ISSN 2409-2665
Journal of Logistics, Informatics and Service Science
Vol. 10 (2023) No. 4, pp. 62-71
DOI:10.33168/JLISS.2023.0405

The Impact of Sustainability Accounting on Financial Reporting Quality: Evidence from the Pharmaceutical and Chemical Sectors on the ASE

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Abstract. This study examines the influence of sustainability accounting, specifically its environmental, economic, and social dimensions, on the quality of financial reports in the pharmaceutical and chemical firms listed on the ASE. The research aims to address the gap in understanding the relationship between sustainability accounting and financial reporting quality in these industries. Using a sample of 27 firms selected from a population of 53, the financial reports and statements from 2016 to 2021 are analyzed as the primary research data source. Statistical methods, including simple and multiple regression models, are employed to test hypotheses and derive results. The findings demonstrate a significant positive impact of sustainability accounting activities on the financial reporting quality of the studied firms. Increasing the reporting of sustainability dimensions enhances the quality of financial reports. The practical implications suggest supporting ASE-listed firms in adopting sustainability accounting initiatives, such as the Fourth-Generation reporting, and revising the listing and disclosure instructions on the ASE to include sustainability accounting as a requirement for disclosure and listing, following the Global Reporting Initiative (GRIG4) guidelines. This study contributes to theory and practice by supplying empirical evidence of the positive relationship between sustainability accounting and financial reporting quality in the pharmaceutical and chemical sectors, emphasizing the importance of integrating sustainability dimensions into reporting practices.

Keywords: Sustainability accounting; Financial reporting quality; Pharmaceutical industry; Chemical industry; ASE-listed firms; Environmental, economic, and social dimensions

1. Introduction

In the wake of accelerating climate change and pressing social issues, businesses are increasingly being evaluated not solely on their financial prowess, but also on their ability to operate sustainably. This more holistic perspective on performance, encompassing economic, environmental, and social aspects, has become a linchpin in contemporary corporate evaluation. The term 'sustainability' in a corporate context refers to practices that meet the needs of the present without compromising the future, thereby creating enduring value across these three dimensions. A company's sustainability performance has far-reaching implications, influencing its future prospects, legitimacy within its operational community, and access to investments (Deswanto & Siregar, 2018).

The Global Reporting Initiative (GRI 2013), a leading organization in sustainability standards, espouses sustainability reporting as an invaluable tool for companies to gauge and communicate their performance across the economic, environmental, and social spectrums. Such reporting has proven instrumental in bolstering corporate image and efficiency, securing stakeholder confidence, and informing decision-making processes. The information disclosed in these reports can help reduce investment risks and contribute to sustainable development (Akhter & Pappu, 2017; Caesaria & Basuki, 2017).

In recent years, the disclosure of sustainability-related data has gained increasing importance in demonstrating corporate transparency and integrity. This trend has been propelled by a burgeoning interest in corporate social responsibility, leading to a rise in standalone sustainability reports that detail a company's annual performance in this area (Younis, 2019; Olawumi & Chan, 2018).

On the other side of the coin, the phenomenon of income smoothing - wherein companies manipulate accounting policies to project consistent and stable income figures - is becoming a common practice. While this may help companies meet shareholder expectations or sidestep political costs, it can also result in financial reports that obscure a company's true profitability, calling into question the reliability of these documents (Mohammadi & Mohammad, 2012; Chen, 2013; Mahmud, 2012).

This study seeks to explore the interplay between sustainability accounting - encompassing social, environmental, and economic facets - and the quality of financial reports among pharmaceutical and chemical companies listed on the Amman Stock Exchange. The impetus for this investigation stems from the mounting significance of sustainability reporting as a fundamental stakeholder demand and the imperative for companies to foster trust in their financial statements. This is particularly crucial in the context of mitigating risks associated with capital markets and various stakeholders, such as investors and financial intermediaries.

The principal question that this study endeavors to answer is: "How does sustainability accounting, incorporating social, environmental, and economic dimensions, impact the quality of financial reports among pharmaceutical and chemical companies listed on the Amman Stock Exchange?"

