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Original Research

Analysis of the Tax Gap and Its Affecting Factors Using Game Theory Approach

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Abstract

The tax gap can be considered as the criterion and principle of the effectiveness and efficiency of the tax system. Inadequate collection of taxes as well as non-realization of tax revenues is called tax gap, which is one of the factors that aggravate the budget deficit. In this paper, the issue of tax gap is investigated with two approaches. The first approach is a situation where two groups of investigators who are willing and unwilling to collude with two groups of taxpayers who are willing and unwilling to collude with a uniform distribution are placed in the game. The second approach also shows a situation where the probability of not discovering a taxpayer's violation is shown by a mathematical function and the quality of investigating groups for taxpayers who are uniformly distributed is unknown. The results of the first approach show that with the increase in the number of taxpayers unwilling to collude and the increase in the number of groups willing to collude with taxpayers, the tax gap decreases. Also, with the reduction of the tax rate and the increase in the number of groups unwilling to collude, the tax gap increases. The results of the second approach show that the tax gap increases with the increase in the number of investigators and also the increase in the probability of dishonesty of the taxpayer.

Keywords: Game Theory, Tax Gap, Taxpayers, Uniform Distribution.

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Introduction

One of the main financial sources of governments is tax, and in many countries of the world, the main planning in the field of employment, security, price stabilization, etc. is done based on it. In recent years, the necessity of identifying effective obstacles in the process of tax collection and empowering the tax system due to the change in the approach of governments' revenue sources towards taxes is undeniable (Salimian et al., 2023). This applies not only to developing countries, but also developed countries are always trying to make the tax system more efficient (Le et al., 2012). Since there is usually a difference between declared and diagnostic tax due to some reasons, this causes in addition to the dissatisfaction of taxpayers, the tax process will be prolonged and will bring a lot of costs to the tax affairs organization (Pakdaman et al., 2014).

The tax gap is defined as the difference between the tax collected and what should be collected according to the laws, and includes things such as tax evasion and deferred taxes, etc. The main factor in the tax gap can be called the inefficiency of the tax system, and if the government's tax revenues are not realized, then, in order to compensate for its budget deficit, the government will turn to printing banknotes and borrowing from the central bank, both of which will cause severe inflation and eventually inefficiency and paralysis of the economy (Khandani & Sameti, 2016).

Governments usually rely on tax declarations prepared by taxpayers (which are usually different from the original and diagnostic tax) and submitted to the tax affairs organization, and this, due to the lack of necessary efficiency in the tax process and the lack of transparency of taxpayers' information, will cause the rights of the beneficiaries to be violated (Didar et al., 2013). A look at this important revenue source for countries reveals that the greater the share of taxes in government expenditures, the more it remarkably prevents the occurrence of undesirable economic effects (Khalilzadeh Silabi et al., 2022). Tax avoidance is in fact the use of gaps and weaknesses of the tax system to reduce tax without violating the laws and regulations. It should be noted that the focus of this paper is on tax avoidance. Tax planning strategies which utilize complex group structures to reduce a company's tax burden without violating tax laws may be morally reprehensible or highly questionable, as these methods are not illegal) Wilson, 2009; Lisowsky, 2010).

Tax evasion and tax avoidance are the main challenges and fundamental obstacles in the tax collection process in most countries. Tax evasion includes non-realistic financial tax reporting such as falsified income, profits, or profits less than the actual amount owed (Becker, 1974).

Tax avoidance; legally using tax laws and the tax system to one's advantage in order to reduce the amount of tax owed (Scott et al., 2010). It is important to note

that both tax evasion and tax avoidance can be considered as forms of tax disability (Wenzel, 2002). Concerning the above definitions, one should distinguish tax evasion and tax avoidance. Tax avoidance is any legal method used by a taxpayer to minimize the amount of income tax owed or in fact to get around the law. In other words, tax avoidance is to take benefit of tax system of the country to reduce the tax owned (Dyrenge et al., 2008). Investigating and measuring each of the factors that create the tax gap and the inefficiency of the system tax is very important. Finally, it should be mentioned that since the tax gap is one of the main factors affecting the budget deficit, therefore the factors affecting the tax gap can bring a country's economy into crisis, because when the government faces increasing deficits it is possible to print banknotes and borrow from the central bank. These cases have increased the amount of liquidity in the country it will cause severe inflation and break the reins, which will paralyze the economy of a country.

In Table 1., a number of studies conducted in the field of the research topic (tax gap and factors affecting it) will be discussed.

Table 1. Past researches

Researcher(s)	Year	Research title	The most important results
Canikalp et al.	2016	Estimating Value Added Tax Gap in Turkey	The policy gap has always been greater than the compliance gap. In other words, the lost income of the government due to exemptions and reduced rates is more than the lost income from the informal sector of the economy and tax evasion.
Danquah & Assibey	2018	The Effect of Financial and Non-Financial Firms Characteristics on Tax Gap	Fixed level variables such as business type, urban location and company experience have a significant effect on reducing the tax gap.
Qaderi et al.	2018	The Effect of Financial and Non-Financial Firms Characteristics on Tax Gap	Financial characteristics have a positive and significant effect on the tax gap, while non-financial characteristics have a negative effect on the tax gap, although its intensity is not statistically significant.
Alfonso et al.	2018	Spatial dynamic modeling of tax gap: the case of Italy	There is a relationship between the determinants such as operational factors of geographical areas with the relative efficiency of tax avoidance.
Sarin & Summers	2019	Shrinking the Tax Gap: Approaches and Revenue Potential	The analysis suggests that with feasible changes in policy, the IRS could aspire to shrink the tax gap by around 15 percent in the next decade-

Researcher(s)	Year	Research title	The most important results
			generating over \$1 trillion in additional revenue by performing more audits (especially of high-income earners), increasing information reporting requirements, and investing in information technology.
Gubara et al.	2020	Games and network structures on corruption, income inequality, and tax control	The initial and final preferences of taxpayers depend on important parameters such as the amount of tax, fine, audit information and costs.
Movahedi Bknazar et al.	2022	Modeling, Survey the Nash Equilibrium and Optimal Tax Fine Rate Determine in the Game of Taxpayers and Tax Affairs Organization	The Nash equilibrium occurs where taxpayers declare their declared tax to be less than the diagnostic tax and the tax affairs organization investigation it carefully.
Hutton	2023	Technical Assistance Report-Revenue Administration Gap Analysis Program-Corporate Income Tax Gap	The estimates for the assessment gap for nonfinancial corporations indicate there may have been an increase in 2012, and then a decline back to the 2011 levels. Under either method, the bulk of the assessment gap appears to be in the manufacturing sector.
Salimian et al.	2023	Modeling Tax Declaration Behavior and Quality of Tax Processing: A Game Theory Approach	The equilibrium expression of taxpayers is a function of diagnostic tax, the quality of investigation groups, the number of investigations and the parameter of dishonesty of taxpayers.
Salimian & Sobhanian	2023	Game Modeling of Collusion and Influential Factors under Uniform Taxpayer Distribution	inverse relationship between the diagnostic tax function of each group of taxpayers and their declared taxes of the same type, as well as the direct correlation between the diagnostic tax function and the declared taxes of the other group of taxpayers

According to the investigations, a lot of research has been done in the field of tax gap (and to a very large extent on tax evasion cases, etc.), some of which have been mentioned. It should be mentioned that the very important topic of collusion between taxpayers and employees of the tax affairs organization is one of the main

and concerns topics of this organization, which has not been addressed in a research in the form of modeling and with the conditions considered in this research. In this research, two main approaches, the first approach presented by Salimian and Sobhanian (2023) and the second approach by Salimian et al. (2023), have been investigated and analyzed. Therefore, the main questions of the research are whether the number of taxpayers, the number of investigation groups willing and unwilling to collude, the tax rate, the benefit resulting from investigation by investigation groups, the number of proceedings and the parameter of dishonesty of taxpayers on the tax gap in what way and how much does it affect? Since there has been no research on the topic of tax gap, the topic of collusion and the quality of investigating groups, which can be one of the main factors affecting the tax gap, therefore, these cases, with a complete analysis of the tax gap from these two important perspectives, are the aspect of novelty and innovation of this research.

This paper is organized in 4 sections. After the introduction, the theory of games is presented in the second part. In the third part, the research method is presented, and in the fourth and final part, there are conclusions and suggestions.

Game Theory

Some researchers compare the importance of game theory design to the discovery of the double DNA spirals and often refer to it as “a theory that can explain everything” (Varoufakis, 2008). It should be noted that game theory can yield results in mutual choice of economic factors based on their preferences that may not have been the focus of any of the factors involved (Owen, 2012). Additionally, game theory focuses on the analysis of rational cooperation and competition between individuals or firms based on mathematical relationships to model the decisions taken by sides of the game involved in the game, who are in conflict (conflict of interest) with each other (Carpenter & Robbett, 2022). Also, game theory allows modelers to think like economists when price theory cannot answer (Gibbons, 1997).

A cooperative game in coalitional form is an ordered pair $\langle N, v \rangle$, where $N = \{1, 2, \dots, n\}$ is the set of players, and $v : 2^N \rightarrow \mathbb{R}$ is a map, assigning to each coalition $S \in 2^N$ a real number, such that $v(\emptyset) = 0$ (Gök & Özcan, 2023). Game theory gives us the tools to describe different type of interactions in a formal way, which gives us hope to get to know and understand them better. Acquiring new, universal knowledge about the phenomena falling within the competition-cooperation spectrum may have a significant impact on the ability to build better organizations and shape the rules of social life (Ozcan et al., 2023).

Game theory modeling has become common in international economics, labor economics, macroeconomics, and public finance, and is progressing toward development economics and economic history. The final goal of this knowledge is to find the optimal strategy for players (Shahbazi & Salimian, 2017). Finally, it

should be said that if game theory tries to provide a unique solution for a game, that solution must be a Nash equilibrium. The Nash equilibrium is reached when each player, according to his belief about the opponent's choice, choose the strategy that will get the most outcomes, secondly, the player's belief is correct, which means that the opponent chooses the strategy formed in the player's belief. The strategies that the players choose in this way constitute their Nash equilibrium strategy (Mas-Colell et al., 1995).

Research Methodology

In this research, two different approaches have been used to obtain the amount of the tax gap, which are discussed separately in the following. It should be noted that the first approach was presented by Salimian and Sobhanian (2023) and the second approach was presented by Salimian et al. (2023).

The first approach

It is assumed in this approach that taxpayers are uniformly distributed in the interval $[0, N]$. Additionally, suppose that there are two types of groups for investigating taxpayers cases, which will be denoted by $i = 1, 2$. Each of these two investigating groups provides investigating services but with a difference in the quality of investigating, denoted by 1 and 2 (G_1, G_2), respectively. Furthermore, assume that the quality of these two investigating groups is generally the same, but group 1 represents a group that has a willing (willing) towards collusion with taxpayers and group 2 represents a group that does not have a willing towards collusion (unwilling) with taxpayers. Additionally, assume that investigating group 1 is located at distance d_1 from point 0, and investigating group 2 is located on the right-hand side of investigating group 1 and at distance d_2 from point N.

Also suppose that of this number of taxpayers, y taxpayers have unwilling collusion with the investigating group, while n taxpayers are willing to collusion with the investigating group in reducing their diagnostic tax ($y + n = N$). If a non-colluding taxpayer is assumed, then it does not matter to him/her which investigating group investigating his/her case, and he/she only wants to minimize the difference between his/her diagnostic and real income tax. However, the situation is different for a colluding taxpayer, and if a colluding taxpayer is not investigating by his/her preferred group, then his/her utility (benefit) will be reduced by the amount of ϕ .

Therefore, the utility function of the taxpayer located at point M is as follows:

$$U^M = \begin{cases} -d_1 - t |M - d_1| & \text{If investigated by group 1} \\ -d_2 - t |M - (1 - d_2)| & \text{If investigated by group 2} \end{cases} \quad (1)$$

Where t is the tax rate. Finally, according to the model of Salimian and Sobhanian (2023), the declaration tax of two groups willing and unwilling to collude has been obtained as follows:

$$d_1 = \frac{\varphi y + Nt(G_1 - G_2 + 3N))}{3N} \quad (2)$$

$$d_2 = - \frac{\varphi y + Nt(G_1 - G_2 - 3N))}{3N} \quad (3)$$

Also, the collection (revenue) function of the tax affairs organization has been obtained as follows:

$$TAX = \frac{\varphi y(2t - 1) + Nt(G_1(2t - 1) + G_2(1 - 2t) + 3N(2t + 3))}{6Nt} \quad (4)$$

(Salimian & Sobhanian, 2023).

According to the results, this function is decreasing with respect to the number of willing to collusion taxpayers, the willing to collusion investigating group, and undesirability, and increasing with respect to the unwilling to collusion investigating group and increasing number of taxpayers. Now, according to relationships 2, 3 and 4, the tax gap in the model of Salimian and Sobanian (2023) is obtained as follows (relation 5):

$$GAP = \frac{\varphi y(2t - 1) + Nt(G_1(2t - 1) + G_2(1 - 4t) + 3N(3 - 2t))}{6Nt} \quad (5)$$

The first approach results

Now, according to relation 5, the following results can be presented:

$$\frac{\partial GAP}{\partial y} = \frac{\varphi(2t - 1)}{6Nt} \quad (6)$$

Considering that the tax rate in Iran's economy is less than 0.5, this result shows that the tax gap decreases with the increase in the number of taxpayers unwilling to collude. This result is clearly defined because the more the number of taxpayers who do not want to collusion increases, then these taxpayers will declare their declaration to a great extent close to diagnosis and this will reduce the tax gap.

$$\frac{\partial GAP}{\partial G_1} = \frac{4t - 1}{6} \quad \frac{\partial GAP}{\partial G_2} = \frac{1 - 4t}{6} \quad (7)$$

These results show that as the number of willing to colluding groups with taxpayers (G_1) increases, the tax gap decreases. The interpretation of this result is that since the tax gap is the difference between diagnostic and declared taxation, therefore, if the number of groups willing to collusion increases, then the difference between declared and diagnostic taxes will also decrease (Because the collusion-willing group accepts great extent the declaration of taxpayers by accepting bribes, etc.) and also the difference between the declaration and diagnostic tax of these groups is very close to each other.

On the other hand, the more the number of groups unwilling to collude (G_2) increases, then the tax gap increases, and the interpretation of this result is the opposite of the above result. The interpretation of this result is that since the tax gap is the difference between diagnostic and declared taxation, therefore, if the number of unwilling to collude groups increases, then the difference between declared and diagnostic taxes will also increase (because the difference between the diagnostic tax of the group unwilling to collusion with the declared tax of taxpayers willing to collusion is great).

These important results can reflect many signs to the tax affairs organization, so that if the number of taxpayers willing to collusion is high, then the increase in the tax gap can most likely be a sign of non-collusion between taxpayers and the investigation groups and vice versa.

$$\frac{\partial GAP}{\partial N} = - \frac{\varphi y(2t - 1) + 3N^2 t(2t - 3)}{6N^2 t} \quad (8)$$

This result shows that with the increase in the number of taxpayers, the tax gap increases. This result is due to the fact that some of these taxpayers are willing to collusive taxpayers ($y + n = N$) which, as mentioned in the previous section, will be the basis for increasing the tax gap.

$$\frac{\partial GAP}{\partial t} = \frac{\varphi y + 2Nt^2(2G_1 - 2G_2 - 3N)}{6Nt^2} \quad (9)$$

This result shows that if $G_1 \geq \frac{2G_2 + 3N}{2}$, the above relationship will be positive. That is, only if the tax rate increases, the tax gap will increase, if $G_1 \geq \frac{2G_2 + 3N}{2}$. Since this relationship will never be established (because the number of willing to collude groups should be more than the number of unwilling to collude groups plus one and a half times the total number of taxpayers), therefore, with the increase in the tax rate, the tax gap will decrease. This result can be interpreted in such a way that in case of an increase in the tax rate, the tax affairs organization expects an increase in its income and this expectation can reduce the risk of collusion between willing to collusion investigating groups and willing to collusion taxpayers, and as a result, the tax gap will be reduced. On the other hand, with the reduction of the

tax rate, these interpretations are reversed and with the reduction of the tax rate, the tax gap increases.

$$\frac{\partial GAP}{\partial \varphi} = \frac{y(2t - 1)}{6Nt} \quad (10)$$

Considering that the tax rate in Iran's economy is less than 0.5, this result shows that with the increase lack of desirability caused by the investigation by a group other than the investigation group willing to collusion, the tax gap decreases. This means that whatever more taxpayers are investigated by a group unwilling to collude, then the taxpayers are forced to provide a high declaration and close to the diagnosis that this factor reduces the tax gap.

The second approach

In this approach, it is assumed that taxpayers are evenly distributed in the range $[0, 1]$. After paying his due book tax, a taxpayer located at point w on the said interval achieves a surplus of:

$$u(w, i) = R - \frac{1}{1 + r\theta} (w - T_i)^2 + q_i - E_i \quad (11)$$

Where R is the reservation value of sale (products or services and etc.), which is assumed to be high enough so that all taxpayers pay taxes; in other words, the market is fully covered. $\frac{1}{1+r\theta}$ is called probability of non-disclosure (violation) and it means that the taxpayer may not disclose all the facts related to his payment. Here, by r , it is meant an assessment performed by the tax assessment groups, such that the higher is r , the less likely will be non-disclosure of violation ($r \geq 0$). Furthermore, by θ , it is meant dishonesty of the taxpayers such that the higher is θ , the less likely will be non-disclosure of violation ($\theta \geq 0$). w is the taxpayer situation and T_i is the due tax for taxpayer i . q_i is the quality of assessment groups i (it is assumed that the difference in the quality of assessors is unknown to the taxpayers) and E_i is the declared amount by taxpayer i . This equation shows that the assessment groups are different both horizontally and vertically. In order to obtain the effect of the uncertainty of the quality of the assessment groups on the taxpayers' declared tax, it is assumed that q_i is a random value, which is unknown to the taxpayer at the time of declaration.

Assume that the difference in the quality of two assessment groups ($q_i - q_j$) which is random is in three H_2, S, H_1 states. In addition, suppose that the difference in quality of two assessment groups is in interval $[-1/2, -1/4]$, equal to H_1 , if the difference in quality of two assessment groups is in interval $[-1/4, 1/4]$, equal to S , and finally if the difference in quality of two assessment groups is in interval $[1/4, 1/2]$ it is equal to H_2 .

