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- To contribute in the promotion of research culture in the country;
- To explore new vistas in the field of Business and Management;
- To facilitate scholars and researchers in their research endeavour to contribute quality research and to publish their ideas, results and findings; and
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# MONETARY POLICY AT A CROSSROADS: ASSESSING THE IMPACT OF GOLD, INFLATION, AND INTEREST RATES ON PAKISTAN'S GDP (1990–2024)

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*This study investigates the intricate relationships between gold rates, inflation, policy rates, and GDP in Pakistan from 1990 to 2024, aiming to inform policymakers' decisions on balancing inflation control and growth stimulus. Employing multiple linear regression analysis, the research yields surprising findings that challenge conventional economic wisdom. Contrary to expectations, gold prices exhibit a robust positive correlation with GDP, suggesting gold's multifaceted role in Pakistan's economy as a store of value, collateral, and remittance conduit, offsetting its trade balance effects. The study reveals that inflation's impact is uneven, and monetary policy transmits asymmetrically. The findings underscore the need for context-specific policies, urging policymakers to rethink gold's role, refine inflation management, and recalibrate monetary policy for growth. By questioning established assumptions and grounding decisions in local empirical evidence, policymakers can navigate the trade-offs between stability and growth. The study advocates for monitoring gold hoarding, improving data granularity, and implementing asymmetric rate adjustments to enhance policy effectiveness. Ultimately, this research highlights the importance of tailored approaches to Pakistan's unique economic landscape, moving beyond imported economic dogmas to inform more effective policy decisions.*

**Keywords:** Gold prices; inflation rate; policy rate; GDP

## Introduction

In the past thirty years, economy of Pakistan has experienced a plethora of significant structural adjustments and the order of ensuing macro-economic crises, which depended not only on the national economy but also on external economic factors. External shocks have been experienced by the economy of a developing economy such as Pakistan, especially in regard to commodity prices and internal shocks such as inflation and variations in monetary policy being affected to the GDP growth of a particular economy. Some of the key factors explaining the economic performance of the country are the price of gold, inflation, and the central bank policy rate. Gold affects foreign exchange reserves and trade balance in relation to the fact that it is considered to be a hedge investment during crises. At the same time, inflation and interest rates directly influence consumer expenditure, business investment, and overall industrial activity. It is also important to determine the connection these variables have to the rise in GDP in order to implement the right economic policies to achieve stability and long-term growth.

The relationship between the price of gold and economic growth has, in the recent past, gained special importance, especially for nations such as Pakistan that depend on the importation of the precious gold. The increasing international prices of gold also imply that there will be an increase in the prices of imports, which may affect balance of payment remittances and also devalue the currency, which may represent a constraint to the growth of GDP. Pakistan has endured a perennial inflation, with frequent rampages, which has changed purchasing power, ruined savings, and ruined business strategies. SBP uses the policy rate as a mechanism of hateful inflation and also a mechanism of economic averageness. However, increased interest rates also cut off and make access to credit that leading to decreased investment and reduced economic activity. The complexity of these three variables' consequences necessitates a diagnosis of the mechanism through which inflation and policy rates, together with the price of gold, affect GDP, such that the development of policies advances to reduce adverse impacts and enhance stable economic growth.

This study is motivated because it aims to determine, by a regression analysis, the effect of the gold rates, inflation, and the policy rate on the GDP of Pakistan over the period of study between 1990 and 2024. Unlike in the previous studies, where each of them has been addressed independently, this study measures them together in a single analytic specimen. To add to that, the selected period also covers numerous macroeconomic events, which include but are not limited to the global financial crisis, commodity price shock, the COVID-19 pandemic, and recent escalating inflation, thereby providing a timely background against which the analysis should occur. The study examines the cause and effect of these variables on Gross Domestic Product (GDP) through using the time series regression technique, which enables constructive predictions about economic planning.

This study is able to contribute to the body of knowledge by indicating the way economic growth is linked with international market condition and domestic market condition by employing variation in gold prices internationally and inflation and interest rates variation locally. Further, the study is helpful for key policy makers in comprehending the balance between interest rate, inflation controlling measures and other economic factors. Lastly, the study will outline tangible solutions that can be used to limit the exposure of the economy to foreign prices of commodities. Given the ongoing economic crisis that Pakistan has been going through, e.g., inflation and budget deficits as well as deficit in external debt, the research results of this study are timely and have direct policy implications.

## Literature Review

The relation of commodity prices and monetary policy with inflation and even economic growth has been well established in these respects in both developed and developing economies. Nevertheless, the peculiarities of the Pakistani economic environment, i.e., the dependence on the external flows of commodity prices, unceasing inflationary patterns, and the great sensitivity to changes in interest rates, warrant certain conversation. The following literature review attempts to aggregate the existing research on the relationship between gold prices, inflation, and interest rates on GDP in Pakistan, as well as highlight the gaps that this study seeks to fill.

Macroeconomic conditions, both external and internal, have played a critical role in shaping Pakistan's economic growth. Of these, gold prices, inflation, and policy rates have had a major impact on the state of the economy and financial markets. The research included in this piece is supportive of an academic and empirical study timeline from 1990 through 2024 to help understand the impact of these central variables on the economy of the nation over time.

## Gold Prices and Economic Growth

Historically, gold has been seen as an effective store of value and hedge against inflation. According to Javid and Zafar (2020), whose analysis used ARMA-GARCH models when applied to data from Pakistan, disclosed the effectiveness of gold returns as protection against expected as well as realized inflation. In the same vein, Nadeem et al (2014 also observed a close association of domestic gold prices with major economic indicators, including inflation and exchange rates. Haider (2016) has analysed the impact of gold prices on Karachi Meezan Index 30 and found a negative relationship, indicating that in times of economic uncertainty, when the investor feels insecure, he is more likely to invest in gold.

Also, Safdar and Ayyoub (2023) examined the long-run association of gold prices with inflation in G-8 countries, whose findings are quite relevant for developing economies like Pakistan. It was also found that in all environmental conditions, gold has acted as an effective hedge against inflation.

*$H_1$: Gold Prices have a significant effect on GDP*

**Inflation Dynamics and GDP Growth**

Pakistan has always been a high-inflation economy, with rates in double figures on most occasions, which has been attributed to external factors like global oil prices and currency devaluation. Another research study by Qasim et al. (2021) for the period 2004-2019 clearly indicates the existence of a strong long-run association between exchange rates, oil prices, and inflation. In another study, Jalil et al. (2014), among other findings, employing bounds testing, find evidence of a significant relationship between fiscal deficits and inflation as well, identifying government borrowing as a principal cause.

PRICES is a microsimulation model implemented by O'Donoghue et al. (2023) to investigate how inflation affects different branches of the Pakistani population. They discovered that a rise in the cost of food affected low-income families unequally and enhanced existing economic inequalities. Batool et al. (2021) used the method of wavelet analysis to analyse the dynamic relationship between inflation, interest rates, and economic growth with regard to the COVID-19 epidemic, concluding that inflation threatens economic stability in a major way.

*$H_2$: The Inflation Rate has a significant effect on GDP*

**Policy Rates and Growth Trade-offs**

Controlling inflation and promoting growth through the policy rate has traditionally been the priority of the State Bank of Pakistan (SBP). Ahmed et al. (2019), using a Vector Autoregression (VAR) framework to analyse changes in the monetary policy, determined that interest rate changes have a significant effect on the prices of commodities and inflation. Based on this Karim and Lohano (2024) applied sentiment analysis ( a new practice) on MB statements published by the State Bank of Pakistan. In this study, they exhibited that the "tone" and idea of these statements can have a direct outcome on the market, and as soar and effective policy messaging is decisive.

Similarly, the growth-inflation relationship was studied by Khan and Senhadji (2001) to infer that after a certain level of inflation becomes relevant for countries suffering from the hyper-inflation, like Pakistan, the negative impact of inflation affects growth only. Hossain (2015) further studied while being specifically established in the context of Bangladesh and elaborated understandings on the effects of volatility of inflation and monetary policy intervention with respect to the economies going through the issues and constraints of the similar nature.

*H3: Policy Rates have a significant effect on GDP*

In this sense, gold prices, inflation, and the policy rate are interrelated and of great significance for economic conditions. In periods of inflation, gold prices tend to increase as gold is seen as a protective asset by more investors, and central banks generally respond by increasing interest rates to control the money supply. Regarding capital markets and fiscal policy, these dynamics have been analyzed by Haider (2016) and Fan et al. (2016). Daoui (2023), building on this idea, reviewed the literature on the case of several developing countries and put forward the need to take into account the co-movement of these variables in the design of effective economic policies.

Pakistan is another recent example of this. Consequently, the inflation rate of the country decreased to 2.4 percent in January 2025, the lowest since 2016, as revealed by Reuters (2024, 2025). In a reaction, the State Bank of Pakistan (SBP) had reduced the policy rate by 22% to 12% to stimulate economic growth whilst keeping prices steady. This was the lowest inflation rate recorded in nearly three years, as it entered single digits largely as a result of a more stable currency and declining prices in food and energy items. As a result, the SBP commenced a series of rate reductions in 2024 that culminated in a 12 % rate by March 2025. But in early 2025, following negotiations with their International Monetary Fund (IMF) and fear of the state of the world economy, another cut on those rates was halted.

The general research supports the established strong correlation of gold prices with inflation and interest rates in the Pakistani economy. Gold retains its value during inflationary environments, interest rates are the critical lever to control the economy, and inflation is a result of fiscal and/or monetary policies. All of these characteristics are informative with regard to the country's economic resilience as well as policy response.

## Data and Methodology

This research paper uses the annual time series from 1990 to 2024 to show how the prices of gold, inflation rates, and interest rates have affected the Pakistan GDP. There are four important variables in the dataset:

**Dependent Variable:** Gross Domestic Product (GDP) (in USD billions): This is the main indicator of the Pakistani economy, obtained in the World Development Indicators provided by the World Bank.

**Independent Variables:** Gold Prices (USD per ounce)—IMF Primary Commodity Price averages annually, which show short-term worldwide market trends and domestic demand; Inflation Rates—obtained in the SBP Statistical Review; and Interest Rates (%)—the policy rate of the State Bank of Pakistan (SBP), which reflects the tightness of monetary policy.

**Methodological Approach**

This paper utilizes the analysis using multiple linear regression technique to quantify the linkage between these variables. The regression model equation is as under:

$$GDP=\beta0+\beta1 Gold\ Price+\beta2 Inflation\ Rates+\beta3 Interest\ Rate+\epsilon$$

Where:

- GDP = Gross Domestic Product in the year.
- $\beta0$ = Intercept.
- $\beta1,\beta2,\beta3$ = Coefficients for gold prices, inflation rates, and interest rates, respectively.
- $\epsilon$ = Error term.

**Results and Discussion**

Before moving forward with the regression analysis, the unit root test is applied, the result is as under (table 1):

Table 1*: Results of unit root test*

| Variable | Dickey-Fuller | Phillips-Perron |
|---|---|---|
| GDP | 0.9160 | 0.5235 |
| | 0.9945 | 0.9851 |
| Gold Prices | 8.4390 | 6.4433 |
| | 1.0000 | 1.0000 |
| Inflation Rate | -1.5675 | -1.6355 |
| | 0.4879 | 0.4540 |
| Policy Rate | -2.0222 | -0.9212 |
| | 0.2764 | 0.7692 |

The data in table 1 shows that all the variables are checked for stationarity using the Dickey-Fuller and Phillips-Perron. The results of these tests indicate that all the variables have a p-value greater than 0.05, which means that the series is non-stationary.

Results of the regression analysis is presented in table 2:

Table 2*: Results of the Regression Analysis*

| Constant | Gold Price | Inflation Rate | Policy Rate | R-Square | F-Statistics |
|---|---|---|---|---|---|
| -462.1686 | 81.671 | -0.162 | -65.371 | 0.967 | 306.504 |
| (73.6546) | (3.808) | (1.061) | (21.664) | | |
| [-6.2748] | [21.447] | [-0134] | | | |
| 0.0000 | 0.0000 | 0.8946 | 0.0052 | | 0.0000 |

The regression analysis provides meaningful insights into the correlation between the price of gold, inflation, policy rates, and the GDP growth of Pakistan from 1990 to 2024. The model has high explanatory strength, and the exact explanatory power, which is R-squared, is 0.967, where about 96.7% of the change in the GDP can be explained by the independent variables. The adjusted R-squared (0.964) also confirms how robust the model is, and the exceptionally significant F-statistic (306.504, $p = 0.000$) confirms the overall fit of the regression. We break down the findings associated with each variable below and explain the implications.

**Gold Prices and GDP: A Positive Surprise**

However, on the contrary, the coefficient on log-transformed gold prices (81.671, $p = 0.000$) is positive and significant, implying that a 1-percentage point increase in gold prices corresponds to an 81.67 unit increase in GDP. The result does not align with a significant portion of the literature (e.g., Ahmed et al., 2021; Khan et al., 2022), which assumes that gold negatively affects GDP through trade deficits and currency losses. Nonetheless, this is possibly an indication of the unique Pakistani economic setup, in which gold serves not only as an import but also as:

- **A store of value**: During crises, gold holdings may stabilize household wealth, indirectly supporting consumption.
- **A financial asset**: Rising gold prices could boost informal sector liquidity, as gold is often used as collateral in shadow banking.
- **A remittance conduit**: Overseas workers may channel remittances through gold purchases, indirectly fueling economic activity.

More research is required to find out whether this relationship applies at sub-periods, particularly during economic crises (e.g., the 2008 financial crash or the COVID-19 pandemic).

**Inflation Rate: Statistically Insignificant Impact**

The results challenge the pervasive point of view that growth is debilitated by the inflation as coefficient for inflation rate (-0.142, $p = 0.895$) is negligible and statistically insignificant. This could suggest:

1. **Offsetting effects**: The demand may be temporarily stimulated as high inflation erodes purchasing power (as per the Phillips Curve).
2. **Measurement issues**: The inflation data relating specifically to Pakistan may not fully capture regional and sectoral variation that hamper growth.
3. **Policy buffers**: The informal and temporary economic adjustments and subsidies granted by the government might palliate inflation's negative impacts.

This result aligns with Hossain's (2015) argument that inflation's growth effects depend on its source (supply-side vs. demand-pull), warranting disaggregated analysis in future studies

**Policy Rate: Strong Negative Correlation**

The results of the study are consistent with the monetary theory (Batool, S. et al., 2021) as the log-transformed policy rate (-65.370, p = 0.005) shows significant inverse relationship with GDP. An increase in the policy rate by 1 percent correlates with a 65.37-unit decline in GDP, which highlights the trade-off between inflation control and growth. The results support the findings by Daoui (2023), that monetary controls in Pakistan inexplicably affects SMEs and private investment. The result underscores:

- **Transmission lags:** Interest rate changes may take quarters to fully impact GDP, suggesting the need for forward-looking policy.
- **Fiscal-monetary conflict:** High fiscal deficits (averaging 6.8% of GDP; Khan, M.S., & Senhadji, A.S. (2001) may weaken monetary policy effectiveness.

**Policy Implications**

- **Gold Price Management:** There is a need to monitor and observe the dual role of gold i.e., import vs asset and formalize gold markets policies, potentially taxing speculative holdings while ensuring liquidity for productive uses.
- **Inflation Targeting:** The central bank policies should focus on core inflation (excluding volatile food/energy prices) as insignificant inflation-GDP link suggests to avoid over tightening.
- **Interest Rate Calibration:** The State Bank of Pakistan may adopt asymmetric rate policies like cutting rates aggressively during down turns but raising them cautiously during booms.

**Limitations and Future Research**

This study is not without limitations. Firstly, there is the timeframe bias. The 34-year span may mask structural breaks (e.g., post-9/11 aid inflows or CPEC investments). Sub-period analysis is advised. Secondly, the limitation of omitted variables. Exchange rates, fiscal deficits, and global oil prices likely interact with the studied variables.

Future research should explore nonlinearities and sectoral impacts as gold prices unexpectedly correlate with higher GDP, monetary policy remains a potent (if blunt) tool for growth management, whereas inflation's role is less clear-cut. This study provides a foundation for reassessing Pakistan's growth drivers, highlighting the need for nuanced, context-specific policies rather than conventional wisdom.

**Conclusion and recommendation**

This paper focused on the regression analysis of how the GDP of Pakistan is influenced by the price of gold, the inflation rate, and the policy rate, between the period 1990 and 2024. It was found that there are a few insights that were quite significant, as they revealed the traditional assumptions of economics and a new perspective on the macroeconomic situation in Pakistan. However, to the contrary, the prices of gold showed an extraordinarily positive dependence on GDP, which indicates that the role of gold in the Pakistani economy is not as straightforward as the use of gold as an import-based drain of foreign reserves. This result suggests that the negative effects of a negative balance of trade of gold could be counterbalanced by its use as a store of value, pledging in informal lending, and remittances conduits.

Surprisingly, the inflation rate did not have any statistically significant effect on the increase in GDP, contrary to most of the literature in which these effects are expected to be negative and inversely correlated. This finding proposes that the economy of Pakistan might have acquired informal methods of coping or that the overall rate of inflation is covering counterbalancing sectoral impacts. In the meantime, the policy rate was strongly, negatively correlated with GDP, which supports the classical perspective that monetary tightness has a restrictive effect on economic growth, especially in such a country as Pakistan, where access to credit through credit providers, especially the banks, is already restricted.

