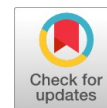# Accountability and Economic Prosperity: Unveiling the Nexus Between Governance Responsibility and GDP Growth in Pakistan

Nosheen Mumtaz, Tuaha Nasim, Iqra Yamin

Abstract: The investigation uses quantitative approaches and 1996–2019 time series information to show the association between GDP metrics and accountability proportion in Pakistan. It examines the causal connection between administration along with GDP development, focusing on how accountability affects FDI, fixed assets, and technology. The research uses bounds test evaluation to determine these parameters' long-term association. Two steps comprise the examination method. Initially, stationarity is tested using typical Augmented Dickey-Fuller (ADF) examinations. Furthermore, autoregressive distributed lag (ARDL) bound testing identifies causality. Fixed finances and technological advancement have significant positive linear associations, while foreign direct investment along with the accountability proportion have moderately favorable linear connections. Granger causality analyses imply that the factors might not have been causally related during the chosen time span. Although the tests show no Granger causal links, the research suggests a relationship among foreign direct investment along with fixed assets that may deserve additional study.

Keywords: Accountability, GDP growth, ARDL, Pakistan

I. INTRODUCTION

An era characterized by dynamic global economic shifts, the role of accountability within governance frameworks has emerged for example a crucial element of sustained economic growth and stability. The connection among accountability and Gross Domestic Product (GDP) growth stands as a focal point in understanding the intricate dynamics shaping modern economies. This research embarks on an exploration of the multifaceted interconnection between accountability and economic prosperity. The fundamental premise underlying this investigation rests on the premise that accountable governance fosters an environment conducive to sustainable economic development. So, governance and economic expansion are major topics in development research (Grindle 2004).

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Effective governance is being extensively debated and implemented across various academic disciplines, with the World Bank initially incorporating it into its 1989 study on people's perceptions of governance. Various indicators have been developed by international organizations to assess governance. For example, the World Bank established the World Governance Indicators (WGI), which consist of a total of six signs: "political stability and absence of violence or terrorism," "rule of law," "control of corruption," "the voice and accountability," and "government effectiveness." Politicians and scholars use the World Administration indicators.Now-a day's efficient working of a modern economy is founded on the transparency and accountability. Mostly powers are delegated to public establishment on the basis of must be allowed to the delegators that is; society sometime transfer of this power is not only useful, but also not harmed. Therefore, openness is needed to ensure that data is accessible to evaluate government performance and prevent power abuse. According to the OECD (2016), "nations with higher standards of institutions suffer less severe adverse economic shocks" [1]. Dictatorships have better governance than elected democrats [2].

The research aims to delve into the mechanisms by which accountability, encompassing transparency, integrity, and responsibility among institutions and individuals, impacts the overall economic performance of a country. It seeks to identify and investigate the both indirect as well as direct impact, of accountable governance on factors such as reducing corruption, improving resource allocation efficiency, and fostering public trust all of which play crucial roles in shaping economic growth trajectories. For technology to help the economy expand and to make government work better, we need to think about what it means for people and an economics in general and make sure it is used in the best way possible. However, [3] highlighted several challenges in the IT adoption process, including bureaucratic and political barriers, insufficient infrastructure, and a lack of IT professionals. Despite these challenges, [4] emphasized the potential for the growth of the large data business in Pakistan, with the government's support for liberal policies and the prioritization of policy measures. AI possesses enormous impact on the world of finance, making it easier to make choices regarding credit in areas like quantitative trading purposes managing financial risks, and fraud discovery. Digital leadership means having an administration that is knowledgeable and accountable so that public services are quick, better, and available 24 hours a day, seven days a week.

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One of the primary objectives is to delineate the mechanisms by which accountability influences governance structures, thereby impacting economic growth. It is widely acknowledged that accountable institutions tend to exhibit reduced corruption, improved resource allocation efficiency, and enhanced public trust factors that inherently contribute to economic resilience and expansion.
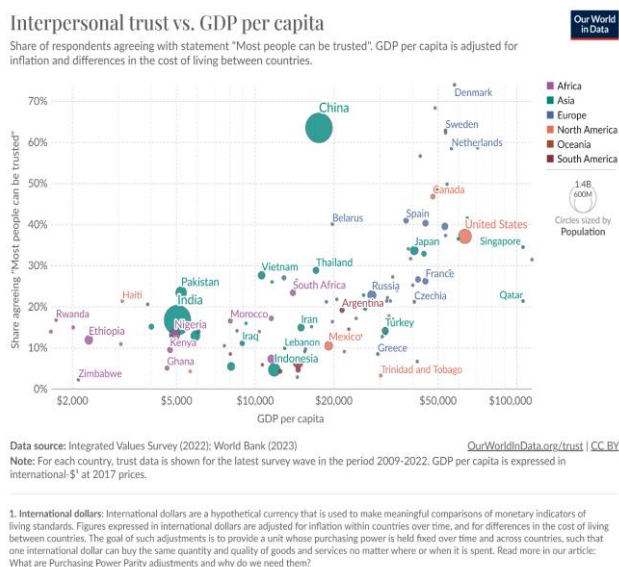
A. Objectives

- Investigate the Relationship: To explore and analyze the intricate relationship between accountability within governance frameworks and the Gross Domestic Product (GDP) growth of economies.
- Examine Mechanisms: To delineate and understand the mechanisms through which accountability influences governance structures, including its impact on reducing corruption, enhancing resource allocation efficiency, and fostering public trust.
- Evaluate Policy Impact: To assess the impact of accountable decision-making on policy formulation and implementation, elucidating how responsible practices contribute to shaping economic policies and their subsequent outcomes.
- Provide Insights: To offer valuable insights into how fostering accountability within institutions and among individuals can create an environment conducive to investment, innovation, and sustainable economic development.
- Inform Stakeholders: To contribute meaningful information to policymakers, stakeholders, and scholars, facilitating a deeper comprehension of the critical role played by governance responsibility in steering long-term economic prosperity

The subsequent questions are what we want to answer: How do different sectors or industries within economies respond to increased accountability measures, and what implications does this have on GDP growth? Can global case studies provide insights into successful models where accountability initiatives have significantly contributed to economic prosperity? What governance factors enable countries with emerging markets to sustain actual economic expansion compared with advanced economies? What are the specific mechanisms through which increased accountability influences economic growth indicators such as reduced corruption, enhanced resource allocation efficiency, and public trust? What are the challenges or barriers faced in implementing and sustaining accountable governance practices, and how do these affect economic development? The purpose is to illuminate governance and financial growth in Pakistan utilising GDP metrics as well as the transparency ratio. That is followed to quantitative method with series data for examine the casual relationship of Administration and GDP growth from 1996 to 2019. This study is focused on the positivity and negativity effects of accountability for selected indicators that are foreign direct Investment, Fixed Capital and Advancement of Technology and Bounds exam will determine long-term partnership. Accountability has great impacts on every sector and factors of economy that are playing role as a catalyst for GDP of every country. It has direct relation to all sectors for growth and developing

economy. In the past, growth theories have mostly looked at the supply of labor, the spread of technology, public buildings, or incentives over creativity as important ways to explain why countries' growth rates are different [5].

The constitution assembly of Pakistan approved the representative office Act and controversial public that demanded the ineligible of public office holders and assess of public holding officer for approximately 15 years. The relationship between GDP indicators and accountability in Pakistan is complex. According to Rehman [6], trading, technological innovation, and energy from renewable sources all have a good effect on the expansion of GDP. On the other hand, foreign direct investment has a negative effect. But recently, there has been more focus on the way institutions and governments work to affect the economy. The IMF (2005) as well as Acemoglu [7] both say that organizations are the main things that make economic growth happen. Dobler [8], also, says that institutions have what makes economic growth differ from country to country. Acemoglu [7] say that institutions are very important for growth because they affect investments and how production is organized.