Also assume that the assessment group 1 is in the left side of assessment group 2 ($T_1 \leq T_2$). That means that the due tax of assessment group 1 is less than that of assessment group 2 (assessment group 2 deals with larger taxpayers). Therefore, having relation 6 and that the indifferent taxpayers is located at point z , we have:

$$z^* = \frac{T_1 + T_2}{2} + \frac{(r\theta + 1)(E_2 - q - E_1)}{2(T_2 - T_1)} \quad (12)$$

Finally, according to the model of Salimian et al. (2023), the equilibrium declared tax of taxpayers 1 and 2 for $0 \leq T_1 \leq T_2 \leq 1$ are:

$$E_1^* = \begin{cases} \frac{-q - T_1^2 + 2T_1 + T_2^2 - 2T_2}{(r\theta + 1)} & \text{if } q < -\frac{1}{4} \\ \frac{-q(r\theta + 1) - T_1^2 - 2T_1 + T_2^2 + 2T_2}{3(r\theta + 1)} & \text{if } q \in \left[-\frac{1}{4}, \frac{1}{4}\right], 0 < z < 1 \\ 0 & \text{if } q > \frac{1}{4} \end{cases} \quad (13)$$

$$E_2^* = \begin{cases} 0 & \text{if } q < -\frac{1}{4} \\ \frac{q(r\theta + 1) + T_1^2 - 4T_1 - T_2^2 + 4T_2}{3(r\theta + 1)} & \text{if } q \in \left[-\frac{1}{4}, \frac{1}{4}\right], 0 < z < 1 \\ q - \frac{T_2^2 - T_1^2}{r\theta + 1} & \text{if } q > \frac{1}{4} \end{cases} \quad (14)$$

The expected income (earning) of tax affairs organization is shown by $EI(T_1, T_2)$ which is random based on the difference in quality of two investigating groups. In this condition, the expected income function of investigating groups 1 and 2 will be as:

$$EI_1(T_1, T_2) = \int_{-\frac{1}{2}}^{-\frac{1}{4}} I_1^m(T_1, T_2) dF + \int_{-\frac{1}{4}}^{\frac{1}{4}} I_1^c(T_1, T_2) dF \quad (15)$$

$$EI_2(T_1, T_2) = \int_{-\frac{1}{4}}^{\frac{1}{4}} I_2^c(T_1, T_2) dF + \int_{\frac{1}{4}}^{\frac{1}{2}} I_2^m(T_1, T_2) dF \quad (16)$$

Where, $F(T) = \frac{2T+1}{2}$ is cumulative distribution function of q parameter. Finally, according to the model of Salimian et al. (2023), the expected income of the two investigating groups will be as follows:

$$I_1 = - \frac{r\theta + 1}{1728(T_1 - T_2)} - \frac{8T_1^3 + 8T_1^2(T_2 + 13) - 8T_1(T_2^2 + 14) - 8T_2^3 - 104T_2^2 + 112T_2 - 27}{288(r\theta + 1)} \quad (16)$$

$$I_2 = - \frac{r\theta + 1}{1728(T_1 - T_2)} - \frac{8T_1^3 + 8T_1^2(T_2 - 17) + 8T_1(16 - T_2^2) - 8T_2^3 + 136T_2^2 - 128T_2 - 27(r\theta + 1)}{288(r\theta + 1)} \quad (17)$$

(Salimian et al., 2023)

Finally, according to the results, the tax gap in the model of Salimian et al. (2023) is as follows:

$$GAP = - \frac{r\theta + 1}{864(T_1 - T_2)} - \frac{16T_1^3 + 16T_1^2(T_2 - 2) - 16T_1(T_2^2 + 35) - 16T_2^3 + 32T_2^2 + 560T_2 - 27(r\theta + 2)}{288(r\theta + 1)} \quad (18)$$

The second approach results

For simplicity in calculations, it is assumed that the diagnostic tax of group 2 (which deals with larger taxpayers) is twice the diagnostic tax of group 1, then:

$$\frac{\partial GAP}{\partial r} = \frac{\theta(r^2\theta^2 + 2r\theta + 1456)}{864(r\theta + 1)^2} \quad (19)$$

This result shows that with the increase in the number of investigating, the tax gap increases. This result can be interpreted as if the taxpayers know that they will be investigated with in several stages, so they will declare their declaration as low as possible and hope that no violation will be discovered (under-declaration). These results are consistent with the results of Salimian et al. (2023). They show that with increase in the number of investigations (r), the declared tax of larger taxpayers will increase and the declared tax of smaller taxpayers will decrease and vice versa. It should also be noted that these results are consistent with the results of Kiral and Mavruk (2018).

$$\frac{\partial GAP}{\partial \theta} = \frac{r(r^2\theta^2 + 2r\theta + 1456)}{864(r\theta + 1)^2} \quad (20)$$

This result also shows that with the increase in the probability of dishonesty of the taxpayer (θ), the tax gap increases. These results are also consistent with the results of Salimian et al. (2023). This result can also be interpreted in such a way that the greater the probability of dishonesty of the taxpayer, the greater the difference between the declared tax (which is very low in this situation) and the diagnostic tax.

Conclusion and Suggestions

One of the main financial sources of governments is tax, and in many countries of the world, the main planning in the field of employment, security, price stabilization, etc. is done based on it. On the other hand, one of the most important and fundamental problems in the field of taxation, especially in developing countries, is the collusion between taxpayers and investigation groups due to the openness of tax laws (with many interpretations), which can be the basis for presenting suggestions from the taxpayers to the investigating groups. These suggestions can be the basis for collusion and noticeable reduction in the collection (income) of the tax affairs organization and ultimately adverse effects on the entire economy. Also, on the other hand, the quality of investigating groups can be considered as a very important factor in creating a tax gap. In this paper, the topic of tax gap is investigated with two approaches. The first approach is a situation where two groups of investigators who are willing and unwilling to collude with two groups of taxpayers who are willing and unwilling to collude with a uniform distribution are placed in the game. The second approach also shows a situation where the probability of not discovering a taxpayer's violation is shown by a mathematical function and the quality of investigating groups for taxpayers who are uniformly distributed is unclear.

The results of the first approach show:

1. With the increase in the number of taxpayers unwilling to collude, the tax gap decreases.
2. As the number of willing to collude groups with taxpayers (G_1) increases, the tax gap decreases.
3. The more the number of unwilling to collude groups (G_2) increases, then the tax gap increases.
4. As the number of taxpayers increases, the tax gap increases.
5. As the tax rate increases, the tax gap decreases.
6. With the increase in the lack of desirability caused by the investigation by a group other than the investigation group willing to collusion, the tax gap decreases.

On the other hand, the results of the second approach show:

1. With the increase in the number of investigators, the tax gap increases.
2. As the probability of dishonesty of the taxpayer (θ) increases, the tax gap increases.

In the end, it is suggested that the tax affairs organization and the tax-related institutions should consider the important factors such as collusion and the quality of the investigating groups and analyze the increase or decrease of this gap with the results of this research in order to more closely examine the very important topic of the tax gap, because according to these results, in the conditions of existence willing to collusion investigating groups, reducing the tax gap will not necessarily be optimal, and vice versa. Therefore, the answers to the main research questions about the impact and severity of the size of the number of taxpayers, the number of willing and unwilling to collude, the tax rate, the benefit resulting from investigation by investigation groups, the number of proceedings and the parameter of dishonesty of taxpayers on the tax gap are given below.

Also, according to the results of this research, the following are suggested strategies to tax affairs organization for reduce the tax gap:

1. The design of tax declarations should be changed in such a way that the declaration of taxpayers is as close as possible to the diagnosis of the investigating group.
2. The tax penalty rate should be determined in such a way that taxpayers have the least desire for collusion and understatement.
3. By designing and setting up the taxpayer system and store terminals, while collecting fair taxes from taxpayers, the tax gap should be reduced.

Finally, it is suggested to consider regional and cultural differences in tax policies in future researches and to use other gaps in tax laws as dummy variables in studies.

Conflict of interest

The authors of this article declare that they have completely followed publishing ethics, including avoiding plagiarism, misbehavior, falsification of data, or double submission and publication, in relation to the publication of the presented article, and there are no commercial interests in this regard.

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Original Research

Analysis of Nigeria Agriculture Promotion Policy on the Economic Performance of Small-Scale Palm Oil Marketers in Edo State

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Abstract

This study examines the influence of the Nigeria Agriculture Promotion Policy (APP) on the economic performance of small-scale palm oil marketers in Edo State. Employing a mixed-methods approach, data were collected from 110 palm oil markers across 11 local government areas (LGAs) in three senatorial districts in Edo State. Quantitative data obtained through questionnaires were analysed using descriptive statistics. Results reveal that the APP effectively enhanced the economic performance of palm oil marketers. Small-scale marketers experienced a significant income increase of 27.7%, rising from N445,072.73 in 2015 to N568,395.45 in 2021. However, the study identified certain limitations of the APP, such as the absence of regular training or skill development programs for marketers and limited access to loan facilities for procuring more efficient palm oil production machinery. These findings hold crucial implications for Nigeria's agricultural policies. The study recommends expanding market linkages at the macro level by promoting micro, small, and medium enterprises that facilitate profitable interactions between input suppliers, producers, processors, marketers, and other stakeholders within the palm oil value chains. Addressing these recommendations can foster the sustainable development of the agricultural sector in Nigeria.

Keywords: Agriculture, Channels, Development, Linkages, Market, Policy.

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Introduction

The Nigeria Agriculture Promotion Policy (APP), initiated in 2016, aims to enhance agricultural productivity, food security, employment generation and foreign exchange earnings from agricultural exports. A key focus of the policy is palm oil production due to its potential as a significant revenue source for the country. The APP aims to enhance productivity, attract private investment, and restructure institutions to promote sustainable agricultural growth.

The APP's performance in palm oil production has yielded positive and negative outcomes. On the positive side, the policy has attracted increased investments in the sector, with heightened interest from both public and private actors in oil palm cultivation. Notably, the government has provided financial support to farmers and investors while improving access to credit, land, and inputs.

Moreover, the policy has raised awareness among smallholder farmers, processors, and marketers about the potential economic opportunities along palm oil productive avenues, resulting in more engagement in crop cultivation. This has led to increased production, productivity, and income for farmers, millers, and marketers.

However, the sector faces significant challenges that have limited the impact of the APP on palm oil production. One major hindrance is the lack of infrastructure and logistical support. Poor rural road conditions hinder the transportation of palm oil to markets, and the shortage of processing facilities in certain areas creates further obstacles. Insufficient linkages to the market are also identified as a constraint.

Without a doubt, Nigeria remains one of the major players in the global palm oil industry, with palm oil being one of its key agricultural commodities. The country has substantial palm oil plantations and a thriving palm oil processing sector. Nigeria's palm oil production and marketing have been influenced by factors such as government policies, international demand, and agricultural productivity. The economic outlook for palm oil production and marketing in Nigeria remains positive, with opportunities and challenges to consider.

Key Opportunities

Growing Demand: Palm oil is a versatile commodity used in various industries such as food processing, cosmetics, and biofuels. As the global population and economies grow, the demand for palm oil is expected to rise, which can benefit Nigerian palm oil producers and exporters.

Government Support: The Nigerian government has historically shown support for the palm oil industry through policies and initiatives aimed at promoting agricultural development and increasing palm oil production. These efforts can enhance the competitiveness of the sector.

Investment Potential: The palm oil industry in Nigeria offers investment opportunities for both local and foreign investors. Investments in improved processing technology and infrastructure can boost productivity and efficiency.

Key challenges

Land and Environmental Concerns: Expanding palm oil production can lead to deforestation and environmental degradation if not managed sustainably. Balancing economic interests with environmental conservation is a significant challenge.

Price Volatility: Palm oil prices are subject to fluctuations in the global market, which can impact the profitability of the sector. External factors like changes in demand from major importing countries and international trade policies can influence prices.

Competition: Nigeria faces competition from other major palm oil-producing countries like Indonesia and Malaysia. These countries often have economies of scale and well-established export networks.

Problem Statement

The Nigerian agriculture sector plays a crucial role in the country's economic development, with palm oil being one of its significant commodities. Small-scale palm oil marketers form a vital segment of this sector, contributing to both employment and income generation for actors along the value chain. However, the effectiveness of the Agriculture Promotion Policy in Nigeria, as it relates to small-scale palm oil marketers, remains uncertain. This policy seeks to promote sustainable agriculture, improve food security, and boost economic growth. Therefore, it is essential to assess the impact of this policy on the economic performance of small-scale palm oil marketers in Edo State.

Research Question

To evaluate the influence of the Nigeria Agriculture Promotion Policy on the economic performance of small-scale palm oil marketers, the following research question will guide the study: How does access to credit provided under the Nigeria Agriculture Promotion Policy affect the income generation and market competitiveness, of small-scale palm oil marketers in the Edo State?

Research Objectives

The main objective of the study is to assess and understand how the Agriculture Promotion Policy in Nigeria has influenced the economic performance of small-scale palm oil marketers specifically within the region of Edo State. This objective would entail understanding the socioeconomic characteristics of small-scale palm oil marketers in the study area and identifying the present and potential challenges or opportunities within the context of the Agriculture Promotion Policy (APP).

Literature Review

The Agriculture Promotion Policy (APP) in Nigeria aims to revitalize the agricultural sector and drive economic growth by implementing strategies like increasing productivity, attracting private investments, and restructuring institutions. Among the key players in the sector are small-scale palm oil marketers, whose performance can be influenced by the provisions of the APP. This literature review compiles existing research on how the APP impacts the economic performance of small-scale palm oil marketers in Edo State. It delves into various factors affecting their operations, such as market conditions, government policies, access to finance, and infrastructure. By analysing these factors, the review provides valuable insights into the challenges faced by small-scale palm oil marketers and offers policy recommendations to improve their economic viability and enhance their contribution to Nigeria's agricultural sector.

The agricultural sector holds significant importance for Nigeria's economy, and within this sector, the palm oil industry plays a crucial role. Small-scale palm oil marketers serve as intermediaries between producers and consumers, making their economic performance vital for the overall growth of the sector.

Factors Influencing Small-Scale Palm Oil Marketers' Performance

The performance of small-scale palm oil marketers under the APP is influenced by various factors. Tiku, Olukosi, Omolehin, & Oniah (2012) conducted a study to examine the palm oil market dynamics in Nigeria and found that the industry exhibited characteristics of an oligopolistic market structure, with a few dominant firms controlling a significant market share. These firms engaged in collusive behaviours and strategic interdependence, potentially leading to anti-competitive practices. The study emphasized the necessity for regulatory intervention to promote fair competition and improve the overall efficiency of the Nigerian palm oil industry.

Also, Ayawari, Nwankwo, & Ugwumba (2017) investigated gender mainstreaming, profitability, determinants of profit, market structure, marketing efficiency, and marketing constraints in the palm oil industry among intermediaries in the South-South states of Nigeria. Their findings reveal a predominance of females (84%) at the retail level and males (62%) at the wholesale level, with 76.6% financing their businesses from personal savings. The market exhibits moderate competition, with Gini coefficients of 0.341 for producers/suppliers, 0.256 for wholesalers, and 0.214 for retailers. Marketing margins are relatively low, and efficiency levels are 50.5% for wholesalers and 70.7% for retailers. Despite challenges, the palm oil trade proves profitable, with significant influences from intermediary type, marketing costs, and product prices. Key constraints include transportation costs, capital inadequacy, and poor sales, calling for infrastructure improvements, cooperative formation, and government support to enhance marketing efficiency and profitability, particularly for female marketers.

Similarly, Okon, Ekong, & Umoh, (2011) conducted a study titled "Market Structure and Conduct in the Nigerian Palm Oil Industry" to assess the economics of small-scale palm oil processing and marketing in specific areas of Rivers State, Nigeria. They discovered that processing 100 palm oil nuts incurred an average cost of NGN 4,500, with

an average revenue of NGN 6,000, resulting in a net profit of NGN 1,500. The major cost components were labour (37%), fuel (26%), and depreciation (18%). The study also highlighted marketing constraints such as inadequate infrastructure, logistical support, and poor rural road conditions, which hindered the transportation of palm oil to markets. Nevertheless, the study concluded that small-scale palm oil processing and marketing remained a profitable venture in the specified areas.

In a related study titled "Market Analysis of Small-scale Palm Oil Processing in West Africa," Urama & Ozor, (2009) conducted a comprehensive investigation into small-scale palm oil processing and marketing in the West African region. Their findings revealed that palm oil marketing economic activity played a vital role in the livelihoods of many rural households. However, they mentioned that the industry is faced with challenges related to outdated technologies, limited access to finance and modern equipment, and inefficient marketing systems. Despite these obstacles, the study highlighted the potential for growth and development by promoting technological advancements, access to credit, and improved market linkages. These interventions could significantly enhance the productivity of the sector and its contributions to local economies.

Market Channel Choices and Access

The APP could facilitate the access of small-scale marketers to more efficient distribution channels and higher-value markets through improved transportation infrastructure and reduced marketing costs. This point was emphasized in a study titled "Determinants of Marketing Channel Choice in the Nigerian Palm Oil Industry" by Omotesho & Okoruwa (2015). The research investigated factors influencing marketing channel selection among palm oil producers in Nigeria. The study employed a comprehensive survey and data analysis, revealing that various factors played significant roles in determining marketing channel preferences. Key determinants included farm size, distance to markets, access to credit facilities, transportation costs, and involvement in cooperative associations. Moreover, the level of education and experience of the palm oil producers also influenced their marketing channel choices. These findings offer valuable insights for policymakers and stakeholders seeking to enhance the efficiency and competitiveness of the Nigerian palm oil sector.

Echoing this point, another study by Falusi & Adepoju (2018) study titled "Analysis of Palm Oil Marketing and Rural Farmers' Income in Osun State, Nigeria" further explores the dynamics of palm oil marketing and its impact on rural farmers' income in Osun State. The researchers conducted an extensive analysis, revealing that the marketing of palm oil significantly influences the livelihoods of rural farmers in the region. Factors such as price fluctuations, market intermediaries, transportation costs, and access to markets were found to have a substantial effect on the income of these farmers. The study also highlighted the challenges faced by the farmers, including inadequate infrastructure and lack of access to credit, which further impact their earnings. This research provides valuable insights for policymakers and market participants to enhance the economic well-being of those involved in the palm oil market.

