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ANALYZING THE IMPACT OF FIRM-SPECIFICS FACTORS ON SUSTAINABILITY PRACTICES: UNRAVELING THE MODERATING EFFECT OF LIQUIDITY

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ABSTRACT

This study aims to investigate the relationships between characteristics of firm-specific & the implementation of sustainable corporate practices, and exploring the moderating effect of liquidity to acknowledge the essential role of financial flow in shaping the sustainable approach of businesses in United States. In the proposed study secondary data of 10 listed chemical industries in US stock market has been gathered over a ten-year period of time from 2013-2022. Data is collected from annual reports, sustainability reports and CSR report of chemical industries. Firm specifics are measured with firm age and return on asset (ROA), corporate governance with CEO duality and board size whereas, sustainable practice have been examined by social and community expenses. The results provides the significant and valuable information in reaching the conclusion and making the sutiable decisions. The study's finding indicates that there is significant impact of ROA, CEO duality and board size upon the sustainable business practices. However, firm age has negative significant effect on both firm specifics and sustainability. Similarly, the results offered certain valuable clues for future researchers.

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INTRODUCTION

The sustainability is broad and interdisciplinary concept that has gained popularity, prompting extensive discussions among the social and scientific communities over the past two decades. It involves initiatives and behaviors that reflect sense of accountability towards the environment, society, and economies (Taha, Omush & Nimer, 2023). Sustainability, at its core, attempts to preserve the long-term well-being of current and future generations by addressing the complex interplay between its dimensions (Schaltegger, 2021). The primary objectives of sustainability encompass promoting economic growth, fostering social progress and protecting environment.

By seeing the liquidity, firms can better plan their sustainability initiatives, aligning them with their financial health to ensure long-term viability and success. Despite increasing polarization in global policy-making, concept of "sustainable development" remains relevant and widely debated across many political ideologies. Sustainability progress refers to fulfills needs without harming ability of the generations to fulfill their own needs (Rocca, Rocca, Fasano & Cariola, 2023).

This study emphasizes the importance of management of resources taking care of environment and ensuring fairness. The sustainability practices refer to actions taken by firms to operate in an environmentally and socially responsible manner (Samuel, Ong, Rahman, Olumide & Alam, 2019). The environmental aspect of sustainability is concerned with reducing negative effects that human activity has on the environment. It includes measures to manage scarce resources, conserve biodiversity, lower carbon emissions, switch to renewable energy sources, and reduce overall environmental impact (Thanh, 2023). Firm specifics are the unique characteristics and resources possessed by individual firms that differentiate them from their competitors. The larger firms may have more resources to invest in sustainability initiatives but might also face greater complexity in implementing change. These firm-specific factors significantly influence a company's sustainability practices and outcomes. In this connection, sustainability practices in corporates encompass a range of strategies and actions aimed at minimizing negative impact by implementing measures over supported strategies to reduce resource consumption, curtail the waste generation, and mitigate environmental risks (Farhan, Almaqtari, Hazaea & Ahdal, 2023).

Problem Statement

Previous study examines moderating effect of liquidity on relationship between sustainability and firm specifics in developing country. Due to study in developing country, research Previous study, carried out in a developing country, was analytical but had to be restricted by its unique environment, which was unable to completely capture the numerous processes that play in the developed economies. It would be interesting to append the determinants of sustainability and specifics expenses in developed country in this study. This shift is particularly significant in the current global discourse upon sustainable corporate practices, as wealthy countries frequently lead in terms of sustainability activities. As mentioned in prior suggestion this study also added new variables of corporate governance attributes that is board size and CEO duality, gives a more thorough and refined study of issues that influence sustainability. Firm-specific factors include internal features that can influence a firm’s approach to sustainability. The study needs to investigate the moderating liquidity significance and impact of firm specifics on practices of sustainability.

Objective of Study

1. To identify impact of firm specifics like firm age and return on assets on sustainability practices
2. To identify the impact of corporate governance upon sustainability practices in chemical industries.
3. To identify the relation and impact of firm specifics on sustainability practices under the moderating effect of liquidity
4. To assess the implications of findings for different contexts in promoting and enhancing sustainability practices.