B. Interpersonal Trust VS. GDP Per Capita:

Interpersonal trust vs. GDP per capita
Share of respondents agreeing with statement "Most people can be trusted". GDP per capita is adjusted for inflation and differences in the cost of living between countries.

Data source: Integrated Values Survey (2022); World Bank (2023)   OurWorldInData.org/trust | CC BY
Note: For each country, trust data is shown for the latest survey wave in the period 2009-2022. GDP per capita is expressed in international-$1 at 2017 prices.

1. International dollars: International dollars are a hypothetical currency that is used to make meaningful comparisons of monetary indicators of living standards. Figures expressed in international dollars are adjusted for inflation within countries over time, and for differences in the cost of living between countries. The goal of such adjustments is to provide a unit whose purchasing power is held fixed over time and across countries, such that one international dollar can buy the same quantity and quality of goods and services no matter where or when it is spent. Read more in our article: What are Purchasing Power Parity adjustments and why do we need them?
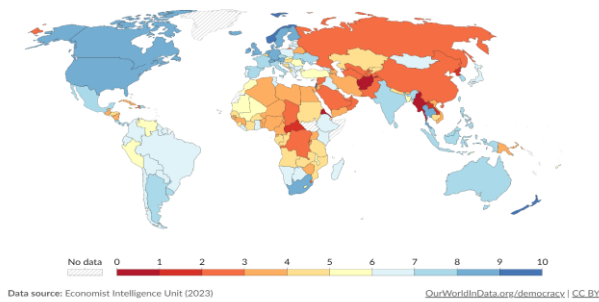
[9] 2023 The analysis of GDP each capita estimates over the lengthy period serves as a crucial instrument for comprehending economic growth and income levels across extended periods. The Integrated Values Survey (2022) and the World Bank report (2023) provide valuable data on trust and GDP per capita for various countries. The trust data represents the latest survey wave conducted within the period of 2009-2022, while the GDP per capita is denoted in international dollars at 2017 prices. It seeks to explore the implications of trust levels on economic performance and to understand the variations in trust across different regions. Consequently, this data offers a comprehensive and insightful view of economic development and income trends across nations in the long term.

C. Political Participation Index:

Political participation index, 2022
Based on the expert assessments and index by the Economist Intelligence Unit (2023)¹. The variable captures the extent to which citizens can and do participate in politics. Higher values indicate more participation.
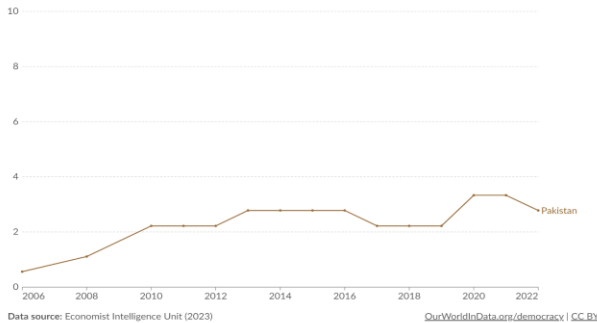
Data source: Economist Intelligence Unit (2023)
OurWorldInData.org/democracy | CC BY

1. Economist Intelligence Unit: The Economist Intelligence Unit publishes data and research on democracy and human rights. It relies on evaluations by its own country experts, supplemented by representative surveys of regular citizens to assess political institutions and the protection of rights. The Economist Intelligence Unit is the research and analysis division of The Economist Group, the sister company of The Economist newspaper. Learn more: Democracy data: how do researchers measure democracy?

D. Pakistan's Political Participation Index: Trends and Analysis

[10] 2023

Political participation index
Based on the expert assessments and index by the Economist Intelligence Unit (2023)¹. The variable captures the extent to which citizens can and do participate in politics. Higher values indicate more participation.

Data source: Economist Intelligence Unit (2023)
OurWorldInData.org/democracy | CC BY

1. Economist Intelligence Unit: The Economist Intelligence Unit publishes data and research on democracy and human rights. It relies on evaluations by its own country experts, supplemented by representative surveys of regular citizens to assess political institutions and the protection of rights. The Economist Intelligence Unit is the research and analysis division of The Economist Group, the sister company of The Economist newspaper. Learn more: Democracy data: how do researchers measure democracy?

during the course of the last 16 years, Pakistan's political participation index (PPI) went up and down. It hit an all-time low within 2014 alongside reached an all-time high within 2018. The PPI relies on the opinions of experts and shows how much people are able to get involved in politics. Higher values indicate more participation.

There are a number of factors that have contributed to the fluctuations in Pakistan's PPI. These include:

Political instability

Pakistan has experienced a number of periods of political instability, including military coups and caretaker governments. These periods of instability have often led to a decrease in political participation.

Electoral reforms

Pakistan has implemented a number of electoral reforms in recent years, including the introduction of biometric voter verification and the lowering of the voting age to 18. These reforms have helped to increase voter turnout and political participation.

Civil society activism

Pakistani community organizations are becoming more important. These organizations have helped to raise awareness of political issues and mobilize citizens to participate in the political process.

Social media

social media has also played a role in increasing political participation in Pakistan. Social media platforms have allowed citizens to connect with each other and share information about political issues.

there is a need for continued efforts to promote political participation in the country. This includes addressing the issue of political instability, continuing to implement electoral reforms, and supporting civil society activism and social media. This study aims to examine the connection among accountable and GDP elements which are most beneficial to the expansion of GDP.

The study is conducted in two steps:

- **Step. I** Traditional Augmented Dickey-Fuller (ADF) experiments are utilized to test stationary behavior. The analysis of time sequence requires this stage to determine whether elements are static versus non-stationary.
- **Step. II** The causality tests use Autoregressive Distributed Lag (ARDL) constraint tests. These types of tests determine long-term interactions between variables. Every factor is integrated using unit root examinations, and other statistical methods are employed to analyses the results.

The provided results include coefficients, standard errors, t-statistics, and probabilities associated with each independent variable and lagged values of those variables. The R-squared and adjusted R-squared values indicate the descriptive control of model. The probabilities associated with the F-statistic and individual coefficients provide insight into the significance of the relationships.

Rest of the paperwork is organized as follows: "Related empirical studies" assessments the associated research. Philosophical background is provided in "methodology of Governance and GDP growth". We offer empirical findings under "Results" and argue in "Conclusion".

II. RELATED WORK

The correlation between GDP metrics and accountability is a topic of considerable interest within the realms of economic progress and governance. Knowing the connection is essential for lawmakers, scholars, and investors in Pakistan who seek to promote sustainable economic expansion and enhance governance standards. The article tries to summaries current research and empirical data on the correlation between GDP metrics and accountability, specifically focusing on Pakistan.

A. GDP Indicators and Economic Progress

Many studies have emphasized the significance of GDP statistics as metrics for economic expansion and growth. Common metrics like the country's gross domestic product (GDP), income per head, and gross national product (GNP), are frequently employed to evaluate the financial health of nations. Furthermore, investing, exports, and consumerism have been seen as crucial factors that fuel economic expansion. In Pakistan, several studies have emphasized the crucial importance of sound government in promoting socio-economic growth. Hassan & Zeb [11] and Akhter & Ummara (2020) [12] emphasize how political unrest and corruption harm good governance, leading to negative impacts on growth.

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Zaman & Saeed (2019) [13] highlight the crucial role of effective governance in fostering sustained economic growth, especially through transparency, responsibility, and widespread engagement. Khushnood et al. (2020) [14] directly correlates excellent governance metrics, like stable politics along with quality of regulations, with the increase in foreign direct investment, a crucial factor for economic development. The findings emphasize the necessity of implementing extensive changes to enhance administration in Pakistan and promote socio-economic development.