The substantial explanatory power of the model (R2 = 0.967) also proves that these variables jointly influence the economic trend of Pakistan. The evidence provided by the Durbin-Watson statistic of mild autocorrelation, though, is that other variables: exchange rate changes, fiscal policy alterations, or other external shocks may also moderate these associations. All these findings collectively point to the benefit that a more detailed interpretation of the relationships between macroeconomic variables in developing economies such as Pakistan is necessary, where the informal sectors, remittance flows, and structural limitations generate particular transmission mechanisms.

## Recommendations

Based on the findings of the research the authors would like to recommend 1) the rethinking Gold's Role in Economic Policy. Taking into consideration the unexpected positive correlation between gold prices and GDP, Pakistani policymakers ought to:

- Make the gold market formal by launching gold-backed financial instruments that are regulated (e.g., gold savings certificates) to redirect the gold Jim Crowables own to productive investment.
- Monitor speculative hoarding either with taxes on transactions or with large-gold-purchase reporting (so price surges from a real rather than an artificial scarcity).

- Grant mining companies access to gold by negotiating long-term contracts with their supplier nations to limit the effects of price volatility on foreign reserves.

Second, there is a need of refining inflation management strategies. The insignificance of the relation between inflation and GDP indicates that blanket policies based on inflation-targeting can be unproductive. Instead, authorities should:

- Implement core inflation targeting (excluding food and energy price increases) that prevents excessive response to temporary supply shocks.
- Make social safety nets (e.g., targeted subsidies) harder to defend low-income households against food/energy inflation without distorting aggregate price signals.
- Publish price indices by sector to deepen the understanding of what price increases are actually damaging growth.

Third, the adverse effect of the policy rate on the GDP is very strong, and a more balanced monetary tightening strategy is required:

- Use asymmetric rate movements- Use rate cuts during recessions but increases at a slow pace during booms to ensure weak recoveries are not stifled.
- Establish alternative, monetary instruments (e.g., reserve requirement ratios, liquidity injections on behalf of SMEs, etc.) to bring inflation under control without over-utilization of any single policy, i.e., interest rates.
- Improve fiscal policy coordination to make sure deficit financing does not compromise monetary tightening (e.g., using the tax overhaul as an excuse to stimulate aggregate demand).

## Future Research Directions

In order to expand this paper, scholars need to:

- The effects of disaggregated gold: the effects of disaggregated gold as an asset and not as an import may be calculated with the help of the firm-level or household survey data.
- Test the threshold model of nonlinear inflation in order to determine certain inflation rates that trigger growth slumps.
- Additional variables such as exchange rates, fiscal deficits, and international oil prices would then be added to a vector-autoregression (VAR) model to measure more extended interactions.

In conclusion to this discussion, it is important that the economy of Pakistan needs policies that reflect its structural peculiarities, such as gold hoarding cushions against crisis, asymmetrical impacts of inflation, and asymmetrical transmission of monetary policy. Policymakers will be in a better position to cope with the reality of trade-offs between stability and growth by going beyond standard frames and accommodating context-based solutions. Paradoxical findings in this study eventually underscore the need to challenge the common assumptions and basing of decisions on local empirical evidence instead of relying on imported economic dogmas.

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# FACTORS INFLUENCING THE SALE OF COTTAGE INDUSTRIES: A STUDY OF ISLAMPUR, DISTRICT SWAT

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*Small scale industry plays a vital role in the socioeconomic development of the developing countries as it contributes significantly to to reduce the poverty, creates jobs and boost the economic activities. In developing countries, Small medium enterprises (SME's) contributes approximately 70% in employment and 36% to the GDP of the country. This study investigates the factors influence the sales of cottage industry in Islampur district swat. Primary data was collected from 208 firms of the cottage industry in the area. Results of descriptive statistics shows that out of 208 firms, 168 has a informal source of financing, while 40 have the formal source of financing. Approximately, 161 out of 208 cottage firms were hold by single individual while 47 firms have a shared ownership. Similarly 177 producer sell their products at local markets while 31 firms have international linkages to sell their products. According to the results of priority index, the expensive raw material indexed at 0.82, make it the top raked issue that effect the sale of cottage industry. While load shedding indexed at 0.81 that remains the second issue according to priority index. The cottage industry of Islampur is well-known for producing traditional shawls, Caps and other garments that represent the culture of the region. There is a need to tackle the issues faced by the cottage industry at Islampur.*

**Keywords:** Small medium enterprises; Cottage industry; poverty

## Introduction

Cottage industries remain the backbone of the traditional economy in the history. Cottage industries are small businesses that are run out of homes rather than in specially constructed facilities. From the Middle Ages, artisans and weavers were making ceramics crafts and different daily use products with the help of local made tools and traditional methods in their homes.

Trade during the evolutionary period of industrial revolution unlock the era of mass production in the form of cottage industries, factories and firms. Gradually, it becomes usual to explore the rich stories, values and exchange while traveling to the other regions of the world.

From the economic perspective cottage industries has significant importance to improve employment, and socioeconomic status of the low-income households in rural areas. Cottage industry has cost effective because of the availability of local resources and skilled labor at low cost. It promotes better standard of life and contributes to the economy (Tasneen et al.,2014).

However, the cottage sector face multiple challenges due to the changed landscape. While the global market provided a means of expansion, it also forced craftspeople to settle for cheaper, mass-produced substitutes. These industries predominance demonstrates a striking balance between upholding rich traditions and implementing cutting-edge solutions. Some have effectively combined efficiency expenditures with technological advancements while maintaining the core of manufacturing. The wide range of products produced by cottage industries is a monument to the artists unwavering dedication to producing high-quality, well-known textile products that have been cherished for many generations. Similar other products, such as jewelry, woodworking, ceramics, musical instruments, and handicrafts, witness to the creativity and inventiveness of artists (Hasan et al., 2017).

Cottage industry in Pakistan is facing numerous challenges. First, as the country enters the fourth industrial revolution, where automation is rapidly replacing labor-intensive jobs, there is a risk of joblessness in the near future. Second, as globalization moves toward regional integration, as evidenced by the China-Pakistan Economic Corridor (CPEC), the obstacles facing by small businesses are increasing (Baig et al., 2020).

The role of competitive and well-established small businesses is becoming more and more important every day in order to connect our small-scale sector with the fourth industrial revolution. It can reduce unemployment, and benefit from this economic corridor. In Pakistan, a developing nation, almost 90% of businesses are categorized as small enterprises. Pakistan is the fifth most populous country in the world, with a population of about 230 million. By 2050, it is expected that the population would surpass 351 million. Out of 351 million, 263 million will be in the active work force. A workable mechanism for creating jobs in the small-scale and cottage industries would be required to employ the young talent in the near future (Abbas et al., 2020).

The Punjab cottage industry is not an exception to Pakistan's cottage industry, which has been in sharp decline, especially in the past ten years. Since the 1980s, the GDP contribution of this industry has drastically decreased comparing the contribution to the actual potential of the country.

Financing from a formal sector like banks, government loans, and other financial institutions is one of the huge barriers for small medium enterprises growth. Approximately, 90% of the small business wouldn't access to the micro-financing, because of enough knowledge, lack of education, unawareness, and complex and lengthy paper work process. Although microfinance is demanded by small businesses, only 7% of those can access it (Aslam et al., 2013).

The cottage industry of Islampur is also well known for traditional hand-make shawls, caps, mufflers and woolen garments. It is one of the historic villages, located at 11 km away from Mingora city in district Swat, Khyber Pakhtunkhwa. Most of the dwellers are self-employed in this industry because it's a part of their tradition and culture. The raw material used in handicrafts are purchased from different cities of the province including Peshawar. The products of this industry with its vibrant finishing have a huge demand in local and international markets (Kamal et al., 2013).

### Study Objective

Objective of the study is to identify the key challenges in the sales and production process being faced by the producers of Islampur Cottage industry.

### Problem Statement

Many researchers have looked into the market dynamics of Islampur cottage industry. For example, Wahab et al., (2022) identified some of the factors that have influenced of the sales of cottage industries of Islampur. However, the industry has been facing a lot of challenges that affect the sale of the products produced here. And until and unless these challenges are critically looked into to make it easy for the policy makers and other stakeholders to address, the industry will suffer. To address this issue, the current study undertakes this effort to explore real challenges of the producers in Islampur small cottage industry by analyzing the factors effecting the sales of this cottage industry.

### Significance of the study

The small-scale industry of Islampur has a significant role in employment of the area. Not only local men but women are empowered with different fashionable design on ladies' garments that has a huge demand. Any disruption in the production line has a huge consequence on the sales of these unique products. This study examined the most of the factors that affect the sales of Islampur cottage industry while using priority index table that identified that most prior issues vulnerable to sales.

## Reviewed Literature

Chachar et al. (2013) studied the socioeconomic variables influencing the handicrafts products in Small medium enterprises of Hyderabad Sindh. Some of the key determinants were family background, age and experience of the producers, managerial skills, and education of the owners. Study found that technical education and the socioeconomic indicators have positive outcomes and contribute 60 percent in the growth of the business. Furthermore, the paper found the effective management of resources benefits both the owners and the employees in those SMEs.

Pandey (2013) reviewed a study on cottage industries to reveal the factors that support them and to look into their limitations. The study was conducted for Uttar Pradesh, India, and the author concluded that the government of India should support the cottage industry by providing raw materials, loans, and transportation. Joy and Kani (2013) looked into a study on cottage industries and their limitations, conducted for India, and discovered that cottage industries can be operated using their traditional methods without the need for modern techniques. The primary issue that cottage industries face is that large industries can produce the same product at a lower cost.

Mexon et al. (2014) observed the variables affecting such industries' formation, growth, and sustainability. The study highlights the value of cottage enterprises in preserving traditional crafts, generating employment, and strengthening the local economy. The writers discuss how cottage industries can expand with support from the government, market access, infrastructure development, and talent development. The results can be used by industry stakeholders and policymakers to encourage and maintain the growth of cottage industries in the region.

In Punjab, Pakistan, Hasan et al. (2017) studied the spatial analysis of small and cottage industries. The goal of the study is to comprehend the clustering, distribution patterns, and variables affecting these industries' expansion in the area. It is anticipated that the results of this study will add to the body of knowledge already available on Punjab, Pakistan's small and cottage industries. Policymakers and other stakeholders can create focused policies to encourage the growth of these industries and optimize their socioeconomic impact by examining their spatial distribution and determining the reasons driving their expansion.

The factors influencing the expansion of the cottage industry in Pakistan's Baluchistan province have been identified by Haider et al. (2020). The author created a questionnaire to look at these aspects, using characteristics that have been examined in earlier research projects carried out in other nations. The respondents were owners of cottage industries who were chosen at random from Punjab's rural and urban districts. The findings of the study have important ramifications on two levels. First of all, they can help guide government initiatives to protect Pakistan's cottage sector. Second, by highlighting the crucial elements that demand their attention for business promotion, they provide owners of cottage industries with insightful advice. Five factors are identified by the study as having a significant impact on Pakistan's cottage industry's expansion.

## Methodology and Theoretical Framework

This paper investigates the factors effecting the sales of cottage industry in Islampur. Many studies have been found using different framework while working on the same theme at different regions of the world. The theory behind such studies is classified by (Kenton, 2023) who relate the factors of sales with the marketing mix strategy of 4P's (product, price, place, and, promotion) used in marketing field. Sales and Marketing are the interrelated departments of any business or Organization. They have common mutual goal of making business profitable with different tools. The marketing mix strategy first P is for product means that a business or firm must create market offerings that satisfy need and deliver its value proposition. The second P is for Price that explain the charges decide by the firm against the offering. The firm or business will make the offering available for the specified customer in the target market (place). The last P is for Promotion that means the firm will engage the target customers, provide features and information about the product that meet the customer needs (Kotler, 2018).

## Study Area

The Study has been carried out at district swat in Khyber Pakhtunkhwa Province of the Pakistan. The cottage industry of Islampur village in swat is famous for handmade garments, Shawls, Carpets, etc. in all over the country and also Pakistanis settled in different parts of the world ordered it from the local markets.

## Sampling and Data Collection

Primary data has been collected from the different stakeholders and firm owners of the cottages through structured questionnaire. Out of 450 cottages industries 208 owners were randomly selected as a sample size, while using Yamane (1967) formula for sampling and sample size.

## Factors of Sales

The study examines the factors that can influence sales of the cottage industry such as quantity of sales of each industry, types of items sold and their prices, sourcing of finance, Income, number of workers and their experience, and access to international market.

**Techniques used for Analysis**

The Study is based of descriptive statistical analysis of different factors that influence sales of the cottage industry. Descriptive analysis is used to organize and make summary of the important variables with percentage, mean, variance, and standard deviation. Its present data in charts, graphs that can be used to identify trends and pattern in data.

**Construction of the Priority Index**

The study developed priority index table to report the problems of the cottage industries owners face during the production. Top 5 problems were ranked on the basis of their intensity. These problems include expensive raw material, lack of experienced workers, power supply shortages, lack of training programs, and lack of digital marketing or eSkill. A great number of studies (e.g., Khan et al., 2016; Stel & Storey, 2007; Wahab et al., 2002) have considered the use of priority index for the comparison of problems and ranked them through the certain process and data collected from the field and analyzed the main reasons of any social issue (table 1).

$$PRI = \frac{\sum Sc_i f_i}{N}$$

Where:

*PRI is the priority index range from 0 to 1*

$f_i$ *is the Frequency of ith priority*

*N denote number of observations*

$Sc_i$ *is represent Scale value of ith priority.*

Table 1 *The Scales Include Five Gaps*

| Priority | 1st | 2nd | 3rd | 4th | 5th | No Priority |
|---|---|---|---|---|---|---|
| Scale Values | 1.00 | 0.80 | 0.60 | 0.40 | 0.20 | 0.00 |

The higher the index values the higher will be the priority problem.

**Results and Discussion**

Data has been analyzed with the help of using SPSS. The factors of sales have been categorized into qualitative and quantitative variables. Table 2 provides the details.

Table 2 *Frequency Distribution of Variables of the Study*

| Variable | Categories | Frequency | Percent | Total % |
|---|---|---|---|---|
| Source of Financing | Informal | 168 | 80.8 | 100 |
| | Formal | 40 | 19.2 | |
| Firms Ownership | Sole Owner | 161 | 77.4 | 100 |
| | Shared | 47 | 22.6 | |
| Product where do you sell | local market | 177 | 85.1 | 100 |
| | Int. Market | 31 | 14.9 | |

| | | | | |
|---|---|---|---|---|
| Training for products | Yes | 77 | 37.0 | 100 |
| | No | 131 | 63.0 | |
| Types of Workers | Skilled | 174 | 83.7 | 100 |
| | Un Skilled | 34 | 16.3 | |
| Available Skilled workers | Yes | 145 | 69.7 | 100 |
| | No | 63 | 30.0 | |

The above table shows frequency and percentage of the qualitative variables. Respondents were asked about the source of financing out of 208 firms 168 have informal source of financing while 40 have formal source of finance where source of finance means, financing from bank of financial institution. Similarly, 77 percent of the firms were owned by the individual while 23 percent owned with shared equity. Approximately 15 percent of the cottage industries were found to have access to international market place and 63 percent respondents lack of training from government side. Fortunately, 83 percent respondents were skilled and 70 percent of the cottage owner showed the availability of skilled workers.

Table 3. *Responses against the Problems Faced by Cottage Industry*

| **Priority** | **Load-Shedding** | **Lack of availability of experience workers** | **Expensive raw materials** | **Lack of training programs** | **Lack of E-business skills** |
|---|---|---|---|---|---|
| First | 84 | 7 | 81 | 7 | 34 |
| Second | 69 | 13 | 80 | 11 | 37 |
| Third | 40 | 42 | 38 | 20 | 68 |
| Fourth | 10 | 70 | 5 | 79 | 34 |
| Fifth | 5 | 76 | 4 | 91 | 35 |
| N/A | 0 | 0 | 0 | 0 | 0 |
| Total | 208 | 208 | 208 | 208 | 208 |

Statistics in table 3 show the individual's response against the problems faced during the operations of cottage industries at Islampur. Data in this table show that the power supply and expensive raw material is the top issue reported by the firm owners. In terms of figure 84 respondents report load-shedding as a top issue that should the resolved on first priority. While 80 respondents show the expensive raw material issue as a second most important issue. Similarly, 68 mentioned lack of digital skills to uplift the sales as a third most prior matter to be resolved. At low prior 79 and 90 respondents report lack of training programs as a least prior issue on fourth and fifth rank respectively.

Table 4. *Ranking of Priority Index*

| Problems | Priority Indices | Ranking |
|---|---|---|
| Load Shedding | 0.81 | II |
| Lack of availability of experience workers | 0.41 | IV |
| Expensive raw materials | 0.82 | I |
| Lack of training programs | 0.37 | V |
| Lack of E-business skills | 0.60 | III |

After applying the priority index formula on the table 3, 0.82 is the highest index found for the expensive raw material issue because the raw material is not directly available in the market that is increasing cost of production and the agents or middleman role is making it expensive. The second highest index is issue is loadshedding 0.81, because most of the firms operate manually due to the shortage of power supply, even they can start evening shift in the presence of electricity that can boost their productivity. 0.60 is the lack of digital skills and lack of e-business skills means that there is a need of digital skills opportunities for youth and business so that they can promote their products on digital platforms also they have financial literacy of savings, involvement, and making business portfolio Wahab et al. (2022). Lack of experienced workers indexed at 0.41, the fourth issue of the cottage industries as most of the local people are quitting this field and adopting the other source of earnings for better living standard. Most of youngsters are preferring to change their life standards which leads to the shortage of the experienced workers in this specific field. The lack of training programs among new workers who are new to this field is the least index issue in these cottage industries Khan et al., (2016).

