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Exploring the dynamics of Bangladesh bank's monetary policy: A factor analysis approach

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ABSTRACT

This study examined the factors influencing the monetary policy of Bangladesh Bank using a structured questionnaire to interview 207 sample respondents from Bangladesh Bank and 19 listed private conventional commercial banks. The study analyzed and interpreted respondents' opinions using descriptive statistics and varimax rotated factor analysis. The study identified the effect level of various factors influencing the monetary policy of the Bangladesh Bank and ranked the factor variables from 1 to 24 based on the adjusted mean score. The researchers found that the most influential factors in the monetary policy of Bangladesh Bank are price risk, market operations, political-economic variables, and governance. In contrast, the most negligible significant factors are price stability and market liquidity based on the varimax rotated factor analysis. Therefore, the study found that the researcher's set of monetary policy factors has significant implications for the Bangladesh Bank's monetary policy.

I. Introduction

Bangladesh is one of the fastest-growing economies in the world as well as the fastest-growing economy in South Asia. While many policy variables have contributed to Bangladesh's prosperity, one of the most important is the country's monetary policy. Monetary policy has become the underpinning of each country's economy, and it has an influence on everyone from individuals to large financial organizations, both local and international, as well as on the whole economy (Goodfriend and King, 1988). Monetary policy seeks to generate macroeconomic stability and a long-term economic growth tendency (Akalpler and Duhok, 2018). Monetary policy is a term that refers to the process through which a country's central bank manages the quantity of money, its availability, and the rate of interest in order to achieve a set of economic growth and stability goals. Monetary policy is predicated on the link between the total quantity of money, interest rates, and the cost of borrowing money. This policy uses several types of devices to influence the exchange rates, growth of the economy, inflation, various currencies, unemployment, interest rates, etc. (Hameed, 2010). Monetary policy deals with the control of discretionary amounts of money by the central bank and is mainly focused on stabilizing prices through targeting inflation rates and exchange rates, leading to a stimulating positive balance of payments and a labor-acceptable level. Further influences the level of economic output growth rate, measured by the sum of excessive liquidity in the economy (Chowdhury and Afzal, 2015). Monetary policy is an important tool in macroeconomic management since it influences economic variables such as job creation, price stability, economic growth, and agricultural prices on the balance sheet, all of which are believed to be affected by monetary policy in some way (Anowor and Okorie, 2016; Precious, 2014).

The central bank of Bangladesh has considered the essential factors influencing the monetary policy while designing and formulating the monetary policy statement (MPS) for regulating the supply and demand for money in the money market. Several external and internal variables significantly influence the central bank's ability to formulate and execute sound monetary policy. The elements undermining the central bank's efficiency are considerably external, or exogenous, as fiscal dominance, dollarization, and global concerns are emphasized. However, some internal aspects such as tools, strategy, and governance should be considered. It will be essential to execute sustained fiscal discipline, flexible

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and targeted dollarization initiatives, and resilient economic growth strategies for monetary policy's long-term efficacy (Pinshi, 2020). Therefore, the economy, and consequently the monetary policy process, are constantly threatened by factors outside the central bank's control and often from sources beyond the jurisdiction of other national government institutions. External factors have a significant influence on the transmission processes inside monetary policy transmission channels and, therefore, on central bank decision-making. External variables that may impact changes in the global economy include commodity price shocks, financial market volatility, national regulations, and fiscal policy. On the other hand, other exogenous factors may arise from a wide range of external events, and the central bank must be skilled in detecting monetary transmission mutations. In an increasingly global economy, the ability of the central bank to accomplish monetary policy objectives is a must (Dan, 2013).

In this study, the researchers delved into the intricate web of factors shaping the monetary policy of the Bangladesh Bank, a critical component in the nation's rapid economic growth. Utilizing a comprehensive approach, involving 207 respondents from Bangladesh Bank and 19 listed private conventional commercial banks, the study employed a structured questionnaire and statistical analyses, including descriptive statistics and varimax rotated factor analysis. The findings unveiled a nuanced hierarchy of factors influencing the monetary policy, with price risk, market operations, political-economic variables, and governance emerging as pivotal considerations. Notably, the study identified previously underestimated factors such as price stability and market liquidity. These results underscore the significance of a nuanced understanding of monetary policy determinants and their relative impact. In the broader context, given Bangladesh's status as one of the fastest-growing economies, the study contributes valuable insights into the intricate dynamics of monetary policy, shedding light on crucial factors that merit attention for sustaining economic stability and growth. The implications of this research extend beyond academia, providing practical guidance for policymakers at the Bangladesh Bank to refine and enhance their monetary policy strategies, considering the multifaceted factors at play. As economic landscapes evolve, recognizing and adapting to these influential factors becomes imperative for maintaining effective monetary policy, fostering economic stability, and supporting long-term growth in Bangladesh.

The study has addressed the main objective of identifying the factors influencing the monetary policy of the Bangladesh Bank. To accomplish the primary goal, the following specific purposes have been addressed:

i. To analyze the operational features of monetary policy in Bangladesh.
ii. To rank the factors influencing the monetary policy of the central bank of Bangladesh.
iii. To explore the different dimensions of determinants of monetary policy in Bangladesh.
iv. To provide some policy implications for improving the operational procedures of monetary policy in Bangladesh.

2. Literature Review

The study has attempted to address the insidious relationship between monetary policy and the money market accordingly. The researcher has made a review of existing literature relating to factors affecting monetary policy published at home and abroad with a view to understanding the nature of the study. Pinshi (2020) has talked about the many outside and inside factors that affect how well the Bank of Congo's monetary policy works. The external, or exogenous, variables that weaken the BCC's efficacy are emphasized as fiscal supremacy, dollarization, and global dangers. Some internal variables, such as tools, strategies, and governance, must, however, be reconsidered. To ensure the BCC's monetary policy is successful in the long run, it will be important to implement sustained fiscal discipline, flexible and specific de-dollarization measures, and economic growth strategies. Mehndiratta (2019) has aimed to examine existing knowledge of the factors that can influence monetary policy framework selection in developing and established economies. This is done by taking a close look at all of the scientific and real-world data from single-country and multi-country studies. In the research, a number of technical, economic, political, and institutional factors are found to affect the choice of framework for both developed and developing economies. It's also possible to figure out that central banks need to be flexible when making their monetary policy framework and monetary policy so that they can respond to a wide range of shocks and situations. Afsar and Dogan (2017) have explored the effects of monetary policy measures by the monetary authority of Turkey on interest rates using micro-variable interest rates and the GARCH model. The influence of CBRT interest rate announcements on volatility was studied in three possible scenarios: a policy rate rise, a policy rate drop, and an interest rate change. Contractual monetary policy statements were shown to have various impacts on market interest rate volatility evaluated in this research, whereas expansive monetary policy statements lower market interest rate volatility. The findings of the research also demonstrated that changes in monetary policy are less impacted by changes in the money supply on deposits lasting up to one year.

Miah and Banik (2017) have examined the effect of monetary policy on private market lending in Bangladesh from 2004 to 2013. The study uses the Vector Error Correction Model (VECM) and the Johansen joint integration test to find the long-term and short-term dynamic links between monetary policy and private sector lending. The results show that quarterly shocks to monetary policy have a big long-term effect on lending in the private sector. Furthermore, in each of the four lags, all factors, such as credit to the private sector, broad money (M2), interest rates, and credit to the government, have an effect on credit in the private sector, but not on interest rates and credit to the government. Dingela and Khobaai (2017) studied the dynamic effect of money supply on economic growth by looking at time series data from African countries in 2016.This study used the autoregressive distributed boundary approach to test for improvement. It also looked at the effect of money supply and GDP per capita. As an example, it is presented using four macroeconomic variables. These are unquestionably the GDP levy, the broad money supply (M3) interest rate, inflation, and what is the positive statistically related link between a large money supply and economic growth, as well as the long and short ends in them.

Chowdhury (2016) looked at the effects of monetary policy shocks on real and nominal variables in Bangladesh using monthly time series data from June 2003 to June 2015.SVAR (structural vector autoregressive) models and impulse response functions were used to study the effect of domestic monetary policy shocks on output, interest rates, inflation, and the nominal exchange rate. A contractionary monetary policy shock, according to the baseline model, makes the domestic interest rate go up and the domestic currency go up. Both production and inflation went down as a result of the shock, but the effects of the shock were not felt right away. In contrast to prior Bangladesh research, the identification technique utilized in this study was successful in addressing liquidity, pricing, and exchange rate issues. Matemilola, Bany-Ariffin, and Muhtar (2015) have investigated the long-run interest rate that passes from the money market rate to the bank lending rate, as well as the asymmetric adjustment of the bank lending rate. Autoregressive and asymmetric error-correcting models were used in the study. The results of asymmetric error correction show that bank lending rates responded to a decrease in South Africa's money market rate. According to the statistics, South African banking institutions are lowering their lending rates. The loan rate seems stiff and stuffy, confirming the consumer reaction assumption.

Miyajima, Mohanty, and Yetman (2014) have discussed the effectiveness of long-term interest rates in global monetary transmission and associated policy concerns in the aftermath of the US Federal Reserve's unusually loose monetary policy. Using a panel VAR model, it looks at what happens to small, open Asian countries when the US term premium is very low. The results show that the US's unusual monetary policy has a big effect on Asia, mostly through low domestic bond rates and fast growth in domestic bank lending. Financial integration does not seem to lessen the national monetary authorities' authority over short-term policy rates. Based on the findings, the study examines alternative policy alternatives for dealing with variable term and risk premiums. Cocris and Nucu (2013) have investigated, using an interest rate channel, the efficacy of the monetary policy transfer mechanism in Romania. Researchers use a VAR model and impulse response methodology to evaluate the effect on financial indicators of the 2003 M01–2012 M06 era of a positive monetary policy shock through a short-term interest rate. The findings show that the impact of a positive monetary policy shock at interest rates causes macroeconomic variables to move in the expected direction: the industrial production indices contract; consumer prices follow a slightly lower trend in the medium and long term; credit activity decreases; the stock index decreases; and the euro appreciates as a national currency. These effects are remarkable for three of the five referred factors: mechanical generation list, stock record, and advance portfolio. Monetary shocks are essential factors to explain industrial output, the loan portfolio, and the exchange rate. Binici and Yörükoglu (2011) have argued over normal monetary growth practices in periods of high growth, supported adjusting short-term interest rates to take care of price stability. Capital flows remain a challenge for monetary authorities. For instance, capital flows may impose inflationary pressures, requiring tighter monetary policy. Tougher monetary policy can attract additional capital inflows and cause an extra appreciation of the currency, putting the economy in a whirlpool as more risks and fears of monetary stability accumulate, they say. The transmission of monetary policy through the normal rate of interest and rate of exchange channels may have decreased with capital inflows. Islam (2010) has explored the factors impacting Bangladesh's money supply. Government borrowing has a substantial impact on inflation. The research is based on qualitative data from the Bangladesh Bank, Ministry of Finance, Bangladesh Bureau of Statistics (BBS), and the National Strategy for Accelerated Poverty Reduction (NSAPR). Variables have a major impact on both the money supply and M2 growth, according to the study. The C/D, R/D, and E/D ratios, as well as the MB result in the money supply, are all altered in mm. Bank deposits are influenced by changes in the CRR, SLR, bank rate, and interest rate spread; they also contribute to reserve money and money supply fluctuations. Singh (2010) has attempted to explain the conduct of monetary policy in India in the context of Taylor's norms. Despite measurement issues, a set of estimated rules show that, while monetary policy responded more to the product gap than the inflation gap from 1950 to 1987, there was a shift in policy response from 1988 to 2009, with a disproportionately strong response to the inflation gap compared to the product gap. The current inflation gap seems to have elicited a strong pro-monetary policy reaction. The inflation coefficient difference has grown dramatically over time, reflecting a change in monetary policy that prioritizes inflation worries. The central bank's rate-easing conduct has also shifted, from a high level of relaxation before to the gradual adjustment of interest rates in recent months.

Zoli (2005) has investigated the point at which fiscal policy influences monetary policy in developing countries. Evidence indicates a system of monetary dominance in the case of Argentina and Brazil during the 1990s and early 2000s. The results show that financial events significantly affect the margins of sovereignty and exchange rates therein over a period of time. According to the paper, at that point, economic policy may have pushed the economy into a state of equilibrium in which increases in the rate of policy intervention are more likely to be associated with devaluation rather than rate of exchange appreciation. Kuttner (2001) has explored the influence of monetary policy changes on a range of market interest rates. Cook and Hahn-style research may be used to discern variations from expected objectives using the Fed's future data. The application of the methodologies described here to study the consequences of monetary policy in other money markets, such as equities and exchange, would be a fascinating avenue of future study. Its main effect is that there is a strong and stable link between unexpected policy moves and market interest rates, while reactions to expected policy moves are often small. A later conclusion is that, with the exception of the short end of the yield curve, loan fees respond to the Fed's inactivity in the same way they respond to open operations. Third, surprise changes in the target rate have nominal implications on future Fed action expectations, which helps to explain why the expectations theory fails at the short end of the yield curve. Woolley wrote in 1983 that political forces play a role in how monetary policy is made. This article gives a basic classification of the kinds of political issues that have caught the attention of students who want to work on economic policy. But in this way, says Woolley, monetary policy is the same as other government programs. Interests and ideas are coming together around this political balance, which is making it hard to change unless there is a crisis, he says. At the end of the article, a more general look at the importance of political issues and how to study them is given. Students should also resist the urge to turn this question into a battle between politics and economics.

The extensive review of related literature in this study provides a comprehensive understanding of the various factors influencing the monetary policy of the Bangladesh Bank. The literature has explored the operational features of monetary policy, the impact of internal and

external variables on the central bank's ability to formulate effective policies, and the challenges posed by factors such as fiscal dominance, dollarization, and global economic concerns. Additionally, the review has highlighted the crucial role of the central bank in navigating through external shocks and global economic changes.

However, despite the wealth of information presented in the literature, a noticeable research gap persists. While existing studies have shed light on the broad contours of monetary policy in Bangladesh, there is a limited focus on systematically ranking and assessing the relative importance of specific factors influencing the monetary policy of the Bangladesh Bank. The identified research gap points to the need for a more granular analysis that not only identifies these factors but also ranks them in terms of their significance. This research endeavor aims to bridge this gap by employing a structured questionnaire and statistical analyses to provide a nuanced understanding of the hierarchy of factors influencing the monetary policy. By addressing this research gap, the study aspires to make both theoretical and practical contributions to the field. Theoretically, the findings of the study will add depth to the existing body of knowledge by offering a more detailed and refined understanding of the key determinants of monetary policy in Bangladesh. Practically, the results can serve as a valuable guide for policymakers at the Bangladesh Bank, offering insights into which factors demand heightened attention and strategic focus. As such, the study is positioned to contribute meaningfully to the ongoing discourse on monetary policy in Bangladesh, with implications extending beyond academia to inform policy decisions and enhance the effectiveness of the country's monetary strategies.

3. Methodology

The researcher collected primary data by interviewing 207 sample respondents on a structured questionnaire. The study has selected Bangladesh Bank and 19 listed private conventional commercial banks to collect data conveniently. The study has chosen 36 officials from Bangladesh Bank (who are working in the Monetary Policy Department, Regulatory Department, Department of Inspection, and Foreign Exchange Policy and Investment Department of Bangladesh Bank). Besides, the study has purposively selected 171 bank professionals (nine from each sample bank—the Treasury Department, Risk Management Department, and Credit Department). The purposive sampling aims to get accurate information from the concerned officials working to implement monetary policy in their banks. The study has organized this study into analyses of operational features of monetary policy, identification of factors influencing monetary policy based on a literature review and content analysis, ranking of variables influencing monetary policy on the mean score, identification of factors affecting the monetary policy of the Bangladesh Bank based on a varimax rotated factor analysis, identification of principal factors, analysis of factors, ranking of elements on a weighted score, and a summary of the findings. The study then analyzed and interpreted the respondents' opinions using percentages, descriptive statistics, and varimax rotated factor analysis.

3.1 Analyses of operational features of monetary policy in Bangladesh

The study collected the opinions of 207 sample respondents on the operational features of monetary policy in Bangladesh. The opinions of the sample respondents have been discussed as follows:

Table 1: Analysis of objectives of monetary policy

Sl. No.	Set of Objectives of Monetary Policy	Number of Respondents	Percentage of Respondents
i.	To maintain price stability	204	98.6%
ii.	To sustain economic growth	204	98.6%
iii.	To reduce unemployment	171	82.6%
iv.	To maintain reasonable exchange rate	168	81.2%
v.	To control interest rate	192	92.8%
vi.	To increase levels of production	162	78.3%
vii.	To maintain balance of payments equilibrium	159	76.8%
viii.	To regulate currency and reserves	174	84.1%
ix.	To manage the monetary and credit system	180	87%
x.	To preserve the par value of domestic currency	165	79.7%
xi.	To utilize resources to the maximum extent.	138	66.7%
xii.	To control wage rate	120	58%

Notes: Data have been Compiled by the researcher

3.1.1. Analysis of objectives of monetary policy

The researcher has found several essential objectives of the monetary policy of the Bangladesh Bank based on the respondents' opinions. It has been found from the perusal of Table 1 that 98.6% of the respondents are of the view that maintaining price stability and sustaining

economic growth are the most significant objectives of monetary policy. 92.8 percent of the respondents believe that regulating interest rates is one of the goals of monetary policy. According to more than 80% of respondents, the goals of monetary policy are to manage the monetary and credit systems, regulate currency and reserves, reduce unemployment, and maintain a stable exchange rate. 70% of the participants who participated in the survey said monetary policy should aim to maintain a steady exchange rate, increase production, and maintain a healthy balance of payments. In the survey, a minimum number of respondents but a satisfactory level of respondents believes that utilizing resources to the maximum extent and controlling wage rates are the goals of monetary policy, accounting for 66.7% and 58% of respondents, respectively. As a result, the study discovered that various monetary policy objectives are being pursued in response to Bangladesh's economic situation.

3.1.2 Analysis of modus operandi/operational tools used in ımplementing monetary policy

The central bank of Bangladesh has some necessary operational tools to formulate and execute monetary policy in the economy. The study has found several essential functional mechanisms of the monetary policy of the Bangladesh Bank based on the respondents' opinions.

Table 2: Analysis of modus operandi/operational tools used in ımplementing monetary policy

Sl. No.	Modus Operandi / Operational Tools	Number of Respondents	Percentage of Respondents
i.	Interest Rate	198	95.7%
ii.	Bank Rate	192	92.8%
iii.	Open Market Operation	192	92.8%
iv.	Repo Rate	159	76.8%
v.	Reserve Repo	156	75.4%
vi.	Interest Rate on Excess Reserve	138	66.7%
vii.	Cash reserve ratio (CRR)	195	94.2%
viii.	Statutory liquidity ratio (SLR)	186	89.9%
ix.	Credit Deposit Ratio or Investment Deposit Ratio	132	63.8%
x.	Liquidity Coverage Ratio (LCR)	141	68.1%
xi.	Net Stable Funding Ratio (NSFR)	144	69.6%
xii.	Capital Adequacy Ratio	126	60.9%

Sources: Survey Instruments, Notes: Data have been Compiled by the Researcher

It is evident from the examination of Table-2 that 95.7% of the sample respondents believe that the interest rate is the most significant operational instrument of monetary policy. 94.2% of the respondents think that the cash reserve ratio is one of the operational tools of monetary policy. According to more than 90% of respondents, the operational tools of monetary policy are the open market operation and statutory liquidity ratio, with 92.8 percent and 92.8 percent, respectively. The modus operandi of monetary policy, according to more than 75% of respondents, are the statutory liquidity ratio, repo rate, and reserve repo, with 89.9%, 76.8%, and 75.4%, respectively. More than 65% of respondents believe that the net stable funding ratio, liquidity coverage ratio, and interest rate on excess reserves are the operational instruments of the monetary policy of the central bank of Bangladesh. According to the study, 63.8 percent and 60.9 percent of respondents, respectively, think that the credit deposit ratio/investment deposit ratio and capital adequacy ratio are operational instruments of monetary policy. Therefore, the study has found many functional tools of monetary policy that have been used in implementing monetary policy in Bangladesh.

3.2 Identification of stakeholders of monetary policy

Monetary policy is used by the central bank, commercial banks, non-bank financial organizations, money market participants, and the government to regulate the quantity of money in a country's economy. The research has identified many significant users of the Bangladesh Bank's monetary policy based on respondents' perspectives.

It is evident from the examination of Table 3 that the stakeholders for whom the monetary policy is prepared are in Bangladesh. With 100% and 49.3 percent, respectively, respondents believe that the money market is the main stakeholder in monetary policy, and the least number of respondents believe that employees are stakeholders in monetary policy. According to the survey findings, over 85% of respondents identified the central bank, commercial banks, and non-bank financial institutions as users of Bangladesh's monetary policy, with 87 percent, 94.2 percent, and 88.4 percent, respectively. The government, capital markets, and investors were identified as stakeholders in monetary policy by more than 70% of respondents, with 78.3 percent, 73.9 percent, and 73.9 percent responding in each category, respectively. In the survey, the minimum number of respondents but a satisfactory level of respondents believe that bank professionals, academicians/researchers, apex bodies (business) or trade associations, suppliers, and consumers are the users of monetary policy, accounting for 69.6%, 55.1%, 68.1%, 63.8%, and 60.9% of respondents, respectively. Therefore, the study has found many stakeholders for whom the monetary policy is prepared in Bangladesh.

Table 3: Identification of stakeholders of monetary policy

Sl. No.	Stakeholders	Number of Respondents	Percentage of Respondents
i.	Central Bank	180	87%
ii.	Commercial Banks	195	94.2%
iii.	Non-bank Financial Institutions (NBFIs)	183	88.4%
iv.	Bank Professionals	144	69.6%
v.	Money Market Participant Other than banks	207	100%
vi.	Capital Market	153	73.9%
vii.	Academicians/Researchers	114	55.1%
viii.	Government	162	78.3%
ix.	Apex Bodies (Business)/Trade Associations	141	68.1%
x.	Investors	153	73.9%
xi.	Suppliers	132	63.8%
xii.	Consumers	126	60.9%
xiii.	Employees	102	49.3%

Sources: Survey Instruments, Notes: Data have been Compiled by the Researcher

3.3. Identification of factors ınfluencing monetary policy on literatures review and content analysis

Many academics have carried out studies to determine the variables that influence monetary policy (Pinshi, 2020; Mehndiratta, 2019; Chowdhury, 2016; Dan, 2013; Rawdanowicz, Renne, Watanabe and Christensen, 2013; Zoli, 2005; Kia, 2004; Woolley, 1983; Levy, 1981). Several variables have been identified via a study of the literature, the monetary policy statement, and content analysis as having an impact on the monetary policy of the central bank of Bangladesh. In table 4, the researcher has compiled the results and findings from previous literature searches.

Table 5: Ranking of variables ınfluencing monetary policy on adjusted mean score

Sl. No.	Variables Factors	Mean Score ($\bar{x}$)	Standard Deviation (σ)	Adjusted Factor Variable ($\bar{x}/\sigma$)	Ranks
X_1	Interest Rate	4.3768	.84194	5.198	IV
X_2	Exchange Rate	4.3623	.70650	6.175	II
X_3	Monetary Policy Instruments	4.5072	.60932	7.397	I
X_4	Operational Strategy	3.9420	.78373	5.030	VI
X_5	Governance	3.8986	.85997	4.533	IX
X_6	Monetary Policy Transparency	3.7536	.88127	4.259	XI
X7	Independence and Credibility of Central Bank	3.7391	1.09346	3.420	XXIII
X_8	Expected Market Liquidity	3.9710	.92309	4.302	X
X_9	Inflation Rate	4.1159	.73837	5.574	III
X_{10}	Levels of Government debt	4.0000	1.02899	3.887	XV
X_{11}	Fiscal dominance	3.7536	.99122	3.787	XVI
X_{12}	Dollarization	3.5652	.89899	3.966	XIV
X_{13}	Global risks	3.7391	1.07993	3.462	XXII
X_{14}	GDP growth	3.9710	.76641	5.181	V
X_{15}	Economic Stability	4.0870	.81780	4.998	VII
X_{16}	Total Investment to GDP	3.8261	.83941	4.558	VIII
X_{17}	Savings to GDP	3.6522	1.01208	3.609	XIX
X_{18}	Fiscal policy	3.9710	1.09774	3.617	XVIII
X_{19}	Green Investment Through Interest Rates	3.6087	.87812	4.110	XIII
X_{20}	Commodity prices	3.5652	.99230	3.593	XX
X_{21}	Financial market volatility	3.7101	1.08603	3.416	XXIV
X_{22}	Changes Global economy	3.7101	1.04461	3.552	XXI
X_{23}	Socio-political factors	4.0000	.93934	4.258	XII
X_{24}	Natural Disaster/Uncertainty	3.7971	1.02297	3.712	XVII

Sources: Survey Instruments, Notes: Data have been Compiled by the Researcher

Table 4: Identification of factors ınfluencing monetary policy on literatures review and content analysis

Factor Variables		Research Study									
		Pinshi (2020)	Mehndiratta (2019)	MPS (2009-2019)	Chowdhury (2016)	Dan (2013)	Bouis, Rawdanowicz, Renne, Watanabe, Christensen (2013)	Zoli (2005)	Kia (2004)	Woolley (1983)	Levy (1981)
Internal Factors	Interest Rate				✓		✓		✓		✓
	Exchange Rate		✓		✓			✓	✓		
	Monetary Policy Instruments	✓			✓						
	Operational Strategy			✓							✓
	Governance			✓							
	Monetary Policy Transparency			✓							
	Independence and Credibility of Central Bank		✓								
	Expected Market Liquidity			✓							
	Inflation Rate		✓		✓		✓		✓		✓
	Levels of Government debt								✓		✓
External Variables	Fiscal dominance	✓					✓	✓			
	Dollarization	✓									
	Global risks	✓									
	GDP growth			✓			✓		✓		
	Economic Stability						✓				
	Total Investment to GDP			✓							
	Savings to GDP			✓							
	Fiscal policy					✓		✓			
	Green Investment Through Interest Rates			✓							
	Commodity prices					✓					
	Financial market volatility					✓					
	Changes Global economy					✓					
	Socio-political factors		✓							✓	
	Natural Disaster/Uncertainty			✓							
Model Used	Content Analysis/ Theoretical	✓				✓		✓	✓	✓	✓
	Structural vector autoregressive (SVAR) models				✓		✓				

3.3.1 Ranking of Variables influencing Monetary Policy on Mean Score

The study has identified the level of effect of factor variables influencing the monetary policy of the Bangladesh Bank based on an adjusted factor.

