Indonesian Journal of Sustainability Accounting and Management
ISSN 2597–6214 | e–ISSN 2597–6222
DOI: 10.28992/ijsam.v7i2.760

Commitment to Applying Green Accounting in Industrial Companies in the Kingdom of Saudi Arabia to Achieve the Dimensions of Sustainable Development

Awadalla Gafer Elhussin Abobaker[1]* | Ardi Gunardi[2]

[1]*College of Science and Humanities at Howtat Sudair, Majmaah University, Department of Business Administration, Al-Majmaah 11952, Saudi Arabia*
[2]*Universitas Pasundan, Faculty of Economics and Business, Bandung, Indonesia*

*Correspondence to: Awadalla Gafer Elhussin Abobaker, Department of Business Administration, College of Science and Humanities at Howtat Sudair, Majmaah University, Al-Majmaah 11952, Saudi Arabia
E-mail: a.abobaker@mu.edu.sa

Abstract: This study aims to examine the degree of commitment of industrial enterprises in the Kingdom of Saudi Arabia to green accounting, contributing to sustainable development goals. Utilizing descriptive-analytic and deductive methods, a unique questionnaire was circulated to a random sample of thirty industrial enterprises. The collected data were processed using the SPSS statistical application. The results indicate a significant lack of industrial firms' dedication to the application of green accounting. It also identifies existing barriers impeding the implementation of green accounting to achieve sustainable development objectives. The study proposes an increased awareness of the concept of "green accounting" and calls for the introduction of laws and accounting standards necessitating businesses to adopt green accounting practices. The significance of the study lies in its distinct focus on the adoption of green accounting in Saudi Arabian industrial enterprises, highlighting both the challenges faced and potential solutions.

Keywords: barriers, green accounting, industrial enterprises, Saudi Arabia, sustainable development.

Article info: Received 11 April 2022 | revised 15 May 2023 | accepted 3 October 2023

Recommended citation: Abobaker, A. G. E., & Gunardi, A. (2023). Commitment to Applying Green Accounting in Industrial Companies in the Kingdom of Saudi Arabia to Achieve the Dimensions of Sustainable Development. *Indonesian Journal of Sustainability Accounting and Management, 7*(2), 317–328. https://doi.org/10.28992/ijsam.v7i2.760

INTRODUCTION

Following economic failures, financial crises, and climate change, interest in sustainable development approaches has surged (Sachs et al., 2019; Buallay et al., 2021). This was clear in the 2015 document of the United Nations Summit on Sustainable Development, in which it was declared that economic growth and sustainable social and environmental policies must be promoted (UN, 2015). Since the United Nations' introduction of the Sustainable Development Goals for the period 2015 to 2030, which are comprised of 17 development goals, nations have raced to accomplish their objectives, including Saudi Arabia. The Kingdom's Vision 2030 has adopted a number of programs, initiatives, and projects that enhance efforts to achieve sustainable development, such as the housing program, the quality-of-life program, the financial balance program, the national personality program,

and the national industries and services development program (Alshuwaikhat & Mohammed, 2017; Rana & Alayed, 2018). As a result, it was able to achieve many of these objectives and even surpass them in stages.

In this context, the Kingdom has set a clear framework for restoring and revitalizing the ecosystem through the Saudi Green Initiative, which aims to achieve zero carbon emissions by 2060; the Al-Ula Initiative, which aims to reduce emissions through initiatives currently underway; and by working to revive its diversity, which has always been a source of commercial and cultural sustainability (Aldossary & Alharbi, 2022; Rana & Alayed, 2018).

Green accounting came from the premise that it works to cover all accounting aspects that may be affected by the response of the economic unit to internal and external environmental and social matters by adopting several procedures and tools through which it can measure these real environmental activities and disclose them, and reduce or reduce these activities through build multiple tools (Maama & Appiah, 2019). It is one of the newly emerged types of accounting, as it integrates environmental sources and assets into corporate accounts and measures the environmental, social and economic impact of business, by determining the use of resources and the cost of the impact of economic units on the environment (Ulupui et al., 2020).

