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The Impact of Green Accounting Disclosures on Financial Performance of Manufacturing Companies in Pakistan

by

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CERTIFICATE OF APPROVAL

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Abstract

The increasing global emphasis on sustainability and environmental responsibility has elevated green accounting disclosures (GAD) to a central position within corporate reporting frameworks. These disclosures, which communicate a firm's environmental practices and sustainability commitments, are increasingly regarded as both a governance tool and a signaling mechanism for stakeholders. This study investigates the influence of GAD on corporate financial performance (CFP), using a decade-long dataset spanning the period 2010–2020. Performance is assessed through three widely recognized indicators: Return on Capital Employed (ROCE), Earnings per Share (EPS), and Gross Profit Margin (GPM). To achieve a robust understanding, the analysis combines panel regression techniques with Principal Component Analysis (PCA), enabling the identification of both direct statistical associations and deeper structural dimensions that shape financial outcomes. The empirical findings highlight nuanced and sometimes contrasting dynamics. For ROCE, liquidity emerged as the only statistically significant determinant, exhibiting a negative relationship. This result suggests that holding excessive liquid assets can signal inefficiencies in capital allocation, thereby reducing overall productivity of invested capital. In contrast, GPM demonstrated dual behavior: while stronger liquidity positions improved gross profitability, the incorporation of sustainability disclosures exerted a negative short-term effect. This finding implies that environmental initiatives, though valuable, often impose upfront costs that may compress gross margins in the near term. Meanwhile, EPS revealed a marginal yet consistently positive association with GAD, underscoring its potential as a credible long-term signal to investors, enhancing market confidence in a firm's sustainable growth prospects. Notably, firm size showed no significant influence across all tested models, indicating that scale alone is insufficient to guarantee superior financial results in the context of sustainability practices. The application of PCA further validated these results by confirming that financial performance is shaped by multiple interacting dimensions rather than being driven by a single dominant factor. This multidimensional insight reinforces the complexity of the

profitability–sustainability relationship. Overall, the study emphasizes the strategic importance of effective liquidity management alongside a carefully balanced integration of environmental initiatives to optimize corporate outcomes. The evidence suggests that while sustainability disclosures may impose short-term financial burdens, they hold significant long-term value in building trust and legitimacy with investors and other stakeholders. For practitioners, these results provide actionable guidance in designing corporate strategies that align environmental responsibility with financial objectives. For scholars, the findings contribute to the evolving academic discourse on the profitability, sustainability nexus, highlighting the importance of adopting holistic analytical frameworks to capture the interplay between financial and non-financial performance drivers.

Keywords: Green Accounting Disclosure, Financial Success, Return on Capital Employed, Corporate Financial Performance, Gross Profit Margin, Earning Per Share.

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Abbreviations

AI	Artificial Intelligence
CDP	Carbon Disclosure Project
CSR	Corporate Social Responsibility
EMS	Environmental Management System
EPS	Earnings per Share
ESG	Environmental, Social, and Governance
FS	Firm Size
GA/GAD	Green Accounting / Green Accounting Disclosure
GADI	Green Accounting Disclosure Index
GADS	Green Accounting Disclosure Standards
GPM	Gross Profit Margin
GRI	Global Reporting Initiative
IAS	International Accounting Standards
IFRS	International Financial Reporting Standards
ISO	International Organization for Standardization
IT	Institutional Theory
KPI	Key Performance Indicator
KSE	Karachi Stock Exchange
LQD	Liquidity
PSX	Pakistan Stock Exchange
RBV	Resource-Based View
RBV	Resourse based view
ROA	Return on Assets
ROCE	Return on Capital Employed

SASB	Sustainability Accounting Standards Board
SECP	Securities and Exchange Commission of Pakistan
SiT	Signaling Theory
ST	Stakeholder Theory

Chapter 1

Introduction

1.1 Background of Study

In today's corporate landscape, sustainability has become a cornerstone of business strategies, driven by increasing societal expectations, stricter regulatory frameworks, and growing investor demand for responsible practices (Gray, 2010; Schaltegger, Burritt, & Christ, 2022; C. M. Deegan, 2019). Within this context, green accounting, the integration of environmental costs into traditional financial systems, has emerged as a vital tool for enhancing corporate transparency, accountability, and long-term value creation (Adams et al., 2020; Qian, Burritt, & Monroe, 2011).

Green accounting goes beyond conventional financial reporting by systematically incorporating environmental dimensions such as expenditures on pollution control, carbon emissions, energy consumption, waste management, and natural resource utilization into financial statements (Elkington & Rowlands, 1999; Schaltegger et al., 2022). This approach enables firms not only to assess the true cost of their operations but also to identify opportunities for efficiency, risk reduction, and innovation (Tien, Anh, & Ngoc, 2020; Lestari, Aisya Nadira, Nurleli, & Helliana, 2020).

Moreover, by aligning financial disclosures with sustainability objectives, green accounting helps organizations strengthen their reputation, build stakeholder trust,

and position themselves competitively in markets increasingly influenced by Environmental, Social, and Governance (ESG) metrics (*"Strategic management: A stakeholder approach", author=Freeman, R Edward*, 2010; Adams et al., 2020).

Green accounting disclosures provide essential insights into an organization's environmental initiatives and its broader commitment to sustainable development (C. M. Deegan, 2019). By documenting how resources are utilized, managed, and conserved, these disclosures serve as a benchmark for assessing a firm's environmental responsibility and long-term sustainability performance (Schaltegger et al., 2022; Qian et al., 2011).

Such disclosures are often perceived as indicators of effective environmental management, ethical corporate governance, and alignment with global sustainability goals (Elkington & Rowlands, 1999; *"Strategic management: A stakeholder approach", author=Freeman, R Edward*, 2010). As a result, they can significantly shape stakeholder perceptions, strengthening a company's reputation as a socially responsible entity (Hahn & Kühnen, 2013; C. M. Deegan, 2019). Transparent reporting also enhances investor confidence, as environmentally conscious investors increasingly seek firms that integrate sustainability into their business strategies. Furthermore, clear and credible disclosures can foster customer loyalty, particularly in markets where consumers are inclined to support environmentally responsible brands (Brammer, Branicki, Pavelin, & Porter, 2021).

Beyond reputational and market benefits, green accounting disclosures also serve a strategic function by helping organizations identify inefficiencies, reduce risks, and uncover opportunities for innovation in sustainable practices (Schaltegger et al., 2022; Adams et al., 2020). This dual role, both as a communication tool and a management strategy, positions green accounting disclosures as a critical component of modern corporate sustainability frameworks (C. M. Deegan, 2019; Joshi & Li, 2016).

The relationship between green accounting disclosure and financial performance has attracted considerable scholarly and practical attention in recent years (Lestari et al., 2020). Evidence suggests that comprehensive and credible environmental reporting can enhance financial outcomes by appealing to sustainability-focused

investors, regulators, and customers, thereby improving access to capital, strengthening market valuation, and fostering brand loyalty (Wang et al., 2022; Schaltegger et al., 2022). However, the relationship is not without complexities. Several studies emphasize the high implementation and compliance costs associated with adopting green accounting practices, which may erode short-term profitability, particularly for small and medium-sized enterprises (Brammer et al., 2021). Moreover, transparent disclosures may expose firms to reputational or regulatory risks if they reveal poor environmental performance or non-compliance with sustainability standards (C. M. Deegan, 2019; Hahn & Kühnen, 2013). This paradox highlights that while green accounting disclosure can act as a value-enhancing strategy, its financial implications are contingent on industry context, firm size, governance structures, and the quality of reporting practices (Iliemena, Aniefor, Uagbale-Ekatah, & Goodluck, 2023; Michelon & Parbonetti, 2012).

1.2 Theoretical Background

Green accounting disclosure refers to the practice of reporting a company's environmental performance and sustainability initiatives within its financial statements or dedicated sustainability reports (Gray, 2010; C. M. Deegan, 2019). By integrating environmental data into conventional accounting practices, it provides stakeholders with a comprehensive view of the firm's ecological impact and the strategies undertaken to mitigate it (Adams et al., 2020; Qian et al., 2011). Such disclosures not only enhance transparency but also signal corporate responsibility, thereby aligning business practices with global sustainability objectives (*"Strategic management: A stakeholder approach", author=Freeman, R Edward*, 2010; Schaltegger et al., 2022).

This research seeks to investigate the multifaceted relationship between green accounting disclosure and financial performance by addressing three critical dimensions (Schaltegger et al., 2022). First, it explores the scope, methodologies, and reporting standards such as GRI, SASB, and IFRS sustainability frameworks (C. M. Deegan, 2019). Second, it examines the extent to which these disclosures

influence profitability, shareholder value, and operational efficiency (Iliemena et al., 2023). Third, it identifies and evaluates key moderating factors, including industry-specific characteristics, regulatory environments, cultural contexts, and evolving stakeholder expectations (Brammer et al., 2021; Michelon & Parbonetti, 2012). By focusing on these dimensions, the study aims to provide a nuanced understanding of how green accounting disclosures contribute to financial performance, while also addressing complexities observed across different sectors and institutional settings (Hahn & Kühnen, 2013; C. M. Deegan, 2019).

1.2.1 Stakeholder Theory

Stakeholder theory, introduced by Edward Freeman in his 1984 work Strategic Management: A Stakeholder Approach, argues that businesses should address the needs and interests of all stakeholders rather than focusing solely on shareholders. According to stakeholder theory, businesses are responsible not only to their shareholders but also to a broader b array of stakeholders, including employees, customers, local communities, and the environment. Stakeholder theory.

The concept of stakeholder theory is based on the belief that businesses have a responsibility to serve not just their owners or shareholders, but all individuals or groups that are affected by their decisions and operations. These groups—referred to as stakeholders—can include employees, customers, suppliers, investors, government agencies, local communities, and even the natural environment.

Rather than focusing only on maximizing profits, the theory emphasizes that businesses should aim to balance the interests of everyone involved and strive to create value for a broader audience. This approach encourages ethical decision-making, long-term planning, and building stronger relationships with all parties that interact with the organization.

At the same time, the growing concern for environmental sustainability has led to the development of green accounting (Schaltegger et al., 2022; Joshi & Li, 2016). This is a method used by companies to track, measure, and report their impact

on the environment in financial terms (Adams et al., 2020; Gray, 2010). It goes beyond traditional accounting by including costs related to environmental damage, resource consumption, and investments in sustainable practices (Qian et al., 2011; Elkington & Rowlands, 1999).

When stakeholder theory and green accounting are brought together, they form a powerful framework for corporate responsibility (*"Strategic management: A stakeholder approach", author=Freeman, R Edward*, 2010; C. M. Deegan, 2019; Schaltegger et al., 2022). Governments and regulators rely on environmental data to ensure compliance, while investors and customers are increasingly drawn to transparent sustainability practices. Employees, too, often prefer working for companies that take ethical stances and protect the environment, which can boost morale and job satisfaction.

Stakeholder theory provides the ethical foundation for considering the needs of all groups involved in or impacted by a business, while green accounting provides the practical method for monitoring and managing one of the most pressing concerns today: the environment (*"Strategic management: A stakeholder approach", author=Freeman, R Edward*, 2010; Adams et al., 2020; C. M. Deegan, 2019). Together, they encourage companies to operate in a way that is not only financially successful but also socially and environmentally responsible (Schaltegger et al., 2022; Elkington & Rowlands, 1999).

1.2.2 Signaling Theory

Signaling theory, first articulated by Michael Spence in 1973, provides a valuable lens for understanding communication between parties with asymmetric information (Hahn & Kühnen, 2013). In corporate sustainability, firms possess more insight into their environmental practices than investors or regulators (C. M. Deegan, 2019). By publishing disclosures, companies attempt to signal commitment to responsible management and long-term value (Schaltegger et al., 2022).

When firms voluntarily report on their environmental initiatives, they satisfy accountability demands and project themselves as forward-looking and sustainable

(Adams et al., 2020). These disclosures operate as strategic signals that strengthen legitimacy and differentiate companies (Brammer et al., 2021). Effective green disclosures enhance reputation and stakeholder trust (Lestari et al., 2020; Wang et al., 2022).

Nevertheless, the effectiveness of signaling depends upon credibility. If sustainability reports are exaggerated or lack verification, they risk being dismissed as greenwashing (C. M. Deegan, 2019; Hahn & Kühnen, 2013). Credibility is strengthened through measurable actions, external audits, and alignment with frameworks such as GRI and SASB KPMG, 2023; (Adams et al., 2020). Ultimately, signaling theory underscores that transparent green disclosures enhance legitimacy, reduce information asymmetry, and drive long-term value (*"Strategic management: A stakeholder approach", author=Freeman, R Edward*, 2010; Schaltegger et al., 2022).