It has been found from the perusal of Table 5 that the essential factor variables in influencing the monetary policy of Bangladesh Bank are the monetary policy instruments: exchange rate, inflation rate, interest rate, GDP growth, operational strategy, and economic stability, which have a rank of I, II, III, IV, V, VI, and VII, respectively, while the least influential factor variable is financial market volatility, which has a rank of 24. Therefore, the study has found that the researcher's set of monetary policy factor variables has significant implications for the Bangladesh Bank's monetary policy.

3.3.2 Identification of factors ınfluencing monetary Policy of Bangladesh bank on varimax rotated factory analysis

The study collected opinions from 207 sample respondents over 24-factor variables in influencing the monetary policy of Bangladesh Bank on a five-point Likert scale. The study used KMO and Bartlett's Test to test the sampling adequacy of the factor model. The study has found that KMO is 0.720, which is statistically significant for factor analysis because the value of KMO is greater than 0.50 (Tabachnick, Fidell, and Ullman, 2007; Hair, Anderson, Tatham, and Black, 1995). The approximate chi-square statistic is 570.748 with 276 degrees of freedom, and the significance level is 0.000. Since the significance value is less than 5%, Bartlett's Test of Sphericity is appropriate for factor analysis (Tabachnick et al., 2007; Hair et al., 1995). Then the study analyzed the data through a sophisticated variable-rotated factor analytical model. The output of this analysis has been discussed in the following paragraph: The relationship between the variables in the zero-order correlation matrix generated from the research conducted to identify the factors affecting Bangladesh Bank's monetary policy is shown in Appendix I.

To describe associations between variables, the correlation matrix should be used (Williams, Onsman, and Brown, 2010). One of the most often used techniques for factor analysis is the correlation matrix, which is particularly popular among researchers (Henson and Roberts, 2006). The correlation matrix demonstrates acceptable coefficients above 0.30 for factor analysis (Sarbabidya, 2015; Tabachnick, Fidell, and Ullman, 2007). There are 51 coefficients in the correlation table with correlations higher than 0.30. As a result, the coefficients with more than 0.30 in the correlation matrix illustrate that all the variables are correlated. It is feasible that these variables should be associated with the same factors.

3.3.3 Identification of principal factors

The 'Principal Components Varimax Rotated Method' of factor analysis is used in the study to identify the variables influencing the monetary policy of the central bank of Bangladesh. The principal component factor accounts for more variation than any factoring loading. To determine group membership, an algorithm may be utilized to unearth a structure only from the correlation structure of the input data. Then, based on Kaiser's (1958) criteria of Eigenvalue >1, the number of primary components preserved in the research was determined. Principal components with higher reliability coefficients are more trustworthy in that the related factors are reproducible in other studies of a similar kind. Then commonality is calculated, which indicates how much of each variable is explained by the underlying variables. Then, factor scores were calculated using the weighted average of principal factor loadings and the average of the relevant variables in the group. The principal component analysis uses commonalities to determine how a specific variable is included in the components (James Wheeler, 2005). Principal Components Analysis (PCA) reduces many variables into smaller components (Tabachnick and Fidell, 2007). Initial communalities are forecasts of the variation in every component or factor contributing significantly to each variable. This has always been equal to 1.0 for correlations when extracting the principal components (Carol and Michael, 2011). Furthermore, it demonstrates that the mean commonality of all the factors after removing them is greater than 0.50, which is significant. If this criterion is not fulfilled, it indicates that specific and consistent factors cannot be determined (Yong and Pearce, 2013).

The total variance explained is used to determine the number of significant factors. For purposes of interpretation, only the extracted and rotated data are relevant. The factors are ranked from greatest explained variance to least explained variation in decreasing order. The Extraction Sums of Squared Loadings are the same as the Initial Eigenvalues, except those factors with eigenvalues less than one are not shown in the Extraction Sums. The extraction sums of squared loadings show the eigenvalues and variance before rotation. The Rotation Sums of Squared Loadings depict the eigenvalues and variance after rotation. The rotated eigenvalues find significant factors (Yong and Pearce, 2013).

Appendix II demonstrates that starting with an eigenvalue higher than 1.0 leads to extracting seven components, which is a typical requirement for a factor to be valid. When the eigenvalue of a component is less than 1.0, it conveys less information than a single item would. (Loewen and Gonulal, 2015).

3.3.4 Analysis of factors

The Rotated Factor Matrix table helps interpret the analysis of the findings. Several variables are rotated to make them simpler to understand. As a result of rotation, many distinct underlying variables may be used to explain or forecast different items as feasible, and each component can describe many things (Loewen & Gonulal, 2015). This research considers loadings of 0.50 or more considerable (Sarbabidya, 2015).

The rotated factor matrix, shown in Appendix III, reveals that the variables under investigation have been divided into seven groups or factors, as interpreted in the following study paragraphs.

Factor I: Fiscal and risk factor

Sl. No.	Factor Variable	Factor Loading
X_{11}	Fiscal dominance	0.829
X_{12}	Dollarization	0.806
X_{13}	Global risks	0.662
X_5	Governance	0.595
X_{18}	Fiscal policy	0.500
Total Variance Explained		18.60%

This factor comprises five-factor variables with factor loadings ranging from 0.500 to 0.829. All these factor variables are positively correlated and have explained 18.60% of the total variation. It implies that fiscal policy, market governance, and risk influence the framing of monetary policy and its effectiveness for accomplishing objectives, most importantly. It has led to a significant "fiscal and risk factor" cluster.

Factor II: Political economic factor

Sl. No.	Factor Variables	Factor Loading
X_{22}	Changes in Global economy	.797
X_{23}	Socio-political factors	.764
X_{24}	Natural Disaster/Uncertainty	.643
X_{10}	Levels of Government debt	.595
Total Variance Explained		13.62%

This factor comprises four-factor variables with factor loadings ranging from 0.595 to 0.797. All these factor variables are positively correlated and have explained 13.62% of the total variation. It implies that changes in the global economy, socio-political factors, natural disasters, uncertainty, and government debt levels influence the framing of monetary policy and its effectiveness for accomplishing objectives, most importantly. It has led to a second significant cluster, "Political Economic Factors".

Factor III: Governance Factor

Sl. No.	Factor Variables	Factor Loading
X_7	Independence and Credibility of Central Bank	.783
X_{15}	Economic Stability	.707
X_{14}	GDP growth	.634
X_6	Monetary Policy Transparency	.541
Total Variance Explained		8.13%

This factor comprises four-factor variables with factor loadings ranging from 0.541 to 0.783. All these factor variables are positively correlated and have explained 8.13% of the total variation. It implies that monetary policy transparency, GDP growth, economic stability, and independence and credibility of the central bank influence the framing of monetary policy and its effectiveness for accomplishing objectives, most importantly. It has led to forming a third significant cluster, the "Governance Factor".

Factor IV: SDG Factor

Sl. No.	Factor Variables	Factor Loading
X_{19}	Green Investment Through Interest Rates	.803
X_{17}	Savings to GDP	.660
X_{16}	Total Investment to GDP	.635
Total Variance Explained		7.18%

This factor comprises three-factor variables with factor loadings ranging from 0.635 to 0.803. All these factor variables are positively correlated and have explained 7.18% of the total variation. It implies that green investment through interest rates, savings to GDP and the total investment to GDP influence the framing of monetary policy and its effectiveness for accomplishing objectives. It has led to forming a fourth significant cluster, the "SDG Factor".

Factor V: Factor of price stability and market liquidity

Sl. No.	Factor Variables	Factor Loading
X_{21}	Financial market volatility	0.739
X_{20}	Commodity prices	0.662
X_8	Expected Market Liquidity	0.585
Total Variance Explained		6.22%

This factor comprises three-factor variables with factor loadings ranging from 0.585 to 0.739. All these factor variables are positively correlated and have explained 6.22% of the total variation. It implies that financial market volatility, commodity prices and expected market liquidity influence the framing of monetary policy and its effectiveness in accomplishing objectives. It has led to forming a fifth significant cluster, "Factor of Price Stability and Market Liquidity".

Factor VI: Factor of market operations

Sl. No.	Factor Variables	Factor Loading
X_3	Monetary Policy Instruments	.776
X_4	Operational Strategy	.623
X_2	Exchange Rate	.587
Total Variance Explained		5.65%

This factor comprises three-factor variables with factor loadings ranging from 0.587 to 0.776. All these factor variables are positively correlated and have explained 5.65% of the total variation. It implies that monetary policy instruments, operational strategy and exchange rate influence the framing of monetary policy and its effectiveness for accomplishing objectives, most importantly. It has led to forming of a sixth significant cluster, "Factor of Market Operations".

Factor VII: Price risk factor

Sl. No.	Factor Variables	Factor Loading
X_1	Interest Rate	.795
X_9	Inflation Rate	.595
Total Variance Explained		4.98%

This factor comprises two-factor variables with factor loadings ranging from 0.595 to 0.795. All these factor variables are positively correlated and have explained 4.98% of the total variation. It implies that interest rate and inflation rate influence the framing of monetary policy and its effectiveness for accomplishing objectives, most importantly. It has led to a seventh significant cluster, "Price Risk Factor".

3.3.5 Ranking of Factors on Weighted Factor Score

The ranking of factors influencing the monetary policy of the central bank of Bangladesh is based on the weighted score. A weighted score can be found as the summation of the factor loading multiplied by the mean score of the variables divided by the number of variables.

Table 6: Ranking of factors on weighted score

Factors	Name of the Factors	Weighted Score	Rank
1	Fiscal and Risk Factor	2.553	VI
2	Political Economic Factor	2.709	III
3	Governance Factor	2.591	IV
4	SDG Factor	2.579	V
5	Factor of Price Stability and Market Liquidity	2.475	VII
6	Factor of Market Operations	2.838	II
7	Price Risk Factor	2.964	I

It has been found from the perusal of Table-6 **t**hat Factor-7 (Price Risk Factor) has a weighted score of 2.964, making it the top factor. This factor comprises the interest rate and inflation rate factor variables. Factor-6 (Factor of Market Operations) has a weighted score of 2.838, which places it at number II. This factor comprises the monetary policy instruments, operational strategy, and exchange rate factor variables. Factor-2 (Political-Economic Factor) has a weighted score of 2.709, making it the third most important factor. This factor comprises the changes in the global economy, socio-political factors, natural disasters and level of government debt factor variables. Because of the weighted score, factor-3 (Governance Factor) is placed fourth, with a weighted score of 2.591. This factor comprises the independence and credibility of the central bank, economic stability, GDP growth and monetary policy transparency factor variables. Factor-4 (SDG Factor) is rated 5 with a 2.579

weighted score. This factor comprises the green investment through interest rates, savings to GDP, and the total investment to GDP factor variables. The weighted score results indicate that factor-1 (Fiscal and Risk Factor) is placed sixth with a 2.553 weighted score. This factor comprises the fiscal dominance, dollarization, global risks, governance and fiscal policy factor variables. Finally, Factor-5 (Factor of Price Stability and Market Liquidity) is rated VII with a 2.475 weighted score. This factor comprises the financial market volatility, commodity prices and expected market liquidity factor variables. The ranking of these factors in order of their magnitudes genuinely reflects the actual scenario of the money market.

4.0 Summary of the Findings

The study has identified several essential objectives of the monetary policy of the central bank of Bangladesh for control of money market operations based on the respondents' opinions. It has been found that 98.6% of the respondents believe that maintaining price stability and sustaining economic growth are the most significant objectives of monetary policy. 92.8 percent of the respondents think that regulating interest rates is one of the goals of monetary policy. According to more than 80% of respondents, the goals of monetary policy are to manage the monetary and credit systems, regulate currency and reserves, reduce unemployment, and maintain a stable exchange rate. 70% of the participants who participated in the survey said monetary policy should aim to maintain a steady exchange rate, increase production, and maintain a healthy balance of payments. In the survey, a minimum number of respondents but a satisfactory level of respondents believe that utilizing resources to the maximum extent and controlling wage rates are the goals of monetary policy, accounting for 66.7% and 58% of respondents, respectively. Therefore, the study has found that a good number of objectives of monetary policy are being adopted depending on the economic situation of Bangladesh. The study has also found that 95.7% of the sample respondents are of the view that the interest rate is the most significant operational instrument of monetary policy. 94.2% of the respondents believe that the cash reserve ratio is one of the operational tools of monetary policy. According to more than 90% of respondents, the operational tools of monetary policy are the open market operation and the statutory liquidity ratio, with 92.8 percent and 92.8 percent, respectively. The modus operandi of monetary policy, according to more than 75% of respondents, are the statutory liquidity ratio, repo rate, and reserve repo, with 89.9%, 76.8%, and 75.4%, respectively. More than 65% of respondents believe that the net stable funding ratio, liquidity coverage ratio, and interest rate on excess reserves are the operational instruments of the monetary policy of the central bank of Bangladesh. According to the study, 63.8 percent and 60.9 percent of respondents, respectively, think that the credit deposit ratio, investment deposit ratio, and capital adequacy ratio are operational instruments of monetary policy. Therefore, the study has found many operational tools of monetary policy that have been used in implementing monetary policy in Bangladesh. The study has identified the stakeholders for whom the monetary policy is prepared in Bangladesh. With 100% and 49.3 percent, respectively, respondents believe that the money market is the main stakeholder in monetary policy, and the least number of respondents believe that employees are stakeholders in monetary policy. According to the survey findings, over 85% of respondents identified the central bank, commercial banks, and non-bank financial institutions as users of Bangladesh's monetary policy, with 87 percent, 94.2 percent, and 88.4 percent, respectively. The government, capital markets, and investors were identified as stakeholders in monetary policy by more than 70% of respondents, with 78.3 percent, 73.9 percent, and 73.9 percent responding in each category, respectively. In the survey, a minimum number of respondents but a satisfactory level of respondents believe that bank professionals, academicians and researchers, apex bodies, business and trade associations, suppliers, and consumers are the users of monetary policy, accounting for 69.6%, 55.1%, 68.1%, 63.8%, and 60.9% of respondents, respectively. Therefore, the study has found many stakeholders for whom the monetary policy is prepared in Bangladesh.

The study has identified the level of effect of factors influencing the monetary policy of the Bangladesh Bank based on the values of adjusted mean score opinions taken on a 5-point Likert scale. The researcher has ranked the factors from 1 to 24 based on the adjusted mean score. The most critical factor variables in influencing the monetary policy of Bangladesh Bank are the monetary policy instruments: exchange rate, inflation rate, interest rate, GDP growth, operational strategy, and economic stability, which have a rank of I, II, III, IV, V, VI, and VII, respectively, while the least influential factor variable is financial market volatility, which has a rank of 24. Therefore, the study has found that the researchers' set of monetary policy factor variables has significant implications for the Bangladesh Bank's monetary policy.

Finally, the study has ranked the factors influencing the monetary policy of the central bank of Bangladesh based on the weighted factor score. Factor-7 (Price Risk Factor) has a weighted score of 2.964, making it the top factor. This factor comprises the interest rate and inflation rate factors. Factor-6 (Factor of Market Operations) has a weighted score of 2.838, which places it at number II. This factor comprises the monetary policy instruments, operational strategy, and exchange rate factor variables. Factor 2 (the political-economic factor) has a weighted score of 2.709, making it the third most important factor. This factor comprises the changes in the global economy, socio-political factors, natural disasters, and level of government debt factor variables. Because of the weighted score, factor 3 (government factor) is placed fourth with a weighted score of 2.591. This factor includes the central bank's independence and credibility, economic stability, GDP growth, and monetary policy transparency. Factor-4 (SDG Factor) is rated 5 with a 2.579 weighted score. This factor comprises green investment through interest rates, savings to GDP, and the total investment to GDP factor variables. The weighted score results indicate that factor 1 (fiscal and risk factor) is placed sixth with a 2.553 weighted score. This factor comprises fiscal dominance, dollarization, global risks, governance, and fiscal policy factor variables. Finally, Factor-5 (the factor of price stability and market liquidity) is rated VII with a 2.475 weighted score. This factor comprises the financial market volatility, commodity prices, and expected market liquidity factor variables. The ranking of these factors in order

of their magnitudes reflects the actual scenario of the money market.

5. Policy Implications

The present study's findings have implications for policymakers, regulators, professionals, practitioners, researchers, and economists in the money market of Bangladesh. Based on the findings and implications thereof, the following suggestions have been put forward as follows:

i. The central bank should consider the following factors in order of importance in setting targets and making operational policies while framing Monetary Policy Statement (MPS) in Bangladesh:

a) Price Risk Factor
b) Factor of Market Operations
c) Political Economic Factor
d) Governance Factor

ii. The central bank should be cautious enough to balance between the interest and inflation targets through the timely application of relevant tools.

iii. The central bank should take an interest in Government, commercial banks, and other money market participants into consideration while preparing MPS in Bangladesh.

iv. The central bank's autonomy should be reflected through framing and executing provisions of MPS in order to ensure governance and accomplish market-driven SDG goals and objectives.

6. Conclusion

The present study has been undertaken to find a set of guidelines for the central banks and banks of Bangladesh in making effective monetary policy to accomplish targets and objectives as set. This has long been a central issue for the country and a concern among academicians, policymakers, and regulators. The study has addressed the concerns of all stakeholders in the money market as to the practical impact of monetary policy on economic development and the determinants of monetary policy. The study has identified the seven significant determinants that influence the monetary policy of Bangladesh Bank, such as the price risk factor, the factor of market operations, political and economic factors (Farooq et al., 2023; Dogru et al., 2019; Işık et al., 2017; Işık, 2015, 2013), governance factors, SDG factors (Dam et al., 2023; Han et al., 2023), fiscal and risk factors (Işık et al., 2023a, 2023b), and factors of price stability and market liquidity (Islam et al., 2023a, 2023b, Sarıgul et al., 2023; Singh, 2022). By statistical analysis, these are the determinants that substantially impact monetary policy. The findings and inferences of the study have filled a gap in the literature and have been used to test the existing theories of monetary policy in Bangladesh. The outcomes and inferences of the study are expected to be significant to all stakeholders, including regulators, commercial banks, academicians, and policymakers. These would also enable the central bank to bring about a qualitative change in making monetary policy the most effective and goal-oriented. Therefore, after analyzing and interpreting the entire study, it has been concluded that many factors significantly influence monetary policy.

6.1. Limitation of Study

There are some limitations of the existing study. The sample size is small because the researcher only connected with those directly involved with monetary policy. The researcher can use more sophisticated models and software to analyze the data in further research. The other factors may have an impact on monetary policy.

Declarations

Availability of data and materials: The datasets are the respondent's opinions collected through a structured questionnaire, which will be available from us on reasonable request.

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Appendix I Result of zero order correlation matrix for factors ınfluencing monetary policy

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}	X_{19}	X_{20}	X_{21}	X_{22}	X_{23}	X_{24}
X_1	1																							
X_2	.113	1																						
	.354																							
X_3	.109	.250**	1																					
	.371	.038																						
X_4	-.122	.331*	.247**	1																				
	.316	.006	.041																					
X_5	.013	.037	-.069	.209***	1																			
	.916	.762	.575	.084																				
X_6	.028	.193	-.092	.149	.277**	1																		
	.820	.113	.450	.221	.021																			
X_7	.204***	.048	-.041	-.001	.065	.329*	1																	
	.092	.695	.736	.995	.594	.006																		
X_8	.109	.039	-.078	-.023	.107	.172	.342*	1																
	.373	.751	.524	.853	.380	.158	.004																	
X_9	.094	.116	-.002	-.118	-.081	.188	.278**	.393*	1															
	.441	.344	.988	.346	.679	.196	.022	.001																
X_{10}	-.119	.040	-.238***	-.109	.249**	.195	.026	-.077	.282**	1														
	.331	.741	.052	.371	.039	.109	.831	.527	.037															
X_{11}	.025	.024	-.009	-.151	.367*	.199	.008	-.040	.120	.346*	1													
	.840	.843	.940	.215	.002	.101	.950	.744	.326	.004														
X_{12}	-.072	.113	-.078	.026	.399*	.197	-.042	-.139	.055	.238**	.637*	1												
	.558	.356	.542	.830	.001	.105	.730	.253	.654	.048	.000													
X_{13}	-.149	.299**	.048	.186	.367*	.194	.029	.037	.131	.384*	.392*	.427*	1											
	.221	.013	.698	.202	.002	.110	.815	.766	.284	.001	.000	.000												
X_{14}	-.097	.155	.189	.315*	.085	.338*	.307*	.144	.188	-.093	-.048	.003	.204***	1										
	.429	.202	.119	.008	.489	.005	.005	.237	.122	.446	.694	.982	.093											
X_{15}	.080	.250**	.236***	.329*	-.134	.278**	.503*	.237**	.178	.315*	-.118	-.148	.009	.520*	1									
	.514	.038	.052	.006	.274	.022	.000	.050	.144	.008	.333	.225	.939	.000										
X_{16}	.032	.157	-.026	.119	.097	.398*	.302**	.202***	.152	.136	.018	.015	.047	.312*	.429*	1								
	.796	.196	.830	.332	.426	.001	.012	.096	.214	.264	.880	.901	.704	.009	.000									
X_{17}	.122	.179	-.020	.011	.297**	.315*	.169	.099	.074	.254**	.133	.203***	.171	.006	-.016	.499*	1							
	.320	.141	.872	.927	.013	.008	.164	.417	.543	.035	.275	.094	.159	.962	.895	.000								
X_{18}	.123	.033	.000	-.105	.153	.053	.006	.043	.186	.299**	.439*	.255**	.316*	-.001	-.128	.058	.348*	1						
	.313	.790	.998	.393	.211	.664	.962	.728	.127	.012	.000	.034	.008	.993	.294	.634	.003							
X_{19}	-.056	.184	-.008	.266**	.278**	.159	-.047	-.087	-.156	.277**	.090	.173	.232***	.092	-.013	.425*	.391*	.095	1					
	.646	.129	.946	.027	.021	.193	.704	.478	.201	.021	.460	.186	.055	.481	.913	.000	.001	.438						
X_{20}	.023	.186	.103	.099	.016	.380*	.219***	.227	.170	.014	-.021	-.116	.208***	.312*	.301**	.137	.081	.042	.089	1				
	.861	.126	.402	.416	.893	.001	.070	.061	.162	.906	.865	.342	.086	.009	.012	.260	.506	.730	.468					
X_{21}	-.040	.101	-.019	.101	-.032	.155	.059	.285**	.226***	.224	-.081	-.116	.173	.258**	.344**	.283**	.518***	.240**	.095	.484*	1			
	.746	.411	.877	.409	.794	.204	.629	.018	.062	.065	.508	.343	.156	.035	.043	.019	.077	.047	.436	.000				
X_{22}	-.041	.045	.050	.141	.180	.113	.036	-.085	.273**	.479*	.072	.193	.258**	.118	-.022	.227***	.390*	.313*	.163	.047	.392*	1		
	.737	.715	.686	.248	.140	.355	.770	.487	.023	.000	.556	.113	.032	.335	.859	.061	.001	.009	.181	.702	.001			
X_{23}	-.019	-.089	.051	-.020	.164	.071	.100	-.119	.042	.320*	.142	.122	.130	.123	-.172	.075	.278**	.200***	.053	-.079	.144	.435*	1	
	.879	.469	.678	.871	.179	.562	.413	.331	.729	.007	.244	.318	.285	.316	.187	.542	.021	.100	.662	.519	.237	.000		
X_{24}	.039	-.060	.097	.022	.277**	.188	-.022	-.037	.246**	.419*	.231***	.318*	.271**	.011	-.242**	.147	.371*	.348*	.483*	-.016	.158	.522*	.352*	1
	.781	.627	.429	.959	.021	.121	.859	.760	.042	.000	.082	.008	.024	.928	.048	.229	.002	.003	.000	.898	.198	.000	.003	

*. Correlation is significant at the 0.01 level (2-tailed).

**. Correlation is significant at the 0.05 level (2-tailed).

***. Correlation is significant at the 0.10 level (2-tailed).

Source: Survey Instrument and Data Output

Notes: Data have been compiled by the Researcher.

Appendix II Analysis of Total Variance Explained for Factors Influencing Monetary Policy

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings			Extraction
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
1	4.463	18.595	18.595	4.463	18.595	18.595	2.777	11.571	11.571	.666
2	3.268	13.616	32.211	3.268	13.616	32.211	2.548	10.618	22.190	.576
3	1.952	8.134	40.345	1.952	8.134	40.345	2.493	10.386	32.576	.699
4	1.724	7.184	47.529	1.724	7.184	47.529	2.152	8.967	41.543	.618
5	1.492	6.216	53.745	1.492	6.216	53.745	2.094	8.725	50.268	.511
6	1.356	5.651	59.396	1.356	5.651	59.396	1.907	7.948	58.216	.562
7	1.196	4.985	64.381	1.196	4.985	64.381	1.480	6.165	64.381	.679
8	.930	3.876	68.257							.514
9	.926	3.857	72.114							.575
10	.850	3.542	75.656							.634
11	.804	3.351	79.006							.733
12	.657	2.736	81.742							.694
13	.653	2.722	84.464							.672
14	.534	2.226	86.690							.678
15	.526	2.192	88.882							.760
16	.501	2.086	90.969							.684
17	.458	1.907	92.876							.687
18	.380	1.582	94.458							.538
19	.321	1.336	95.794							.725
20	.269	1.122	96.916							.546
21	.250	1.042	97.958							.712
22	.209	.870	98.829							.720
23	.156	.649	99.477							.645
24	.125	.523	100.000							.621

Extraction Method: Principal Component Analysis. Sources: Survey Instruments. Notes: Data have been Compiled by the Researcher

Appendix III: Rotated Factor Matrix for Factors Influencing Monetary Policy

Variables	Component						
	1	2	3	4	5	6	7
X_{11}	.829						
X_{12}	.806						
X_{13}	.662						
X_5	.595						
X_{18}	.500						
X_{22}		.797					
X_{23}		.764					
X_{24}		.643					
X_{10}		.595					
X_7			.783				
X_{15}			.707				
X_{14}			.634				
X_6			.541				
X_{19}				.803			
X_{17}				.660			
X_{16}				.635			
X_{21}					.739		
X_{20}					.662		
X_8					.585		
X_3						.776	
X_4						.623	
X_2						.587	
X_1							.795
X_9							.595

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. *Sources: Survey Instruments. Notes: Data have been Compiled by the Researcher.*

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The influence of service strategies and business relations on the growth of starup businesses in medium digital marketing

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ABSTRACT

The lack of business land to foster the growth of new firms is the issue facing South Sulawesi's startup community. Getting funding is one of the biggest problems that companies have. Even with the abundance of public and private financing initiatives, getting funding is frequently a challenging and drawn-out procedure. There are still a number of places in South Sulawesi with restricted access to digital technology and the internet, despite the country's ongoing technical growth. This could be a barrier for new business, particularly those are in the technology industry. An industrial ecology is therefore required. The purpose of this study is to examine how digital marketing, business partnerships, and service initiatives affect the expansion of startup companies. additionally, to examine the ways in which digital marketing-related service tactics adopted by startups can impact the expansion of their enterprises. This may entail evaluating the ways in which service personalization, speed, and quality may affect client happiness and, eventually, company expansion. A sample of 225 startups was used in this study, and questionnaires and focus group discussions were used to collect data. To evaluate the data, the Smart-PLS application was used. The study's findings demonstrate the importance of service plans and commercial partnerships for both digital marketing in startup companies and digital marketing itself. Digital marketing, meanwhile, is powerless to mitigate the impact of commercial partnerships and service plans on fledgling companies.