Green accounting tries to incorporate both economic and environmental information, and it evaluates the usage of resources by analyzing financial statements (Johansson, 2018; Callejas & Ocampo-Salazar, 2021). Measuring and communicating cost information that has an actual or potential impact on the environment, and measuring the company's impact on the environment, but in a material way (such as production waste or oil refinery waste), so that it is not without benefit as it achieves sustainability by preserving the value of goods and services that depreciate over time. In addition to helping to decrease costs by minimizing damage and hazardous waste, time must be accounted for and legally addressed by enacting the required legislation to restrict this issue, which has become one of society's major challenges (Gavriletea, 2017). The purpose of this study is to determine the extent to which industrial companies in Sudair Industrial City in the Kingdom of Saudi Arabia are committed to implementing green accounting to achieve the dimensions of sustainable development, and to identify the barriers that prevent the application of green accounting to industrial companies in the Kingdom of Saudi Arabia.

Since the beginning of the 1980s, environmental problems have threatened life forms on the planet, the most prominent of which are environmental pollution and the increased depletion of natural resources (Dunlap & Catton, 1994; Gatto & McCardle, 2019). Since the economic unit is a part of the societal system through its continuous economic and social role and because it is one of the primary parties responsible for the environmental deterioration occurring in society, it is necessary for the economic unit to contribute to addressing this issue.

These issues were not addressed in the financial statements, which added a new and evolved dimension. For the accounting profession, which was limited to financial and economic aspects in the past, the trend towards adopting environmental (green) accounting has become necessary due to the significance of determining and measuring environmental costs, thereby necessitating social, environmental, and economic disclosure, which then evolved into disclosure of environmental costs (Ojiakor et al., 2018). Given the significance of green accounting and the necessity of sustainability, the American Institute of Certified Public Accountants (AICPA) developed the AD R Standard (SOP-96-1) in 1996 to address environmental duties (Freedman & Stagliano, 2007). This standard provided substantial new and thorough environmental accounting rules. Several names have appeared in the field of accounting thought: "green accounting," "environmental accounting." They all seek to address and identify activities and programs that affect the environment. It is the responsibility of

countries to spend a significant amount of money to protect the environment from corporate damage in order to preserve the capabilities of future generations and achieve sustainable development and social welfare (Khajehpour et al., 2017). Determining the extent to which industrial companies operating in Sudair Industrial City adhere to the application of green accounting to achieve the dimensions of sustainable development in the Kingdom of Saudi Arabia and what obstacles they face in applying green accounting constitutes the central challenge of this study.

The following are the research objectives: Exposing the commitment of industrial firms to use green accounting in order to fulfill the features of sustainable development represented by the environmental dimension in the Kingdom of Saudi Arabia Determine the extent to which industrial firms in the Kingdom of Saudi Arabia are committed to using green accounting in order to accomplish the economic dimension of sustainable development. Exposing the level of industrial enterprises' commitment to implementing green accounting in order to accomplish the features of sustainable development represented by the social component in Saudi Arabia Identifying impediments to the implementation of green accounting in industrial firms operating in Sudair Industrial City, Saudi Arabia.

The significance of this study stems from the significance of green accounting in demonstrating the dimensions of sustainable development and preserving it, in achieving the optimal use of natural resources as one of the pillars of sustainable development, in demonstrating the role played by industrial companies in Sudair Industrial City in the Kingdom of Saudi Arabia through their social responsibility towards society and the environment, and in attracting the attention of these groups. The success of the application of green accounting, particularly at a time when there is an active demand from some countries, professional associations, and accounting bodies to disclose environmental and social costs in their financial reports, in light of the growth of technology and the expansion of industrial projects, makes the lists.

In light of the fact that finance does not match reality, the researcher might emphasize the significance of this study as follows: 1) Scientific significance: It represents the theoretical foundation of green accounting in order to realize the objectives of sustainable development in its environmental, social, and economic dimensions. Environmental programs and activities based on the ideas of sustainable development will be used to make industrial firms in Sudair Industrial City more aware of the environment. 2) Importance from a pragmatic standpoint: It is illustrated by the following: The researcher hopes that the results of this study will benefit industrial companies operating in Sudair Industrial City by revealing the dimensions of the application of green accounting to achieve sustainable development goals and the decisions that can be made regarding their responsibilities to the environment and society. The following hypotheses have been formed based on the present study's aims and the needs of implementing green accounting to meet the sustainable development goals of industrial enterprises operating in Sudair Industrial City in the Kingdom of Saudi Arabia:

In the Kingdom of Saudi Arabia, there is no statistically significant association between the adoption of green accounting by industrial enterprises and the attainment of sustainable development characteristics through the environmental component. In the Kingdom of Saudi Arabia, there is no statistically significant association between the adoption of green accounting by industrial enterprises and the attainment of sustainable development characteristics through the economic component. In the Kingdom of Saudi Arabia, there is no statistically significant association between the use of green accounting by industrial enterprises and the attainment of sustainable development characteristics through the social component. In Saudi Arabia, there are no statistically important reasons why industrial firms can't use green accounting to help reach the goals of sustainable development.