B. Accountability and Governance

Accountability, particularly in the realm of governance, has been a critical area of research and policy focus. The concept of accountability encompasses transparency, responsibility, and answerability of government institutions, public officials, and private sector entities. Eshiet [15] [16] and Mehrotra [17] all emphasize the crucial role of voice and accountability in governance effectiveness and socio-economic development. Eshiet [16] specifically highlight the potential of civic organizations, such as rural women's associations, in promoting social accountability and citizen engagement.

This aligns with Mehrotra [17] emphasis on the importance of deep democratic decentralization in ensuring accountability in service delivery. Zaman & Saeed (2019) [13] voice along with transparency are established elements of government in Pakistan. Comprehensive administration and planning, emphasizing excellence and standards, enhance good governance by ensuring socioeconomic progress for the entire country. Hassan and Zeb (2021) [11]. The volatile political environment and deeply ingrained institutional corruption throughout the past few decades have significantly damaged effective governance of a broad scale. These studies collectively underscore the need for active citizen participation and effective mechanisms for holding decision-makers accountable in order to drive positive governance outcomes and socio-economic development.

C. The Nexus Between GDP Indicators and Accountability

The relationship between GDP indicators and accountability has been a relatively underexplored area in the literature. However, scholars such as Ivanyna & Salerno (2021) [18] have emphasized the interconnectedness of economic performance and governance quality. Their research suggests that accountable governance can positively influence economic indicators by fostering an environment conducive to investment, reducing corruption, and enhancing public service delivery. Financial development and good governance play crucial roles in fostering an environment conducive to investment, reducing corruption, and enhancing public service delivery, therefore aiding in the advancement of the economy. Beck (2011) [19] An efficient financial system serves as vital for growth that progress. Dzhumashev (2014) [20] emphasizes how corruption along with governance interact to influence the effectiveness of spending by the government. Enhancing financial development enhances the financial health of countries through improving the productivity of market mechanisms and the efficacy of financial intermediaries.

Conversely, deficiencies in accountability mechanisms can lead to economic inefficiencies, resource misallocation, and hindered growth prospects. Various studies have shown that accountability deficits have negative impacts on the economy and growth possibilities. Fontaine et al. (2020) [21] and Fosu [22] both emphasize the importance of public accountability in preventing political downsides and improving economic outcomes. This is further supported by [23] Graziano who finds that corruption and low accountability lead to reduced effort and cost inefficiency in public services. However, lagunes_perustudy (2018) [24] offers a potential solution, showing that civil society oversight can strengthen accountability and lead to efficiency gains in public works.

D. Challenges and Opportunities in Pakistan

In the context of Pakistan, the relationship between GDP indicators and accountability presents unique challenges and opportunities. The country has grappled with issues related to corruption, political instability, and institutional weaknesses, which have implications for economic performance Emphasising the significance of improved accountability systems to tackle obstacles and encourage lasting economic development, aligning with Bartelmus's (1992) [25] research advocating for the integration of environmental issues into economic strategies via economic-environmental finance. Gberevbie et al. (2017) [26] further underscored the role of accountability in addressing challenges such as corruption and poor resource management, which hinder sustainable development The World Bank Washington (2003) [27] and Scobie (2018) [28] highlighted the significance for citizen responsibility in government, with Washington emphasizing inclusion and Scobie focusing on climate change governance. These studies collectively support the need for enhanced accountability frameworks to address these challenges and create an enabling environment for sustainable economic growth.

The literature study emphasizes the relationship between GDP measures and accountability, underscoring the influence of the level of governance overall the economy. Although current research offers useful insights, additional empirical investigations are required to fully comprehend the particular nature of this connection within the historical setting of Pakistan. The statistical examination aims to enhance the existing knowledge by offering actual information and conclusions on the correlation between GDP metrics and fiscal responsibility in Pakistan.

III. METHODOLOGY AND DATA COLLECTION

A. Nature of study:

The study is based on relationship between GDP indicators and accountability ratio in Pakistan. That is followed to quantitative method with series data for examine the casual relationship of Administration and GDP growth from 1996 to 2019. This study is focused on the positivity and negativity effects of accountability for selected indicators that are foreign direct Investment, Fixed Capital and Advancement of Technology.

B. Type of Facts:

The data is founded on quantitative yearly cycle on Economic indicators with FDI, Fixed Capital and advancement of technology with Accountability ratio, which cover the 1996-2019 periods, has used in this study.

C. Sample of Study:

Data is gathered from multiple sources about an additional basis, including the International Financial Statistics (IFS) Annual and the World Development Indicators 2012 version provided web by the World Bank's website. This data has been used for twenty-three years to supplement local information on GDP proportions.

D. Selected Variables:

a. Administrative accountability:

The phrase refers to evaluating the performance of designated personnel and authorities to determine if their acts are within or beyond the boundaries of their authority. Accountability has shown inconsistent issues and foundations over time. Four varieties of accountability can be distinguished based on a number of measurements: the accountable party, the recipient of transparency, the standards or ideals guiding accountability, along with the methods of ensuring accountability. Conventional accountability emphasis's fiscal transaction frequency, authentic submission, legal compliance, and compliance to administrative regulations. Executive accountability emphasizes effectiveness and affordability in utilizing both inside and outside resources. Programmed responsibilities centers on the outcomes of government activities. Process accountability highlights operational procedures and techniques. When connecting accountability to Administration theory, a commonality is observed in the forms of accountability along with the diversity within Public Administration. Accountable can be enhanced by external pressures and by internalizing self-regulatory principles. Power, privacy, employee behavior regulatory procedures including control, oversight, influence, and leadership, along with extra-bureaucratic ideals contribute to accountability. This is a growing reliance on joyful and engaging processes, emphasizing collaboration and even self-regulation of accountability norms. Yet, issues persist with splicing, corruption, and the mismatch between government activities as well as public interest. Accountability has great impacts on every sector and factors of economy that are playing role as a catalyst for GDP of every country. It has direct relation to all sectors for growth and developing economy. Pakistan's transparency index ranges from -2.5 (poor) to 2.5 (high). The most recent data point from 2019 shows -0.84 points. Pakistan's Vote and Transparency Index is rated at -2.5, indicating a weak level of accountability.

Table- I: This table is representing the overall accountability ratio on the basis of per year GDP of Pakistan.

Year	Facts
2016	-0.7
2017	-0.69
2018	-0.8
2019	-0.84

b. Economic development:

Economic development is the expansion of the output of economic products and services when comparing different time periods. It may be expressed in conventional or actual terms based on inflation. The growth of the economy is often assessed by gross national and domestic product (GDP), although alternative metrics are occasionally employed.

c. Indicators of Economic Growth:

- Natural Resources
- Fixed Capital
- Labor
- Human Capital.
- Technology
- Law
- Entrepreneurship. / Foreign Direct Investment

These all factors for development of an economy are very necessary but we will focus on Fixed Capital, Technology and Foreign direct investment overall bases.

d. Fixed Capital:

Are long term or physical assets that are building or purchase by Govt. or a company for development of infrastructure and is using for the production of its goods and services, like Vehicles such as trucks, Machinery, Office furniture, Land, Wood and Buildings. These assets are illiquid and aren't easily convertible into cash. The assets aren't sold or eaten by the business and its personnel. Instead, it is utilized for manufacturing items and services. Tangible fixed-income assets can undergo depreciation to gradually decrease their recorded value. Tangible assets including structures, machinery, and technology are depreciable. Land is unable to be depreciated until it has natural resources as it does not diminish in value over time. So, these assets are very important to investigate in public sectors because these are playing important role for production of new goods by using of old inputs.

