

The Role of Lean Accounting in Achieving Sustainable Development Goals

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Abstract : This research aims to identify the effective role of lean accounting in achieving sustainable development goals by addressing a set of principles that contribute to positive gains. These principles include methods for achieving agility, reducing waste and inefficiencies in costs, achieving a competitive advantage, and generating profits that contribute to sustainable development. The study reached several conclusions, the most important of which was that the failure to implement lean accounting tools negatively impacts the achievement of sustainable development goals. It also reached several recommendations, the most important of which is organizing introductory courses on lean accounting for employees to teach them the concepts of lean accounting and its application mechanisms.

Keywords: Lean Accounting, Sustainable Development; Financial accounting, financial comptation

دور المحاسبة الرشيقة في تحقيق أهداف التنمية المستدامة

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المخلص : يهدف هذا البحث إلى تحديد الدور الفعال للمحاسبة الرشيقة في تحقيق أهداف التنمية المستدامة، من خلال تناول مجموعة من المبادئ التي تسهم في تحقيق مكاسب إيجابية. وتشمل هذه المبادئ أساليب تحقيق المرونة، وتقليل الهدر وعدم الكفاءة في التكاليف، وتحقيق الميزة التنافسية، وتوليد الأرباح التي تدعم التنمية المستدامة. وقد توصلت الدراسة إلى عدة استنتاجات، كان أبرزها أن عدم تطبيق أدوات المحاسبة الرشيقة يؤثر سلباً في تحقيق أهداف التنمية المستدامة. كما قدمت الدراسة مجموعة من التوصيات، أهمها تنظيم دورات تعريفية حول المحاسبة الرشيقة للموظفين لتعريفهم بمفاهيمها وآليات تطبيقها.

الكلمات المفتاحية : المحاسبة الرشيقة، التنمية المستدامة، المحاسبة الماليه , التنافس المالي

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1.0 Introduction

The significant developments in recent years across all economic, social, and technological aspects have rendered current accounting systems insufficient for handling complex operations. It has become essential to develop a new accounting system that improves, develops, and increases efficiency in order to achieve improvements in production quality, delivery speed, and cost reduction. Organizations must adopt alternative manufacturing models, including lean manufacturing, to improve production and quality (Hasan et al, 2024). Therefore, a shift from traditional methods to new ones is necessary (Mahmood et al, 2024). Lean accounting is a modern concept and a key to progress and overcoming the problems of traditional accounting. Stemming from lean manufacturing, lean accounting helps in making better decisions and achieving rational, long-term improvement by preparing comprehensive financial and non-financial reports (Iliemena et al, 2023). These reports provide useful information for managers and employees to make lean decisions using its robust tools, which eliminate waste, losses, and excess costs associated with traditional accounting. Lean accounting tools focus on delivering value to customers and meeting their needs through continuous improvement (Pramono et al, 2023). These decisions lead to reduced production time and costs, and improved pricing, revenue, and profitability. Lean accounting is a modern accounting tool that aims to reduce resource waste, thereby lowering costs and helping companies compete. This study focuses on investigating the availability of the necessary elements for implementing lean accounting in companies to achieve sustainable development goals (Nilashi et al, 2023). Lean accounting, as a general term, is used to describe changes in the lean business environment (Ovharhe et al, 2022). It is a set of concepts that work to reduce costs in order to reflect better financial performance for the company that applies these concepts in its industrial processes to achieve waste-free production . Alternatively, it can be viewed as a set of principles and practices that work to reduce costs by eliminating all forms of waste, eliminating activities that add no value to the product, and simplifying all accounting processes while maintaining financial control. Rabe et al, (2023) also consider lean accounting to be a new concept designed to better improve the financial performance of companies that adopt lean thinking concepts and principles as one of their business strategies (Kokubu et al, 2023). This requires changing the accounting, measurement, and control systems in a way that serves and accurately reflects the results of applying lean thinking principles in all company activities. Lean accounting is also defined as an approach that aims to support and encourage lean manufacturing, avoid constraints during the production process, and eliminate errors and losses by focusing on the value stream during the production process Most lean accounting methods were developed to support manufacturing companies and implement lean accounting within the framework of manufacturing companies (Alves et al, 2022). Now, lean accounting methods are expanding into other sectors such as financial services, healthcare, government, and education. Lean accounting processes can be implemented at an early stage, and it's crucial to apply lean optimization throughout the entire company (Ahmad et al, 2023). Nowhere is accounting more suitable than in the month-end closing, accounts receivable, accounts payable, payroll, cost accounting, and reporting processes (Eweje et al, 2021) . There are three main reasons for implementing lean optimization methods in accounting processes To improve the company's operations and processes (Dobrowolski et al, 2022) .To encourage people to learn lean methods and gain practical experience with them, as most people don't learn lean methods from books but through real-world experience. Eliminating waste will free up time to fund people working on advancing lean accounting. Sustainable development, in its