Likewise, Nze, Nzeakor, & Egbosionu, (2017) conducted a comparative analysis of palm fruit processing and palm oil marketing in Anambra State, Nigeria. The research

aimed to identify and compare the factors influencing these two activities and estimate their costs and returns, among other objectives. The study selected five local government areas and randomly sampled 100 palm fruit processors and 100 palm oil marketers using questionnaires. The findings showed that sex and labour costs impacted palm fruit processing, while factors affecting palm oil marketing included labour costs, electricity costs, and palm oil prices. Importantly, palm fruit processing was found to be more profitable than palm oil marketing. Recommendations included encouraging palm fruit processors to secure land for their operations and reducing labour, transportation, and loading/offloading costs to enhance profits in palm oil marketing.

Adeyemo & Bakare, (2019) evaluation of market structure and conduct in the Nigerian palm oil industry, emphasized the importance of regulatory interventions to ensure fair market conduct. In their research, they investigated the dynamics of the Nigerian palm oil industry, conducting a comprehensive analysis of its market structure and conduct. The findings revealed that the industry demonstrated characteristics of an oligopoly, with a few dominant players controlling a substantial portion of the market. Additionally, instances of collusive behaviour among key market participants were identified, potentially leading to anti-competitive practices.

The study highlighted the necessity for regulatory measures and policy interventions to foster fair competition and create a more efficient and competitive market in the Nigerian palm oil industry. To achieve this goal, the APP could implement policies that promote healthy competition, prevent market manipulation, and safeguard the interests of small-scale palm oil marketers.

Synthesis and Policy Recommendations

To address the challenges in palm oil marketing and the lack of information regarding its role in sustaining livelihoods, Obasi & Kalu, (2015) while focusing on Arochukwu Local Government Area of Abia State, surveyed 80 marketers using questionnaires and applied descriptive statistics, budgetary analysis, and Ordinary Least Square (OLS) regression to analyse the data. Findings revealed profitable palm oil marketing in the area, with wholesalers averaging a monthly profit of ₦175,015.25 and retailers ₦39,143.78. While marketing efficiency was generally high, return on investment was relatively low (3.492% for wholesalers, and 9.22% for retailers). Education, experience, sales volume, and marketing costs significantly influenced efficiency. Seasonality, perishability, high costs, taxes, and credit access were identified as major challenges. Recommendations include continuous education, improved infrastructure, and cooperative formation to enhance market capacity.

The combined findings from these studies underscore the crucial role played by small-scale palm oil marketers in Nigeria's palm oil industry. To support these businesses, policymakers and stakeholders should prioritize initiatives aimed at improving the economic viability of small-scale palm oil marketing ventures. This could be achieved by enhancing their access to credit and modern technologies, providing technical assistance, and training, and facilitating efficient marketing channels. Furthermore, policymakers can play a pivotal role in establishing a fair and competitive market structure that safeguards the interests of these small-scale palm oil marketers. Implementing regulatory

interventions to prevent monopolistic practices and promote transparency will significantly contribute to their economic growth.

Methodology

The main objective of this research is to analyze the performance of small-scale palm oil marketers in Edo State under Nigeria's Agricultural Promotion Policy. The study focuses on several key aspects, including the social and economic characteristics of the palm oil marketers, their sales and income levels, the main marketing challenges they encounter.

To accomplish this goal, the researchers employed a survey design based on the Rapid Rural Appraisal (RRA) approach. The RRA approach, as defined by Townsley, (1996) involves a systematic, semi-structured activity conducted by a multidisciplinary team in the field to gather up-to-date information and formulate innovative hypotheses about rural economic life. The researchers chose RRA because it involves the perspectives and knowledge of rural people in assessing development policies and programs. McCracken, Pretty, & Conway, (1988) describe RRA as an action-oriented investigation method used in developing countries, rather than providing a strict definition. It employs techniques such as group dynamics, surveying and sampling, interviewing, and community mapping to collect data.

The study used both primary and secondary data. Secondary data were obtained from institutional sources and included information on palm oil production and available palm oil processing technologies in the study area. These sources comprised Edo ADP and NIFOR. Primary data, on the other hand, were gathered from different types of respondents, including palm oil marketers, policymakers, and development practitioners. Policy-related data affecting palm oil production, processing and marketing were obtained from ADP and NIFOR. NIFOR serves as the government research institute responsible for promoting research and development in the palm oilfield, while ADP is a government agency that promotes awareness and the adoption of improved farming technologies.

The research focused on three Senatorial Districts of Edo State - Edo South, Edo North, and Edo Central - known for palm oil production. In the second stage of sampling, five Local Government Areas (LGAs) were deliberately selected in Edo South, and three LGAs were deliberately selected in both Edo Central and Edo North. Ten palm oil marketers were purposively selected per LGA, resulting in a total of 110 farmers targeted for questionnaire administration. The Snowball technique was used to identify and interview these marketers.

Results and Discussion

Socio-Economic Characteristics of Marketers

Age of Marketers

The pooled result (Table 4.11) indicates that most (40 %) of the respondents were 30-39 years, 27.27 % were 40-49 years, 18.18 % were 50-59 years and 11.82 % were below 30 years. The pooled average age of respondents was 41 years. This implies that most of the palm oil marketers in the study area were young; thus, in their active age and have the vigour to market their product (palm oil) and compete favourably with the major palm oil firms. The findings agree with that of Iwuji (2014), who explained that palm oil marketing needs able-bodied men and women to carry out tasks such as loading, and offloading, which are some of the activities carried out in palm oil marketing.

Sex of Marketers

Female folks (82.73 %) dominated the business of marketing palm oil in the study area as against the males (17.27 %) as shown in Table 1 below. Studies (Adedayo & Tunde, 2013; Fabiyi & Akande, 2015) have shown that women play a major role in agricultural marketing and the result of this study attests to this.

Marital Status of Marketers

Most (90 %) of the respondents in the study location were married, 6.36 % were single while 3.64 % were widows (er) (Table 1). The result suggests that most of the palm oil marketers in the study area had marital responsibilities, and this may have motivated them to engage in the palm oil business as a source of income to cater for their families.

Table 1. Socio-economic characteristics of marketers

Variable		Total		
		Freq	%	Mean
Age range (years)	<30	13	11.82	
	30-39	44	40.00	
	40-49	30	27.27	
	50-59	20	18.18	
	60 & above	3	2.73	
	Total	110	100.00	41
Sex	Female	91	82.73	
	Male	19	17.27	
	Total	110	100.00	
Marital status	Married	99	90.00	
	Single	7	6.36	
	Widow(er)	4	3.64	
	Total	110	100.00	
Educational level	No formal education	8	7.27	
	Primary education	19	17.27	
	Secondary education	57	51.82	
	Post-secondary	26	23.64	
	Total	110	100.00	
Household size	1-4	52	47.27	
	5 - 8	38	34.55	

Variable		Total		
		Freq	%	Mean
	9 - 12	17	15.45	
	>12	3	2.73	
	Total	110	100.00	5
Palm oil marketing experience range (years)	1-9	37	33.64	
	10-19	48	43.64	
	20-29	19	17.27	
	30-39	6	5.45	
	40-49	0	.00	
	50+	0	.00	
	Total	110	100.00	17
Membership of association	Non-member	77	70.00	
	Member	33	30.00	
	Total	110	100.00	

Educational Status of Marketers

The educational status of the marketers shows that most (51.82 %) of them had secondary school education, 23.64 % had post-secondary school education, 17.27 % had primary education, while 7.27 % had no formal education (Table 1 above). The result shows that most of the palm oil marketers in the study were literate since over 80 % of them had one level of formal education. This means that most of the palm oil marketers might read and write and, hence, under the federal government agriculture promotion policy, can beautifully package, brand and attract better prices and higher patronage for their palm oil products.

Household Size of Marketers

The majority (47.27 %) of the respondents had a household size of 1-4, 34.55 % had 5-8, 15.45 % had 9-12 while 2.73 % had above 12 members in their household (Table 1 above). The average household size of respondents was 5, implying that most of them have people depending on them and palm oil marketing could be a source of income to provide for these family members. The member of the household could also be a source of labour to the respondents in their palm oil marketing business.

Palm Oil Marketing Experience

Table 1 above also suggests the marketing experience of the respondents. The result revealed that the highest proportion (43.64 %) of the respondents had 10-19 years of experience, 33.64 % had 1-9 years, 17.27 % had 20-29 years and 5.45 % had 30-39 years of experience. The average marketing experience was 17 years, implying that most of the palm oil marketers in the study location were experienced in the palm oil marketing business and might be able to understand and assess the impact of the agricultural promotion policy on their business.

Membership Association Status of Marketers

Most respondents (70 %) were non-members of any association except for 30 % who indicated they belonged to one association or the other (Table 1 above). Being members of an association affords members access to privileges such as information and credit. The fact that most of the marketers are non-members suggests they may be limited in access to credit that can assist in the development of their business.

Source of Finance for Marketers

The sources of finance accessed by the marketers were examined in the study. The pooled result (Figure 1 below) revealed that all (100 %) of the respondents used their personal savings to finance their business, 47.27 % got funds from their family and friends, 22.73 % sourced funds from Microfinance banks, while commercial banks and money lenders were a source of finance for 9.09 % and 7.27 % of the respondents respectively. Finance is very important in the life of any business as it is a major determinant of its expansion and coverage.

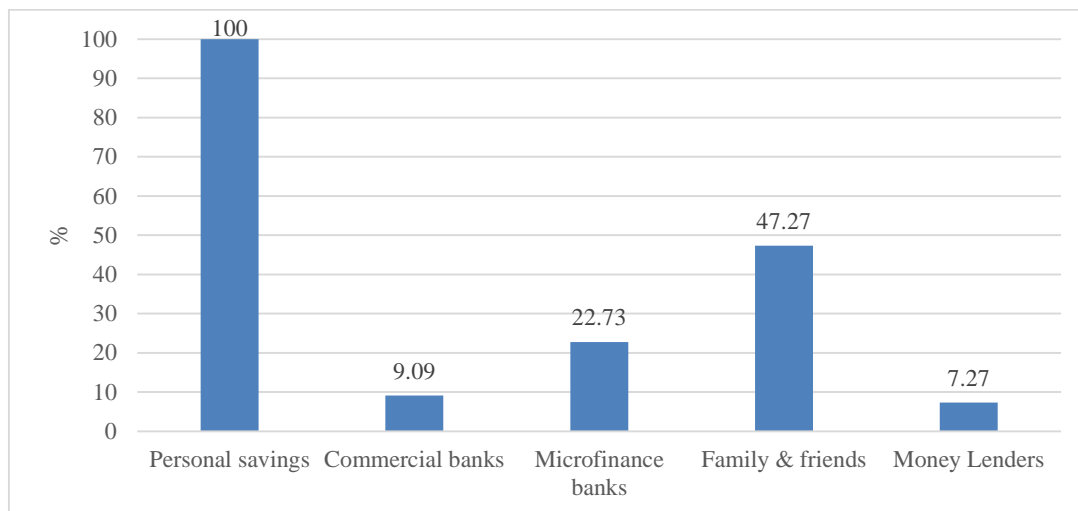


Figure 1. Source of Finance Marketers

Policy Impact on Marketers' Sales

The study assessed the impact of the agriculture promotion policy on the sales of palm oil by respondents in the locale. The result (Table 2) revealed that the average sale of palm oil was 1,369.45 litres and 1,748.91 litres for the years 2015 and 2021 respectively. The result indicates a growth in the quantity of palm oil sold by marketers between 2015 and 2021 i.e., since the implementation of the agricultural promotion policy. This suggests a positive impact of the policy on the marketing of palm oil in the study area.

Table 2. Policy Impact on Marketers' Sales (palm oil)

Year	Quantity of palm oil (Litres)
2015	1,369.45
2021	1,748.91

Income of Marketers

On the income of palm oil marketers (Table 3 below), the pooled results show an increase in average income from ₦ 445,072.73 in 2015 to ₦ 568,395.45 in 2021. This suggests a positive impact of the agricultural promotion policy on the income of palm oil marketers in the study area.

Table 3. Policy impact on marketers' income

	Edo North	Edo South	Edo Central	Total
	Mean	Mean	Mean	Mean
Income per annum (2015)	448760.00	448283.33	435,716.67	445,072.73
Income per annum (2021)	575770.00	550116.67	574,383.33	568,395.45

Constraints Faced by Palm Oil Marketers

The result (Table 4 below) shows that palm oil marketers were faced with several constraints. The seriousness of the constraints was measured on a four (4) point Likert scale and a mean benchmark of 2.50 and above was used to judge the serious constraints. Inadequate capital (mean = 3.41) and seasonal variability which affects supply (mean = 3.35) were the most severe constraints facing palm oil marketers in the study area. Other constraints include high transportation cost (mean = 3.02), difficulty in accessing credits (mean = 2.99), price fluctuation (mean = 2.71), low pricing of palm oil (mean = 2.67) and high competition (mean = 2.65). However, poor marketing information (mean = 2.31), high market charges (mean = 2.27), poor storage (mean = 2.13), theft (mean = 2.13) and high cost of purchase (means = 1.79) were not considered serious by respondents.

Table 4. Marketing constraints faced by respondents

	Very serious		Serious		Little serious		Not serious		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Mean*	SD
Inadequate capital to expand	68	61.82	24	21.82	13	11.82	5	4.55	3.41	.87
Seasonal variability (affects supply)	60	54.55	33	30.00	13	11.82	4	3.64	3.35	.83
Price fluctuation	23	20.91	51	46.36	17	15.45	19	17.27	2.71	.99
Difficulty in accessing credit	53	48.18	20	18.18	20	18.18	17	15.45	2.99	1.14
High market charges	0	.00	56	50.91	28	25.45	26	23.64	2.27	.82
Poor storage	16	14.55	19	17.27	38	34.55	37	33.64	2.13	1.04
Numerous sellers (high competition)	38	34.55	23	20.91	21	19.09	28	25.45	2.65	1.20
Poor marketing information	30	27.27	16	14.55	22	20.00	42	38.18	2.31	1.24
Low pricing of palm oil	41	37.27	24	21.82	13	11.82	32	29.09	2.67	1.25

	Very serious		Serious		Little serious		Not serious		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Mean*	SD
High transportation cost	59	53.64	16	14.55	13	11.82	22	20.00	3.02	1.21
Theft	16	14.55	19	17.27	33	30.00	42	38.18	2.08	1.07
High cost of purchase	0	.00	19	17.27	49	44.55	42	38.18	1.79	.72

*Serious (mean > 2.50)

Test of Hypotheses

T-test was employed in the test of the hypotheses. This section presents and discusses the results.

The following null hypotheses were tested:

There is no significant influence of access to credit provided under the agriculture promotion policy on the income of smallholder palm oil value chain actors in Edo State

Policy Impact on Marketers' Income (T-Test)

The T-test result (Table 5) indicates a substantial increase in the income per annum of palm oil marketers between 2015 (N445,072.7) and 2021 (N568,395.4). The difference of N123,322.72 was significant at the 5% level since the calculated t value ($t = 13.31$) is greater than the tabulated t value (1.98). This suggests that the agricultural promotion policy positively and significantly impacted the income derived from palm oil marketing by respondents in Edo state.

Table 5. Impact of policy on the income of marketers (T-Test)

Year	Mean (₦)	Difference	T value	Prob. level	Decision
2015	445,072.7273	123,322.72	13.31	$P < 0.01$	Significant
2021	568,395.4545				

Policy Impact on Marketers' Sale (T-Test)

The T-test result (Table 6) shows a significant increase in palm oil sales (litres) by respondents in the study location since the introduction of the agricultural promotion policy. The average quantity sold per annum in 2015 was 1,369.4 litres while 1,748.9 litres was recorded in 2021. The difference of 379.45 litres was significant at the 5% level ($t_{cal} = 13.32$; $t_{tab} = 1.98$), suggesting that the agricultural promotion policy positively and significantly impacted the quantity of palm oil sold by marketers in Edo state.

Table 6. Impact of policy on sales of marketers (T-Test)

Year	Palm oil (litres) (mean)	Difference	T value	Prob. level	Decision
2015	1369.4545	379.45	13.32	P < 0.01	Significant
2021	1748.9091				

Summary of Findings

This study investigates the influence of Nigeria's agriculture promotion policy on the economic performance of small-scale palm oil marketers in Edo State. The research focused on examining the social and economic characteristics of palm oil marketers, analysing their sales and income levels, and identifying the primary marketing challenges they face under the agriculture promotion policy.

The major findings of this study in line with the stated objectives are noted below:

Table 7. Major findings

Variable	Findings
Sex distribution of palm oil marketers	Most studies found that females (82.73 %) dominated the business of palm oil marketing in the study locale.
Experience of palm oil marketers	Most of the palm oil marketers in the area were experienced, with an average experience of 17 years.
Membership in associations	Most (70 %) of the palm oil marketers in the study did not belong to any association.
Source of finance for the business	The major source of finance for running the business was personal savings (100 %).
Key constraints faced by marketers	The most severe constraints facing palm oil marketers were inadequate capital and seasonal variability which affects supply. Other constraints included high transportation costs, difficulty in accessing credit, price fluctuation, low pricing of palm oil, and high competition.
Impact of Nigeria's agricultural promotion policy on palm oil sales	The study found that the average sale of palm oil increased significantly from 1,369.45 litres in 2015 to 1,748.91 litres in 2021. This suggests that the agricultural promotion policy had a positive impact on the marketing of palm oil in the area.
Impact of Nigeria's agricultural promotion policy on the income of marketers	The study found that the average income of marketers also increased significantly from N4,450,72.73 in 2015 to N5,683,95.45 in 2021. This suggests that the agricultural promotion policy significantly impacted the income of palm oil marketers in Edo state.

Discussion of Findings

The studies conducted on the palm oil industry in Nigeria reveal some crucial insights. Firstly, it is evident that the industry is predominantly dominated by female marketers,

many of whom possess significant experience and are self-financed. This finding agrees with the findings of (Adedayo & Tunde, 2013; Fabiyi & Akande, 2015), Omotesho & Okoruwa, (2015) and Ayawari, Nwankwo, & Ugwumba (2017) who observed that women play a pivotal role in the palm oil marketing business. Women in palm oil marketing have a significant impact on the sector's economic performance. They contribute to increased sales as major supply chain players.