The purpose of this study is to determine the extent to which industrial companies in Sudair Industrial City, Saudi Arabia, are implementing green accounting to achieve the dimensions of sustainable development. The study aims to identify the barriers that prevent the application of green accounting in these companies.

The study's significance lies in its contribution to demonstrating the dimensions of sustainable development and the importance of green accounting in achieving it. By examining the commitment of industrial firms to green accounting, the study can reveal the role these companies play in promoting sustainable development and fulfilling their responsibilities towards the environment and society. Additionally, the study can provide insights into the obstacles faced by industrial companies in implementing green accounting, which can inform decision-making and strategies to overcome these barriers.

By adopting a scientific and pragmatic approach, the study aims to provide theoretical foundations for green accounting and its connection to sustainable development. It also seeks to benefit industrial companies in Sudair Industrial City by providing them with information on green accounting's application and its potential impact on their responsibilities and decision-making processes.

In summary, the study aims to: 1) Expose the commitment of industrial firms to using green accounting to fulfill the environmental dimension of sustainable development in Saudi Arabia. 2) Determine the extent of industrial firms' commitment to green accounting in achieving the economic dimension of sustainable development. 3) Expose the level of industrial enterprises' commitment to implementing green accounting in accomplishing the social component of sustainable development in Saudi Arabia. 4) Identify impediments to the implementation of green accounting in industrial firms operating in Sudair Industrial City, Saudi Arabia.

Overall, this study aims to contribute to the understanding of green accounting's role in achieving sustainable development and provide practical insights for industrial companies in Saudi Arabia.

METHODS

The study population consists of industrial companies operating in Sudair Industrial City, Saudi Arabia, Al Majmaah Governorate. The project is located 120 km north of the city of Riyadh on an area of (264) million square meters and a length of (32) km on the Riyadh-Qassim road. It is divided into two levels, namely the medium and light industries zone, which includes: medium industries ("forming metals, plastics, and paper products"), food industries, pharmaceutical industries, heavy industries ("melting and rolling of metals"), and building materials ("cement products of all kinds"). Basic metal industries (26 factories), food products (24 factories), building materials and ceramic and glass industries (47 factories), wooden products and furniture (7 factories), chemical and plastic products (75 factories), manufactured metal products, machinery and equipment (73 factories), and paper, printing, and publishing products (8 factories), one textile factory, and the other (32) factories; this coincided with the joining of many leading brands such as: Samnan Company, Windsor, Herfy, Al-Jazeera Paints, and the factory of Sudair Industrial Pharmaceutical Company, and a manufacturer of medicinal active substances.

A regular random sample consisting of 30 operating industrial companies was chosen. The researcher distributed 220 questionnaires to financial managers, accountants, auditors, department heads, and employees. The number (176) was retrieved by 80% of the questionnaire due to the lack of response by some, and to find out the optimal limit for the random sample, the researcher applied the Richard Gere equation, which states:

$$\frac{\left(\frac{z}{d}\right)^2 \times (0.50)^2}{1+\frac{1}{N}\left[\left(\frac{z}{d}\right)^2 \times (0.50)^2 - 1\right]}$$

Where:
N = community size
Z = the standard score corresponding to the significance level 0.95, which is equal to 1.96
D = percentage error

By applying the equation, the optimal size of the research sample becomes (176) individuals with a rate of 80%. The frequencies and percentages of the study sample were calculated according to gender, educational qualification, and a number of years of experience, and the following table shows this. The researcher relied on collecting data to serve the study through the use of a survey list, which is the most appropriate method for this type of research. The researcher developed a questionnaire as a tool for the study after reviewing the tools used in previous studies related to the subject of the study. The survey list that was directed at the study sample included the following: 19 elements divided into its four axes, the researcher believes that they represent the role of green accounting in achieving the dimensions of sustainable development, and these dimensions were chosen by referring to previous studies in this field, and by being guided by the opinions of many experienced employees, and the researcher sent a survey list to individuals. The sample included a letter addressed from the researcher to the respondent, explaining the objectives of the study and the procedures for completing the questionnaire. The questionnaire was sent to all respondents (176) manually, via e-mail, as well as using the technique of filling out the questionnaire via the Internet using the questionnaire website.