I. Introduction

The current digital era is a time that provides benefits for many parties, especially the Indonesian people. This is related to the increase in internet users throughout the world, especially in Indonesia which reached 102 million users and was ranked 6th. (Startupranking.com, 2019). The development of the internet has opened up opportunities for the emergence of startup businesses, most of which operate in the e-commerce sector. The development of e-commerce provides benefits for consumers and companies, because there are no time and space limitations in marketing products, reducing operational costs and increasing market share. Meanwhile, for consumers, the benefits are ease in carrying out transactions without being bound by time and space as well as ease in making electronic payments such as electronic money as a means of transferring the purchase of the desired product. The existence of the Digital Techno Startup business during the Covid-19 pandemic is still promising, especially in the e-commerce sector (Ulfa, Arofatin, 2020).

Based on data released by startupranking.com, Indonesia is ranked 5th in the world with 2,200 startups. The distribution of startup businesses in Indonesia is 522 in Jabodetabek, 115 in Sumatra, 113 in East Java. The development of startup businesses has a positive impact on domestic economic growth. Efforts to develop digital startups in Indonesia are supported by the Government program through 1000 new startup projects. To support this program, the government has prepared a digital startup development roadmap through seminars, workshops, competency hackathons, bootcamps and incubation(Katadata.co.id., 2020).

The number of digital startups nationally has experienced significant growth, however the development of local startups in Indonesia has not been consistent in the early stages of their development so that most local startups have failed and some have made major changes to their

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business models. Startup growth during the Covid-19 pandemic only grew in a few areas such as Jakarta, Bandung and Yogyakarta, while other areas, especially in Eastern Indonesia, were less developed, such as Makassar. Growing a startup business is often a challenge. Many startups fail within the first few years, and successful startups often face intense competition and rapid changes in technology and consumer preferences.

The main obstacle faced by Makassar startups is that there is no strong business area in the startup industry. This area is not conducivefor them so that new startups don't last long and even die by themselves. An ecosystem is needed for this startup. This industrial business area must be designed by stakeholders so that startups have space to live and develop (Kompasiana.com, 2017).

Based on this research gap, the novelty of this research lies in its object, where several previous studies that were used as references were mostly conducted on conventional startup businesses in big cities outside Sulawesi such as Jakarta, Bandung and Yogyakarta, while this research focuses more on this research in this research in startup business. Techno Digital in Makassar.

The specific aim of this research is to build a startup business management model with a focus on three things, namely: 1) service strategy management, 2) business relationship management, and 3) digital marketing management. The emergence of phenomena related to the decline in startup business growth during the Covid-19 pandemic and the high disparities in startup business growth between provinces in Indonesia are the methodological reasons why this research is important.

Analyzing the Influence of Service Strategy to analyze how the service strategy implemented by a startup can influence its business growth in the context of digital marketing. This can involve assessing how service quality, speed of service, and personalization of service can impact customer satisfaction and ultimately business growth. To examine how business relationships, such as strategic partnerships or relationships with customers, can influence startup business growth. This may include assessing how these relationships can help the startup gain access to new resources, knowledge, or markets. To identify key factors that can influence startup business growth in the context of digital marketing. This may include assessing how factors such as innovation, adaptability or understanding of digital markets can impact business growth.

The contributions of this research to the literature may include: 1) New Understanding of Service Strategy and Business Relationships: This research may provide new understanding of how service strategy and business relationships can influence the growth of startup businesses, which can be a valuable addition to existing ones literature 2) Practical Insights for Startups: This research can provide practical insights for startups on how they can design and implement service and business relationship strategies to support their growth in digital marketing. 3) Further Research Framework: This research can provide a framework for further research regarding the factors that influence startup business growth in the context of digital marketing.

2. Literature Review, Theoretical Background and Hypothesis

2.1. *Startup Business*

E-business and e-commerce are fields of study that continue to grow in the current digital business era along with new trends in digital business. The use of e-business and e-commerce in business activities has begun to spread to startup businesses, although its development is still limited to large cities in Indonesia. The birth of e-commerce opened up opportunities for people to do business online by utilizing social media both in the product marketing process and transactions (Ahmadi and Hermawan, 2013;Wibowo and Haryokusumo, 2020; Hong et al., 2021).

Based on survey results from the Indonesian Internet Service Providers Association (APJII), internet users in Indonesia in 2022-2023 will reach 215.63 million people, an increase compared to the previous year which only reached 210.03 million users.(Dataindonesia.id, 2023).

The increase in internet users every year opens up opportunities for the emergence of startup businesses by utilizing digital technology through online marketing as a transaction market. The accelerated growth of Information and Communication Technology (ICT) can give rise to trends that change traditional business models or encourage the growth of startups that tend to take advantage of technological opportunities. The ever-changing development of society's needs is both an opportunity and a challenge for startups to meet society's needs. Startup businesses that are growing rapidly and are in great demand by people living in the current digital era are game makers, educational applications, e-commerce trading, and information or news content applications.

Utilization of e-commerce for digital startup businesses according to (Kotler, Philip and Armstrong, 2012). This can be done through: 1) Business to Business (B2B) Model, 2) Business to Customer (B2C) Model, and 3) Customer to Customer (C2C) Model.

2.2. Service Strategy Management

Refers to the approach and tactics used by a startup to serve its customers. This can include aspects such as service quality, service speed, service personalization, etc. Service strategies can be measured through various methods, such as customer satisfaction surveys, response time analysis, or personalization assessments

Service strategy management, related to digital-based service processes in business management, starting from business identity identification, promotion, transaction processing, distribution to after-sales service. In this research, service strategies are measured using the servqual method developed by Parasuraman et. al., 1990 (Tjiptono, Fandy, 2011) namely reliability, responsiveness, guarantee, real evidence, and attention as determining factors in determining service quality.

The digital era has become a very fundamental change in the business world, so that business competition is greatly influenced by the service strategies provided by startups in providing services to customers. So business people need a digital marketing communication strategy so that they don't get the wrong target (Ri'aeni, 2017). Digital marketing platforms are one of the right strategies to encourage startup business growth in the current digital era (Mahmud, 2022).

This argument underlies the formulation of the research hypothesis as follows:

H_1 : Service strategy management has a significant positive effect on startup business growth
H_2 : Service strategy management has a significant positive effect on digital marketing.

2.3. Business Relationship Management

Refers to the relationships a startup builds with other parties, such as business partners, customers or suppliers. This may include aspects such as the number and quality of strategic partnerships, the level of customer satisfaction, or the quality of relationships with suppliers. Business relationships can be measured through methods such as surveys, interviews, or business data analysis. Business relationship management identifies the needs of existing and potential customers and ensures that services are developed according to customer needs.

There are four focuses in business relationship management, namely customer satisfaction, improving service processes, improving service and the role of managers. To support the focus on managing business relationships, openness and easy access to information for business relationships is needed (Wissen & Anatan, 2023). To create open information in business relationships, in the digital marketing era, the use of a company website is very influential in supporting business growth (Martini et al., 2022; Chun-Der Chen and Edward CS Ku, 2021).

This argument underlies the formulation of the research hypothesis as follows:

H_3 : Business relationship management has a significant positive effect on startup business growth
H_4 : Business relationship management has a significant positive effect on Digital Marketing

2.4. Digital Marketing

The use of digital platforms in marketing can provide convenience and comfort in transactions, according to consumer needs,(Pradiani, 2018). So that the massive use of digital marketing for MSMEs will increase customer awareness (Aliami, S., Hakimah, En and Fauji, 2018). The emergence of digital platforms opens up opportunities for startup businesses to develop further, such as Marketplace, Pedia stores, Lazada, using WhatsApp (WA), Instagram (IG), Facebook (FB) and other content.creative (Santoso, 2020; Febriantoro, 2018; Pradiani, 2017).

The digital platform becomes an online department store as an e-business model related to seller and buyer activities (Mubarok, 2019; Umami and Darma, 2021). Based on the research results, it shows that the use of digital marketing has a significant effect on the development of MSMEs.

This argument underlies the formulation of the research hypothesis as follows:

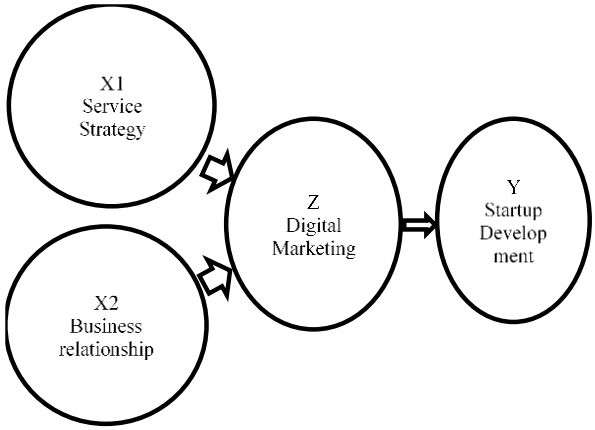
H_5 : Digital marketing has a significant positive effect on Startup Business Growth
H_0 : Digital marketing cannot mediate the influence of service strategy management on growth
H_0 : Digital marketing cannot mediate the influence of business relationship management on start-up business growth

2.5. Startup Business Growth

Refers to the increase in size or success of a startup, which can include aspects such as increasing revenue, increasing the number of customers, or expanding into new markets. Business growth can be measured through methods such as financial data analysis, customer data analysis, or market assessment.

By describing these variables clearly, research can help ensure that research results can be interpreted correctly and that the research provides valuable insight into the topic under study.

2.6. Conceptual framework



Service strategy management in this research is measured by indicators of reliability, responsiveness, assurance, real evidence, and attention. Business relationship management variables are measured using indicators of partnership, non-partner, social and financial support. Meanwhile, digital marketing is measured by indicators of interest level, closeness level and commitment level. Likewise, with the startup business growth variable which is measured by management indicators, digital technology and planning.

3. Methodology

This research is included in the quantitative category using primary data obtained from a survey of startup business people in Makassar City and Gowa Regency. The research design used is a confirmatory research approach with Structural Equation Modeling (SEM) which is used to test existing hypotheses or theories regarding the relationship between variables. Sampling uses a survey method, namely collecting data from a large sample through questionnaires or interviews. Surveys can be carried out directly. Determining the sample uses a simple random sampling method where each member of the population has the same opportunity to be selected as a sample,(Sugiyono, 2019). Based on the characteristics of the respondents in this research, namely, 1) Respondents can be selected from startups between 1 and 5 years old. The reason is, startups at this stage have usually passed the initial stages of formation and are now focused on growth and expansion. 2) Respondents can be selected from various industries, such as technology, e-commerce, fintech, or other related sectors. This will ensure that the research covers a wide range of startup businesses. 3) Respondents can be selected from startups of various sizes, from small to medium scale. This will ensure that the research covers a wide range of startup types, from small and growing startups to more established startups. And 4) Respondents can be selected from startups operating in various locations, both within and outside the country. This will ensure that the research covers the broad context of the market and business environment. So, this research has a minimum sample of 225 respondents.

Partial least squares structural equation modeling (PLS-SEM) was used to analyze the descriptive and statistical findings in this study. The variable instrument measurement model in this research uses validity and reliability tests, with stages of convergent validity, average variance extraction (AVE), discriminant validity, and composite reliability (CR).

The next step, after the outer model meets the requirements, can be tested on the inner model. The inner model can be evaluated by looking at the r-square value (reliability indicator) of the dependent construct and the t-statistic value of the path coefficient test. The higher the r-square value means the better the prediction model of the proposed research model. The path coefficient value shows the level of significance in hypothesis testing.

4. Results and Discussion

This research was conducted on startups in Makassar City and Gowa Regency involving 225 startups as respondents. Based on the results of primary data collection and secondary data, the discussion of the research results begins with a description of the characteristics of the respondents or business actors involved, which are divided into small and medium scale businesses.

4.1. Characteristics of the Research Sample

Table 1: Sample Characteristics

Sample Characteristics	Amount	Percentage
Type of business		
1. small business	75	33.33%
2. Medium Business	150	66.67%
Business Length		
1- 4 years	113	50.22%
4-7 years	112	49.78%
7-10 years	0	0
>10 years	0	0
Initial Business Capital		
1. Own Funds	206	91.56%
2. Give	19	8.44%
Number of Samples	225	100%

Source: 2023 Primary Data Processing Results

Based on the data in table 1, it can be seen that in this study the research sample for small businesses was 75 businesses and 150 medium businesses, so the data obtained predominantly came from medium businesses. The average length of business is 1-7 years, with business capital coming from their own capital.

This data shows that start-up businesses in Makassar City and Gowa Regency have been around for a long time on average, but have not developed enough due to limited access to business capital so they cannot develop their businesses.

4.2. Variable Description

Variable descriptions are carried out to provide an overview of each variable based on respondents' answers to each indicator used which is measured based on the average value. The results of measuring indicators show that: first, service strategy management is measured by indicators of reliability, responsiveness, assurance, real evidence and attention, where the highest average score is the responsiveness indicator with a value of 4.38. This high score occurs because employees have a quick response to developments and changes in consumer tastes for products, and the lowest average value is found in the Reliability indicator with an average value of 4.03. This low score occurs because employees are still not careful in serving customers.

Table 2: Frequency Distribution of Service Strategy Variables

Indicator	STS		T.S		N		S		SS		TOTAL		method
	F	%	F	%	F	%	F	%	F	%	F	%	
SL1	3	1.60	17	9.04	28	14.89	59	31.38	81	43.09	188	100	4.05
SL2	2	1.06	18	9.57	33	17.55	54	28.72	81	43.09	188	100	4.03
SL3	0	0.00	15	7.98	18	9.57	56	29.79	99	52.66	188	100	4.27
SL4	0	0.00	12	6.38	15	7.98	50	26.60	111	59.04	188	100	4.38
SL5	3	1.60	14	7.45	24	12.77	51	27.13	96	51.06	188	100	4.19
SL6	2	1.06	13	6.91	19	10.11	48	25.53	106	56.38	188	100	4.29
SL7	0	0.00	16	8.51	29	15.43	69	36.70	74	39.36	188	100	4.07
SL8	0	0.00	15	7.98	26	13.83	51	27.13	96	51.06	188	100	4.21
SL9	0	0.00	15	7.98	18	9.57	45	23.94	110	58.51	188	100	4.33

Source: 2023 Primary Data Processing Results

Second, for the business relationship management variable which is measured by indicators of partnership, non-partner, social and financial support, the highest average value is found in the social support indicator of 4.40. This happens because of the support of social institutions in building networks with consumers so that the products being marketed sell well. Meanwhile, the indicator with the lowest average value is the financial indicator, namely 4.29. Thus, it can be assumed that a strong indicator forming the business relationship management variable is the indicator of social support.

Table 3: Frequency Distribution of Business Relationship Variables

Indicator	STS		T.S		N		S		SS		TOTAL		method
	F	%	F	%	F	%	F	%	F	%	F	%	
RB1	0	0.00	13	6.91	17	9.04	57	30.32	101	53.72	188	100	4.31
RB2	0	0.00	13	6.91	16	8.51	57	30.32	102	54.26	188	100	4.32
RB3	0	0.00	14	7.45	14	7.45	54	28.72	106	56.38	188	100	4.34
RB4	1	0.53	13	6.91	18	9.57	46	24.47	110	58.51	188	100	4.34
RB5	0	0.00	11	5.85	18	9.57	57	30.32	102	54.26	188	100	4.33
RB6	0	0.00	11	5.85	19	10.11	62	32.98	96	51.06	188	100	4.29
RB7	0	0.00	13	6.91	19	10.11	55	29.26	101	53.72	188	100	4.30
RB8	0	0.00	13	6.91	14	7.45	52	27.66	109	57.98	188	100	4.37
RB9	0	0.00	13	6.91	14	7.45	46	24.47	115	61.17	188	100	4.40

Source: 2023 Primary Data Processing Results

*Third*for digital marketing variables which are measured by indicators of interest level, affinity level and commitment level, where the highest average value is found in the interest level indicator of 4.36. This happens because product advertising has its own characteristics that make it attractive and different from other brands. Then the lowest mean value was 3.97 for the commitment level indicator. This low indicator is because not all products produced meet customer expectations so they still need to be developed. Thus, it can be assumed that a strong indicator forming a digital marketing variable is an indicator of the level of attractiveness.

Table 4: Frequency Distribution of Digital Marketing Variables

Indicator	STS		T.S		N		S		SS		TOTAL		method
	F	%	F	%	F	%	F	%	F	%	F	%	
DM1	2	1.06	16	8.51	20	10.64	37	19.68	113	60.11	188	100	4.29
DM2	0	0.00	17	9.04	18	9.57	34	18.09	119	63.30	188	100	4.36
DM3	0	0.00	16	8.51	25	13.30	59	31.38	88	46.81	188	100	4.16
DM4	1	0.53	14	7.45	26	13.83	60	31.91	87	46.28	188	100	4.16
DM5	1	0.53	16	8.51	22	11.70	55	29.26	94	50.00	188	100	4.20
DM6	1	0.53	15	7.98	22	11.70	58	30.85	92	48.94	188	100	4.20
DM7	0	0.00	16	8.51	18	9.57	61	32.45	93	49.47	188	100	4.23
DM8	0	0.00	18	9.57	36	19.15	68	36.17	66	35.11	188	100	3.97
DM9	1	0.53	15	7.98	25	13.30	71	37.77	76	40.43	188	100	4.10

Source: 2023 Primary Data Processing Results

*Fourth*for the startup business growth variable which is measured by the digital technology management and planning indicator, where the highest average value is found in the digital techno indicator at 4.41. This means that the use of digital platforms will make it easier for startup businesses to serve customer needs, while the lowest average score is 4.07 on the management indicator. This is due to the ineffective use of digital platforms in business management.

Table 5: Table of Frequency Distribution of Startup Businesses

Indicator	STS		T.S		N		S		SS		TOTAL		method
	F	%	F	%	F	%	F	%	F	%	F	%	
PS1	1	0.53	10	5.32	30	15.96	56	29.79	91	48.40	188	100	4.20
PS2	0	0.00	11	5.85	29	15.43	82	43.62	66	35.11	188	100	4.08
PS3	0	0.00	10	5.32	37	19.68	71	37.77	70	37.23	188	100	4.07
PS4	0	0.00	8	4.26	22	11.70	57	30.32	101	53.72	188	100	4.34
PS5	0	0.00	8	4.26	19	10.11	69	36.70	92	48.94	188	100	4.30
PS6	0	0.00	9	4.79	17	9.04	49	26.06	113	60.11	188	100	4.41
PS7	0	0.00	9	4.79	22	11.70	82	43.62	75	39.89	188	100	4.19
PS8	0	0.00	8	4.26	22	11.70	85	45.21	73	38.83	188	100	4.19
PS9	0	0.00	9	4.79	19	10.11	79	42.02	81	43.09	188	100	4.23

Source: 2023 Primary Data Processing Results

4.3. Evaluation of External Model Construction

Convergent validity is part of the measurement model which in SEM-PLS is usually called the outer model, while in covariance-based SEM it is called confirmatory factor analysis (CFA)(Sholihin and Dwi, 2021). There are two criteria to assess whether the outer model meets the convergent validity requirements of the reflective construct, namely (1) loading above 0.7 and (2) significant p-value (<0.05) (Sholihin and Dwi, 2021) However, in some cases, loading requirements above 0.7 are often not met, especially for newly developed questionnaires. Therefore, a loading between 0.40-0.70 should be considered to maintain it (Sholihin and Dwi, 2021). In the external model we know Load Factor. The load factor value shows the correlation between the indicator and the construct. An indicator with a low load value indicates a malfunction of the measurement model. Expected load value > 0.7. In the external model we know Cross Loading. This value is another measure of discriminant validity. The expected value is that each indicator has a higher loading for measuring the construct being measured compared to the loading value for other constructs. In the external model, we knowComposite Reliability.

This value shows internal consistency, namely a high composite reliability value shows the consistency of the value of each indicator in measuring the construct. Expected CR value > 0.7.
The results of instrument validity testing based on Loading Factor can be depicted in the following Picture:

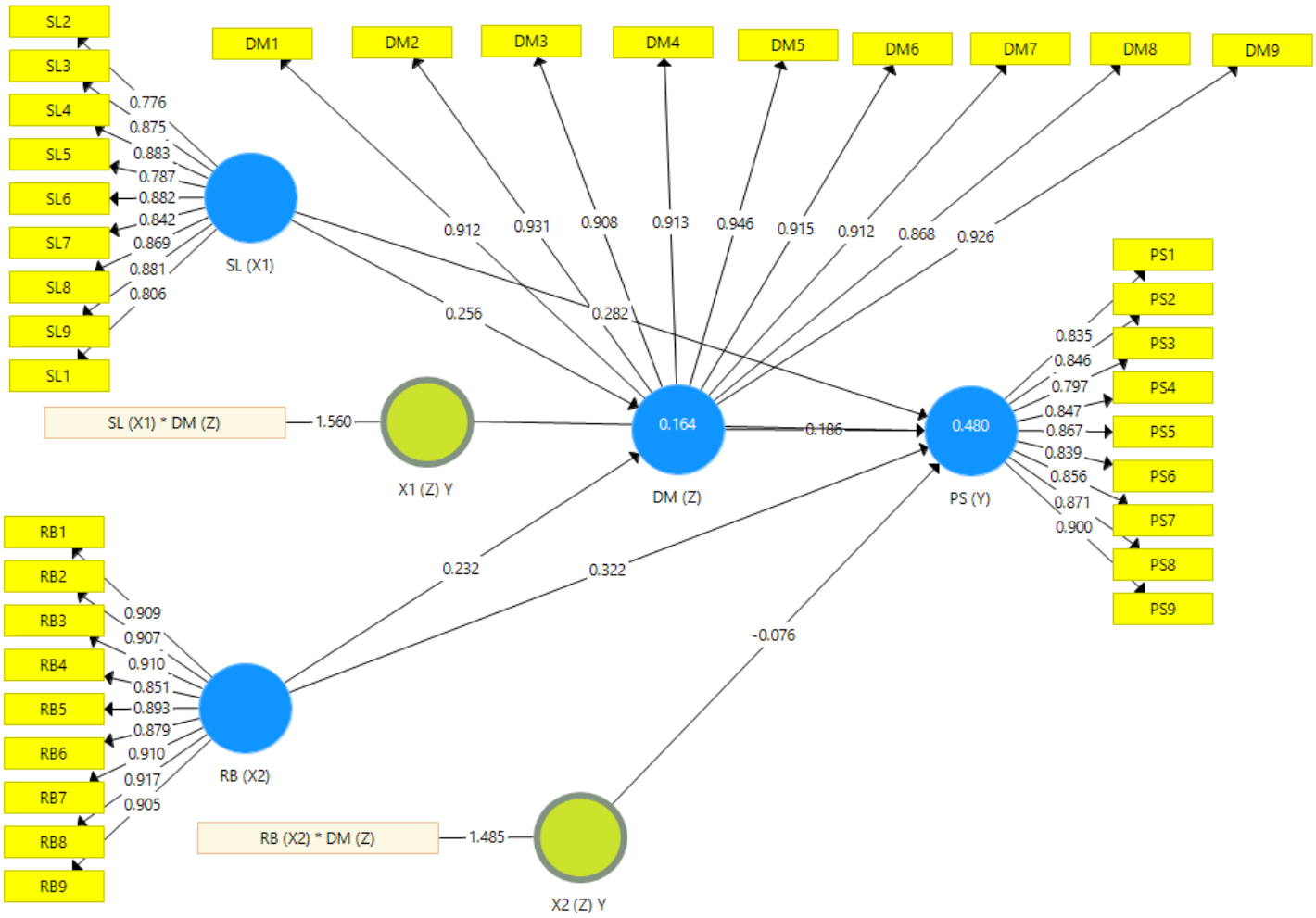


Figure 2: External Model

Based on Figure 2, it can be seen that the Loading Factor (LF) value of all variable indicators is > 0.07 so that all indicators used are declared valid. Evaluation of construct reliability values is measured from Cronbach's alpha and composite reliability values using the PLS algorithm calculation command. A construct is declared reliable if the Crombach's alpha value is > 0.7. The results of construct measurement can be explained in the following table:

Table 6: Establishing Reliability based on Convergent Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average (AVE)
SL (X1)	0.950	0.954	0.958	0.715
RB (X2)	0.970	0.971	0.974	0.807
DM(Z)	0.976	0978	0979	0837
PS (Y)	0.952	0.955	0.959	0.725
X1(Z)Y	1,000	1,000	1,000	1,000
X2(Z)Y	1,000	1,000	1,000	1,000

Source: Data Processing, SMART PLS, 2023

The Crombach's alpha value for all constructs in this study is > 0.7 so it can be concluded that these indicators are consistent in measuring the construct. You can also look at the values to see the Average Variance Extracted (AVE) value.

Where a construct that has good validity is that the AVE value must be above 0.50. It can be seen from the table above that the AVE value for each construct is above 0.50. After evaluating convergent validity, the next step is to test discriminant validity. Discriminant validity is carried out to ensure that each concept of each latent variable is different from other variables. Then a discriminant validity test was carried out using the Fornell-Larcker approach as explained in the following table:

Table 7: Latent variable correlation

	DM(Z)	PS (Y)	RB (X2)	SL (X1)	X1(Z)Y	X2(Z)Y
SL (X1)	0.343	0.532	0.373	0.846		
RB (X2)	0.328	0.547	0898			
DM(Z)	0.915					
PS (Y)	0.444	0.851				
X1(Z)Y	-0.345	-0.410	-0.379	-0.380	1,000	
X2(Z)Y	-0.319	-0.423	-0.336	-0.398	0.540	1,000

Source: Data Processing Results, SMART PLS, 2023

Based on table 3, it shows the comparison between the AVE value and the AVE root. The latent variable correlation that can be explained is the construct AVE Strategy Root for Service (0.845), Business Relations (0.898), Digital Marketing (0.914), Startup Business Growth (0.851). Meanwhile, the maximum correlation is 0.486, so the AVE root value for each construct is greater than the correlation value for other constructs. This shows that the discriminant validity requirements are met.