comprehensive and general sense, is defined as an activity encompassing all sectors, whether within the state, organizations, public or private sector institutions, or even among individuals (Ríos et al, 2024). It constitutes the process of developing and improving existing conditions by studying the past and learning from its experiences, understanding the present and changing it for the better, and planning effectively for the future (Namburi and Phongkrapan, (2025). This is achieved through the optimal utilization of human and material resources and capabilities, including the information, data, and knowledge possessed by those involved in the development process. It also emphasizes the absolute importance of continuous learning, acquiring and applying experiences and knowledge (Abobaker, 2023; Sadiq et al, 2023). Development is not limited to one aspect or field of life but includes social, economic, political, military, human, psychological, intellectual, medical, educational, technological, and other areas (Dasgupta et al, 2024); . Its primary aim is to raise and improve the standard of living for individuals and ensure a better life for future generations. Second: Dimensions of Sustainable Development.

2.0 Research Methodology

2.1 Practical Aspect

To test the research hypotheses, a questionnaire was designed and distributed to a sample of decision-makers and accountants working in public companies. The data collected by the questionnaire was analyzed using descriptive and analytical statistical methods, and the SPSS statistical analysis program was used. (80) questionnaires were distributed, and (72) questionnaires were received, representing a response rate of (90%), which is a good response rate.

2.2 Study Sample

The study sample included public companies. Eighty questionnaires were distributed to decision-makers and accountants, and 72 questionnaires were returned. This was done to measure the role of lean accounting in achieving the Sustainable Development Goals.

2.3 Sampling Method

The researchers used a simple random sampling method to distribute questionnaires to employees, assuming a homogeneous population. Therefore, the researcher used a simple random sampling method and then drew a suitable sample size of 80 employees, representing the study population.

2.4 Statistical Indicators

The researchers relied on the data and information obtained from the research for statistical analysis, using a five-point Likert scale. The researcher used the most important statistical indicators appropriate to the research hypotheses and questions, as follows:

- 1- Frequencies and Percentages: To determine the number and percentage of respondents within the research sample.
- 2- Weighted Arithmetic Mean: Used to determine the degree of agreement of the surveyed sample with the research questions.
- 3- Standard Deviation: Used to determine the degree of dispersion of the surveyed sample's responses regarding the degree of agreement.
- 4- Correlation Coefficient: Used to measure the degree of correlation between the research variables and to determine the type of relationship: direct (positive) or inverse (negative).
5. F-

test: Used to determine the effect of independent variables on the dependent variable.

6. Regression equation: Used to determine the extent of the independent variable's influence on the dependent variable.

7. One-way ANOVA: Used to determine if there are differences in the research sample's responses based on the demographic variables of the research.

Note: Significance values (sig.) were used to test the research hypotheses instead of tabulated values due to the accuracy of the results calculated from significance values (sig.).

It should be noted that all these indicators were calculated using the Statistical Package for the Social Sciences (SPSS version 20).

2.5 Demographic Variables of the Research

The description of the demographic variables of the research sample is shown in table 1.

Table1. Frequencies and Percentages of the Demographic Variables of the Research

Variable	Category	Frequency	Percentage
Age	Less than 25 years	56	77.8
	25 – less than 35 years	12	16.7
	45 – less than 55 years	4	5.6
	Total	72	100.0
Gender	Male	52	72.2
	Female	20	27.8
	Total	72	100.0
Specialization	Accounting	52	72.2
	Economics	8	11.1
	Statistics	2	2.8
	Other	10	13.9
	Total	72	100.0
Educational Qualification	Preparatory	16	22.2
	Bachelor's	48	66.7
	Master's	4	5.6
	Doctorate	4	5.6
	Total	72	100.0
Years of Service	Less than 5 years	16	22.2
	5 to less than 15 years	40	55.6
	11 to less than 25 years	4	5.6
	25 to less than 33 years	4	5.6
	31 years and above	8	11.1
	Total	72	100.0

Regarding the gender variable, the frequency of males was the highest, reaching 52 at 72.2%, while the frequency of females was 20 at 27.8%. Regarding age groups, the frequency of the age group under 25 years was 56. 77.8%. Regarding job titles, the highest frequency was for "other" at 52, representing 72.2%. As for length of service categories, the highest frequency was for "less than one year" at 44, representing 61.1%. Regarding educational qualification categories, the highest frequency was for "Bachelor's degree" at 48, representing 66.7%.