It is clear from Table 1 that the majority of the respondents were 159 males, or 90.3%, while females numbered only 17, or 9.7%, of the total sample of 176 respondents. It is clear from Table 2 that the largest number of bachelor's degree holders was 125, or 71.02%, followed by diploma holders, who numbered 32, or 18.2%. Master's certificate holders numbered only 13, or 7.4%. Finally, the number of PhD holders reached 4, or 4% of the sample. The total number of 176 respondents. It is clear from Table 3 that the majority of respondents occupy the position of accountant, numbering 105, or 59.7%, followed by the position of the financial manager, numbering 36, or 20.5%, then the position of financial controller, numbering only 35, or 19.5%, out of the total sample of 176 respondents. It is clear from Table 4 that the majority of respondents whose experience ranged from (more than 15 years) amounted to 107, or 59.7%, while those whose experience ranged from (10 years to less than 15 years) numbered 35, at a rate of 19.9%, while those whose experience ranged from (5 years and less) (from 10 years old) and (less than 5 years old) were only 18, or 10.2% of the total sample of 176 respondents. Table 1 shows all these results.

Cronbach Alpha was calculated to measure the stability coefficient for each axis of the resolution, as shown in the following Table 2. It is clear from Table 2 that Cronbach's alpha for all paragraphs of the axes of the questionnaire is < 0.6, and there is great homogeneity and consistency between the variables of the study whenever the value of Cronbach's alpha approaches one, and the opposite occurs if the value of Cronbach's alpha approaches zero.

Table 1 Explain the characteristics of the research sample

The sample members according to the type variable	**number**	**(%)**
Male	**159**	**90.3**
Female	**17**	**9.7**
The sample members according to the qualification variable	**number**	**(%)**
Bachelor's	**125**	**71.02**
Master's	**13**	**7.4**
Ph.D	**4**	**2.3**
Diploma	**32**	**18.2**
The sample members according to the variable of specialization	**number**	**(%)**
Accountant	**105**	**59.7**
Financial Manager	**36**	**20.5**
Financial Controller	**35**	**19.9**
The sample members according to the experience variable	**number**	**(%)**
Less than 5 years	**18**	**10.2**
From 5 years and less than 10	**18**	**10.2**
From 10 years and less than 15	**35**	**19.9**
15 years and over	**107**	**59.7**
Total	**176**	**100%**

Source: prepared by the researcher from the outputs of the (SPSS) package.

Table 2 It shows Cronbach's alpha stability indices for the paragraphs of the axes of the questionnaire

Axes	**Number of statements**	**Stability coefficient Cronbach's alpha**
The first axis	5	0.628
The second axis	5	0.706
Third axis	5	0.684
Fourth Axis	4	0.933

Source: prepared by the researcher from the outputs of the (SPSS) package.

RESULTS AND DISCUSSION

Before verifying the validity of the study's hypotheses, the researcher resorted to using the Kolmengrove-Smirnov test to verify the extent to which the study data were subject to a normal distribution, and the Table 3 illustrates this.

It is clear from Table 3 that the Z value calculated for the first axis expressions is (0.221) and the significance level is less than 0.05, which indicates the existence of statistically significant differences between the distribution of the axis data and the normal distribution. And the calculated Z value for the second axis expressions is (0.283)

and the level of significance is less than 0.05, which indicates the existence of statistically significant differences between the distribution of the axis data and the normal distribution. And that the Z value calculated for the phrases of the third axis is (0.214) and the level of significance is less than 0.05, which indicates the existence of statistically significant differences between the distribution of the data on the axis and the normal distribution, and that the Z value calculated for the phrases of the fourth axis is (0.402) and the level of significance is less than 0.05, which indicates the existence of statistically significant differences between the distribution of axis data and the normal distribution (Al-Budaiwi, 2021). After making sure that the study data were subject to a normal distribution, the researcher tested the study hypotheses as follows:

Presentation and discussion of the results of the first hypothesis, which states: (There is no statistically significant relationship between the application of green accounting in the industrial companies operating in Sudair Industrial City and the achievement of sustainable development through the environmental dimension). Table 3 shows the results of the relationships in this hypothesis.

Table 3 Demonstrates a normal distribution test

Interlocutor	number of phrases	Z - Test	Significance level value
The first axis	5	0.221	0.000
The second axis	5	0.283	0.000
Third axis	6	0.214	0.000
fourth Axis	4	0.402	0.000
All hypotheses	**19**	**0.542**	**0.000**

Source: prepared by the researcher from the outputs of the (SPSS) package.