4.4. Deep Model Hypothesis Testing

Testing of the inner model (structural model) can be evaluated by looking at the r-square (reliability indicator) of the dependent construct and the t-statistic value of the path coefficient test. The higher the r-square value means the better the prediction model of the proposed research model. The path coefficient value indicates the level of significance in hypothesis testing, which can be explained in the following table:

Table 8: Significance test of variable ınfluence

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T statistics (O/STDEV)**	**P value**
Direct Influence					
Service Strategy -> Digital Marketing	0.256	0.253	0.110	2,336	0.020
Business Relationships -> Startups	0.322	0.322	0.116	2,791	0.005
Digital Marketing -> Startups	0.186	0.176	0.074	2,513	0.012
Service Strategy -> Startup	0.282	0.283	0.113	2,496	0.013
Business Relations -> Digital Marketing	0.232	0.235	0.103	2,264	0.024
Indirect Influence					
Service Strategy -> Digital Marketing -> Startup	0.035	0.048	0.096	0.364	0.001
Business Relationships -> Digital Marketing -> Startups	-0.076	-0.066	0.107	0.711	0.478

Source: Smart PLS 2023 Data Processing Results

Based on the results of data processing, it shows that the variable significance test can answer the hypothesis: First, service strategy management (X1) has a significant positive effect on digital marketing (Z) with a P-value of 0.020 < 0.05 (hypothesis accepted). Both business relationship management (X2) have a positive and significant effect on digital marketing (Z) with a P-value of 0.024<0.05. (hypothesis in Accept). The three service management strategies (X1) have a positive and significant effect on start-up business growth (Y) with a P-value of 0.013 < 0.05 (hypothesis accepted).

The four business relationships (X2) have a positive and significant effect on start-up business growth (Y) with a P-value of 0.005 < 0.05 (hypothesis accepted). Fifth, digital marketing (Z) has a positive and significant effect on start-up business growth (Y) with a P-value of 0.012 < 0.05 (hypothesis accepted). The six digital marketing (Z) cannot mediate the influence of service strategy (X1) on start-up business growth (Y) with a P-value of 0.001<0.05 (hypothesis accepted). The seven digital marketing (Z) cannot mediate the influence of business relationships (X2) on start-up business growth (Y) with a P-value of 0.478 > 0.05 (hypothesis rejected).

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5. Discussion

5.1. *The Influence of Service Strategy Management on Digital Marketing and Business Growth Straup*

Based on the results of data processing, it shows that the significance test of the service strategy management variable (X1) has a significant positive effect on digital marketing (Z). This means that startups really need digital-based services in promoting and managing their business. So it is necessary to adjust services according to consumer tastes by utilizing online media/online stores such as marketplaces, Lazada, creative content and social media. Meanwhile, the influence of service strategy management on startup business growth based on data processing results shows that the significance test of the service strategy management variable (X1) has a positive and significant effect on start-up business growth (Y). This means that a service strategy with a digital system will make it easier for consumers to make transactions. If it becomes easier for consumers to make transactions, there will be more and more enthusiasts/consumers, which will have an impact on business growth.

This finding is relevant to the research results (Ri'aeni, 2017; Mahmud, 2022)who found that digital marketing platforms are the right strategy for building marketing communications to develop businessstartups.

5.2. *The Influence of Business Relationship Management on Digital Marketing and Startup Business Growth*

Based on the results of data processing, it shows that the significance test of the business relationship management variable (X2) has a positive and significant effect on digital marketing. This means that the more business relationships there are, the more business growth will also increase. Meanwhile, the influence of business relationship management on startup business growth based on the results of data processing shows that the significance test of the business relationship management variable (X2) has a positive and significant effect on startup businesses growth (Y). This means that the existence of business relationships influences the level of business growth.

This finding is relevant to the research results (Nindito Prasetyo, 2018) findthat digital marketing-based business relationship services have an influence on the growth of startups in Indonesia, especially those that focus on customer service.

5.3. The Influence of Digital Marketing on Startup Business Growth

Based on the results of data processing, it shows that the significance test of the digital marketing variable (Z) has a positive and significant effect on startup business growth (Y). This means that digital marketing is a strategy to increase the competitiveness of startup businesses through the use of social media and online stores. These findings are relevant to opinions and research results (Santoso, 2020; Febriantoro, 2018; Pradiani, 2017; Mubarok, 2019) which states that the use of digital marketing platforms has a significant influence on the development of MSMEs.

5.4. The Influence of Service Strategy and Business Relationships on Startup Business Growth as moderated by Digital Marketing

Based on the results of data processing, it shows that the significance test of the digital marketing variable (Z) cannot moderate the influence of service strategy (X1) on start-up business growth (Y). This means that small-scale startups have not fully utilized digital marketing in managing their business, which has an impact on slowing business growth. Meanwhile, the influence of service strategy on startup business growth is moderated by digital marketing. Based on the results of data processing, it shows that the significance test of the digital marketing variable (Z) cannot moderate the influence of business relationships (X2) on startups. improve business growth (Y). This means that the use of digital marketing in building business relationships has not been fully implemented so that the acceleration of small-scale startup growth is still slow.

These findings differ from opinions and research results (Aliami, S., Hakimah, EN, and Fauji, 2018; Santoso, 2020; Febriantoro, 2018; Pradiani, 2017; Mubarok, 2019) which states that the use of digital marketing platforms is a service strategy in developing startup businesses and building business relationships.

Based on the results of quantitative data processing and the results of a SWOT analysis carried out by looking at internal factors (strengths/strengths) and external factors (opportunities and threats), it can be concluded that the startup business model is appropriate in facing competition and markets. The need is business digitalization. All business activities are integrated with big data-based digital systems.

Comprehensive research regarding local startup businesses, especially in the city of Makassar, has yet to be found. The main obstacle faced by Makassar startups is that there is no strong business area in the startup industry. This area is not conducive for them so that new startups do not last long and even die by themselves. So an industrial business area ecosystem is needed that is able to provide space for startup businesses to live and develop.

The limitations of this research are the limited sample and business scale, so that future researchers can develop it on a larger sample and also study medium-sized businesses.

6. Conclusions and Implications

Conclusions about the influence of service strategies and business correlation on the growth of startup businesses in digital marketing media may vary depending on the context and specific research results such as effective service strategies are very important for the growth of

startup businesses in digital marketing media. High-quality service can increase customer satisfaction, build loyalty, and encourage positive word-of-mouth that can attract new customers. In additional, strong business relationships, building and maintaining strong business relationships are also important for the growth of a startup business. Good relationships with customers, business partners, and other stakeholders can help startups gain access to resources, gain support, and expand their reach in the market. Based on the results of data processing and hypothesis testing results using Smart-PLS, the following results were obtained:

- Service strategy management (X1) has a significant positive effect on Digital Marketing (Z). This means that startups really need digital-based services in promoting and managing their business. So it is necessary to adjust services according to consumer tastes,
- Business relationship management (X2) has a positive and significant effect on digital marketing (Z). This means that the more business relationships there are, the more business growth will increase,
- Service strategy management (X1) has a positive and significant effect on Startup Business Growth (Y). This means that a service strategy with a digital system will make it easier for consumers to make transactions. If it becomes easier for consumers to make transactions, there will be more and more enthusiasts/consumers, which will have an impact on business growth.
- Business relationship management (X2) has a positive and significant effect on Start Up Business Growth (Y). This means that the existence of business relationships influences the level of business growth,
- Digital marketing (Z) has a positive and significant effect on the growth of StartUp Business (Y). This means that digital marketing is a strategy to increase startup business growth in the era of industrial revolution 4.0,
- Digital Marketing (Z) cannot moderate the influence of service strategy management (X1) on Startup Business Growth (Y). This means that small-scale startups have not fully utilized digital marketing in managing their business, which has an impact on slowing business growth.
- Digital marketing (Z) cannot moderate the influence of business relationship management (X2) on Business Startup Growth (Y). This means that the use of digital marketing in building business relationships has not been fully implemented,
- Meanwhile, from the aspect of startup business competitiveness is based on resultsFrom the SWOT analysis carried out by looking at aspects of internal factors (strengths and weaknesses) and external factors (opportunities and threats), it can be concluded that the right startup business model is appropriate. in facing competition and market needs is digitalization business. All business activities are integrated with big data-based digital systems.

6.1. Suggestion

Here are some suggestions that may be relevant:

- Service Strategy Startups must ensure that they have a strong service strategy. This includes understanding customer needs and expectations, providing high-quality service, and handling problems or complaints quickly and efficiently. In a digital context, this can also involve using technology such as chatbots or AI to provide fast and efficient customer support.
- Digital Marketing, Digital marketing is a very effective tool for startup business growth. This can involve using SEO, content marketing, email marketing, social media marketing, and online advertising to reach, attract, and retain customers.
- Prioritize Customer Service: Organizations must prioritize customer service as an important part of their strategy. This may include improving the quality of service, increasing the speed of service, or increasing personalization of service.
- Prioritize Customer Service: Organizations must prioritize customer service as an important part of their strategy. This may include improving the quality of service, increasing the speed of service, or increasing personalization of service.
- Use Digital Technology: Organizations must leverage digital technology to support their service strategies and business relationships. This may include the use of digital platforms to interact with customers, the use of analytics to understand customer needs, or the use of digital technology to improve operational efficiency.

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The effect of oil price on stock market performance and petrochemical stock value using NARDL

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ABSTRACT

The aim of the study is to examine the impact of oil prices on the stock market performance and the stock value of petrochemical companies on the Tehran Stock Exchange (TSE). For this, it utilizes the Non-linear autoregressive distributed lag during 2011 to 2021 using time series data with monthly frequency. The results showed that in the short run, the oil price has an asymmetric impact on the stock value of petrochemical industries and also on the performance of the stock market, while in the long run, this effect is symmetrical. So, the influence of bouncing up the oil price is greater than the impact of its moving down. Then, the asymmetric effect happens through the increase in oil prices. Therefore, ups and downs in oil prices lead to fluctuations in the stock market returns, especially in petrochemical companies. Based on the results, capital market participants should watch the informational content of oil price fluctuations to make buying and selling decisions and invest in companies' shares according to these fluctuations.

I. Introduction

In stock markets, small savings can be optimally placed on the path of movement towards more considerable investments. Participation in this market for investors deciding on the best investment options is a breathtaking issue. Consequently, based on the decision theory in uncertain conditions, the decision-makers try to pick out the best available options (Bird et al., 2014). In the current era, crude oil is known to be a crucial important factor in producing all kinds of products. In any economy, fluctuations in crude oil prices can have both positive and negative shocks on economic developments. The oil price is one of the most exogenous variables that affect many economic variables, including the stock exchange index (Samadi et al., 2007).

One of the logical reasons for using oil price as the most essential element in stock market analysis is the valuation of stock prices by the present value of future cash flows that are affected by macroeconomic events (Bhar and Nikolova, 2009). In oil exporting countries, the influence of the oil price related variations may be varied, so oil revenues affect the main variables of these economies. Therefore, oil price fluctuations affect these companies' productions, operations, and sales, which ultimately varies stock returns and stock market value (Paytakhti Oskooe and Shafei, 2016). To study how the oil price affects the stock market, researchers have examined the impacts of oil price variations on the stock exchange value, (see Ciner, 2013; Bouri, 2015; Mohanty et al. 2010; Phan et al., 2015; Cunado and de Gracia, 2014; Nusair, 2016; Dizaji, 2014). The last studies showed that the inflation in oil price has multiple influences on exporting and importing countries; as a consequence, this research has examined the impact of crude oil prices on Iran's stock market and petrochemical stocks using the NARDL approach. In the following, the literature review and background, research methods and patterns, findings, and finally the conclusion have been discussed.

2. Literature Review and Theorical Background

Considering the relationship between oil prices and stock market indices can get care from investors to build up an investment portfolio and risk caring in the stock market. Also, it can help policymakers in regulating and effectively monitoring the stock market. Although the stock

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market in oil-exporting countries, including Iran, has less depth, the changes in oil prices affect the returns of the stock market and the stock value in different ways.

First of all, the liquidity is created by exporting oil. In this way, with the increase in the oil price, abundant foreign currencies will flow to the Foreign Exchange Reserve Account. Oil price shocks coupled with the rise in oil revenues result in a broadening of the monetary base, and inevitably leads to liquidity growth and higher inflation rates. Besides, such an oil price shock leads to a depreciation within the real exchange rate and a decline in economic competitiveness in all scenarios. Hence, monetary rules-regardless of the exchange rate regime would lead to a lack of competitiveness with shifting degrees of intensity (Amiri et al., 2021). A positive affiliation between oil prices and financial liquidity in the medium run. Monetary liquidity led oil prices in the short run during the worldwide monetary retreat (Khan et al., 2021). Therefore, when there isn't sufficient request for these currencies, the Central Bank must oversee the currency exchanges and constrained to purchase it and alter it to Rial for governmental transactions, as the result of these policies, bouncing the net foreign assets of the Central Bank and expanding the monetary amount of the country. On the contrary, at the time of oil price reduction, since the government could not dimmish its expenses, it is forced to borrow from the Central Bank; subsequently, the government's net obligations to the Central Bank has expanded, which moreover increased the monetary amount of the country. In this manner, the government's financial policy may increment the money supply. A boost in the sum of money in the economy can affect the stock price index both as a political variable at the large scale and as a portion of a portfolio (Ebrahimi and Shokri, 2012).

Second, entering foreign currency into the country, that is, the drift of oil prices happens through foreign currency. Since oil is exchanged for dollars in the international markets, eventually, with the increase in the oil price, a lot of foreign currency enters the country; in this case, two scenarios arise: the first scenario is an increase in the oil price, an increase in income and it follows foreign exchange reserves, which result in strengthening the value of the national currency against foreign currency. This situation leads to an increase in the income of companies that export goods and in the value of their shares. In the second scenario, an increase in the oil price will reduce the profitability of importing companies and ultimately reduce the value of their shares (Morley and Pentecost, 2000).

Third, the bounce of oil prices impacts society's desires. The going up the oil prices bring up oil incomes for oil-supplying countries, at that point it leads to the formation of optimistic expectations related to the development and prosperity of economic exercises in the country, which causes expectations to extend the profitability of listed companies will ultimately lead to the increment and positive growth of the future long run cash stream and, consequently, increase the stock index (Fang et al., 2009).

Fourth, another impact path of oil prices is on income channel. Selling oil at a higher price blows wealth from oil-importing countries to oil-exporting countries. The influence of this increase depends on the government's utilization of it. In case these incomes adjust with the purchase of domestic services and merchandise, it will raise the public wealth. Contrarily, with the increment in demand for labor and capital, many investment opportunities will pop up. As a result, it leads to a positive drift in the future cash flow of companies. Inflation in oil price, however, as a production input leads to an increase in the cost and a decrease in the income of the companies, which hurts the cash flows of the companies, which will reduce the market value of these companies (Hassanzadeh and Kianvand, 2014).

Fifth, the oil prices have a reversible impact. The oil price inflation moves quickly up the cost of products made by developed countries, and since most of the countries supplying oil do not have the necessary ability and technology to process oil, they import oil products and their derivatives, which has a negative effect on the future cash flows for the companies located in these countries, and consequently, it leads to a decrease in the stock market value (Arouri and Rault, 2009).

Hosseini and Dadras Moghadam (2022) showed that companies' stock returns are strongly influenced by oil price shocks. Mohammadi et al. (2021) have found a negative and significant relation between oil prices and returns of asset for companies in the chemical and refining industry on TSE. Taleblo et al. (2017) have found that the oil price shocks contain a negative impact on the stock returns, and it will take four future periods to alter its effect. Sardar and Sharma (2022) explored the non-linear relation between oil prices and stock returns by modeling the asymmetric effect around the zero lower bound using government-dependent local forecasts; they showed that when the economy works in the zero lower bound, oil price shocks raise stock returns. However, when interest rates are high, stock returns and oil prices have a negative relation. Alzyadat et al. (2021) presented evidence of a reverse asymmetric effect in the Saudi Arabian stock market during the period before the COVID-19 pandemic. Cheikh et al. (2021) found that the stock markets of the Persian Gulf Cooperation Council do not have the same sensitivities to oil price variations and documented that oil price variations have asymmetric impacts on stock returns in some countries of the Persian Gulf Cooperation Council. Liu et al. (2020) explores the response of China's petrochemical markets to oil price hops. They showed that the current oil price bounced have reversely drifts on the proceeds of petrochemical products and petrochemical stocks. But the effect of the postponed transformations on these earnings is inverse. So, the previous could be a reflection of panic caused by information of extreme peril, and the last is a reflection of rationality by hoarders. According to the above arguments, the following hypotheses can be proposed:

- The rise and fall of oil prices have asymmetric drift on the stock market index.
- The rise and fall of oil prices have asymmetric drift on the petrochemical industries stock index.

3. Research Method and Model

This study is a post-event research. Secondary data collection method was used to collect the necessary data and information. These monthly data have been gathered for the period 2011-2021 the websites of TSE and Rahavard-Navin database. Since the oil price is an exogenous variable compared to the stock market index, the autoregressive distributed lag (ARDL) can be used. Still, the reaction of the stock market to oil price fluctuations may be different and non-linear. So, a non-linear autoregressive distributive lag (NARDL) is better to employ (Kumar et al. 2023). In this method, the effect of ups and downs of oil price is separated into two categories, because of different responses of the stock price index.

The NARDL, an amplified form of the ARDL, was created by Granger and Yoon (2002). This method is utilized to identify non-linear and asymmetric relations between variables within the long and short run. In this way, the fluctuations of the variables are divided into two groups of ups and downs fluctuations. The $NARDL_{pq}$ model is defined as follows:

$$Y_t = \sum_{i=1}^{p} \omega_j Y_{t-i} + \sum_{i=0}^{q} (y_i^+ X_{t-i}^+ + y_i^- X_{t-i}^-) + \varepsilon_t \quad (1)$$

Positive and negative fluctuations are defined as follows:

$$X_t^+ = \sum_{j=1}^{t} \Delta X_j^+ = \text{Max}(\Delta X_{j.0}) \quad (2)$$

$$X_t^- = \sum_{j=1}^{t} \Delta X_j^- = \text{Min}(\Delta X_{j.0}) \quad (3)$$

The cumulative NARDL model with short-term and long-term asymmetry is equal to:

$$\Delta Y_t = \mu + pY_{t-1} + yX_{t-1} \sum_{i=1}^{p-1} \omega_i \Delta Y_{t-i} + \sum_{i=0}^{q-1} (\vartheta_i^+ \Delta X_{t-i}^+ + \vartheta_i^- \Delta X_{t-i}^-) + \varepsilon_t \quad (4)$$

$$\Delta Y_t = \mu + pY_{t-1} + y^+ X_{t-1}^+ + y^- X_{t-1}^- + \sum_{i=1}^{p-1} \omega_i \Delta Y_{t-i} + \sum_{i=0}^{q-1} \vartheta_i \Delta X_{t-i} + \varepsilon_t \quad (5)$$

When an asymmetry is detected in the NARDL model, either in the short or long run, this asymmetry reacts to a positive or negative shock. This direct reaction is derived from positive and negative dynamic coefficients and is related to a change in X^+ and X^-. The use of this model has the following advantages: (1) This model can be used regardless of whether the variables of the model are I(1) and I(0) or a combination of both. (2) This method does not include the short-term dynamics in the error correction part. (3) This method can be used with few observations. (4) It is possible to use this method even when the explanatory variables are endogenous (Monjazab and Nosrati, 2018).

The first model to test the first hypothesis:

$$\Delta LTSE_t = \beta_0 + \beta_1 \sum_{t=1}^{t} \Delta LTSE_{t-1} + \delta_1 LTSE_{t-1} + \delta_2^+ LOILP_{t-1} + \delta_3^- LOILP_{t-1} + D1 + D2 + \delta_4 ECT_{t-1} + \varepsilon_t \quad \text{Model (1)}$$

The second model to test the second hypothesis:

$$\Delta LPETRO_t = \beta_0 + \beta_1 \sum_{t=1}^{t} \Delta LPETRO_{t-1} + \delta_1 LPETRO_{t-1} + \delta_2^+ LOILP_{t-1} + \delta_3^- LOILP_{t-1} + D1 + D2 + \delta_4 ECT_{t-1} + \varepsilon_t \quad \text{Model (2)}$$

The dependent variables:

LTSE: A logarithm of the stock exchange index, the stock price index in the TEPIX of TSE, is based on the Laspeyres formula.

LPETRO: A logarithm of Petrochemical Industries Index in the TSE.

The independent variable:

LOILP: A Logarithm of the price of each barrel of OPEC crude oil is used as an explanatory variable.

Dummy variable:

The time series may undergo sudden switching that leads to structural failure, and ignoring it will cause false results. In the time frame of this study, factors such as Iran's nuclear negotiations, oil and non-oil sanctions, turning to clean energy such as wind and solar power, the political risk of the OPEC member countries, and finally, the COVID-19 pandemic, affected the oil price. They made a strong impact. Therefore, the following dummy variables have been used.

D1: the first dummy variable (from December 2017 to July 2018, it takes 1 and for the rest it takes zero).

D2: the second dummy variable (from February 2016 to March 2019, it takes 1 and for the rest it takes zero).

4. Findings

4.1. Checking the reliability of the variables

If the variables of a model do not have a single root, the results will be completely misleading. This problematic situation leads to false regression (Koop, 2013). In examining the significance of research variables, the results of the generalized Dickey-Fuller test and Phillips-Perron test showed that all variables are significant with one lag difference.

Table 1: Stationarity test: Dickey-Fuller & Phillips- Phillips-Perron

Variables	ADF				PP			
	Zero order difference		First order difference		Zero order difference		First order difference	
	t	**Sig.**	**t**	**Sig.**	**t**	**Sig.**	**t**	**Sig.**
LOILP	-2.561	0.103	-8.770	0.000	-2.224	0.198	-11.919	0.000
LTSE	0.789	0.993	-6.927	0.000	1.055	0.997	-6.943	0.000
LPETRO	0.563	0.988	-8.065	0.000	0.633	0.990	-8.655	0.000

According to Table 1, the results of the unit root tests, the NARDL approach is suitable for the estimation.

4.2. Diagnostic tests: according to Table (2), the results of the diagnostic tests show that the tests of non-homogeneity of variance (Breusch-Pagan), serial autocorrelation (Brush-Godfrey), and dependent form of the model (Ramsey's RESET test) indicate the absence of serial autocorrelation and homogeneity of variance. Also, the explained model has a correct and appropriate specification.

Table 2: Diagnostic tests of the research hypotheses

Hypotheses	diagnostic tests	test results	
		f	Sig.
(1)	Variance heterogeneity	1.2291	0.246
	Serial autocorrelation	1.2554	0.289
	F-statistic	0.0274	0.868
(2)	Variance heterogeneity	0.9056	0.555
	Serial autocorrelation	0.0228	0.977
	F-statistic	0.2254	0.635

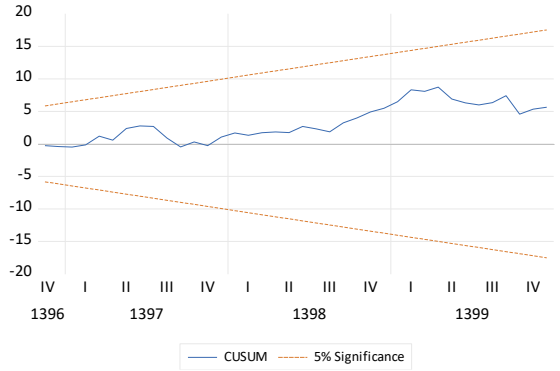
4.3. The results of the hypotheses

The non-linear ARDL approach requires determining the optimal lag. In this research, the optimal lag has been estimated using on the Hannan-Quinn criterion (for data between 100 and 200). According to the lowest value of this criterion, the optimal lag is 4, and selected models with and without dummy variables for the first hypothesis (3, 4, 3, 0, 0) and the second hypothesis (3, 4, 3, 0, 0), respectively.

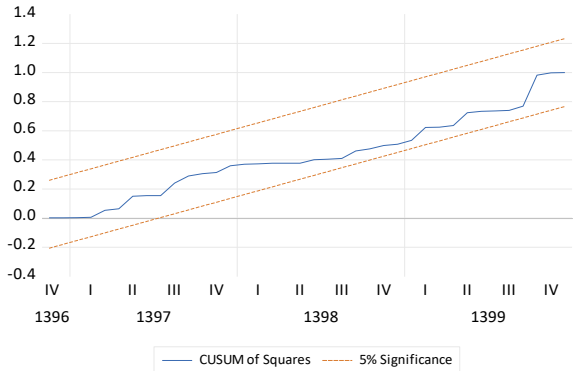
4.4. The results of the first hypothesis test

According to Table (3), in the short term, the stock market index has a lag-positive and significant effect on the stock price index in the current period. The positive oil price shock has a positive and significant impact on the stock market index in lags 1 and 4, and in lag 3, it has a significantly negative effect. Also, the negative oil price shock has a positive and significant impact on the stock market index in lag 3. In the long term, the coefficients of positive and negative fluctuations of oil prices are substantial, but according to the results of the bound test and the statistical value of F (2.484), it is less than the listed bounds at a significant level of 5%; so, there is not a long-term accumulation between the oil price and the stock market index. Based on this, the error correction model test (ECM) is not performed.

To check the stability, the sum of regression residuals test and its square have been used. The results of the tests in graphs (1) and (2) show that considering that the movement path of the residuals did not go out of the bilinear range, therefore the parameters of the hypothesis are stable.