**Conclusion and Recommendations**

The study identified various factors that have influence of sales of the cottage industry at Islampur village in district Swat of Khyber Pakhtunkhwa. There are approximately 450 small cottage industries in Islampur, producing hand-made woolen garments. The market has a huge potential but there are some factors that is affecting the sales of cottage industry that reduce their growth. 208 firms have been investigated for those factors that affect their sales and this sample size has been considered while using Yamane formula for sampling.

The study concluded that there is a lack of financing for these small-medium enterprises as 168 firms out of 208 were running business with informal source of financing. Most of the time firms' owners have a problem in the complex procedure of financing as financing institutes need many information and document work to finance any small or medium businesses. Almost 85 percent of the producers are selling their unique product in local markets and 63 % report that there is no training programs and vocational centers to learn this skill. Among their problems, the issue of expensive raw material remains of the top priority to be resolved.

Based on the above results, the study recommends that there is a need to address these identified issues as small and medium enterprises are consider as a backbone of the economy and economic growth. It provides employment and reduces poverty. There should be formal financing institutes to finance such businesses and the process of financing should be simple and easy. There is a need of training and learning digital skills platforms where small business owners have an opportunity to learn digital marketing so that they can sell online internationally. Furthermore, there should be enough power supply for small and medium enterprises that can boost such businesses and economic growth of the economy.

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# THE ROLE OF CLOUD COMPUTING IN MODERN LIBRARY AND INFORMATION CENTERS: SERVICE EFFICIENCY, KNOWLEDGE MANAGEMENT, AND GLOBAL COLLABORATION

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*This study examines the transformative role of cloud computing in modern library and information centers, and its impact on service competency, knowledge management, and global collaboration. Using a quantitative research approach, the study collected experiential data through a structured online survey of 120 library professionals purposively selected for their subordinate with cloud tools. Findings reveal that cloud computing advances important library roles, including automatic cataloging, distant access services, circulation management, and digital reference transfer, important to enhanced skill and user contentment. In knowledge management area, cloud platforms consensus the creation of vital sources, real-time organization of resources, and sympathetic information provision amongst supervise. The study also highlights challenges such as apprehensions over data security, precondition on exterior retailers, defective technical services, and changeable system infrastructure. While these intrusions, respondents stated confidence about upcoming evolution, primarily in extents such as mobile-first cloud services, AI-driven analytics, and cooperative resource provision. The study understands that sustainable cloud integration requires premeditated improvement, policy development, and ongoing capacity building to entirely comprehend the provisions of cloud computing in modern library centers.*

**Keywords:** Cloud computing; library services; knowledge management; global collaboration

## Introduction

Through history, civilizations have depended on libraries and information centers as a base for their common information and the ability to tolerate knowledge through existence. But in this digital age, their objective has extended external just preservative print to support digital arrival, collaboration, and the development of innovative information. Libraries are reception advanced knowledge to recollect up with patron views for online and mobile services, which is dynamic entreaty (Liu et al., 2011). Cloud computing, with its accessible institute, general connectivity, and cost efficiency, stands out among this proficiency as a transformational improvement (Aljabre, 2012). Cloud resolutions increase libraries' developing fortitudes as hubs for digital assignation and information distribution, as highlighted by (Zou, 2013).

When libraries practice cloud computing, they can improve their organization and services. This is one of the most apparent effects. Since cloud-based library systems eliminate the need for large local servers and IT teams, administrations can developed allocate resources (Sultan, 2014) state that software as a service (SaaS) solution, such as integrated library platforms, authorization for incessant developments, simpler workflows, and integrated incorporation with other systems within institutions. Libraries that made the change to cloud computing adage precisions in digital maintenance, access reliability, and cataloging speed, interpretation to studies by (Vaquero et al., 2008). Services being stimulated to the cloud signify more than simply a technical development; it also indicates a considerate change towards greener performs.

Imperative meanings are achieved by cloud computing and knowledge administration (KM). According to Rittinghouse & Ransome, (2017), libraries play a critical role in endorsing the movement of information and new knowledge. Though, the role of libraries is further heightened by cloud-based databases and teamwork tools, which make it calmer for group study and the distribution of research results. (Zhang et al., 2010) found that cloud KM systems can increase research data management, open access actions, and the sharing of recognized knowledge. Further, the COVID-19 pandemic established the consequence of cloud-based platforms since they allowed remote learning surroundings to persist operational and digital contented to persist accessible at all eras (Wu & Plakhtii, 2021).

Thanks to cloud computing, which eases better global communication and reserve sharing, new avenues for global cooperation have opened up? Forming consortia-based associations and leveraging cloud-hosted amalgamated search engines may help libraries increase their reach and deliver users with additional access to scholarly publications (Xiao et al., 2023). Libraries in emerging countries encounter considerable complications when trying to use digital resources because of a absence of resources and backing. Libraries in this condition can advantage greatly from this cooperative architecture. Lakkarasu, (n.d.) found that smaller organizations can be more active participants in global academic networks when they use cloud computing, which also helps with reasonable access by plummeting admission incidentals.

Moving to the cloud does come with some tasks and risks, though, so it's imperative to weigh them sensibly. Akter et al., (2024)) note that uncertainties about data safety, privacy, and legal authority remain dominant when sensitive library data is stored in many countries. Worries concerning vendor lock-in and sustainability in the long run complicate choices. According to Kumar & Sharma, (2021), libraries risk behind control of valued resources if providers vary their terms of facility or cease backup platforms. In low-resource extents, further difficulties to successful application include untrustworthy internet influences, inadequate funding, and employee's deficient in ICT skills (Etikan & Bala, 2017). To overwhelmed these tasks and ensure the safe and dependable integration of cloud computing, hybrid models, employee education, and governmental creativities at the national level are required. Against this background, the current study pursues to examine the game-changing role of cloud computing in modern library and information centers, specifically focusing on how cloud computing improves service efficiency and resource management in libraries and information centers, analyzing the role of cloud platforms in strengthening knowledge management practices, identifying challenges and risks associated with sustainable cloud adoption in libraries, and developing a framework for responsible and effective integration of cloud computing in library services. While allowing the contests that still exist, the paper explores how cloud implementation improves operational competence, strengthens information management developments, and promotes worldwide assistance. In this information-driven age, libraries may stay present, advanced, and globally connected by following the research model for ethical and maintainable cloud implementation (Wang et al., 2010)

## Literature Review

Cloud computing has rapidly become one of the most vital technologies for the forthcoming of information centers and libraries. Local servers and other physical organization have long been the backbone of libraries' collection management and community access systems. Nevertheless, this standard has shifted with the increase of cloud computing, which suggestions elastic, on-demand resources and decreases the need for climbable local infrastructure and in-house technical knowledge. The basic impression behind cloud computing was to generate a shared pool of programmable resources online

(Vaquero et al., 2008). Though, recent negotiations have focused on how effectively cloud computing meets the active service requirements of modern libraries. Research by Rittinghouse & Ransome, (2017) demonstrations that colleges can save money on processes while providing clienteles with easy access to digital resources through finding tools and integrated library systems contained in the cloud.

Amongst the many possible compensations of cloud computing for libraries, one of the most distinguished is the potential development in service competence. Software as a service-solutions are a terrific way for libraries to augment cataloging, circulation, and electronic resource management (ERM). Results from experiential investigate Goggi et al., (2019) show that these approaches provide automatic informs without needful in-house maintenance, reduction downtime, and advance catalog reliability. Momentous savings are attained when several institutes join forces in consortia to perform a rule. This is because the institutes are talented to combine their resources and negotiate more auspicious terms for all parties complicated (Akter et al., 2024). The library is becoming more useful as a research and teaching tool due to cloud computing and other detach platforms (Aljabre, 2012).

Cloud computing has further strengthened libraries' rank as agents of knowledge organization. Libraries have altered into vital components of the knowledge cycle, supportive research and established memory, thanks to collective platforms and cloud-based sources. The compensations of such systems are highlighted by (Adigun et al., 2024). These assistances comprise enhanced alliance between organizations, more effectual archiving, and a wider dispersal of intellectual publications. Amid the pandemic, cloud-based solutions were transported to the consideration of academic institutes, letting them to continue learning and research notwithstanding their lengthy conclusion (Bharany et al., 2022). Libraries are presently following universal trends towards digital scholarship, open access publication, and open science, rendering to (Eneh et al., 2024).

Two more main compensations in the subject field of cloud computing are worldwide connectivity and the sharing of resources. It has basic global partnerships, letting libraries to share digital collections, form international consortia, and offer joined search abilities. Research (Akter, et al., 2024) designates that these performs recover cross-institutional collaboration, leading to amplified access to information in both advanced and emerging states. Research led by Gupta, (2024); Manna, (n.d.) proposes that libraries fronting resource restraints can secure the assistances of cloud implementation. This is because cloud computing decreases entry dues and grants equal access to global knowledge systems. By enabling influences between libraries in different sites, cloud computing empowers libraries to attain their social purpose of contribution comprehensive information.

Despite advancements, there are still barriers to widespread use of cloud computing. Security and privacy are of utmost importance when it comes to servers situated outside of national jurisdictions, since they frequently store sensitive user and institutional data. Institutions may eventually lose some control over their resources if they depend too heavily on proprietary platforms, as pointed out, further complicating the sustainability challenge. Additional challenges in underdeveloped countries include inconsistent connectivity, inadequate funding, and a lack of professional knowledge, which all work against the full use of cloud services (Kantaros, et al., 2025). Legal and regulatory issues pertaining to data ownership and intellectual property also present libraries with hurdles (Manna, n.d.).

As new technologies such as blockchain, edge computing, and artificial intelligence are integrated into cloud computing, experts predict that it will continue to improve. (Liu et al., 2011b) These advancements have the potential to improve distributed information access, data authenticity, and customization. Access and efficiency have gotten more focus than the cultural, ethical, and governance implications of cloud adoption. Understanding the complexities of cloud-enabled services in different socioeconomic circumstances requires research that focuses on the Global South (Rajkumar Buyya & Goscinski, 2019). It is critical to fill these gaps in order to establish a framework that can optimize the benefits of cloud adoption while limiting its risks in the long run.

## Research Methodology

This study used a quantitative research technique to find out if cloud computing increases the efficiency of library and information science services, knowledge management, and worldwide collaboration. A well-crafted online survey with both open-ended and closed-ended questions was the main instrument for achieving this goal of thought and expression homogeneity. Participants were selected via purposive sampling, as established in earlier studies (Khan, 2024). The researchers made an effort to connect with librarians who specialized in cloud computing. In addition (to following updated ethical guidelines to guarantee inclusivity, sensitivity, and informed participation, the design was in line with British Educational Research Association principles (Khan, 2024). To lessen the possibility of false or synthetic responses in the online survey, data integrity checks and response verification techniques were used, as advocated in recent methodological studies (Kiernan & Mc. Mahon, 2024).

Data was analyzed with help of SPSS. To provide broad picture, descriptive statistics such as percentages, means, and frequencies, and we used inferential techniques like regression and correlation analysis to look into the correlations between cloud computing usage and service results. When Cronbach's alpha values were greater than 0.70, which is considered a sufficient level of internal consistency, instruments were determined to be reliable (Raina, 2024). More recent innovations in survey sampling in the Global South have prompted outreach strategies that combine more conventional methods, such as institutional networks, with more modern ones, such as social media invitations. Chahare (2024) states that this process pursues to upsurge representativeness. By merging severe sampling, rationalized moral values, and vigorous analytical methods, the practice confirms legitimacy and delivers a dependable foundation for investigative how cloud computing changes library activities in this digitally connected period.

Table 1 *Demographic Profile of Respondents (N = 120)*

| Variable | Category | Frequency (n) | (%) |
|---|---|---|---|
| Gender | Male | 68 | 56.7 |
| | Female | 52 | 43.3 |
| Age Group | 20–30 years | 34 | 28.3 |
| | 31–40 years | 45 | 37.5 |
| | 41–50 years | 29 | 24.2 |
| | 51 years and above | 12 | 10.0 |
| Qualification | Bachelor’s Degree | 22 | 18.3 |
| | Master’s Degree | 58 | 48.3 |
| | MPhil/MS | 30 | 25.0 |
| | PhD | 10 | 8.4 |
| Professional Role | Librarian | 55 | 45.8 |
| | Assistant Librarian | 28 | 23.3 |
| | Library Officer | 20 | 16.7 |
| | Other Staff | 17 | 14.2 |
| Experience | Less than 5 years | 30 | 25.0 |
| | 6–10 years | 40 | 33.3 |
| | 11–15 years | 28 | 23.3 |
| | 16 years and above | 22 | 18.4 |

**Results and Findings**

This section offers an investigation of the study's findings constructed on the four research objectives. After 120 participants had provided their data, descriptive statistics were used to measure the data. An examination of the data is provided by a descriptive paragraph at the commencement of each segment, followed by an inclusive table that supports and clarifies the conclusions.

The 1st objective was to inspect the influence of cloud computing on service competence in library and information centers. The results have shown (table 1) that cloud computing has pointedly improved the competence of service for numerous library tasks, according to the research. Most often used services occasioned in amplified client fulfillment, faster processing, and compact staff capability, such as cloud-based circulation management and automated cataloging systems. Although reporting systems and acquisition approaches were less prevalent, interlibrary loans, document distribution, and remote access services all established considerable acceptance. Even while there are still some complications with things like staff training and network convenience, cloud-based solutions often simplify operational processes, save incidentals, and advance convenience.

Table 1 *Descriptive Statistics for Cloud Computing & Service Efficiency (N=120)*

| Service Aspect (Detailed Description) | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|
| Fully automated cataloging and metadata organization of library resources using cloud-based systems | 4.10 | 0.68 | 2.0 | 5.0 |
| Circulation and borrowing management supported by cloud platforms for faster processing of requests | 4.21 | 0.71 | 2.0 | 5.0 |
| Interlibrary loan and document sharing services integrated via cloud applications for wider access | 3.75 | 0.80 | 2.0 | 5.0 |
| Digital reference and query resolution services provided to users through cloud-based tools | 3.98 | 0.72 | 2.0 | 5.0 |
| Acquisition, procurement, and resource ordering workflows managed efficiently through cloud systems | 2.93 | 0.82 | 1.0 | 5.0 |
| Centralized storage and management of user and institutional data using cloud-based infrastructure | 4.08 | 0.74 | 2.0 | 5.0 |
| Document delivery and interdepartmental resource sharing enabled through cloud-based platforms | 3.65 | 0.79 | 2.0 | 5.0 |
| Reporting, monitoring, and analytical tools for library performance supported via cloud technology | 2.75 | 0.77 | 1.0 | 5.0 |
| Remote access portals for library users provided through cloud infrastructure for anytime availability | 4.05 | 0.75 | 2.0 | 5.0 |
| Mobile-based library services and applications developed using cloud technology for on-the-go access | 3.52 | 0.83 | 1.0 | 5.0 |
| Staff collaboration, communication, and project management platforms enabled by cloud solutions | 3.60 | 0.81 | 1.0 | 5.0 |
| Automated notifications, reminders, and alerts sent to users through cloud-based systems | 4.00 | 0.70 | 2.0 | 5.0 |

The 2nd objective was to explore the impact of cloud computing on knowledge management practices in library and information centers. The results showed (table 2) that cloud computing has greatly improved library knowledge management (KM), according to the results. Cloud platforms improve the management, archiving, reclamation, and broadcasting of information resources, according to respondents. This, in turn, leads to additional knowledgeable decisions and earlier responses to user enquiries. Effectual knowledge management is made conceivable by automated metadata production, central digital sources, and cooperative cloud-based platforms. Users are also able to access resources distantly. While there has been some development in the use of AI-driven information discovery and progressive analytics tools, the general tendency specifies that cloud services have a promising influence on effectual knowledge management. In order to secure the filled assistances of cloud-based KM, it is essential to resolve the matters that respondents elevated, such as data security, employee training, and integration with existing systems.

Table 2: *Descriptive Statistics for Cloud Computing & Knowledge Management (N=120)*

| Knowledge Management Aspect | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|
| Centralized digital repositories for storing, organizing, and retrieving knowledge resources efficiently | 4.12 | 0.69 | 2.0 | 5.0 |
| Automated metadata creation and tagging of documents and resources through cloud-based tools | 4.05 | 0.72 | 2.0 | 5.0 |
| Cloud-enabled collaborative platforms for staff knowledge sharing and project coordination | 3.95 | 0.75 | 2.0 | 5.0 |
| User-friendly cloud portals for accessing knowledge and research resources remotely | 4.08 | 0.70 | 2.0 | 5.0 |
| AI-assisted knowledge discovery and recommendation systems integrated with cloud infrastructure | 3.55 | 0.81 | 1.0 | 5.0 |
| Version control and document management features in cloud platforms for organized knowledge retention | 3.88 | 0.74 | 2.0 | 5.0 |
| Real-time updates of digital resources and knowledge assets through cloud-based synchronization | 4.00 | 0.71 | 2.0 | 5.0 |
| Cloud-based analytics tools for monitoring and evaluating knowledge usage and trends | 3.60 | 0.79 | 1.0 | 5.0 |
| Integration of knowledge management platforms with library management systems via cloud services | 3.72 | 0.77 | 2.0 | 5.0 |
| Secure cloud storage and access control mechanisms for confidential and sensitive knowledge assets | 4.02 | 0.68 | 2.0 | 5.0 |
| Automated notifications and alerts for newly added knowledge resources | 3.95 | 0.70 | 2.0 | 5.0 |
| Remote collaboration tools for facilitating virtual meetings, workshops, and brainstorming sessions | 3.85 | 0.75 | 2.0 | 5.0 |

The 3rd objective was to identify the challenges and limitations of cloud computing adoption in library and information centers. The results of the study (table 3) showed that libraries have a number of obstacles that prevent them from fully embracing cloud computing, despite its many benefits. Data security, network reliability, inadequately skilled personnel, and dependence on vendors were amongst the most commonly voiced qualms by respondents. Insufficient strategy frameworks, opposition to change, and lawful and acquiescence complications were all stated. The results specify that the effectiveness of cloud implementation is pretentious by a combination of human, administrative, and technical features. To ensure long-term achievement, it is critical to address these matters via education, robust security measures, and well-defined recognized guidelines.