Table 4 Demonstrates the application of green accounting in industrial companies operating in Sudair Industrial City and achieving sustainable development through the environmental dimension

	Phrase	U	STD	Chi	D.F	Sig	approval level
1.	Your facilities are committed to applying green accounting by combating pollution and reducing gas emissions	1.69	0.46	27.841	1	0.000	not agree
2.	Your facilities apply green accounting to preserve natural resources and rationalize consumption to achieve sustainable development	1.79	0.40	61.455	1	0.000	not agree
3.	Your facilities recycle waste and produce environmentally friendly products	2.30	1.01	189.136	3	0.000	not agree
4.	Your facilities carry out awareness campaigns to preserve the environment	3.007	1.34	65.330	2	**0.000**	I agree
5.	The application of green accounting leads to the reduction of environmental damage to living organisms	1.99	0.44	173.330	2	0.000	not agree
Total score for all paragraphs		2.69	1.02	165.347		0.000	not agree

Source: prepared by the researcher from the outputs of the (SPSS) package.

It appears from Table 4 that the arithmetic mean for each of the paragraphs of this hypothesis is less than the mean of hypothesis 3, and this result indicates that the majority of the study sample does not agree with all the items that measure this hypothesis except for the fourth paragraph of the paragraphs of the axis, which

states (your facilities in awareness campaigns to preserve the environment), where the average value was less than the hypothesis mean 3. This indicates that there are no statistically significant differences, and to prove the validity or invalidity of the hypothesis, the chi-square test was used, and the table shows that the calculated chi-square values for each of the paragraphs of the hypothesis At a level of significance of 0.00, less than the level of significance a = 0.05, where the value of the chi-squared for all paragraphs of the hypothesis was 165.347, with a level of significance less than 0.05. From the above, the null hypothesis is rejected and the alternative hypothesis is accepted, which is: "There is a statistically significant relationship between the application of green accounting in industrial companies operating in Sudair Industrial City and achieving sustainable development through the environmental dimension." It has been validated in all the paragraphs that measure it. And by comparing the result of the hypothesis with the studies conducted in the Saudi environment, we find it consistent with the study of Abu Amara (2019), which is that companies in Saudi Arabia bear their responsibilities towards the environment in general, but they did not achieve the levels of application of the required environmental responsibility disclosure, as well as being in agreement with Mahmoud's (2019) study, which shows the low level of application of accounting disclosure of sustainable development practices for Saudi companies.

Presentation and discussion of the results of the second hypothesis, which states: There is no statistically significant relationship between the application of green accounting by industrial companies and the achievement of dimensions of sustainable development through the economic dimension in the Kingdom of Saudi Arabia.

Table 5 It shows the arithmetic means and standard deviations of the respondents' responses about the application of lean accounting tools

	Phrase	U	STD	Chi	D.F	Sig	approval level
1.	The application of green accounting helps in achieving optimal utilization and preservation of renewable resources	1.79	0.40	61.455	1	0.000	I agree
2.	The application of green accounting leads to knowing the company's ability to develop and grow its environment	1.90	0.70	22.989	2	0.000	not agree
3.	Green accounting helps to achieve product safety and standards	2.30	1.01	184.364	3	0.000	not agree
4.	Green accounting helps to employ natural resources without degrading the components of the environment	1.79	0.40	64.455	1	0.000	not agree
5.	Green (environmental) accounting requirements are disclosed in the financial statements	4.46	1.05	161.414	2	0.000	I agree
Total score for all paragraphs		**3.01**	**1.03**	**198.453**		0.000	

Source: prepared by the researcher from the outputs of the (SPSS) package.

It appears from Table 5 that the arithmetic mean for each of the paragraphs of this hypothesis is less than the mean of hypothesis 3, with the exception of phrase No. 5 which states, "The requirements of green (environmental) accounting are disclosed in the financial statements," and this result indicates the disagreement of the majority of individuals. The study sample includes all items that measure this hypothesis. To prove the validity or invalidity of the hypothesis, the k-square test was used. Table 5 shows that the k-square values calculated at the level of significance 0.00 are less than the level of significance a = 0.05, where the value of the k-squared for all paragraphs of the hypothesis was 198.4, at a lower level of significance of 0.05, and this indicates that there are statistically significant differences between the general arithmetic mean of hypothesis 3.01 and the hypothetical mean of 3. From the foregoing, the null hypothesis is rejected and the alternative hypothesis is accepted, which is, "There is a statistically significant relationship between the application of green accounting

in the industrial companies operating in Sudair Industrial City and the achievement of sustainable development through the economic dimension of the Kingdom of Saudi Arabia." It has been validated for all the items that measure it. By comparing the result of the hypothesis with studies conducted in the Saudi environment, we find that this result is consistent with the result of the Tawfiq & Youssef (2019) study, which found the existence of a significant inverse relationship between the dispersion of ownership and the level of quality of sustainability disclosure and the existence of a direct relationship between the level of quality of sustainability disclosure and family ownership of companies.