Graph 1. Cumulative sum test of regression residuals



Graph 2. Cumulative sum of squares test of regression residuals

Table 3: Results of the first hypothesis test

variable	coefficient	t statistic
C	0.812	2.681**
LTSE(-1)	1.233	13.420**
LTSE(-2)	-0.145	-1.030
LTSE(-3)	-0.168	-1.937
LOILP_POS	-0.036	-0.248
LOILP_POS(-1)	0.328	2.016*
LOILP_POS(-2)	.0295	1.872
LOILP_POS(-3)	-0.664	-4.698**
LOILP_POS(-4)	0.284	2.699**
LOILP_NEG	-0.007	-0.084
LOILP_NEG(-1)	-0.228	-1.630
LOILP_NEG(-2)	0.053	0.330
LOILP_NEG(-3)	0.300	2.415*
D1	-0.041	-1.322
D2	-0.042	-1.341
F statistic	Adj. R^2	DW
1894.1*	0.995	1.984
LOILP_POS	2.546	4.398**
LOILP_NEG	1.458	2.890**
D1	0.514	1.317
D2	0.527	1.801

F-bound test			
F statistic	I(1)	I (0)	Sig.
2.484	3.22	2.303	10%
	3.698	2.688	5%
	4.787	3.602	1%

** Significance at the 1% level, * Significance at the 5% level.

According to Table (4) and also according to the significance of the F statistic in the short term, the oil price has an asymmetric effect on stock returns. On the other hand, considering the non-significance of the F statistic in the long term, the H_0 of this hypothesis (symmetric effect) is confirmed. The results of the Wald test also confirm the results of Table (3) and show that the oil price affects the stock market index only in the short term.

Table 4: Wald test results for the first hypothesis

Short term F-statistics	Long-term F-statistics
8.1743**	0.0113

** Significance at the 1% level, * Significance at the 5% level.

4.5. The results of the second hypothesis test

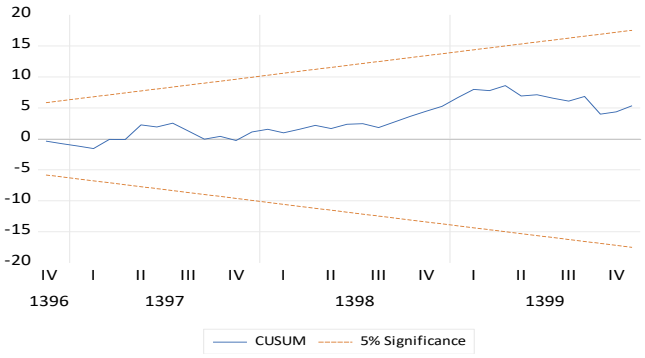
According to Table (5), in the short term, the petrochemical industry index has a positive and significant effect on the petrochemical industry stock price index in the current period. The positive oil price shock has a positive and significant effect on the petrochemical index in lags 1 and 4, and in lag 3, it has a negative and significant impact. So, with a 1% increase in the oil price, the stock index of petrochemical industries decreases by 0.74% (lag 3). Also, the negative shock of oil prices has a positive and significant effect on the index of petrochemical industries in lag 3. In the long term, the coefficients of positive and negative fluctuations of oil prices are significant, but according to the results of the F-bound test and the value of the F statistic of 2.175, it is 5% less than the listed bound at a significant level; therefore, there is a difference between the oil price and the petrochemical industry index. There is no long-term co-accumulation. Based on this, the test of the error correction model (ECM) is not performed.

Table 5: The results of the second hypothesis test (effect of oil price on petrochemical index)

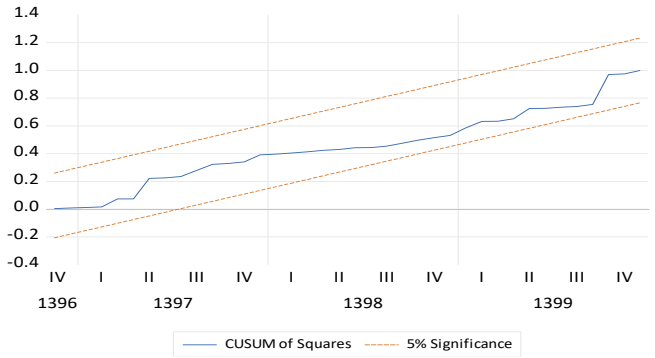
variable	coefficient	t statistic
C	0.520	2.555**
LPETRO(-1)	1.151	12.383**
LPETRO(-2)	-0.046	-0.333
LPETRO(-3)	-0.175	-2.010*
LOILP_POS	-.127	-0.751
LOILP_POS(-1)	0.405	2.148*
LOILP_POS(-2)	0.375	2.043*
LOILP_POS(-3)	-.742	-4.504**
LOILP_POS(-4)	0.293	2.399*
LOILP_NEG	0.033	0.340
LOILP_NEG(-1)	-0.236	-1.445
LOILP_NEG(-2)	-0.016	-0.090
LOILP_NEG(-3)	0.342	2.3838*
D1	-0.024	-0.670
D2	-0.042	-1.195
F statistic	Adj. R^2	DW
1419.9*	0.994	1.98
LOILP_POS	2.890	36.55**
LOILP_NEG	1.745	2.460*
D1	-0.343	-0.677
D2	-.604	-1.659
	F-bound test	
F statistic I(1)	I (0)	Sig
2.175 3.22	2.303	10%
3.698	2.688	5%
4.787	3.602	1%

** Significance at the 1% level, * Significance at the 5% level.

The results of parameter stability tests in graphs (3) and (4) show the stability of the hypothesis parameters.



Graph 3. Cumulative sum of squares test of regression residuals



Graph 4. Cumulative sum of squares test of regression residuals

To check the symmetry in the short and long term, the Wald test is used, the null hypothesis of which is the existence of symmetry effect in the short and long term, if the significance probability of this test is less than 5%, the null hypothesis is rejected, which means that there is an asymmetric effect (Monjazab and Nosrati, 2018).

Table 6: Wald test results for the second hypothesis

Short term F-statistics	Long-term F-statistics
8.1329*	0.3725

* Significance at the 1% level, ** Significance at the 5% level.

Based on the results of Table (6) and considering the significance of the F statistic in the short term, the null hypothesis of the Wald test, i.e., the existence of a symmetric effect, is rejected. In other words, the oil price has an asymmetric impact on the stock index of petrochemical industries in the short term. On the other hand, considering the non-significance of the F statistic in the long term, the null hypothesis of this hypothesis is confirmed, so, in the long run, the oil price has a symmetric impact on the stock index of petrochemical industries.

5. Conclusions and suggestions

In the economic development of countries, the oil price and the stock market are constantly related to each other. Hence, considering the acceptance of the individuals, economic operators, and investors to activate in the TSE, and on the other hand, since the large and index-making companies, in the TSE are basically petrochemical companies whose volume, in addition to their transactions affecting the movement of the stock market index, the investigation of the impact of oil prices on the stock market performance and the value of petrochemical stocks seems to be a significant issue. In this article, by using time series data with monthly frequency in the period from 2011 to 2021, using the NARDL approach, the effect of oil price on the performance of the stock market and petrochemical industry index was explored. The results show that in the short term, the oil price has an asymmetric effect on the stock market index and the petrochemical index (this results are like Kumar et al. 2023, and Okere et al., 2021), while in the long term, this effect is symmetrical. Since oil price fluctuations have influenced the behavior of investors, so oil price variations have informational content. Therefore, it is recommended that to make the right decision, investors be aware of how the oil price affects the stock market and petrochemical index, because this helps to identify the right time for how to invest and create profit in the stock market. In other words, investors can determine the right time to enter or exit the market by carefully studying the impact of oil prices in the breaks, thus, they will achieve a good return. They can choose a suitable strategy for themselves. On the other hand, managers of petrochemical companies, knowing the different effects of oil prices, can adopt appropriate strategies in the short and long term to maintain the company's competitive position in the market and increase the stock value. Since the oil price variable is considered a powerful exogenous variable, financial managers and investors should examine the actual performance of the company in their evaluations and pay attention to oil price fluctuations as a variable with informational content. In the meantime, the government can reduce its excessive reliance on oil revenues by using tax revenues. Also, it seems necessary to design strategies that can guarantee stability in the capital market along with the serious pursuit of policies supporting economic growth regardless of oil price shocks under sustainability (see Alvarado et al., 2022a, 2022b, Deng et al., 2022; Ongan et al., 2022; Altunöz, 2023; Dogru et al., 2023; Han et al., 2023a, 2023b; Islam et al., 2023; Sümerli et al., 2023; Cui et al., 2024; Işık et al., 2024a, 2024b, 2023, 2021, 2020; Pasigai & Jusriadi, 2024; Rana et al., 2024).

Some limitations in the implementation of this study, such as exchange rate, inflation, interest rate, along with oil price, have an effect on the stock value, therefore, it is suggested to include these factors in the models for future researches.

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Data availability: The datasets generated and analyzed during the current study are available at the Tehran Stock Exchange, and Rah Avard Novin Information Bank.

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Does the publication of judgments on the Internet change the outcome of administrative litigation cases? A DID-model-based analysis

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ABSTRACT

This article analyses the influence of the publication of judgments on the Internet on the results of administrative litigation cases in China. Due to the particularity of administrative litigation, courts are often subject to the restriction of public power in the trial process, and defendants are in a stronger position than plaintiffs. In 2010, the Supreme People's Court (SPC) issued the Regulations on the Issuance of Judicial Documents on the Internet by the People's Courts, which for the first time imposed clear and detailed regulations on the publication of judgments. This Regulation promotes judicial openness and establishes judicial credibility, which is conducive to balancing the litigation status of the plaintiff and the defendant. By sampling 7463 judgment documents from 2012 to 2015 on China Judgment Online, this study applies a difference-in-differences model to determine the influence of the Issuance of Judgments on the Internet Regulation on administrative litigation by form of closure, the plaintiff winning rate, and the withdrawal rate of the plaintiff. The implementation of this Regulation was found to significantly increase the rate of judgment and reduce the plaintiff withdrawal rate, significant impacting the trial results of administrative litigation cases.

I. Introduction

Adopted by the National People's Congress in 1989 and implemented in 1990, the Administrative Litigation Law of the People's Republic of China marked a milestone in China's legal system, as it enabled the people to sue the government and restricted administrative power. It is an important litigation system intended to ensure that the legitimate rights of citizens and organizations are not infringed upon by administrative power, and that the country is administered according to law (Huang, 2013). However, administrative litigation has always been plagued by "difficulties in docketing and trialing" (Yu, 2014), because under the regional administrative system of China, the local judicial system is closely linked to the local government, as a result of which the local court has become 'the court of the local government', laying the foundation for local protectionism in the judicial system (Liu, 2003). In addition, the court funds mainly come from the budget of the government at the same level, which gives the administrative system the ability to interfere with the judicial system (Liu, 2003; Chang and Liu, 2018). Furthermore, the relatively weak position of ordinary citizens or organizations in the face of public power, such as the difference in bargaining power in terms of lobbying channels and the cost of proof (Zhang and Ke, 2002), leads to their low success rate in administrative litigation.

With the advancement of China's legal system, judicial justice has become a matter of increasing concern for society. The constant recurrence of cases of corruption, bribery, and injustice has impacted the public's trust in the courts. In 2009, the Supreme People's Court (SPC) issued a notice entitled 'The Third Five-Year Reform Outline for the People's Courts (2009–2013)', proposing to 'study and establish a system for the on-line release of judgment documents and a system for the on-line inquiry about enforcement information of cases', which would promote the process of judicial information disclosure in China and thereby enhance the public spirit of citizens and the legitimacy of the government, and thus is an important measure to prevent corruption, prevent the abuse of public power, and improve the administrative efficiency of the government (Fang, 2013; Carlo Bertot, Jaeger, and Grimes, 2012; Zuo, 2018).

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The Regulations of the Supreme People's Court on the Issuance of Judgments on the Internet by the People's Courts (hereinafter referred to as 'the Regulation'), adopted on 13 November 2013, clarify the basic principles, scope of disclosure, procedures, time limits, and supervision mechanisms for the publication of judgments online (He and Yang, 2014). The publication of judgments online is an innovative attempt by the judiciary in the field of judicial information disclosure (Işık et al., 2021). When adjudication documents are no longer open only to the parties of the case or professionals but are subject to social supervision, judges will undoubtedly become more prudent in the trial process (Ma, Yu, and He, 2016). Therefore, this provision can force the impartiality of trials and prevent the abuse of power. Moreover, the provision is also conducive to unifying the scale of adjudication and the professionalism of judges, and promoting precision in the administration of justice (Lin and Wang, 2013). The disclosure of cases allows judges to quickly search for similar cases on the platform, use the experience of other judges to quickly locate the applicable laws and rules, and consider the relevant legal issues more comprehensively. It provides institutional safeguards to ensure the rights of citizens and social organizations in administrative litigation cases and helps to change the disadvantaged position of plaintiffs in such cases.

As shown in Figure 1, according to the data from China Judgment Online, the number of administrative cases included on the website has increased year by year since the implementation of the Regulation, showing an accelerated growth trend in the early years and a gradual slowdown trend in recent years. As of January 2022, China Judgment Online included about 128.27 million judgments, of which nearly 3.08 million were administrative cases.

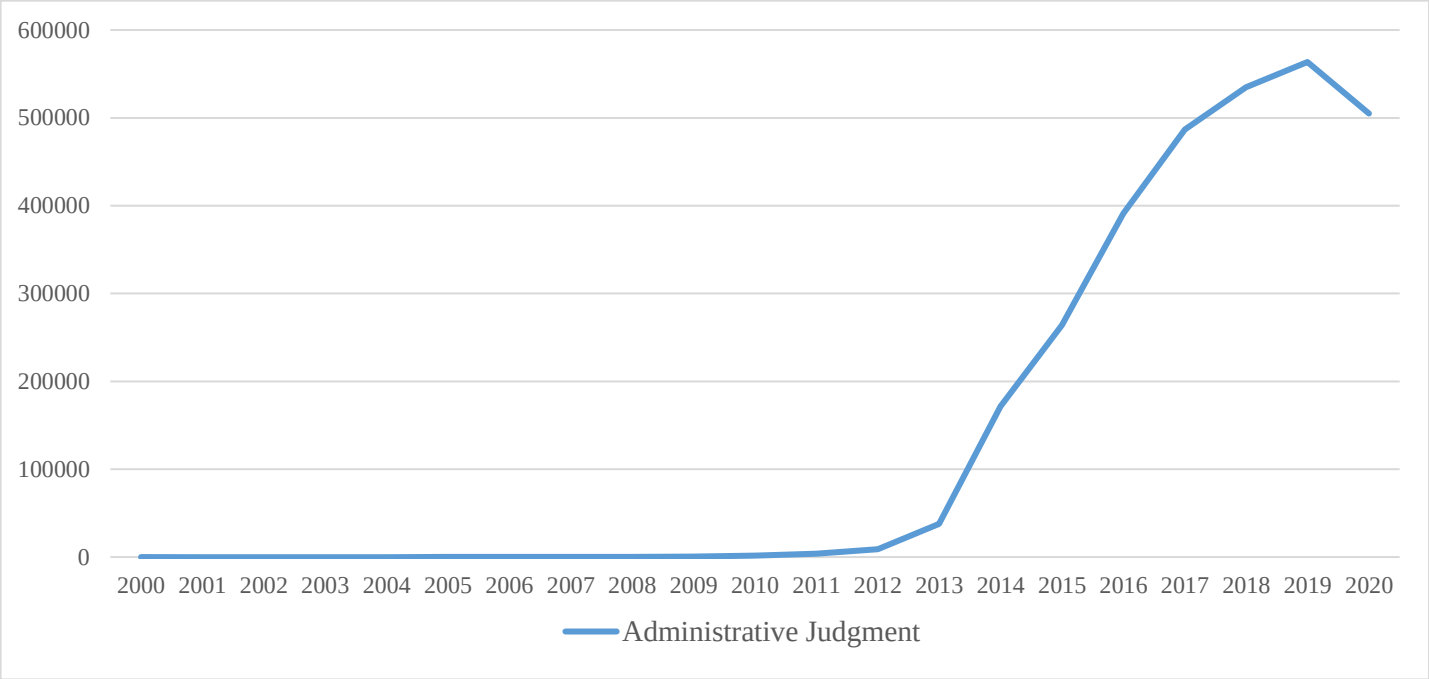

Figure 1: Trend of inclusion of administrative judgments in China Judgment Online from 2000 to 2020

Note. Data source: China Judgment Online (https://wenshu.court.gov.cn)

The promotion of judgment documents online has stimulated a large body of related research. Scholars have focused on the impact of the implementation of the regulations on the internal and external aspects of the judicial system. As far as the internal aspect of the judicial system is concerned, the mass disclosure of court outcomes allows the SPC to control the process of reporting information within the judicial hierarchy as part of the process of centralization of justice in China (Chen, Liu, and Tang, 2022). The SPC can use the mechanism of guiding cases to unify the application of law and the scale of decisions, improve the quality of judges and contribute to precise justice (Lin and Wang, 2013). At the same time, the trial data recorded on China Judgment Online serves as a central tool for evaluating judges' performance (Ahl and Sprick, 2018) and can push judges to better ensure the fairness of trials. As far as the external aspect of the judicial system is concerned, some scholars believe that the disclosure of courts' trial documents is an important initiative to guarantee citizens' right to know and supervise and is conducive to enhancing public trust in the judiciary (Ma, Yu, and He, 2016). However, some scholars have expressed doubts about the success of the implementation of the regulations in promoting judicial credibility. They argue that the main users of the platform are legal professionals rather than the general public, because the general public often does not have the ability or interest to systematically use this complex database in assessing the Chinese judicial system, and the media, under the control of the authority, also do not contribute to build public pressure. It is thus difficult to achieve the intended purpose of building public trust in the judiciary through the disclosure of judgment documents (Ahl and Sprick, 2018).

In the process of implementing the regulations, some scholars have expressed concern about the institutional dilemma of the regulations in terms of policy document, supervision, and accountability mechanisms (Li, 2017). The disclosure of judgments involves conflicts between the public's right to know and the public's right to privacy, the public's right to know and the citizens' right to personal information, and between

jurisprudential and ethical principles (Hu, 2015; Zhao, 2012). Therefore, the institutional design should be typified according to the specific contents of the documents, such as principled online, principled not online, consensual not online, and anonymous online (Zhang and Chen, 2015), in order to alleviate the problem of conflicting rights.

The realization of policy goals cannot be achieved without effective policy implementation; therefore, the academic community is particularly concerned about the current situation of the regulations. Based on the extraction and statistics of the documents published on China Judgment Online, some scholars have found that the number and proportion of judicial documents currently show an overall upward trend, but that there remain such problems as insufficient comprehensiveness, poor timeliness, poor standardization of the content, inconvenient access to the documents, and obvious regional differences (Yang, Qin, and He, 2019; Ma, Yu, and He, 2016). The causes of these include not only institutional factors such as ambiguous standards of disclosure, lack of supporting measures, and inadequate recourse and discipline (Zhao, & and Li, 2015), but also external factors such as authority and the level of market development (Tang and Liu, 2019).

In general, most of the researches available focus on the regulations, analyzing the policy benefits, potential pitfalls, and the current implementation status. At the same time, few scholars have explored the impact of the implementation of the regulations on the outcome of administrative litigation, especially the interaction between judicial power, administrative power, and civil rights therein.

Using a difference-in-differences (DID) model, this study attempts to answer the follow questions: 1) Does the publication of judgments on the internet change the outcome of administrative litigation cases? 2) Is the implementation of judgments online more conducive to safeguarding the rights and interests of plaintiffs in administrative litigation cases, as shown by a comparison of the trial outcomes of administrative litigation cases before and after the Regulation? 3) To what extent has the Regulation affected the trial outcomes of administrative litigation cases?

2. The Development of the Administrative Litigation Law and the Publication of Judgments on the Internet

The adoption of the Administrative Litigation Law of the People's Republic of China at the Second Session of the Seventh National People's Congress in 1989 marked a significant advancement in the promotion of human rights protection and the development of the rule of law in China. Prior to the promulgation of the Administrative Litigation Law, there was no specific law in the Chinese judicial system to safeguard the rights and interests of administrative counterparts (plaintiffs), and administrative litigation cases were handled under the 1982 Civil Procedure Law. In 1986, the Standing Committee of the National People's Congress deliberated and adopted The Public Security Administration Punishments Law, provided that citizens could institute an action with the people's court against contested public security punishments, and established the jurisdictions of courts at different levels and the standards for litigation fees, providing a reference to the basic principles for the formal law of China's administrative litigation and administrative trial. At the same time, various local courts began to set up the administrative tribunals, and the number and types of administrative litigation cases were increasing, making it urgent for specialized laws to clearly regulate the scope of administrative litigation, jurisdiction, and procedures (Jiang, 2019).

Based on extensive research and expert consultation, the Administrative Litigation Law of the People's Republic of China was promulgated on 4 April 1989 and implemented on 1 October 1990. In the past, influenced by the traditional 'government-public' relationship and institutional environment, Chinese individuals tended to believe that the government was authoritative, and often did not even believe that they could file a complaint with the people's court. The promulgation of the Administrative Litigation Law has given support to plaintiffs' rights and interests through explicit legal provisions. With the success of some citizens' administrative litigation to defend their rights, the public began to break free of the shackles of the old concept and consciously used legal ways to resolve administrative disputes. At the same time, the Administrative Litigation Law has to a certain extent become an effective external force to compel the administrative organization to implement administration according to the law and restrain administrative inaction or disorderly action. Once the administrative act of an administrative organ is evaluated negatively by the court, the organ and the relevant staff will bear a certain responsibility, which forces the administrative organ to carry out self-monitoring, self-correction, and self-regulation in order to improve administrative law enforcement (Ma, 2019).

Yet a policy does not go from introduction to implementation easily. Indeed, the implementation of the Administrative Litigation Law remains incomplete. Given the low status of the judiciary in the political hierarchy and its high dependence on the government in terms of personnel arrangements and funding, judges are often reluctant to assume the formally granted powers to bind administrative officials (Li, 2013). It is common for the administrative agency to refuse to appear in court, refuse to answer questions, refuse to pay court fees, and refuse court decisions (O'Brien and Li, 2004). For the general public, defending their legitimate rights and interests through administrative litigation can be described as 'eggs against stones', with 'difficulties in filing, trialing, and enforcing' constituting the core dilemma in administrative litigation practice (He, 2018).

In response to this realistic dilemma, the Administrative Litigation Law received a revision in 2014 to improve the purpose of administrative litigation, the scope of cases received, and the jurisdictional system. For example, a system whereby the leaders of administrative organs appear in court in response to lawsuits has been implemented, and legal awareness among heads of administrative agencies has increased. These measures resolved the problem of administrative departments refusing to appear in court and to respond. Also, the Administrative Litigation Law stipulates that whether the reconsideration agency decides to sustain or change the original administrative act, the reconsideration agency should attend as a co-defendant in the administrative litigation so as to resolve the problem of the long and ineffective cycles of the reconsideration organs in the past and to try to bring into play the internal self-monitoring function of the administrative organs (Işık et al., 2024a, 2024b, 2024c). It also attempts to resolve the problem of the 'localization of justice' to ensure judicial independence and impartiality through the mechanism of higher-level jurisdiction and cross-area jurisdiction of some cases.

In addition, China has actively promoted the process of judicial information disclosure, issuing the Regulations on the Publication of Judgments on the Internet by the People's Courts three times, in 2010, 2013, and 2016, which marked different stages in the development of a system to place judicial documents online. First was the stage of sporadic disclosure. In 2000, the SPC issued a judicial document and took the lead in proposing that its daily judgments would be disclosed 'selectively' through the Internet, followed by people's courts at all levels disclosing some judgments on the 'China Court Website' (Hu, 2015). In 2007, the SPC issued the Opinions on Strengthening the Openness of the People's Courts' Judgments, which promoted the implementation of openness in local courts. However, the disclosure of judgment at this stage was sporadic and lacked a dedicated bulk disclosure channel (Ma, Yu, and He, 2016). Second was the stage of public availability. In November 2010, the SPC issued the Regulations on the Issuance of Judicial Documents on the Internet by the People's Courts, which for the first time set out clear and detailed regulations on the disclosure of judgments. At this stage, except for judgments that are not allowed to be disclosed by law, judgments are 'allowed' to be disclosed online. At the same time, the parties to a case have the right to decide whether or not to disclose the judgments in their cases. The third stage was the mandatory disclosure stage. In November 2013, the SPC published the Regulations on the Issuance of Judgments on the Internet by the People's Courts (2013 Revision), requiring that people's courts 'must' disclose all valid and eligible judicial documents on China Judgment Online. It also eliminated internal approval procedures within the courts and the right of parties to give prior consent and afterwards doubt to the disclosure of judgments (Hu, 2015), which could effectively guarantee citizens' right to information and supervision of the judiciary. Fourth is the stage of efficient disclosure. The SPC issued its third regulation on the publication of judgments in 2016, clarifying and refining the requirements for the comprehensiveness, timeliness, and standardization of the disclosure of judgments (Yang, Qin, and He, 2019), which better facilitates public access to judgments and promotes judicial justice.

3. Research Design

3.1. Variable setting and research hypotheses

The judiciary, within the institutional set-up of balances with the executive and the legislature, is considered an important basis for safeguarding the rights of citizens against infringement by the public power and other parties. However, judges in authoritarian systems not only often have little independence, when they do, they tend to cater to public power (Helmke and Rosenbluth, 2009). Even in a democratic system, judicial independence is not entirely present (Geyh, 2014; Hershkoff, 2023). In China, due to the institutional set-up, the local judiciary is dependent on the local government for financial and personnel matters, which may lead to improper interference by the local government in the judicial process and, to a certain extent, weaken the function of the courts as an impartial judge to resolve disputes and restrain government power (Chang, and Liu, 2018).

Because of the unique structure of administrative litigation, the outcome of the trial will be closely related to the interests of the government and its staff, so the phenomenon of administrative interference in justice may be more serious, and the 'citizens' (plaintiffs) are often in a relatively weak position. With the implementation of the Regulation, the judgments of cases accepted by the SPC and local courts will need to be disclosed on China Judgment Online to be monitored by the public and society. The disclosure of judgments helps ensure that judicial power operates 'in the light of the sun', raises the cost and risk of rent-seeking, breaks the concealment of power operation, and provides a preventive mechanism for anti-corruption (Mulgan, 2007; Zuo, 2018). Second, disclosure is an important constraint mechanism to reduce subjectivity in the suits and to prevent abuse of power (Hood and Heald, 2006). On the other hand, the disclosure of judicial documents can break down information barriers between administrative counterparts and administrative subjects, reduce information asymmetry, and thus improve the relative advantage of plaintiffs in administrative litigation. Therefore, we believe that the Regulation can help to achieve the balance between the rights and interests of plaintiffs and administrative subjects and, to a certain extent, alleviate the dilemma of 'difficult to file and try cases' in administrative litigation.