Research Questions

1. RQ1: How does firm age and return on assets impact adoption of sustainability practices within chemical industries?
2. RQ2: How does corporate governance, specifically board size and CEO duality, influence the implementation of sustainability initiatives?
3. RQ3: Does liquidity moderate the relationship between firm specifics and sustainability practices?
4. RQ4: What are implications of findings for chemical industry companies, policymakers, and stakeholders in promoting and enhancing sustainability practices?

LITERATURE REVIEW

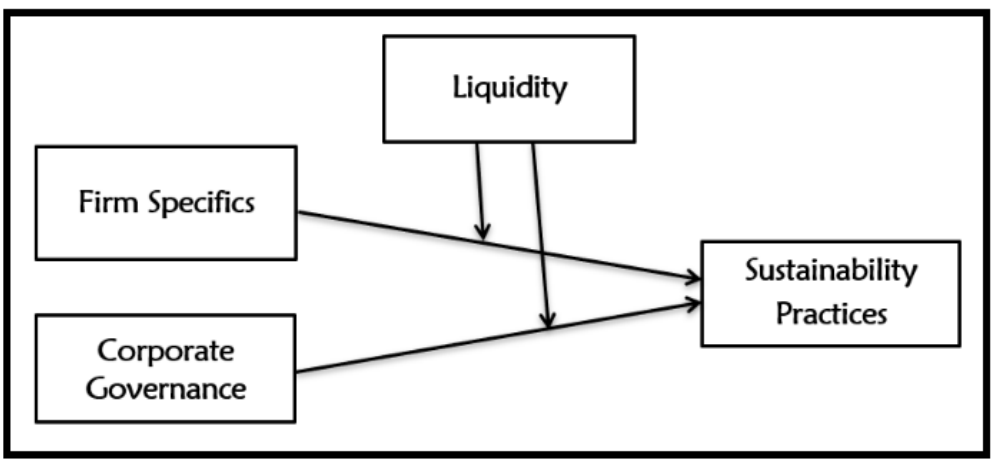
Sustainability practices in organizations have become crucial aspect of contemporary business operations, reflecting an awareness of profound impact that companies have on environment and society (Boffa et al., 2024). To begin with, it is important to define what the sustainability practices entail. This research shows that sustainability practices encompass a range of actions and initiatives adopted by organizations to minimize their negative environmental and social impacts while simultaneously pursuing long-term profitability. In this linking, these practices typically involve integrating environmental, social, and economic considerations into decision -making processes (Elkhwesky et al., 2022). Thus, the dimensions of sustainability practices are multilayered, extending beyond just environmental concerns. As highlighted by Ricciolin et al. (2023), sustainability practices can be categorized into three main dimensions: environmental sustainability, social sustainability, and economic sustainability. Environmental sustainability encompasses efforts to reduce resource consumption, minimize waste, and lower greenhouse gas emissions. Social sustainability involves promoting fair labor practices, ensuring employee well-being, and engaging with local communities. Finally, economic sustainability pertains to financial stability and long-term profitability through the responsible business practices (Thanh, 2023).

Governments worldwide are imposing stricter environmental regulations, making it imperative for the companies to abide by these laws to avoid legal repercussions. Additionally, the evolving landscape of consumer preferences plays significant role in motivating sustainability adoption. As consumers become more environmentally conscious, favor products and services from the companies with eco-friendly and socially responsible practices, so incentivizing organizations to integrate sustainability into their strategies (MacMillan, 2020). When a person holds dual positions of CEO (Chief Executive Officer) and board chair in a business, this is referred to as the CEO duality. This study found that CEO duality has a number of advantages. First off, by removing any conflicts between the CEO and the chairperson, it can increase the effectiveness of decision-making, resulting in quicker and more decisive decisions. Due to CEO's in-depth knowledge of both internal operations and external concerns, CEO duality also gives the firm a cohesive vision and strategic direction. Additionally, it encourages efficient coordination and communication between board of directors and top management, ensuring that objectives and plans are in line. To reduce conflicts of interest and maintain effective governance, it is vital to take into account any potential downsides and to implement necessary checks and balances (Yu, 2023).