Table 1 . Represents the scores on a five-point Likert scale

Response	Strongly Disagree	Disagree Somewhat	Not Sure	Agree	Strongly Agree
Score	1	2	3	4	5

3.0 Results and discussion

3.1 Internal Consistency Results

Table (2) shows the correlation coefficient between each dimension of the first axis and the total score for the axis. The correlation coefficients are significant at a significance level of $\alpha = 0.01$, thus indicating that the axis is valid for what it was designed to measure.

Table 6. Shows the results of Cronbach's alpha test for measuring the reliability of the questionnaire

No.	Dimension	Number of Items	Cronbach's Alpha Coefficient
1	Lean Accounting	9	0.873
2	Sustainable Development Goals (SDGs)	9	0.919
Total Questionnaire Items		18	0.974

3.2 Description and Diagnosis of Research Variables

This section includes a description and diagnosis of the main study variables, represented by the dimensions of lean accounting as an independent axis and the Sustainable Development Goals as an adopted axis within the company. Appropriate statistical analyses were used to achieve this. Arithmetic Means and Standard Deviations of Sample Responses on Lean Accounting

Table 2. below describes the research variables related to lean accounting

No.	Statement	Weighted Mean	Standard Deviation
1	Applying Lean Accounting tools leads to cost reduction by improving financial and operational efficiency.	3.8889	1.32617
2	Applying Lean Accounting tools is considered an advanced stage in the transition from traditional management to lean management.	4.0289	0.92074
3	Utilizing Lean Accounting tools provides relevant information for performance evaluation when public companies adopt the lean production system.	4.1389	0.96074
4	Applying Lean Accounting tools leads to the management of accounting and financial operations in the workplace through the visual display of information and data related to daily activities and procedures.	4.0556	1.04045
5	Applying Lean Accounting tools leads to identifying the main causes, problems, advantages, and available capabilities in these economic units.	4.1944	1.09073
6	Applying Lean Accounting tools leads to a radical change in the measurement method by using a mix of operational, financial, and non-financial metrics for the value stream.	4.4167	0.99642
7	Applying Lean Accounting tools leads to the elimination of waste and loss in production processes to reach the minimum cost level.	3.9722	0.94070
8	Applying Lean Accounting tools facilitates the optimal utilization of resources, increasing profitability, and achieving financial goals.	3.7778	1.17379
9	Applying Lean Accounting tools helps in measuring performance by focusing on the information system and providing accurate cost information.	3.4722	1.31987
Overall Average		4.0062	0.59507

Table 2. shows that lean accounting achieved an overall arithmetic mean of (4.0062) and a standard deviation of (0.59507). This indicates the homogeneity of the sample's responses regarding the arithmetic mean. At the item level, item (2) in this dimension, which states that "Applying lean accounting tools is an advanced stage in the transition from traditional to lean management," showed the highest homogeneity, achieving a mean of (4.0289) and a standard deviation of (0.92074). The trend for this item is "agree," and the overall trend for lean accounting is also "agree."

Table 3. below describes the research variables related to the Sustainable Development Goals Standard

No.	Statement	Weighted Mean	Standard Deviation
1	The primary goal of sustainable development is to conserve economic resources, which can be achieved through the use of lean accounting tools.	4.1667	1.02817
2	Achieving sustainable development goals in companies is a requirement for community welfare.	3.9722	1.05522
3	Achieving sustainable development goals leads to meeting the needs of the present without compromising the ability of future generations.	3.6667	0.98561
4	Achieving sustainable development goals helps in preserving a healthy environment for the community.	4.1389	1.15022
5	Achieving sustainable development goals leads to companies contributing to bearing any cost for external environmental remediation.	3.7778	0.98883
6	Achieving sustainable development goals requires directing resources in a way that achieves social benefits for the community, thereby enhancing citizen trust in the state.	3.6944	1.06421
7	Achieving sustainable development goals contributes to minimizing the consumption of energy and other natural resources.	1.8889	1.22798
8	Achieving sustainable development goals helps create regional and international cooperation to face environmental requirements and problems, and enhance all countries' capacities to apply democratic principles and practices and respect human rights and minorities.	1.8687	1.20920
9	Achieving sustainable development goals helps promote individual development by reducing the disparity in income distribution among community members.	3.4444	1.06160
Overall Average		3.8611	0.61226