Nigeria's agriculture promotion policies have improved palm oil sales and marketers' income, benefiting women who experienced significant income growth. Women's central role in the sector highlights the need for recognition and support. Addressing the challenges, they face and creating an enabling environment is vital for their continued success and sustainable development in the palm oil marketing business.

The research highlights the noteworthy impact of marketing on marketers' income. The agricultural promotion policy in Nigeria has demonstrated promising outcomes. From 2015 to 2021, there was a substantial increase in average palm oil sales, resulting in a corresponding rise in marketers' average income. These findings indicate that the policy has positively contributed to the growth and overall performance of the Nigerian palm oil industry. This finding is in consonant with the findings of Falusi & Adepoju (2018) who emphasized that the marketing of palm oil significantly influences the livelihoods of rural farmers in the region.

For policymakers and stakeholders, these findings are of paramount importance. They underscore the potential benefits of continued government support to the palm oil industry through financial assistance, infrastructure improvement, and research and development promotion. Such interventions can further enhance the industry's performance, create more employment opportunities, and boost income in rural communities (Omotesho & Okoruwa, 2015) Nze, Nzeakor, & Egbosionu, (2017).

An interesting aspect that emerged from the studies is that the palm oil marketing industry appears to be an attractive business opportunity for women. Given that women constitute most marketers and exhibit greater expertise in the field, they seem to possess a competitive advantage in this sector. Combined with the positive effects of the agricultural promotion policy, this finding highlights the potential for empowering women in the palm oil industry, which can contribute to overall economic growth.

The studies shed light on the opportunities and challenges in the Nigerian palm oil industry. These challenges were also enumerated in detail by Urama & Ozor, (2009), Okon, Ekong, & Umoh, (2011) and Obasi & Kalu, (2015). By capitalizing on the strengths of female marketers and leveraging the benefits of the agricultural promotion policy, this study agrees with Falusi & Adepoju, (2018) that government and stakeholders can further propel the industry's success and contribute to the nation's economic prosperity.

Conclusion

This study offers valuable insights into the impact of Nigeria's Agriculture Promotion Policy on the economic performance of small-scale palm oil marketers in Edo State. By

analysing various research studies and analysing data gathered for the study, we have identified key factors influencing their operations, including access to credit, modern technologies, and efficient marketing channels. The policy recommendations centre on enhancing economic viability, promoting fair market practices and creating a supportive environment for small-scale palm oil marketers. If these recommendations are effectively implemented, they have the potential to foster sustainable economic growth within the palm oil industry while contributing to Nigeria's broader agricultural sector objectives.

Recommendations

By implementing the following recommendations, policymakers and stakeholders can foster sustainable growth, profitability, and improved livelihoods for those involved in the palm oil marketing sector. Additionally, it is essential to sensitize palm oil marketers to the benefits of social associations and expand market linkages at the macro level to strengthen the entire palm oil value chain and attract policy support.

The following additional recommendations are proposed based on the research findings:

- a) **Encourage Female Participation:** Promote and support female entrepreneurs in the palm oil marketing sector through targeted training, financial assistance, and networking opportunities to empower women and enhance their participation in the industry.
- b) **Support Experienced Marketers:** Recognize and harness the expertise of experienced palm oil marketers by providing mentorship programs and knowledge-sharing platforms to drive industry growth.
- c) **Promote Association Memberships:** Encourage palm oil marketers to join associations to access resources, market information, and collective bargaining power, enhancing their competitiveness and strengthening the overall sector.
- d) **Diversify Sources of Finance:** Explore alternative financing options, such as microloans or revolving credit, to mitigate risks and improve financial stability for palm oil marketers beyond relying solely on personal savings.
- e) **Address Key Constraints:** Target interventions to address severe constraints, such as inadequate capital and seasonal variability, by providing financial support during lean seasons and facilitating access to credit to improve operations and manage supply fluctuations.

Recommendation for Future Research



This paper recommends investigating the impact of the Agriculture Policy (APP) on the income of palm oil marketers in other palm oil-producing belts in Nigeria. Such studies should also consider other incentives deplored under the APP to boost the palm oil marketing business of small-scale actors.

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<p>HOW TO CITE THIS ARTICLE</p> <p>Ijie, B., & Iyoriobhe, M. (2023). Analysis of Nigeria Agriculture Promotion Policy on the Economic Performance of Small-Scale Palm Oil Marketers in Edo State. <i>International Journal of Management, Accounting and Economics</i>, 10(10), 765-781.</p> <p>DOI: 10.5281/zenodo.10429579</p> <p>URL: https://www.ijmae.com/article_184177.html</p>	 <p>A square QR code that, when scanned, likely leads to the full text of the article.</p>

Original Research

Reporters Without Borders and Tourism Industry in Southwest Asian Countries

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Abstract

Governmental and non-governmental organizations and experts have focused on media freedom and reforms in the last two decades. The present study examines the impact of Reporters Without Borders on the profit of the tourism sector in selected countries in Southwest Asia from 2012 to 2018. It investigates this relationship using a dynamic panel data method and a two-stage generalized moment system (GMM). The obtained results indicate that with a unit increase in the Reporters Without Borders index, the income of the tourism industry increases by 1.062%. Also, for other control variables, it can be concluded that with an increase of 1 unit in the good governance index, tourism revenues increased by 0.784 percent, and also with a 1 percent increase in the official exchange rate, the gross domestic product Per capita and trade openness of tourism industry income increases by 0.005, 2.134 and 0.628 percent respectively. It is worth mentioning that all the obtained coefficients were significant and positive.

Keywords: Dynamic Panel Data, GDP Per Capita, Good Governance Index, Official Exchange Rate, Press Freedom, Trade Openness.

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Introduction

Tourism is one of the most diverse and dynamic industries in the world. Many developing or underdeveloped countries rely heavily on the tourism and travel industry for income generation, employment, social development, and infrastructure.

Various studies (Cavalheiro et al., 2020; Khayrulloevna, 2020; Shariffuddin et al., 2021) note the beneficial impact of tourism-related activities on the economy. Tourism is a viable facilitator for economic growth and development (Brida et al., 2020; Detotto et al., 2021; Rheeders & Meyer, 2022; Aleksandrovna, 2022). The tourism sector is one avenue that can be used to improve economic growth and development. Tourism is competitive, interlinked, and globalized (Detotto et al., 2021). Tourism can assist in lessening poverty, improving income distribution, raising product and service demand, creating more tax revenues (Ren et al., 2019), and giving governments access to more foreign monetary inflows (Detotto et al., 2021). Shamai and Yousofi Babadi (2018) state that the improvement of the tourism sector, in conjunction with social and cultural progress, leads to an increase in the prosperity of a region's economy. Furthermore, tourism will strengthen the country's economic resilience, but success in tourism growth will be visible if its sponsors are effectively organized. (Wijaya et al., 2022). Aleksandrovna (2022) urges that tourism should be deemed as important as it contributes to employment opportunities, and due to it being interlinked, it provides benefits for various other sectors. As such, it is clear that the development of the tourism sector contributes positively to the development of the socio-economic environment.

In addition, tourism has recently emerged as an attractive and hot topic among academics, students, and researchers. The World Tourism Organization estimated that in 2017, 1.323 billion visitors left their country to visit the countries of interest, reaching 1.4 billion in 2018, with a growth of 6%. It is predicted that by 2030, there will be between 1 billion and 800 million tourists worldwide.

According to the United Nations World Tourism Organisation (UNWTO, 2023), tourism in most regions has improved from previous declines in arrivals and expenditure. Accordingly, in 2022, tourism arrivals reached 900 million globally, led by the Middle East and European regions (UNWTO, 2023). The UNWTO (2023) expected the tourism sector's arrivals of regions to recover between 80 and 95% of the pre-COVID-19 levels.

Also, in terms of the total share of travel and tourism in the gross domestic product (GDP) worldwide, it can be concluded that in 2022, the total share of travel and tourism in the global gross domestic product (GDP) will be 23% less compared to 2019. It was the year before the coronavirus (COVID-19) pandemic started. Overall, the contribution of travel and tourism to the global GDP in 2022 was 7.7 trillion dollars. This figure is projected to reach \$9.5 trillion in 2023, five percent below pre-pandemic levels (Figure 1).

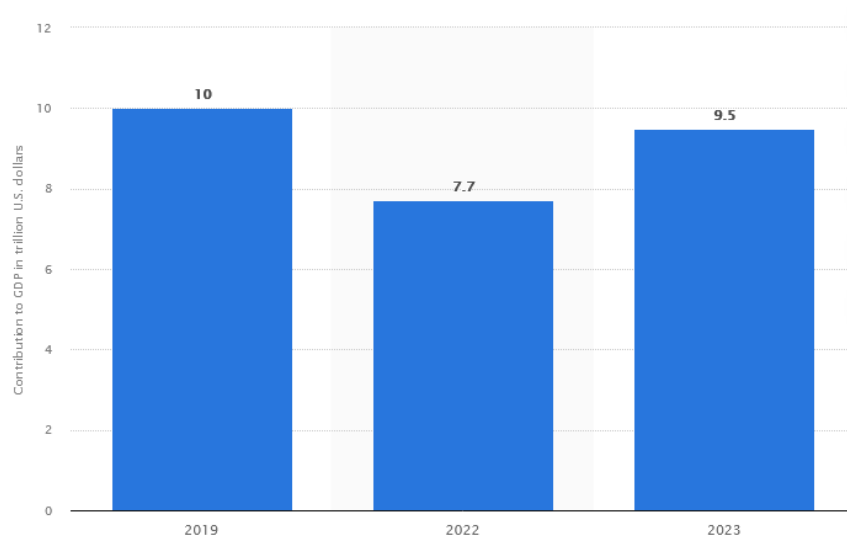


Figure 1. The total contribution of travel and tourism to gross domestic product (GDP) worldwide in 2019 and 2022, with a forecast for 2023 (in trillion U.S. dollars)
 Source: Statista Research Department (2023)

One of the most important factors affecting the tourism industry that previous studies have not investigated is the role of the media and media freedom on the industry (tourism income). In this study, we aim to address the relationship between tourism development and income distribution by linking the arguments to a line of studies that examine the role of a country's media environment. Thus, we extend this discussion by examining the effects of media freedom on tourism development.

Press and media freedom closes the gap between government and people (Bazley et al., 2002), eliminates corruption, and fights religious bigotry (Jankov et al., 2002; Adam, 2002). It encourages political participation and stimulates economic growth (Roll & Talbot, 2003). The independent press benefits the public because it presents a true or more true picture of society and increases the accountability of the people's representatives (Leeson, 2008). The concept of freedom of speech is a controversial issue in the literature. After World War II, the first definition of free speech relative to the geographic structure of politics focused primarily on government-controlled press releases. However, many experts believe that in addition to complete independence, a free press also has the power to criticize, except for defamation and honor laws (Leeson, 2008; Adam, 2002). Based on the theories of media freedom, two components of press freedom can be stated below: 1) The relative absence of the clauses expressed in the media. 2) Relative absence of non-governmental restrictions.

A recent study by Gottfried et al. (2017) shows that the media affects people's attitudes towards the national government differently. Mickoleit (2014) documents that social media influences the policies of governments around the world. This is consistent with the view that the media can put controversial social issues about the tourism sector on the public agenda.

We argue that significant media heterogeneity through press freedom pressures the national government to distribute tax revenues equitably. A free media environment also

highlights exploitation in tourist areas and influences the government to provide better public services and create more open policy processes. Previous studies show that news media and press freedom influence government policies and responses to social issues (Hollander, 2014).

Besides the freedom of the media and the press, another important variable that can play a positive role in the development and growth of the tourism industry is the governance index. Good governance has been a dominant theme in public sector management in recent decades, and the role that government plays in the health of society is essential. Global surveys and data show that good governance is critical in emerging countries and has long been a cornerstone of development. The European Union states that achieving fair and sustainable social and economic growth requires transparent management and good governance in the country (Barnard, 2007; Minehir & Gamble, 2019).

Good governance is increasingly popular in law, politics, and economics. Scholars have devoted considerable attention to studying good governance, as it appears to have economic and political importance to economies (Akram et al., 2021; Baig & Zahra, 2020). Good governance produces outcomes that meet societal needs while maximizing the use of available resources. In addition, Siskavati et al. (2020) believe that good governance is a process by which the government performs public affairs and manages public resources. According to Adink (2019), good governance is a standard that the government must adhere to, which is one of the people's fundamental rights in their country. Detotto et al. (2021) state that good governance creates benefits through the following: (1) the first benefit is that it reduces transaction costs, enabling markets to be more efficient, and (2) Increasing technologies and maintaining political stability in conditions of rapid social transition" due to competent governance. As a result, good governance can be considered a source of development.

In previous studies, the Reporters Without Borders index and good governance have been conducted separately in the tourism sector. Thus, according to the existing gap in the current tourism literature, this research examines whether free media environments affect tourism development differently. Therefore, the significant innovation of the present research is that it examines the role of media freedom and good governance index on tourism revenues by econometric modeling of dynamic panel data. In addition, it should be mentioned that no research has been done regarding the current issue at the global level. However, in the following, some related studies will be reviewed.

Beha (2023) investigated the effect of good governance and quality of institutions on tourism development in a panel of 27 countries from the European Union from 2008 to 2021. The control variables used, which also represent the determinants of tourism, are GDP growth rate per capita, inflation, higher education, quality of the environment, and trade. Quality of institutions indexes are constructed based on indicators of government effectiveness, political stability, regulatory quality, the rule of law, and voice and accountability. To estimate the impact of selected determinants in tourism development, we used the Generalised method of the moments-GMM model. According to the results, there is a positive connection between the quality of institutions and tourism.

Shah (2023) examined the impact of effective governance on the tourism poverty nexus in six South Asian countries from 2002 to 2019. An econometric methodology included fully modified ordinary least squares (FMOLS) and dynamic ordinary least squares (DOLS) econometric models. The results confirmed the positive and significant impact of tourism development and the effectiveness of the government on poverty reduction. In addition, results confirm that governance quality and tourism development have complementary impacts on poverty reduction.

Detotto et al. (2021) postulate the importance of good governance by stating that the development of the private sector, households, and investors depends on a stable and predictable environment. In this respect, governance plays a crucial role. Various studies (Detotto et al., 2021; Gretzel & Jamal, 2020; Bichler, 2021; Maniatis, 2016) indicate that high-quality, strong institutions lead to economic growth and development. According to Nurman et al. (2021), good governance enables regions to develop and implement strategies for new market creation, ensuring price stability and efficient distribution of products. Tourism revenues could rise due to improved sector productivity and efficiency by solid governance (Detotto et al., 2021).

Studies related to media freedom and good governance: According to the review of the relevant literature, only one study has investigated this relationship. Stark et al. (2015) believe that free media, as a check and balance institution, plays an important role in fighting corruption. In addition, the global expansion of Internet connectivity and e-government increases the likelihood of exposing corrupt government officials. This cross-national study assesses the impact of media freedom, Internet access, and online government service delivery on corruption using secondary data from 157 countries. Freedom of the media, access to the Internet, and the provision of online government services have a significant impact on reducing corruption at the national level. However, although Internet access remained constant from 2003 to 2013, the effect of providing online government services only appeared in 2013. This research also explores the fundamental interaction between two Internet-related factors.

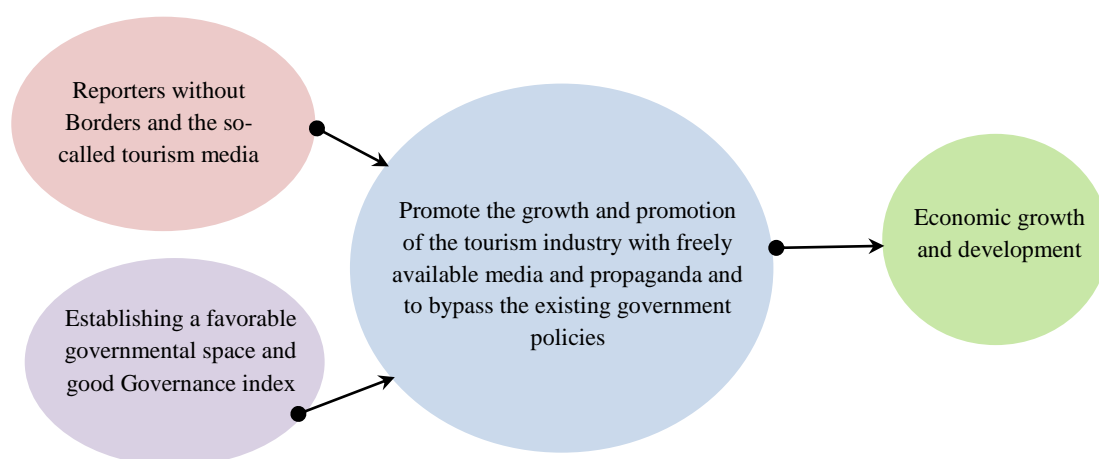


Figure 2. The conceptual model of the current research

According to (Figure 2), as a final remark in this section, it can help promote an infrastructure for other media freedom. Also, according to theoretical and empirical foundations, establishing a high-governmental atmosphere and improving governance in most studied countries can enrich the tourism industry. Thus, it is causing high and enormous revenues, followed by optimal and steady economic development.

A review of previous studies shows that Reporters Without Borders and good governance have been investigated separately in the tourism sector and show that the improvement of both these indicators can help the development of tourism, but none of the studies show the effect of both. They have not investigated this variable on tourism income. Therefore, considering the current gap in tourism literature, this research examines whether free media environments affect tourism development differently. It also examines two hypotheses: the Reporters Without Borders (RSF) index and the Governance Index Good (GGI) have a positive and significant effect on the income of the tourism industry. This study is innovative regarding the impact of RSF on tourism revenues, as research has yet to examine this issue. The structure of this research is as follows. The next section presents our materials and methods. After that, the third part shows the result and discussion, and the conclusion will be discussed in the fourth part.

Methodology

Generalized Method of Moments (GMM) approach

Most economic relationships involve dynamic adjustment processes. Dynamic models are very popular in panel data frameworks in labor, development, and general macroeconomics (Panchanan Das, 2019).

Dynamic panel models are regression models that include both cross-sectional effects and a lagged dependent variable. They are a powerful tool to deal with eliminated factors whose effects persist over time (Gotti-Rose and Rashid al-Khattabi, 2017). In the model with dynamic panel data, the lags of the dependent variable are used as explanatory variables. This means dynamic panel data models are useful when the dependent variable is related to past facts. However, the coefficients of lagged dependent variables may be far from our interest.