Table- II This table is showing the increment of total fixed assets on the basis of GDP in Pakistan. Fixed assets index; in percentage

2008	15.3%
2009	15.6%
2010	21.3%
2011	20%
2012	17.4%
2013	15%
2014	11.8%
2915	10.9%

E. Foreign Direct Investment:

Is a purchase by an organization or person in a single nation into commercial endeavors in another nation? FDI occurs when a shareholder creates business activities or purchases intellectual property from foreign company. FDIs are different from investing in portfolios, when an investor buys stocks at foreign companies.

F. Role of Foreign Direct Investment:

Foreign investments usually go towards open economies with a skilled workforce and promising growth opportunities, as opposed to tightly regulated ones. Foreign direct investment frequently encompasses greater than simply a financial investment. This may also involve provisions regarding leadership or innovation. Foreign direct investment can be defined by gaining significant control or influence over the way decisions are made in a foreign business. The Bureau of Economic Analysis stated that foreign direct investors spent $4.46 trillion in U.S. enterprises by the conclusion of 2019. Manufacturers was the leading industry, receiving slightly more than 40% of Foreign Direct Investment (FDI) in 2019. A notable correlation among Foreign Direct Investment (FDI) and economic growth has been acknowledged since the mid-1980s. Foreign Direct Investment (FDI) fosters evolution in the economy directly and indirectly through its interaction with human capital.

Table- III Pakistan foreign Direct Investment:

YEAR	% OF GDP	INFLOWS, US DOLLAR
2019	0.80	2.22 B
2018	0.55	1.74 B
2017	0.82	2.50 B

G. Advancement of Technology:

Technological progress obliges to development that requires investment in new tackle and structure changing, the latest technology in a way to comprehend its benefits.

H. Benefits of advancement of Technology:

It has good effects for production of finished goods that are directly affected for GDP.

New technology demonstrates also affected for employee's progress.

Updated technology helps to avoid becoming archaic.

Update technology boost the economic culture.

Pakistan is currently on track to become one of the most rapidly developing economies in Asia, with 720 startups established within the nation since 2020, representing a rise of 67 percent in investment. The government is implementing evaluates to establish a conducive environment for economic growth, including easing regulatory restrictions and offering a year's worth of tax reductions. Pakistan has improved its global ranking from 136th out of for 108th within 2019, attracting $18.8 million for technological investments. The technology sector has facilitated greater access to local funding, leading to increased funding from investors such as Fatima Gobi Ventures and active angel investors.

Therefore, Technological progress and economic development are closely interconnected. Technology level significantly influences economic growth. Rapid expansion can be achieved throughout with the assistance of advanced technology. Technological progress drives economic growth. This study aims to evaluate the correlation between accountability along with key GDP parameters that have the greatest beneficial and have good impacts on the expansion of GDP. This research endeavor consists of two parts.

The first step involves testing for stationarity using traditional Augmented Dickey-Fuller (ADF) tests,

While 2nd one base on the causality tests that is based on ARDL bound tests with application of integration of all variables bases of unit rot tests and after that other statistical tool are follow for interpretation of results in different moods.

Figure is showing the complete frame work of the relationship of methods that will be applied to calculate different effects on the GDP factors.
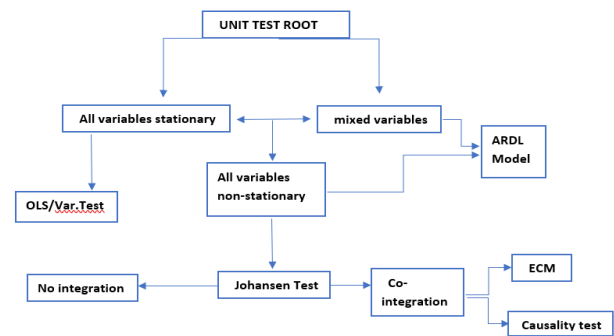
I. Analytical techniques:

a. Unit root tests:

Prior to doing a correlation test for analyses of period series, it can be essential to test the factors for stationarity. They are going to employ ADF tests developed by Phillips and Perron in 1988 to detrend the data and separate the constant and pattern effects using the generalized least squares (GLS) technique. This will be done before estimating the effect size using the Dickey-Fuller analysis suggested by Elliott et al. (1996) and Vougas (2007) [29]. Additionally, we will use the ARDL bound examine to regulate the command of combining entirely variables through unit root testing. The variables under test ought to lack nonstationary (I(2)) in order to prevent inaccurate outcomes. These results will represent that all results are non-stationary at suitable level.

J. Specification of Model:

This model is very useful for find out the relationship between economics variables. It bases on different test like ADF for Stationarity. It is clear and helpful for time series analysis and interpretation and before bounds test it also find-out the integration between all variables so, from this way it is suitable to generate appropriate results.

a. Ardl model:

The Autoregressive Distributed Lag (ARDL) tactic is utilized for calculating both long-term and short-term associations as well as the dynamic interaction among variables. Pesaran et al. established an ARDL Testing technique in 2001 to explore the presence of an interaction among factors. This technique offers three precise advantages: It avoids the issue regarding integration sequence associated with the Johansen likely approach by Johansen & Juselius (1990) [30]. Most conformist multivariable co-integration approaches are mostly applicable to big numbers of samples. M. Hashem Pesaran (2001) [31] suggests that the 81 technique is appropriate for low sample size studies as it provides independent estimations regarding both long-term and short-term effects, together with correct t-statistics even when certain regressions were endogenous. Harris (2003) [32]

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But here ARDL model will be estimated in form to test the co-integration relationship between the variables: administration accountability, Net foreign direct investment, fixed capital and advancement of technology.

The ARDL restrictions testing technique remains used to guesstimate equations. The research will utilize Autoregressive Distributed Lag (ARDL) with four variables through Ordinary Least Squares (OLS) to look at the presence of a lasting association among the variables. It includes using an F-test aimed at evaluating the importance of values about the lag time sequence to each variable along with a vector autoregressive model of sequence p.

Were, St is column trajectory or base variable or output composed of four variables

St = f (A.Act, FDIt, FCt, A.Tct)

ARDL selected for this study because it has three main advantages,

It is not necessary for every factor to be incorporated in the exact same sequence, yet it may be applied when the fundamental variables have been incorporated of ordering one, a value of zero and fractional. It is especially effective for tiny and restricted data samples. According to several academics, it provides impartial estimates of long-term models. The ARDL framework used in this work is presented as follows,

D(ln(A.Act)=a01+b11 ln(A.Act-1)+b21 ln(F.Ct-1)+b31 ln(FDIt-1)+b41 ln(T.Ct-1))+∑a1iD(ln(A.Act-i))

∑ a2i D(ln(F.Ct-i))+∑ a3i D(ln(FDIt-i))+∑ a4i D(ln(T.Ct-i))+€1t…………(1)   (i=1,2,3,4)

D(ln(F.Ct))= a02+b12 ln(A.Act-1)+b22 ln(F.Ct-1)+b31 ln(FDIt-1)+ b41 ln(T.Ct-1))+∑ a1i D(ln(F.Ct-i))+∑a2i D(ln(A.Act-i))+∑a3iD(ln(FDIt-i))+∑a4iD(ln(T.Ct-i))+€2t… ………..(2)   (i=1,2,3,4)

D(ln(F.Dt))= a03+b13 ln(A.Act-1)+b23 ln(F.Ct-1)+b33 ln(FDIt-1)+ b43 ln(T.Ct-1)+

∑a1iD(ln(FDIt-i))+∑a2iD(ln(F.Ct-i))+∑a3iD(ln(A.Act-i))+ ∑a4i(ln(T.Ct-i))+€3t…………..(3)   (i=1,2,3,4)

D(ln(T.Ct))= a04+b14 ln(A.Act-1)+b24 ln(F.Ct-1)+b34 ln(FDIt-1)+ b44 ln(T.Ct-1)+∑ a1i D(ln(T.Ct-I))+∑a2i D(ln(F.Ct-i))+∑a3iD(ln(FDIt-i))+∑a4iD(ln(A.Act-i)+€4t… ……..(4)

In these equation "ln" remains the logarithmic operative while "D" is the variance and "€" represent the error relations.