3.2. Core variables and research hypotheses

Based on the above analysis, the core independent variables in this paper are the sorting dummy variable (named Tit), the time dummy variable (named Pit), and the difference-in-differences variable Tit * Pit (named DID). The dependent variable is the outcome of the case, including the three specific variables: whether the case was closed by judgment (named Conclusion), whether the plaintiff won the case (named Win), and whether the plaintiff withdrew the case (named Withdraw). The variables are assigned in Table 1.

In administrative litigation, the most important function of the judiciary is to review the legality of specific administrative actions; a judgment to close a case means that the court conducted a substantive trial, while a ruling to close a case is a decision to deal with procedural matters in the litigation, which may or may not have been substantively tried (Huang, 2013). Therefore we can consider judgment to close a case as meaning that the court has considered the legality of the administrative action.

According to Huang's survey, 56.4% of first instance administrative cases were closed by ruling, while 43.6% were concluded by judgment (2013). The fact that more than half of the cases were closed by ruling indicates that the courts did not give an answer to the legality of the administrative action under suit (Huang, 2013). Courts and judges in administrative litigation are more willing to choose other informal ways to trial cases, and avoid making formal judgments on the legality of the administrative action. We argue that the disclosure of judicial information is conducive to public scrutiny of the judgment behavior of courts and judges, which in turn promotes the active performance of adjudication functions by courts and judges and increases the rate of judgment in administrative cases. This leads to Research Hypothesis H1: The Regulation helped to increase the judgment rate. We noted the ways in which the sample cases were concluded. The ruling closure applied

to the scope of not docketing the complaint, turning down the case, objection to jurisdiction, etc.; judgment closure applied to the scope of upholding, modifying, revoking, ordering to perform within a time limit, confirming illegal or invalid, rejecting the application, and so on.

Table 1: Variable definitions

Type	Variable	Definition
Dependent variables	Conclusion	1 if the case was concluded in judgment, 0 if the case was concluded in ruling.
	Win	1 if the plaintiff won the case, 0 if the defendant won the case.
	Withdraw	1 if the plaintiff withdrew the case, 0 if the plaintiff did not withdraw the case.
Independent variables	T_{it}	1 if the case is in the treatment group, 0 if the case is in the control group.
	P_{it}	1 if the year is before the Regulation implement, 0 if the year is after the Regulation implement.
	DID	$T_{it} * P_{it}$
Control variables	Level	2 dummy variables were generated using the Primary Court as the control group.
	Plaintiff	1 if the plaintiff of the case was a citizen, 0 if the plaintiff of the case was an organization.
	Defendant	1 if the defendant of the case was government, 0 if the defendant of the case was a government functionary.

Win. According to existing studies, if the judgments of upholding and rejecting application in administrative litigation cases are classified as judgments in favor of the defendant, they account for 28.3% of the total number of cases. If the remaining judgments are classified as judgments in favor of the plaintiff, they account for 10.7% of the total number of cases. However, in other types of cases, defendants' success rate is only around 7% (Huang, 2013). These figures indicate that the plaintiff's success rate is lower and the defendant's success rate is higher in administrative litigation cases than in other types of cases. Based on the above analysis, we believe that disclosing documents online will likely increase the success rate of plaintiffs, and thus proposed Research Hypothesis H2: The Regulation helped increase the success rate of plaintiffs.

This article drawled on the method used by scholars Long and Wang to determine the winning party, considering the relative weakness of the plaintiff in the litigation process, such that as long as the plaintiff's claim is satisfied in whole or in part, the plaintiff is deemed to have won the case 2014. If the court's decision includes revoking, modifying, or confirming as illegal or invalid, then the plaintiff is deemed to have won the case; if the court's decision does not contain any content in favor of the plaintiff, including upholding, rejecting the suit/appeal/application, permission to withdraw/treat the suit as withdrawn, or suspension of proceedings, then the administrative agency is deemed to have won the case.

Withdraw. The reasons for the plaintiff's withdrawal are diverse, and the interference of various pressures on litigation is the main reason for the plaintiff's irregular or involuntary withdrawal. It is not uncommon for the plaintiff to apply for withdrawal due to the defendant's change of behavior. This study suggests that the implementation of the Regulation may have some impact on the plaintiff's litigation psychology, enhancing his trust in the judiciary, which in turn influence his decision whether to withdraw the case. This leads to Research Hypothesis H3: The Regulation helped to reduce the withdrawal rate of plaintiffs.

In this study, we examined the specific outcomes of the sample cases to record the plaintiff's withdrawal application and the court's disposition of the case as withdrawn, and form a dichotomous variable of whether the plaintiff withdrew or not.

Control Variables.

Jurisdictional Court Levels (Named Level). One of the main features of administrative litigation is the guarantee of a fair trial through hierarchical jurisdiction (Huang, 2013). However, for China's special institution of administrative divisions, administrative interference in the judiciary and judicial local protectionism still exist. In this context, courts may face the risk of reduced financial budgets if they make decisions affecting local interests in the trial of administrative litigation (Işık et al., 2023; Zhang, 2003). Particularly in the case of intermediate and the primary courts, factors such as limited financial input and one-way dependence on the financial department have a significant impact on their position in the political power structure. Therefore, this study included the level of jurisdictional court (named Level) as a control variable, and classified jurisdictional court levels into superior, intermediate, and primary courts according to the judicial hierarchy in China.

Types of Plaintiffs (Named Plaintiff). According to Article 2 of China's Administrative Litigation Law, citizens, legal persons, or other organizations who believe that the administrative action taken by an administrative agency or any employee infringes upon their lawful rights and interests have the right to file lawsuits in the court in accordance with this Law. This study thus divided administrative litigation plaintiffs into two categories: citizens and organizations. Among them, organizations included enterprises, factories, industrial committees, villagers' groups, cooperatives, and village committees. Although everyone is equal before the law, there are differences in the risks and litigation costs

that different types of plaintiffs can bear (Zhang and Ke, 2002). Compared with individual citizens, organizations have a higher tolerance for risk and can bear higher costs of litigation, and they are more likely to engage professionally qualified litigation agents. As a result, the difference in plaintiffs' bargaining power may also affect the trial of the case, so it was used as a control variable (named Plaintiff) in this paper.

Type of Defendant (Named Defendant). The Administrative Litigation Law stipulates that competent defendants include the administrative agency and its authorized organizations. China's administrative regions are divided into three levels: the provincial level (province, autonomous region, municipality directly under the Central Government, and autonomous prefecture), county level (county, autonomous county, and city), and township level (township, ethnic township, and town), and local governments at all levels established the necessary functional departments. Such an administrative division, combined with the fact that the local judicial system is elected by and accountable to the local people's congresses, may weave a 'spider's web' around the courts, resulting in many local governments actually considering the courts as one of their functional departments in practice. As a result, the influence of local governments over the courts is higher than that of government functionaries. In this study, defendants were divided into two categories, government and government functionaries, which were included as control variables (named Defendant). The operation and assignment methods of the above variables are shown in Table 1.

3.2. Model

The DID model is widely used in policy analysis（Ying, 2023). The main idea is to set the sample affected by the policy as the treatment group, and the sample not affected by the policy as the control group. Then, by comparing the change in the observation of the treatment group (D1) with the change in the observation of the control group (D2) before and after the implementation of the policy, we could find the actual effect of the policy shock (DID = D1−D2). The DID model can largely solve the endogenous problem and effectively control the effect between the independent variables and the dependent variables, which is suitable for our research purpose. However, as the implementation of the Regulations on the Issuance of Judgment Online is 'one-size-fits-all' and the policy is not piloted or implemented in stages, the Regulation will cause policy shocks to all courts. Because there is no 'treatment group' or 'control group' in the strict sense, it was more appropriate to use the Generalized DID Model in this paper. The Generalized DID Model applies to a situation under which all individuals are affected by the policy, but the impact of the policy is different for each individual. In terms of judicial practice, there are differences in the progress and strength of the implementation of the Regulation among courts, and courts from different areas or different levels have different degrees of discretion, resulting in uneven specifics of the online access in each region. Based on the above analysis, this study applied the Generalized DID Model and adopted the 50% public case closure ratio as the cut-off to distinguish the treatment and control groups (see Table 2 for details).

Table 2: Control group and treatment group

Control group					Treatment group				
No.	Area	Total disclosure (piece)	Total conclusion (piece)	Rate (%)	No.	Area	Total disclosure (piece)	Total conclusion (piece)	Rate (%)
1	Xizang	6994	46,090	15.17	21	Guangxi	359,580	700,404	51.34
2	Heilongjiang	136,434	757,504	18.01	22	Fujian	630,914	1,174,871	53.70
3	Jiangxi	118,107	558,585	21.14	23	Ningxia	98,288	178,912	54.94
4	Xinjiang	150,087	674,729	22.24	24	Henan	874,386	1,587,876	55.07
5	Hainan	51,484	222,007	23.19	25	Hunan	536,460	950,800	56.42
6	Inner Mongolia	186,058	797,930	23.32	26	Hubei	509,035	879,746	57.86
7	Shanghai	293,108	1,159,500	25.28	27	Hebei	738,399	1,222,775	60.39
8	Shanxi	136,635	529,435	25.81	28	Shandong	1,509,674	2,301,000	65.61
9	Yunnan	184,679	691,986	26.69	29	Zhejiang	1,571,855	2,391,000	65.74
10	Guizhou	171,574	616,298	27.84	30	Anhui	800,469	1,179,129	67.89
11	Beijing	311,185	991,125	31.40	31	Shaanxi	512,868	656,325	78.14
12	Liaoning	442,633	1,252,210	35.35					
13	Guangdong	859,973	2,317,200	37.11					
14	Tianjin	209,145	502,132	41.65					
15	Chongqing	401,730	927,321	43.32					
16	Gansu	194,624	449,200	43.33					
17	Sichuan	686,253	1,571,539	43.67					
18	Qinghai	53,143	116,174	45.74					
19	Jilin	289,635	602,082	48.11					
20	Jiangsu	1,218,865	2,506,253	48.63					

Note. Data source: Ma, C., Yu, X. H., and He, H. B. (2016), Big data analysis: Report on the online disclosure of judicial documents in China, *China Law Review*, (04), 195-246. https://qikan.cqvip.com/Qikan/Article/Detail?id=670326819

Based on the DID model, the basic model in this paper is:

$Y_{it} = \beta_0 + \beta_1 T_{it} + \beta_2 P_{it} + \beta_3 T_{it} * P_{it} + \varepsilon_{it}$, (Model 1)

where Yit is the dependent variable referred to the outcome of the policy. i is the corresponding sample and t is the corresponding time. Tit is the sorting dummy variable, such that if individual i is affected by the policy implementation, then individual i belongs to the treatment group and the corresponding Tit takes the value of 1. If individual i is not affected by the policy implementation, then individual i belongs to the control group and the corresponding Tit takes the value of 0. Pit is the policy time dummy variable. We set 1 January 2014 as the policy implementation node, with Pit taking the value of 0 before the policy implementation node and 1 after the policy implementation node. Tit*Pit is the interaction term between the group dummy variable and the time dummy variable, i.e. the difference-in-differences variable (named DID), whose coefficient β3 reflects the net effect of policy implementation; ε_{it} is the error term. Taking other influencing factors into account, the model can be further expressed as:

$Y_{it} = \beta_0 + \beta_1 T_{it} + \beta_2 P_{it} + \beta_3 T_{it} * P_{it} + Z_{ity} + \varepsilon_{it}$, (Model 2)

where Z_{ity} denotes the other explanatory variables and control variables.

3.3. Data and Sample

Considering the symmetry and richness of the data, this study sampled the administrative case documents of the people's courts in all provinces, municipalities, and autonomous regions from 2012 to 2015 on China Judgment Online. We sampled 7463 administrative case documents with a decision date of the 10th of each month, and the yearly distribution of the sample was as follows: 155 in 2012, 645 in 2013, 3,640 in 2014, and 3,023 in 2015. We collated and recorded information on the date of decision, case number, geographical information of the jurisdictional court, hierarchy of the jurisdictional court, type of plaintiff, type of defendant, form of conclusion, and outcome of the trial contained on the documents (Variable summary statistics are shown in Table 3).

It should be noted that since the object of this article is administrative litigation cases and their outcomes and the focus is on 'civil lawsuit' cases, the following principles were followed in the selection of data: only administrative documents of the first trial, second trial, and retrial in administrative cases were captured, excluding non-lawsuit administrative execution, administrative compensation documents, and other documents; only judgments and rulings involving the actual rights of the parties, such as suspension of proceedings and dismissal of complain, were captured; only mediation, decision, notice, order, etc., were recorded; only judgments and rulings on suspension of proceedings, dismissal of prosecution, etc., which involve the actual right of appeal of the parties, were recorded, excluding consent judgment, written decision, notice, order, etc.; only record documents that satisfy both the requirements of the appellant or the applicant for retrial being the plaintiff of the first

Table 3: Variable summary statistics

Variable	Value	Number	Percentage	Observation
Conclusion	1	4108	55.04%	7463
	0	3355	44.96%	
Win	1	1489	19.95%	7463
	0	5974	80.05%	
Withdraw	1	1647	22.07%	7463
	0	5816	77.93%	
T_{it}	1	3655	48.97%	7463
	0	3808	51.03%	
P_{it}	1	6663	89.28%	7463
	0	800	10.72%	
DID	1	3078	41.24%	7463
	0	4385	58.76%	
Level	Primary	4398	58.93%	7463
	Intermediate	2733	36.62%	
	Superior	332	4.45%	
Plaintiff	1	1147	15.37%	7463
	0	6316	84.63%	
Defendant	1	1817	24.35%	7463
	0	5646	75.65%	

instance (i.e. the 'citizens') and the appellee or the respondent of retrial being the defendant of the first instance (i.e. the 'official'); those cases in which the 'official' appeals the 'citizens', or in which a third party is the only appellant were excluded; and if the contents of the document cannot be distinguished due to the principle of concealment, they would be excluded.

In terms of data errors, although we have made relevant considerations and technical processing to ensure the reliability of the data, there are still some uncontrollable factors. First, because those documents which were completed before the Regulation were uploaded late, there is a great difference in the total number of documents before and after the Regulation, and the number of documents usually fluctuates. Second, the lack of specification for uploading documents and the technical problems with the website itself, such as discrepancies where the information in the search field does not match the actual instrument information, which may lead to bias in some analyses based on this information.

4. Empirical Results

4.1. Case Settlement Method

There is a correlation between the case settlement method and the case classification (Shen, 2007). According to the statistics concerning the case settlement method of the sample, the rate of judgment and ruling remained largely similar across years（see Table 4). Overall, 55.04% of the cases were closed by judgment, while nearly half of the cases were closed by ruling. The high ruling rate is partly related to the current judicial reform trend, and partly reflects the dilemma that administrative litigation is "difficult to judge" (He, 2012). With the widespread use of mediation in administrative litigation in recent years, and with the Supreme Court's reinforcement of the rules related to the withdrawal of a plaintiff's case after the defendant has changed the administrative action being sued, it seems that the courts are reluctant or even refuse to issue formal judgments in administrative litigation cases (Huang, 2013). The courts avoid a trial and prefer to use other informal means to hear cases, leading to the legality of the contentious administrative actions associated with the case not having been effectively answered (Chen, 2024). It is thus difficult for the judiciary to maximize its function of restraining administration.

Table 4: Analysis of case settlement method

Year	2012	2013	2014	2015	Total
Judgment	80	327	2202	1499	4108
(percentage)	(51.61%)	(50.70%)	(60.49%)	(49.59%)	(55.04%)
Ruling	75	318	1438	1524	3355
(percentage)	(48.39%)	(49.30%)	(39.51%)	(50.41%)	(44.96%)

To further validate these findings, we used the DID model to discuss whether the implementation of the Regulation helped to improve the rate of judgment in administrative litigation. Model 1 is the basic model, in which only the impact of the core independent variables is included. Model 1 shows that the coefficient of DID is positive and statistically significant at the 1% level. The model also shows that after the implementation of the Regulation, the odds ratio of judgment in administrative litigation is 1.826 times higher than the odds ratio before the

Regulation. In order to observe the impact of the type of plaintiff, the type of defendant and the level of jurisdictional court on the case settlement method, we included these control variables to build Model 2. The key variable DID in Model 2 still has a positive and statistically significant impact on the increase in the rate of judgment. Therefore, we believe that Research Hypothesis H1, 'the Regulation helped to increase the rate of judgment', has been verified. The implementation of the Regulation reduced the phenomenon of 'courts' avoidance of judging' in administrative litigation, enabling the courts to better exercise their power of judicial supervision and protect the legal right of citizens.

In terms of the relevant control variables, in Model 2 (see Table 5), the coefficient of Defendant is negative, indicating that a lower proportion of cases is taken to judgment closure when the defendant is government than a government functionary. The odds ratio of judgment when the defendant is the government is 0.771 times higher than when the defendant is a government functionary, indicating that local governments have a greater influence on the courts than government functionaries. As for the level of jurisdictional court, the coefficient for Intermediate is positive and statistically significant at the 1% level, indicating that a higher proportion of cases are closed by judgment when the court of jurisdiction is the Intermediate People's Court than the Primary Court, which is in line with expectations. The regression results for Superior are not significant and the direction of the coefficient is not as expected. Although the impact of Plaintiff on Conclusion is not statistically significant, the direction of the variable's coefficient is as expected, indicating that the percentage of administrative litigation cases concluded by judgment is 1.857 times higher when the plaintiff is an organization than a citizen. This could to some extent indicates that organizations tend to have more advantages than do citizens in administrative litigation cases.

4.2. Plaintiff Win Rate

The success rate of plaintiffs in administrative litigation cases has always been the key matter of public and scholarly attention. As shown in Figure 2, the average success rate of plaintiffs in 7463 samples from 2012 to 2015 is very low, only 19.95%. Based on the adverse selection effect in litigation, people tend to appeal to the court only when they feel their chances of winning are high. When the cost of suing is too high or confidence in justice is lacking, suing will not be people's first choice, and most of these potential plaintiffs opt out of the judicial field (Zhang

and Ke, 2002). As defined in this study, if the court's conclusion partially satisfies the plaintiff's legal claim, then the plaintiff will be considered the winner. In conclusion, the 19.95% success rate actually overestimates the contrast in power between the administrative counterpart and the administrative subject.

Table 5: Results of the DID model of case settlement method

		Model 1	Model 2
P_{it}		−.296** (.744)	−.268* (.765)
T_{it}		−.778*** (.460)	−.695*** (.499)
DID		.602*** (1.826)	.592*** (1.808)
_cons		.600*** (1.823)	.419*** (1.520)
Level	Intermediate	–	.273*** (1.313)
(Primary = 0)	Superior	–	−.138 (.871)
Plaintiff (citizen = 0)	Organization	–	.619 (1.857)
Defendant (Government Functionary = 0)	Government	–	−.260*** (.771)
N		7463	7463
R^2		0.008	0.033

*** p < 0.01, * p < 0.1, OR values in brackets.

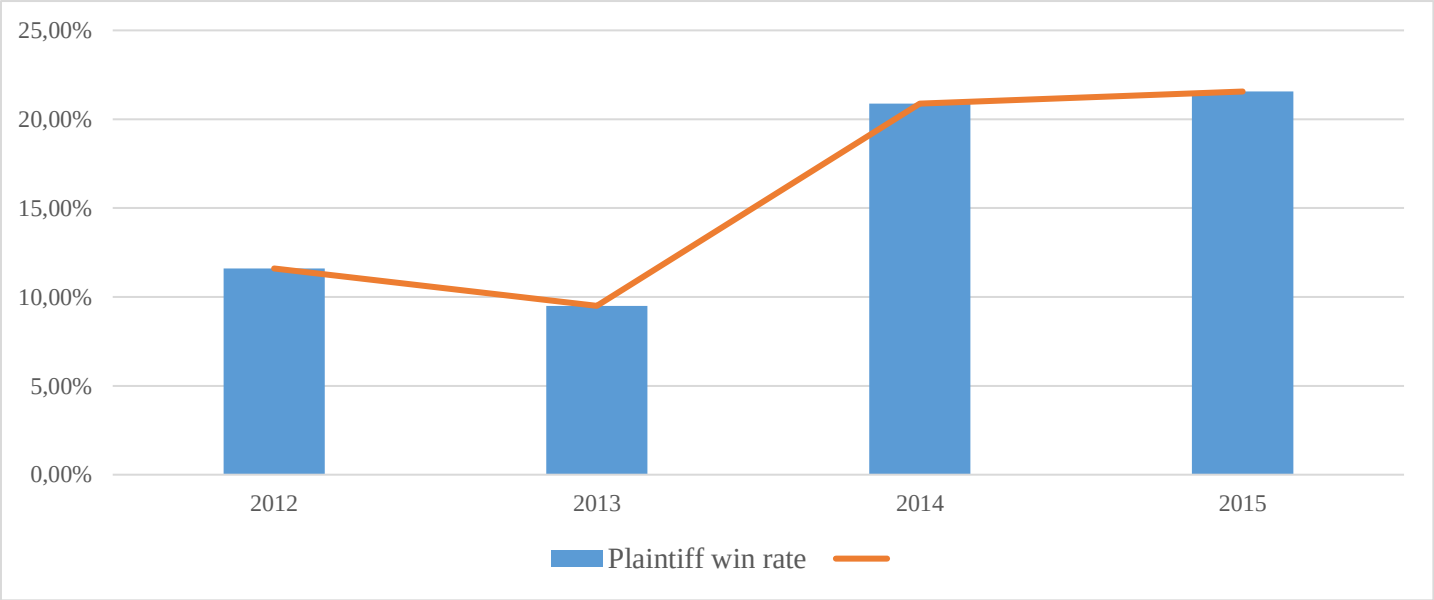

Figure 2: Analysis of plaintiff win rate

Despite the low overall plaintiff win rate, it shows an upward trend after the implementation of the Regulation. Figure 2 shows that the plaintiff win rate increases by almost 10 percentage points between 2012 and 2015. As The results of the independent-sample t-test (see Table 6) shows that the mean value of Win before the implementation of the Regulation is 0.19, while the mean value of Win after the implementation of the Regulation is 0.21, with a mean difference of 0.023 and a t-test accompanying probability of 0.013, less than 0.05. These results indicate that the plaintiff win rate is significantly higher after the implementation of the Regulation than before at a 5% significance level.

Table 6: Results of the Independent-Sample T-Test

	Before		After		T-test				
Category	Mean	Std. Dev.	Mean	Std. Dev.	Mean Differences	Std. Dev. Difference	Sig. (2-tilled)	t	df
Win	.190	.391	.210	.408	.023	.009	.013**	2.476	7408.627

* p < 0.1, OR values in brackets.

To further verify whether the implementation of the Regulation enhanced the plaintiff's success rate, we built Model 3 (including core independent variables) and Model 4 (including core independent variables and control variables), in which we entered Win as the dependent variable. Table 7 shows that the estimated impacts of DID are not significant in either Model 3 or Model 4, and Hypothesis H2, 'the Regulation helped to increase the success rate of plaintiffs', is not supported. However, it can still be seen that the Regulation has a positive effect on the plaintiff win rate, although the effect does not reach statistical significance. In terms of the control variables, the estimated impacts of Level, Plaintiff, and Defendant on the dependent variable are inconsistent with expectations, which merits further attention.

Table 7: Results of the DID model of plaintiff win rate

		Model 3	Model 4
P_{it}		.840*** (2.317)	.837*** (2.310)
T_{it}		.013 (1.014)	−.124 (.884)
DID		.218 (1.244)	.270 (1.309)
_cons		−2.264*** (.104)	−2.094*** (.123)
Level	Intermediate	−	−.601*** (.548)
(Primary = 0)	Superior	−	−.176 (.839)
Plaintiff (citizen = 0)	Organization	−	−.362*** (.696)
Defendant (Government Functionary = 0)	Government	−	.505*** (1.657)
N		7463	7463
R^2		0.018	0.049

*** p < 0.01

Although higher plaintiff win rates are not always better, in the court's decision, especially in the administrative litigation field, the plaintiff is in a weaker position than the defendant. If the plaintiff's legal claims are met, this indicates that justice contributes to protect citizens' legitimate rights and interests from being infringed (Shen, 2007). The positive effect of the Regulation on the plaintiff win rate shows that information disclosure is conducive to improving the effectiveness of the judiciary.

4.2. Plaintiff Withdrawal Rate

Withdrawal is a special system in China's administrative litigation, which can be divided into two types: the plaintiff's withdrawal application and the court's disposition of the case as withdrawn. Withdrawal makes up the bulk of the various conclusions in administrative litigation (He, 2012). Application for withdrawal is the plaintiff's right, but the reasons for withdrawal are various, among which the plaintiff's relatively weak bargaining power and interference from diverse parties are the important factors (Xie, 2010). In our samples, the average plaintiffs' withdrawal rate is as high as 22.07% (see Figure 3).

The high rate of plaintiff withdrawal is due to the Administrative Litigation Law itself, but also to the political system, the judicial environment, and other factors. Some withdrawals are voluntary because the defendant changed the specific administrative act, and some withdrawals might have been involuntary, made in response to external pressure. In fact, most withdrawals do not maximize the plaintiffs' interests, but represent the 'second best option'.

Many scholars have summarized the performance of 'abnormal withdrawal', which usually includes the following four situations: First, the defendant privately mediates with the plaintiff and mobilizes the plaintiff to withdraw. Specifically, in the process of case hearing, the defendant finds that their own behavior is indeed illegal, so they privately seek to convince the plaintiff to withdraw with benefits in order to avoid losing the case. Second, the defendant puts pressure on the plaintiff, coercing him or her into withdrawing the case. This situation often occurs in administrative fields characterized by regular administrative enforcement, such as taxation, construction, public security, industry and commerce, and environmental protection. Third, the court persuades the plaintiff to withdraw the case. In cases which are hard to judge, some courts will adopt mediation to persuade the plaintiff to withdraw the case. Fourth, the plaintiff applies to withdraw the case due to the high cost of litigation. Specifically, the plaintiff's ability to resist pressure in administrative litigation is generally lower than that of the defendant, so if the case is not concluded for a long time, the plaintiff's litigation costs will inevitably increase and he or she will therefore be more likely to withdraw the case (Huang, 2013; Xie, 2010; Sun and Xing, 1996; Li and Luo, 1997).

In either case, bad gaming involving the plaintiff, the defendant, and the judiciary will provide a breeding ground for corruption in both the government and the judiciary, which is not conducive to the development of fairness, justice, and democracy. Also, it will discourage citizens' motivation and their trust in government, and it is not conducive to social supervision (Wu, 2018; Willis,2023). Against this background, a question arises: can the implementation of Regulation reduce the high plaintiff withdrawal rate and reduce government corruption? Figure 3 shows that the withdrawal rates of plaintiffs are similar in 2012 and 2013 and in 2014 and 2015. Meanwhile, there is a significant change in the withdrawal rate before and after the Regulation, with a drop of almost 13 percentage points.