Including dependent variable lags provides a suitable description of many economic dynamic adjustment processes. However, in the analysis of panel data with short time intervals, there often seem to be inference problems, including small sample bias in coefficient estimation and hypothesis testing (Morris & Sarafidis, 2015). However, including lagged dependent variables introduces a correlation between the regressions and the residual error, and the endogeneity problem appears. This endogeneity issue suggests that least-squares-based estimators may be inconsistent. Using instrumental variable (IV) or generalized method of moments (GMM) methods produces consistent parameter estimates for data with limited periods and large cross-sections. Among them, the GMM system estimator has become increasingly popular. This is because it provides efficient asymptotic inference using minimal statistical assumptions (Panchanan Das, 2019).

Generalized Method of Moments (GMM) estimation is one of two econometric developments in the 1980s that revolutionized empirical work in macroeconomics. Among the pioneering articles in this method were the articles of Hansen (1982) and Hansen and Singleton (1982) (Sorensen, 2022). Based on dynamic panel models, the generalized moment estimator (GMM) is used in the equations in which there are unobservable effects specific to each country and the lag of the dependent variable. The generalized method of moments (GMM) is a method for constructing estimators similar to maximum likelihood (ML). GMM uses assumptions about specific moments of random variables instead of the entire distribution, making GMM more robust and efficient than ML (Drucker, 2015).

The consistency of the GMM estimator depends on the validity of the assumption of non-autocorrelation of the error statements and instruments, which can be tested by two tests specified by Arellano and Bond and Arellano and Burrow. First, the Sargan test checks the validity of instruments with predetermined limits. It determines any correlation between instruments and errors and has a chi-square distribution. The second test is the chain correlation test, which tests the existence of second-order chain correlation in disturbance components using M2. In this method, endogenous variables can be used; one of the ways to control the endogeneity of variables is to use an instrumental variable.

One of the advantages of GMM is that it allows us to use the intercept of these variables as suitable tools to control endogeneity. The GMM method can include the dynamics in the investigated variable in the model and can be used in all-time series, cross-sectional, and panel data. Using the dependent dependent dependent variable can also cause the loss of collinearity in the model. However, the main advantage of this method is that all the regression variables that are not correlated with the disturbance components (including the dependent and explanatory variables) can potentially be instrumental.

This study examines the impact of Reporters Without Borders (RSF) on the income generated in the tourism sector using a dynamic panel data approach and the generalized system of moments (SGMM) method for 14 Southwest Asian countries from 2012 to 2018. As an explanatory variable, the dependent variable describes econometric patterns with dynamic links (fit model parameters). The method of moment generalization was first described by Hansen (1982). This provides an easy measure to find the efficiency of the estimates. This strategy considers the dynamic effect of the dependent variable. This technique will show at least standard and inconsistent results despite the correlation of explanatory factors.

However, in a dynamic panel data model, the lag between the dependent variable and the lags of the other variables (in a regression framework) is used as an instrument for the second lag of the dependent variable and the lags of the other variables as instruments. They are determining the dependent variable based on the generalized method of moments. The generalized method of moments (GMM) proposed by Arellano and Bond (1991) is an alternative to the present model to remove the effects attached to segments (individuals) and all fixed variables from the subject. The extended two-step technique is used to reduce the correlation between the gap and the false term and intercept variables as a tool for female estimation. If there is an inconsistent change in the error component, estimating a two-step method becomes more efficient and effective. Conditional mode is

used between errors and alternating values of the dependent variable in torque positions. It is expected that the disturbance components in this process do not have serial correlations. Arellano and Band's approach and test are used to test for serial correlation in disturbances. Sargan's test is used in this model to check the instrumental variables' validity by testing the over-identification limits (Baltaggi, 2013).

Case Study and Data Used

In economic studies, assumptions are examined in a specific geographic area. Therefore, with its innovative idea, the current research examines the hypotheses raised in the previous section in the form of selected countries in Southwest Asia. The motivation for choosing this category of countries is the importance and innovation of using indicators of media freedom and good governance, as well as the importance of having income from the tourism industry to avoid a single-product economy. Therefore, the current study selected countries from among 22 emerging countries in Southwest Asia. Information was unavailable for some of these countries, so they were excluded from further analysis. Finally, data from 14 countries were used and analyzed (Figure 3).



Figure 3. The map of selected Studied emerging Southwest Asian countries (Color Figurers is only available in the online mode)

Source: Google My Maps² and Research Compilation

Research model and used variables

In this research, tourism income is the dependent variable. Since tourism revenue affects the variables of the previous and subsequent year (for example, 1000 travelers visited a tourist attraction), part of the money collected from these visitors is spent on renovations and advertising. This will lead to developing and expanding building facilities and attracting more tourists in the coming years. As a result, it attracts visitors and increases the income of tourists. The World Bank website, the World Development

² <https://www.google.com/maps/about/mymaps/>

Indicators (WDI) database, and the World Governance Index (WGI) database were used to collect data for this study.

The study of the impact of Reporters Without Borders on the income of the tourism industry in selected countries of Southwest Asia is inspired by the theoretical foundations and empirical studies of Boga and Arkisi (2019), Litao (2015), Daryai et al. (2013), Memipour and Nazari (2014), and Bouhalis and Demizi (2013), as well as the panel data model introduced and used by Baltagi (2015). The equation for investigating the impact of Reporters Without Borders on tourism industry revenues in selected countries in Southwest Asia is as follows:

$$\text{Ln (TR)}_{it} = \beta_0 i + \text{Ln } \gamma(\text{TR})_{i(t-1)} + \beta_1 \text{Ln (RSF)}_{it} + \beta_2 \text{Ln (GGI)}_{it} + \beta_3 \text{Ln (OER)}_{i(t-1)} + \beta_4 \text{Ln (GDPP)}_{it} + \beta_5 \text{Ln (TO)}_{it} + \text{Uit} \quad (1)$$

In Eq.1, $\text{Uit} = \mu_i + \lambda_i + \text{vit}$, in which μ_i represents the specific effects of the country and λ_i represents the effect of the following year, and we will describe in more detail each of these cases.

Table 1 discusses the definitions of the used variables and the source of each one.

Table 1. Introduction of variables

Variables	Definition	Variable type	Source
Ln (TR)	The revenue of the tourism industry (in billion US dollars)	The dependent variable	World Bank ³
RSF	Reporters Without Borders (Reporters et al.) ⁴	independent variable	International Organization for Reporters Without Borders Global ⁵
GGI	Good Governance Index ⁶	independent variable	World Governance Index ⁷
OER	Official exchange rate (in US dollars)	Control variable	World Bank
Ln (GDPP)	Real GDP per capita based on purchasing power	Control variable	World Bank

*Ln: Logarithmic Format

According to Table 1, the description of the used variables is as follows:

³ <https://data.worldbank.org/>

⁴ Press freedom index is published by Reporters Without Borders, as an annual score representing the countries' ranking concerning the freedom of the press in the country. According to the press release, each country grants some 0 (free) to 100 (minimum freedom).

⁵ <https://rsf.org/en>

⁶ The combination of six leading indices of governance introduced by the World Bank has been achieved by SPSS software analysis with Principal Factors Analysis technique. The results of this approach show in the Appendix.

⁷ <https://databank.worldbank.org/source/worldwide-governance-indicators>.

Explanatory Variables Used in the Model (Empirical Model)

The first and perhaps the most important point to note is that tourism revenue (TR) is the dependent variable (in US dollars), according to research conducted by Boga and Erkisi (2019), Panik (2014), and Cho (2010).

Reporters Without Borders (RSF): This index is an annual score for countries evaluated by Reporters Without Borders. This index represents journalists, information technology agencies, citizens' freedom, and governments' efforts to respect and guarantee this freedom.

Good Governance Index (GGI): Described in various ways. Good governance is defined by the Organization for Economic Co-operation and Development (OECD) as working in different fields to achieve balance at different national and international levels. Lyon (2000), on the other hand, defines good governance as the effectiveness of the country's economic and social resources. How transparent, responsive, fair, and open is this system? Based on World Bank indicators, GGI includes six important and influential sub-indices: 1) Voice and responsiveness. 2) Political stability. 3) Government effectiveness. 4) supervisory quality. 5) rule of law; and 6) corruption control is evaluated. As Khan et al. (2021), Bhuiyan et al. (2023), and Shamaï and Yousefi (2018) argue, this variable is expected to have a very important and significant impact on tourism revenues.

The explanatory control variables included in the model are:

Official exchange rate (OER): The official exchange rate is a critical and influential control variable on tourism revenues. If the exchange rate in the destination country is lower than the country of origin, this will be a good incentive for visitors or tourists to go to the destination country. Therefore, the exchange rate is one of the important and influential variables used in modeling this research. As a result, the exchange rate is the most relevant variable in the study process, which, in theory and most previous studies, such as Xue et al. (2022), is also evident.

Gross domestic product per capita (GDPP) is one of the most important factors affecting tourism in the destination country, the country's income. In other words, since travel is usually considered an economic good, thus, this variable is more sensitive to the income level. Therefore, it is considered one of the most important components of the tourism income equation. This research applies the real income variable based on purchasing power. However, a review of previous studies shows that in most studies, GDP per capita significantly affects tourism income. Also, Wijeskara et al. (2022) and Khanal et al. (2021) in their article show that tourism significantly contributes to economic growth and vice versa. Therefore, the higher their GDP is, the more they earn from tourism (Xue et al., 2022).

Trade openness (TO) is a critical factor in analyzing and quantifying a country's economic progress, calculated as the sum of all exports and imports to GDP. Therefore, the larger the government deficit, the more open a country's borders are to exporters and importers, which means that the country and its economy have a more open and accessible level of trade. Based on previous studies such as Boga and Erkisi (2019), alşkan et al.

(2019), Okafor et al. (2021), and Mester et al. (2023), this variable is one of the most important and influential factors affecting tourists' income.

Furthermore, natural disasters, conflicts, policy changes, preferences, propaganda, expectations, political instability, terrorism, and other special events affect tourism. Due to the lack of data for the mentioned factors, these factors are entered into the model as a disturbance or error term and tested.

RSF and Tourism Industry

We begin by providing a descriptive analysis of the leading variables of our study. Any country with a lower ranking on the RSF index is better. In addition, variable annual RSF statistics are provided for approximately 179 countries. Therefore, to examine the relationship between the tourism industry and Reporters Without Borders, the six-year average (2012-2018) of the Reporters Without Borders (RSF) index is shown in (Figure 4). In the RSF variable, the closer the number of Reporters Without Borders is to zero, the better the media freedom in that country. Therefore, Iran has the worst among the studied countries, and Armenia has the best RSF rate. It can also be seen in (Figure 5) that Iran has the highest rank, and Armenia has the lowest rank among the studied countries.

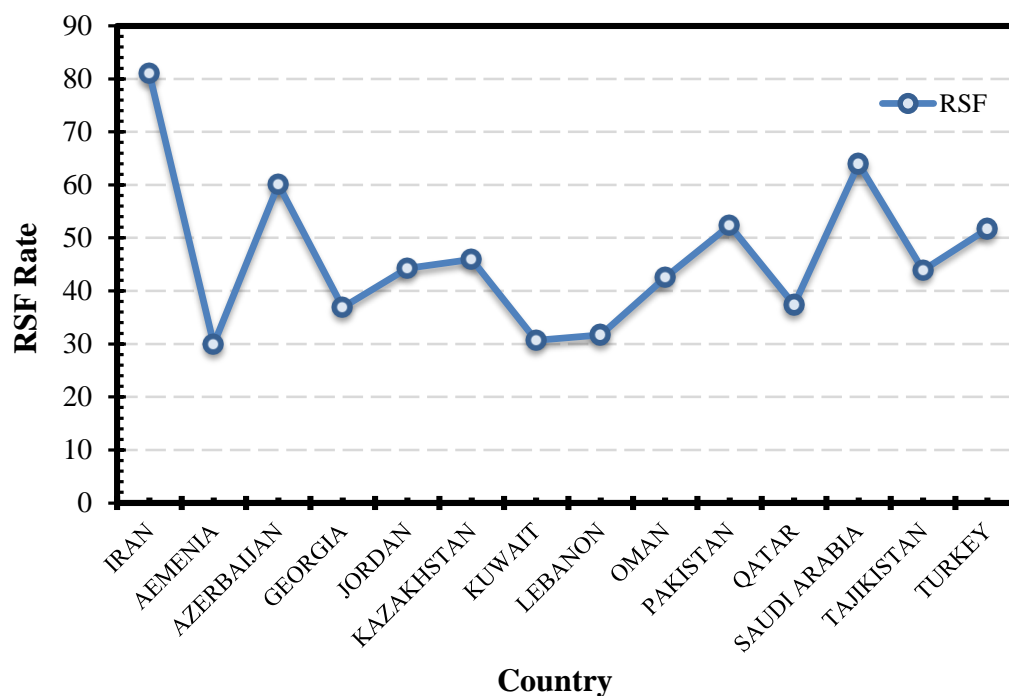


Figure 4. Average Rate of RSF in 2012-2018.
 Source: rsf.org and researcher's calculation.

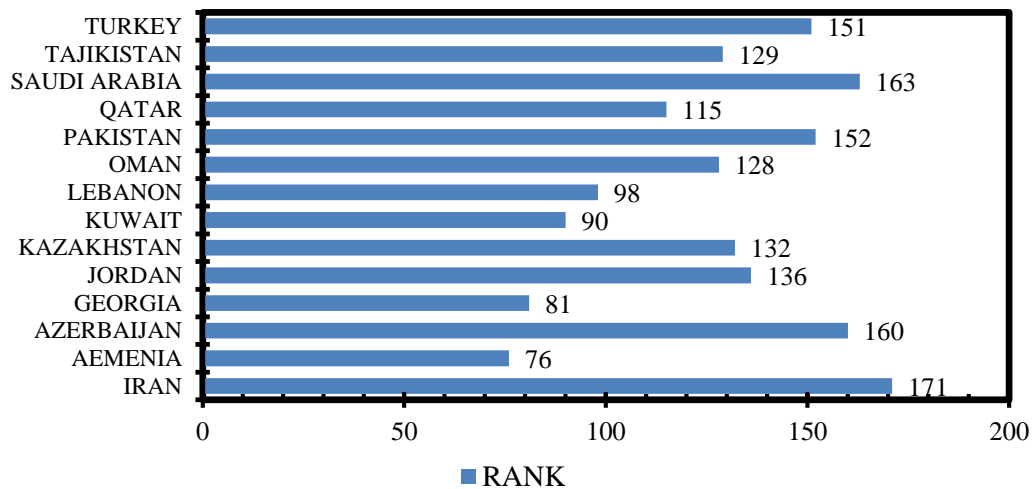


Figure 5. Average Rank of RSF in 2012-2018.
 Source: rsf.org and researcher's calculation.

As shown in Figure 6, according to the latest statistics available in the press freedom index, Iran, with a value of 72.20, and Saudi Arabia, with a value of 62.73, were ranked 174 and 170, respectively. Therefore, they have the lowest value in the world press freedom index. On the other hand, Georgia, with a value of 28.64, and Armenia, with a value of 28.83, are ranked 60 and 63, respectively. Therefore, compared to the two. Countries of Iran and Saudi Arabia have a much better situation regarding the press freedom index in the world.

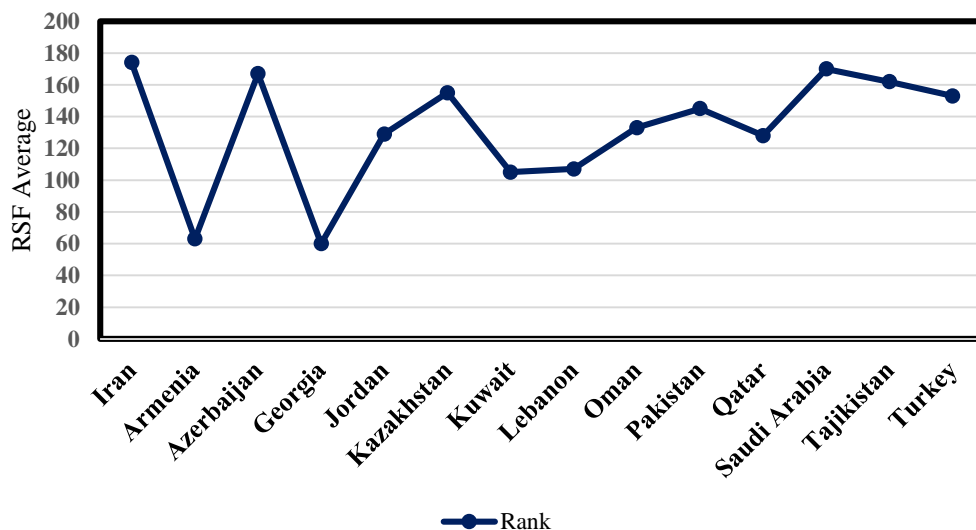


Figure 6. Selected Countries RSF, 2021 Rank.
 Source: rsf.org and researcher's calculation.

According to Kamforo (2010), the press should serve the public interest and be trusted by citizens, not government officials. Experts and practitioners agree that the media is responsible for guiding and motivating officials to work only for the public good (Stiglitz, 2002). For example, Sen (1999) highlights the role of the free media in selecting factors

that reflect people's true preferences. On the other hand, an impartial press may also reduce religious prejudices (Nikitina, 2020; Adam, 2002) and minimize corruption (Egbunda, 1994; Jankoff et al., 2002; Reinikka & Svensson, 2005).

Stromberg (2004) also found that a free press fosters accountability and increases people's quality of life. One of the critical techniques to ensure press freedom is to minimize information asymmetry and create barriers between citizens and governments (Besley et al., 2002). This practice allows the government to have a say in its policies and shape them for the benefit of the people. The press release also invites people to participate in politics (Karppinen, 2007; Kuenzi & Lambright, 2007; Leeson, 2008).

Egorov et al. (2009) examine media freedom in non-democratic countries in their work. According to them, freedom of the media is very important to establish social order because it allows a fair and independent evaluation of the government's policies. As a result, the freedom of the press allows the people to evaluate the government's performance and decide on the country's future. However, since tourism is a multifaceted activity involving various economic, social, and other groups, it requires a strong governance framework to progress toward sustainable growth. As a result, governance in tourism development has become increasingly important in recent years, as it directly and indirectly affects tourism development (Karlikar & Becker, 2014; Cornelissen, 2005).