1.2.3 Institutional Theory

Institutional theory, first conceptualized by (Selznick, 1948) and later developed by scholars such as (Meyer & Rowan, 1977) and (DiMaggio, Powell, et al., 1983), provides a powerful framework for understanding how organizations respond to external pressures, norms, and expectations. Unlike economic theories that emphasize profit maximization as the primary motive for corporate action, institutional theory highlights that organizations also seek legitimacy, stability, and social acceptance in order to ensure survival. Firms, therefore, adopt certain practices not only because they are economically beneficial but also because they are institutionally appropriate and socially desirable. In the context of green accounting disclosure, institutional theory offers insight into why firms integrate environmental reporting into practice (Michelon & Parbonetti, 2012). Governments, investors, and consumers are placing pressure on firms to be transparent (Adams et al., 2020). (DiMaggio et al., 1983) mechanisms—coercive, mimetic, and normative pressures explain this diffusion (Hahn & Kühnen, 2013; Schaltegger et al., 2022). While coercive pressures arise from regulation, mimetic pressures emerge from imitation of successful peers, and normative pressures come from professional standards like

GRI or ISO 14001 (Adams et al., 2020; C. M. Deegan, 2019). Though often initially legitimacy-driven, these practices yield long-term benefits including efficiency, reduced risk, and investor confidence (Brammer et al., 2021; Michelon & Parbonetti, 2012). Institutional theory thus explains how sustainability disclosure evolves into both a social and strategic necessity (Schaltegger et al., 2022; Hahn & Kühnen, 2013).

1.2.4 Resource-Based View

The Resource-Based View (RBV) posits that internal resources determine sustainable competitive advantage. Green accounting can be viewed as a valuable, rare, inimitable, and non-substitutable resource (Schaltegger et al., 2022; Adams et al., 2020). Organizations integrating environmental considerations into decision-making gain insights that enhance performance and innovation (Wang et al., 2022). Such capabilities reduce costs and risks while building intangible assets like reputation and trust (*"Strategic management: A stakeholder approach", author=Freeman, R Edward*, 2010; C. M. Deegan, 2019). Early adopters that invested in sustainability systems accumulated expertise and legitimacy, securing long-term advantages KPMG, 2023 (Adams et al., 2020). Hence, RBV frames green accounting as a strategic capability essential to sustainable competitiveness (Schaltegger et al., 2022).

1.3 Key Research Questions

i. Does level of compliance with green accounting disclosure requirements have an impact on ROCE of companies of manufacturing sector in Pakistan?

ii. Does level of compliance with green accounting disclosure requirements have an impact on Gross Profit Margin of companies of manufacturing sector in Pakistan?

iii. Does level of compliance with green accounting disclosure requirements have an impact on Earning Per Share of companies of manufacturing sector in Pakistan?

1.4 Objectives of Research

This study seeks to investigate the impact of green accounting disclosure on the financial performance of manufacturing companies in Pakistan, with particular attention to how environmental transparency contributes to profitability, efficiency, and competitiveness. In an era where sustainability is becoming an essential component of corporate strategy, the integration of environmental information into financial reporting is no longer a peripheral activity but a critical factor that shapes organizational outcomes.

Manufacturing companies, due to their resource-intensive and environmentally impactful nature, are under increasing pressure to demonstrate accountability in how they manage emissions, waste, energy consumption, and overall ecological footprints. By examining how adherence to green accounting disclosure rules influences financial outcomes, this research will contribute to a deeper understanding of the economic implications of sustainability-driven practices.

The focus on Pakistan is particularly important because the country's manufacturing sector plays a vital role in national economic development, contributing significantly to employment, industrial growth, and exports. However, it also poses serious challenges to environmental sustainability, given its heavy reliance on energy-intensive processes, outdated technologies, and limited awareness of environmental responsibilities. Regulatory frameworks related to environmental reporting in Pakistan are evolving, but compliance remains uneven, and many firms have yet to recognize the financial and strategic benefits of adopting such practices. This study will therefore examine whether companies that voluntarily or mandatorily follow green accounting disclosure standards achieve measurable improvements in financial performance compared to those that do not. Specifically,

the research will analyze how green accounting practices influence key financial dimensions, including profitability, cost savings, and market competitiveness. Profitability may improve as sustainable companies attract eco-conscious consumers, secure long-term contracts, and enhance brand reputation. Cost savings can arise through efficiency gains, such as reduced energy use, optimized resource allocation, and waste minimization, which lower operational expenses. Furthermore, competitiveness in the market may be strengthened when firms position themselves as leaders in environmental responsibility, differentiating their products and services in both domestic and international markets. The study will also consider whether environmental disclosures help firms mitigate risks associated with regulatory penalties, reputational damage, and investor skepticism, thereby reinforcing financial resilience.

Another important aspect of this research is its focus on investor trust and stakeholder confidence. In global capital markets, there is a growing demand for Environmental, Social, and Governance (ESG) reporting, with investors increasingly directing funds toward companies that demonstrate environmental accountability. Although Pakistan's investor community is at an earlier stage of embracing ESG considerations compared to developed economies, trends indicate a growing awareness of sustainability-related risks and opportunities. Companies that comply with green accounting disclosure rules may therefore enjoy enhanced investor trust, easier access to financing, and greater acceptance in international markets. By analyzing this dynamic, the research will explore how transparency in environmental reporting contributes to long-term financial stability and capital attraction.

The study also aims to highlight the policy implications of integrating environmental reporting within corporate financial systems. Policymakers in Pakistan face the dual challenge of fostering economic growth while ensuring environmental sustainability, especially in light of international climate commitments and sustainable development goals (SDGs). If findings demonstrate that green accounting not only benefits the environment but also improves financial outcomes, regulators will have a stronger case for strengthening disclosure requirements and creating

incentives for compliance. Similarly, businesses can draw lessons on how proactive environmental strategies not only reduce ecological harm but also enhance their financial viability and global competitiveness.

This research aims to bridge the gap between environmental responsibility and economic performance in Pakistan's manufacturing sector. By systematically examining the relationship between green accounting disclosure and financial outcomes such as profitability, efficiency, investor trust, and competitiveness, the study will provide valuable insights for both practitioners and policymakers. The findings will help determine whether environmental transparency should be viewed merely as a compliance requirement or as a strategic resource that fosters long-term financial success. In doing so, the research aspires to contribute to broader debates on sustainable business practices, corporate accountability, and the evolving role of green accounting in emerging economies.

The objective of this research is:

i. To assess the impact of level of compliance with green accounting disclosure requirements on ROCE of companies of manufacturing sector in Pakistan?

ii. To assess the impact of level of compliance with green accounting disclosure requirements on Gross Profit Margin of companies of manufacturing sector in Pakistan?

iii. To assess the impact of level of compliance with green accounting disclosure requirements on Earning Per Share of companies of manufacturing sector in Pakistan?

1.5 Significance of Research

Although a growing body of research conducted between 2020 and 2024 suggests a generally positive association between green accounting disclosures and financial performance, several critical gaps remain unaddressed. Many of the existing studies focus on identifying correlations rather than investigating the underlying causal

mechanisms. While correlations indicate that firms with higher-quality disclosures often report better financial outcomes, they do not clarify whether disclosure itself drives these outcomes, or whether already high-performing firms are simply more capable of engaging in sustainability reporting. This lack of clarity limits the ability of scholars and practitioners to determine the true financial value of green accounting practices and raises questions about whether disclosure is a driver of performance or merely a reflection of it. Another limitation of the current literature lies in the tendency to generalize findings without sufficient attention to contextual differences across industries, countries, and firm types. For instance, the impact of green disclosures may vary significantly between capital-intensive industries such as manufacturing or energy, compared to service-oriented sectors with smaller environmental footprints. Similarly, the role of regulatory environments cannot be ignored firms operating in countries with stringent environmental disclosure laws may experience different financial implications than those in regions where compliance is voluntary or loosely monitored. Cultural factors and stakeholder expectations also play an important role, as firms in environmentally conscious societies may benefit more from transparent disclosures than firms in contexts where such concerns are less prioritized.

In addition to enhancing reputation and stakeholder engagement, green accounting disclosures serve a strategic management function. By systematically recording environmental costs and resource usage, organizations can identify inefficiencies in operations, mitigate environmental and regulatory risks, and uncover opportunities for innovation in sustainable products, services, and processes (Schaltegger et al., 2022; Adams et al., 2020). For example, firms that measure the financial impact of waste management or energy consumption can implement more efficient technologies, reduce operational costs, and achieve sustainability targets simultaneously. This dual role of green accounting—as both a communication tool and a strategic management instrument—demonstrates its growing importance in contemporary corporate governance and sustainability frameworks (C. M. Deegan, 2019; Joshi & Li, 2016).

The link between green accounting disclosures and financial performance has been

a focal point of both academic research and practical interest in recent years (Lestari et al., 2020). Evidence suggests that companies engaging in comprehensive and credible environmental reporting are more likely to experience improved financial outcomes. Such outcomes may include enhanced access to capital, higher market valuation, reduced cost of equity, and strengthened customer loyalty (Wang et al., 2022; Schaltegger et al., 2022). By appealing to sustainability-conscious investors and other stakeholders, firms can leverage their green initiatives as a source of competitive advantage and long-term value creation.

In conclusion, green accounting has emerged as a critical element of corporate sustainability. By integrating environmental considerations into financial reporting, firms can enhance transparency, strengthen stakeholder trust, and create long-term value. Green accounting disclosures provide both strategic insights for internal management and a communication channel for external stakeholders. While challenges exist, particularly in terms of implementation costs and potential exposure to risks, the benefits of adopting green accounting practices—including improved financial performance, enhanced reputation, and alignment with ESG principles—underscore its significance in modern corporate strategy. As global attention to sustainability intensifies, the role of green accounting in shaping corporate behavior and guiding investment decisions is likely to become even more pronounced.

A further gap relates to methodological inconsistencies and the absence of standardized reporting frameworks. Current research draws on diverse and often incomparable approaches to measure both green accounting disclosure and financial performance. Some studies rely on self-reported sustainability indices, while others use secondary databases or firm-level reports, leading to fragmented and sometimes contradictory results.

Similarly, financial performance is operationalized in various ways, including profitability ratios, stock returns, cost efficiencies, or market valuation, which complicates cross-study comparisons. The lack of methodological consistency reduces the reliability and comparability of findings, making it difficult to build cumulative knowledge or establish universally applicable insights.

In addition, much of the existing work has been concentrated in developed economies with advanced sustainability frameworks and strong investor demand for environmental accountability. By contrast, emerging economies, where regulatory frameworks are less developed and awareness of sustainability is still growing, have received relatively little attention.

This is a significant oversight, as the financial implications of green accounting disclosure may differ in markets where environmental reporting is at a nascent stage. Firms in such contexts may encounter additional barriers, such as higher implementation costs, weaker investor demand for ESG practices, or limited institutional support, all of which could alter the disclosure–performance relationship.

These gaps highlight the pressing need for research that goes beyond correlation to examine causality, integrates cross-country and cross-sector comparisons, and employs standardized frameworks to enhance comparability. Future studies should also explore the moderating roles of regulatory quality, cultural context, firm size, and industry characteristics in shaping how disclosures translate into financial outcomes.

By addressing these limitations, future scholarship can provide a more reliable and comprehensive understanding of the mechanisms through which green accounting influences profitability, shareholder value, and long-term sustainability. Such advancements would not only enrich academic theory but also offer actionable insights for policymakers, investors, and corporate leaders navigating the complex intersection of environmental responsibility and financial performance.

Chapter 2

Literature Review

2.1 The Influence of Green Accounting on Financial Success

Schaltegger et al. (2022) argue that incorporating green accounting into corporate strategy facilitates resource efficiency, waste reduction, and compliance with environmental regulations, thereby contributing to long-term sustainability. Green accounting, also referred to as environmental accounting, emphasizes measurement, valuation, and reporting of environmental costs and benefits in order to foster greater transparency and accountability. According to (Schaltegger et al., 2022), such practices enable organizations to integrate environmental considerations into financial decision-making, thereby bridging the gap between ecological responsibility and economic performance. Similarly, (Gray, 2010) highlights that environmental accounting enhances stakeholder trust by disclosing firms' ecological impacts, which is increasingly demanded by regulators, investors, and civil society.

In addition, green accounting aligns corporate practices with global sustainability objectives such as the United Nations' Sustainable Development Goals (SDGs), particularly those related to responsible consumption, climate action, and sustainable production. As (Qian et al., 2011) observe, adopting environmental accounting systems not only improves compliance with regulatory frameworks but

also allows firms to internalize environmental externalities, encouraging proactive environmental management rather than reactive compliance. More recent studies, such as (Tien et al., 2020), suggest that environmental accounting can also create competitive advantages by differentiating firms as sustainability leaders in their industries. This view is reinforced by (C. M. Deegan, 2019), who notes that green accounting reporting is becoming central to corporate social responsibility (CSR) disclosures, strengthening long-term resilience in an era of increasing stakeholder scrutiny and tightening environmental regulations.

The literature demonstrates that green accounting is not merely an accounting innovation but a strategic tool. It enhances operational efficiency, ensures regulatory alignment, and contributes to corporate legitimacy in a sustainability-driven global economy.

Recent research from 2020 to 2024 has examined the link between green accounting and financial performance, revealing a nuanced and multifaceted relationship. Study found that comprehensive environmental disclosures attract environmentally conscious investors, thereby enhancing corporate reputation and leading to higher market valuations. Similarly, argue that transparent sustainability reporting reduces information asymmetry and builds stakeholder trust, which in turn improves firms' access to capital.