BOUNDS Test:

The evaluation is mainly based on the cumulative F-statistic, that follows linear asynchronous dispersion assuming no co-integration. First stage is to estimate four formulas utilizing Ordinary Least Squares (OLS) to find a long-standing connection among variables. Assessment is conducted by employing an F-test to determine the significance of the correlations of lagged levels of variables. Hence,

H0: b1i=b2i=b3i=b4i=0

Against alternative,

H1: b1i≠b2i≠b3i≠b4i≠ 0 for (i=1, 2, 3, 4)

F-statistic of test which normalize on A.Ac that will be,

FAA.c = (AA.c/F.C, FDI, T.C)

FF.C = (F.C/AA.c, FDI, T.C)

FFDI = (FDI/AA.c, FCI, T.C)

FT.C = (T.C/AA.c, FDI, F.C)

The minimum and maximum value ranges are determined using a predefined significance threshold to feed calculating assumptions regarding all variables included in ARDL, which have been incorporated of degree zero. If the number exceeds the lower boundaries value, the null assumption of a lack of co-integration has been ruled out and the coefficient of F is going to be reduced.

Granger long Route causality test:

When co-integration has been verified, the conditional autoregressive distributed lag (ARDL) the longer-term model with lag orders q, q1, q2, and q3 is used.

Ln(AA.ct)=a0+∑a1i ln(AA.ct-i)+∑a2i ln(F.Ct-i)+∑a3i ln(FDIt-i)+∑a4i ln(T.Ct-i)+€t…………(5)

And these variables have been already defined. The orders of ARDL (p,q1,q2,q3) four variables are selected from AIC.

D(ln(GDPt))=a0+∑a1iD(ln(A.Act-i))+∑a2iD(ln(F.Ct-i))+∑ a3iD(ln(FDIt-i)+∑a4iD(ln(T.Ct-i))+αECTt-1+€t………….(6)

D(ln(AAct)=a0+∑a1iD(ln(A.Act-i))+∑a2iD(ln(F.Ct-i))+∑a 3iD(ln(FDIt-i))+∑a4iD(ln(T.Ct-i))+€1t....................(7)

D(ln(F.Ct))=a0+∑a1iD(ln(F.Ct-i))+∑a2iD(ln(A.Act-i))+∑a3 iD(ln(FDIt-i))+∑a4iD(ln(T.Ct-i))+€2t……………(8)

D(ln(FDIt))=a0+∑a1iD(ln(FDIt-i))+∑a2iD(ln(F.Ct-i))+∑a3i D(ln(A.Act-i))+∑a4i(ln(T.Ct-i))+€3t………(9)

D(ln(T.Ct))=a0+∑a1iD(ln(T.Ct-I))+∑a2iD(ln(F.Ct-i))+∑a3i D(ln(FDIt-i))+∑a4iD(ln(A.Act-i)+€4t…..........(10)

Descriptive statistics:

the quantitative annual time series data on economic indicators, FDI (Foreign Direct Investment), Fixed Capital, advancement of technology, and the Accountability ratio covering the period from 1996 to 2019.Different techniques will be used by us in which mean, median, standard deviation, Kortosis, co-efficients, probability, correlation for more authentic explanation of effects.

- Average, Mode, Highest, and Lowest:

The Average, Mode, Highest, and Lowest values provide a central tendency and range of the data for each variable. For example, the mean and median values for each variable give an indication of the typical level of the economic indicators over the period, while the maximum and minimum values show the range of variation.

- Standard Deviation:

The deviation from the mean quantifies the level of variability or spread within the dataset. Larger standard deviation signifies greater variation in the readings of economic gauges throughout the time frame.

- Skewness and Kurtosis:

Skewness assesses the level of symmetry in the distribution, whereas kurtosis evaluates the thickness of the tails in the distribution. A skewness number near 0 suggests a distribution that is mostly symmetrical, whereas kurtosis assesses the existence of abnormal values within the dataset.

- Jarque-Bera Assessment:

The test known as Jarque-Bera assesses the normalcy of data. The test statistic and probability provide information about whether the data for each variable follows a normal distribution. A lower probability indicates that the data may not be normally distributed.

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- Sum and Sum of Squared Deviations:

The total variance along with average of the squared differences offer comprehensive assessments of the overall values and variance of the financial indicators during the whole-time frame.

- Observations:

From 1996 to 2019, the total number of observed represents the sample length or the amount of information points for every factor.

Table- IV

	AC	FC	FDI	TA
Mean	2.074958	15.13808	2.864833	0.307875
Median	2.500000	14.93950	2.679500	0.269000
Maximum	3.000000	17.73200	5.361000	0.633000
Minimum	0.400000	12.52100	1.325000	0.109000
Std. Dev.	0.923391	1.450065	1.011131	0.150784
Skewness	-0.732090	0.246739	0.635362	0.631140
Kurtosis	1.988799	2.174035	2.998150	2.619956
Jarque-Bera	3.166350	0.925738	1.614742	1.737782
Probability	0.205322	0.629475	0.446029	0.419416
Sum	49.79900	363.3140	68.75600	7.389000
Sum Sq. Dev.	19.61095	48.36186	23.51488	0.522923
Observations	24	24	24	24

Correlation

Intensity along with the direction that the linear link among two variables are measured by correlation coefficients. They will examine the association between economic indices (FDI, Fixed Capital), technological development, and visibility from 1996 through 2019. Pearson correlation coefficient approaching 1 suggests a robust upward linear association, while -1 suggests a strong unfavorable linear connection. Coefficients near 0 indicate little or no linear connection. Additionally, the amplitude and trend of the linear connections between those factors (advancement of innovation), FC (Fixed Capital), FDI (Foreign Direct Investment), along with TA (Accountability ratio) are presented in the data table.

Table- V Results of Correlation

	AC	FC	FDI	TA
AC	1	-0.28905720835576674	0.1757819421771309	0.476416856618508 2
FC	-0.2890572083576674	1	0.2020402938769034	0.312151839679639 9
FDI	0.1757819421771309	0.2020402938769034	1	0.3783330556824 71
TA	0.4764168566185082	0.3121518396796399	0.3783330556824 71	1

The correlation value among AC with FC is around -0.289, suggesting a weak adverse linear correlation, while the correlation among AC with FDI is about 0.176, suggesting a poor linear positive association. The correlation factor among AC with TA is around 0.476, suggesting a modest positive linear link. The correlation value among FC with FDI is around 0.202, suggesting a poor linear positive connection. The correlation coefficient between FC and TA is about 0.312, indicating a weak positive linear relationship. The association coefficient between Foreign Direct Investment (FDI) and Total Assets (TA) is around 0.378, suggesting a modest positive linear relationship. These correlation coefficients can provide insights into the relationships between the economic indicators and the advancement of technology, as well as their impact on the Accountability ratio over the specified period.

2nd test

Factors Accountability ratio (TA), Advancement of Innovation (AC), Fixed Capital (FC), and Foreign Direct Investment (FDI) as determined by paired Granger causality analyses conducted between 1996 as well as 2019. To find out if a single series variable may predict another, one uses Granger causality analyses.