2. Lecture Review

Sustainability performance reports have been significantly instrumental in influencing the economics of corporate businesses. Extensive studies highlight their positive impact on the financial and non-financial performance of companies (Francisco & Matthias, 2017; Jel, 2016; Cheng et al, 2015; Eccles & Serafiem, 2015, Alshehadeh & Atieh, 2020, Laila,2023). Furthermore, they have been proven to enhance the quality of information available to shareholders by shedding light on the company's strategy, resource allocation, and stakeholder involvement in key decisions. This improved quality of information leads to identifying risks and opportunities, refining internal operations, boosting efficiency, and making cost savings, ultimately impacting the financial performance of companies positively. Interest in disclosing sustainability information is also shown to contribute to improved financial performance (Longoni and Cagliano, 2018; Deswanto and Siregar, 2018; HO et al, 2019). Investigations into the relationship between sustainability disclosure and the accuracy of forecasting future events, such as

those conducted by Bernardi & Stark (2015), underline the crucial role sustainability reports play in strategic decision-making. Further, non-financial information disclosure has implications for financial benefits, including reduced information asymmetry and a lower cost of capital (Maurice, 2016).

A study by Dong et al (2021) emphasizes how sustainability reports play a vital role in delivering precise and crucial information to stakeholders, reinforcing the notion of their value in corporate strategy and resource allocation. Nonetheless, while sustainability reports significantly influence financial performance indicators from the management or shareholders' perspective, their effect on financial performance from the market's perspective is not as pronounced (Jan et al, 2019; Dong et al, 2022).

The concept of sustainability also extends into three key dimensions, namely environmental, economic, and social. The environmental dimension concerns the company's impact on the environment and ways to measure and disclose this information. The aim is to bolster long-term environmental sustainability performance through management systems, which act as innovative tools in promoting environmental sustainability (Akhter & Pappu, 2017; Goel, 2021; Alshehadeh, 2021). The economic dimension has recently attracted attention due to its profound impact on the environment, society, business partners, and suppliers. The focus has shifted towards sustainable economic development in conjunction with social and environmental growth (Younis, 2019).

The social dimension envelops public contributions, society, and human resources. Although the scope of corporate social responsibility is dynamic and lacks fixed guidelines, businesses are acknowledged to exercise social responsibilities through activities related to their workforce, societal interactions, and consumer protection (Thaslim & Antony, 2016). However, disagreements on the nature, content, and limits of corporate social responsibility have hampered the development of sustainability accounting concepts in this domain.

The Global Financial Reporting Initiative (GRI) is a significant reference point in sustainability reporting, offering standards for the disclosure of a company's environmental, social, and economic performance (GRI, 2020). GRI principles set a framework for defining report content and determining report quality, which includes promoting balance, comparability, accuracy, timeliness, clarity, and reliability. The quality of financial reports, a topic frequently debated among researchers, is often assessed using the earnings management index, a quantitative measure encapsulating income smoothing operation, market return volatility per share, the quality of adjusted accruals, and accounting earnings quality (Cvetanovska & Kerekes, 2015). Income smoothing, a practice undertaken by management to lessen fluctuations in periodic profits, plays a significant role in profit quality and share price in the financial market (Matsuura, 2008). The primary purpose is to regulate profits and maintain a steady and consistent growth rate, as it is considered more favourable than volatile fluctuations. Amneh & Abu-Nassa (2002) argue that the principal motivation behind income smoothing is to meet financial analyst expectations and prevent unexpected income changes. This tactic can also help reduce demands from workers and unions for wage increases and improved working conditions (Luqman & Muqdad, 2019). Various measures are used to ascertain whether a company is engaging in income smoothing. Cvetanovska & Kerekes (2015) propose three measures, and Chen (2013) introduces two different measures. Both sets of measures can be used to determine if a company is involved in income smoothing, leading to a comprehensive understanding of the reporting quality. (Alrai, 2023)

3. Methods

3.1. Sampling

To ensure reliable results, a sample of 27 companies was selected from a study community of 53 companies, representing 51% of the community. The selected companies met the criteria for selection, provided complete financial data for the studied period (2016 to 2021) and were listed on the Amman Stock Exchange during the entire study period. The primary data for the study was collected from the

financial statements and reports of the sample companies (Alshehadeh & Al-Khawaja, 2022).

3.2. Hypotheses:

- HO: There is no statistically significant effect at the level ($\alpha<0.05$) of sustainability accounting on the quality of financial reports in pharmaceutical and chemical companies listed on the Amman Stock Exchange.

Sub-hypotheses:

- **HO1**: The impact of environmental sustainability accounting on the quality of financial reports of pharmaceutical and chemical companies listed on the Amman Stock Exchange is not statistically significant at the level of $\alpha \leq 0.05$.
- **HO2**: The impact of social sustainability accounting on the quality of financial reports of pharmaceutical and chemical companies listed on the Amman Stock Exchange is not statistically significant at the level of $\alpha \leq 0.05$.
- **HO3**: The impact of economic sustainability accounting on the quality of financial reports of pharmaceutical and chemical companies listed on the Amman Stock Exchange is not statistically significant at the level of $\alpha \leq 0.05$.