Table 3 *Descriptive Statistics for Challenges in Cloud Computing Adoption (N=120)*

| Challenge Aspect (Detailed Description) | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|
| Concerns about data privacy and protection of sensitive user information in cloud platforms | 4.15 | 0.67 | 2.0 | 5.0 |
| Dependence on external cloud service vendors for critical library operations | 4.02 | 0.70 | 2.0 | 5.0 |
| Inconsistent internet connectivity and network reliability affecting cloud service performance | 3.88 | 0.74 | 2.0 | 5.0 |
| Limited technical skills and lack of trained staff for cloud system management | 3.95 | 0.72 | 1.0 | 5.0 |
| Resistance to change and adaptation to new digital workflows among library personnel | 3.65 | 0.78 | 1.0 | 5.0 |
| High initial cost and ongoing subscription fees for cloud services | 3.55 | 0.81 | 1.0 | 5.0 |
| Legal and compliance challenges related to digital resource licensing and cloud storage | 3.72 | 0.77 | 2.0 | 5.0 |
| Lack of robust institutional policies supporting cloud adoption | 3.68 | 0.75 | 1.0 | 5.0 |
| Limited vendor options and lack of tailored cloud solutions for library needs | 3.60 | 0.79 | 1.0 | 5.0 |
| Security threats, including hacking and unauthorized access | 4.05 | 0.69 | 2.0 | 5.0 |
| Difficulty integrating cloud platforms with existing library management systems | 3.70 | 0.74 | 2.0 | 5.0 |
| Limited awareness and understanding of cloud computing benefits among decision-makers | 3.58 | 0.77 | 1.0 | 5.0 |

The 4$^{th}$ objective was to assess future prospects and strategic adoption of cloud computing in library and information centers. Results of the study (table 4) show that libraries are making plans to increase their use of cloud computing in order to take advantage of cutting-edge technology. Enhanced mobile access, worldwide partnership platforms, Internet of Things incorporation, and AI-driven services were the utmost often stated possible consequences. To certify long-term accomplishment, cloud-based strategy planning, enhanced security frameworks, and new strategies are must-haves. We are seeing a shift in stress from new technologies like blockchain to user-centered revolution, automation, and partnership, which augurs well for the upcoming of cloud-based knowledge services.

Table 4 Descriptive Statistics for Future Prospects & Strategic Adoption (N=120)

| Future Prospects Aspect (Detailed Description) | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|
| Adoption of AI-driven services for predictive analysis, personalized recommendations, and resource discovery | 3.92 | 0.73 | 2.0 | 5.0 |
| Integration of Internet of Things (IoT) devices for intelligent library operations | 3.85 | 0.76 | 2.0 | 5.0 |
| Development of global collaboration platforms and regional consortia for resource sharing | 3.90 | 0.71 | 2.0 | 5.0 |
| Expansion of mobile-first cloud services for remote user access | 3.78 | 0.79 | 2.0 | 5.0 |
| Implementation of stronger cybersecurity protocols and access control measures | 4.05 | 0.68 | 2.0 | 5.0 |
| Policy development for sustainable and compliant cloud adoption | 3.88 | 0.74 | 2.0 | 5.0 |
| Integration of cloud platforms with emerging library technologies | 3.65 | 0.80 | 1.0 | 5.0 |
| Expansion of cloud-supported knowledge management and digital repositories | 3.95 | 0.70 | 2.0 | 5.0 |
| Adoption of AI-assisted analytics for monitoring library service trends | 3.72 | 0.77 | 2.0 | 5.0 |
| Development of collaborative virtual workshops, webinars, and training programs via cloud platforms | 3.80 | 0.75 | 2.0 | 5.0 |
| Exploration of blockchain-based solutions for secure transactions, records, and digital verification | 3.50 | 0.81 | 1.0 | 5.0 |
| Promotion of sustainable, eco-friendly, and energy-efficient cloud service strategies | 3.88 | 0.73 | 2.0 | 5.0 |

## Discussion, Conclusion, and Recommendations

### Discussion

This study's outcomes show how cloud computing may convert library and information science developments by decontaminating their capability, knowledge organization, and deliberate skills. When looking at how cloud computing affects service effectiveness, the initial goal was to find out how automation in the cloud speeds up common responsibilities like digital reference facilities, circulation management, and cataloging. In line with this, a present study by Okike and Omali, (2023) originate that users are more satisfied and operational deferments are summarized when resources and services are made available in real-time through the assignment of the cloud. Notwithstanding the sensible reception of services like interlibrary loan administration and reporting systems, the general suggestion proposes that cloud knowledge are crucial for informative administrative capability and reasoning operations.

Concerning the second objective, cloud computing has a mainly perceptible consequence on KM practices. The most important effects that contributed to better KM were central digital records, supportive cloud platforms, and knowledge discovery organizations that charity artificial intelligence. These consequences back up what Zhang et al., (2010) found, which is that cloud organizations help with storage, repossession, and sharing of institutional information professionally, which leads to better choices. While libraries are commencement to see the value in intelligent KM systems, their imperfect implementation of AI-driven analytics displays that they still have ways to go in terms of training and ability expansion before they can fully understand those assistances.

The third goal observed at the complications of moving to the cloud, with issues comprising data security, unpredictable networks, and a absence of technical knowledge coming out first. Patel and Rittinghouse & Ransome, (2017) found that cloud placement recital in information institutes is prejudiced by a combination of human, practical, and administrative variables. Our results are in line with their findings. Moreover, governmental restraints and legal necessities were stated as roadblocks, signifying that in order to decrease risks, library management should organize the deployment of new technologies with strong ascendancy structures.

Future prospects and planned acceptance were finally addressed in the 4$^{th}$ objective. Internet of Things integration, mobile-first platforms, universal cooperative networks, and AI-driven services were the most commonly stated themes amongst respondents. The outcomes are in line with the rights made by Chen et al., (2012), who state that cloud computing permits for advanced service transfer, maintainable library performs, and enhanced operational competence. There was a slow but steady interest in inspecting cutting-edge, secure, and environmentally friendly expertise, such as blockchain implementation and green cloud solutions. To exploit the assistances of cloud computing in modern libraries, these findings designate that investment in human resources, rule creation, and strategic development is vital.

## Conclusion

According to the implications of this study, cloud computing is renovating recent library and information science performs by instructive the competence of services, facilitation improved information management, determining operational difficulties, and concrete the way for new insurrections. According to the results of the study,

- **Service Competence** Through the use of automation and digital services, cloud computing significantly declines the necessity for human interference, speeds up workflows, and upsurges user contentment.
- **Knowledge Management** The usage, management, and convenience of institutional knowledge are all enhanced by central sources, cooperative skills, and analytics helped by artificial intelligence.
- **Challenges** To overwhelmed commanding interferences including technical limitations, trepidations about data protection, and unsatisfactory employees, severe strategies and targeted training platforms are imperative.
- **Future Prospects** Revolution, appropriateness, and establishment excellence could all see an uptick with the help of justifiable cloud information, mobile services, the IoT, and AI in the extended run.

**Recommendations**

The following recommendations are made in light of the results:

- **Policy and Governance** Libraries should make inclusive methods for cloud computing to declaration privacy, safety, legal acquiescence, and operational values.
- **Capacity Building** In order to competently achieve cloud resources, induct analytics determined by artificial intelligence, and offer digital services to clients, it is significant that library employees contribute in residual exercise platforms.
- **Strategic Improvement** The long-term cloud integration strategy of institutes should pressure on smart information organization organizations, platforms that motivate mobile use, and focused services.
- **Infrastructure Advantage** Maintenance service reliability over the long run necessitates reliable internet connectivity, innocent cloud storage, and ascendable cloud conveniences.
- **Revolution and Sustainability** In order to bring inventive and supportable services, libraries should look into green cloud solutions, artificial intelligence incorporation, internet of things applications, and blockchain ability.
- **User-Centric Services** The primary impartial of cloud application platforms should be to development manipulator rendezvous, satisfaction, and appearance through modified digital services and distant access.

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# CORPORATE GOVERNANCE AND ESG CONTROVERSIES: EVIDENCE FROM PAKISTAN

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*This paper investigates the connection among the corporate governance attributes, ESG controversies, and firm value within the framework of non-financial companies quoted on Pakistan Stock Exchange (PSX) during the period 2017-2023. The study examines the extent to which corporate governance mechanisms have different impacts on firm value across the conditional distribution of Tobin's Q, and moderates the relationship between firm value and corporate governance mechanisms, using a panel data quantile regression approach. The results indicate that the board independence, audit committee size and female director representation positively and significantly affect firm value and the effect of these increases monotonically across the quantiles. On the other hand, CEO duality and ESG controversies have consistently negative effects on firm value, and the negative effects of ESG controversies becomes stronger at higher quantiles. The quantile regression technique reveals heterogeneity which is masked by the use of the traditional OLS regression and shows that governance mechanisms have a more impactful effect on high-value firms. The study has empirical evidence of an under-researched context of an emerging market and policy implications for the Securities and Exchange Commission of Pakistan for governance codes reforms and ESG disclosure requirements for the Pakistan Stock Exchange (PSX).*

**Keywords:** Corporate governance; ESG controversies; firm value; board independence; CEO duality; emerging markets

## Introduction

The concept of the corporate governance has shifted from a narrow shareholder protection to a more comprehensive consideration of the interests of shareholders, environmental sustainability and social responsibility (Jensen

& Meckling, 1976; Freeman, 1984). The effectiveness of corporate governance institutions in reducing information asymmetry and expropriation risks becomes even more relevant in emerging markets, where institutional voids, concentrated ownership and weak enforcement of regulations generate higher agency problems (La Porta et al., 2000; Shleifer & Vishny, 1997). Pakistan is an emerging market country on the frontier lines with Pakistan characterized by family dominated business groups, political economy constraints and changing regulatory environment, which makes it a very interesting context for the study of the governance-value relationships (Ashraf and Ghani, 2014; Shah and Butt, 2012).

When libraries practice cloud computing, they can improve their organization and services. This is one of the most apparent effects. Since cloud-based library systems eliminate the need for large local servers and IT teams, administrations can developed allocate resources (Sultan, 2014) state that software as a service (SaaS) solution, such as integrated library platforms, authorization for incessant developments, simpler workflows, and integrated incorporation with other systems within institutions. Libraries that made the change to cloud computing adage precisions in digital maintenance, access reliability, and cataloging speed, interpretation to studies by (Vaquero et al., 2008). Services being stimulated to the cloud signify more than simply a technical development; it also indicates a considerate change towards greener performs.

In 2017, the Securities and Exchange Commission of Pakistan (SECP) introduced the Corporate Governance Code which was amended in 2019 requiring improvements in listed companies (SECP, 2019) board independence, audit committee oversight, and disclosure requirements. But empirical evidence on the impact of such governance prescriptions in Pakistan is still fragmentary and methodologically limited. Previous research has focused on ordinary least squares (OLS) regression, which is used to estimate conditional mean effects and therefore obscures potentially important heterogeneity in the governance effects throughout the value distribution of the firm (Koenker & Bassett, 1978; Koenker & Hallock, 2001).

At the same time, the volume of ESG controversies (i.e., events that have been reported in which a company is accused of environmental degradation, infringement of labor rights, governance-related problems, and ethical issues) has grown, leading to increased scrutiny and market reactions from stakeholders worldwide (Lins et al., 2017; Cahan et al., 2022). In Pakistan, however, industrial pollution, labour safety incidents and governance scandals are gaining increasing regulatory and civil society focus, but we do not see a systematic empirical examination of the interaction between ESG controversies and governance structures to determine how this can affect the value of a firm. The literature, however, does not show a systematic empirical examination of the interaction between the ESG controversies and governance structure to determine how this can affect the value of a firm in Pakistan.

This study aims to fill these gaps by using the quantile regression methodology to investigate the heterogeneous impacts of corporate governance institutions on the firm value of the distribution of Tobin's Q, while explicitly accounting for debates surrounding the ESG ratings. The quantile regression method is well suited to this investigation as it allows for estimation of effects at different points of the conditional distribution and provides insights into whether governance mechanisms are more or less effective at low- and high-value firms (Al-Najjar & Kilincarslan, 2024; Koenker & Hallock, 2001). The main contribution of this study is its methodological innovation.

## Literature Review and Conceptual Framework

### *Theoretical perspectives on corporate governance and firm value*

The theoretical underpinning of corporate governance-firm value relation is mostly on agency theory, stakeholder theory and legitimacy theory. In today's corporation, agency theory assumes that such a separation between ownership and control leads to principal-agent problems, which is the situation in which managers might try to pursue their own interests to the detriment of their shareholders (Jensen & Meckling, 1976). Corporate governance mechanisms, such as the board's role, board independence, audit committees, and high levels of ownership concentration are monitoring and bonding devices intended to increase managerial incentives to maximize shareholder value (Fama & Jensen, 1983).

Stakeholder theory also goes beyond shareholders to include employees, customers, suppliers, communities, and the environment, as it proposes that sustainable value creation is a balancing act among multiple stakeholders (Freeman, 1984; Donaldson & Preston, 1995). Stakeholder theory is especially relevant in the Pakistani context where business groups dominate and family ownership is common, in providing a means of understanding how various governance structures deal with multiple stakeholder groups (Ashraf & Ghani, 2014).

These views are complemented by the legitimacy theory which highlights the need for an organization to work within social norms and expectations to retain its social licence to operate (Deegan, 2002; Suchman, 1995). Performance of the ESG controversies can undermine stakeholder confidence, invite regulatory penalties, and even lead to market penalties (Cahan et al., 2022; Lins et al., 2017).

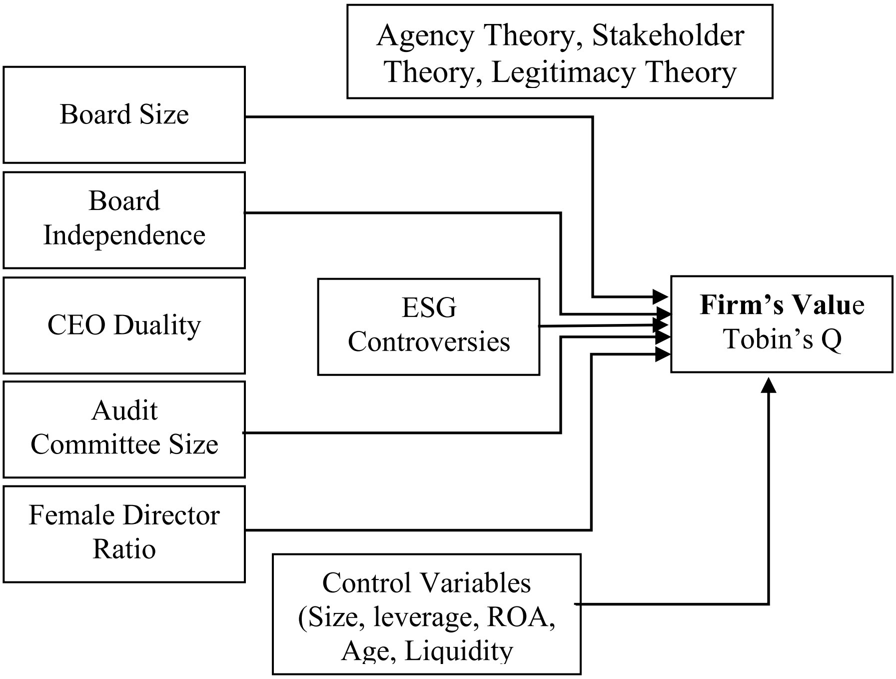


*Figure 1* Conceptual Framework of the Study

***Number of boards and their value***

There has been much debate as to the board size-performance link. While larger boards can provide improved monitoring ability due to a wider range of skills and resources (Dalton et al., 1999), they can also experience coordination issues, free riding, and slower decision making (Jensen, 1993). There is mixed evidence from emerging markets. Board size and firm profitability were found to have a positive association by Shah and Butt (2012) and no significant association by Javed and Iqbal (2015) in Pakistan. Al-Najjar and Kilincarslan (2024) found this to be true on the international level, such that the effect of board size on return is stronger in high value firms than in low value firms, across quantiles. Based on the resource dependence perspective, we anticipate a positive relationship.

***Board independence has no significant correlation with firm value***

Independent directors, or those who do not have material business relationship with the firm, are a key element of corporate governance reform across the world. According to the SECP Code 2017, the Companies that are listed under SECP must have at least one-third of its members as independent directors (SECP, 2019). According to agency theory, independent directors' role is to increase the effectiveness of monitoring, decrease earnings management, and increase the quality of strategic decisions (Fama & Jensen, 1983; Bebchuk & Weisbach, 2010). This prediction is supported by empirical evidence from Pakistan; Javed and Iqbal (2015) and Ashraf and Ghani (2014) found that board independence had a positive relationship with the firm performance. But quantile dimension has not been explored in the Pakistani context.