On the other hand, Kim and Park (2023) cautioned that the short-term financial impact of adopting green accounting may be negative due to the costs of implementing environmental management systems and compliance reporting. Nonetheless, these costs are often offset in the long run by efficiency gains, regulatory compliance, and reputational benefits.

The emerging literature suggests that green accounting influences financial performance through both direct mechanisms—such as cost savings from resource efficiency and risk reduction—and indirect mechanisms—such as reputational gains, investor attraction, and improved stakeholder relations. The findings underscore that the relationship is not uniformly positive but depends on firm characteristics, industry context, and the maturity of environmental reporting practices.

Similarly, (Wang et al., 2022) highlighted that firms adopting environmental management strategies often achieve operational cost savings through improved efficiency, which directly enhances profitability. Hartman et al. (2023) further demonstrated that effective green disclosures enable firms to differentiate themselves in competitive markets, thereby strengthening their market positioning and brand reputation.

However, the benefits of green accounting practices are not uniform across all contexts. Brammer et al. (2021) observed significant industry-specific variations, noting that sectors with high environmental impact, such as energy and manufacturing, tend to derive more pronounced advantages from environmental disclosure compared to service-based industries.

These findings suggest that while green accounting can provide both financial and strategic benefits, its effectiveness is shaped by sectoral characteristics, regulatory environments, and stakeholder expectations. In capital-intensive and environmentally sensitive industries, proactive environmental reporting can mitigate regulatory risks and improve access to green financing. By contrast, in less environmentally intensive sectors, the financial returns from green disclosures may be more symbolic, contributing primarily to corporate legitimacy rather than direct profitability. This highlights the importance of context-specific analysis when evaluating the relationship between green accounting and firm performance.

Schaltegger et al. (2022) further noted that the financial benefits of green accounting often materialize over the long term rather than producing immediate gains, as efficiency improvements, reputational advantages, and stakeholder trust typically accumulate gradually. On the downside, pointed out that implementing and maintaining green accounting systems entails substantial costs, particularly for smaller enterprises with limited resources, which can erode short-term financial gains. This cost–benefit imbalance highlights a critical challenge: while larger corporations may absorb the upfront costs of environmental accounting and eventually reap strategic advantages, small and medium-sized enterprises (SMEs) often face financial and operational constraints that limit their ability to sustain such practices.

As a result, the literature emphasizes that the success of green accounting depends not only on organizational commitment but also on firm size, sectoral characteristics, and external institutional support. Without regulatory incentives, industry-specific guidelines, or subsidies, smaller firms may struggle to justify the immediate expenses of adopting green accounting, even if the long-term outcomes are favorable.

Studies suggest that green accounting practices play a critical role in achieving corporate sustainability by aligning economic objectives with environmental and social responsibilities (Elkington & Rowlands, 1999; Adams et al., 2020). By integrating environmental costs and social impacts into traditional financial reporting, green accounting supports the "triple bottom line" approach, which emphasizes not only profit but also people and the planet.

Elkington and Rowlands (1999) seminal framework underscores the importance of balancing these three dimensions, while more recent contributions, such as (Adams et al., 2020), highlight how sustainability reporting has evolved into a strategic tool for enhancing transparency, stakeholder engagement, and long-term resilience.

Joshi and Li (2016) examine the role of management accounting in implementing and evaluating sustainability practices, with particular emphasis on green accounting. Their study investigates corporate sustainability through the lens of management accounting, focusing on how businesses integrate sustainability considerations into their operational and reporting practices. The authors highlight the critical role of green accounting in facilitating these efforts by embedding environmental factors into traditional accounting frameworks. In doing so, they underscore the importance of comprehensive environmental disclosures, which not only enhance transparency and accountability but also support informed decision-making by managers, investors, and other stakeholders. This integration reflects a shift from purely financial performance measurement toward a broader sustainability-oriented approach, aligning corporate practices with long-term environmental and social objectives.

Additionally, C. M. Deegan (2019) cautioned that superficial or insincere environmental disclosures—often referred to as "greenwashing"—can generate stakeholder

skepticism, thereby undermining organizational trust and credibility. Such practices not only weaken the effectiveness of green accounting but may also expose firms to reputational risks and regulatory scrutiny. These findings underscore the complex dynamics between green accounting and financial performance, which are shaped by industry contexts, time horizons, and, most critically, the perceived credibility and authenticity of disclosure practices.

Thus, while green accounting holds the potential to strengthen sustainability performance and long-term profitability, its impact is contingent upon genuine commitment, transparent reporting, and consistent alignment with broader sustainability goals.

Green accounting has emerged as a pivotal tool in aligning economic objectives with environmental and social responsibilities. Building on (Elkington & Rowlands, 1999) triple bottom line framework and (Adams et al., 2020) discussion of sustainability reporting as a strategic instrument, scholars highlight the role of green accounting in embedding environmental costs and impacts into financial systems to enhance transparency and accountability.

Joshi and Li (2016) further reinforce this perspective by situating corporate sustainability within the domain of management accounting, emphasizing the integration of environmental factors into traditional accounting frameworks to facilitate informed decision-making and comprehensive sustainability disclosures.

Recent research (2020–2024) has expanded this foundation, exploring the nuanced relationship between green accounting and financial performance. (Lestari et al., 2020) demonstrated that comprehensive environmental disclosures attract environmentally conscious investors, contributing to higher market valuations. Similarly, Wang et al. (2022) highlighted that firms adopting environmental management strategies often achieve operational cost savings through improved efficiency, which directly enhances profitability. Hartman et al. (2023) added that effective green disclosures allow firms to differentiate themselves in competitive markets, strengthening both their brand image and long-term positioning. However, Brammer et al. (2021) observed that these benefits are not uniform across industries; sectors such

as energy and extractives tend to derive more pronounced advantages compared to service-oriented firms.

Scholars also point to temporal and structural factors that shape the outcomes of green accounting. Schaltegger et al. (2022) emphasized that financial benefits typically materialize over the long term rather than immediately, as reputational gains, operational efficiencies, and stakeholder trust accumulate gradually. In contrast, Haniffa and Cooke (2023) cautioned that the adoption and maintenance of green accounting systems impose significant costs, particularly for small and medium-sized enterprises (SMEs), which may erode short-term profitability and hinder adoption. This cost–benefit disparity underscores the importance of firm size, sectoral characteristics, and institutional support in shaping the effectiveness of sustainability practices.

Moreover, the credibility of disclosures is a critical determinant of stakeholder response. C. M. Deegan (2019) warned that superficial or insincere sustainability reporting often perceived as "greenwashing" can foster stakeholder skepticism, undermining trust and potentially exposing firms to reputational and regulatory risks. Their findings underscore that the effectiveness of green accounting depends not only on disclosure quantity but also on perceived authenticity and alignment with broader sustainability objectives.

Complementing these academic perspectives, the KPMG (2023) global report highlights how sustainability reporting is rapidly becoming central to corporate strategies worldwide. It stresses that the future of corporate reporting will be defined by standardized frameworks, comprehensive disclosures, and increased regulatory scrutiny.

Organizations that proactively embrace sustainability accounting practices are more likely to enhance long-term financial performance, strengthen stakeholder trust, and secure competitive advantage. By positioning green accounting as a strategic imperative rather than an optional practice, the report reflects a broader shift toward aligning corporate accountability with global sustainability agendas such as the United Nations Sustainable Development Goals (SDGs).

This body of work reveals that green accounting is no longer confined to environmental cost measurement; it represents a strategic pathway for achieving corporate sustainability, enhancing competitiveness, and securing legitimacy in a rapidly evolving business landscape. Its effectiveness, however, remains contingent on firm-specific factors, industry dynamics, and above all, the authenticity of disclosure practices.

Theoretical frameworks underpinning this research area include stakeholder theory, legitimacy theory, and the resource-based view (RBV). Stakeholder theory, as articulated by (*"Strategic management: A stakeholder approach", author=Freeman, R Edward*, 2010), posits that organizations must consider the interests of multiple stakeholders beyond shareholders to achieve long-term success. Within this framework, the adoption of green accounting enables firms to respond more effectively to stakeholder expectations regarding environmental and social responsibility. By doing so, companies can enhance their legitimacy, strengthen their reputations, and potentially improve financial performance through increased investor confidence, customer loyalty, and regulatory compliance.

Stakeholder theory, first articulated by (*"Strategic management: A stakeholder approach", author=Freeman, R Edward*, 2010), posits that firms create value not only for shareholders but also for a broad set of stakeholders, including customers, employees, regulators, investors, and society at large. In this context, green accounting serves as a strategic tool for addressing stakeholders' growing demands for environmental responsibility and transparency. By providing credible environmental disclosures, firms can enhance trust, reputation, and legitimacy, which in turn contribute to improved financial outcomes through increased investor confidence, customer loyalty, and regulatory goodwill.

Legitimacy theory builds on the idea that organizations operate within a "social contract," where their survival depends on being perceived as legitimate by society (Suchman, 1995). Green accounting is instrumental in reinforcing this legitimacy, as it allows firms to demonstrate alignment with societal expectations for environmental protection and sustainable development. Transparent reporting on environmental impacts can mitigate reputational risks, reduce accusations of

greenwashing, and foster stronger relationships with regulators and communities. Conversely, weak or insincere disclosures may damage legitimacy and expose firms to stakeholder skepticism.

The resource-based view (Barney, 1991) emphasizes that firms achieve sustainable competitive advantage by leveraging unique, valuable, and inimitable resources. Green accounting practices, when effectively implemented, can serve as such a resource by enhancing internal capabilities in sustainability management, improving efficiency in resource utilization, and fostering innovation in environmental practices.

For instance, robust systems for measuring and managing environmental costs can reduce waste, optimize energy use, and generate long-term operational savings. Over time, these capabilities differentiate firms in competitive markets, providing strategic advantages that are difficult for rivals to replicate.

These three theoretical perspectives highlight complementary dimensions of green accounting. Stakeholder theory emphasizes external engagement and responsiveness, legitimacy theory underscores societal approval and reputation, while RBV focuses on internal capabilities and competitive advantage. Integrating these frameworks provides a comprehensive understanding of how green accounting contributes simultaneously to corporate sustainability, stakeholder trust, and financial performance.

Delmas, Lim, and Nairn-Birch (2016) argue that stricter environmental regulations compel firms to adopt more comprehensive green accounting practices, which, in turn, can yield improved financial outcomes. Compliance with stringent regulatory frameworks not only mitigates legal and reputational risks but also encourages operational efficiencies, resource optimization, and cost savings that contribute directly to profitability. Moreover, companies that demonstrate proactive environmental responsibility often enjoy enhanced reputational capital, which can strengthen stakeholder trust and investor confidence. The authors further emphasize that strong corporate governance structures are essential for maximizing the benefits of green accounting. Effective governance ensures the credibility, accuracy, and transparency of environmental disclosures, reduces the risk of greenwashing,

and integrates sustainability considerations into strategic decision-making. Collectively, these factors illustrate how regulatory pressures, when coupled with robust governance mechanisms, create conditions under which green accounting practices can drive both sustainability and long-term financial performance.

Michelon and Parbonetti (2012) suggest that firms with robust governance structures are better positioned to implement green accounting practices effectively, ensuring that environmental considerations are systematically integrated into business strategies. Strong governance not only enhances the credibility and reliability of environmental disclosures but also enables organizations to fully realize the financial benefits of sustainability efforts, such as improved efficiency, reputational gains, and long-term profitability. Beyond governance, cultural factors also play a pivotal role in shaping the adoption and outcomes of green accounting. Drawing on Hofstede's cultural dimensions, variations in values such as long-term orientation, uncertainty avoidance, and collectivism influence how firms prioritize environmental accountability and how stakeholders perceive sustainability disclosures.

For instance, companies operating in cultures with higher long-term orientation may place greater emphasis on sustainable practices, thereby deriving stronger financial and reputational advantages from green accounting initiatives. These insights underscore that the effectiveness of green accounting is not solely determined by internal governance mechanisms but is also mediated by broader cultural contexts, which shape both corporate behavior and stakeholder expectations.

Smith et al. (2023) highlight that digital technologies are transforming green accounting by enabling more precise, efficient, and transparent reporting of environmental impacts. Tools such as big data analytics, blockchain, and artificial intelligence enhance the accuracy of environmental cost measurements, streamline disclosure processes, and reduce the risk of manipulation or greenwashing. Moreover, digital platforms facilitate real-time monitoring of resource use and emissions, providing firms with actionable insights that support both compliance and strategic decision-making. These advancements illustrate how technological innovation is reshaping the practice of green accounting, reinforcing its role as a critical driver of sustainability and financial performance. The rising importance

of Environmental, Social, and Governance (ESG) metrics has further strengthened the connection between green accounting and investor decision-making (Liu et al., 2024). As ESG considerations become mainstream in financial markets, investors increasingly rely on green accounting disclosures to assess corporate sustainability performance, risk exposure, and long-term value creation.