To verify the relationship between this change and the Regulation, the DID model was again used (see Table 8). Model 5 (which only includes the core independent variables) shows that the coefficient of DID is negative and statistically significant at the 1% level. This shows that the odds ratio of plaintiffs' withdrawal is 0.191 times higher after the Regulation. Controlling for Level, Plaintiff, and Defendant, Model 6 provides

a similar result for the effect of the Regulation, which means Hypothesis H3, 'the Regulation helped to reduce the withdrawal rate of plaintiffs', is verified. The disclosure of judicial information helps to reduce bad gaming in administrative litigation, improves judicial transparency and fairness, curbs corruption, and increases plaintiffs' confidence in using administrative litigation to defend their rights.

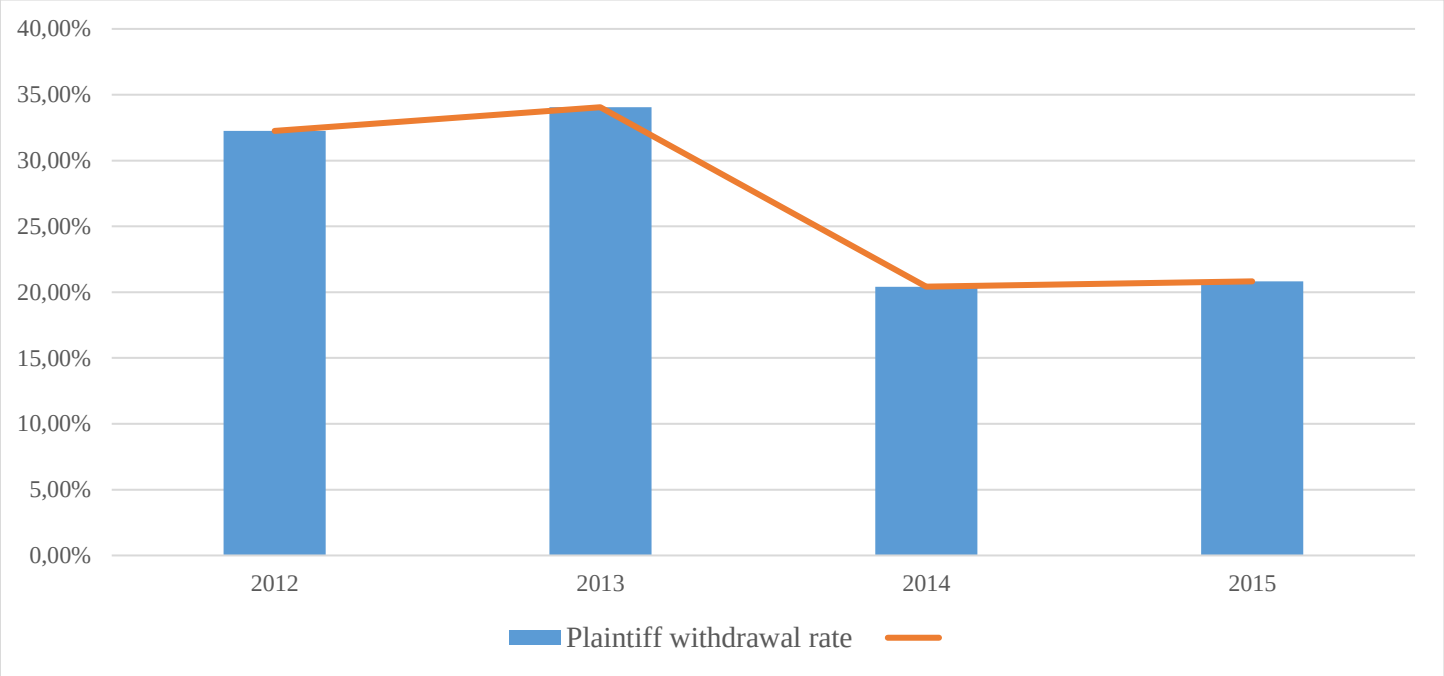

Figure 3: Analysis of plaintiff withdrawal rate

Table 8: Results of the DID model of plaintiff withdrawal rate

		Model 5	Model 6
P_{it}		.747*** (2.110)	.788*** (2.200)
T_{it}		2.002*** (7.406)	1.790*** (5.992)
DID		−1.654*** (.191)	−1.514*** (.220)
_cons		−2.264*** (.104)	−1.702*** (.852)
Level	Intermediate	–	−1.485*** (.740)
(Primary = 0)	Superior	–	−2.137*** (.118)
Plaintiff (citizen = 0)	Organization	–	−.160* (.227)
Defendant (Government Functionary = 0)	Government	–	−.301*** (.182)
N		7463	7463
R^2		0.040	0.155

*** p < 0.01, * p < 0.1, OR values in brackets.

In addition, the control variables Level, Plaintiff, and Defendant all have the significant effect on the plaintiff withdrawal rate. Except for Defendant, all the directions of the control variables are consistent with expectations. Specifically, compared with the Primary Court, the odds ratio of plaintiffs' withdrawal in the Intermediate People's Court and the Superior People's Court is 0.74 and 0.118 times higher, respectively. This suggests that the higher the level of the court, the less bad gaming and administrative interference in the judicial process. At the same time, the ability to take risks and access resources tends to be stronger when the plaintiff is an organization than a citizen, which will mitigate the withdrawal of cases.

5. Conclusions, Discussion and Policy Implications

Government information is of great value to the development of the country. The disclosure of government information is conducive to

safeguarding citizens' right to information, fostering their ability to participate in politics, and improving the government's effectiveness and ability to fight corruption. For the above reasons, we believe that the disclosure of government information is an ineluctable requirement for the construction of democracy. The disclosure of information by the judiciary plays a vital role in driving the general process of government information disclosure. The Regulation on the Issuance of Judgments on the Internet, officially implemented at the beginning of 2014, constitutes the key part of the exploration and development of China's judicial information disclosure institutions, aimed at strengthening social supervision, implementing the principle of openness in trials, improving the effectiveness of the judicial system, and promoting fairness and justice. This study focuses on the field of administrative litigation in China. A total of 7463 judge documents were extracted from China Judgment Online to build the database, and a DID Model was applied to estimate the impact of the Regulation on the outcome of administrative litigation and to explore the interaction between judicial power, administrative power, and civil rights. The findings of the study are as follows:

First, against the background of the 'difficulty in judgment' in Chinese administrative litigation, the implementation of the Regulation significantly increased the rate of judgment in administrative litigation as the courts have become more likely to review the legality of specific administrative actions, which will promote the supervisory function of the judiciary and curb the judicial corruption.

Second, citizens are often in a weak position when they face public power in administrative litigation, and the success rate of plaintiff is lower than that of defendant. This research found that the Regulation had a positive impact on the plaintiff win rate. The active protection of the plaintiff's legal rights and interests by the judiciary shows that disclosure of information is conducive to the effectiveness of the judiciary, and it can promote fairness and justice. At the same time, research found that the effects of the level of jurisdictional court, the type of plaintiff, and the type of defendant on the plaintiff win rate were not consistent with our expectations, which is contrary to the research findings of Chang (2018) and other scholars, and merits further analysis.

Third, the high withdrawal rate of plaintiff has been a challenge to the reform of the administrative litigation institution, especially in view of the large number of abnormal withdrawals. Scholars such as Ahl (2018) argued that it is difficult for the public and the media to exert direct pressure on the courts or administrative authorities by relying on judgment documents, and thus difficult to build public trust in the judiciary. However, the result showed that the Regulation significantly reduced the plaintiff withdrawal rate, reduced bad gaming in the litigation process, increased the credibility of the judiciary, and created better conditions for exercising social monitoring. The study also found that organizations had a stronger ability to take risks and access resources than citizens, thus mitigating the withdrawal rate. This finding is in line with Huang's (2013) findings on the state of first trials in administrative litigation.

In summary, the disclosure of judgment documents can help to solve some of the existing problems in China's administrative litigation, reduce the judiciary's over-reliance on the administrative organs, balance the relative positions of plaintiff and defendant in administrative litigation cases, and safeguard the people from infringement of their legitimate rights and interests. At the same time, the implementation of the regulation is conducive to the effective use of mechanisms of social monitoring of the judiciary and administrative organs, forcing them to optimize internally and improve the effectiveness of governance.

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The interaction effects of social media-driven advertising on consumers' purchase intention

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ABSTRACT

The paradigm of social media-driven advertising has experienced a huge transformation in predicting consumers' behavioral intentions in recent years. To shed light on the interaction effects of social media-driven advertising, this study aims to explore the various stimuli of social media advertising that may influence consumers' purchasing intentions. The study recruited 240 social media users online using a purposive sampling technique, and the data were analyzed using Structural Equation Modeling. The estimation revealed that e-WOM and interaction have a significant positive effect on brand image, whereas entertainment does not. The brand image plays a significant positive role in predicting consumers' purchasing intentions. The findings offer valuable insights to marketers and brand practitioners for anticipating brand perception and consumers' likelihood to purchase the brand. Research findings, discussions, and implications are presented.

I. Introduction

The paradigm of social media-driven advertising has experienced a huge transformation in predicting consumers' behavioral intentions and purchasing decisions in recent years (Alalwan, Rana, Dwivedi, and Algharabat, 2017). The marketer interacts to the customers through advertisement using traditional media as marketing tool. In recent years, the marketing pattern has changed, and technology is progressively establishing a presence across various facets of our daily lives (Alim et al., 2023). The social media changes the communication system between marketers and consumers (Alim et al., 2021). Customers browse social media to find information concerning the brands, and promotions, resulting in buying their desired products (Alalwan et al., 2017). Brand promoters can engage with their customers in a more informative and interactive way through social media communication (Lee and Hong, 2016; Barreda et al., 2016). Firms can create customer awareness, build brand image, and influence to purchase of the brand by using social media advertising (Duffett, 2015; Kapoor et al., 2017; Shareef et al., 2019; Asif et al., 2023; Işık, et al., 2024c). Thus, marketers are putting their interest in social media advertising to capture consumers' closer attention under sustainable environment (Duffett, 2015; Işık, 2015; Alvarado et al., 2022; Ongan et al., 2022; Koscak et al., 2023; Işık et al., 2021, 2024d).

However, the social media stimuli that may produce better interactions with its users (e.g., consumers) are unclear in the literature of the realm of social media advertising (Hamouda, 2018; Seo and Park, 2018). Many past studies focused on the investigation of social media advertising and its impact on brand image and consumers' behavioral intention (Seo and Park 2018; Dehghani and Tumer, 2015; Bilgin, 2018; Algharabat, 2017; Godey et al. 2016). These studies employed commonly used social media advertising drivers such as entertainment, and interaction to investigate brand image and consumers' purchase intention (Seo and Park, 2018; Alalwan et al, 2017). However, electronic word of mouth is imperative in social media advertising, while most studies ignored how consumers interact with e-WOM (Godey et al., 2016). Scholars also emphasize uncovering the primary factors that could impact consumer reactions and perceptions toward social media advertisements (Logan et al. 2012; Oh et al., 2015). Literature also argued that eWOM is a well-contributed factor in social media advertising to predict brand image and customer purchase intention (Seo and Park, 2018). Besides, interaction is examined in the literature as a factor of social media advertising, in the relationship between brand image and purchase intention (Seo and Park, 2018; Alalwan et al, 2017). As social

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two-way communication, interaction may influence the brand image resulting in purchase intention. Consequently, interaction as an independent construct, is needed to be examined. Therefore, to close the identified research gaps, this study attempts to employ entertainment, interaction, and eWOM on the relationships of brand image with consumers' purchase intention in the context of a developing country settings such as- in Bangladesh. To address the research gaps, we employ the following research questions.

RQ1: How does entertainment, interaction, and electronic Word-of-Mouth (eWOM) influence the relationship between brand image and consumers' purchase intention in a developing country context like Bangladesh?

RQ2: What are the specific impacts of entertainment, interaction, and eWOM on the relationship between brand image and consumers' purchase intention within the unique socio-economic setting of Bangladesh?

So, the main objective of the study is to investigate how the factors of entertainment, interaction, and electronic Word-of-Mouth (eWOM) influence the relationship between brand image and consumers' purchase intention in the specific context of Bangladesh as a developing country. The paper further focused on the theoretical background and hypotheses development. Research methods, analysis and findings, and discussions and implications are further presented. Finally, the conclusions and future research directions are outlined.

2.1 Empirical Studies

2.1.1 Entertainment

Entertainment via media channels pertains to the amusement experienced by users engaging with various media outlets (Eighmey and McCord, 1998). Entertainment is seen as an outcome of experiencing fun and enjoyment on social media (Agichtein et al., 2008). Advertising entertainment is described as the likability of an ad and the enjoyment and pleasure it brings to consumers (Zhou and Bao, 2002). Muntinga et al. (2011) argued that consumers primarily use social media platforms seeking enjoyment, relaxation, and leisure. Additionally, consumers expect social media advertising to provide entertainment value, influenced significantly by ad execution styles like virtual direct experiences, message appeals, and interactivity commonly found on social media networks (Zhang and Mao, 2016).

Previous researchers practiced this antecedent in social media advertising platforms (Seo and Park, 2018; Bilgin, 2018; Algharabat. 2017; Hamouda, 2018; Dehghani and Tumer, 2015; Abbasi et al., 2023). Seo and Park (2018) along with Bilgin (2018) concluded that brand image and brand awareness are positively influenced by entertainment. However, the researchers used the antecedent as a social media advertising activity rather than an individual construct. Only a limited number of researchers have identified a positive correlation between entertainment and the intention to purchase on social media advertising studies (Seo and Park, 2018; Algharabat. 2017; Hamouda, 2018). Therefore, this paper aims to investigate the connections of interaction with brand image, as well as the association between entertainment and intention to purchase.

Interactivity stands out as a crucial and central factor linked to online platforms and social media websites. As a result, this factor has garnered significant focus from researchers in the respective field (McMillan and Hwang, 2002; Kiousis, 2002; Kweon, Cho, and Kim, 2008; Shilbury et al., 2014; Aljumah, Nuseir, and Refae, 2023). Social media interaction involves the essential exchange of communication content between brands and customers on social media platforms (Kaplan and Haenlein, 2010; Gallaugher and Ransbotham, 2010). Researchers argued that interaction on social media serves as a crucial motivator for generating user-generated messages (Daugherty, Eastin, and Bright, 2008). Social media also provides the opportunity for assistance, discussion space, and the exchange of ideas to its users. This antecedent is commonly practiced in many studies regarding social media advertising (Godey et al., 2016; Algharabat, 2017; Alalwan, 2018; Seo and Park 2018; Bilgin, 2018; Aljumah, Nuseir, and Refae, 2023). It is observed that Seo and Park (2018) and Bilgin (2018) both identified that interaction affects brand image positively. Although both have addressed social media advertising activity, they do not recommend it as an individual antecedent. Hence, this study is conducted to find a relationship between interaction and brand image. However, Alalwan (2018) determined a favorable connection between interaction and the intention to make a purchase.

2.1.2 e-WOM

Consumer WOM behaviors are considered a result of commitment, and a positive emotion (Amine, 1998). In the field of social media research, Godey et al. (2016) asserted that electronic word-of-mouth (eWOM) refers to how extensively consumers upload content and share information about brands. Brown (2011) supplemented this by stating that social media enhances users' capacity to assess products, leading to eWOM enhancement. E-WOM gains empathy, credibility, and relevance as consumers can freely convey brand-related information to their contacts (Jansen et al., 2009; Kim and Ko, 2012). Chu and Kim (2011) classified the utilization of social media (eWOM) into three angles: seeking opinions (searching for and disseminating information), opinion-sharing by influential figures (shaping users' attitudes and actions), and opinion-forwarding behavior (sharing information with others).

Prior researchers (e.g., Godey et al. 2016; Algharabat, 2017; Seo and Park, 2018; Ghosh, Alim, and Hossain, 2021; Ghosh et al., 2023; Siddiqui et al., 2021; Abbasi et al., 2023; Khan et al., 2024) have investigated this factor within the realm of social media research. Godey et al. (2016) and Alim et al. (2020) established a positive correlation of electronic word-of-mouth (eWOM) on brand image. However, Alim et al. (2017) demonstrate a non-significant relationship between e-WOM and brand image. Thus, our study is looking forward to exploring the interaction effect of e-WOM on brand image and further analyzing the relationship between e-WOM and purchase intention.

2.1.3 Brand image

The brand image mirrors the unique components of a brand, including its name, symbol, logo, and slogan, when brand image involves the

positioning of the brand in consumers' minds, going beyond just visual cues. According to Iversen and Hem (2008), brand image embodies consumers' perceptions, encompassing all the meanings and assessments associated with the brand. The study of Blackwell and Miniard (2006) indicates that brand image serves as a cue for recalling brand information, suggesting that it may have both tangible and intangible associations in consumers' minds. Through media channels, consumers seek to access both the concrete and abstract associations of products or services through the brand image, thereby acquiring market insights (Story and Loroz, 2005). Previous researchers (e.g., Dehghani and Tumer, 2015; Seo and Park, 2018; Bilgin, 2018; Alim et al., 2020; Siddiqui et al., 2021; Salhab et al., 2023) have explored this factor in the context of social media advertising and found a positive interaction between brand image and consumer's intention to purchase (Dehghani and Tumer, 2015; Alim et al., 2020; Siddiqui et al., 2021; Salhab et al., 2023).

2.1.4 Consumers' intention to purchase

Intention to purchase is determined by a consumer's level of interest in a product and the probability of making a purchase. Grewal, Monroe, and Krishnan (1998) described purchase intention as the likelihood that is controlled by customers who plan to buy a specific product. In numerous studies, it is strongly linked to attitudes and preferences regarding a brand or product (Kim and Lee, 2009; Kim, Kim and Johnson, 2010; Lloyd and Luk, 2010; Kim and Ko, 2012). Previous research has emphasized that purchase intention emerges as the primary indicator of the effectiveness of advertising and can be impacted by factors such as the attitude toward the advertisement. (Chen and Wells, 1999). For example, MacKenzie and Lutz (1989) discovered that attitudes toward advertisements impact both brand image and purchase intentions. Furthermore, Zeng et al. (2009) identified a significant and positive correlation between the value of advertising and behavioral intentions in the realm of social media. Previous researchers (e.g., Alalwan 2018; Dehghani and Tumer 2015; Dehghani et al. 2015; Mamun et al., 2022; Rana, 2024; Kim and Ko 2010; Islam et al., 2023a; Islam et al., 2023b; Hossain, Shanta, and Alim, 2021; Siddiqui et al., 2021; Salhab et al., 2023; Khan et al., 2024) also acknowledged purchase intention as a dependent construct in the social media marketing context.

2.2 Theoretical Background and Hypotheses Development

The theoretical framework of this paper focuses on understanding the interaction effects of social media advertising-driven stimuli on brand image and customers' intention to purchase. This study proposes that the drivers of social advertising (entertainment, interaction, and e-WOM) may or may not affect brand image and customers' purchase intention. The connections are depicted in a conceptual framework outlining the influencers of social media advertising and consumers' intention to purchase. More specifically, the framework argues that the three proposed drivers or stimuli of social media advertising (i.e., entertainment, interaction, and e-WOM) interact to both brand image and consumers' intention to purchase. This assertion is supported by similar studies in the field (Seo and Park, 2018; Işık et al., 2024a; Islam et al., 2022; Işık et al., 2024b; Dehghani et al., 2015; Islam et al., 2024; Bilgin, 2018; Algharabat, 2017; Rana et al., 2023; Islam et al., 2020; Godey et al., 2016; Islam et al., 2021). Within this context, Seo and Park (2018) and Bilgin (2018) found that entertainment and interaction significantly influence the brand image of products in social media advertising, and e-WOM also exerts a noteworthy impact on these components (Godey et al., 2016). However, as depicted in Figure 1, it is anticipated that the drivers of social media advertising (interaction, entertainment, and e-WOM) directly influence brand image (Seo and Park, 2018). Therefore, it is expected that strong social media advertising positively influences the brand image. However, interaction also has a direct connection with customers' purchase intention as communication content influences the customers' minds to decide on purchasing products through social media advertising (Alalwan, 2018). Conversely, research on social media advertising has asserted that brand image directly and positively affects customers' purchase intention (Dehghani et al., 2015; Seo and Park, 2018; Bilgin, 2018; Dehghani and Tumer, 2015). Consequently, the preceding arguments and discussions give rise to the following hypotheses:

H1: Entertainment positively impacts the brand image of products featured in social media advertising.
H2: Interaction positively impacts the brand image of products showcased through social media advertising.
H3: e-WOM positively impacts the brand image of products presented via social media advertising.
H4: Brand image positively influences consumers' purchase intention of products presented through social media advertising.

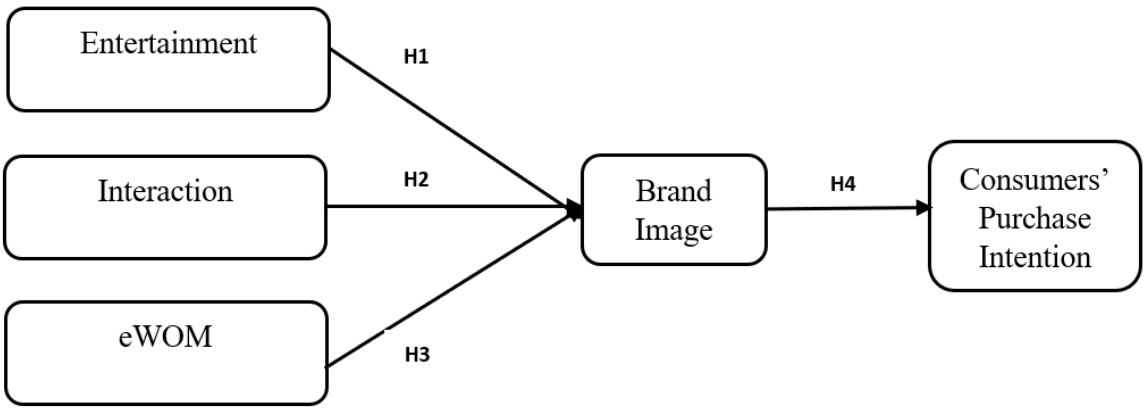

Figure 1: Conceptual Framework

3. Research Methodology

A quantitative survey was undertaken to collect data and evaluate the importance of the suggested connections delineated in the theoretical framework. The survey consisted of 16 items along with five fundamental demographic information (e.g., age, marital status, gender, etc.). Items related to the constructs of entertainment and eWOM were adapted from the research of Kim, and Ko (2010), while items concerning the construct of interaction were derived from Alalwan's study (2018). The items related to the brand image construct were borrowed from the work of Seo and Park (2018), and the items for consumers' purchase intention were taken from Alalwan's (2018) study. A six-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (6) was utilized to gauge respondents' reactions to the survey items.

The research enlisted social media consumers through online means, employing purposive sampling, and acquired 246 fully completed responses. Of these, the study utilized 240 valid responses for the conclusive analysis, discarding six due to unacceptable content. The chosen sample size aligns with recommendations from different researchers (Tabachnick and Fidell, 2007; Hoyle, 1995), meeting the minimum requirements for employing the method of data analysis, namely Partial Least Squares-Structural Equation Modelling (PLS-SEM). Participation in the survey was voluntary.

This paper utilized PLS-SEM to assess the hypothesized relationships within the research model. PLS-SEM is particularly appropriate for both confirmatory and exploratory research, aiming to explore and confirm the connections between endogenous and exogenous constructs, where independent factors forecast the eventual dependent factor. (Hair, Ringle, and Sarstedt, 2011; Ringle, Wende, and Becker, 2015). This analytical method has seen an increased application in marketing research (Henseler, Ringle, and Sinkovics, 2009).

In testing the conceptual framework using the PLS-SEM approach, the paper initially evaluated factor loading, average variance extracted, composite reliability, and Fornell and Larcker's (1981) standard in reflective factors, adhering to recommended minimum values. Subsequently, blindfolding and bootstrapping methods were employed to determine the validity of the structural model. Additionally, the study conducted analyses for the effect size of estimated relations and the predictive significance of the structural model (Hair Jr et al., 2021; Ringle et al., 2015).

4. Analysis and Findings

4.1 Respondents' profiles

Table 1 indicates that most of the respondents were young people between 21 to 30 years (63.75%) followed by 18 to 20 years (16.67%). In terms of gender, 57.08% were male whereas 42.92% were female. In terms of marital status, 70% were unmarried, and the rest 30% were married. The educational status of the respondents, most of the respondents were studying in graduation (46.67%) followed by post-graduation (42.08%). Regarding social media usage, most participants were Facebook users (63.33%), with YouTube users comprising 24.58%, and WhatsApp users accounting for 10%.

Table 1: Demographic results

Characteristics	(N=240)	(%)
Age:		
18 years to 20 years	40	16.67
21 years to 30 years	153	63.75
31 years to 40 years	30	12.5
41 years to 50 years	8	3.33
Above 50 years	9	3.75
Gender:		
Male	137	57.08
Female	103	42.92
Marital Status:		
Unmarried	168	70.0
Married	72	30.0
Education:		
SSC	9	3.75
HSC	13	5.42
Graduation	112	46.67
Post-graduation	101	42.08
Other	5	2.08
Social Media Platform:		
Facebook	152	63.33
YouTube	59	24.58
WhatsApp	24	10.0
Others	5	2.09

Note: Characteristics refer to the attributes of respondents' profiles, N denotes the number of respondents, and % indicates the valid percentage.

4.2 Measurement model

In the measurement model, the first step involves assessing factor loading, average variance extracted (AVE), and composite reliability (CR) to ensure convergent validity (Fornell and Larcker, 1981). Table 2 demonstrates that all item loading values surpassed the recommended threshold of 0.6 (Wong, 2013; Hair et al., 2011), and the values of CR for the constructs of the study surpassed the standard level of the suggested value of 0.708 (Hair Jr et al., 2021). At last, the paper observed that the AVE values for the constructs of the study were higher than the recommended threshold of 0.5, indicating satisfactory convergent validity (Fornell and Larcker, 1981; Bagozzi and Yi, 1988). Thus, all conditions necessary to confirm the convergent validity of the reflective model were met.