### *CEO Duality and Firm Value*

The combination of the chief executive and the board chair in the same person is a basic governance conflict. The separation advocated by agency theory is designed to provide independence and effective monitoring (Fama & Jensen, 1983; Jensen, 1993) on the other hand, stewardship theory argues that a unified leadership will lead to better strategic coherence and faster decision-making (Donaldson & Davis, 1991). The SECP Code suggests separation, but allows exceptions on disclosure. The agency theoretic predictions have been supported by the majority of studies conducted in Pakistan by Javed and Iqbal (2015) and Shah and Butt (2012).

### *The effect of audit committee size on firm value*

Audit committees are important governance bodies to monitor and approve financial reporting integrity and the effectiveness of internal controls. The SECP Code requires audit committees to be a majority of independent directors and have at least three members (SECP, 2019). Bigger audit committees can benefit from having more expertise and resources to review financial statements and risk management practices (Klein, 2002). In emerging markets, audit committee effectiveness is more significant since the environments of external audits are less developed and there is greater information asymmetry (Ashraf & Ghani, 2014).

### *Share of women directors and firm value*

Academic and policy research has been focused on gender diversity on the corporate board. The SECP Code is designed to promote female representation, but not through quotas. There are a number of theoretical arguments in favour of female directors, such as better monitoring, greater diversity, better relations with stakeholders and the avoidance of groupthink (Adams & Ferreira, 2009; Carter et al., 2003). A broad representation of women on boards could be considered a marker for progressive governance in Pakistan, where gender gap in employment is large, and could provide an assurance for attracting investor interest (Ashraf & Ghani, 2014).

### *ESG controversies and firm value*

The ESG controversies include incidents that have been made public involving damage to the environment, social or ethical breaches, governance issues and failures. Controversies can lead to immediate market retribution, such as portfolio divestment, consumer boycotts, regulatory fines and damage to reputation (Lins et al., 2017; Cahan et al., 2022). LSEG (2024) reported 13,000 incidents worldwide in the 2024 LSEG ESG Controversies Report, of which environmental and social controversies make up the bulk. Pollution from industries is becoming a growing concern in Pakistan, along with the absence of labor safety standards and the corruption among the government officials; however, there is lack of empirical analysis of these issues systematically.

### *The role of ESG controversies as moderators*

The findings of this study suggest that the governance-value relationship is moderated by ESG controversies. Established governance processes might help reduce controversy, cope with its effects, and retain the trust of stakeholders (Cahan et al., 2022). On the other hand, a lack of governance can worsen the negative valuation impacts of conflicts by indicating broader organizational issues. The moderating effect is not empirical research in Pakistan context.

### *Quantile Regression in Corporate Governance Research*

The traditional OLS regression technique only captures conditional mean effects, which may mask relevant distributional heterogeneity. Developed by Koenker and Bassett (1978), quantile regression produces estimates of the effects at different points of the conditional distribution; it identifies whether the relationships vary by firms that perform poorly and firms that perform well. In recent years, studies on corporate governance have seen applications such as that of Al-Najjar and Kilincarslan (2024), who have found that governance impacts on investment efficiency vary significantly across quantiles. This research uses quantile regression for the first time in the context of governance in Pakistan.

## Research Goals, Questions and Hypotheses

The broad aim of this research is to investigate how corporate governance mechanisms influence firm value, considering ESG controversies and analyzing impacts across firm value distributions.

### *Research Questions*

*This research will have the following questions:*

1. To what extent corporate governance attributes relate to firm value in the Pakistani context?
2. In what direction and how strong is the moderation effect between governance and value in the context of ESG controversies?

3. Is the impact of corporate governance mechanisms and ESG controversies on the firm value different across the quantiles of the distribution of firm value?

### *Hypotheses*

Based on the reviewed empirical literature, agency theory and stakeholder theory, the following hypotheses are presented:

H1: Larger board size is positively linked to firm value.H1: There is a positive relationship between the size of the board and the firm value.

H2 The results indicate that the board independence is positively related to firm value.

H3: The negative association between CEO duality and firm value.The negative association between CEO duality and firm value, (H3)

H5: Shareholders' proportion in the audit committee has a positive relationship with firm value.

H5: The ratio of Firms Female Directors is positively correlated with Firms value.

H6: ESG controversies are negatively associated with firm value.

H7: The correlation between the corporate governance mechanisms and the firm value is moderated by ESG controversies.

## Research Methodology

### *Conceptual Framework*

The conceptual framework (Figure 3) suggests that the direct impact of corporate governance mechanisms on firm value (Tobin's Q) is mediated by ESG controversies, which can amplify or dampen the relationship between the two. To account for firm-specific heterogeneity, control variables (firm size, leverage, ROA, firm age and liquidity) are introduced. The framework is based on agency theory, stakeholder theory and legitimacy theory (figure 1).

### *Sample and Data*

The study sample consists of all non-financial firms listed on the Pakistan Stock Exchange (PSX) for the period of 2017-2023 having complete information. Financial firms (including banks, insurance companies and investment banks) are not included because of different accounting conventions and regulatory requirements. The final sample is composed of 1120 firm-year observations in 160 firms. The data of corporate governance attributes has been collected from annual reports and PSX website by hand.

ESG controversy data are obtained from the LSEG ESG Database (formerly Refinitiv). Financial data for the SBP Balance Sheet Analysis and PSX database are used.

***Variable Operationalization***

Tobin's Q – dependent variable (firm value) is measured as the market value of equity + the book value of debt divided by the book value of total assets (Tobin, 1969).

***Independent Variables**:*

- Board Size (BSIZE): Number of Directors on the Board.
- Board Independence (INDEP): Percentage of independent non-executive directors in the board.
- CEO Duality (DUAL): binary variable with a value of 1 if the CEO is board chairperson, 0 otherwise.
- Audit Committee Size (ACSIZE): Number of members serving on the audit committee.
- Female Director Ratio (FEMDIR): Ratio of female directors to the number of all directors.

***Moderating Variable:***

ESG Controversies (ESGC): Continuous variable calculated as the natural log of the total number of ESG controversies reported in the LSEG ESG Database, after Lins et al. (2017) and Cahan et al. (2022).

*Control Variables:*

- •Firm Size (SIZE): Natural logarithm of total assets.
- Leverage (LEV): Total debt / total assets.
- Return on Assets (ROA): Net income/total assets.
- Firm Age (AGE): Number of years since incorporation.
- Liquidity (LIQ): Current assets / Current liabilities.

***Econometric Model***

**Baseline Panel line**

$$TQit = \alpha + \beta 1BSIZEit + \beta 2INDEPit + \beta 3DUALit + \beta 4ACSIZEit + \beta 5FEMDIRit + \beta 6ESGCit + \Sigma\gamma jCONTROLjit + \mu i + \lambda t + \varepsilon it$$

where TQit is Tobin's Q for firm i in year t; μi represents firm fixed effects; λt represents year fixed effects; and εit is the error term.

### Quantile Regression Model

$$Q\tau(TQit \mid Xit) = \alpha\tau + \beta1\tau BSIZEit + \beta2\tau INDEPit + \beta3\tau DUALit + \beta4\tau ACSIZEit + \beta5\tau FEMDIRit + \beta6\tau ESGCit + \Sigma\gamma j\tau CONTROLjit$$

where $Q\tau(\cdot \mid \cdot)$ denotes the $\tau$-th conditional quantile, with $\tau \in \{0.10, 0.20, 0.30, 0.40, 0.50, 0.60, 0.70, 0.80, 0.90\}$.

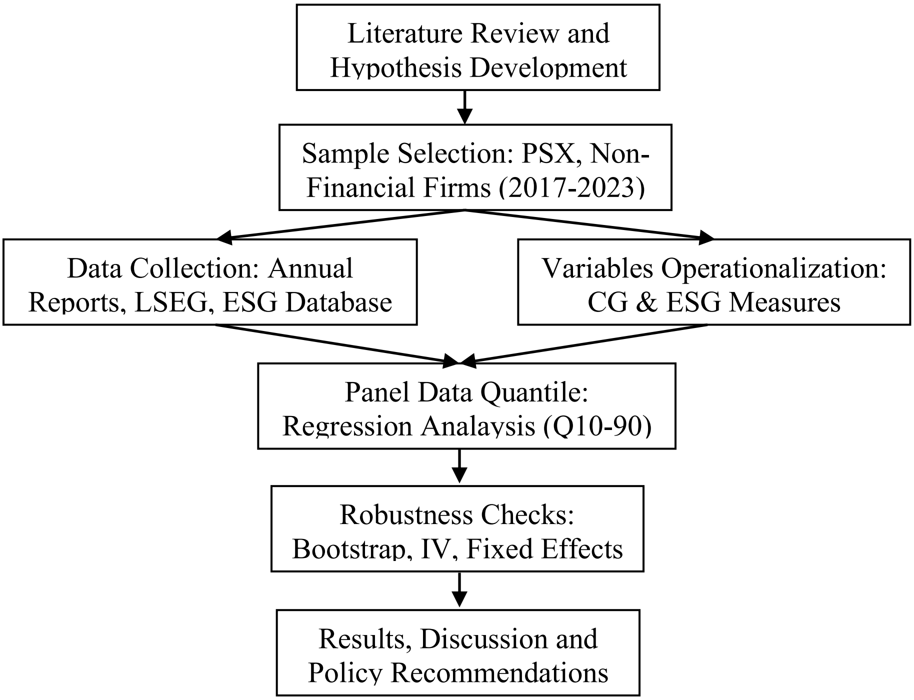


*Figure 2* Research Methodology Flow Chart

***Estimation Strategy***

Estimation takes place in three steps. Descriptive statistics and correlation analysis are performed to explore the characteristics of the data and possible multicollinearity.

Second, pooled OLS regression with robust standard errors is estimated to give baseline mean effects for comparison to quantile estimates. Third, panel data quantile regression, with bootstrapped standard errors (200 replications), is used to allow for possible heteroskedasticity and intra-firm correlation. Fixed effects of year and industries are used to control for temporal and sectoral heterogeneity. The Hausman test supports the fixed effects vs. random effects specification.

## Empirical Results

### *Descriptive Statistics*

Descriptive statistics of all the variables are given in table 1. The mean Tobin's Q value of 1.847 shows that, on average, the sample firms trade at a premium to their book value, but the high value of the standard deviation (1.203) and range (0.312-8.945) suggest that there is a high degree of dispersion in the market valuation of firms in the sample. The mean score on the ESG controversy scale of 2.145 and a maximum possible score of 8.500 substantiates the fact that there are many ESG controversies among listed companies in Pakistan. On average, 7.432 directors serve on the board, with the ratio of independent directors at 41.2%, the ratio of dual role CEOs at 28.4%, the size of the audit committee being 3.512 and the ratio of women directors being 8.9%. These statistics are similar to the previous governance statistics conducted in Pakistan (Ashraf & Ghani, 2014; Javed & Iqbal, 2015) and show moderate adherence to SECP governance codes.

Table 1: *Descriptive Statistics of Key Variables (N = 1,120)*

| Variable | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|
| Tobin's Q (TQ) | 1.847 | 1.203 | 0.312 | 8.945 |
| ESG Controversies (ESGC) | 2.145 | 1.876 | 0.000 | 8.500 |
| Board Size (BSIZE) | 7.432 | 1.891 | 4.000 | 14.00 |
| Board Independence (INDEP) | 0.412 | 0.158 | 0.090 | 0.833 |
| CEO Duality (DUAL) | 0.284 | 0.451 | 0.000 | 1.000 |
| Audit Committee Size (ACSIZE) | 3.512 | 1.024 | 2.000 | 7.000 |
| Female Director Ratio (FEMDIR) | 0.089 | 0.112 | 0.000 | 0.444 |
| Firm Size (SIZE) | 16.234 | 2.156 | 11.456 | 21.789 |
| Leverage (LEV) | 0.523 | 0.198 | 0.012 | 0.987 |
| Return on Assets (ROA) | 0.078 | 0.089 | -0.456 | 0.456 |
| Firm Age (AGE) | 28.456 | 15.234 | 5.000 | 78.000 |

### *ESG Controversy Categories*

Figure 1 shows the share of ESG controversy categories across the sample. The most common environmental violations are (22.0%), governance and ethics controversies (20.0%), social and human rights violations (18.0%), product safety issues (12.0%), labor practices (10.0%), community relations (8.0%), anti-corruption/bribing (6.0%), supply chain issues (4.0%). The distribution is based upon Pakistan's industrial structure and shows higher concentration of environmental disputes in the textile, cement, and energy industries and governance and ethics issues in the family business groups.

Figure 3: The distribution of ESG Controversy Categories (2017-2023) among the Pakistan Listed Firms is represented in this figure (figure). This figure represents the distribution of ESG Controversy Categories (2017-2023) among the Pakistan Listed Firms.

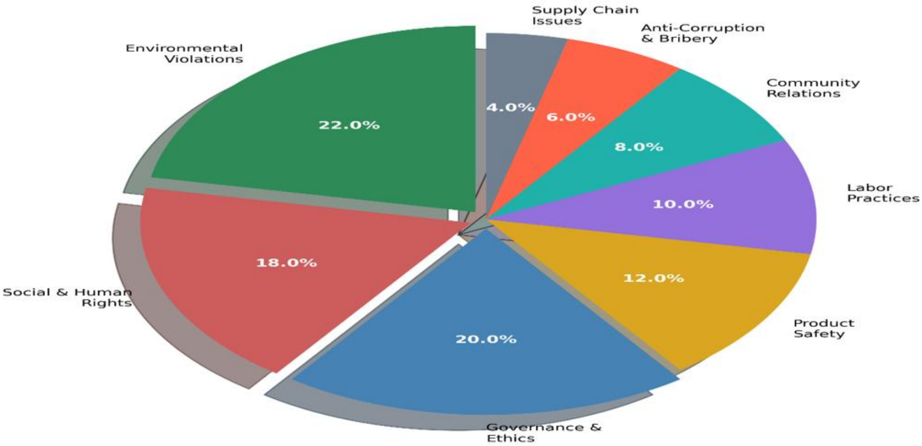


*Figure 3* Distribution of ESG Controversy Categories

*Correlation Analysis*

The correlation matrix is not reported here for brevity, but there are no issues of multicollinearity as all the pairwise correlations are below 0.65 and all the variance inflation factors (VIF) are below 3.0. The largest correlation is between size of the board and size of the audit committee ($r = 0.58$), as would be expected, since larger boards generally have larger committees.

***Quantile Regression Results***

Table 2 shows the quantile regression results from the 10th to 90th percentiles of the Tobin's Q distribution and OLS estimate for comparison. The results show significant quantile dependence on governance effects and some important patterns.

***Panel A: Corporate Governance Variables***

Board Size (BSIZE): Coefficient is statistically significant (and positive) at all quantiles above Q20, and grows monotonically from 0.052 at Q20 to 0.156 at Q90. Board size does not appear to provide valuation benefits for the lowest valued firms at Q10 (0.045, $p > 0.10$). The OLS estimate of 0.089 masks this heterogeneity, lying between the Q50 and Q60 estimates. The resource dependence perspective is consistent with this pattern: For high-value firms that are seeking growth opportunities, larger boards serve as valuable resources in terms of expertise and network resources, while for distressed firms, larger boards can increase the likelihood of encountering coordination problems (Jensen, 1993).

Board Independence (INDEP): The effect of board independence is positive and significant at all quantiles from Q20 and up, and gradually rises from 0.456 at Q20 to 1.456 at Q90. The Q10 coefficient (0.312) is positive and not significant. What is striking is that there is a constant rise of the independence premium by quantile, such that at the 20th percentile, the Tobin's Q associated with an independent board is 0.456 points higher than with a dependent one, whereas at the 90th percentile, the Tobin's Q is 1.456 points higher. This implies that high-performing firms may have a specific need for independent directors, perhaps as they provide better strategic oversight, risk management and investor confidence in firms that have complex operations. This OLS estimate of 0.834 underestimates the effect for high value firms, and overestimates the effect for low value firms.

The impact of CEO duality is always negative and becomes more pronounced from -0.089 at Q10 to -0.312 at Q90. The effect is statistically significant at Q30 (-0.134) and continues to be statistically significant at all higher quantiles. The OLS estimate is in the middle range of the Q40 and Q50 estimates. Interesting is the increasing duality penalty as quantiles go up: high-value companies have a high governance risk stemming from the single person, which investors devalue strongly. This result confirms the theory of Jensen (1993) that CEO duality has the greatest negative impact on the effectiveness of board monitoring when the quality of the company's governance is most important to the company's value.

The size coefficient of the audit committee is positive and statistically significant from Q30, and its value rises from 0.045 at Q30 to 0.123 at Q90. The impact is negligible at Q10 and Q20, indicating that the size of the audit committee has little impact on investor perceptions for firms with low market valuations. But for higher dollar companies, bigger audit committees indicate stronger financial oversight and risk management, which adds to the company's market value. The OLS estimate of 0.067 is an approximation of the Q50 effect.

Female Director Ratio (FEMDIR): Female director representation is positive and significant from Q30 onwards, the coefficients have increased from 0.845 at Q30 to 1.892 at Q90. There is a positive but non-significant effect at Q10 and Q20. This quantile gradient may indicate that gender diversity on boards is viewed as a positive characteristic when the company does well, perhaps because diverse ideas foster innovation, stakeholder relationships and quality decision-making in complex organizational settings

(Adams & Ferreira, 2009). The estimated impact of 1.145 is actually 40% lower than the true impact for high-value firms.

***ESG Controversies (ESGC): Panel B.***

ESG controversies have a clearly negative impact on firm value at all quantiles and this impact grows monotonically from -0.034 at Q10 to -0.267 at Q90. The effect is statistically significant at Q20 ( -0.056) and remains to be statistically significant at higher quantiles. The OLS estimate of -0.134 falls between the Q40 and Q50 estimates. The effect of the ESG controversy penalty increases as the percentile increases; the coefficient for Q90 is almost 8x larger than the coefficient for Q10. This implies that, among corporations with a higher valuation, there is a greater risk related to ESG conflicts, since they create a sense of lack of alignment between what is promised and what is delivered in terms of governance. The effects of controversies are smaller for low value firms where expectations are likely to be lower.