Table- VI

Pairwise Granger Causality Tests			
Date: 12/14/20 Time: 17:29			
Sample: 1996 2019			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
FC no Granger Cause AC	22	0.32627	0.7260
AC no Granger Cause FC		1.20590	0.3238
FDI no Granger Cause AC	22	0.15254	0.8597
AC no Granger Cause FDI		0.14930	0.8624
TA no Granger Cause AC	22	0.76559	0.4804
AC no Granger Cause TA		0.15944	0.8539
FDI no Granger Cause FC	22	3.41078	0.0568
FC no Granger Cause FDI		0.97133	0.3986
TA no Granger Cause FC	22	0.66123	0.5290
FC no Granger Cause TA		0.19779	0.8224
TA no Granger Cause FDI	22	1.08590	0.3599
FDI no Granger Cause TA		0.23800	0.7908

- Null Hypothesis:

- For every combination of factors, this row lists the assumption of null that is being checked. In all of these cases, the null assumption implies that the initial variable is not causing the second factor.

- Obs:

This column indicates the number of observations used in the test.

- F-Statistic:

The F-statistic tells us how important the curve is as a whole. In this case, the delay numbers of the possibly causing variable are used to see how well they can foresee a possibly triggered variable.

- Prob:

P-value for the F-statistic can be seen in this column. p-value shows how likely it is that the specified F-statistic will be seen if the null assumption is true. There is more evidence toward the null assumption when the p-value was smaller.

IV. RESULT AND DISCUSSION

A. Interpreting the Results:

Two experiments are performed for every combination of variables: if the initial Granger affects the second along with if the second affects the first. When the p-value (Probability) is lower than 0.05, idea of a null fails and Granger affects the second factor. When the p-value exceeds than the threshold for significance stage, the null assumption cannot be rejected, and the initial variable fails to Granger influence the second factor.

B. Based on the results

The Granger-Causality analyses among FC, FDI, and TA have p-values over 0.05. It has not enough proof to disprove the null assumption that these factors cannot Granger cause one another. The p-values over FC and FDI, FC and TA, and FDI and TA all exceed more than 0.05, suggesting not enough proof to disprove the unproven theory that those factors cannot Granger affect one another. The analysis is FDI Granger producing FC has a p-value = 0.0568, so it's approximately 0.05.

These findings show that the factors may not have a Granger causal link during the selected time span. The FDI-FC test is near to significant, suggesting a relationship which might deserve further examination. Graphing FC, AC, FDI, with TA time series information with a Granger causality analysis finding.
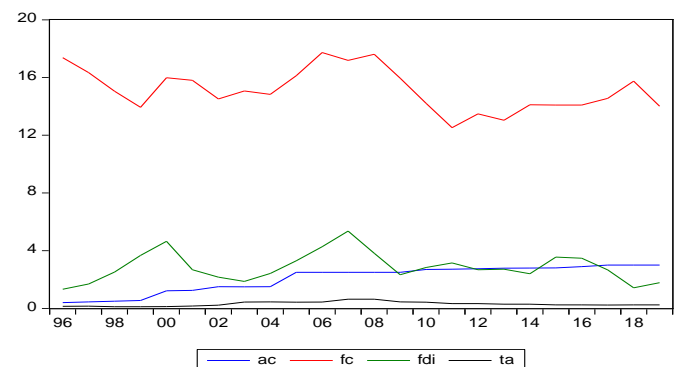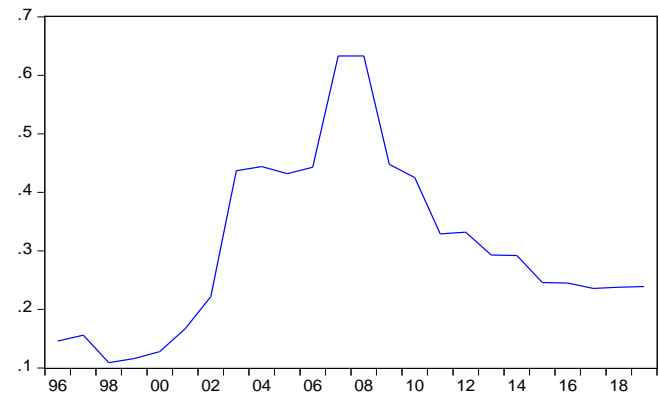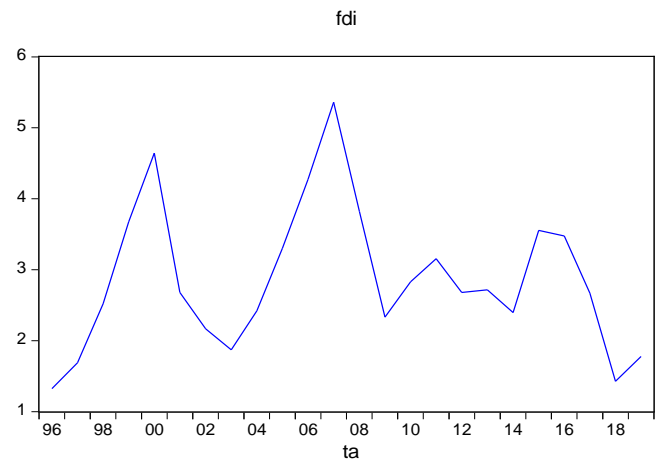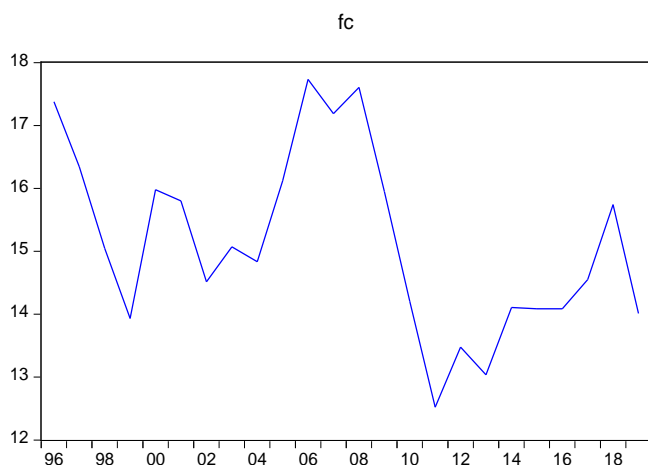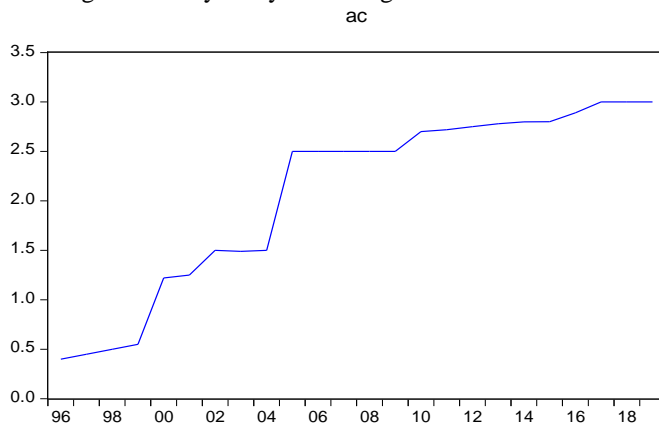

Table- VII

ARDL Bounds Test
Date: 01/03/21   Time: 13:51
Sample: 2000 2019
Included observations: 20

Null Hypothesis: No long-run relationships exist

| Test Statistic	Value	k
F-statistic	3.527411	3
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