The effectiveness of other governance structures is also a factor in how the CEO duality affects sustainability outcomes. As per Claiborne et al. (2020), independent directors and strong board

monitoring, for instance, can help to counteract any detrimental effects of CEO duality on the sustainable policies. This emphasizes how crucial a strong board of directors is to guaranteeing sound decision-making. Additionally, CEO's dedication to sustainability and his/her principles are important. Regardless of their dual status, CEOs who have strong environmental and social values are likely to promote sustainable practices, according to study by (Romano et al., 2020). As a moderator in financial studies, liquidity is supported by strong theoretical framework that is based on ideas of risk management and market efficiency. As per research, Efficient Market Hypothesis (EMH), there is no way for investors to continuously outperform market through trading methods as asset prices totally represent all existing information in efficient market. Illiquid assets are frequently vulnerable to information asymmetry and, as a result, pose larger risks to investors who showed that an asset's illiquidity can vividly alter its predicted returns, provide additional evidence in support of this claim. The link amid information asymmetry, risk, and market efficiency is therefore moderated in financial studies by liquidity (Alawaqleh et al., 2023).

Figure 1
Theoretical Framework



This conducted research in the business to better understand the significance of liquidity in the relationship amid firm-specific characteristics and sustainability performance. As indications of corporate specificity, the researchers emphasized on elements such as R&D expenditure and intellectual property. According to the findings, liquidity positively reduced the impact of these factors on sustainability performance (Uyar et al., 2023). The larger levels of liquidity bolstered positive impact of intellectual property on sustainable outcomes in chemical industries. This implies that enterprises with greater liquidity were better able to translate their investments in R&D. intellectual property into sustainable practices and favorable sustainability performance (Maqbool et al., 2021). Several variables in study can be ascribed to the good impact of liquidity on the relationship between business specifics and sustainability. For starters, liquidity gives businesses financial flexibility & stability need to effectively undertake sustainable initiatives. It allows companies to commit resources to long-term sustainability projects while absorbing any short-term expenses linked with implementing sustainable practices (Maqbool et al., 2021). Second, liquidity improves access to money for long-term investments such as acquiring new

technology/creating environmentally friendly structure. This finance access allows enterprises to pursue sustainable innovation & attain higher levels of sustainability performance (MacMillan, 2020).

Hypothesis Development

1. H1: There is significant influence of the firm age upon the sustainability practices.
2. H2: There is significant influence of return on the asset on sustainability practices.
3. H3: There is significant influence of CEO duality upon the sustainability practices.
4. H4: There is significant influence of the Board size on the sustainability practices.
5. H5: Liquidity moderates relationship amid firm specifics & sustainability practices.

RESEARCH METHODOLOGY

In contrast to the previous studies that relied on secondary data collection, this research also utilizes secondary data, a prominent financial information source in United States. In this linking, the focus of this study is specifically on the chemical industries of US, as conducting a sector-specific analysis provides deeper insights due to unique business operations of different sectors.

Research Variables

The sustainability is commonly understood to have three interrelated dimensions: economic, social & environmental. In line with the aspects, this study measures sustainability expenditure by considering the following components like: Social aspect: This dependent variable measured using social and community expenses. These represent the funds allocated by manufacturing industries annually to manage their impact on the society, the financial resources allotted by a corporation to support and contribute to benefit of society and the local areas in which it works. These expenses cover things like donations to charities, development projects, and campaigns to deal with social and environmental problems. Independent variables: The research considers firm-specific determinants as independent variables to predict the dependent variable. The selected firm-specific determinants include firm age, board size, return on the assets and CEO duality.

Firm Specifics Determinants

Firm Age

The firm age is the duration since the founding of the corporation. It measures the company's longevity and experience in sector, which may have an impact on its sustainability practices. Return on Assets (ROA): Return on Assets (ROA) is a financial term that measures a company's profitability by examining how effectively it generates earnings in comparison towards all of its assets. Thus, it displays the financial performance, which affects how decisions are made about sustainability.

Corporate Governance

Board Size: The number of directors on board of directors is referred to as board size. It display make-up of governing body in charge of making strategic choices and implementing corporate governance procedures. CEO Duality: It describes the context in which same person serves as both CEO and the chairman of the board. It represents concentration of power among company executives.