The results in Table3 . indicate that the SDGs achieved an overall mean of (3.8611) and a standard deviation of (0.61226). This demonstrates the homogeneity of the sample's responses regarding the mean value. At the item level, item (3) in this dimension, which states: "Achieving the SDGs will meet the needs of society in the present without compromising the ability of future generations to meet their own needs," showed the highest homogeneity, achieving a mean of (3.6667) and a standard deviation of (0.98561). The trend for this item is "Agree," and the overall trend for the SDGs is also "Agree."

3.4 Testing the First Main Hypothesis

This hypothesis states that there is a significant correlation between lean accounting and the Sustainable Development Goals (SDGs).

H0: There is no significant correlation between lean accounting and the SDGs.

H1: There is a significant correlation between lean accounting and the SDGs.

Table 4. Represents the correlation relationship.

Pearson Correlation	**0.519
Sig. (2-tailed)	0.001
N	72

Table 4. indicates the existence of a significant correlation between lean accounting and the Sustainable Development Goals (SDGs). The Pearson correlation coefficient was significant and equal to (0.519), as the significance value is sig. The value is (0.001), which is less than 0.01 with 99% confidence. This means that the first main hypothesis is confirmed, i.e., there is a significant relationship between lean accounting and the Sustainable Development Goals (SDGs).

2- Testing the second main hypothesis: which states that there is a statistically significant effect of lean accounting on the SDGs.

H0: There is no effect of lean accounting on the SDGs.

H1: There is an effect of lean accounting on the SDGs.

Table 5. Represents the ANOVA table.

Models	Sum of Squares	df	Mean Square	F	Sig.
Regression	3.540	1	3.540	12.562	.0010
Residual	9.581	34	0.282		
Total	13.120	35			

The results of the F-test indicate an effect of lean accounting on the Sustainable Development Goals (SDGs). Table (5) shows that the calculated F-value was (12.562) at a significance level of (0.05), where the p-value was (0.000), which is less than 0.05. This means rejecting the null hypothesis and accepting the alternative hypothesis, indicating that lean accounting has an effect on the SDGs.

Table 6. Represents the impact of lean accounting on the SDGs.

	B	Std. Error	Beta	T	Sig.	R²
(Constant)	1.720	0.611	-	2.818	0.008	0.270
X	0.534	0.151	0.519	3.544	0.001	

Table 6. indicates that the value of R2 is (0.270). This means that Lean Accounting explained (27%) of the changes in the Sustainable Development Goals (SDGs). The value of B = (0.534) indicates that increasing the Lean Accounting variable by one standard deviation will lead to an increase in the SDGs by 53.4% of one standard deviation.

Table 7. Impact of Lean Accounting on the Sustainable Development Goals

Dependent Variable	Independent Variables	F	R2	β (Beta)	Significance of Effect
Strategic Knowledge		23.383	0.407	0.461	Significant

Table 7. indicates that the value of R2 is (0.407), which means that strategic knowledge explained (40.1%) of the changes in the Sustainable Development Goals. The value of B = 0.461 means

that increasing the strategic knowledge variables by one standard deviation will lead to an increase in the Sustainable Development Goals by 46.1% of one standard deviation.

4.0 Conclusions

The failure to implement lean accounting tools negatively impacts the achievement of the Sustainable Development Goals. The lack of awareness of lean accounting concepts among most government entities has negatively affected their implementation. 3- The depletion of most of the state's resources and the failure to optimally utilize and preserve natural resources for future generations. It was observed that there is an over-reliance on extractive natural resources, which are themselves being depleted in one way or another without regard for sustainable development goals, thus negatively impacting their achievement. The lack of lean accounting has negatively affected the prices of local products, making them unable to compete with imported products. The lack of lean accounting negatively impacts the efficiency and adequacy of natural resources. The lack of lean accounting affects decision-makers, accounting information, and its users.

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