Presentation and discussion of the results of the third hypothesis, which states: "There is a statistically significant relationship between the application of green accounting by industrial companies and the achievement of dimensions of sustainable development through the social dimension in the Kingdom of Saudi Arabia."

Table 6 It shows the arithmetic means and standard deviations of the respondents' responses about the social dimension

	Phrase	U	STD	Chi	D.F	Sig	approval level
1.	Your organization helps support educational and cultural activities and institutions	2.80	0.99	117.136	3	0.000	not agree
2.	Helps your organization to train and employ new graduates	2.20	0.40	61.455	1	0.000	not agree
3.	Your organization employs people with special needs	3.40	1.11	24.761	2	0.000	not agree
4.	Your organization supports health care services and institutions	2.91	1.14	22.989	2	0.000	not agree
5.	Your organization makes donations and charitable contributions	3	1.09	14.330	2	I agree	I agree
Total score for all paragraphs		**3.61**	**1.42**	**176.166**		**0.000**	I agree

Source: prepared by the researcher from the outputs of the (SPSS) package.

It appears from Table 6 that the arithmetic mean for each of the paragraphs of this hypothesis is less than the mean of hypothesis 3, except for phrase No. 5, which states that your organization makes donations and charitable contributions, and this result indicates that the majority of the study sample does not agree with all the items that measure this hypothesis. To prove the validity or invalidity of the hypothesis, the k-square test was used, and the table shows that the k-squared values were calculated at the level of significance 0.00, which is less than the level of significance a = 0.05, where the value of the k-squared for all paragraphs of the hypothesis was 176.166, and this value is at a significant level less than 0.05, and this indicates that there are statistically significant differences between the general arithmetic mean of the hypothesis 3.61, and the hypothetical mean 3. From the foregoing, the researcher concludes that the third hypothesis, which states that "there is no statistically significant relationship between the application of green accounting in the industrial companies operating in Sudair Industrial City and the achievement of sustainable development through the social dimension," has been validated in all the items that measure it. And by comparing the result of the hypothesis with the studies conducted in the Saudi environment, we find that this result is consistent with the result of the study by Obaid (2019), which found a significant relationship between the disclosure of sustainable development in its three dimensions in financial reports and the operational performance of Saudi companies.

Presentation and discussion of the results of the fourth hypothesis, which states: There are no statistically significant obstacles to the application of green accounting by industrial companies to achieve the dimensions of sustainable development. In Saudi Arabia, Table shows the results of the relationships of this hypothesis.

Table 7 It shows the arithmetic means and standard deviations of the respondents' responses about the obstacles to applying lean accounting tools

	Phrase	U	STD	Chi	D.F	Sig	approval level
1.	The company's accountants are not familiar with green accounting to achieve the dimensions of sustainable development	2.21	0.989	173.330	2	0.000	not agree
2.	Scarcity of educational and awareness programs that fulfill the preparation of environmental sustainability reports	1.80	0.602	67.136	2	0.000	not agree
3.	There are no binding laws and regulations for preparing sustainability reports	2.21	0.989	173.330	2	0.000	not agree
4.	The lack of accounting standards for green accounting obliges companies to disclose sustainability reports	1.80	0.602	67.136	2	0.000	not agree
Total score for all paragraphs		**2.65**	**0.99**	**170.251**	**2**	0.000	not agree

Source: prepared by the researcher from the outputs of the (SPSS) package.