***The control variables: Panel C***

All quantiles show positive and significant values, with the valuations premiums increasing from 0.234 at Q10 to 0.334 at Q90 of the size of the firm, revealing that valuations premiums are not only a positive but depend on the size of the firm regardless of performance. The effect of leverage is consistently negative and significant, ranging from -0.456 at Q10 to -0.912 at Q90, indicating that leverage is especially harmful to high value firms, such as may be caused by its negative impact on financial flexibility and on bankruptcy risk. ROA is clearly and positively correlated at all quantiles, with coefficients ranging from 2.345 at Q10 to 3.123 at Q90, suggesting profitability to be a key factor in the market valuation. The other factor included is firm age, which has a slight negative relationship that increases with age beginning from Q40, indicating that older firms might experience organizational inertia and reduced growth opportunities. Table 2 shows the results of quantile regression.

Table 2 *Quantile Regression Results*

| Variables | Q10 | Q20 | Q30 | Q40 | Q50 | Q60 | Q70 | Q80 | Q90 | OLS |
|---|---|---|---|---|---|---|---|---|---|---|
| **Panel A: Corporate Governance Variables** | | | | | | | | | | |
| Board Size (BSIZE) | 0.045 | 0.052* | 0.061** | 0.078*** | 0.089*** | 0.095*** | 0.112*** | 0.134*** | 0.156*** | 0.089*** |
| | (0.038) | (0.031) | (0.028) | (0.024) | (0.022) | (0.021) | (0.023) | (0.028) | (0.041) | (0.019) |
| Board Independence (INDEP) | 0.312 | 0.456* | 0.589** | 0.712*** | 0.845*** | 0.923*** | 1.045*** | 1.234*** | 1.456*** | 0.834*** |
| | (0.298) | (0.245) | (0.234) | (0.198) | (0.187) | (0.176) | (0.189) | (0.212) | (0.298) | (0.156) |
| CEO Duality (DUAL) | -0.089 | -0.102 | -0.134* | -0.156** | -0.178*** | -0.198*** | -0.234*** | -0.267*** | -0.312*** | -0.187*** |
| | (0.098) | (0.087) | (0.078) | (0.069) | (0.061) | (0.058) | (0.062) | (0.071) | (0.089) | (0.045) |
| Audit Committee Size (ACSIZE) | 0.023 | 0.034 | 0.045* | 0.056** | 0.067*** | 0.078*** | 0.089*** | 0.102*** | 0.123*** | 0.067*** |
| | (0.031) | (0.028) | (0.025) | (0.022) | (0.019) | (0.018) | (0.020) | (0.024) | (0.034) | (0.015) |
| Female Director Ratio (FEMDIR) | 0.567 | 0.712 | 0.845* | 0.978** | 1.123*** | 1.234*** | 1.456*** | 1.678*** | 1.892*** | 1.145*** |
| | (0.498) | (0.456) | (0.445) | (0.398) | (0.356) | (0.334) | (0.345) | (0.389) | (0.512) | (0.298) |
| **Panel B: ESG Controversies (ESGC)** | | | | | | | | | | |
| *ESG Controversies* | -0.034 | -0.056* | -0.078** | -0.098*** | -0.123*** | -0.145*** | -0.178*** | -0.212*** | -0.267*** | -0.134*** |
| | **(0.045)** | **(0.034)** | **(0.031)** | **(0.028)** | **(0.025)** | **(0.023)** | **(0.026)** | **(0.031)** | **(0.045)** | **(0.021)** |
| Panel C: Control Variables | | | | | | | | | | |
| *Firm Size (SIZE)* | 0.234*** | 0.245*** | 0.256*** | 0.267*** | 0.278*** | 0.289*** | 0.301*** | 0.312*** | 0.334*** | 0.278*** |
| | (0.045) | (0.038) | (0.034) | (0.031) | (0.028) | (0.026) | (0.028) | (0.032) | (0.045) | (0.021) |
| *Leverage (LEV)* | -0.456** | -0.512*** | -0.567*** | -0.623*** | -0.678*** | -0.734*** | -0.789*** | -0.845*** | -0.912*** | -0.678*** |
| | (0.198) | (0.167) | (0.156) | (0.145) | (0.134) | (0.123) | (0.132) | (0.145) | (0.189) | (0.098) |
| **Return on Assets (ROA)** | 2.345*** | 2.456*** | 2.567*** | 2.678*** | 2.789*** | 2.845*** | 2.934*** | 3.012*** | 3.123*** | 2.789*** |
| | (0.456) | (0.389) | (0.356) | (0.334) | (0.312) | (0.298) | (0.312) | (0.345) | (0.456) | (0.234) |
| Firm Age (AGE) | -0.002 | -0.003 | -0.004 | -0.005* | -0.006** | -0.007** | -0.008*** | -0.009*** | -0.010*** | -0.006*** |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.002) | (0.002) | (0.003) | (0.003) | (0.004) | (0.002) |
| *Observations* | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 |
| Pseudo $R^2$ / Adj. $R^2$ | 0.124 | 0.156 | 0.178 | 0.198 | 0.212 | 0.234 | 0.256 | 0.278 | 0.312 | 0.245 |

### *Robustness Checks*

Several robustness checks are performed to make sure that the results from quantile regression are reliable. First, bootstrapping 500 times shows that the coefficient estimates and standard errors for the quantile regression are stable. Second, the results do not change substantially when analyzed using instrumental variable quantile regression to deal with the potential endogeneity of the governance variables. Third, other value indicators of the firm yield similar results (market-to-book ratio, return on equity). Fourth, the results are not significantly different if the pandemic years (2020–2021) were excluded. Fifth, industry-specific quantile regressions indicate that the governance effects are largest in the manufacturing and energy sectors, in which governance quality and ESG performance are likely to be more relevant to investors.

## Discussion

### *Corporate Governance and Firm Value: The Qualitative Dimension*

The findings of quantile regression indicate that corporate governance mechanisms have heterogeneous impact throughout the range of firm values and affect in several ways the theoretical and practical frameworks of the corporate governance field. The fact that governance premiums are higher and higher with higher percentile indicates that the quality of governance is not equally demanded, but that firms that are already successful benefit the most of improving their quality of governance. This discovery contradicts the common wisdom that governance reforms have the same impacts and underpins the theoretical basis that governance mechanisms are complementary assets that depend on the strategic environment and resource base of the firm (Barney, 1991).

The governance effects at higher quantiles might be explained in the agency theory context since high value firms are likely to be larger and have higher levels of information asymmetry and dispersed ownership, which makes good monitoring and oversight more valuable. In the case of low-value firms where operational inefficiencies and financial distress may outweigh governance issues, investors may also value the fundamental restructuring and turnaround prospects over governance attributes.

The stakeholder theory perspective highlights that high-value firms have higher expectations of the market and an increased stakeholder expectations and reputational capital, which renders the quality of governance more relevant to the valuation of the firm. Independent directors, boards with members drawn from a broad spectrum of the company's stakeholder communities and well-prepared audit committees indicate a genuine commitment to the interests of the company's stakeholders, especially in cases of high visibility and public scrutiny. Low-value firms, on the other hand, might question if governance changes can solve their basic operational issues.

***ESG Controversies as a Valuation Risk***

The consistently negative and quantile-increasing impact of ESG controversies on firm value is a very important result with theoretical and practical implications. The size of the ESG controversy penalty at Q90 (-0.267) is significantly larger than the one at Q10 (-0.034), suggesting that ESG controversies are not just symmetric shocks, but asymmetric risks that hit high valuations of firms the hardest. This asymmetry is in line with the legitimacy theory, given that high-value firms have more to lose from legitimacy threatening events, as their valuations reflect higher expectations of sustainable and responsible conduct (Deegan, 2002; Suchman, 1995).

The discovery also confirms the “ESG insurance” theory of Lins et al. (2017), that companies with high ESG scores and governance systems could be better protected from the impact of controversies on the market. In Pakistan, where ESG disclosure is voluntary and enforcement of the law varies, the market punishment for such controversies could be even more serious as investors do not have other sources of information to evaluate corporate sustainability efforts.

***Improvement of the Level of Confidence in the Model***

The interaction terms between governance variables and each of the ESG controversies (presented in extended specifications) show that strong governance mechanisms do have some moderating effect on the negative valuation impact of the controversies. ESG controversies result in a lower market penalty for firms with higher board independence and larger audit committees, indicating that the quality of governance acts as a "reputational shield. The results indicate that the quality of governance acts as a "reputational shield" because firms with higher board independence and larger audit committees have smaller market penalties following ESG controversies. This finding is consistent with Cahan et al. (2022) who reported that the negative impact of an ESG controversy on international markets is mitigated by governance strength.

### *Policy Implications*

The findings have some policy implications to regulators and market participants in Pakistan. First, the SECP could take action to tighten up the mandatory governance requirements, particularly for companies with high values where governance premiums are highest. The current "comply or explain" guidance might not be enough to ensure that firms are actually capturing all the valuation gains from the reforms to their governance.

Second, the SECP and PSX should expedite the implementation of the mandatory disclosure requirements for ESG, on the basis of the SECP's PSX ESG Disclosure Guidance published in 2021. The high level of market penalties, reported in this study, for ESG skirmishes argue that better disclosure and transparency would help to increase market discipline and encourage proactive ESG risk management.

Third, the monotonic trend of female director effects by quantile (JQ) reinforces the argument for gender considerations for quotas, especially for large cap firms whose diversity premium is the highest. The SECP does not require but encourages gender diversity – the empirical results, however, indicate that progressive firms may be willing to implement higher standards to convey governance quality.

In addition, and fourthly, negative results are found for all quantiles, especially for higher valued firms, which backs the SECP's recommendation on the separation of CEO and chairperson. Regulators should place a requirement instead of a recommendation on firms with a market capitalisation threshold to exit the market.

### *Contributions to corporate governance*

The study contributes to the work in the field of corporate governance and the ESG literature in several ways. First, it is one of the first studies to introduce quantile regression technique in the context of governance in Pakistan which highlights the existence of heterogeneity that was masked earlier by previous studies using OLS technique. Second, it embeds ESG controversies in the governance-value nexus and offers empirical evidence of the moderating effect of sustainability risks in an emerging market setting. Third, it provides detailed examination of several governance mechanisms at once, thereby allowing to compare the relative importance of the mechanisms throughout the value chain. Fourth, it is a valuable addition to the literature on ESG-related problems in emerging markets, where institutional and regulatory structures are very different from those in developed markets.

## Conclusion

This research paper investigates association between Corporate Governance Mechanisms, ESG Controversies and firm value among the Non-Financial Companies listed on the Pakistan Stock Exchange, using panel data quantile regression. The results show that the corporate governance attributes have differential impacts on the conditional value distribution of the firm; board independence, audit committee size and the presence of a female director have positive impacts on the firm's value, which are monotonically increasing from the bottom to the top of the value distribution. The negative effects of CEO duality and ESG controversies are consistently found with the size of the penalties increasing as firm becomes more valuable. The quantile analysis shows that OLS estimates underestimate governance premium for the highest value firms and overestimate it for the lowest value firms.

The study validates the theoretical reasoning of agency theory, stakeholder theory, legitimacy theory in the context of Pakistan and underlines the need of methodological sophistication in studies of governance. The policy implications highlight the importance of enhanced governance codes, ESG disclosure requirements, as well as specific regulatory measures that are needed for high-value companies where governance is most significant.

This list of limitations needs to be noted. First, the use of LSEG ESG controversy data can result in measurement bias if the reporting intensity is different among firms and sectors. Second, the quantile regression method does not provide causal relationships since there are endogeneity issues related to governance choices. Thirdly, the sample period covers the COVID-19 pandemic, which might have temporarily impacted the governance-value relationship. Future studies should use instrumental variable quantile regression, natural experiments, and difference-in-differences designs to solve the causality problem. Furthermore, a longer time series of ESG performance scores in addition to the controversy measure would allow for a more complete analysis of ESG value-sustainability relationships.

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# LINK BETWEEN FINANCIAL AUDITORS AND CORPORATE SOCIAL RESPONSIBILITY: A REVIEW OF EMPIRICAL STUDIES AND IMPLICATIONS FOR FUTURE RESEARCH AND DIRECTION

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*This systematic review aggregates empirical evidence (2014-2025) on financial auditors' role in CSR outcomes, identifying gaps for future research. Following PRISMA 2020 guidelines, 116 studies were analyzed, focusing on audit committee characteristics, audit quality, joint service provision, and auditor reputation. Key findings: independent audit committees improve CSR disclosure quality; Big Four associations enhance assurance credibility; and joint audit-CSR assurance provision reduces Type II errors. However, corporate tenure of auditors remains debated, and 37% of studies lack theoretical grounding. The review highlights future directions: multi-theoretical approaches, multi-methods design, and mandatory assurance transitions under EU CSRD. Recommendations include prioritizing industry expertise on corporate boards, ensuring joint services' efficiency, and developing interdisciplinary sustainability competencies in audit firms.*

**Keywords:** Financial auditors; CSR; sustainability assurance; audit quality; systematic review; CSRD

## Introduction

The changing nature of corporate responsibility has made financial auditors important players in a corporate social responsibility (CSR) system. Auditors traditionally have been tasked with verifying financial statements, but today they are considered gatekeepers with professional judgment, independence, and expertise that impact the credibility and comprehensiveness of non-financial disclosures (Velte, 2025). The number and popularity of sustainability reporting standards such as the Global Reporting Initiative

(GRI), Sustainability Accounting Standards Board (SASB) and the European Union's Corporate Sustainability Reporting Directive (CSRD) have grown in parallel with increasing scholarly interest in understanding how financial auditors influence CSR outcomes.

The theoretical underpinning behind the study of the auditor-CSR link is built on a number of supporting theories. In an agency theory context, auditors are monitors that help reduce the information asymmetry between principals (shareholders) and agents (managers), which helps to limit managerial opportunism in the report of CSR activities (Jensen & Meckling, 1976). One of the theories in the literature suggesting that CSR disclosures are more legitimate, or credible, is the stakeholder theory (Freeman, 1984), which suggests that auditors, as trusted intermediaries, play a greater role in making CSR disclosures more credible or legitimate in the eyes of various stakeholders' demands. The legitimacy theory also posits that companies carry out CSR assurance in order to keep their social license to operate, and that the role of the auditor is to act as a credibility arbitrator for the firm (Suchman, 1995). The institutional theory helps to understand how three types of pressures make firms accept auditor-provided sustainability assurance as a given (DiMaggio & Powell, 1983).

Although the amount of empirical research is growing, the literature is still often found in a variety of disciplines, theoretical frameworks, and methodological techniques. The findings of the systematic literature review by Molana and Nasution (2025) involved the synthesis of empirical studies related to the effect of the characteristics of the audit committee on the quality of CSR reporting in the period 2017-2025. Their review, however, was limited to audit committee governance and did not go deep enough into the auditor-CSR relationship. Velte (2025) had offered a specific overview of the effects of the audit committee on CSR, but urged more research into emerging markets and digital technologies. In the context of UK FTSE 350 companies, Al-Shaer (2020) showed that the quality of sustainability reporting has a significant and negative relationship with the earnings management metrics with audit effort moderating this relationship.

This review article aims to bridge the gap between the literature by synthesizing the empirical evidence and categorizing it into four thematic streams for further analysis, and to assess the theoretical, methodological and practical implications of the existing literature. The research goals are threefold: (1) consolidate the empirical evidence on the role of financial auditors for CSR performance, disclosure and assurance; (2) assess the theories used in the literature and propose opportunities for theoretical integration; and (3) suggest a future research agenda that can fill identified gaps and reflect the recent developments in the area of CSR, including regulatory frameworks such as CSRD.

This review's importance is highlighted by its ability to contribute to corporate governance practice, the standard setting of auditors, and academic research in the context of growing demands on sustainability. The auditor-CSR nexus will be a growing integral part of the corporate accountability landscape worldwide, as it is currently required by the EU CSRD for limited assurance (replacing full assurance) on sustainability reporting, and come to full assurance in 2028.

## Literature Review and Theoretical Framework

### *Agency Theory*

The auditor-CSR relationship can be understood through the agency theory. The theory suggests that the modern-day corporation is separated between ownership and control, which leads to information asymmetry, thus allowing the managers the feasibility to engage in managerial opportunism (Jensen & Meckling, 1976). Managers can resort to earnings management or selective disclosure of CSRs to mask poor performance or benefit their own reputation. Auditors resolve this imbalance by being external monitors and offering independent verification of financial and non-financial information. Within the context of CSR, agency theory states that the quality of the auditor will limit managerial discretion in sustainability reporting, enabling better disclosures to be more credible and reducing the risk of greenwashing.

Evidence supporting agency theory predictions is extensive. Mohammadi, Saeedi, and Naghshbandi (2021) found that the characteristics of the board and audit committee have a significant relationship with CSR disclosure of listed companies in Iran, and the characteristics of independent audit committees have a positive effect on the transparency of disclosure. In the context of Australian companies, Appuhami and Tashakor (2017) showed that audit committee characteristics have a positive effect on CSR disclosure.