Good Governance Index (GGI) and Tourism Industry

The governance indicators, i.e., government effectiveness, political stability, regulatory quality, the rule of law, and voice and accountability, also positively affect tourism development. Terrorism, environmental degradation, and corruption have shown adverse effects on tourism development as well as components of tourism development. Economic growth and trade openness have an encouraging effect on tourism development and its comments. It is concluded that through good governance, tourism may be developed, but terrorism and corruption need to be eliminated.

For the tourism sector to produce valid social and economic benefits, the principles of good governance should be considered. Tourism governance encompasses activities in the economic and political environment found locally, nationally, and globally (Bichler, 2021). According to Gretzel and Jamal (2020), transparency and effective government, for example, the capability to develop and execute effective policies, restructure institutions, organize resources available, facilitate economic and social well-being, enforce the rule of law, reduce corruption and involvement, are all examples of good governance. One of the most contentious issues in the literature is how governmental policies affect the tourism sector and how crucial political stability is to the long-term viability of the sector. Özgit (2022) stated that the optimal strategy for long-term sustainable tourism necessitates the creation of a system for efficient monitoring and regulations that are swiftly put into place thanks to sound governance.

In sustainable development, good governance is a collaborative endeavor that integrates environmental, social, and economic issues (Gretzel & Jamal, 2020; Siskawati et al., 2020). Although the concept of good governance is believed to be taken up by the public sector (government), it should be remembered that the community and private

sector can also uphold governance. Raszkowski and Bartniczak (2018) postulate that public managers influence good governance in the sense that they should demonstrate strong leadership, the ability to inspire people to achieve the set goals, and the ability to use both intellectual and organizational capacity. However, there are challenges in governance for tourism regarding the various roles of government and the private sector and the sector's social and environmental costs (Siakwah et al., 2020).

In this regard, the government institution, based on the views, has a decisive role in advancing the society towards progress. Based on theories about international tourism based on media embargoes in most countries, there is a gap in research that makes it very difficult for journalists and documentary makers to write stories and produce content about the potential of tourism in Asian countries. These countries have a long history and valuable resources, but most people only hear about it and invest little. Thus, it can be concluded that the only hypothesis of this research is that Reporters Without Borders has a positive and significant effect on tourism income.

Results

To check for a non-false estimate between model variables, the variables in the regression should be evaluated for having a unit root. If the data used in the study have a unit root, the estimation findings will lead to spurious regression. However, given the years investigated (because of geographical and statistical limits), this research is six years for the panel data resilience test. Panel data from less than 15 years is optional for the concepts in the Baltic book (Baltagi, 2013).

However, in (Table 2), the findings of the estimation of the impact of the variables of borderless reporters as explanatory factors and other control factors on the level of tourism incomes (equation of equation 1) using dynamic panel data technique (SGMM technique). It has been reported Based on the findings of the model, all the coefficients are significant at the error level of less than 5%, and all these coefficients have a positive and significant effect on tourism income.

Table 2. Estimation Results of the Model by Two-Step GMM

Variables	Coefficients	Z statistic value	Probably value***
RSF	1.062	11.38	0.001
GGI	0.784	5.23	0.000
OER	0.005	12.35	0.002
Ln (GDPP)	2.134	14.11	0.000
Ln (TO)	0.628	3.25	0.000
Cons	-72.520	-14.65	0.000
Sargan	12.235* (0.752) **		
M1	0.778* (0.437)**		
M2	-0.892* (0.373)**		
Wald	33425* (0.000)**		

* Indicates the statistics value ** Indicates the probability level ***
Indicates significance at 5% level

According to the results of Table 2, the null hypothesis (which is based on Eq 1) will not be rejected. As a result, the variables used in estimating the model are of sufficient quality (there is no correlation between the disturbance components and the instrumental variables used). As a result, the variables used by the instrument in the model estimations are of sufficient quality (there is no correlation between the nuisance components and the instrument variables used). Consequently, using instrumental variables to manage the relationship between the explanatory factors and the equation is critical. Also, the findings of the autocorrelation of disturbance components (Table 2) do not show a significant relationship between the autocorrelation of 5% and the second rank. As a result, one of the important categories of this section is the interpretation and analysis of the model according to the above findings.

The following findings (a 95% confidence level) can be deduced from the results of (Table. 2):

The estimated coefficient of Reporters Without Borders (RSF), as one of the basic variables in this research, has a positive and significant effect on the amount of income from the tourism industry with this interpretation. In other words, an increase of 1 unit in the number of borderless reporters increased tourism income by 1.062 units. This meaningful conclusion is about the only hypothesis in this study, and it is consistent with studies such as Comeforo (2010).

The Good Governance Index (GGI) is one of the most important variables affecting the income of the tourism industry; in other words, with an increase of 1 unit in the rate of good governance, tourism income increases by 0.784 units. This result is consistent with the research findings of Joppe (2018), Khan et al. (2021), Bhuiyan et al. (2023), and Shamai and Yousefi (2018) argue that this variable is expected to have a very important and significant impact on tourism revenues.

Also, significant results have been obtained for the control variables of this research. The calculation coefficient of the official exchange rate (OER) showed a positive and significant effect on the income of the tourism industry. Therefore, a one percent increase in the official exchange rate increases tourism income by 0.005, per the findings of Xue et al. (2022). Also, GDP per capita coefficients positively and significantly affect tourism revenues. Tourism income has grown by 2.134% for every percentage increase in this variable. GDP per capita has a significant effect on tourism income. Also, Wijeskara et al. (2022) and Khanal et al. (2021) in their article show that tourism significantly contributes to economic growth and vice versa. Therefore, the higher their GDP is, the more they earn from tourism (Xue et al., 2022).

Therefore, improving the socio-economic status of a country is one of the elements that determine the amount of income generated by tourism, which is consistent with the findings of Litao (2015) and Sokhnor (2019). The calculated trade openness (TO) coefficient is also positive and significant. The amount of money received from the tourism business grows by 0.628% for every percentage increase in this variable, also, according to the findings of Boga and Erkisi (2019) and alşkan et al. (2019) and Okafor et al. (2021) and Mester et al. (2023).

Finally, we must mention whether or not the test statistic of the parameter estimated by the sample is equal to the desired parameter. Also, the T-test statistic with a value of 14163 and a probability level of zero percent of error has been obtained to estimate the value. A model where the null hypothesis is related to ineffective variables in regression

As the last point in this section, this research is unique regarding subject and methodology. This claim can be seen by examining various related research, such as Alam and Alisha (2013) and Tran et al. (2011). Thus, the role of press freedom in the Good Governance Index (GGI) and the relevance of a strong democratic system in the selected countries is examined in this study. In addition, dynamic panel econometric models and the System Generalized Method of Moments (SGMM) are used. The basic hypothesis and question of this study, based on the effect of the Reporters Without Borders (RSF) index on the income of tourists, showed that the RSF index has a positive and fundamental effect on the income of tourists in selected countries, including Iran.

Discussion

Some of the comments are excerpted from the article, which can be seen below. The term economics refers to maximizing profit while working with limited resources. No matter what one seeks, one may find spiritual benefits in travel. The prevailing norm must be the same, whether the company provides products and services to visitors or the host state benefits economically from tourist spending. Economic brokers try to fulfill demand by supplying limited tourism resources (both physical and financial). Physical and practical requirements (typically restricted) are combined with intellectual needs to create demands (which are almost unreasonable). Similarly, those economies attempt to determine how to get the most out of scarce tourism resources. At the same time, they must deal with ever-changing expectations (whose physical needs and psychic desires are created).

The present study examines the impact of Reporters Without Borders on the profits of the tourism sector in selected countries in Southwest Asia from 2012 to 2018. This method uses the dynamic panel data and a two-stage generalized Moment system. Since good governance is one of the primary components of attracting foreign visitors, according to experts and researchers, the findings of this study have a beneficial effect on the quality of good governance for foreign visitors. In addition, the six governance sub-indices of the World Bank, created from the good governance index, have a positive and significant effect on the income from the tourism sector in selected countries in Southwest Asia. Therefore, the findings of this research confirm the two hypotheses of this research, namely that Reporters Without Borders (RSF) has a positive and significant effect on the number of tourism industry revenues and the positive effects of the good governance index on the amount of tourism industry revenues. The amount of income from the tourism industry.

According to the results obtained, it may be agreed that a free and fair press is in the interest of society. In addition, policymakers should understand that a free and independent press is good for the economy. Therefore, policies should be aligned to encourage a fairer and fairer press. As a result, public trust and vital freedom of the press will increase, and promotion and synergy in the tourism sector will be strengthened,

resulting in economic growth. However, since good governance is an essential component in attracting international tourists, the findings of this study have a significant beneficial effect on the quality of good governance for international visitors. Six World Bank governance sub-indices are combined to create a good governance index that positively and significantly impacts tourism sector income in selected countries in Southwest Asia.

As a result, boosting tourist industry income brings the following benefits: Press freedom can advance through media privatization, especially given the romantic mood and existing waiver in the researched nations, particularly Iran. Furthermore, in a country like Iran, the press promotes various viewpoints and information sources that are critical for tourism income. The private sector's support and promotion of content efficiency and their great investments have resulted in the media cycle and press movement being more remarkable than previously (as well as more prosperous countries like Turkey). Also, by stressing the six power components, emphasize building and strengthening the institutional ecology and governance (Control of Corruption, Government Effectiveness, political stability, Regulatory Quality, Rule of Law, and Voice and Accountability).

Moreover, among the other benefits introduced, consider trade liberalization and lessening the depth of geopolitics and security in Iran because entry and exit will occur if a nation's borders are more open. Furthermore, it impacts tourism profits since facilitating visitors' entrance as a luxury product within a country's borders increases the money generated by the tourism sector. The focus on developing GDP per capita growth may indicate that the country's income is focused on the tourist industry, with a single-product trade fleeing. On the other hand, any value in this is an investment field, future tourism income, and the growth of numerous economic sectors. Consequently, officials will be able to predict the expansion of output inside the country based on the findings of this fascinating study. Moreover, it has the potential to boost tourism earnings.

According to the results obtained from the present research, Improvements in the mentioned variables, including reporters without borders, governance, GDP, exchange rate, and trade openness, can improve tourism in 14 emerging countries of Southwest Asia. In this way, the need to pay attention to the variables mentioned in the countries under investigation becomes more apparent.

Limitations of the Study

One of the important limitations of the present study is the relatively short period of available time series data, which is common in similar analyses. This research investigates the relationship between Reporters Without Borders, governance, and tourism revenues in 22 emerging countries of Southwest Asia. However, from 22 countries, information was unavailable on some of them, so they were excluded from the list. Analysis. Finally, data from 14 countries were used and analyzed. Therefore, the

current research is limited due to the lack of data to measure international tourism indicators in some emerging countries in Southwest Asia.

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Appendix

To establish an overall indicator of good governance (based on World Bank measurements for this issue, they measure this using six essential indicators for each nation, defined by the Principal Factor Analyses (PFA) components of the variance data utilized). The total index is then calculated by combining these components. This procedure was carried out using SPSS software.



To see if this approach is adequate for merging the data utilized, the KMO⁸ test and the Bartlett test are used. The results can be as follows.

- 1) The factor analysis is highly appropriate if the KMO is more significant than 0.9.
- 2) The factor analysis is correct if the KMO is more than 0.8 but less than 0.9.
- 3) Factor analysis is often suitable when the KMO is more than 0.7 but less than 0.8.
- 4) Factor analysis is typically unacceptable if the KMO is more than 0.6 but less than 0.7.
- 5) If KMO is less than 0.5, factor analysis is not recommended (Qi et al., 2013, p. 454).

The following are the results of this test (Table 3).

Table 3. Results of the KMO and Bartlett Index for the Selected Countries


Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.915
	Approx. Chi-Square	1543.342
Bartlett's Test of Sphericity	Df.	15
	Sig.	0.000

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⁸ Kaiser-Meyer-Olkin Measure (KMO) of Sampling Adequacy.

Original Research

Earnings Management and MD&A Readability: Does Business Strategy Matter? Evidence in Indonesia

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Abstract

This study aims to examine the role of business strategy in the relationship between earnings management and MD&A readability. Previous research has shown inconsistency of results in testing the effect of earnings management on MD&A readability. This inconsistency can be caused by the fact that the business strategy variable has not been included as a contextual basis for the implementation of operational activities. Earnings management in this study is measured by real earnings management, because previous studies have used accrual earnings management. The hypotheses are tested with the multiple linear regression. The results show on 189 cross-sectional data on publicly traded consumer goods companies show that: (1) real earnings management reduces MD&A readability in defender and prospector companies; (2) analyzer companies perform real earnings management – discretionary expenses reduce the readability of MD&A; (3) firm size as a control variable in this study has no effect on the readability of MD&A. The results of this study imply that (1) strategy is a contextual factor that affects operational activities and ultimately on the readability of MD&A, (2) earnings management through discretionary expense activities reduces the readability of MD&A, regardless of the business strategy adopted by the company.

Keywords: MD&A readability, Real earnings management, Strategy.

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Introduction

Narrative information on management discussion and analysis (MD&A) has been a concern of academics since the 1980s. At that time, the issue was the method of measuring MD&A readability (Balata, 2005). Content analysis is the most popular method used to measure MD&A readability. Several studies identified 8 topics in MD&A, namely: (i) environmental quality control and factory modernization; (ii) increased profits and sales; (iii) operational changes to increase profits and strengthen the company; (iv) company growth through capital expenditure and expansion; (v) maintenance of operational programs to deal with strikes and imported goods; (vi) substantial operational success in the 4th quarter; (vii) inventory management; (viii) management improvements due to strikes by workers, imported products, and factory modernization cost (Balata, 2005; Scott, 2015). The results of these studies show that there is no difference in the mean value between narrative information on MD&A and narrative information on the president director letter, so it can be concluded that the readability of narrative information on MD&A is sufficient. Previous research also used content analysis to measure the legibility of MD&A narrative information (Balata, 2005). His research proves that MD&A narrative information is an explanation of information in financial form. So, this narrative information provides an explanation to make it easier for external users to understand financial performance achievements. However, when financial performance is low, the narrative information becomes long and complex, making it difficult for external users to understand.

The readability of narrative information in accounting research aims to find a form of reporting so as to narrow the information asymmetry between internal and external parties. Information asymmetry has two types: adverse selection and moral hazard. Adverse selection is a type of information asymmetry in which management sorts out information that needs to be conveyed to external parties. Moral hazard is a type of information between the parties in the principal and agent relationship, where the agent understands the company's internal conditions better than the principal (Scott, 2015). This information asymmetry results in investment risk by external parties. Reducing information asymmetry can be done by mandatory and voluntary disclosure of narrative information. Academics have researched more voluntary disclosures than mandatory disclosures. Voluntary disclosure provides an opportunity for companies to convey more information than others, so as to narrow the information asymmetry. The high level of disclosure on MD&A gets a positive market response (Ongkoseputro, 2019). Narrative information on MD&A that contains complex and ambiguous sentences results in high cost of equity or investment risk (Rjiba, Saadi, Boubaker, & Ding, 2021). These studies conclude that MD&A narrative information reduces information asymmetry.

MD&A narrative information that has low readability is usually caused by management's opportunistic behavior which is known as earnings management. Earnings management is an effort to engineer earnings which is motivated by the management's desire to get bonuses, or to fulfill market expectations, or to fulfill the expectations of other parties such as creditors, or tax reductions (Scott, 2015). Previous studies have proven the effect of earnings management on MD&A readability. Several previous studies have shown that earnings management reduces the readability of MD&A (Ajina, Laouiti, & Msolli, 2016; Cheng, Zhao, Xu, & Gong, 2018; Lo, Ramos, & Rogo, 2017;

Suripto, 2013; Tarjo & Anggono, 2020). Several other studies have proven that earnings management has no effect on MD&A readability (Rahman & EDT, 2020; Yulivia, Rahman, & Yohana, 2021). These previous studies still show inconsistent results.

This study attempts to fill the gaps of previous studies by providing novelty, first, the use of business strategy as a contextual factor. The business strategy serves as a guide and direction in carrying out operational activities. The effectiveness of strategy implementation must be reported by management to shareholders. The preparation of financial statements as a form of accountability to shareholders will be influenced by management behavior. Not many previous studies have examined the role of business strategy in the relationship between earnings management and MD&A readability.

Previous studies have shown consistent results that companies with a prospector strategy have lower MD&A readability than companies with a defender strategy. The results of the study concluded that the level of readability of MD&A was not caused by the opportunistic behavior of management but the characteristics of its business strategy (Habib & Hasan, 2020; Lim, Chalmers, & Hanlon, 2018; Rahman & EDT, 2020). Companies with a prospector strategy have the main characteristic of making the market competitive through the launch of new products. This results in high research and development costs for companies with prospector strategies. And the return on research and development costs takes more than one year to assess its effectiveness. Therefore, companies with this strategy tend to make complex sentences on the MD&A narrative information compared to the defender strategy. Companies with a defender strategy have the characteristics of surviving and trying to reduce the level of uncertainty in the business environment due to the intensity of competition. This encourages the use of simple sentences in the MD&A. These studies only use two extreme strategy typologies: prospector and defender. This study uses an analyzer strategy, in addition to prospectors and defenders.

Second, this study investigates the role of business strategy as a contingent factor affecting operational activities. The choice of certain business strategies affects management in reporting earnings. The prospector strategy has a tendency to carry out earnings management on an accrual basis compared to defenders (Pinheiro de Sá, Rodrigues, & Gomes, 2021). The new products produced by the company with the prospector strategy take time to generate profits. Companies with this strategy have a tendency to perform accrual earnings management. Meanwhile, companies with a defender strategy have a tendency to perform real earnings management compared to prospectors (Widyasari, Harindahyani, & Rudiawarni, 2017; Wu, Gao, & Gu, 2015). Real earnings management is profit manipulation through non-accrual operational activities such as: operating cash flow, production costs, and operating expenses. Management manipulates these accounts in order to meet certain profit targets. Efficient management of operational activities is the company's keyword with a defender strategy. This is what underlies the argument that companies with a defender strategy have a tendency to do real earnings management. However, (Purba, Fransisca, & Joshi, 2021) proved the opposite results from previous studies. Companies with a defender strategy (prospector) tend to carry out accrual (real) earnings management. Therefore, this study seeks to develop a model that can prove that the choice of strategy is a condition where management behaves

in engineering its earnings reporting so that the readability of MD&A narrative information is low.