Moderating Variable

A company ability to satisfy its instant financial obligations with its current assets is assessed by its current ratio. In order to evaluate its impact on relationship between firm-specific traits, corporate governance, and sustainability practices, it is introduced as the moderating variable. Current Ratio: A financial indicator called the current ratio assesses a company's capacity to meet its short-term liabilities with its short-term assets. In this connection, it is determined by dividing a company's current assets by its current liabilities, and it gives information on the liquidity and capacity of the organization to meet short-term financial needs. Data Collection: In this study, data collecting was thus, a vital phase that used a deductive approach to gather appropriate information. The focus of this research was on chemical industries in the United States.

Sample Size: The sample size consists of 10 chemical industries, resulting in a total of 100 of observations. These industries were chosen to provide the diverse and representative sample of sector. This study offers thorough understanding of trends and advancements in the field of chemical industries by gathering data over the 10-year period of time, from 2013 to 2022. By examining how variables have changed and interacted over a period of time, it is possible to gain insights into short-term fluctuations and long-term patterns. The reliability & capacity to gather insightful data on dynamics of research issue are both improved by temporal scope of study.

Table 1

Previous Research Outcomes

Variables	Author	Hypothesis
FA × SCE	Carolina (2021)	Accepted
ROA × SCE	Lancee (2017)	Accepted
CEO × SCE	Ganesan (2017)	Rejected
BS × SCE	Tawfeeq (2019)	Accepted
CRAT× FA × SCE	Akhtar (2019)	Accepted

RESULTS OF STUDY

SPSS software in which regression and correlation analysis is used to investigate relationship between firm characteristics, liquidity & sustainability practices. Direct impacts of firm-specific factors on sustainable practices are evaluated using regression analysis. Moderation analysis using Hayes' methodology is carried out to assess the moderating impact of liquidity on these connotations.

Table 2

Coefficient of Regression

Model		Un-Standardized		Standardized		
		B	SE	Beta	t	Sig.
1	(Constant)	.533	.310		1.715	.090
	FA	.000	.001	-.031	-.289	.773
	ROA	.030	.021	.227	2.379	.019
	SIZE	.043	.017	.244	2.468	.015

CEO	.259	.119	.213	2.170	.033
a. Dependent Variable: SCE					

Table shows that board size significance value is 0.015 which must to be below than 0.05 and the t-value is 2.468. This implies that the board size has statistically significant positive impact on SCE. Higher social and community expenses are related with greater board size. This means hypothesis of SIZE variable is accepted. CEO significance is 0.033 which must to be below than 0.05 and the t-value is 2.170. This suggests a statistically significant favorable impact of CEO duality on SCE. This means hypothesis of CEO duality variable is accepted. Higher social and community expenses are frequently seen when CEO duality is frequent. The value of t help to indicates the sample size difference and variance according to the data. Secondly, the value of beta indicates the one unit change in independent variable i.e. Firm age cause .000 increase in dependent variable that is SCE. Similarly, one unit change in ROA and board size cause .030 and .043 increase in SCE. In CEO duality, on unit change cause .259 increase in SCE. In this linking, the coefficient analysis table inclusively shows that among the independent variables, Return on Assets, Board Size, and CEO Duality have statistically significant impact on Social and Community Expenses (SCE) this mean hypothesis are accepted of these variables, from these results while Firm Age have negative significant impact in this model and hypothesis are rejected.

Moderation Analysis

Firm Age, SCE & CRAT

The constant term has the intercept of 1.1356. It represents SCE value that might be expected if all predictor variables were set to 0. Statistically significant firm age coefficient (p = 0.0010) is 0.0072. This implies that, assuming other factors remain constant, SCE ought to rise by about 0.0072 units for every unit increase in FA. CRAT has the coefficient of 0.1296 and a statistical significance of 0.0300. This shows that SCE ought to rise by about 0.1296 units for every unit increase in CRAT. Interaction term is statistically significant (p = 0.0001) and has a coefficient of -0.0042. This shows that there is a major impact on SCE from the interaction between FA a CRAT.