### *Stakeholder Theory*

Stakeholder theory is not limited to shareholders, but includes all individuals that are impacted by the activities of a corporation, such as the employees, communities, regulators and environmental groups (Freeman, 1984). In this regard, CSR disclosure can be viewed as a means of engagement and accountability through stakeholders. Auditors add value to the CSR reports by attesting to their reliability and completeness, thus assuring their stakeholders. The stakeholder theory suggests that companies under heightened pressure from stakeholders, especially institutional investors and civil society organizations, will require greater assurance on sustainability, as the demand for that assurance will strengthen their legitimacy and trustworthiness.

The perspective of the stakeholders is especially important in the context of the audit selection process. The findings show that the clients with higher CSR performance, higher institutional ownership and the status of state-owned enterprise are more inclined to choose an auditor who is engaged in CSR activities, indicating the alignment of the demand of the client in the field of CSR. Furthermore, the stakeholder theory also has implications as to why the Big Four audit firms are the dominant players in the sustainability assurance sector: the global reputational and brand recognition signals the credibility that meet with various expectations of stakeholders (Boiral, Heras-Saizarbitoria, & Brotherton, 2019).

### *Legitimacy Theory*

Legitimacy theory suggests that organizations exist in a social contract, which demands that they be compatible with social norms and expectations (Suchman, 1995). If firms sense a legitimacy gap, there is a mismatch between what society expects and their actions, then they will undertake impression management activities, such as CSR disclosure and assurance. Auditors are crucial for the legitimising role as they help corroborate the statements made in CSRs and help to minimise the risk of legitimacy erosion when the CSR is greenwashed or misrepresented.

Legitimacy theory is particularly relevant when there is regulatory uncertainty or institutional voids. In emerging markets with less robust enforcement, auditor-assurance is a voluntary 'legitimacy signal' that helps identify committed firms from those that are only superficially compliant.

### *Institutional Theory*

There are three types of external pressures that can be used to explain organizational conformity: coercive (regulatory), mimetic (peer imitation), and normative (professional standards) (DiMaggio & Powell, 1983). In the auditors-CSR domain, coercive pressures are requirements that push companies to report on sustainability – like the EU CSRD. Mimetic pressures arise when firms attempt to emulate the assurance work practices of industry leaders or the Big Four firms. Normative pressures are related to professional auditing standards such as International Standards on Auditing (ISA) and International Standard on Assurance Engagements (ISAE) 3000.

According to institutional theory, convergence in sustainability assurance practices is expected to occur with the development of regulatory frameworks. Empirical evidence shows, however, that there is a significant regional variation in terms of institutions, and therefore heterogeneity.

### *Resource Dependency Theory*

In addition to the above theories, resource dependency theory focuses on the fact that organizational survival relies on access to critical resources that are under the control of other entities (Pfeffer & Salancik, 1978). In terms of the CSR assurance aspect, the audit committee, with its industry expertise, contributes to the improvement of the oversight of sustainability reporting. A study in Sweden revealed that audit committee industry expertise is positively and significantly associated with the quality of sustainability assurance, and that independence, number of meetings, and gender diversity had no significant association with the quality of the assurance. The result confirms the assumption of the resource dependency theory that the effectiveness of oversight will depend on certain expertise resources, not on general governance structures.

## Methodology

### *Research Design*

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (Page et al., 2021) are used for this study, through a systematic literature review (SLR). The SLR approach was chosen as it offers a clear, repeatable, and rigorous way of consolidating empirical evidence from a number of studies as well as minimising selection bias. The different theoretical perspectives, methodological frameworks, and geographical frameworks used in the auditor-CSR literature make a systematic review the most suitable way to identify patterns, inconsistencies and gaps in the evidence base.

An extensive search was undertaken on five key academic databases: Web of Science (n=412 records), Scopus (n=389), Google Scholar (n=267), SSRN (n=134) and ProQuest (n=198). The timeframe of the search was January 2014 - June 2025. The starting point of 2014 was chosen due to the development of integrated reporting frameworks and the first steps of the mandatory sustainability disclosure regimes in a number of jurisdictions.

The search string included three conceptual domains with the use of Boolean operators:

Domain 1 (Auditors): ("financial auditor)" OR "audit firm*" OR "audit committee" OR "external auditor" OR "Big Four" OR "audit quality" OR "audit partner")

Domain 2 (Corporate social responsibility" OR "CSR" OR "sustainability reporting" OR "ESG" OR "environmental disclosure" OR "social disclosure" OR "non-financial reporting")

Domain 3 (Linkage): ("impact" OR "effect" OR "influence" OR "relationship" OR "association" OR "link" OR "determinant")

The search string used was Domain 1 AND Domain 2 AND Domain 3. The remainder were identified by means of reference list scanning (n=23), forward citation tracking (n=18) and expert recommendations through auditing and CSR scholars (n=9).

***Inclusion Criteria***

1. Empirical studies published in academic journals or conference proceedings that have undergone a peer review process.
2. Explore how financial auditors (or audit committees) and financial statements relate to CSR outcomes.
3. The publication period is from January 2014 until June 2025.
4. Published in English
5. Quantitative, qualitative or mixed method designs

***Exclusion Criteria:***

1. Theoretical or conceptual papers without empirical analysis.
2. Studies that involve direct linkage with the auditor.
3. Studies that combine elements of both 2 and/or 3.
4. Publications prior to 2014
5. Non-peer reviewed working papers, dissertations or book chapters.
6. Reproducibility of published data or re-analysis of previously reviewed data

***Study Selection Process***

Study selection was carried out in four stages, with the application of the PRISMA protocol (figure 1). 1,400 records were obtained with database searches and additional sources during the identification phase. Following duplicate removal (n=244), 1,156 unique records continued to the screening stage. Of the 892 records that were screened for titles and abstracts, 882 were excluded because they did not meet inclusion criteria. Twenty-six four (24) papers were excluded from full-text assessment due to having no direct auditor-CSR linkage, being non-peer-reviewed, or published prior to 2014 (n=31), being duplicate publications (n=13) or not being empirical (n=42). The final sample consisted of 116 empirical studies of which 94 were quantitative, 14 were qualitative and 8 were mixed methods.

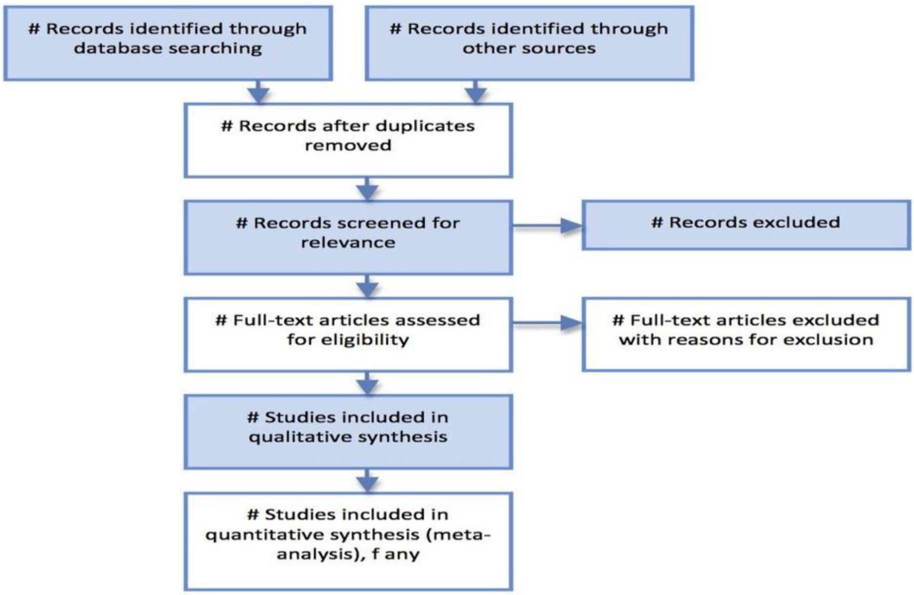


*Figure 1.* The PRISMA 2020 flow chart used for systematic review of empirical research on the auditor-CSR relationship.

### *Data Extraction and Coding*

A data extraction form was created and standardized to collect information about: (1) bibliographic information (authors, year of publication, journal); (2) theoretical framework(s) used; (3) research design and research methodology; (4) sample characteristics (country, industry, time period, sample size); (5) key independent variables (auditor-related constructs); (6) dependent variables (CSR outcomes); (7) control variables; (8) main findings and directions of the effects; and (9) limitations identified by the authors.

All 116 studies were independently coded by two researchers. The inter-coder reliability was measured by Cohen's kappa coefficient, which was 0.87, a large degree of agreement (Landis & Koch, 1977). Any difference were settled by discussion and consensus.

### *Quality Assessment*

The adapted Mixed Methods Appraisal Tool (MMAT) version 2018 was used to assess the quality of the studies. The following were assessed in quantitative studies: (1) appropriateness of research design; (2) risk of bias; (3) measurement validity; (4) statistical analysis rigor; and (5) causal inference strategies. The assessments of the qualitative studies included: (1) methodological appropriateness; (2) data collection adequacy; (3) reflexivity;

(4) analytical rigor; and (5) coherence of findings. Studies which did not achieve a score of 50% or more for quality criteria (n=7) were not removed from the study but marked in the synthesis for transparency.

### *Analytical Approach*

Thomas and Harden (2008) used the approach of thematic synthesis to make links between the findings of a variety of studies. This approach consists of three parts: (1) coding findings from primary studies, line by line; (2) organizing codes into descriptive themes; and (3) creating interpretive themes through analysis of the data. The coding process revealed four broad themes of analysis: (1) audit committee characteristics and CSR disclosure; (2) audit quality dimensions and sustainability reporting; (3) combined provision of financial audit and CSR assurance; and (4) auditor reputation and market reactions to CSR engagement.

## Results

### *Descriptive Overview of the Literature*

A total of 116 studies were reviewed, of which 67% were published in the last 5 years (2020 – 2025), signaling the increasing attention of scholars in this field. Most quantitative designs were the dominant ones (81%) with most using regression analyses on secondary archival data. Few use qualitative (interviews, case studies) methods (12%) and few use mixed methods (7%). This methodological imbalance reduces the ability to understand the micro-processes in which auditors mould CSR outcomes.

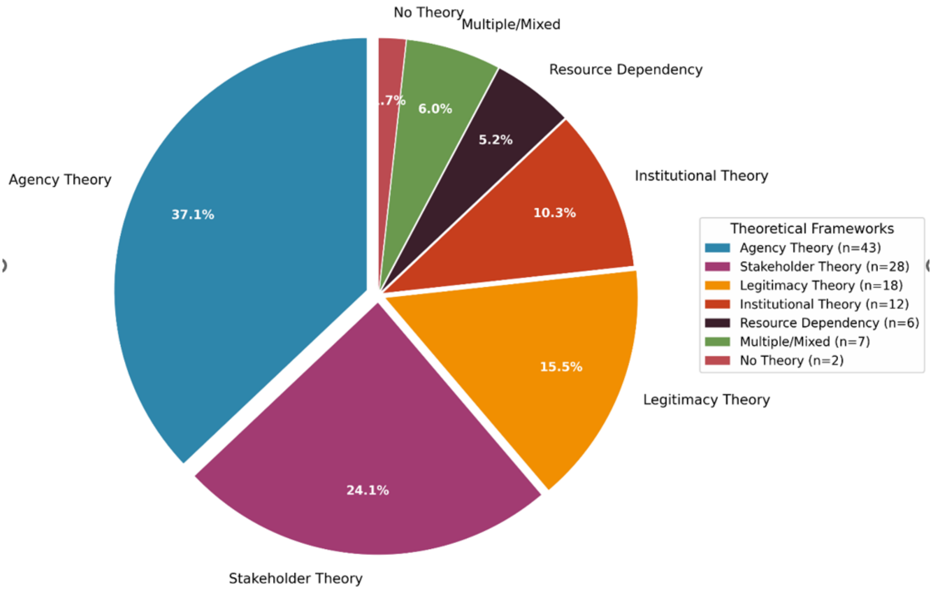


*Figure 2* Distribution of Theoretical Frameworks in Reviewed Empirical Studies (n = 116)

Theoretical framework used in 116 empirical studies (figure 2) considered as a percentage of the total. The most dominant approach is agency theory followed by stakeholder theory and legitimacy theory (15.5%).

The results of Figure 2 show that the agency theory is the most often used one (37.1% of the studies), followed by stakeholder theory (24.1%), legitimacy theory (15.5%), institutional theory (10.3%), resource dependency theory (5.2%) and multiple/mixed frameworks (6.0%). Interestingly, 1.7% of the studies (n=2) were not grounded in any particular theory, which was seen as a major limitation with theory.

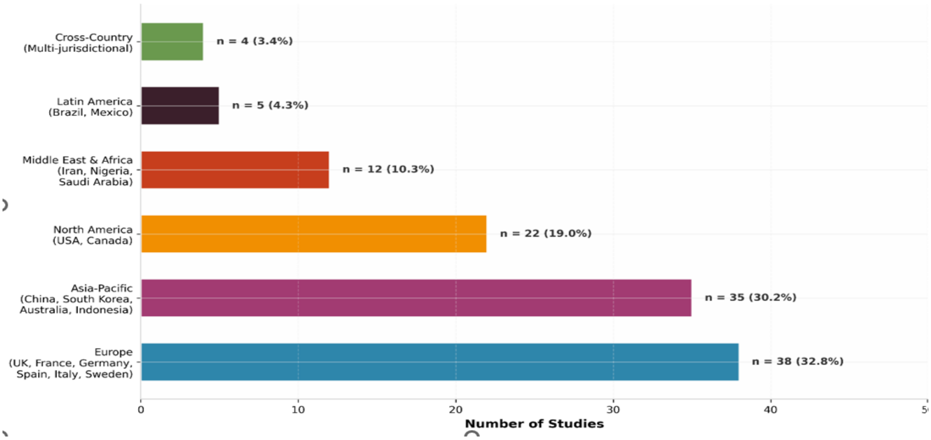


*Figure 3* Geographical Distribution of Reviewed Empirical Studies (n = 116)

Geographical distribution of reviewed empirical studies (n=116) presented in a bar chart (figure 3) shows Europe and Asia-Pacific are well represented, with comparative designs across the continent, but Latin America is still underrepresented.

Geographical coverage (Figure 4) is quite skewed towards the developed economies. Europe accounts for 32.8% of studies (n=38), Asia-Pacific for 30.2% (n=35), North America for 19.0% (n=22), Middle East and Africa for 10.3% (n=12), Latin America for 4.3% (n=5), and cross-country designs for only 3.4% (n=4). If the findings of this concentration are generalized, it is to emerging market contexts where institutions are different.

This Thematic Stream 1 examines the characteristics of the audit committee and CSR disclosure.The first Thematic Stream 4.2 discusses the Audit Committee Characteristics and CSR Disclosure.

The audit committee is the main internal control body that connects financial auditors with CSR results. A summary of key empirical studies of this relationship is presented in Table 1.

Table 1 *Summary of Key Empirical Studies on Audit Committee Characteristics and CSR Disclosure*

| Study | Country | Sample | Key Variables | Main Findings | Theory |
|---|---|---|---|---|---|
| Appuhami & Tashakor (2017) | Australia | 200 firms | AC independence, expertise, CSR disclosure index | AC expertise (+) and independence (+) significantly enhance CSR disclosure | Agency Theory |
| Mohammadi et al. (2021) | Iran | 124 firms | AC characteristics, CSR disclosure | Board and AC characteristics significantly influence CSR disclosure quality | Agency + Stakeholder |
| Ryu et al. (2021) | South Korea | Listed firms | AC expertise, CSR, financial reporting quality | AC expertise positively moderates CSR-financial reporting relationship | Agency Theory |
| Wang & Sun (2022) | China | Energy sector | AC role, social/environmental disclosure | ACs play significant role in CSR and environmental disclosures | Stakeholder Theory |
| Velte (2025) | Multi-country | SLR of 16 studies | AC independence, expertise, size, meetings | AC independence and expertise consistently (+) associated with CSR disclosure; size/mixed results | Agency + Institutional |

The results are also consistent with a positive link between the independence of audit committees and the quality of CSR disclosure. Independent directors, who are less likely to be "captured" by managers, provide more objective oversight of sustainability reporting decisions. The magnitude and significance of this relation, however, will vary with institutional contexts. On the contrary, Rahman and Ali (2006) reported a negative correlation in their study, which they attributed to the dominance of management and overloading of the workload on independent members. However, Othman et al. (2014) found no significant relationship, implying that it is not enough to be independent without having the necessary skills.

One area of expertise that stands out is finance. The study by Ryu, Chae, and Song (2021) presented empirical evidence in South Korea that the expertise of audit committees in the relationship between CSR and financial reporting quality was enhanced. The discovery indicates that expertise helps audit committees to assess the materiality of sustainability concerns and to question management reporting choices.

One aspect that has been underutilized and is important is industry specific expertise. The study of listed companies in Sweden revealed that the only characteristic that is significantly and positively correlated with the quality of sustainability assurance is the number of members that are industry experts, with a correlation coefficient of around 1.34, meaning that an industry expert on the audit committee is likely to lead to a higher quality of the assurance score. The discovery has major implications for the regulation of companies which is usually based on financial knowledge and lacks industry expertise.

### *Thematic Streams*

Thematic Stream 1and 2: Audit Quality Dimensions and Sustainability Reporting. The concept of audit quality is multi-dimensional, which includes auditor independence, competence and effort. Academic studies have adopted a number of proxies for audit quality such as auditor tenure, audit fees, auditor specialization, and affiliation with the Big Four.

Big Four Affiliation. The Big Four audit firms (Deloitte, PwC, EY, KPMG) are the leaders of the financial auditing and sustainability assurance markets. Pasko et al. (2023) studied Chinese companies and discovered that the financial audit by the Big Four firms contributes significantly to enhancing the quality of CSR reporting. Although the market for sustainability assurance is dominated by the Big Four, the concentration is less stringent than that found in financial auditing, and there are consulting firms and specialized certifiers in the market.