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Test Equation:				
Dependent Variable: D(AC)				
Method: Least Squares				
Date: 01/03/21 Time: 13:51				
Sample: 2000 2019				
Included observations: 20				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FC)	-0.122532	0.077655	-1.577907	0.1657
D(FC(-1))	-0.208865	0.076709	-2.722826	0.0345
D(FDI)	-0.041684	0.110470	-0.377332	0.7189
D(FDI(-1))	0.564145	0.222424	2.536348	0.0443
D(FDI(-2))	0.397923	0.164590	2.417659	0.0520
D(FDI(-3))	0.271988	0.111634	2.436426	0.0507
D(TA)	-0.793096	0.675417	-1.174230	0.2848
D(TA(-1))	-0.316580	0.747586	-0.423469	0.6867
D(TA(-2))	0.969923	0.868119	1.117270	0.3066
C	1.744598	1.020681	1.709248	0.1383
FC(-1)	0.046277	0.072246	0.640542	0.5455
FDI(-1)	-0.705619	0.319379	-2.209346	0.0692
TA(-1)	0.308748	0.765499	0.403330	0.7007
AC(-1)	-0.116505	0.098362	-1.184452	0.2810
R-squared	0.871321	Mean dependent var		0.122500
Adjusted R-squared	0.592517	S.D. dependent var		0.259061
S.E. of regression	0.165370	Akaike info criterion		-0.565237
Sum squared resid	0.164083	Schwarz criterion		0.131776
Log likelihood	19.65237	Hannan-Quinn criter.		-0.429172
F-statistic	3.125207	Durbin-Watson stat		2.823787
Prob(F-statistic)	0.085022			

F-statistic result from the analysis is 3.527411, which is in contrast to crucial values to assess relationship relevance. The essential values under 10%, 5%, 2.5%, along with 1% degrees of significance are compared. Every random variable's coefficients, average errors, t-statistics, likelihoods, and values that lag are shown in the evaluation equation. Coefficients show how each variable affects accountability ratio. Its t-statistics and probability show these affects' statistical significance. The framework explains 87.13% the reliant variable's variance, according to the R-squared statistic of 0.871321. The revised R-squared value is 0.592517, indicating therefore this model might not fit well and that other factors may have been overlooked. The F-statistic along with coefficient probability reveal relationship importance. Its explanatory power was near to statistically meaningful around the threshold of five percent, having an F-statistic likelihood of 0.085022. The research reveals that the responsibility ratio could be related to the independent variables, however the model isn't significant. In order to comprehend the factors' long-term correlations, more research and model refinement may be needed.

C. Model Stability

Model stability examinations, such as CUSUM and CUSUM square tests, assess long-term and short-term sustainability. Blue lines have to appear among red lines to indicate CUSUM exam reliability and accuracy. Since the blue lines were among the reddish lines, the predicted results were stable.

CUSUM ——— 5% Significance

CUSUM of Squares ----- 5% Significance
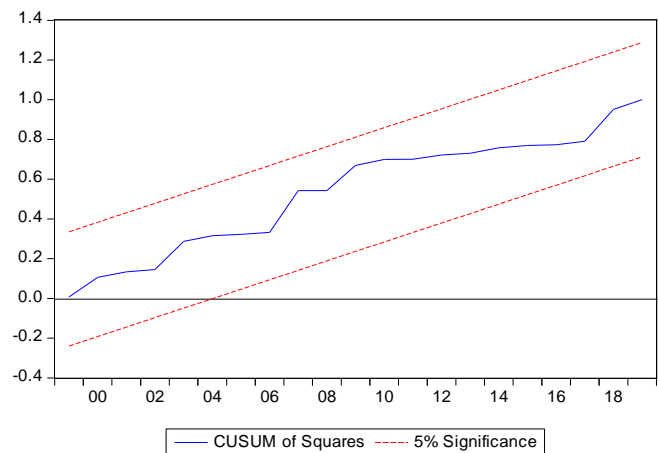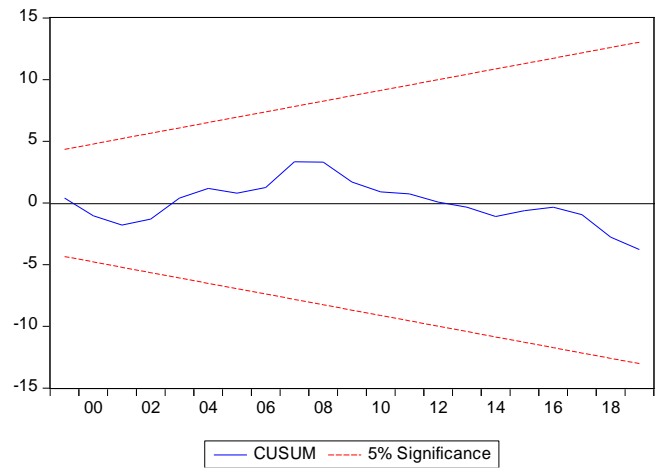
D. Statistical Significance and Interpretation

a. Statistical Significance:

Granger causality study examines the causal connection among variables by determining if previous outcomes predict the present ones. The analysis shows statistically if one factor "Granger-causes" another. Granger causality examinations show the degree of causal links between factors.

b. Interpretation:

Granger causality analysis may identify the causative relationship between independent factors (e.g., foreign direct investment, fixed investment, with technical advancement) along with the accountability proportion. Significant outcomes from Granger causality show that uncorrelated variables affect accountability proportion. The examination can reveal dynamic connections among variables as lead-lag connections. Granger causality research can inform decisions and policies based on connections between variables.

c. Statistical Significance:

The ARDL bounds test resulted in an F-statistic value of 3.527411, which was compared against critical values at different significance levels. The model explains approximately 87.13% of the variation in the dependent variable (R-squared = 0.871321). The adjusted R-squared value of 0.592517 suggests that the model may not be the best fit, indicating potential unaccounted factors.

The probabilities associated with the F-statistic and individual coefficients provide insights into the significance of the relationships.

d. Interpretation:

The ARDL limits test yielded as F-statistic score of 3.527411, that was compared to critical values for different significance thresholds. The model predicts 87.13% for the dependent factor variation (R-squared Value 0.871321). The corrected R-squared score of 0.592517 implies that the hypothesis might not fit well due to unexplained factors. The F-statistic while coefficient probability reveals relationship importance.

e. Discussion

Using the Autoregressive Distributed Lag (ARDL) constraints analysis as well as Granger causality evaluation, the article examined long-term correlations among foreign direct investment, fixed capital, technical advancement, as well as accountability proportion. The study examined how these distinct variables affected the responsibility ratio and their dynamics as time went by. The ARDL bounds test showed that the framework described 87.13% of responsibility ratio fluctuation, demonstrating some links between variables that are independent with the factor that is dependent. Yet, the corrected R-squared value showed unexplained factors affecting the transparency ratio, requiring additional research and model development. In addition, Granger causality analysis examined the causal linkages among variables that were independent as well as responsibility ratio. This investigation examined whether foreign direct investment, fixed capital, and technology advancement Granger affect accountability ratios. Granger causality test degrees of significance revealed causal relationship intensity and direction. The study used the ARDL limits test along with Granger causality evaluation to understand responsibility ratio components. The ARDL framework revealed general correlations between variables, but Granger causality study revealed dynamic interactions with causal effects. The results indicate that foreign direct investment, fixed investment, technological advancement, as well as the accountability proportion are linked. The simulation's predictive value may be low, suggesting undiscovered accountability ratio considerations. To better comprehend these links and guide accountability as well as economic growth strategy, more study, model modification, more variables are suggested.

V. CONCLUSION & RECOMMENDATIONS

The research aimed to investigate the association among GDP indicators while the accountability proportion in Pakistan, with an emphasis on establishing a causal connection between treatment, GDP growth, while the impact of transparency in chosen variables like foreign direct investment (FDI), fixed capital, and technological advancement. The investigation used quantitative methodologies along with time sequence information to use Bounds examination in order to determine the long-term correlations between each variable. The study utilized Augmented Dickey-Fuller (ADF) checks to evaluate stationary patterns and ARDL (Autoregressive Distributed Lag) boundary analyses to establish causal links.