Third, the use of real earnings management as a measurement of earnings management. Previous research using real earnings management is still limited (Lo et al., 2017; Tarjo & Anggono, 2020). Previous studies on MD&A legibility tend to use accrual earnings management.

This study aims to examine the role of business strategy in the relational relationship between earnings management and MD&A readability. Earnings management that occurs depends on the choice of business strategy by the company. This is what makes MD&A readability easy or difficult. The results showed that the level of MD&A readability was high in the companies: (i) defenders and prospectors who performed real earnings management – abnormal operating cash flow, production costs and discretionary expenses, (ii) discretionary expenses have been used by the companies to manage earnings to low the MD&A readability regardless of the adoption of strategy.

This study provides academic contributions, namely (i) the strategy analyzer is in a position between the defender and the prospector so that statistically it results in multicollinearity which causes F to be insignificant, (ii) the gunning fog index (GFI) obtained through the use of the website: <http://gunning-fog-index.com/> is more appropriate for MD&A in English than in Indonesian, (iii) real earnings management - discretionary expense is a strong proxy for real earnings management, and (iv) strategy analyzer should not be used in the model because of its measurement is in the middle position between defender and prospector. This research also makes a practical contribution for shareholders and potential shareholders to be careful in using MD&A. MD&A which contains long and complex sentences means that the company carries out real earnings management, especially at discretionary expenses.

Literature Review

Agency Theory

Agency theory defines a business organization as a nexus of contracts. Contracts in this organization give rise to differences of interest between the parties who make the contract (Hill & Jones, 1992; Pepper, 2019). In the context of this research, the parties who make the contract are shareholders and management. This separation of ownership and management functions occurs when the organization grows to be large. It is intended that business organizations can carry out their operational activities efficiently (Fama, 1980).

The manager only functions as the manager of the business organization and not the owner. This is what triggers conflicts between shareholders as principals and managers as agents. Managers reject the economic theory which states that the main goal of the company is to achieve maximum profit. This maximum profit is only to fulfill the interests of shareholders as owners. Therefore, managers behave opportunistically in managing the company. Its main objective is the fulfillment of its personal interests compared to shareholders. This opportunistic behavior incurs agency costs (F. E. Fama, 1980;

Schillemans & Bjurstorm, 2020). Agency costs can be reduced by incentive mechanisms that are considered fair by managers (Schillemans & Bjurstorm, 2020).

Information Asymmetry

The separation of ownership and control functions is a factor that triggers information asymmetry. Managers have a role to control the company, but are not owners. This affects the management in managing the company optimally, because it will only fulfill the interests of shareholders as owners. In managing the company, management has greater information about the actual condition than shareholders (Scott, 2015).

Information publication is triggered by (i) adverse selection and (ii) moral hazard (Scott, 2015). Adverse selection is a type of information asymmetry where one party bound in a contract has an advantage in obtaining information compared to the other party. The party who benefits is the management as the manager of the company. Management can sort out which information needs to be conveyed to external parties or shareholders. Moral hazard is a type of information asymmetry where management has opportunistic behavior in conveying information to shareholders who do not have access.

MD&A Readability

MD&A is part of the annual report which contains information (Keuangan, 2021): review of information per segment, comprehensive financial performance, ability to pay debts, collectability of accounts receivable, capital structure, capital expenditures, material information after the date of the accountant's report, business prospects, comparison of targets with realization financial statements, targets or projections for the coming year, marketing aspects, dividend policy, realization of the use of proceeds from public offerings, other material information, policy changes that have a significant effect on issuers, and changes in accounting policies. It can be concluded that the narrative information MD&A aims to explain the performance achievements and business prospects.

Performance and business prospects are the keywords needed by shareholders regarding the company's sustainability. Therefore, the narrative information MD&A should be easy for shareholders to understand (Schroeder & Gibson, 1990). The ease of understanding this narrative information depends on the use of sentences in the MD&A. Complex and long sentences make it difficult for shareholders and other external users to understand this narrative information.

Several methods are used by academics to identify MD&A readability, namely: content analysis, checklist, and gunning fox index. Content analysis uses keywords based on themes that must exist in the MD&A. This method counts the number of times the keyword appears on MD&A. The checklist uses a checklist containing what information should be disclosed in the MD&A. A score of 1 (0) is given to information that is (not) disclosed based on the checklist. The disclosure index is obtained from the total score of information disclosed in MD&A divided by the total score that should be disclosed based on the checklist. Content analysis and checklists produce an index or score that shows the

amount of information disclosure. A high (low) index or score indicates easy (difficult) MD&A readability.

Gunning fox index (GFI) was developed by Gunning in 1952 (Flory, Phillips, & Tassin, 1992). Conceptually, this method identifies the use of complex sentences in MD&A. The use of complex sentences which are usually long and multilevel indicates the difficulty of understanding the sentence (Flory et al., 1992). High (low) GFI indicates difficult (easy) MD&A readability (Rahman & EDT, 2020; Sahyda, Yurniawati, & Rahman, 2019).

Earnings Management

Earnings management is management behavior that manipulates or manipulates earnings (Scott, 2015; Vitolla, Raimo, & Rubino, 2019). Earnings management action is motivated by various aspects, among others: first, bonuses expected by management. Bonuses as part of the management's compensation will be obtained if the management achieves certain profit targets. If achieving the profit target is difficult due to tight competition conditions or other external factors, management tends to manipulate earnings. It aims to get a bonus. Second, it reduces the cost of debt. The cost of debt referred to here is long-term debt. This debt is a contract between the company and creditors. The contract stipulates the provisions regarding the company's obligation to pay a certain interest rate, and other costs, among others, in the event of a debt contract default, as well as the potential to commit borrowing back in the future. Earnings management is a tool used by management so that there is no violation of debt contracts and guarantees to creditors related to the efficiency of operational activities by management. Third, earnings management is carried out to meet shareholder expectations. Profitability is the easiest indicator of management success for shareholders and potential shareholders. An increase in profit indicates an increase in cash flow to be received by shareholders. Fourth, earnings management is motivated by initial public offering (IPO). IPO is a company's effort to get funding from investors. Earnings management is a beauty contest tool used by IPO companies.

Earnings management or earnings engineering is still within the limits required by financial accounting standards. Accrual basis assumptions used by accounting standards provide an opportunity for management to exercise discretion. Several models have been developed to identify accrual earnings management, including: the Healy model in 1985, the DeAngelo model in 1986, the Jones model in 1991, and the modified Jones model in 1995 (Pinheiro de Sá et al., 2021; Suyono, 2017; Vagner, Valaskova, Durana, & Lazaroiu, 2021). This accrual earnings management has several weaknesses, including: (i) detection of inefficient accrual earnings management levels when associated with MD&A readability (Balata, 2005; Sun, Johnson, & Bradley, 2022), and (ii), accrual earnings manipulation does not have a direct cash flow impact (Ali & Kamardin, 2018; Roychowdhury, 2006; Sanad, Shiwakoti, & Kukreja, 2019; Sari et al., 2012).

Real earnings management is the manipulation of earnings from normal operating activities. This is motivated by management's desire to mislead stakeholders so that they believe in achieving profit targets derived from normal operating activities (Cohen & Lys, 2022; Kothari, Mizik, & Roychowdhury, 2016; Roychowdhury, 2006). The method used

to detect the existence of earnings management through variables: operating cash flow, discretionary operating expenses, and production costs. These three variables each indicate the existence of sales manipulation, reduced discretionary expenses, and overproduction or increased production to reduce COGS (Kothari et al., 2016).

Sales manipulation is done by giving massive discounts. This results in the recognition of sales in the next year being carried out in the current year. Another way to manipulate sales is to offer softer credit of terms. For example, consumers are charged 0% if the payment of receivables is done at the end of the fiscal year. This increase in sales volume and settlement of receivables causes a decrease in cash flow due to the discount.

Operational discretionary expenses such as: research and development, advertising, maintenance and others are usually charged at the time of the transaction. This will result in a decrease in profit. If management reduces discretionary expenses, management can achieve profit targets.

Production cost reduction is carried out by mass production to meet demand expectations. High production volume will reduce fixed costs which in turn lowers production costs per unit. Low production costs per unit result in decreased cost of goods sold (COGS).

Contingency Theory

Contingency theory is an organizational theory that explains that the company's internal processes are determined by contextual factors. So, this theory seeks to explain organizational effectiveness is determined by the suitability of contextual factors with operational activities. This theory helps academics to understand the causes of things in organizations. Example: strategy as one of the contextual factors must be implemented to achieve performance. If the achievement of performance is low, then the company must look for the cause: whether the mechanisms and processes in the organization do not support the implementation of the strategy (Otley, 2016). Figure 1 below shows the relationship of strategy with organizational variables.

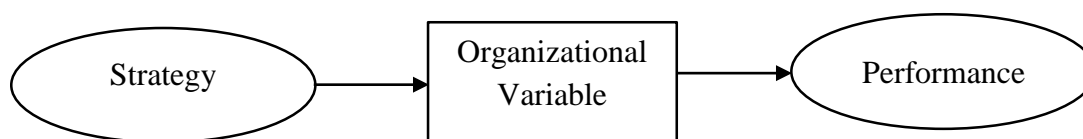


Figure 1. Model of Contingency Based Strategy
 Sources: (Otley, 2016)

Figure 1 above shows that the implementation of strategy in the company affects organizational variables, resulting in performance. This research model was developed based on Figure 1 above. Strategy is a contextual factor that influences earnings management behavior as an organizational variable. This resulted in the use of sentences in the narrative information of reports to external parties. In other words, the level of readability is the performance of management in delivering information to external parties.

Contingency theory testing is statistically based on several methodologies: (i) selection, (ii) interaction, and (iii) systems (Otley, 2016; Otley, 1980). Selection is a contingency testing method to examine the effect of contextual factors on organizational variables. The statistical test used is correlation or regression. Interaction is a bivariate testing method between contextual factors and organizational variables, as well as their effect on performance. The statistical test is moderated regression analysis or MANOVA. System is a contingency test between many contextual factors on organizational variables, and their effect on performance. Statistical tests can use the deviation between the ideal and non-ideal groups.

This research uses interaction approach. This research model examines the differences in strategy adoption by companies affecting earnings management behavior. This results in the use of sentences in the narrative information of reports for external parties.

Business Strategy

Business strategy is a guideline and direction for a business organization to carry out its vision and mission (Hitt, Ireland, & Hoskisson, 2017). Business strategies are adopted by companies to deal with competitive environmental conditions. The typology of business strategy is defender, prospector and analyzer (Hitt et al., 2017; Miles et al., 1978).

Defender is the right strategy to face the conditions of a stable business competition environment. Companies with this strategy have the following characteristics: serving certain market niches, producing not many types of products, preventing the entry of new competitors by achieving economies of scale.

Prospector is a pro-active strategy thereby increasing competition. Companies with this strategy have the characteristics: create new innovative products, seek new market opportunities, and become first movers in the market. True prospectors emphasize the importance of product innovations over profitability.

Analyzer is a strategy that lies between defender and prospector or a combination of both. Analyzer combines the strengths of defender and prospector. The main characteristic of this strategy is to minimize risk and increase profitability.

Firm Size

Company size is the size of the company based on total assets. Company size affects the level of disclosure in annual and financial reporting. Large companies tend to carry out higher levels of disclosure than small companies. The readability of MD&A in large companies is easier to understand than small companies (Ajina et al., 2016; Sahyda et al., 2019).

Research Method

Testing H1 – H3 using the equations below.

$$GFI_i = \beta_0 + \beta_1 REM_CFO_i + \beta_2 REM_PROD_i + \beta_3 REM_DISCX_i + \beta_4 REM_CFO_i * DF_i + \beta_5 REM_CFO_i * PR_i + \beta_6 REM_CFO_i * AN_i + \beta_7 SIZE_i + \varepsilon_i \quad (1)$$

$$GFI_i = \beta_0 + \beta_1 REM_CFO_i + \beta_2 REM_PROD_i + \beta_3 REM_DISCX_i + \beta_4 REM_PROD_i * DF_i + \beta_5 REM_PROD_i * PR_i + \beta_6 REM_PROD_i * AN_i + \beta_7 SIZE_i + \varepsilon_i \quad (2)$$

$$GFI_i = \beta_0 + \beta_1 REM_CFO_i + \beta_2 REM_PROD_i + \beta_3 REM_DISCX_i + \beta_4 REM_DISCX_i * DF_i + \beta_5 REM_DISCX_i * PR_i + \beta_6 REM_DISCX_i * AN_i + \beta_7 SIZE_i + \varepsilon_i \quad (3)$$

Where:

GFI	=	Gunning fog index
REM_CFO	=	Real earnings management – cash flow operations
REM_PROD	=	Real earnings management – production costs
REM_DISCX	=	Real earnings management – discretionary expense
DF	=	Defender
PR	=	Prospector
AN	=	Analyzer
REM_CFO*DF	=	Interactions of REM_CFO with defender strategy
REM_CFO*PR	=	Interactions of REM_CFO with prospector strategy
REM_CFO*AN	=	Interactions of REM_CFO with analyzer strategy
REM_PROD*DF	=	Interactions of REM_PROD with defender strategy
REM_PROD*PR	=	Interactions of REM_PROD with prospector strategy
REM_PROD*AN	=	Interactions of REM_PROD with analyzer strategy
REM_DISCX*DF	=	Interactions of REM_DISCX with defender strategy
REM_DISCX*PR	=	Interactions of REM_DISCX with prospector strategy
REM_DISCX*AN	=	Interactions of REM_DISCX with analyzer strategy
SIZE	=	Firm size
β_0	=	Constanta
$\beta_1 - \beta_7$	=	Beta/coefficient
ε	=	Error terms

H1 and H3 are supported when β_4 and β_6 significant and negative. H2 is proven when β_5 significant and positive.

The dependent variable of the study was MD&A readability. Readability of MD&A is the informative ability of MD&A to be understood by external users. This variable was measured by the Gunning Fog Index (GFI). GFI uses formula [6], [10]:

$$GFI = 0.4 \times \left(\left(\frac{\text{word}}{\text{sentences}} \right) + 100 \times \left(\frac{\text{complex words}}{\text{words}} \right) \right)$$

The formula can be found by using the web-based application: <http://gunning-fog-index.com/>. The application is valid by using MD&A in English rather than Indonesian's language. Table 1 below shows the GFI scores and the interpretation.

Table 1. MD&A Readability

GFI	Readability Status
≥ 18	Hard to be read
14 - 18	Difficult
12 - 14	Ideal
10 - 12	Acceptable
8 - 10	Very easy

The independent variables of this study are real earnings management and business strategy. Real earnings management is earnings manipulation behavior through real activities (Kothari et al., 2016; Roychowdhury, 2006). Real earnings management is measured by 3 operational variables, namely: operating cash flow, production costs, and discretionary expenses. The following formula calculates the magnitude:

1. Abnormal cash flow (REM_CFO)

$$\frac{\text{CFO}_{it}}{\text{Assets}_{i,t-1}} = k_1 \frac{1}{\text{Assets}_{i,t-1}} + k_2 \frac{\text{SALES}_{it}}{\text{Assets}_{i,t-1}} + k_3 \frac{\Delta \text{SALES}_{it}}{\text{Assets}_{i,t-1}} + \varepsilon_{it}$$

2. Abnormal production cost (REM_PROD)

$$\frac{\text{PROD}_{it}}{\text{Assets}_{i,t-1}} = k_1 \frac{1}{\text{Assets}_{i,t-1}} + k_2 \frac{\text{SALES}_{it}}{\text{Assets}_{i,t-1}} + k_3 \frac{\Delta \text{SALES}_{it}}{\text{Assets}_{i,t-1}} + k_4 \frac{\Delta \text{SALES}_{i,t-1}}{\text{Assets}_{i,t-1}} + \varepsilon_{it}$$

3. Abnormal discretionary expense (REM_DISCX)

$$\frac{\text{DISX}_{it}}{\text{Assets}_{i,t-1}} = k_1 \frac{1}{\text{Assets}_{i,t-1}} + k_2 \frac{\text{SALES}_{it}}{\text{Assets}_{i,t-1}} + \varepsilon_{it}$$

Abnormal cash flow, abnormal production cost, and abnormal discretionary expense are obtained at the residual value of each formula.

Business strategy is a guideline or direction for management in carrying out its operational activities to achieve the company's vision and mission (Hitt et al., 2017). The formula used to measure business strategy includes the following 4 ratios:

1. The employee to sales ratio is calculated from the number of employees divided by the average sales for the last three years in the observation period.

2. Changes in sales are obtained from changes in sales in year t minus $t-1$ divided by the average sales for the last three years in the observation period.

3. Employee fluctuation is the standard deviation of the number of employees in the last three years in the observation period.

4. The capital intensity ratio is obtained from the average property, plant and equipment (PPE) in the last 3 years in the observation period.

Each ratio is divided into quintiles. A score of 1 is assigned to the lowest quintile to a score of 5 to the highest quintile. Except, for the capital intensity measure ratio, a score of 1 is assigned to the highest quintile up to a score of 5 is assigned to the lowest quintile. Then all scores are added up for each year (Rahman & EDT, 2020).

Table 2. Business Strategy

Score	Strategy
6 - 10	Defender
11 - 15	Analyzer
16 - 20	Prospector

Business strategy is measured by a dummy variable. Defender (DF): A score of 1 is given for the defender strategy, a score of 0 for the analyzer and prospector strategy. Analyzer (AN): Score 1 is given for strategy analyzer, score 0 for strategy defender and prospector. Prospector (PR): Score 1 is given for prospector strategy, score 0 for defender and analyzer strategy.

The control variable in this study is firm size (SIZE). Company size is the size of the company (Ajina et al., 2016). This variable is measured by Ln_Total Assets.

The population of this study is manufacturing companies listed on the Indonesia Stock Exchange with an observation period of 2017-2019. The sampling technique used purposive sampling. Table 3 below shows the results of sampling.