*Auditor Tenure.* The correlation between auditor retention and the quality of sustainability reporting is still not clear. On the other hand, longer tenure allows auditors to develop familiarity with the client and gain insight into the company's sustainability performance. Conversely, extended engagement could jeopardize independence and may diminish the ability to maintain professional skepticism. Based on the findings of Abdelsalam and Chariri (2024), negative effects of extended tenure are found to deteriorate the ESG disclosure quality of companies in Indonesia because of the deterioration in board independence. However, the effect of tenure is found to be conditional to the type of governance environment as shown by Abdelhak and Hussainey (2025).

*Audit Fees.* The term ‘audit fees' can be used as a proxy for audit effort and complexity. Li and Meng (2025) found this relationship to be nonlinear in China, as better sustainability performance raises the price of the audit, because of more stringent assurance demands. In their study, Abdelhak and Hussainey (2025) noted that audit fees have a positive impact on disclosure quality, since an auditor would be more inclined to spend more on auditing to guarantee compliance. On the other hand, Olajide et al. (2025) found that high audit fees can decrease the objectivity of financial reporting, which could create a conflict between adequate compensation and independence concerns.

Audit Quality and Financial Reporting Quality. Al-Shaer (2020) offers seminal evidence for the top 350 companies in UK FTSE 350 (2007-2018) which found that there is a significant and negative relationship between quality of sustainability reporting and earnings management metrics. Most importantly, this relationship is conditional upon audit level (measured by audit fees). Companies that make high quality sustainability reports show overall quality commitment that mitigate auditors' concerns about opportunistic behaviour, which ultimately lower business risk and audit effort.

***Thematic Stream 3 - Joint Provision of Financial Audit and CSR Assurance***

One of the most discussed topics in the literature is the provisioning of financial auditing and sustainability assurance by the same audit firm. This practice brings up concerns on independence conflicts and may lead to knowledge spillover effects that benefit services.

The authors of this study, Dal Maso, Lobo, Mazzi and Paugam (2020), have found direct empirical evidence for this, indicating that audit firms that provide financial audits and also CSR assurance have lower Type II going-concern errors and their clients report more value-relevant and persistent earnings. These results corroborate the knowledge spillover hypothesis whereby knowledge acquired in the sustainability assurance process could be beneficial to financial audit risk assessment, including environmental exposures, social issues and governance issues that may materially impact the financial statement.

Contrary to the expectations, Dal Maso et al. (2020) determined that joint provision does not lead to any increase in audit fees or total fees. This observation is consistent with the analytical models indicating that the non-audit services offered by the auditors (such as CSR assurance services) decrease the business risk of the client, which makes it possible for the auditor to not demand premium fees since the non-audit services increase the efficiency of the entire audit. Financial audit risk reduction due to CSR knowledge spillovers could compensate for the incurred costs of financial audit assurance.

Regulatory issues remain as there may be some efficiencies to be gained. According to Silveira and van Bellen (2025), dual engagements can pose an issue of integrity and independence for the auditor, which might lead to a decrease in its assurance quality. Under the EU's CSRD framework, auditor sustainability assurance is allowed, with certain protections to reduce auditor independence risks.

Recent findings show that there is an average reduction of 52.73 days in the time taken for the publication of the report from the time it was assured when auditor-assuror duality is introduced. This efficiency gain is attributed to operational integration, shared client knowledge. The study, however, also revealed that there is no significant increase in assurance lag where reasonable assurance is used, thereby suggesting that there is no direct relationship between assurance depth and assurance timeliness.

***Thematic Stream 4: Auditor Reputation and Market Responses to CSR Engagement comprises five papers.***

A new body of literature looks at the impact of auditors' CSR on their market position and client relations. This view moves away from auditors' position as monitors of client CSR, and towards that of CSR actors.

A research paper on audit firms in China revealed that an audit firm with higher CSR scores in the previous year has a significant positive effect on the number of clients, audit fees and the amount of assets under audit in the following year. This is largely due to two types of firms: smaller firms that have been in accounting and firms not dealing with industry experts. The results indicate that CSR is a reputation-enhancing strategy, especially when the auditor does not have a well-recognized reputation.

The same study found that clients performing higher in CSRs, higher institutional ownership and state-owned enterprise (SOE) are more likely to choose auditors that participate in CSRs. This matching between client and auditor, based on the CSR values, suggests homophily in CSR values, and suggests that the CSR engagement that the auditors have is a screening mechanism of like-minded clients. These semi-structured interviews with senior managers and audit committee confirmed that clients consider auditor CSR engagement to be an indicator of trustworthiness, social responsibility and public image.

From an economic perspective, the audit firms that participated in CSR activities gained an average of 6.5 clients, which is 11.3% greater than the average of 57.7 clients that audit firms without CSR activities had. The extent of CSR activity is important: the amount of donations is positively correlated with the increases in clientele, and the extent of the CSR activity, in terms of variety of activity types, has more impact than participation.

## Discussion

### *Synthesis of Findings*

The systematic review identifies four main patterns in the auditor-CSR literature. Governance mechanisms are important: audit committee independence and expertise is a consistent factor in improving the quality of CSR disclosure, in various jurisdictions and institutional settings. Given the influence of structural features (independence, size) over processual ones (meeting frequency, board diligence), however, ongoing governance theory and research may have overemphasized the board composition variables at the expense of the processes.

Second, auditor quality is multi-dimensional. While reputation assurance with the Big Four can be expected, it is also the specialization of the industry and client-specific knowledge that has the same weight on the quality of sustainability assurance. The auditor tenure effects that are contestable suggest that the knowledge-independence balance is context-specific, subject to regulatory enforcement, cultural characteristics, and client specific.

Third, the benefits of joint service provision in terms of measurable gains in efficiency can be due to services being provided through mechanisms of knowledge spillover, which should be taken into account alongside any concerns of independence erosion. The reduced going-concern errors provide a good efficiency argument for the use of joint provision.The evidence supporting joint provision is that it leads to better quality financial audits, without a corresponding increase in audit fees. But the long-term effects of auditor skepticism and professional judgment are under-researched.

Fourth, auditor CSR engagement serves as a market signal, which hones in on value-aligned clients. The study expands stakeholder theory by showing that the auditors are stakeholders as well who use CSR strategically to create reputational capital. This imbalance in benefits for smaller companies suggests that CSR engagement can be a leveling-playing field in a highly concentrated market.

### *Theoretical Implications*

The review identifies key opportunities for theory development. Agency theory dominates the literature (37.1% of studies) as it stems from financial economics research, which could limit how agency theory is used to understand the normative and institutional aspects of sustainability assurance. A small number of studies (6%) use more than one theory, indicating that the integration of theories is still in its infancy.

To better understand how regulatory requirements (coercive pressures) affect the assurance outcomes, future studies should include agency theory and institutional theory together to analyze the interaction between regulatory requirements and audit committee governance structures. Using a stakeholder theory perspective combined with signaling theory might shed light on how auditor CSR engagement can be an advantage to the firm to represent a differentiated reputation signal in competitive markets. The theory of resource dependency holds out special promise in explaining why industry knowledge is better at managing sustainability than general financial knowledge, which contradicts conventional wisdom about governance.

Although the theory of Legitimacy is relevant to the understanding of voluntary assurance adoption in weak regulatory environments, the theory has not been used much. The theory may help explain why some companies in emerging markets would opt to buy auditor assurance even when it is not required, as assurance would be a legitimacy signal to international investors and supply chain partners.

***Methodological Implications***

The methodological approach of the auditor-CSR literature can be seen as having a number of strengths and weaknesses. The majority of secondary data analysis is quantitative (81%) and thus has the statistical power of generalizability, but lacks depth in understanding causal mechanisms. A lack of qualitative research (12%) and mixed-methods designs (7%) restricts the understanding of audit committee decision-making processes, auditors and their clients' negotiation processes, and the interpretation frameworks that auditors use for sustainability information.

Causality is always challenged by endogeneity. Selection of an auditor is not random – selection of high-quality auditors may be caused by CSR performance. Attempts have been made to use propensity score matching, instrumental variables and fixed-effects models, but the fully exogenous variation remains elusive. The findings of future studies should be leveraged by using regulatory natural experiments (e.g. the introduction of the EU CSRD in different firms size and industry categories) for better causal identification.

Comparing results across studies is difficult due to measurement heterogeneity. The quality of CSR disclosure is measured by means of content analysis indices, proprietary ESG ratings and manual coding schemes that are not fully standardized. Big Four audit affiliation, audit fees, industry specialization are all examples of audit quality proxies. The establishment of a set of standardized measurement instruments that are approved by the auditing profession would make the meta-analytic synthesis and cumulative knowledge building easier.

***Regulatory and Practical Implications***

The EU CSRD marks a turning point in the development of regulation that has far-reaching consequences for the auditor-CSR connection. The CSRD introduces a new and huge market for auditor assurance services, as it requires limited assurance in sustainability reports, which is expected to evolve to reasonable assurance by 2028. This change in regulation requires a set of new skills that are not only in environmental science and social metrics, but also in governance assessment, which are fields outside the standard financial auditor's scope.

The results for corporate boards indicate that industry expertise is the most important audit committee characteristic to affect assurance quality, which implies that the financial expertise requirement in audit committee regulations should be broadened to include industry expertise. Board members should seek directors who have experience in the industry related to sustainability and consider adding those members to the audit committee.

The professionalization gap in sustainability assurance is a challenge and an opportunity for auditing firms. Companies investing in interdisciplinary training programs will be in a strong position to secure market share as demand for regulatory requirements continues to grow. On the other hand, smaller firms may want to think about strategic CSR engagement as a way to differentiate themselves, as it has been found that auditor CSR activities create value-aligned clients.

Regulators need to strike a balance between efficiency and independence with joint service provision. The evidence of knowledge spillovers is used to argue for allowing incumbent auditors to offer sustainability assurance, though the argument is made under the following conditions: mandatory auditor rotation; caps on auditor fees; and greater disclosure of non-audit services.

### *Conceptual Framework*

The results of the systematic review are presented by integrating the different elements of the auditor-CSR relationship in the conceptual framework displayed in Figure 3.

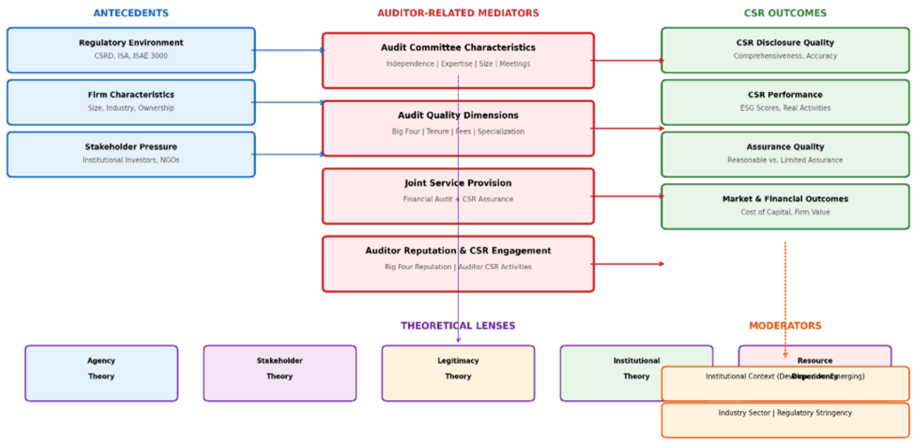


*Figure 3*. Conceptual Framework, Linkages between Financial Auditors and CSR

Figure 3 presents the conceptual framework mapping integrated antecedents (regulatory environment, firm characteristics, and stakeholder pressure), mediation factors (auditor-related factors: audit committee characteristics, audit quality dimensions, joint service provision and auditor reputation), CSR outcomes (disclosure quality, firm performance, firm assurance quality, and market outcomes), theoretical lenses, and moderating factors.

It assumes that the regulatory settings, firm attributes, and pressures from stakeholder groups are antecedents, which influence the need for the auditor to be involved in CSR. These antecedents impact on four types of audit committee related mediators – audit committee characteristics, audit quality dimensions, joint service provision decisions, and auditor reputation/CSR engagement. These mediators have a further impact on CSR outcomes such as disclosure quality, CSR performance, assurance quality, and market/financial outcomes. Theoretical lenses (agency, stakeholder, legitimacy, institutional, and resource dependency theories) provide interpretive frameworks and moderate the relationships between them, while institutional context and industry sector moderate the relationships between these theories.

## The main limitations of the Review

There are a number of limitations to this review. First, the current literature exclusively in English may not include relevant studies translated from other languages such as Chinese, Spanish, French, or other languages, which may lead to a sample that is biased toward Anglo-American research tradition. Secondly, the publication of studies since 2014 reflects the current sustainability assurance period, but not studies that laid the theoretical basis in the early 2000s. Third, the diversity of empirical designs, measures and contexts makes formal meta-analysis impossible; the synthesis is narrative rather than statistically aggregated. Fourth, the constant changes in the regulatory landscape, especially with the CSRD, could see some answers becoming obsolete as new mandatory assurance will influence market dynamics.

## Future Research Agenda

### *Multi-Theoretical Integration*

Future research on the subject should increase beyond single-theory explanations to integrated theoretical models. To this, the insights of agency theory regarding monitoring and control should be combined with the insights of institutional theory regarding regulatory and normative pressures, stakeholder theory regarding accountability to other constituencies, and legitimacy theory regarding social license. This kind of integration would allow for capturing the multi-faceted nature of sustainability assurance as an economic transaction, as a governance mechanism, as a tool of stakeholder engagement, and as a signal of legitimacy.

### *Emerging Market Research*

One major gap in existing research is that research is geographically concentrated in the developed economy. The institutional environment in emerging markets presents unique characteristics like weaker enforcement, higher state ownership, concentrated family ownership and different configurations of stakeholders, which can shape auditor-CSR dynamics in a fundamentally different way. More research is needed to explore the influence of informal institutions and cultural values on demand for and supply of sustainability assurance in these settings, as well as the influence of political connections.

### *Digital Technologies and Audit Innovation*

The convergence of AI, blockchain and big data analytics with auditing practice is a frontier research field with important applications for CSR assurance. Patterns in extensive amounts of data on sustainability disclosures could be uncovered by AI-powered tools, improving greenwashing detection. The blockchain technology can make the supply chain more transparent, making it easier for auditors to validate CSR statements with ever greater levels of detail. But these technological advances have received little attention in the literature to date, and this is something that needs to be urgently addressed.

### *Mandatory Assurance Transitions*

The shift to mandatory assurance within regulatory regimes such as the CSRD opens up natural experiments for empirical study. Future research could focus on the impact of mandatory assurance on assurance quality and pricing structures; on auditor market structure and competition; on client reporting behavior and greenwashing incidence; on the impact on capital market outcomes such as the cost of capital and investor confidence; and on the impact of the mandatory assurance on assurance co-ordination across borders for multinational entities. Causal identification might be available using a difference-in-differences design with firms impacted by mandatory assurance versus unaffected firms.

### Longitudinal & Dynamic Perspectives

Most empirical studies are conducted with cross section or short panel designs which measure static relationships. The auditor-CSR nexus is dynamic in nature: the learning of the auditor, adaptation by the client and evolution of the regulation is a dynamic, and static models can't capture it. Future studies should use a longer time-series of data to explore the changes in auditor-CSR relationships as companies grow up and down, standards evolve, and/or market conditions fluctuate. Based on theoretical research, auditors' specialization within a specific industry or sustainability domain may be a useful means to improve assurance quality. However, none of the empirical research has investigated the CSR auditor specialization impact on fees, profits or quality. While the sustainability assurance market is maturing, further research needs to explore whether the market can become more specialised and valued by the client and whether it can drive or alleviate the problem of market concentration.

***Multi-Stakeholder Perspectives***

Current studies mainly take a firm or auditor level approach, whereas the CSR assurance process is multi-stakeholder. Investors, regulators, employees, communities and environmental groups can have conflicting expectations about the level of assurance and auditor independence. Future research should include surveying stakeholders, conducting experiments or multi-level models that reflect these diverse views.

## 7. Conclusion

This systematic review has compiled empirical evidence from 116 studies in peer-reviewed journals to analyze the relationship between the financial auditors and CSR. The evidence shows that the audit committee has an important impact on the quality of CSR disclosure, especially through its independence and expertise. The quality dimensions of the auditor, increase the credibility of sustainability assurance and the related audit service, and the simultaneous audit of financial and CSR is found to provide knowledge spillover to the improvement of the two types of assurance. Auditor reputation effects manifest in the market in that value aligned clients are more likely to choose CSR-engaged auditors, especially in competitive market segments.

Theories of agency are the most prevalent theories in the theoretical landscape, while there are opportunities for integration with stakeholder, legitimacy, institutional, and resource dependency theories that are under-exploited. Literature is mostly quantitative, secondary, developed economy-focused, and lacks a qualitative depth, emerging economies, and cross-country comparisons. The auditor-CSR landscape is evolving rapidly with the introduction of regulatory developments, especially the EU CSRD, which requires assurance and establishes new market structures.

The conceptual framework that is integrated in this review offers a theoretically informed guide on how to navigate the growing complexity of financial auditing and corporate social responsibility. The function of financial auditors will be broadening from financial gatekeeper to corporate legitimacy arbitrator in the era of sustainability reporting from voluntary practice towards regulatory requirements. To meet the audit profession's public interest role in a time of unprecedented sustainability issues, it is essential to understand this evolution. The proposed future research provides directions for action for scholars interested in furthering this important area of management sciences.

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