Table 3
Moderation Outcomes

	Coeff	se	t	p	LLCI	ULCI
Constant	1.1356	.2003	5.6692	.0000	.7380	1.5332
FA	.0072	.0021	3.3805	.0010	.0030	.0115
CRAT	.1296	.0588	2.2031	.0300	.0128	.2464
Int_1	-.0042	.0010	-4.1673	.0001	-.0061	-.0022

Conditional Effect

The conditional impacts of FA at various CRAT levels. For instance, the impacts of FA on SCE are positive, negative, and negative, respectively, with CRAT levels of 1.0748, 1.8300, 2.4884. The first and third CRAT values are statistically significantly affected by these effects from the results.

Table 4
Conditional Effects of Focal Predictor at Values of Moderator

CRAT	Effect	t	p	LLCI	ULCI
1.0748	.0027	2.0380	.0443	.0001	.0054
1.8300	-.0004	-.3575	.7215	-.0026	.0018
2.4884	-.0031	-2.4037	.0181	-.0057	-.0005

Return on Asset, SCE & CRAT

The constant term has the intercept of 1.0598. In the scenario where ROA and CRAT are both 0, it represents the expected value of SCE. Thus, ROA coefficient is 0.0612, and the statistical significance level for it is 0.0697. This shows that in this situation, ROA may not have a large individual impact on SCE. With a coefficient of 0.0677 and p value of 0.4051, CRAT is also not statistically significant. This suggests CRAT might not affect SCE significantly on an individual basis. The coefficient for interaction term is -0.0148, however it is not statistically significant (p = 0.3029). This suggests that ROA and CRAT's interaction may not have a big impact upon the SCE.

Table 5
Unconditional Interaction between ROA and CRAT

	Coeff	se	t	p	LLCI	ULCI
Constant	1.0598	.2067	5.1274	0000	.6495	1.4701
ROA	.0612	.0334	1.8342	.0697	-.0050	.1275
CRAT	.0677	.0810	.8363	.4051	-.0930	.2284
Int_1	-.0148	.0143	-1.0358	.3029	-.0431	.0136

The findings of study indicate that in this model, neither Return on the Assets (ROA), Current Ratio (CRAT), nor their interaction significantly predict Social as well as Community Expenses (SCE). The entire model does not demonstrate a substantial link between these variables and SCE. Other potential components or variables that may influence SCE in this situation should be considered by researchers, as the ones included in this model do not appear to be significant predictors.

Table 6
Specific Model

	coeff	se	t	p	LLCI	ULCI
Constant	-.2488	.3848	-.6465	.5195	-1.0125	.5150
SIZE	.1428	.0320	4.4681	.0000	.0794	.2062
CRAT	.7214	.2054	3.5125	.0007	.3137	1.1291
Int_1	-.0649	.0189	-3.4353	.0009	-.1023	-.0274

CRAT has a coefficient of 0.7214 and statistical significance level of 0.0007. This suggests that CRAT has a sizable favorable impact on SCE. The interaction is -0.0649, and it is significant (p = 0.0009). This suggests that there is major impact on SCE from relationship amid SIZE and CRAT.

Conditional Effect

The conditional effects of SIZE at various degrees of CRAT. For instance, the impacts of SIZE on SCE are positive, positive, and negative, respectively, with CRAT values of 1.0748, 1.8300, and 2.4884. The first and second CRAT readings are statistically significantly affected by these factors.

Table 7

Conditional Effects of Focal Predictor at Values of Moderator

CRAT	Effect	se	t	p	LLCI	ULCI
1.0748	.0731	.0182	4.0243	.0001	.0370	.1091
1.8300	.0241	.0183	1.3140	.1920	-.0123	.0605
2.4884	-.0186	.0260	-.7162	.4756	-.0701	.0329

CEO Duality, SCE and CRAT:

The constant term is 1.1112, which serves as intercept. In the scenario where CEO and CRAT are both 0, it shows expected value of SCE. A statistically significant coefficient for CEO exists at 0.5550 (p = 0.0137). This indicates that CEO has an immense positive impact on SCE. CRAT has a coefficient of 0.0828 but p = 0.1946 indicates that it is not statistically significant. This suggests that CRAT does not significantly affect SCE on an individual basis. The coefficient for interaction term is -0.1369, however it is not statistically significant (p = 0.1447). This suggests that in this model, the interaction between the CEO and CRAT does not significantly affect the SCE.