It appears from Table 7 that the arithmetic mean for each of the paragraphs of this hypothesis is less than the mean of Hypothesis 3, and this result indicates that the majority of the study sample does not agree with all the items that measure this hypothesis. To prove the validity or invalidity of the hypothesis, the Kai-square test was used, and the table shows that the Kai-square values were calculated at the significance level of 0.00, which is less than the significance level a = 0.05, as the Kai-square value for all paragraphs of the hypothesis was 170.251, and this value is at a significant level less than 0.05, and this indicates that there are statistically significant differences between the general arithmetic mean of hypothesis 2.65 and the hypothetical mean of 3. From the foregoing, the researcher concludes that the fourth hypothesis, which states that "there are no statistically significant obstacles to the application of green accounting in the industrial companies operating in Sudair Industrial City to achieve the dimensions of sustainable development," has been validated in all the items that measure it. Thus, the null hypothesis is rejected, and we accept the alternative hypothesis that says, "There are statistically significant obstacles to the application of green accounting in industrial companies operating in Sudair Industrial City to achieve the dimensions of sustainable development." Comparing the result of the hypothesis with the studies conducted in the Saudi environment, we find that this result is consistent with the results of each of the Meligy (2015) and Mahmoud (2019) studies, which both found a low level of accounting disclosure about the sustainable development practices of Saudi companies, and the disclosure information was in a quantitative and descriptive form (mixed disclosure).

CONCLUSION

In conclusion, the statistical data suggests a significant, though somewhat low, positive correlation between the implementation of green or environmental accounting by industrial companies in Sudair Industrial City and the advancement of sustainable development goals through an environmental lens in Saudi Arabia. The arithmetic mean for the environmental dimension in the sample was 2.69, with a standard deviation of 1.2. Furthermore, the findings indicate a substantial positive correlation between the adoption of green accounting by these industrial firms and the fulfillment of sustainable development via the economic dimension. The arithmetic mean for this dimension was 3.01, with a standard deviation of 1.3. The researcher also discovered a highly significant positive link between the use of environmental accounting by these companies and the

promotion of sustainable development through the social dimension, with an arithmetic mean of 3.61 and a standard deviation of 1.42. The study also pointed to a major positive correlation between the challenges to the application of green accounting in these companies and the realization of sustainable development goals in the Kingdom, with an arithmetic mean of 2.65 and a standard deviation of 0.99 for the environmental dimension. The central research objective was to determine whether the application of green accounting by industrial companies in Sudair Industrial City had a significant impact on the attainment of sustainable development goals across various dimensions. The findings confirm that it does, but with varying degrees of correlation across the environmental, economic, and social dimensions. However, this study had certain limitations. It was focused solely on the industrial companies in Sudair Industrial City, which might not be representative of other sectors or regions in the Kingdom of Saudi Arabia. The results may also be skewed by factors not considered in the study, such as government policies or global economic trends. Moving forward, it is recommended that industrial firms in Sudair Industrial City increase their use of green accounting to support the achievement of sustainable development goals. Incentives, such as tax breaks or commercial facilities, could be provided to motivate these companies. Additionally, it is crucial to educate workers in the field through workshops and specialized training courses on green accounting and sustainable development. Future studies could expand the scope to include other industrial cities in Saudi Arabia to better understand the challenges in applying green accounting towards sustainable development in line with the Kingdom's Vision 2030. It would also be beneficial to examine different sectors and understand how green accounting can be effectively implemented across them.

ACKNOWLEDGMENT

The authors would like to thank the Deanship of Scientific Research at Majmaah University for funding this work through Research No. 544.

ORCID

Awadalla Gafer Elhussin Abobaker https://orcid.org/0000-0002-5105-7440
Ardi Gunardi https://orcid.org/0000-0002-0372-7067

REFERENCES

Abu Amara, M. M. J. (2019). Disclosure of environmental responsibility in Saudi joint stock companies. International Journal of Economics and Business, 7(3), 286-302. https://doi.org/10.31559/GJEB2019.7.3.3

Al-Budaiwi, E. M. F. (2021). *Principles of choosing the statistical method in physical education research*. Faculty of Physical Education, Tanta University, Arab Republic of Egypt.

Aldossary, M., & Alharbi, H. A. (2022). An eco-friendly approach for reducing carbon emissions in cloud data centers. *Computers, Materials and Continua, 72*(2), 3175–3193. https://doi.org/10.32604/cmc.2022.026041

Alshuwaikhat, H. M., & Mohammed, I. (2017). Sustainability matters in national development visions—Evidence from Saudi Arabia's Vision for 2030. *Sustainability, 9*(3). https://doi.org/10.3390/su9030408

Buallay, A., Fadel, S. M., Alajmi, J., & Saudagaran, S. (2021). Sustainability reporting and bank performance after financial crisis: evidence from developed and developing countries. *Competitiveness Review: An International Business Journal, 31*(4), 747–770. https://doi.org/10.1108/CR-04-2019-0040

Callejas, D. G., & Ocampo-Salazar, C. A. (2021). Whither environmental accounting. The challenge of ecological and green accounting. In *Environment and Innovation* (pp. 179-200). CRC Press.