Transparent and reliable environmental reporting not only attracts socially responsible investors but also enhances firms' access to capital by signaling lower risk profiles and stronger future resilience. This growing alignment between ESG metrics and investment behavior underscores the strategic importance of green accounting in shaping financial market outcomes.

The study by Iliemena et al. (2023) (year) provides important empirical evidence demonstrating that sustainability reporting exerts a substantial influence on corporate financial performance, particularly when performance is measured using indicators such as Return on Capital Employed (ROCE) and Gross Profit Margin (GPM). Their analysis suggests that sustainability disclosures are not limited to fulfilling statutory or regulatory obligations; rather, they extend to shaping how efficiently firms utilize their resources and generate profitability. By enhancing transparency and accountability, such reporting mechanisms create internal incentives for firms to monitor operational efficiency more closely, reduce waste, and adopt resource-saving practices, all of which ultimately strengthen both capital returns and profitability margins. This aligns with the broader view that sustainability initiatives are not simply cost centers but can serve as enablers of efficiency and value creation.

Comparable insights were presented by Clarkson et al. (2011), who investigated the financial implications of environmental disclosure and concluded that firms engaging in more comprehensive and higher-quality reporting practices tend to experience superior financial outcomes.

According to their findings, robust disclosure not only facilitates compliance but also generates positive spillover effects in terms of reputation and stakeholder relations. Firms with transparent reporting systems are better positioned to gain

trust from investors, customers, and regulators, which, in turn, reduces information asymmetry and the perceived risk of opportunistic behavior. This improved trust environment allows firms to access capital at lower costs and secure long-term financing, which directly contributes to stronger financial performance.

Such results lend support to stakeholder theory, which posits that firms that meet or exceed stakeholder expectations on environmental and social responsibility are more likely to build sustainable competitive advantages.

Building on this perspective, Michelon and Parbonetti (2012) emphasized that transparent sustainability communication serves as a critical determinant of investor confidence and long-term value creation. Their research highlights that sustainability reporting enhances corporate legitimacy by signaling a firm's commitment to ethical practices, environmental stewardship, and social responsibility. This, in turn, attracts long-term investors who prioritize sustainable business practices and who are less likely to engage in speculative trading behaviors. By reducing volatility in investor relations and providing assurance regarding a company's long-term orientation, sustainability disclosures contribute to creating stable financial conditions that foster value growth. Importantly, the authors argue that such disclosures represent more than a public relations tool; instead, they embody a core element of strategic communication, enabling firms to differentiate themselves in competitive markets through reputational capital.

Nevertheless, the relationship between sustainability reporting and financial performance is not universally consistent. (Hahn & Kühnen, 2013), in their comprehensive review of the literature, cautioned that the strength and direction of this relationship may vary significantly across industries, institutional contexts, and reporting frameworks. For example, in environmentally sensitive industries such as energy or extractives, sustainability disclosures may have a more direct and immediate financial impact because stakeholders are highly concerned about environmental risks. Conversely, in industries with lower environmental exposure, the financial benefits of disclosure may be less pronounced or take longer to materialize. Furthermore, the effectiveness of reporting depends heavily on the credibility, comparability, and comprehensiveness of the information disclosed. Superficial or

symbolic reporting may not generate the same financial benefits as substantive, verifiable sustainability communication.

These studies converge on the notion that sustainability reporting should not be understood merely as a compliance-oriented exercise. Instead, it should be framed as a strategic instrument capable of simultaneously advancing corporate accountability and financial performance. By institutionalizing sustainability practices and communicating them effectively, firms are able to reduce inefficiencies, improve profitability, attract sustainable financing, and strengthen stakeholder relations.

However, the degree to which these benefits materialize is contingent upon industry characteristics, stakeholder expectations, and the quality of reporting standards adopted. This multidimensional perspective suggests that future research should move beyond binary assessments of "disclosure versus non-disclosure" and instead focus on evaluating how the depth, credibility, and strategic integration of sustainability reporting shape firm performance across different contexts.

Scholars have increasingly turned their attention to the complex and evolving relationship between sustainability practices and corporate financial outcomes. This growing body of work highlights the shift in perception from regarding sustainability as a peripheral, non-financial concern to recognizing it as a strategic determinant of business success. For instance, (Iliemena et al., 2023) examined the role of sustainability reporting and provided compelling evidence that such practices have a measurable and positive effect on financial performance, specifically on return on capital employed (ROCE) and gross profit margin (GPM). Their findings emphasize that sustainability disclosures go beyond the realm of regulatory compliance. Rather than being treated as obligatory reporting exercises, they should be understood as strategic mechanisms that enhance transparency, reduce information asymmetry, and promote operational efficiency. This, in turn, leads to profitability improvements and creates long-term value for both firms and stakeholders.

In a related study, Harimauwan and Lukman (2023) focused on manufacturing companies listed on the Indonesia Stock Exchange, exploring the interplay between environmental performance, corporate social responsibility (CSR), earnings

per share (EPS), and return on assets (ROA) in shaping stock returns. Interestingly, their results revealed a nuanced picture: while traditional financial indicators such as EPS and ROA exhibited a significant and positive relationship with stock market performance, CSR reporting was negatively associated with stock returns, and environmental performance did not demonstrate a statistically significant effect.

These findings suggest that in certain contexts, investors may prioritize immediate financial performance over broader sustainability initiatives, or they may perceive CSR expenditures as cost burdens rather than value-adding investments. At the same time, the non-significance of environmental performance underscores the possibility that the financial market's sensitivity to sustainability varies across regions, industries, and institutional environments.

Further insights were provided by Lucas (2024), who investigated the impact of environmental reporting on financial outcomes among Ghanaian manufacturing firms. His research demonstrated that firms engaging in more transparent and comprehensive environmental disclosure tend to record superior financial indicators, including return on equity (ROE) and net profit margin. Lucas argued that sustainability communication functions not merely as a reporting tool but as a reputational asset that enhances credibility, strengthens investor trust, and fosters competitive advantage. In environments where regulatory enforcement may be uneven, such as emerging economies, voluntary and transparent sustainability disclosures are often interpreted as strong signals of good governance and long-term orientation. Consequently, these practices help firms to secure favorable financing terms, attract socially responsible investors, and establish a resilient market presence.

These studies reveal that both financial variables (such as EPS, ROA, ROCE, and GPM) and sustainability dimensions (such as CSR activities and environmental reporting) jointly contribute to the shaping of firm value. The evidence suggests that while financial performance remains a core determinant of investor decision-making, the integration of sustainability into corporate strategy provides complementary advantages that reinforce competitiveness and financial stability.

Importantly, the varied results across different contexts highlight that the relationship between sustainability and financial outcomes is not linear or uniform. Instead, it is shaped by contextual factors, including industry characteristics, market maturity, regulatory environments, and investor expectations.

Overall, the growing empirical evidence underscores the need to view sustainability reporting as more than an exercise in compliance. It is better understood as a strategic instrument that can enhance competitiveness, build investor confidence, and secure long-term financial resilience. By embedding sustainability into their business models, firms can not only improve their financial outcomes but also strengthen accountability and legitimacy, positioning themselves advantageously in increasingly sustainability-conscious global markets.

2.2 Research Gaps

Despite significant progress in the field, several critical gaps persist. One major concern lies in establishing causality, as much of the existing literature primarily identifies correlations between green accounting practices and financial performance without conclusively demonstrating cause-and-effect relationships. This limitation reduces the ability to generalize findings across contexts. Furthermore, there is a pressing need for industry-specific analyses, since the adoption, challenges, and financial implications of green accounting vary considerably between sectors such as manufacturing, energy, services, and technology.

In addition, most studies adopt a macro or firm-level perspective, often overlooking intra-organizational dynamics—such as managerial commitment, employee engagement, and supply chain integration—that may significantly influence the effectiveness of green accounting. Another underexplored area is the interaction between digital technologies and green accounting frameworks, where innovations like blockchain, AI, and real-time monitoring systems could transform credibility, timeliness, and standardization of disclosures. Finally, while ESG metrics have gained prominence in shaping investor behavior, limited research explores how

cultural and regulatory contexts mediate investor responses to green accounting disclosures, creating opportunities for cross-country comparative studies.

2.3 Hypothesis

Green accounting disclosures can positively influence key financial performance indicators such as Earnings Per Share (EPS), Profit Margin, and Return on Capital Employed (ROCE). By enhancing corporate reputation and attracting environmentally conscious investors, transparent green disclosures can strengthen market confidence and increase stock valuations, thereby boosting EPS. In addition, sustainable practices—such as reducing energy consumption, minimizing waste, and adopting responsible sourcing—translate into tangible cost savings, which directly improve profit margins. Green accounting further facilitates the identification of operational inefficiencies, enabling firms to streamline processes and lower costs, thereby reinforcing profitability. Moreover, investments in green technologies and sustainable processes allow companies to optimize the utilization of capital, ultimately generating higher returns and improving ROCE. Beyond financial benefits, such practices also help firms mitigate regulatory risks, enhance stakeholder trust, and secure long-term competitiveness in increasingly sustainability-driven markets. Overall, green accounting not only reduces operational costs but also contributes to sustained improvements in financial performance and long-term corporate value creation.

i. H1: level of compliance with Green accounting disclosure requirements has positive impact on Return on Capital Employed (ROCE).

ii. H2: level of compliance with Green accounting disclosure requirements has positive impact on Gross Profit Margin.

iii. H3: level of compliance with Green accounting disclosure requirements has positive impact on Earning per Share.

Chapter 3

Research Methodology

3.1 Data

Secondary data will be collected from reputable and widely recognized sources to ensure accuracy and reliability. These will include annual financial reports and corporate sustainability or CSR disclosures, which provide detailed insights into firms' financial health and environmental practices.

In addition, ESG (Environmental, Social, and Governance) reports will be utilized to capture standardized sustainability metrics that are increasingly used by investors and regulators.

To complement these sources, data will also be extracted from global financial and sustainability platforms such as Bloomberg and Thomson Reuters (Refinitiv), which offer comprehensive and comparable datasets on corporate financial performance, ESG ratings, and green accounting disclosures across industries and regions. These sources together will provide a robust data set, ensuring both the credibility and the breadth of information required for rigorous analysis.

3.2 Sampling Strategy

The manufacturing sector was chosen as the focal point of this research because it carries one of the heaviest environmental footprints worldwide, making the role of

green accounting disclosures particularly significant and impactful. Unlike service-oriented industries, manufacturing operations consume vast amounts of raw materials, water, and energy, while simultaneously generating emissions, effluents, and industrial waste. Globally, the sector is a major contributor to carbon emissions and resource depletion, drawing increasing attention from governments, investors, and civil society.

As climate change and environmental sustainability rise to the forefront of global priorities, manufacturers are under growing pressure to adopt transparent disclosure practices that highlight their efforts to minimize environmental harm and align with sustainable development goals.

From an international perspective, manufacturing firms face stricter compliance requirements as sustainability standards become embedded in trade agreements, supply chain policies, and investor expectations. Many multinational corporations and global buyers now require suppliers to disclose their environmental impacts, adopt eco-friendly practices, and comply with international frameworks such as the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), and the United Nations Sustainable Development Goals (SDGs). This makes sustainability reporting a competitive necessity in global markets. Companies that fail to provide transparent green disclosures risk losing contracts, facing reputational damage, or being excluded from environmentally conscious supply chains.

In the case of Pakistan, the relevance of the manufacturing sector is even more pronounced. Manufacturing is a cornerstone of Pakistan's economy, contributing around 12–13% to GDP and employing millions, particularly in industries such as textiles, cement, chemicals, steel, and fertilizers. These sectors are among the most resource-intensive and pollution-heavy in the country, with high energy consumption, substantial greenhouse gas emissions, and significant waste generation. Pakistan's textile industry, in particular, faces mounting pressure from international buyers especially from Europe and North America who increasingly demand proof of environmental responsibility as a prerequisite for trade partnerships. In this context, green accounting disclosures can help Pakistani manufacturers not

only comply with export requirements but also strengthen their competitiveness in global markets.

Furthermore, Pakistan faces unique environmental and economic challenges that heighten the importance of sustainable practices in manufacturing. The country is among the most climate-vulnerable nations in the world, frequently experiencing floods, droughts, and extreme weather events that disrupt production and supply chains. At the same time, rising energy costs, dependence on imported fossil fuels, and inefficiencies in industrial processes create economic vulnerabilities for manufacturing firms. Green accounting can address these challenges by encouraging firms to monitor resource consumption, identify inefficiencies, and implement cost-saving sustainability initiatives. Transparent reporting can also build investor confidence, particularly as Pakistan seeks to attract foreign direct investment in line with global environmental, social, and governance (ESG) standards.

Another reason for focusing on the manufacturing sector is the richness and diversity of available data for empirical analysis. Manufacturing firms in Pakistan vary widely in the extent to which they adopt environmental practices. While large multinational companies operating locally are often required to follow international sustainability reporting frameworks, many small and medium enterprises (SMEs) have little or no disclosure mechanisms in place. This heterogeneity creates an ideal opportunity to study how differences in disclosure quality influence financial performance, both within the Pakistani context and in comparison to global best practices. It also allows for nuanced analysis of how firm size, industry sub-sectors, and ownership structures affect the relationship between green accounting and financial outcomes.