3.3. Variables

The independent variable in the study was sustainability accounting, consisting of environmental performance, social performance, and economic performance. The dependent variable was income smoothing operations in pharmaceutical and chemical companies listed on the Amman Stock Exchange. The controlling variables were financial leverage, measured as total liabilities divided by total assets, represented by the symbol (LEV), and company size, measured by taking the natural logarithm of total assets at the end of the year, represented by the symbol (SIZE), as stated in the study by Dhaliwal et al. (2015).

The sustainability performance disclosure was assessed using content analysis to identify the sustainability indicators disclosed by each company in its annual reports. The following steps were followed:

- Researchers compiled a list of sustainability disclosure indicators, using the most significant items outlined in the Global Reporting Initiative's (GRI) sustainability disclosure guide as a checklist.
- The fourth update (G4) of the GRI guide was used, as it is widely recognized and used internationally in the sustainability field (KPMG, 2017; Chen et al., 2015; Michelon et al., 2015).
- The GRI Fourth Update (G4) comprised 91 sustainability indicators, which were divided into three categories: economic, environmental, and social.
- A value of 1 or 0 was assigned to each company's level of sustainability performance disclosure. If a company disclosed a particular item in accordance with the GRI Fourth Update (G4), it was assigned a value of 1. If a company did not disclose the item but it was applicable to them, it was assigned a value of 0. If the item did not apply to the company, it was marked with an (x) to avoid penalizing the company for non-disclosure.

Based on these values, the level of sustainability performance disclosure was calculated as follows:

$$SR = (ADL/TDL)$$

Whereas (SR) is the level of total disclosure of all sustainability indicators (environmental, social, and economic), and (ADL) represents the number of actual items disclosed by the company, and (TDL) represents the maximum number of applicable items in the indicator.

The dependent variable in this study is income smoothing, which serves as an indicator of financial report quality. The model by Francis et al. (2004) is widely used by researchers to measure income smoothing practices by companies. The model evaluates the extent to which accrual accounting has

reduced the fluctuations of a company's operations by comparing the ratio of cash flow volatility to earnings volatility.

Cash flow volatility is determined by calculating the standard deviation of cash flows from operations relative to total assets at the beginning of the year. A higher value of the ratio indicates a lower degree of income smoothing. The equation used to measure income smoothing according to this model is as follows:

$$SI_{j,t} = \sigma_j (NI_{j,t} / \text{Total Assets}_{j,t}) / \sigma_j (CFO_{j,t} / \text{Total Assets}_{j,t})$$

Where $SI_{j,t}$: Income smoothing degree of the company (j) for a period (t), σ_j : Standard deviation, $NI_{j,t}$: Net income of the company (j) before unusual items for a period (t), $CFO_{j,t}$: Net cash flows Operating Company (j) for the period (t); Total Assets j,t, Total assets of the previous year of Company (j) for the period (t).

The larger values of the smoothing index (SI) indicate a lower level of income smoothing or less practice of income smoothing operations, and therefore the administration's failure to manipulate the values of accounting income, as well as the availability of qualitative characteristics (relevance, reliability, and comparability), and therefore this matter reflects the quality of financial reports.

In this study, the selected companies were categorized into two groups: smooth and non-smooth, utilizing the classification model developed by Francis et al. (2004). The findings revealed that out of the 27 companies examined, 21 were identified as engaging in income smoothing practices. To facilitate the classification process, a coding system was implemented. Companies that were observed to practice income smoothing were assigned a code of 1, while those that did not engage in such practices were assigned a code of 0. To analyse the data for each company, the researchers utilized the SPSS statistical analysis software, specifically version 22, which provided a comprehensive platform for conducting the necessary statistical analyses and computations (Al Omari, et al. 2017).

4. Results

The findings of this study reveal a disparity in the disclosure of sustainability dimensions among the companies in the study sample. The percentage of disclosure, as per the International Sustainability Reporting Initiative (GRI) fourth update (G4) scale, ranges from 20% to 31%. This indicates a low level of disclosure, which could be attributed to the companies' voluntary commitment policies towards disclosing their sustainability dimensions.