Dunlap, R. E., & Catton, W. R. (1994). Struggling with human exemptionalism: The rise, decline and revitalization of environmental sociology. *The American Sociologist, 25*(1), 5–30. https://doi.org/10.1007/BF02691936

Freedman, M., & Stagliano, A. J. (2007). Some new evidence on the effectiveness of authoritative environmental reporting guidance. *Envisioning a New Accountability (Advances in Public Interest Accounting), 13*, 1–15. https://doi.org/10.1016/S1041-7060(07)13001-7

Gatto, G., & McCardle, J. R. (2019). Multispecies design and ethnographic practice: Following other-than-humans as a mode of exploring environmental issues. *Sustainability, 11*(18). https://doi.org/10.3390/su11185032

Gavriletea, M. D. (2017). Environmental impacts of sand exploitation: Analysis of sand market. *Sustainability, 9*(7). https://doi.org/10.3390/su9071118

Johansson, E. (2018). *Large-Scale Land Acquisitions as a Driver of Socio-Environmental Change: From the Pixel to the Globe* [Doctoral dissertation, Lund University]. Faculty of Science, Department of Physical Geography and Ecosystem Science.

Khajehpour, H., Saboohi, Y., & Tsatsaronis, G. (2017). Environmental responsibility accounting in complex energy systems. *Journal of Cleaner Production, 166*, 998-1009. https://doi.org/10.1016/j.jclepro.2017.08.013

Maama, H., & Appiah, K. O. (2019). Green accounting practices: lesson from an emerging economy. *Qualitative Research in Financial Markets, 11*(4), 456–478. https://doi.org/10.1108/QRFM-02-2017-0013

Mahmoud, A. H. A. H. (2019). The extent to which Saudi joint stock companies disclose sustainable development practices in their financial reports, a field study. *Journal of Administrative and Economic Sciences, 13*(1), 61-115.

Meligy, M. M. A. H. (2015). The impact of disclosure of sustainable development practices on the quality of accounting profits for companies registered on the Saudi Stock Exchange. *Accounting Thought, Department of Accounting and Auditing, Faculty of Commerce, Ain Shams University, 4*(19), 3-60.

Obaid, R. R. (2019). The impact of the disclosure of sustainable development in financial reports on operational performance and its reflection on the value of companies: an applied study on companies traded, the most important of which are in the Saudi capital market. *Journal of Economics and Administration, 34*(2), 87-117.

Ojiakor, I., Ezuwore, C. N., & Ozioko, B. (2018). Environmental Cost Disclosure in the Financial Statements of Motor Vehicle Manufacturing Firms in South East Nigeria. *IJSAR Journal of Advanced Management and Social Sciences (IJSAR-JAMSS), 5*(3), 271-285. Available at: https://www.mdcjournals.org/pdf/153833713520183009081552.pdf

Rana, D., & Alayed, R. S. (2019). Green business: Sustainability within Saudi vision 2030. *International Journal of Advance Study and Research Work, 1*(9), 4–14. https://doi.org/10.5281/zenodo.2532182

Tawfiq, A. M. S. M. F., & Youssef, H. M. I. (2019). Studying and testing the relationship between the quality of voluntary disclosure about sustainability and corporate ownership structure by applying to listed companies about sustainability and corporate ownership structure by applying to companies listed in the Saudi Stock Exchange. *Journal of Accounting Research, 14*(2), 9–76.

Sachs, J. D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N., & Rockström, J. (2019). Six Transformations to achieve the Sustainable Development Goals. *Nature Sustainability, 2*(9), 805–814. https://doi.org/10.1038/s41893-019-0352-9

Ulupui, I. G. K. A., Murdayanti, Y., Marini, A. C., Purwohedi, U., Mardi, & Yanto, H. (2020). Green accounting, material flow cost accounting and environmental performance. *Accounting, 6*(5), 743–752. https://doi.org/10.5267/j.ac.2020.6.009

United Nations. (2015). *Draft outcome document of the United Nations Summit for the Adoption of the Post-2015 Development Agenda: draft resolution/submitted by the President of the General Assembly*. New York: United Nation. Available at: https://digitallibrary.un.org/record/800852/files/A_69_L.85-EN.pdf?ln=en