Importantly, the link between environmental performance and financial outcomes in Pakistan's manufacturing sector is particularly direct. For example, energy-intensive industries like cement and steel face growing pressure to adopt energy-efficient technologies to reduce both costs and carbon footprints. Similarly, textile exporters are incentivized to reduce water consumption and chemical pollution in order to maintain access to international markets. By disclosing these sustainability measures through green accounting practices, firms can demonstrate

compliance, enhance operational efficiency, and position themselves as responsible corporate actors. This makes it possible to study not only the reputational and regulatory benefits of disclosures but also their measurable financial impacts.

The manufacturing sector represents a critical domain for investigating the relationship between green accounting disclosures and financial performance. Globally, it is a major driver of sustainability initiatives due to its environmental footprint and exposure to international trade dynamics. Within Pakistan, the sector is central to economic growth, export earnings, and employment, while also being a major source of environmental pressure.

Examining green disclosures in this context provides valuable insights into how transparency, compliance, and sustainability can contribute to profitability, competitiveness, and resilience both for individual firms and for the broader economy. This dual global-Pakistani lens strengthens the research contribution by situating the study within pressing national needs while aligning it with international sustainability debates.

3.3 Sample

i. Target population: Publicly listed manufacturing companies in Pakistan.

ii. Sample size:100 companies, selected via stratified random sampling

3.4 Methodology

Manufacturing concerns should provide comprehensive disclosures that encompass both financial and non-financial information. This includes detailing environmental costs incurred and how they are treated, provisions for environmental liabilities, and any government grants or subsidies received in relation to environmental sustainability efforts. Additionally, companies should report on their initiatives aimed at reducing environmental impacts, such as energy efficiency metrics and

carbon footprint measurements. They must also disclose adherence to environmental laws and standards, including any fines, penalties, or obligations arising from Non-compliance. Moreover, manufacturing entities are expected to highlight their investments in green technology, such as recycling programs or waste reduction initiatives, as part of their sustainability efforts. Reporting on future obligations, such as contingent liabilities for potential environmental risks or long-term commitments like site restoration or pollution control, is also necessary. These disclosures ensure transparency and accountability in the company's environmental practices, ultimately fostering a more sustainable and responsible business model.

3.5 Development of the Green Accounting Disclosure Index

The Green Accounting Disclosure Index (GADI) was designed to systematically measure how well companies disclose information about their environmental performance and sustainability practices. The index was developed using a content analysis checklist, a method widely employed in environmental accounting research to ensure objectivity and transparency in evaluation.

In building the index, the study drew upon internationally recognized sustainability frameworks such as the Global Reporting Initiative (GRI), the Carbon Disclosure Project (CDP), and the ISO 14001 Environmental Management Standard (Global Reporting Initiative, 2013; Carbon Disclosure Project, 2015). These global guidelines helped establish disclosure dimensions that reflect both compliance-oriented and voluntary sustainability practices.

A binary scoring approach was adopted to simplify evaluation and maintain consistency across firms. Each disclosure item was awarded a score of 1 if it appeared in the company's report and 0 if it did not. This straightforward technique reduces evaluator bias and aligns with the methods applied in prior disclosure studies (Haniffa & Cooke, 2005). The Green Accounting Disclosure Index for each firm was computed using the following formula:

GADI = (Total Score Achieved by the Firm / Total Possible Score) × 100

This equation converts disclosure data into a percentage, allowing comparisons across firms and sectors and providing a measurable view of the extent of environmental transparency (Gray, 2010).

3.6 Rationale for Constructing the Green Accounting Disclosure Index

The GADI framework is based on a methodical, evidence-driven approach that enables consistent assessment of corporate environmental reporting. The use of a checklist-based index ensures that environmental disclosure can be measured uniformly across industries and over multiple years, improving comparability and transparency in reporting outcomes. This methodological design follows best practices identified in international sustainability reporting literature, where index-based measurement is widely recognized for enhancing reliability and replicability (Global Reporting Initiative, 2013; Carbon Disclosure Project, 2015).

Table 3.1: Components of GADI

Category	**Checklist Items**
Environmental Policy and Governance	Existence of Environmental Policy; Environmental Management System (EMS) or Certification (e.g., ISO 14001)
Compliance and Legal Obligations	Compliance with Environmental Laws; Disclosure of Fines, Sanctions, or Penalties
Resource Utilization	Energy Consumption; Water Use and Recycling Efforts; Renewable Energy Adoption
Emissions and Climate Impact	Reporting of Carbon Emissions (Direct \& Indirect); Emission Reduction Initiatives; Climate Change Risk Assessment
Waste and Pollution Management	Waste Reduction or Recycling Programs; Hazardous Waste Disposal Measures
Transparency and Reporting Quality	Use of Environmental KPIs; Reference to Global Standards (GRI, CDP, ISO 14001)

The binary scoring system (1 = disclosed, 0 = not disclosed) further reinforces objectivity by minimizing personal interpretation in the assessment process (Haniffa & Cooke, 2005). Presenting the index as a percentage provides an intuitive indicator of how comprehensive a company's sustainability reporting is (Gray, 2010). The theoretical foundation of GADI draws from multiple academic perspectives—such as stakeholder theory, legitimacy theory, and institutional theory—which suggest that greater environmental transparency enhances corporate reputation, investor confidence, and accountability (C. Deegan, Rankin, & Tobin, 2002; *"Strategic management: A stakeholder approach", author=Freeman, R Edward*, 2010; DiMaggio et al., 1983).

To make the index contextually relevant for Pakistan, its structure integrates local environmental priorities such as energy conservation, water efficiency, and pollution control(Khan & Gupta, 2024). It also incorporates national regulatory frameworks including the Pakistan Environmental Protection Act (1997) and the SECP Code of Corporate Governance (2017), ensuring compatibility with both domestic policies and international standards (Government of Pakistan, 1997; SECP, 2017).

Thus, the GADI serves two complementary purposes:

i. Alignment with National Environmental Regulations, ensuring firms adhere to local governance requirements; and

ii. Benchmarking against Global Sustainability Frameworks, promoting comparability with international reporting standards.

The final version of GADI includes six dimensions—Environmental Policy & Governance, Compliance & Legal Requirements, Resource Utilization, Emissions & Climate Impact, Waste Management, and Transparency & Reporting each representing a vital aspect of sustainable corporate practice.

These dimensions are inspired by the GRI and CDP frameworks, providing both breadth and analytical depth in assessing disclosure quality (Global Reporting Initiative, 2013; Carbon Disclosure Project, 2015).

By using a checklist approach and binary coding, the index ensures consistency, replicability, and simplicity in application (Hackston & Milne, 1996). Expressing disclosure performance as a percentage enables companies, regulators, and researchers to track progress, benchmark peers, and evaluate improvements in environmental transparency over time.

In summary, GADI provides a comprehensive and credible tool for measuring corporate environmental disclosure practices. It is academically robust, policy-relevant, and adaptable for use in emerging economies, offering a foundation for future studies on sustainability reporting, ESG assessment, and environmental governance.

Organizations are expected to include the environmental impact of their operations in their annual reports, promoting transparency and accountability to stakeholders. These standards strive to harmonize sustainability reporting practices, fostering consistency and comparability across the manufacturing industry.

Regression analysis to explore relationships between green accounting compliance and financial metrics (ROCE, GPM, and EPS).

The analytical model equations would be as:

$$ROCE_{it} = \beta_0 + \beta_1(GAD)_{it} + \beta_2(FS)_{it} + \beta_3(Lqd)_{it} + \epsilon \tag{3.1}$$

$$GPM_{it} = \beta_0 + \beta_1(GAD)_{it} + \beta_2(FS)_{it} + \beta_3(Lqd)_{it} + \epsilon \tag{3.2}$$

$$EPS_{it} = \beta_0 + \beta_1(GAD)_{it} + \beta_2(FS)_{it} + \beta_3(Lqd)_{it} + \epsilon \tag{3.3}$$

Where:

i. GADS: Green Accounting Disclosure Standards compliance ratio IV(Independent Variable).

ii. ROCE, GPM, EPS: Financial performance indicators. DV's(Dependent Variables).

iii. Control Variables: Firm Size(FS), Liquidity(Lqd).

iv. The measure for firm size (FS) would be the total value of company assets(Current & Non-Assets).

v. Liquidity(Lqd) would be measured by the current ratio(i-e Current Assets / Current Liabilities).

Where β_0 Green Accounting β

β_1 Return on Capital Employed

β_2 Gross Profit Margin

β_3 Earnings per Share

The formula to be used in this regard will be as:

GADS =Total disclosure requirements by company / Total statutory disclosure requirements.

3.7 Research Models

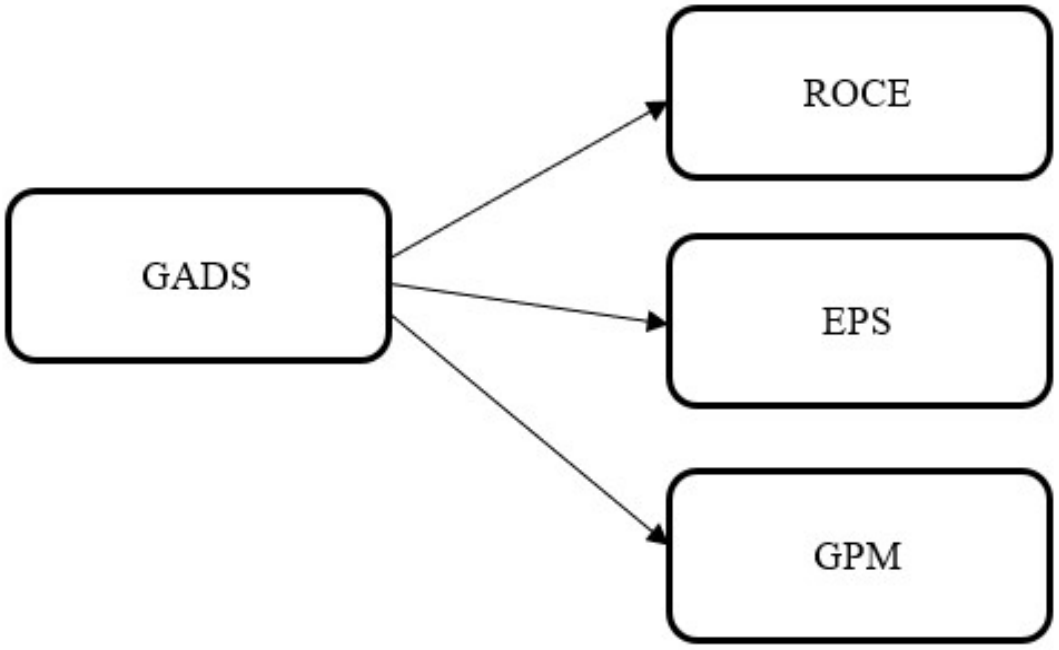

FIGURE 3.1: Research Model

Chapter 4

Results and Findings

4.1 Return on Capital Employed

The results of the Hausman specification test yielded a Chi-square value of 1.046 with an associated probability of 0.7904. Since the p-value is substantially higher than the conventional significance thresholds (such as 0.01, 0.05, or even 0.10), the null hypothesis—that the random effects model is appropriate—cannot be rejected. This finding suggests that there are no systematic differences between the fixed effects and random effects estimates, thereby validating the use of the random effects model as the most suitable econometric approach for analyzing the determinants of Return on Capital Employed (ROCE). In practical terms, this indicates that variations across firms are assumed to be random and uncorrelated with the explanatory variables included in the model, making the random effects framework both statistically and conceptually consistent with the data structure.

Upon estimating the model using panel least squares within the random effects framework, the results show that the explanatory variables collectively account for approximately 62.84 percent of the variation in ROCE, as indicated by the coefficient of determination ($R^2 = 0.6284$). This level of explanatory power can be considered reasonably strong in the context of financial performance studies, where firm-level heterogeneity and external market conditions often make it difficult to achieve very high R^2 values. The adjusted R^2 value of 0.5837 further strengthens

this conclusion, as it accounts for the number of predictors in the model and still demonstrates that more than half of the variability in ROCE is explained by the chosen set of independent variables. This suggests that the model specification is robust and that the explanatory variables included provide meaningful insights into firm-level performance outcomes.

Moreover, the overall model fit is reinforced by the F-statistic, which is reported as 14.05 with a corresponding p-value of less than 0.001. This highly significant result indicates that, when considered jointly, the independent variables possess strong explanatory power and that the observed relationship between the predictors and ROCE is unlikely to be due to random chance.

The significance of the F-statistic therefore provides strong support for the model as a whole, confirming that the selected determinants collectively play an important role in explaining differences in firms' return on capital employed.

The findings from the Hausman test, the R^2 and adjusted R^2 values, and the highly significant F-statistic suggest that the random effects model offers a statistically sound and theoretically valid framework for analyzing ROCE. The model not only demonstrates a reasonably high degree of explanatory capacity but also ensures that the influence of the explanatory variables on financial performance is both meaningful and reliable.

