conformities order through activate the principle of accountability and motivation.

2. since the results of the study indicates that there is low level of continuous improvement practice, the study recommends handling related fields to planning for continuous improvement, providing data bases, spreading a culture of improvement, raising awareness of its methods and tools, and working to implement the improvements provided so that they are more professional and realistic, especially as it works to motivate employees to practice improvement

(69.2%) of internal audit procedures positive correlation with continuous improvement processes

3. Since the results of the study showed a statistically significant presence of internal audit continuous improvement, the study recommends the need to pay attention to internal audit processes of the quality management system and increase their rates to explore and apply continuous improvement, especially (69.2%) of internal audit procedures have positively related with continuous improvement processes.

4.Since the results of the study showed a significant statistical significance for the qualification of auditors for continuous improvement, the study recommends the necessity of qualifying auditors and training them qualitatively on auditing methods, using checklists, using statistical tools for quality, and developing their skills in managing audit operations and teams,

especially that(60.8%)of the procedures auditor qualification processes are positively related to continuous improvement process.

5.since the results of the study showed that there is no significant statistical significance for the planning of internal auditing in continuous improvement, the study recommends that the matter be subjected to more studies on the effectiveness of planning, as planning within the efforts of the internal audit process was mentioned in the ranking in the third place, which requires the presence of a high degree of planning, as it is the basis for the work, and from this the study recommends the need to pay attention to the comprehensiveness interest of the audit and focus on activities of importance and relevance to the outputs of the energy sector.

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