The results of a statistical analysis (Table 1) investigating the impact of the quality of sustainability accounting on income smoothing in pharmaceutical and chemical companies listed on the Amman Stock Exchange have been obtained. The correlation coefficient between the independent and dependent variables was found to be 31.5% (R), with the coefficient of determination (R^2) at 17.8% (0.178). This indicates that 17.8% of changes in the income smoothing processes are attributed to factors related to the quality of sustainability accounting in the public shareholding companies in the pharmaceutical and chemical industries listed on the Amman Stock Exchange. The effect score value for the quality of environmental performance accounting was found to be 0.362 (β), for social performance accounting 0.274 (β), and for overall performance accounting 0.157 (β). The study also revealed that financial leverage and company size had a positive and significant impact on income smoothing, with regression coefficients of 0.2440 and 0.188, respectively, and a level of significance less than 0.05. This means that an increase in the quality of sustainability performance accounting by the companies under study will lead to a reduction in income smoothing processes and, as a result, an improvement in the quality of the financial reports of the pharmaceutical and chemical companies listed on the Amman Stock Exchange. The calculated F value, referred to in Table 1, confirms the acceptance of the alternative hypothesis that states that there is a statistically significant effect (at the level of $\alpha \leq 0.05$) of the quality of sustainability accounting on the quality of financial reports of the pharmaceutical and chemical companies listed on the Amman Stock Exchange.

Table 1. Results of multiple regression analysis

Model Summary			**ANOVA**				**Coefficients**			
dependent variable	R	(R^2	degrees of freedom (DF)		F	P-value	β		T	P-value
Income smoothing	0.135	0.178	Regression	3	4.657	0.011	**ESR**	0.362	2.734	0.012
			residuals	23			**CSR**	0.274	1.058	0.301
			Total	26			**ESR**	0.157	1.223	0.234
							LEV	0.244	3.514	0.001
							SIZE	0.188	2.729	0.007

To test these sub-hypotheses, a correlation coefficient was calculated between the dimensions of sustainability and the quality of financial reports of public shareholding pharmaceutical and chemical companies listed on the Amman Stock Exchange.

Table 2. Summary of the linear regression analysis

Dependent variable	**Independent variables**	**Correlation coefficient R**	**Coefficient of determination (R^2)**	**corrected correlation coefficient**	**value F**	**P-value**
Income smoothing	environmental	0.308	0.095	0.089	17.368	0.00
	social	0.229	0.053	0.047	9.206	0.003
	Economical	0.182	0.049	0.043	8.572	0.004

It is observed from Table 2 that the environmental aspect had the greatest impact on the quality of financial reports, as the correlation coefficient between the environmental aspect and the quality of financial reports was 0.308. The social aspect followed with a correlation coefficient of 0.229 between it and the quality of financial reports, while the economic aspect was third in terms of its impact on the quality of financial reports, with a correlation coefficient of 0.182 between it and the quality of financial reports. It can be seen from the above table that all sustainability dimensions are statistically significant at the level of significance ($\alpha \geq 0.05$), implying a positive relationship between sustainability dimensions and the quality of financial reports. This further indicates that an increase in the disclosure of sustainability indicators leads to an improvement in the quality of financial reports for the companies under study.

The value of the coefficient of determination (R^2) for the environmental dimension was 0.095, indicating that 9.5% of the variation in the quality of financial reports can be explained by this dimension. The value of the test statistic (F) was 17.368. The value of R^2 for the social dimension was 0.053, indicating that 5.3% of the variation in the quality of financial reports can be explained by this dimension. The value of F was 9.206. The value of R^2 for the economic dimension was 0.049, indicating that 4.9% of the variation in the quality of financial reports can be explained by this dimension. The value of F was 8.572. These results support the acceptance of the three sub-hypotheses, which state that the environmental, social, and economic dimensions of sustainability have a statistically significant impact on the quality of financial reports of the publicly traded pharmaceutical and chemical companies listed on the Amman Stock Exchange, at a significance level of 0.05 or less.

Therefore, the following equation stands for a regression model where the dependent variable (SI jt) is hypothesized to be influenced by the independent variables ESR it, CSR it, SIZE it, and LEV it, along with the constant part of the regression equation (βo). The coefficients β1, β2, β3, β4, and β5 represent the estimated effects of these independent variables on the dependent variable (regression coefficients), and the error term εit captures the unexplained variation in SI jt.

$$SI\ jt = \beta o + \beta 1\ ESR\ it + \beta 2\ CSR\ it + \beta 3\ ESR\ it + \beta 4\ SIZE\ it + \beta 5\ LEV\ it + \varepsilon it$$

5. Discussion

Sustainability practices, including corporate social responsibility, play a crucial role in increasing finances and profits in the Pharmaceutical and Chemical sectors by integrating various dimensions and ensuring the firms' ability to meet their needs without compromising future goals. Effective financial management, which involves organizing, planning, and controlling financial activities, is instrumental in efficiently utilizing available funds and promoting sustainability.