Table 2: Results of Item Reliability

Constructs	Item	Description	Factor loading	CR	AVE
Entertainment (ENT)	ENT1	Social media advertising is fun.	0.85	0.87	0.77
	ENT2	Contents of social media advertising are seen as interesting.	0.90		
Interaction (INT)	INT1	Social media advertising effectively collects customer feedback.	0.69	0.86	0.56
	INT2	Social media advertising gives me the impression that it values listening to its customers.	0.79		
	INT3	Social media advertising motivates customers to provide feedback.	0.78		
	INT4	Social media advertising provides customers with the chance to express their opinions.	0.74		
	INT5	Social media advertising enables interactive communication between customers and businesses.	0.74		
Electronic Word-of-Mouth (eWOM)	eWOM1	I want to share information about social media advertising with my friends.	0.87	0.85	0.73
	eWOM2	I want to share content from social media advertising on my social media account.	0.85		
Brand Image (BRI)	BRI1	Social media advertising makes the brand as leader in the industry.	0.70	0.84	0.57
	BRI2	Social media advertising helps me to keep the brand in my memory.	0.69		
	BRI3	Social media advertising makes the brand customer centered.	0.77		
Consumers' Purchase Intention (CPI)	CPI2	I wish to purchase products that are advertised on social media.	0.86	0.90	0.75
	CPI3	I am inclined to buy products that are promoted on social media.	0.89		
	CPI4	I intend to make purchases of products that are advertised on social media.	0.85		

The item CPI1 was deleted due to a poor loading score.

The present study also assessed discriminant validity through the method suggested by Fornell and Larcker (1981). According to this traditional approach, it is deemed valid when the square roots of the Average Variance Extracted (AVE) values exceed the correlation values for each pair of research constructs (see Table 3). Consequently, the study also satisfied the criteria for discriminant validity.

Table 3: Square root of the AVE and correlation of coefficient

	BRI	ENT	INT	CPI	eWOM
BRI	0.83				
ENT	0.69	0.78			
INT	0.39	0.37	0.82		
CPI	0.55	0.56	0.45	0.76	
eWOM	0.51	0.60	0.38	0.47	0.85

Note: The bold diagonal values indicate the square root of the Average Variance Extracted (AVE), while the off-diagonal value signifies the correlation coefficient.

4.3 Structural Model

Bootstrapping was utilized in the structural model to evaluate the path connections, ensuring the accuracy and significance of these relationships between the study constructs (Hair Jr et al., 2021). Specifically, 5,000 smaller samples were selected from the original dataset. Findings obtained from the bootstrapping technique (refer to Table 4) reveal that the immediate influence of INT and e-WOM on BRI, as well as BRI on CPI, were statistically significant and positive. Consequently, hypotheses 2, 3, and 4 were supported. However, the direct effect of ENT on BRI was negative and not significant, leading to the non-support of hypothesis H1.

Furthermore, the effectiveness of the structural model in predicting outcomes was evaluated using the blindfolding technique (Ringle et al., 2015; Hair Jr et al., 2021). Specifically, the determination of coefficient (R^2) was employed to assess the part of the variance in the endogenous variable forecasted from the independent constructs. The structural model also investigated the predictive relevance through cross-validation using Stone-Geisser's standard (Q^2). For BRI, the R^2 and Q^2 values were 0.42 and 0.30, correspondingly, indicating that BRI having 42% variance was explicated by ENT, INT, and e-WOM. For CPI, the R^2 and Q^2 values were 0.33 and 0.27, respectively, indicating that 33% of the variance in CPI was explained by BRI. The results also established predictive relevance, as the Q^2 values for BRI and CPI were 0.30 and 0.27, respectively, both greater than 0.

Moreover, the effect sizes (f^2), which quantify the relative impact of an independent construct on a dependent construct, were significant (Chin, 2009). E-WOM on BRI (f^2=0.26) is the largest effect size, followed by INT on BRI (f^2=0.13). The other calculations of effect sizes between the study variables are detailed in the following table (refer to Table 4).

Table 4: Findings from the Structural Model

Direct Effect	Beta	S.E.	t-value	p-value	5.00%	95.00%	Decision	f^2	R^2	VIF	Q^2
H1: ENT -> BRI	0.06	0.06	1.01	0.16	-0.04	0.15	Not Supported	0.00	0.42	1.27	0.30
H2: INT -> BRI	0.40	0.05	7.54**	0.00	0.31	0.48	Supported	0.13		1.38	
H3: e-WOM -> BRI	0.31	0.05	5.76**	0.00	0.21	0.39	Supported	0.26		1.31	
H4: BRI -> CPI	0.33	0.06	5.36**	0.00	0.24	0.44	Supported	0.00	0.33	1.30	0.27

**p < 0.01, *p < 0.05, S.E. = Standard error.

5. Discussions and Implications

The main aim of this study is to test the interaction effects of various social media advertising stimuli on consumers' intention to purchase in the context of Bangladesh. It encompasses a variety of social media drivers to assess their interconnectedness and their impact on customers' purchasing decisions. The findings from the analysis are made in line with the earlier proposed hypotheses of the study. Out of four hypotheses, three hypotheses were supported, and the other one was rejected. Our study delves into the interaction effects of entertainment, interaction, and e-WOM on the brand image of a product presented through social media and customers' purchase intention. The findings are mixed, carrying practical implications for social media advertising strategies. The increasing significance of entertainment, interaction, and e-WOM has been observed, with several researchers employing these constructs to elucidate brand image (Seo and Park, 2018). It's important to note that consumers' perceptions of entertainment, interaction, and e-WOM are subjective and influenced by various factors (Alalwan, 2018; Algharabat, 2017). The present study distinctly demonstrates the substantial influence of entertainment, interaction, and e-WOM on brand image, aligning with previous research (Seo and Park, 2018; Bilgin, 2018; Godey et al., 2016). The results highlight that interaction and e-WOM significantly impact the brand image of products promoted on social media, whereas entertainment does not exert influence on brand image. Moving forward; the paper has also addressed a link between the brand image and consumers' purchase intention through social media advertising. The findings revealed that an attachment to consumers' purchase intention is a result of the brand image to which it is enticed (Dehghani et al., 2015). Customers who are immersed in social media and perceive the sites to be attractive tend to become attached to the brands and tend to adopt the symbolic meanings of the brands into their own identity. Furthermore, how does brand image translate into customers' purchase intention is shown that social media advertising leads to the brand image which in turn leads to enhanced purchase intention of the customers. This finding may be considered a superior contribution to this study. The study also demonstrated that brand image is an important issue in increasing positive intention in customers' minds to purchase products experiencing social media advertising. This finding supports previous claims that brand image can play an empirical role in the development of customers' minds toward purchasing products after observing advertisements through social media (Dehghani et al., 2015).

In practical terms, numerous scholars have investigated the drivers of social media advertising, identifying their significant impact on brand image and customer purchase intention within the realm of products presented through social media advertising (Alalwan, 2018; Algharabat, 2017). This research adds to the current body of literature by investigating factors, such as entertainment, interaction, and e-WOM, that directly influence brand image and, consequently, customer purchase intention. It provides a comprehensive understanding of the factors influencing customer purchase decisions in social media within the context of Bangladesh. The study reveals that certain advertising features, including entertainment, interaction, and e-WOM, play a crucial role in influencing customer purchase intention in the realm of social media marketing. Thus, social media advertising producers and online marketers can nurture these factors to make their promotional activities more successful. Several academicians, business firms, advertising agencies, and those who are working with social media can also take the opportunity to apply

this study's findings in the field. These suggestions can assist social media marketers in developing and enhancing product brands to attract more customer attention for purchasing products featured on social media.

6. Conclusions and Future Research Directions

The current study provides valuable perspectives on the influence of drivers for social media advertising including entertainment, interaction, and e-WOM, on brand image and customer purchase intention. It establishes a comprehensive framework for examining brand image and customer purchase intention through the utilization of social media advertising. Structural equation modeling was employed to further examine the influence of these drivers on brand image and customer purchase intention, providing partial support for the formulated hypotheses. The findings prompt additional discussions on the intricate relationships between social media advertising drivers and brand image, as well as customer purchase intention.

6.1 Limitations of the study

Nevertheless, the study has two notable limitations that open avenues for future research. Firstly, the sample population primarily consisted of students at various academic levels, ranging from graduate to postgraduate. Despite rigorous sampling and data analysis procedures, the study's generalizability is limited as it does not explore the perspectives of other demographics such as working professionals, entrepreneurs, and social media practitioners. Addressing these diverse groups could enhance the broader applicability of the findings. Secondly, the study focused on three fundamental social media drivers, overlooking other important factors like informativeness and credibility.

6.2 Future research directions

Future research could incorporate the unexplored constructs (informativeness and credibility), exploring their potential impact on brand image and customer purchase intention in the realm of social media advertising. Besides, the context of the study is on a developing country. Future studies may focus on developed of underdeveloped country context. Also, the multi-country context may give a different outcome. Lastly, Scholars are also suggested to conduct longitudinal research as the dimension of social media advertising is changing day by day. So, collecting data from different time periods may give more realistic insights of social media advertising for the practitioners.

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A new pathway to sustainability: Integrating economic dimension (ECON) into ESG factors as (ECON-ESG) and aligned with sustainable development goals (SDGs)

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ABSTRACT

The concept of traditional ESG (Environmental, Social, Governance) factors is a sine qua non for sustainability and constitutes the cornerstones of a sustainable economy. However, although the inevitable impacts of economic activities on sustainability, it lacks the economic dimension (denotes ECON). Therefore, this study proposes to complete this missing leg, integrate economics into ESG, and obtain and introduce ECON-ESG as a composite sustainability concept. While ESG represents firm and microeconomics-based sustainability based only on environmental, social, and governance factors, ECON-ESG also incorporates the economy and represents sustainability, including macroeconomics affecting the firm's performance. Additionally, the linkage between ECON-ESG and SDGs will provide scholars with a composite form variable for use in sustainability models.

I. Introduction

Integrating Environmental, Social, and Governance (ESG) factors into sustainability has become essential to assessing a country's sustainable development pathways (Işık et al., 2024a, 2024b). However, ESG considerations mainly focus on firm-based, often lacking a direct linkage with economic fundamentals. Therefore, we transform this traditional three-component concept (ESG) into a four-component form by adding the "economics pilar" and making it ECON-ESG. This new form (concept) will fill the gap in the literature of studies that use ESG factors without considering the effects of economic metrics on sustainability.

This proposed form of sustainability can serve many of the purposes listed below for policymakers and scholars:

- Firm-based microeconomic ESG incorporates macroeconomic content with added macroeconomic indicators such as GDP, unemployment, and interest rates. Therefore, ECON-ESG factors may represent sustainability, including the economy, with the inevitable impact of macroeconomics since firms are directly affected by macroeconomic policies.
- Investors increasingly recognize the importance of economic sustainability alongside ESG considerations. Including economic factors into ESG and making it ECON-ESG will enhance its relevance to investors seeking to align their investments with both financial and sustainable development goals.
- ECON-ESG form will encourage policymakers to adopt policies that foster sustainable economic growth while addressing environmental and social challenges. This alignment promotes a balanced approach to policymaking that supports long-term prosperity and well-being.
- Economic stability is closely linked to overall sustainability. Assessing economic factors alongside ESG metrics will help identify potential risks and vulnerabilities, enabling stakeholders to implement proactive measures to mitigate economic, environmental, and social risks.
- Our proposed form, ECON-ESG, links the United Nations's sustainable development goals (SDGs) by using some selected indicators (shown in Table 1) of 232 SDG indicators. These selected indicators, such as CO2 emissions, control of corruption, and government effectiveness, correspond to the environment (E), social (S), and governance (G), respectively. Following these indicators, we add macroeconomic indicators (ECON) to ESG. This link between ECON-ESG and SDGs is necessary because the Sustainable Development Goals indicators are

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numerous and clearly defined. However, ESG factors are not clearly defined like SDG factors. Therefore, this link will enable us to integrate Sustainable Development Goals with ECON-ESG and have a holistic perspective on sustainability.

- This link will also enable us to question whether the results of empirical studies using the ECON-ESG form harmonize with the SDG factors within the framework of the used SDG indicators.
- The same link between ECON-ESG and SDGs will provide scholars with a composite form variable for use in sustainability models. Policymakers can leverage SDG indicators to identify areas where ESG factors can be incorporated into policy frameworks, leading to more holistic and effective policy solutions.
- The same link may improve accountability and reporting mechanisms to measure progress; policymakers can enhance transparency and accountability in monitoring the effectiveness of policies and initiatives promoting sustainability.

2. Literature Review

Various studies incorporate recommendations from ESG analysis reports provided by asset managers and rating agencies when constructing the composite ESG index (Capelle-Blancard et al., 2019; Diaye et al., 2022; Işık et al., 2024a, 2024b). These reports are from various entities such as VIGEO (2013), HSBC AM (2013), Natixis AM (2013), MSCI, ESG Research (2011), and the emerging market debt team at Neuberger Berman (2014). Despite their comprehensive coverage, concerns persist regarding the reliability and uniformity of these ratings (Chatterji et al., 2009). Many ESG ratings focus on evaluating policies and occasionally superficial actions rather than quantifying actual reductions in environmental or social impacts and associated risks (Gonenc and Scholtens, 2017).

3. Indicators Used for ESG Factors

Işık et al. (2024a, 2024b), Diaye et al. (2022), and Capelle-Blancard et al. (2019) have underscored the extensive range of factors utilized in computing Environmental, Social, and Governance (ESG) indices. Environmental metrics encompass considerations such as air quality, water resources, forest conservation, and the integration of renewable energy sources. Social indicators encompass human capital development, demographic dynamics, healthcare provisions, employment dynamics, and efforts towards gender equality. Governance criteria commonly include evaluations of democratic institutions and the implementation of policies aimed at ensuring safety and effective governance. Table 1 describes the detailed explanation of individual ESG factors.

Table 1 Measuring ESG Indicators

Dimension	Measuring Items
Environmental	Renewable energy consumption
	Combustible renewable energy (% of total energy)
	Renewable electricity output
	Forest area
	Control air pollution (CO2 emissions, Methane emissions, Nitrous oxide emission)
	Natural resources depletion
	Access to clean fuels and technologies for cooking
	Waste water treatment
Social	School enrollment secondary
	Health expenditure, public
	Life expectancy
	Population density
	Female to male Ratio
	Gender parity index
	Non-vulnerable employment
Governance	Control of corruption
	Regulatory quality
	Rule of law
	Government effectiveness
	Political stability and absence of violence/terrorism

4. Indicators Used for Economic Factors

The traditional ESG framework provides valuable perspectives on environmental stewardship, social responsibility, and governance practices. However, it tends to neglect the direct influence of economic factors on sustainability outcomes at the national level. Economic performance, encompassing indicators like GDP growth, unemployment rates, and income distribution, significantly shapes a country's capacity to tackle environmental issues, foster social equity, and maintain effective governance standards. Yet, the existing gap between economic factors and ESG metrics hampers policymakers' and stakeholders' capacity to devise efficient strategies for sustainable development and inclusive growth. Although various other factors have both direct and indirect connections to the economy, Table 2 outlines the proposed economic indicators, which are vital measures for evaluating the performance of the economy (Işık et al., 2024a, 2024b; Jain and Singhal, 2023; Korkmaz et al., 2022; Thomas Ng et al., 2000; Landefeld et al., 2008; Kosarev and Ponomarenko, 1996; Zarnowitz & Braun, 1989; Cain, 1979).

Table 2 Measuring Economic Indicators

Dimension	Measuring Items
Economic Variables	Gross domestic product
	Interest rate
	Consumer price index
	Foreign exchange rate
	Unemployment rate

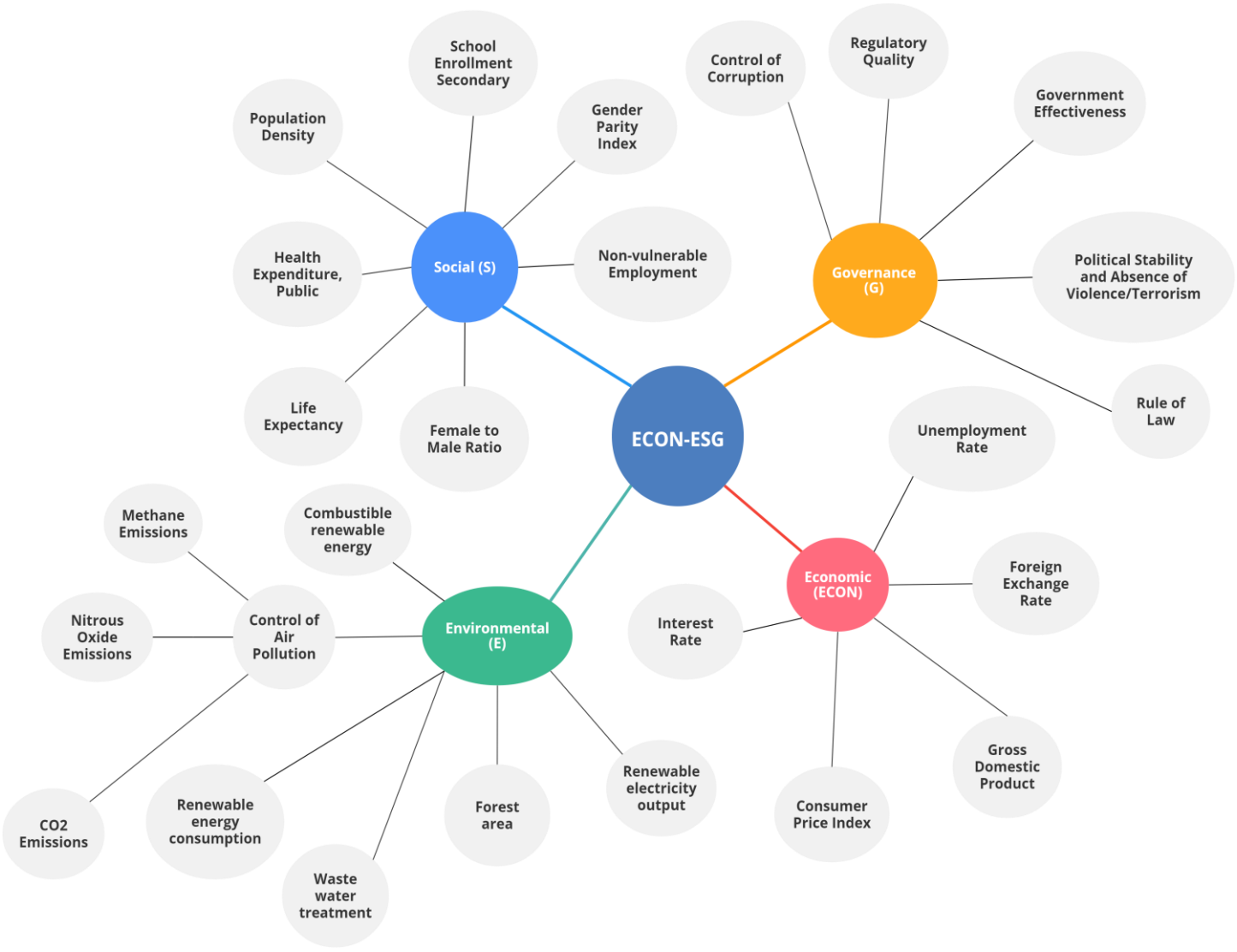

Figure 1 Integrating economic dimension (ECON) into ESG factors as (ECON-ESG)

Each of these economic variables/indicators is considered crucial for understanding various aspects of economic health. Gross Domestic Product (GDP) is a comprehensive measure of a country's economic activity, reflecting overall growth and productivity. Interest rates influence borrowing, saving, and investment decisions, impacting consumer spending and inflation rates. The Consumer Price Index (CPI) tracks changes in the cost of living, providing insights into inflationary pressures. Foreign Exchange Rates affect international trade competitiveness and capital flows, influencing export/import dynamics and inflation. The Unemployment Rate indicates labor market conditions and economic resilience, reflecting the availability of jobs and consumer confidence. Monitoring these variables collectively provides a holistic view of economic performance, aiding policymakers, businesses, and investors in decision-making and risk management.

5. Methodology

The methodology of the proposed composite ECON-ESG framework (see Figure 1) is constructed using individual economic (ECON), environmental (E), social (S), governance (G), and ECON-ESG indices in the following procedural steps:

Principal Component Analysis: Principal Component Analysis (PCA) is a statistical method that identifies coherent subsets of variables in a dataset by combining highly correlated variables into components. These components reveal underlying processes that explain the association among the variables (Tabachnick et al., 2007). PCA aims to extract maximum variance from the dataset, with each component representing a linear combination of observed variables that maximally separates subjects by maximizing the variance of their component scores. Subsequent components are computed from residual correlations to extract maximum variability. The variability captured by subsequent components in PCA is uncorrelated with the first component, ensuring independence. These subsequent components also extract maximum variability from residual correlations and remain independent from each other. As a result, the extracted components represent a significant portion of the variance in the original dataset and can be utilized in further analysis. Creating an ECON-ESG form principal component analysis can be an appropriate method. We propose a new dimension that is vital to the country's sustainable development.

The PCA procedure in this study, shown in Figure 2 involves these key stages:

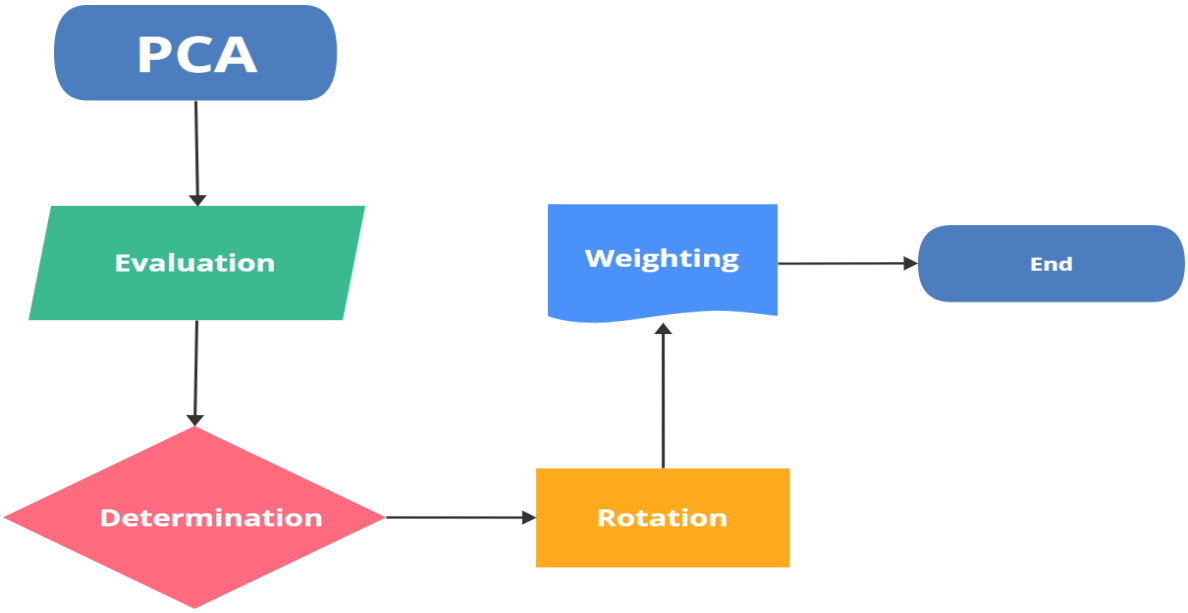

Figure 2 PCA Calculation Stage

- *Evaluation*: Evaluating variable relationships using the Kaiser-Meyer-Olkin (KMO) measure, with a threshold KMO statistic of 0.6, to proceed with factor analysis (Kaiser and Rice, 1974). This measure assesses how well-suited the variables are for factor analysis by comparing the sum of squared correlations to the sum of squared partial correlations.
- *Determination*: Determining the number of factors needed and their calculation through PCA. Factors are coefficients (loadings) that measure correlations between individual indicators and latent factors. PCA forms linear combinations of fundamental indicators, with the first principal component capturing the highest variance in the sample, followed by successive components explaining smaller portions of variance and being uncorrelated with each other.
- *Rotation*: Rotating factors to simplify interpretation. Factor rotation is a standard step in factor analysis aimed at reducing indeterminacy in results. The varimax method, employed here, minimizes the number of variables with high loadings on the same factor, thereby approximating a "simple structure" where each indicator predominantly loads on one retained factor. This enhances factor interpretability.
- *Weighting*: Constructing weights for summary indicators based on factor loadings and their contribution to explained variance. Detailed indicators are weighted according to the proportion of variance explained by associated factors (normalized squared loading). In contrast, factors are weighted based on their contribution to the explained variance in the dataset (normalized sum of squared loadings).

6. Conclusion

In conclusion, the integration of Environmental, Social, and Governance (ESG) factors has become integral to assessing countries' sustainable development trajectories. However, traditional ESG frameworks often lack a direct link to economic fundamentals. Recognizing this gap, the concept of "ECON-ESG" has been proposed, aiming to enhance sustainability assessment by incorporating economic indicators alongside traditional ESG metrics.

While ESG analysis reports from various sources provide valuable insights, concerns remain regarding their reliability and uniformity. Moreover, existing ESG indices primarily focus on evaluating policies rather than quantifying actual environmental and social impacts. This paper proposes a comprehensive approach to ESG assessment, utilizing a wide range of environmental, social, and governance indicators. Additionally, it introduces economic variables such as GDP, interest rates, and unemployment rates into the assessment framework. Principal Component Analysis (PCA) is suggested as an appropriate method for creating the ECON-ESG form. This involves evaluating variable relationships, determining the number of factors, rotating factors for interpretation, and weighting factors based on their contribution to explained variance.

Incorporating economic indicators into ESG and making it ECON-ESG form provides a more holistic understanding of countries' sustainability and development efforts. It enables policymakers, businesses, and investors to make informed decisions and devise efficient strategies for sustainable growth and inclusive development.

6.1 Future Gap and Limitations

The difficulty of ensuring the reliability and consistency of ESG indicators in the process of integrating economic indicators into ESG is a limitation of this proposed ECON-ESG form. Because this potential limitation may affect the accuracy of sustainability assessments. Therefore, future research should focus on refining methodologies for ECON-ESG assessment and exploring alternative statistical techniques and data sources to enhance accuracy and reliability. Additionally, efforts to standardize ESG indicators that will be used with high representative power and standard reporting techniques are crucial for more accurate and comparable empirical results with other studies in the literature. Empirical studies using long-time series are needed to understand the long-term impact of ECON-ESG on sustainability outcomes and economic performance. At the same time, integration with emerging trends such as climate change and technological innovation should be prioritized to ensure the framework remains relevant and effective in guiding decision-making. Because new technological developments such as AI are coming into use rapidly and widely and are starting to change many things, from the economy to the environment and social life.

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