The correlation analysis revealed strong positive linear relationships between fixed capital and technology advancement, as well as moderate positive linear relationships between FDI, technology advancement, and the accountability ratio. However, the Granger causality tests did not indicate significant causal relationships between the variables within the specified time frame. While the study did not find significant Granger causal relationships, it did suggest a potential relationship between FDI and fixed capital that may warrant further investigation. The results highlight the complexity of the interactions between economic indicators and accountability measures, emphasizing the need for continued research to better understand the dynamics at play.

The study provides useful insights regarding the links between economic indicators and fiscal responsibility in Pakistan. The results highlight the significance of examining many elements that impact economic growth with responsibility, emphasizing the necessity for additional research to improve our comprehension of these connections. These insights can help legislators and other interested parties make educated decisions to promote equitable economic growth and transparent standards throughout the nation as a whole.

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Ethical Approval and Consent to Participate	No, the article does not require ethical approval and consent to participate with evidence.
Availability of Data and Material	Not relevant.
Authors Contributions	I am only the sole author in this aticle.

REFERENCES

1. Caldera Sánchez, A., Rasmussen, M., & Röhn, O. (2016). Economic Resilience: What Role for Policies? Journal of International Commerce, Economics and Policy, 07(02), 1650009. https://doi.org/10.1142/S1793993316500095
2. Tarverdi, Y., Saha, S., & Campbell, N. (2019). Governance, democracy and development. Economic Analysis and Policy, 63, 220–233. https://doi.org/10.1016/j.eap.2019.06.005
3. Kundi, G. M. (2008). DIGITAL PAKISTAN: OPPORTUNITIES & CHALLENGES. JISTEM Journal of Information Systems and Technology Management, 5(2), 365–390. https://doi.org/10.4301/S1807-17752008000200009
4. Latif, Z., Tunio, M. Z., Pathan, Z. H., Jianqiu, Z., Ximei, L., & Sadozai, S. K. (2018). A review of policies concerning development of big data industry in Pakistan: Subtitle: Development of big data industry in Pakistan. 2018 International Conference on Computing, Mathematics and Engineering Technologies (ICoMET), 1–5.

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5. Jan Fagerberg. (1994). Technology and International Differences in Growth Rates. https://doi.org/https://www.jstor.org/stable/2728605
6. Rehman, A., Ma, H., Ahmad, M., Ozturk, I., & Işık, C. (2021). Estimating the connection of information technology, foreign direct investment, trade, renewable energy and economic progress in Pakistan: evidence from ARDL approach and cointegrating regression analysis. Environmental Science and Pollution Research, 28(36), 50623–50635. https://doi.org/10.1007/s11356-021-14303-9
7. Acemoglu, D., Johnson, S., & Robinson, J. A. (n.d.). INSTITUTIONS AS A FUNDAMENTAL CAUSE OF LONG-RUN GROWTH.
8. Dobler, C. (2011). The impact of formal and informal institutions on economic growth: a case study on the MENA region. Peter Lang.
9. "Pakistan." Our World in Data, ourworldindata.org/country/pakistan.
10. "Documents & Reports - All Documents | the World Bank." World Bank, documents1.worldbank.org.
11. Hassan, M., & Zeb, R. (2021). Analysing the Impact of Good Governance on Socio-Economic Development: A Case Study of Pakistan. NUST Journal of Social Sciences and Humanities, 7(1), 1–35. https://doi.org/10.51732/njssh.v7i1.73
12. Akhter, F., & Ummara, U. (2020). Impact of Good Governance on Sustainable Economic Development: Pakistan's Case. Cross Current International Journal of Economics, Management and Media Studies, 2(7), 107–112. https://doi.org/10.36344/ccijemms.2020.v02i07.002
13. Zaman, S., & Saeed, S. (2019). Good Governance as an Instauration Towards Socioeconomic Development: a Case Study of Pakistan. Journal of Public Administration and Governance, 9(3), 58. https://doi.org/10.5296/jpag.v9i3.15168
14. Khushnood, E., Channa, Z. H., Bhutto, M., & Ali Erri, M. (2020). Impact of Good Governance Indicators on the Inflow of Foreign Direct Investment (FDI) In Pakistan. NICE Research Journal, 69–83. https://doi.org/10.51239/nrjss.v0i0.175
15. Eshiet, I. (2019). Voice and Accountability. International Journal of Political Activism and Engagement, 6(3), 10–22. https://doi.org/10.4018/IJPAE.2019070102
16. Eshiet, I. (2022). Voice and Accountability. In Research Anthology on Citizen Engagement and Activism for Social Change (pp. 18–27). IGI Global. https://doi.org/10.4018/978-1-6684-3706-3.ch002
17. Mehrotra, S. (2006). Governance and basic social services: ensuring accountability in service delivery through deep democratic decentralization. Journal of International Development, 18(2), 263–283. https://doi.org/10.1002/jid.1219
18. Ivanyna, M., & Salerno, A. (2021). Governance for Inclusive Growth. IMF Working Papers, 2021(098), 1. https://doi.org/10.5089/9781513582467.001
19. Beck, T. (2011). The Role of Finance in Economic Development: Benefits, Risks, and Politics. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.1974471
20. Dzhumashev, R. (2014). Corruption and growth: The role of governance, public spending, and economic development. Economic Modelling, 37, 202–215. https://doi.org/10.1016/j.econmod.2013.11.007
21. Fontaine, G., Medrano Caviedes, C., & Narváez, I. (2020). Public Accountability Deficits as a Policy Problem (pp. 1–18). https://doi.org/10.1007/978-3-030-28995-9_1
22. Fosu, A. (2006). Institutions, Governance and Economic Development in Africa: An Overview. Journal of African Economies, 15(Supplement 1), 1–9. https://doi.org/10.1093/jae/ejk004
23. Graziano Abratey. (2014). Corruption, Accountability and E¢ ciency. An Application to Municipal Solid Waste Services.
24. lagunes_perustudy. (2018). Guardians of Accountability: A Field Experiment on Corruption & Inefficiency.
25. Bartelmus, P. (1992). Accounting for sustainable growth and development. Structural Change and Economic Dynamics, 3(2), 241–260. https://doi.org/10.1016/0954-349X(92)90005-Q
26. Gberevbie, D., Joshua, S., Excellence-Oluye, N., & Oyeyemi, A. (2017). Accountability for Sustainable Development and the Challenges of Leadership in Nigeria, 1999-2015. SAGE Open, 7(4), 215824401774295. https://doi.org/10.1177/2158244017742951
27. THE WORLD BANK Washington, D. C. (2003). Better Governance for Development in the Middle East and North Africa (C. Humphreys & A. Banerji, Eds.). The World Bank. https://doi.org/10.1596/0-8213-5635-6
28. Scobie, M. (2018). Accountability in climate change governance and Caribbean SIDS. Environment, Development and Sustainability, 20(2), 769–787. https://doi.org/10.1007/s10668-017-9909-9
29. Vougas, D. V. (2007). GLS detrending and unit root testing. Economics Letters, 97(3), 222–229. https://doi.org/10.1016/j.econlet.2007.03.016
30. Johansen, S., & Juselius, K. (1990). MAXIMUM LIKELIHOOD ESTIMATION AND INFERENCE ON COINTEGRATION — WITH APPLICATIONS TO THE DEMAND FOR MONEY. Oxford Bulletin of Economics and Statistics, 52(2), 169–210. https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x
31. M. Hashem Pesaran, Y. S. and R. J. S. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. Https://Www.Jstor.Org/, 16.
32. Harris, R. and S. R. (2003). Applied Time Series Modelling and Forecasting. Applied Time Series Modelling and Forecasting. https://eprints.gla.ac.uk/33105/

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