The findings of the study reveal that enhancing the quality of sustainability reports positively impacts stakeholder trust and credibility in the Pharmaceutical and Chemical sectors. Consequently, stakeholders perceive the sustainable performance of companies in these sectors more favorably, resulting in benefits such as improved financial reports, reduced political costs, increased corporate transparency, mitigated management risks, and enhanced communication with shareholders. This highlights the advantages of integrating sustainability dimensions into business practices and reporting, benefiting not only the environment and society but also financial performance in the Pharmaceutical and Chemical sectors.

It is worth noting that sustainability reports in the Pharmaceutical and Chemical sectors should not segregate economic, social, and environmental dimensions. However, recent research conducted on companies within these sectors in Jordan and the public shareholding industrial companies reveals a decline in the quality of these reports, despite their significance for investor decision-making. This decline is consistent with previous studies (Francesco & Matthias, 2017; Jel, 2016; Eccles & Serafiem, 2015, Atieh, et al, 2022). The mixed motives of companies in the Pharmaceutical and Chemical sectors regarding sustainability reporting, combined with a lack of clear reporting guidelines, grant them considerable discretion in determining the content of their reports.

Enhancing the quality of sustainability reports in the Pharmaceutical and Chemical sectors fosters stakeholder trust and credibility, leading to improved financial reports, reduced political costs, increased corporate transparency, mitigated management risks, and enhanced communication with shareholders. However, challenges persist in reporting sustainability activities, primarily due to the absence of clear reporting guidelines. This discretion granted to companies in these sectors leads to inconsistencies and, at times, a decline in the quality of their sustainability reports. (Al-Omoush et al., 2022)

From a theoretical standpoint, this study contributes to the growing body of knowledge by emphasizing the importance of sustainability reports in building stakeholder trust and credibility within the Pharmaceutical and Chemical sectors. The findings highlight that when the quality of sustainability reports improves, stakeholders perceive the sustainable performance of companies in these sectors more positively. This supports the notion that integrating sustainability dimensions into business practices and reporting not only benefits the environment and society but also positively influences financial performance specifically in the Pharmaceutical and Chemical sectors. Thus, sustainability and financial performance are interconnected within these sectors.

In terms of practical implications for the Pharmaceutical and Chemical sectors, the study underscores the need for organizations to prioritize the quality of their sustainability reports. Improving the quality of these reports yields practical benefits such as reduced political costs, enhanced corporate transparency, mitigated management risks, and improved communication with shareholders. The study emphasizes the necessity of clear reporting guidelines and standards within these sectors to ensure consistency and comparability in sustainability reporting practices. Additionally, it highlights the significance of sustainability committees within companies operating in the Pharmaceutical and Chemical sectors, staffed by experts in sustainability-related fields, to maintain the integrity and accuracy of sustainability reporting.

From a policy perspective, the study calls for the intervention of professional organizations and government bodies in regulating the preparation and verification of sustainability reports within the Pharmaceutical and Chemical sectors. The findings emphasize the importance of enacting laws and

regulations, particularly in contexts lacking local sustainability standards. Policymakers should consider establishing reporting requirements that incentivize companies in the Pharmaceutical and Chemical sectors to adopt sustainability accounting practices. For instance, the study suggests revising listing and disclosure requirements for companies in these sectors listed on stock exchanges, making sustainability accounting reporting a condition for listing and disclosure. These policy interventions can enhance transparency, accountability, and comparability in sustainability reporting within the Pharmaceutical and Chemical sectors, ultimately fostering sustainable business practices.

While this study provides valuable insights, it is important to acknowledge its limitations. One limitation is its focus on industrial firms within the Pharmaceutical and Chemical sectors on the ASE, which may limit the generalizability of the findings to other sectors or regions. Additionally, the study relies on self-reported data from sustainability reports, which may introduce biases or variations in reporting practices. Future research could broaden the scope by examining other types of organizations within the Pharmaceutical and Chemical sectors and employing alternative data collection methods, such as interviews or surveys. Furthermore, exploring the long-term effects of sustainability accounting on financial performance within these sectors would provide a more comprehensive understanding of their interrelationship.

6. Conclusion

The study highlights the need for professional organizations and government intervention to regulate the preparation and confirmation of sustainability reports. This includes the creation of laws and regulations in the absence of local sustainability standards. The study also stresses the importance of establishing sustainability committees within industrial companies, staffed by experts in sustainability-related fields such as the environment, sociology, and chemistry. Finally, the study recommends supporting companies listed on the Amman Stock Exchange (ASE) to adopt sustainability accounting practices, including the Global Reporting Initiative (GRI.G4) initiative. It suggests reviewing ASE listing and disclosure requirements to include sustainability accounting reporting as a condition for listing and a disclosure requirement.

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