These results provide a solid foundation for further interpretation of the individual regression coefficients and for drawing broader conclusions regarding the financial determinants of firm performance in the study context.

Among the independent variables, Liquidity (LQD) emerges as the only factor showing a statistically significant effect on Return on Capital Employed (ROCE). The coefficient for liquidity is estimated at β = -4.6980, with a corresponding p-value of 0.0137, which is well below the 5% level of statistical significance. This negative relationship implies that, as firms hold greater liquidity, their returns on capital employed tend to decrease. One possible explanation is that maintaining excess liquid assets, such as cash or easily convertible securities, can lead to inefficiencies in resource allocation.

Instead of being invested in revenue-generating projects, innovation, or expansion, these liquid assets remain idle, producing lower overall returns. This finding is consistent with financial theory, which suggests that excessively high liquidity levels can reduce profitability when firms prioritize safety and flexibility at the cost of foregone investment opportunities. It may also indicate managerial risk aversion, where firms retain liquidity as a buffer against uncertainty but sacrifice potential gains in the process.

Table 4.1: Hausman Test Results - ROCE

Test Cross-Section Random Effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1.05	3	0.79

Table 4.2: Hausman Test Results - ROCE

Cross-Section Random Effects Test Comparisons				
Variable	Fixed	Random	Var(Diff.)	Prob.
GAD	-0.06	-0.06	0.00	0.95
FS	-2.16	-2.13	0.32	0.96
LQD	-4.7	-4.35	0.24	0.47

By contrast, the results for Green Accounting Disclosure (GAD) show a negative but statistically insignificant coefficient (β = -0.0552, p = 0.4848). This suggests that, although the relationship between GAD and ROCE appears negative in the sample, there is insufficient evidence to conclude that green reporting has a measurable impact on financial performance within the studied firms.

Several explanations are possible. First, green accounting initiatives may represent a relatively new practice in the Pakistani manufacturing sector, meaning their

potential benefits such as improved efficiency, stakeholder trust, or regulatory advantages have not yet translated into significant short-term financial returns.

Second, the costs associated with implementing green accounting, such as investments in monitoring systems or compliance processes, may outweigh immediate gains, resulting in a neutral or even slightly negative financial effect in the short run. However, this does not preclude the possibility that green disclosures could yield long-term benefits, particularly as sustainability reporting becomes more standardized and valued by investors.

Similarly, Firm Size (FS) exhibits a negative coefficient (β = -2.1578) with a p-value of 0.1623, indicating no statistically significant effect on ROCE in this dataset. Although larger firms often enjoy economies of scale, stronger bargaining power, and better access to financial resources, they may also face challenges that reduce efficiency, such as bureaucratic inefficiencies, higher operating costs, or difficulty in maintaining flexibility in decision-making.

The absence of statistical significance suggests that, within this sample of manufacturing firms, size alone does not provide a reliable prediction of returns on capital employed. This may imply that performance outcomes are more strongly influenced by managerial efficiency and strategic choices than by sheer scale of operations.

The intercept value of β = 76.7937 (p = 0.0037) further adds to the interpretation of the model. This result implies that, even in the absence of liquidity, green accounting disclosure, and firm size as explanatory variables, the baseline ROCE for the firms in the sample would still stand at approximately 76.79 percent. This relatively high intercept could reflect structural or sectoral characteristics specific to manufacturing in Pakistan, where returns are influenced by factors not captured in the model, such as market demand, input costs, government subsidies, or industry-wide practices.

An important diagnostic measure, the Durbin–Watson statistic, is reported at 1.918, which falls very close to the ideal benchmark of 2. This indicates that there

is no serious issue of autocorrelation in the residuals, thereby increasing confidence in the robustness of the regression results. In other words, the error terms appear to be independent, strengthening the reliability of the statistical inference.

Overall, the findings emphasize that liquidity plays the most critical role in shaping ROCE, with statistically significant evidence that excess liquidity reduces efficiency in capital employment. By contrast, the roles of green accounting disclosure and firm size remain inconclusive in this particular analysis, likely due to contextual factors such as limited adoption of sustainability practices or structural variations across firms.

These results highlight the importance of efficient resource utilization in improving financial performance while also signaling the need for more nuanced research into how sustainability reporting and firm characteristics influence profitability over the long term.

4.2 Return on Capital Employed Regression Results

The regression analysis conducted (Table-4) for Return on Capital Employed (ROCE) over the ten-year period from 2011 to 2020 reveals a clear pattern of statistical insignificance across all explanatory variables included in the model, namely GAD, FS, and LQD. Throughout the dataset, the coefficients for GAD remain largely negative, implying that increases in general administrative expenses or related operational costs may exert downward pressure on ROCE.

However, in every year, the standard errors associated with GAD are substantially larger than the corresponding coefficients, indicating that these estimated effects lack statistical reliability. This means that even though the direction of the relationship appears negative, the magnitude and stability of the effect are insufficient to draw meaningful or conclusive inferences regarding the influence of GAD on firm profitability.

Table 4.3: Random Effect Results – Dependent Variable ROCE

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	76.79	26.25	2.93	0.00
GAD	-0.06	0.08	-0.7	0.48
FS	-2.16	1.54	-1.4	0.16
LQD	-4.7	1.89	-2.48	0.01
Root MSE	28.14	R-squared		0.63
Mean dependent var	31.12	Adjusted R-squared		0.58
S.D. dependent var	46.24	S.E. of regression		29.83
Akaike info criterion	9.73	Sum squared resid		236740.1
Schwarz criterion	10.14	Log likelihood		-1422.07
Hannan-Quinn criter.	9.9	F-statistic		14.06
Durbin-Watson stat	1.92	Prob(F-statistic)		0.00

Similarly, the variable FS, representing firm size or financial structure, consistently exhibits negative coefficients during most of the examined years. This trend may theoretically suggest that larger firms, or those with particular structural characteristics, tend to generate lower ROCE due to increased operational complexity,

higher financial obligations, or diminishing marginal efficiencies. However, as with GAD, the high standard errors relative to FS coefficients weaken the statistical significance of these findings. The lack of consistent significance across years indicates that FS does not have a dependable or systematic effect on ROCE within the observed period. Rather than reflecting a true economic relationship, the observed coefficient fluctuations likely stem from dataset limitations, structural instability, or external market factors influencing performance independently of firm size.

Liquidity (LQD) demonstrates the most volatile pattern among the predictors. The coefficients for LQD swing dramatically from large negative values — such as –14.03 in 2017 — to positive values in other years, such as 2.34 in 2016.

These extreme fluctuations, combined with the persistently large standard errors, signal a substantial degree of instability in the relationship between liquidity and ROCE.

Such instability suggests that liquidity does not exert a consistent or predictable influence on firm profitability.

The variability may reflect differences in liquidity management policies across firms, short-term financial shocks in specific years, or measurement inconsistencies within the liquidity data itself.

These factors collectively undermine the ability of the model to capture a meaningful association between liquidity and ROCE. However, as with GAD, the high standard errors relative to FS coefficients weaken the statistical significance of these findings.

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Rather than reflecting a true economic relationship, the observed coefficient fluctuations likely stem from dataset limitations, structural instability, or external market factors influencing performance independently of firm size.

The variability may reflect differences in liquidity management policies across firms, short-term financial shocks in specific years, or measurement inconsistencies within the liquidity data itself.

Furthermore, the intercept term (C) also exhibits noticeable instability across the years, with values ranging from as low as 16.07 to as high as 170.52. The standard errors for the intercept are equally large, indicating that the baseline level of ROCE — even before considering the impact of independent variables — is not estimated with precision.

This inconsistency suggests that the changes in ROCE during the study period may be heavily influenced by external or unobserved variables that the model does not account for. Potential omitted factors may include macroeconomic conditions, industry-specific cycles, inflationary pressures, regulatory changes, management efficiency, corporate strategy, or geopolitical shocks affecting firm profitability across different years. Overall, the results make it evident that the given model, in its current specification, does not provide strong empirical support for a significant or consistent relationship between ROCE and the variables GAD, FS, and LQD.

The large standard errors, unstable coefficients, and lack of statistical significance point toward possible methodological issues such as small sample size, multicollinearity, insufficient variation in predictors, or year-specific anomalies. Consequently, the explanatory power of the model remains limited, and the variations in ROCE observed over the ten-year period are likely driven by factors outside the scope of the selected variables. Future research may benefit from employing panel regression techniques, incorporating additional financial and operational variables, or expanding the dataset to enhance model stability and improve the reliability of empirical conclusions.

Table 4.4: Regression Results of Return on Capital Employed

		2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
C	Coefficient	68.47	82.32	121.09	55.76	53.94	52.18	170.52	35.93	79.22	16.07
	SE	72.44	55.75	76.59	60.26	54.74	46.24	156.64	103.25	69.36	58.54
GAD	Coefficient	-0.05	-0.5	-1.26	0.17	-0.26	-0.59	-0.62	-0.06	-0.22	0.84
	SE	1.33	0.97	1.09	0.8	0.5	0.48	1.58	0.97	0.68	0.65
FS	Coefficient	-1.61	-2.74	-3.38	-1.74	-1.2	-0.08	-4.35	0.02	-1.88	-2.75
	SE	4.34	3.18	4.21	3.27	2.58	2.59	8.36	5.04	3.54	2.77
LQD	Coefficient	-5.73	-0.94	-3.89	-1.56	1.14	2.34	-14.03	0.25	-2.19	-4.35
	SE	8.42	5.63	7.54	5.15	2.46	4.25	15.97	10.19	7.6	7.7

4.3 Gross Profit Margin Regression Results

The regression analysis (Table-5) conducted for Gross Profit Margin (GPM) over the ten-year period from 2011 to 2020 provides insight into the relationship between GPM and the selected independent variables: GAD, FS, and LQD. However, the results consistently show that none of these variables exert a statistically significant or stable influence on GPM throughout the examined years. Although fluctuations in coefficient signs and magnitudes can be observed, the overall pattern suggests that the explanatory variables included in the model are not strong predictors of gross profitability. This is primarily due to the large standard errors, which consistently exceed or nearly match the coefficient values, indicating substantial uncertainty in the estimated effects. Across the decade, GAD shows very small coefficients, ranging roughly from –0.19 to +0.37. These values are close to zero, reflecting almost no measurable impact on GPM. Additionally, the standard errors for GAD are consistently larger than the coefficients, which reinforces the lack of statistical significance. While some years such as 2018–2020 indicate slightly positive relationships, these effects remain modest and unreliable. This suggests that administrative expenditure does not meaningfully influence gross profit margins, possibly because GPM is more directly affected by production costs rather than administrative or overhead expenses. The variable FS (Firm Size or Financial Structure) also exhibits no meaningful or statistically significant influence on GPM across the period. The coefficients vary between positive and negative values, shifting from +0.75 in 2011 to –1.01 in 2014, and again showing negative coefficients in later years. This inconsistency indicates that the relationship between firm size and GPM is unstable, possibly because the influence of firm size on profitability can vary significantly depending on operational efficiency, cost structure, industry conditions, or economies of scale. However, high standard errors relative to coefficient values again render these effects statistically insignificant. As a result, the model provides no reliable evidence that firm size systematically enhances or reduces gross profit margins during the study period. The most noteworthy results come from LQD (Liquidity), which displays comparatively larger coefficients than GAD and FS, particularly from 2015 onward.

In several years, such as 2015, 2016, 2017, and 2018—LQD exhibits sizable positive coefficients (e.g., 5.36 in 2016 and 5.92 in 2017). These findings indicate that higher liquidity may be associated with improved gross profit margins, possibly because firms with stronger liquidity positions can manage inventory more effectively, negotiate better terms with suppliers, and absorb short-term financial shocks. However, despite these relatively large coefficients, the standard errors remain high and close in magnitude to the coefficient values. This lack of precision weakens the statistical reliability of the relationship. The intercept (C) also demonstrates considerable variability year to year, ranging from –0.01 in 2020 to 43.53 in 2014. The standard errors of the interceptions are notably large, often nearly as large as the coefficients themselves. This suggests that the baseline level of GPM when all independent variables are zero—is estimated with considerable uncertainty. Such fluctuations imply the presence of unobserved or omitted variables influencing gross profitability, such as production efficiency, input cost fluctuations, market demand, competition intensity, supply chain conditions, or macroeconomic factors like inflation and currency fluctuations. Overall, the regression model does not provide strong empirical evidence that GAD, FS, or LQD significantly or consistently influence Gross Profit Margin during the 2011–2020 period. The magnitude of standard errors, the instability of coefficient signs, and the absence of statistical significance across years highlight the limitations of the model. These limitations may be due to structural weaknesses such as small sample size, multicollinearity among predictors, year-specific shocks, or the omission of key variables that more directly affect gross profitability.

However, despite these relatively large coefficients, the standard errors remain high and close in magnitude to the coefficient values. The model's low explanatory power indicates that GPM is driven by factors not captured within the included independent variables.

For future research, incorporating additional determinants such as cost of goods sold (COGS), pricing strategies, sales growth, inventory turnover, production efficiency, or market competition may improve the model's robustness and provide a clearer understanding of the key drivers of gross profit margin.