Table 8

CEO Duality, SCE & CRAT

	Coeff	se	t	p	LLCI	ULCI
Constant	1.1112	.1635	6.7983	.0000	.7867	1.4357
CEO	.5550	.2210	2.5109	.0137	.1162	.9937
CRAT	.0828	.0634	1.3061	.1946	-.0430	.2086
Int_1	-.1369	.0931	-1.4705	.1447	-.3218	.0479

Table 9

Interaction between CEO & CRAT

Test of Highest Order Unconditional Interaction			
	R2-chng	F	P
X*W	.1013	11.8012	.0009

There is no need to analyze conditional effects or Johnson-Neyman areas in this instance since the interaction term and CRAT are not statistically significant. In this overall analysis, research indicates that CEO Duality significantly lowers social and community expenses (SCE). Still, neither the Current Ratio (CRAT) nor the CEO-CRAT interaction in this model had statistically significant effects on SCE. When studying impact of CEO Duality and Current Ratio on social and community spending within context of study, researchers should take these findings into account.

DISCUSSIONS

This study offers valuable insights into intricate connection amid firm-specific characteristics, sustainability, and liquidity practices inside the US chemical industry. Our research underlines significance of considering numerous firm-specific determinants when examining the adoption and application of sustainable business practices. Primarily, positive effect of return on assets (ROA), CEO duality, and board size on sustainability practices highlights the position of sturdy financial performance and real structure of corporate governance in promoting sustainability initiatives. Companies with higher ROA are positioned better to finance in sustainable practices and technologies, whereas larger board sizes and separate chairperson and CEO roles enable more comprehensive decision-making procedures conducive to sustainability incorporation (Boffa et al., 2024). But, negative influence of firm age on sustainability practices proposes that older businesses may face the difficulties in adapting to developing sustainability practices and standard.

This highlights the need for constant adaptation and innovation within the established firms to remain competitive and sustainable in long run. Besides, this research reveals the moderating impact of liquidity, as represented by current ratio (CR), on relationship among firm specifics and sustainability practices. It has been determined that liquidity plays a significant role in mitigating the negative effect of certain firm-specific features on sustainability emphasizing the importance of financial firmness in enabling companies to invest in sustainable practices (Uyar et al., 2023). These findings have substantial implication for both policymakers & practitioners in the chemical industry. The companies can leverage their knowledge of the interplay between firm-specific factors and liquidity to grow the tailored sustainability approaches that capitalize their strengths though addressing potential weaknesses. However, Policymakers can use these understandings to design controlling frameworks and incentives that motivates organizations to prioritize sustainability and improve their flexibility towards the social and environmental challenges.

CONCLUSION

The current research is conducted to demonstrate the impact of firms' specifics on the practices of the sustainability under the moderating effect of liquidity in the US chemical industry. The key findings of this study revealed that firm-specific determinants such as return on assets (ROA), board size, and CEO duality significantly influenced sustainability practices. However firm age has negative impact upon sustainability. Additionally, the study identified that the current ratio had a moderating effect on the relationship between firm specifics and sustainability practices, indicating that liquidity played role in negative impact toward firm-specific characteristics and sustainability.

Limitation & Future Direction

The study's limitations include a relatively short data collection period from 2013 to 2022, a small sample size of only 10 chemical industries. To address these limitations, future research should examine expanding data collection to capture long-term trends, diversifying the sample to cover broader range of industries that could enhance external validity of study results and include additional firm-specific factors. Future researches could benefit from global viewpoint by doing cross-country comparison analysis and assessing sustainability strategies in various countries. Future researches could compare sustainability practices between large corporations and small and medium sized enterprises. SMEs appearance exclusive challenges and prospects

in sustainability. These stages would lead to a more thorough knowledge of influence between the firm-specific features and the sustainable practices, increasing the study's applicability and usefulness.

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