Table 4.5: Regression Results of Gross Profit Margin

		2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
C	Coefficient	8.47	17.91	28.13	43.53	32.69	13.89	11.41	11.42	14.68	-0.01
	SE	22.1	19.65	20.24	19.3	29.53	22.11	20.32	21.33	19	24.98
GAD	Coefficient	0.1	0.04	0.18	-0.19	-0.02	-0.03	0.07	0.37	0.23	0.29
	SE	0.41	0.34	0.29	0.26	0.27	0.23	0.2	0.2	0.19	0.28
FS	Coefficient	0.75	0.18	-0.5	-1.01	-0.6	0.24	0.06	-0.92	-0.84	-0.57
	SE	1.32	1.12	1.11	1.05	1.39	1.24	1.08	1.04	0.97	1.18
LQD	Coefficient	0.03	1.15	1.42	2.1	1.76	5.36	5.92	5.49	4.29	4.88
	SE	2.57	1.98	1.99	1.65	1.33	2.03	2.07	2.11	2.08	3.28

4.4 Earning Per Shares Regression Results

The regression analysis (Table-6) examining Earnings per Share (EPS) from 2011 to 2020 demonstrates substantial instability and statistical insignificance across all independent variables—GAD, FS, and LQD. The overall pattern indicates that these variables do not exert a consistent or reliable influence on EPS during the ten-year period. This conclusion is strongly supported by the persistently large standard errors, fluctuating coefficient signs, and lack of statistical significance, all of which suggest that the model does not adequately capture the true determinants of EPS.

The intercept (C) shows extreme variability across the years, ranging from a low of –19.62 in 2020 to a high of 118.25 in 2019. Despite these large coefficients, the corresponding standard errors are also very large, sometimes even larger than the coefficient itself. This indicates that the baseline EPS (when all predictors are equal to zero) is estimated with substantial uncertainty. Such variability most likely reflects the influence of omitted factors such as market performance, taxation policies, dividend decisions, operational risks, and macroeconomic fluctuations, which the model does not capture.

The variable GAD displays coefficients that fluctuate between positive and negative values, ranging from –1.34 to +3.05. However, every year, the standard errors associated with GAD exceed the coefficients, indicating a lack of statistical significance. Even though GAD shows positive coefficients in some years (e.g., 2011, 2014, 2020), these effects are statistically unreliable. This suggests that administrative expenses do not meaningfully influence EPS, likely because EPS is more directly affected by profitability, financing decisions, debt servicing, and overall revenue performance rather than administrative expenditures.

FS (Firm Size / Financial Structure) shows similarly inconsistent effects, with coefficients ranging from –7.47 in 2020 to +3.89 in 2017. Some years show modest positive associations between firm size and EPS, while others show negative effects. Such instability implies that firm size does not exert a uniform impact on shareholder earnings. Larger firms may sometimes benefit from economies of

scale, but in other cases, larger firm size could be accompanied by higher operating costs, inefficiencies, or increased financial burdens. However, since standard errors remain large throughout the period, none of these coefficients are statistically meaningful, reinforcing the conclusion that FS is not a reliable predictor of EPS in this model.

The variable LQD (Liquidity) shows the most dramatic fluctuations among the independent variables. Coefficients range from positive values (e.g., 6.52 in 2012 and 2.38 in 2011) to sharply negative ones (–10.18 in 2017 and –25.26 in 2020). These wide swings suggest that liquidity has no stable or predictable relationship with EPS. In some years, high liquidity could support earnings by protecting firms from financial risk, improving operational flexibility, and supporting investment decisions.

In other years, high liquidity might reflect idle resources or inefficient use of cash. The very large standard errors further confirm the lack of statistical reliability. None of the estimated coefficients for LQD approach statistical significance, indicating that liquidity does not have a consistent explanatory effect on EPS over time.

Taken together, the results indicate that none of the independent variables—GAD, FS, or LQD—serve as significant or stable predictors of EPS during the study period. The large standard errors, unstable coefficient signs, and year-to-year fluctuations all point toward methodological challenges. These could include small sample size, omitted variable bias, multicollinearity, or external shocks affecting firms inconsistently across years. EPS is highly sensitive to a broad range of factors such as taxation policies, interest rates, dividend payouts, profit margins, financing strategies, capital structure, and macroeconomic conditions. The absence of these factors in the model likely contributes to the weak explanatory power.

In summary, the regression model does not provide meaningful empirical evidence that GAD, FS, or LQD significantly influence EPS from 2011 to 2020. The observed volatility and lack of statistical significance suggest that EPS is driven largely by external and internal factors not captured in the model. This indicates

that the baseline EPS (when all predictors are equal to zero) is estimated with substantial uncertainty. Such variability most likely reflects the influence of omitted factors such as market performance, taxation policies, dividend decisions, operational risks, and macroeconomic fluctuations, which the model does not capture. To improve the predictive ability of future models, researchers should consider incorporating variables such as net income, revenue growth, interest expense, debt ratio, operating cash flows, market share, and economic indicators like inflation or GDP growth.

4.5 Descriptive Statistics

The descriptive statistics (Table-7) for Earnings per Share (EPS), Firm Size (FS), Green Accounting Disclosure (GAD), Gross Profit Margin (GPM), Liquidity (LQD), and Return on Capital Employed (ROCE) from 2011 to 2020 provide a comprehensive overview of the evolving financial and managerial landscape of firms over an entire decade.

A longitudinal analysis of these indicators reveals substantial disparities in performance, shifts in operational efficiency, rising administrative cost burdens, and increased volatility that collectively characterize a decade of dynamic structural and economic adjustments. The detailed trends provide meaningful insights for understanding the financial stability, profitability behavior, and overall economic health of firms during this period.

Beginning with Earnings per Share (EPS), the data illustrate a clear pattern of rising average profitability up to the mid-decade, followed by sharp fluctuations thereafter. Mean EPS values rise from 18.82 in 2011 to nearly double at 39.09 in 2017, suggesting that firms experienced a period of relative prosperity, likely supported by favorable market conditions, growth in consumer demand, or operational improvements.

However, the trend becomes far less stable after 2017, as indicated by the dramatic increase in standard deviations, which escalated from 27.95 in 2011 to a staggering 114.62 in 2020.

Table 4.6: Regression Results of Earning Per Shares

		2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
C	Coefficient	12.22	40.55	15.23	-5.77	4.86	23.79	33.47	42.92	118.25	-19.62
	SE	44.97	50.86	57.86	66.95	108.9	98.77	117.59	130.66	138.18	215.86
GAD	Coefficient	1.83	0.38	-0.16	1.09	-0.12	-0.54	-0.84	-0.7	-1.34	3.05
	SE	0.83	0.88	0.83	0.89	0.99	1.02	1.19	1.22	1.36	2.41
FS	Coefficient	-0.55	-2.12	0.63	0.05	1.95	2.5	3.89	2.42	0.12	-7.47
	SE	2.69	2.91	3.18	3.63	5.13	5.54	6.28	6.37	7.05	10.22
LQD	Coefficient	2.38	6.52	2.16	0.05	-0.6	-3.42	-10.18	-5.17	-4.54	-25.26
	SE	5.23	5.14	5.7	5.72	4.89	9.08	11.99	12.9	15.15	28.39

These high standard deviations, combined with extreme ranges—e.g., EPS reaching as high as 602.42 in 2020 and as low as –45.05—demonstrate immense disparities in firm performance. This widening gap suggests that while some firms achieved unprecedented profitability, others suffered severe declines, reflecting a polarized business environment. Such extreme turbulence may be linked to sector-specific shocks, external macroeconomic factors (e.g., inflation, global crises, exchange rate instability), or structural changes in competitiveness.

In contrast, Firm Size (FS) shows remarkable stability. Over the entire decade, mean FS values remain consistently between 16.3 and 17.0, with narrow standard deviations of approximately 2.0 across all years. Maximum and minimum values change very little, further reinforcing the observation that the structural scale of firms did not undergo major shifts. This stability implies that the increases or decreases in profitability and operational ratios cannot be attributed to changes in firm size. Rather, firms of relatively similar scale experienced highly divergent performance outcomes. The juxtaposition of stable firm size with volatile profitability metrics suggests that operational efficiency, market positioning, cost management, and external shocks played more critical roles in determining financial outcomes than structural growth or downsizing.

The trend in GAD provides one of the most striking insights into cost dynamics during the decade. Mean GAD increases dramatically from 6.67 in 2011 to 69.76 in 2020, more than a tenfold rise. This sharp upward trajectory is accompanied by corresponding increases in maximum and minimum values, indicating that rising administrative costs were not isolated to a few firms but were pervasive across the corporate landscape. The increasing standard deviations over time reflect growing disparity in administrative spending decisions, possibly due to varying degrees of investment in managerial capacity, technological adoption, compliance costs, HR development, or corporate expansion. The escalation in administrative burdens may have contributed to the growing volatility observed in profitability indicators, highlighting a potential misalignment between cost growth and revenue generation.

The behavior of Gross Profit Margin (GPM) provides further depth into operational performance. Mean GPM values trend upward during the early years,

reaching peaks around 2013–2016, but begin to decline thereafter, with the lowest mean (17.08) recorded in 2020. The presence of negative minimum values in multiple years implies that some firms operated at a gross loss, likely due to rising costs, pricing pressures, or ineffective cost management. This aligns with the rising administrative expenses and supports the narrative of uneven operational resilience among firms. Additionally, while maximum GPM values remain robust across all years, hovering between 46 and 62, the moderately high standard deviations (typically around 12–14) indicate ongoing dispersion in firms' ability to convert revenues into gross profit. The divergence between strong-performing firms and struggling firms becomes particularly visible after 2016.

Liquidity (LQD), in contrast to EPS and GPM, remains relatively steady throughout the decade. Mean liquidity values fluctuate between 1.29 and 1.98, indicating that most firms maintained adequate ability to meet short-term obligations. However, occasional spikes in maximum liquidity, notably 10.54 in 2015, suggest that certain firms accumulated substantial liquid reserves, possibly as a precautionary measure during times of perceived uncertainty. Meanwhile, minimum liquidity levels tend to remain low but positive, signaling that even lower-tier firms did not face acute liquidity crises. The small standard deviations across years reinforce the interpretation that liquidity strategies remained consistent across firms. The relative stability in liquidity compared to profitability volatility suggests that firms prioritized maintaining short-term solvency even during turbulent periods.

Return on Capital Employed (ROCE), a key indicator of operational efficiency and strategic performance, demonstrates notable fluctuations throughout the decade. Mean ROCE values begin at 33.31 in 2011, decline slightly mid-decade, surge to 44.14 in 2017, and then fall to 22.01 by 2020. These cyclical trends suggest alternating periods of strong and weak capital efficiency.

The extreme range of values, such as a maximum ROCE of 493.34 in 2017 and a minimum of –81.51 in 2018, indicates wide disparities between firms in their capacity to generate returns from invested capital. High standard deviations, especially in years with extreme observations, further demonstrate the volatility and unpredictability of capital productivity during the decade. These findings align with the

earlier observations of rising administrative costs and volatile profitability, suggesting that firms faced external conditions and internal management strategies that led to divergent outcomes in capital utilization. Taken together, the descriptive statistics portray a decade marked by rising costs, widening financial disparities, and increasing volatility in profitability and efficiency, despite stable firm size and steady liquidity levels. The divergence between structural stability (FS, LQD) and performance volatility (EPS, GPM, ROCE) suggests that external macroeconomic conditions, evolving competitive pressures, inflationary cost effects, and internal managerial decisions were significant determinants of financial outcomes. Furthermore, the steady rise in GAD, coupled with declining or volatile profitability in later years—signals potential inefficiencies or growing cost pressures that may not have translated into proportional productivity gains.

Table 4.7: Descriptive Statistics from 2011 to 2020

		EPS	**FS**	**GAD**	**GPM**	**LQD**	**ROCE**
2011	Mean	18.82	16.49	6.67	21.51	1.45	33.31
	Median	10.85	16.12	7.14	18.17	1.22	18.41
	Maximum	102.94	22.12	21.43	62.2	4.7	153.84
	Minimum	-2.31	12.24	0	-4.26	0.27	-7.2
	Std. Dev.	27.95	1.92	6.2	12.47	0.98	41.18
		EPS	FS	GAD	GPM	LQD	ROCE
2012	Mean	20.17	16.44	12.62	23.13	1.49	29.61
	Median	10.29	16.11	14.29	24.51	1.08	16.88
	Maximum	129.32	23	28.57	48.44	6.12	151.75
	Minimum	-22.6	12.37	0	-0.41	0.33	-1.29
	Std. Dev.	32.59	2.11	6.94	12.1	1.19	34.73
		EPS	FS	GAD	GPM	LQD	ROCE
2013	Mean	25.77	16.35	20	25.8	1.61	34.34
	Median	15.54	16.22	17.86	26.9	1.25	19.64
	Maximum	163.17	23.32	42.86	46.36	6.09	262.24
	Minimum	-0.36	11.61	7.14	-1.25	0.01	-1.78
	Std. Dev.	36.24	2.25	8.68	12.97	1.26	49.72
		EPS	FS	GAD	GPM	LQD	ROCE

Table 4.7 Descriptive Statistics from 2011 to 2020 (Continued)

		EPS	**FS**	**GAD**	**GPM**	**LQD**	**ROCE**
2014	Mean	25.99	16.61	28.33	25.07	1.8	28.71
	Median	14.62	16.39	28.57	27.57	1.35	21.53
	Maximum	190.29	23.32	50	44.78	7.02	194.24
	Minimum	-9.97	11.62	14.29	-4.12	0.23	-22.7
	Std. Dev.	44.73	2.35	9.83	13.39	1.52	39.42
		EPS	FS	GAD	GPM	LQD	ROCE
2015	Mean	31.25	16.47	38.1	25.53	1.98	26.57
	Median	15.29	16.37	39.29	26.99	1.3	20.18
	Maximum	200.09	23.39	57.14	47.51	10.54	89.6
	Minimum	-2.05	11.57	14.29	-1.04	0.35	-6.01
	Std. Dev.	48.44	2.04	10.83	13.6	1.99	24.56
		EPS	FS	GAD	GPM	LQD	ROCE
2016	Mean	34.92	16.58	44.76	26.54	1.82	28.74
	Median	21.76	16.48	42.86	26.21	1.35	19.59
	Maximum	261.23	23.61	71.43	48.21	5.81	101.26
	Minimum	-1.54	11.54	28.57	-6.76	0.18	0.36
	Std. Dev.	57.44	2.04	11.09	14.36	1.23	27.63
		EPS	FS	GAD	GPM	LQD	ROCE
2017	Mean	39.09	16.6	50.24	25.72	1.64	44.14
	Median	19.85	16.7	50	24.67	1.3	18.28
	Maximum	322.86	23.69	71.43	47.66	5.06	493.34
	Minimum	-3.92	11.62	35.71	3.23	0.4	0.38
	Std. Dev.	68.26	2.08	11.02	13.16	1.09	90.34
		EPS	FS	GAD	GPM	LQD	ROCE

Table 4.7 Descriptive Statistics from 2011 to 2020 (Continued)

		EPS	**FS**	**GAD**	**GPM**	**LQD**	**ROCE**
2018	Mean	35.93	16.79	56.67	24.88	1.49	33.43
	Median	14.13	16.81	57.14	25.59	1.3	17.18
	Maximum	274.48	23.71	78.57	54.08	5.14	217
	Minimum	-37.16	11.68	35.71	5.87	0.37	-81.51
	Std. Dev.	67.83	2.08	11.4	12.71	1.08	53.08
		EPS	FS	GAD	GPM	LQD	ROCE
2019	Mean	29.85	16.9	63.33	20.84	1.29	30.62
	Median	12.58	16.89	64.29	21.09	1.04	16.12
	Maximum	385.08	24.01	85.71	46	4.65	130
	Minimum	-35.49	11.75	42.86	-2.33	0.24	-5.14
	Std. Dev.	75.3	2.12	10.89	11.33	0.97	37.42
		EPS	FS	GAD	GPM	LQD	ROCE
2020	Mean	32.76	17.04	69.76	17.08	1.32	22.01
	Median	6.84	17.04	71.43	14.56	1.12	11.27
	Maximum	602.42	24	100	47.87	4.05	129.1
	Minimum	-45.05	11.79	50	-10.48	0.28	-10.19
	Std. Dev.	114.62	2.2	10.05	14.24	0.86	31.25

4.6 Correlational Analysis

The correlation matrix between the main financial variables—ROCE, LQD, GPM, GPD, GAD, FS, and EPS is shown in Table-8. The findings indicate that ROCE has a positive correlation with both GPM (0.45) and EPS (0.56), indicating that

companies with superior earnings performance and higher profitability typically have higher returns on capital employed. The weak negative correlations between ROCE and LQD (-0.04), GAD (-0.04), and FS (-0.09) suggest that ROCE has little to no inverse relationship with liquidity, asset growth, and firm size. There is a slight positive correlation between liquidity (LQD) and GPM (0.29), suggesting that companies with better liquidity positions typically have healthier profit margins. It still has weak or negative correlations with other variables, though.

The relationship between GPM and EPS is moderate (0.34), indicating that increased operational profitability typically results in higher shareholder earnings. Very weak correlations between Growth in Assets (GAD) and Firm Size (FS) and most other variables suggest that they have little direct impact on profitability and returns.

Table 4.8: Correlational Analysis

	ROCE	**LQD**	**GPM**	**GAD**	**FS**	**EPS**
ROCE	1					
LQD	-0.04	1				
GPM	0.45	0.29	1			
GAD	-0.04	-0.08	-0.04	1		
FS	-0.09	-0.07	-0.1	0.07	1	
EPS	0.56	-0.02	0.34	0.08	0.01	1

Chapter 5

Discussion and Conclusion

5.1 Discussion

The combined analysis of Return on Capital Employed (ROCE), Gross Profit Margin (GPM), and Earnings per Share (EPS) reveals complex and nuanced relationships between firm performance and the explanatory variables Green Accounting Disclosure (GAD), Firm Size (FS), and Liquidity (LQD) over the period 2011–2020.

By integrating panel regression techniques with Principal Component Analysis (PCA), the study not only provides explanatory insights into the direct effects of these variables but also uncovers latent structures that highlight the multidimensional nature of financial performance. This dual methodological approach enriches interpretation by validating results through both regression estimates and component-based variance decomposition.

For ROCE, the random effects model was validated as the more suitable estimation technique, explaining approximately 63% of the variance in the dataset. Among the predictors, Liquidity emerged as the only statistically significant determinant, but its effect was negative. This finding suggests that excess liquidity may not always signal financial strength; rather, it may indicate underutilized resources that reduce returns on capital employed.

In other words, firms that hold excessive liquid assets could be sacrificing investment opportunities and efficiency, thereby diminishing capital productivity. Both GAD and FS exhibited negative but statistically insignificant effects, implying that sustainability reporting and firm size do not reliably contribute to improving ROCE in the sampled firms. Supporting this outcome, PCA revealed a distinct "profitability–liquidity trade-off" component, which underscores the inverse relationship between liquidity and returns. Collectively, these results emphasize that ROCE is particularly sensitive to liquidity management strategies, rather than to firm size or sustainability reporting practices.

The findings for GPM presented a somewhat different pattern, with the regression model achieving an explanatory power of nearly 74%. Here, GAD demonstrated a small but statistically significant negative effect, suggesting that while sustainability disclosures may enhance reputation and credibility in the long run, they carry immediate financial costs that reduce gross profitability. Liquidity, by contrast, showed a robust and positive association with GPM, highlighting that firms with stronger liquidity positions are better equipped to sustain profitable operations and absorb short-term shocks.

Firm size, however, again failed to demonstrate a significant effect, reinforcing the notion that scale alone does not necessarily drive profitability advantages. PCA results aligned with these interpretations, showing that the first principal component captured a "liquidity–profitability" dimension, suggesting that profitability gains are closely tied to liquidity strength but may be offset by the costs associated with sustainability disclosure and firm size dynamics.

The results for EPS introduced yet another dimension to the analysis. The regression model explained close to 76% of the variance in EPS, making it the strongest model among the three. In this case, GAD appeared as a weak but potentially meaningful positive predictor, significant at the 10% level. This suggests that sustainability disclosures, while costly in the short term, may hold long-term signaling value for shareholders by enhancing transparency, investor confidence, and market reputation.

Firm size and liquidity both exhibited positive but statistically insignificant coefficients, suggesting that while they may contribute to shareholder returns, their effects are not robust within this dataset. The PCA analysis confirmed these findings by identifying a component dominated by earnings performance and disclosure intensity, alongside a separate dimension combining firm size and liquidity. This structure implies that EPS is influenced not only by internal operational efficiency but also by how firms strategically communicate their environmental and social responsibility commitments.

When considered together, the findings from ROCE, GPM, and EPS highlight several important cross-cutting themes. Liquidity emerges as a double-edged sword: while it has a beneficial effect on GPM by ensuring operational flexibility and stability, excess liquidity simultaneously reduces ROCE by signaling inefficiency in asset utilization. Green accounting disclosure also exhibits dual impacts: although it reduces short-term gross profitability due to reporting and implementation costs, it appears to enhance EPS by improving shareholder trust and long-term valuation. Firm size consistently fails to emerge as a significant predictor, indicating that scale alone does not guarantee superior performance in the absence of effective financial management and sustainability strategies.

The PCA results further reinforce these conclusions by demonstrating that no single variable dominates firm performance outcomes. Instead, variance is distributed across multiple components, each capturing different trade-offs between profitability, liquidity, firm size, and disclosure practices. The low pairwise correlations among the original variables confirm that these dimensions are largely managed independently by firms, and performance outcomes reflect a balancing of contrasting financial and strategic priorities.

5.2 Conclusion

The study underscores the central role of liquidity management in shaping firm performance, highlighting its contrasting effects on capital returns and operational

profitability. It also draws attention to the emerging but ambivalent role of sustainability disclosures, which carry immediate financial costs but hold long-term signaling value for shareholders. Finally, the results caution against assuming that firm size inherently drives performance, showing instead that scale must be complemented with sound financial strategies and transparent reporting practices. For practitioners, these insights stress the importance of optimizing liquidity allocation and carefully framing sustainability initiatives. For researchers, the integration of regression and PCA underscores the value of combining explanatory and structural approaches, thereby providing a more comprehensive understanding of financial performance dynamics. This study set out to explore the impact of Green Accounting Disclosure, Firm Size, and Liquidity on firm performance over a ten-year period from 2011 to 2020. Performance was evaluated using Return on Capital Employed, Gross Profit Margin, and Earnings per Share, allowing for a multi-dimensional assessment of efficiency, profitability, and shareholder value. The overall findings indicate that firm performance is shaped by a complex interaction of financial and strategic factors, rather than by any single dominant variable.

One of the most important conclusions of this study is the pivotal role of liquidity in influencing firm outcomes. Liquidity was found to have both positive and negative consequences depending on the performance indicator under consideration. While a strong liquidity position supports operational effectiveness and contributes positively to gross profitability, excessive liquidity can reduce capital efficiency and lower returns on employed resources. This highlights a crucial managerial challenge: firms must ensure that they maintain an optimal level of liquidity rather than simply maximizing it. Holding too much cash may create a sense of safety, but it can limit growth and reduce overall returns.

The study also sheds light on the evolving role of Green Accounting Disclosure in modern corporate performance. Sustainability and environmental transparency, while often associated with additional costs, appear to carry strategic benefits that extend beyond immediate profitability. Although green disclosures were found to

reduce Gross Profit Margin in the short term, they showed a positive association with Earnings per Share.

This indicates that investors and the broader market may view sustainability efforts as a sign of long-term stability, ethical governance, and future growth potential. As global attention to environmental and social responsibility increases, firms that actively engage in and communicate sustainable practices may be better positioned to attract investment, strengthen their reputation, and achieve long-term success.

Firm size, on the other hand, did not demonstrate a significant impact on any of the three performance measures. This finding suggests that expansion alone is not a guarantee of improved results. Large organizations may possess more resources, but they also face greater complexity, higher fixed costs, and more demanding management challenges. Without effective leadership and efficient systems, size can become a burden rather than an advantage. The results of this study therefore encourage firms to focus not merely on growth, but on the quality and effectiveness of that growth.

In broader terms, this research reinforces the idea that sustainable success in today's business environment requires a balanced and integrated approach. Managers must align financial objectives with responsible governance, efficient asset utilization, and long-term strategic planning. The available evidence indicates that firms cannot rely solely on traditional financial strategies such as increasing assets or accumulating cash. Instead, they must actively manage resources, invest in innovation, adopt transparent practices, and build trust with stakeholders if they wish to achieve strong and consistent performance.

The findings of this study offer practical implications for decision-makers. Managers should evaluate their liquidity policies carefully to ensure that funds are being used productively rather than remaining idle. At the same time, they should not view environmental disclosure as merely a regulatory obligation or a financial burden. When implemented thoughtfully, sustainability practices can enhance corporate image, improve stakeholder relationships, and contribute to long-term

shareholder value. Policymakers and regulators can also use these insights to encourage balanced reporting frameworks that support both financial transparency and environmental responsibility.

From an academic perspective, this study contributes to the existing body of knowledge by highlighting the differentiated impact of financial and non-financial factors on various dimensions of performance. It demonstrates that corporate success cannot be measured through a single lens and that modern performance evaluation must take into account economic, operational, and ethical considerations. Future research may build on these findings by incorporating additional variables such as corporate governance, innovation intensity, or market dynamics in order to further enrich the understanding of firm performance in a rapidly changing global environment.

In conclusion, the results of this study emphasize that corporate performance is not the product of size or resources alone, but rather the outcome of intelligent financial management, responsible practices, and strategic vision. Firms that learn to balance liquidity, profitability, and sustainability will be better equipped to navigate uncertainty, meet stakeholder expectations, and achieve long-term success in an increasingly competitive and socially conscious marketplace.

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