Table 3. Sample Criteria

	Number
Manufacturing firms during 2017 - 2019	363
a. Incomplete data	(24)
b. Financial statements in foreign currency	(114)
Outlier	(36)
Firm years	189

Table 3 shows the data of this study as many as 189 firm years. The statistical tool used for testing is moderated regression analysis (MRA). The stages of testing carried out before testing the hypothesis are:

1. Normality test

2. Classical assumption test consists of heteroscedastic test and multicollinearity test
3. Goodness of fit test consists of coefficient determination test (R^2) and F test.

The results of those tests can be found on Appendix.

Hypotheses Development

Companies with a defender strategy strive to carry out their operational activities efficiently. Efficiency is obtained through increasing production volume optimally. It aims to reduce the fixed costs of production. Efficiency is the key word for defender companies to set competitive selling prices, making it difficult for new competitors to enter. Competitive selling prices allow defender companies to increase their sales volume. Defender companies seek to reduce advertising expense, and seek to reduce research and development and other operational expenses. It aims to increase profitability.

Defender companies tend to do real earnings management (Widyasari et al., 2017; Wu et al., 2015) compared to prospector companies. Therefore, MD&A narrative information contains long and complex sentences, thereby reducing its readability.

H₁: Real earnings management reduces the readability of MD&A in defender firms.

The prospector company has the main characteristics as an innovator company. This type of company focuses on product innovations because of the company's strategic position as a first mover. Therefore, profitability is difficult to achieve by the company in the short term. This encourages management behavior to exercise discretion in manipulating earnings on an accrual than real basis. Prospector companies have been empirically proven to perform accrual earnings management (Widyasari et al., 2017; Wu et al., 2015) compared to real earnings management. Therefore, MD&A narrative information is easier for external users to understand in prospector companies than other strategies.

H₂: Real earnings management improves MD&A readability in prospector firms.

Analyzer companies have the characteristics of minimizing risk and increasing profitability. Analyzer companies seek to take advantage of market opportunities by launching new products with competitive selling prices. The analyzer company strives for cost efficiency so that it can set a competitive selling price. Cost efficiency is obtained through increasing sales volume, even though the profit margin is low. Another way is to achieve economies of scale in production to reduce fixed costs per unit. The analyzer company will use its discretion in charging research and development costs, in order to increase profitability. Therefore, analyzer companies tend to carry out real earnings management so that the readability of MD&A is low.

H₃: Real earnings management lowers MD&A readability in analyzer firms.

Results and Discussion

Descriptive Statistic

Descriptive statistics for each variable are presented in Table 4 below.

Table 4. Descriptive Statistic

Variable	Min.	Max	Mean	Std. Deviation
GFI	8.65	18.47	13.46	2.19
REM_CFO	0.06	2.67	1.06	0.47
REM_PROD	0.07	2.30	0.80	0.42
REM_DISCX	0.00	0.70	0.17	0.15
SIZE	25.22	33.49	28.73	1.66

GFI = Gunning fox index
REM_CFO = Real earning management – cash flow
REM_PROD = Real earning management – production
REM_DISCX = Real earning management – discretionary
SIZE = Firm size

Table 4 above shows the descriptive statistics of the dependent variable of this study, namely the Gunning Fox Index (GFI). The GFI used as a measurement of MD&A readability has a mean value of 13.46 with a standard deviation of 2.19. This means that the MD&A readability of the sample firms are ideal. The minimum GFI value of 8.65 is owned by PT. Asiaplast Industri, Tbk in 2018. This means that MD&A in 2018 is easily understood by external users. While the MD&A that cannot be read is PT. Astra International, Tbk in 2019 with the highest GFI score of 18.47.

The independent variable is real earnings management. Real earnings management is measured by 3 abnormal variables: operating cash flow, production costs, and discretionary expenses. Abnormal operating cash flow has a mean value of 1.06 with a standard deviation of 0.47. This indicates that earnings management through operational cash flow activities is quite high. The mean value tends to the maximum value of 2.67. This maximum value is owned by PT. Wilmar Cahaya Indonesia, Tbk in 2019. Meanwhile, the earnings management activity with the lowest cash flow is PT. Inti Agri Resources, Tbk in 2017.

Abnormal production costs have a mean value of 0.80 with a standard deviation of 0.42. This indicates that earnings management activities by sample companies through production costs are relatively low. This mean value is far from the maximum value of 2.30 and the minimum value of 0.07. Companies that have earnings management activities through the highest (lowest) production costs are PT. Wilmar Cahaya Indonesia, Tbk in 2019 (PT. Inti Agri Resources, Tbk in 2017).

Abnormal discretionary load has a mean value of 0.17 with a standard deviation of 0.15. This shows that earnings management activities through discretionary expenses are low. The minimum value of 0.00 is owned by PT. Bumi Teknokultura Unggul, Tbk in 2019. This means that the company does not carry out earnings management activities through discretionary expenses. While the maximum value of 0.7 is owned by PT.

Unilever, Tbk in 2017. This means that Unilever carried out earnings management activities through discretionary expenses in 2017.

The control variable in this study is firm size (SIZE). The mean value of this variable is 28.73 or Rp. 18.906 billion. This indicates that the average assets owned by the sample companies are IDR 18.906 billion. The maximum value of 33.49 is owned by PT. Astra International, Tbk with total assets of IDR 351,958 billion in 2019. While the smallest sample company is PT. Primarindo Asia Infrastructure, Tbk with total assets of IDR 89 billion in 2017.

The other independent variable in this study is business strategy. Figure 2 below shows the strategy adoption of the sample firms.

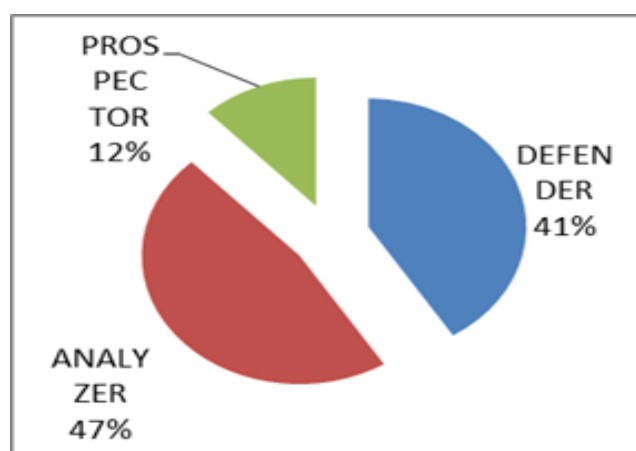


Figure 2. Business Strategy

Figure 2 above shows that the analyzer is the most chosen strategy by the sample companies at 47% or 89 firm's year. Defender is the second largest strategy at 41% or 78 firm's year. And prospector is a strategy with at least 12% or 22 firm's year.

Findings

This study uses 3 research equations. The research equation (1) is:

$$GFI_i = \beta_0 + \beta_1 REM_CFO_i + \beta_2 REM_PROD_i + \beta_3 REM_DISCX_i + (1) \\ \beta_4 REM_CFO_i * DF_i + \beta_5 REM_CFO_i * PR_i + \beta_6 REM_CFO_i * AN_i + \beta_7 SIZE_i + \varepsilon_i$$

The results of the equation (1) test show that (i) there is multicollinearity between REM_CFO and REM_PROD so that REM_PROD is removed from equation (1); and (ii) the analyzer strategy (AN) have caused F to be insignificant so that the statistical application program excludes the equation. The results of testing equation (1) are presented in Table 5 below.

Table 5. Results of Equation (1)

	Beta	p-value	
REM_CFO	-1,29	0.00***	Significant
REM_DISCX	4.40	0.00***	Significant
REM_CFO*DF	0.56	0.05**	H1 accepted
REM_CFO*PR	0.73	0.08*	H2 rejected
SIZE	0.08	0.40	Not significant

*** Significant at level of confidence 99%

** Significant at level of confidence 95%

* Significant at level of confidence 90%

Table 5 shows that REM_CFO has a negative effect on GFI. REM_DISCX has a positive effect on GFI. The interaction between REM_CFO and DF have a positive effect on GFI. The interaction between REM_CFO and PR on GFI is also significant and positive. This means that H1 is accepted while H2 is rejected. While, the control variable SIZE has no effect on GFI.

Research equation (2) in this study is:

$$GFI_i = \beta_0 + \beta_1 REM_CFO_i + \beta_2 REM_PROD_i + \beta_3 REM_DISCX_i + \beta_4 REM_PROD_i * DF_i + \beta_5 REM_PROD_i * PR_i + \beta_6 REM_PROD_i * AN_i + \beta_7 SIZE_i + \varepsilon_i \quad (2)$$

The test results of equation (2) show there is a multicollinearity between REM_CFO and REM_PROD*DF and REM_PROD*PR. And there is multicollinearity between REM_PROD*DF, REM_PROD*PR and REM_PROD_AN. Therefore, REM_CFO and REM_PROD*AN are removed from the equation by the statistical application program. The test results are shown in Table 6.

Table 6. Results of Equation (2)

	Beta	p-value	
REM_PROD	-1.25	0.00***	Significant
REM_DISCX	3.42	0.00***	Significant
REM_PROD*DF	0.82	0.03**	H1 accepted
REM_PROD*PR	0.92	0.07*	H2 rejected
SIZE	0.08	0.37	Not significant

*** Significant at level of confidence 99%

** Significant at level of confidence 95%

* Significant at level of confidence 90%

Table 6 above shows that REM_PROD has a negative effect on GFI. REM_DISCX has a positive effect on GFI. The interaction between REM_PROD and DF has a positive effect on GFI. Likewise, the interaction of REM_PROD with PR affects GFI. Meanwhile, SIZE has no effect on GFI. The results of equation (2) are consistent with the results of equation (1).

The research equation (3) is:

$$GFI_i = \beta_0 + \beta_1 REM_CFO_i + \beta_2 REM_PROD_i + \beta_3 REM_DISCX_i + \beta_4 REM_DISCX_i * DF_i + \beta_5 REM_DISCX_i * PR_i + \beta_6 REM_DISCX_i * AN_i + \beta_7 SIZE_i + \varepsilon_i \quad (3)$$

The results of the test of equation (3) also show that (i) there is multicollinearity between REM_CFO and REM_PROD, so that one must be removed from the equation, and (ii) REM_DISCX is removed by the statistical application program from the model if it is run simultaneously with the respective interaction of REM_DISCX with each strategy. Therefore, Table 7 shows the results of data processing separately between REM_DISCX and its interaction variables for each variable.

Table 7. Results of Equation (3)

	Beta	p-value	Beta	p-value	
REM_PROD	-0.82	0.03**	-0.87	0.02**	Significant
REM_DISCX			3.36	0.00***	Significant
REM_DISCX*DF	3.66	0.01***			H1 accepted
REM_DISCX*PR	6.11	0.01***			H2 rejected
REM_DISCX*AN	2.61	0.04**			H3 accepted
SIZE	0.08	0.39	0.08	0.39	Not Significant

*** Significant at level of confidence 99%

** Significant at level of confidence 95%

* Significant at level of confidence 90%

Table 7 above shows results that are consistent with the results of equations (1) and (2). REM_PROD has a negative effect on GFI. REM_DISCX has a positive effect on GFI. All the results of the interaction between REM_DISCX and each strategy have a positive effect on GFI. This means that H1 and H2 are rejected, while H3 is supported. SIZE also has no effect on GFI consistently.

Real earnings management on MD&A readability in defender firms

The results of testing equations (1) to (3) show consistent results. Real earnings management decreases the MD&A readability of defender firms. Defender companies perform earnings management through real activities: operating abnormal cash flow, abnormal production costs, and abnormal discretionary expenses.

Table 8 below shows each real earnings management variable in defender firms.

Table 8. GFI and Real Earnings Management - Defender

	Min.	Max.	Mean	Std. Deviation
GFI	9.41	17.81	13.62	2.01
REM_CFO	0.06	2.67	0.98	0.49
REM_PROD	0.07	2.30	0.73	0.44
REM_DISCX	0.00	0.61	0.16	0.15

Table 8 above shows the minimum and maximum GFI, abnormal cash flow operational (REM_CFO), abnormal production cost (REM_PROD), and abnormal discretionary expenses (REM_DISCX) values for the entire sample in Table 4 adopting the defender strategy. The mean value of GFI, abnormal cash flow operation, abnormal production, and abnormal discretionary expenses shown by Table 8 are lowest than the prospector and analyzer companies (Table 9 and Table 10).

Defender companies have the main characteristics of increasing profitability. This profitability is obtained through competitive selling prices. The competitive selling price at this defender company shows the giving of big discounts to increase sales volume. Increasing the profitability of defender companies is done by reducing fixed costs. Fixed costs of production can be reduced by increasing production volume by optimally utilizing production capacity. This is in accordance with Roy chowdhury's argument when developing a real earnings management model (Roychowdhury, 2006).

The minimum REM_DISCX value of 0.00 in the entire sample (Table 4) adopts the defender strategy. Discretionary expenses such as research and development costs on defender companies are usually low. Another discretionary expense is selling expense. Defender companies are usually able to save on selling expenses because the market they serve is difficult for new players to enter.

Earnings management activities through the manipulation of operational activities in defender companies affect the preparation of MD&A reports. The Gunning Foq Index (GFI) as a proxy for MD&A readability in defender companies has mean value 13.62 with a standard deviation of 2.01. The GFI of defender companies is in the range of ideal (11.61) meanings the MD&A is difficult to read (15.63). This concludes that the readability of MD&A is relatively low.

This indicates that companies with a defender strategy have a tendency to manipulate operational activities in conducting earnings management. The results of this study support previous studies (Widyasari et al., 2017; Wu et al., 2015).

Real earnings management on MD&A readability in prospector firms

The results of testing equations (1) to (3) consistently prove that real earnings management reduces the readability of MD&A in prospector companies. Therefore, the H2 of this study is not empirically supported. Prospector companies also perform real earnings management as proxied by abnormal: operational cash flow, production costs, and discretionary expenses.

Table 9 below shows GFI and real earnings management variable in prospector companies.

Table 9. GFI and Real Earnings Management - Prospector

	Min.	Max.	Mean	Std. Deviation
GFI	10.77	17.56	14.07	1.61
REM_CFO	0.61	1.61	1.17	0.31
REM_PROD	0.13	1.32	0.85	0.36
REM_DISCX	0.06	0.42	0.20	0.11

Table 9 above shows that the descriptive statistic of prospector companies. The mean value of GFI and real earnings management variable in prospector companies is greater compare to the GFI and real earnings management variable in defender companies (Table 8). The readability level of MD&A in prospector companies has a mean value of 14.07 with a standard deviation of 1.61 or is in the range of 12.5 to 15.67. The prospector company's MD&A readability status is hard to read. The prospector companies manipulate their earnings management by using real activities. It is shown by the mean value of abnormal CFO, production, and discretionary expenses are higher than defender and analyzer companies (Table 8 and Table 10). This indicates that prospector companies manipulate operational activities more than defender companies.

The main characteristic of a prospector company is innovator, and not reap of the profitability in the short terms. This of course will not be of interest to shareholders. Shareholders want cash flow derived from profitability. Moreover, the operational activities have to be done efficiently. That's why management, morally hazard, will manipulate its operational activities. So that, they would please the shareholder.

Prospector companies carry out real earnings management to meet shareholder expectations. This affects the preparation of the MD&A report. The relatively low readability of MD&A is caused by real earnings management activities in prospector companies.

Real earnings management on MD&A readability in analyzer firms

Strategy analyzer combines the strengths of defenders and prospectors. This concept affects the measurement of the analyzer strategy which is in a position between the defender and the prospector. Statistically, this analyzer strategy resulted in the model being unfit to be used as a hypothesis test so that this variable was excluded from the model. Equations (1) and (2) cannot be used to test the role of the analyzer strategy in the relationship between abnormal operational cash flow and abnormal production costs on MD&A legibility. Only equation (3) can be used to test the strategy analyzer. The test results prove that real earnings management through abnormal discretionary expenses reduces the readability of MD&A in analyzer companies. However, this H3 proof must be interpreted with caution.

Table 10 below shows GFI and real earnings management variable in analyzer companies.

Table 10. GFI and Real Earnings Management - Analyzer

	Min.	Max.	Mean	Std. Deviation
GFI	8.65	18.47	13.17	2.43
REM_CFO	0.43	2.47	1.11	0.47
REM_PROD	0.31	1.94	0.86	0.40
REM_DISCX	0.02	0.70	0.16	0.15

Table 10 above shows that the mean value of GFI, abnormal cash flow operational (REM_CFO), abnormal production cost (REM_PROD), and abnormal discretionary expenses (REM_DISCX) are between the defender and prospector companies (Table 8 and Table 9). GFI score has the minimum value 8.65 (very easy) and the maximum 18.47 (hard to read), mean value of GFI is 13.17 (ideal). It concludes that the analyzer companies have the ideal MD&A readability. The mean value of REM_CFO, REM_PROD, and REM_DISCX are 1.11; 0.86; and 0.16 respectively. It means that the analyzer tends to manipulate the cash flow operational and production cost. The abnormal of discretionary expense is the lowest, so that, the analyzer less manipulate discretionary expense.

The analyzer companies are stuck in the middle of defender and prospector companies. The main characteristic of analyzer is the combination of the strength of defender and prospector. They practice operations activities efficiently and R&D activities. That's why they tend to manipulate earnings by using cash flow from operations activities, production cost, and discretionary expenses.

The result shows that the earnings management by discretionary expenses reduces the readability of MD&A. This indicates that the low level of MD&A readability is caused by the manipulation on discretionary expenses. The results of this study conclude that the strategy analyzer is not an appropriate proxy in this research model. The variable analyzer strategy shows results that tend to be the same as the defender strategy. Subsequent research should only use strategies that are indeed opposite, such as defenders and prospectors.

Firms size on MD&A readability

Equations (1) to (3) consistently prove that firm size does not affect the readability of MD&A. Small or large companies are not factors that encourage the use of long and complex sentences in MD&A.

This insignificant result can be caused by the amount of total assets owned by the sample companies are not much different. The mean value of Ln total assets is 28.73 with a standard deviation of 1.66. The minimum value of 25.49 is not much different from the maximum value of 33.49. This description indicates that the size of the company from the total assets owned by the sample companies is relatively the same.

Additional test

This additional test was conducted to ascertain the role of business strategy in the relationship between real earnings management and MD&A readability. Additional tests

were performed by regressing variables: abnormal cash flow operational, abnormal production costs, abnormal discretionary expenses, defender, prospector, analyzer and size. REM_CFO and REM_PROD is tested separately due to the multicollinearity. Likewise, with DF and AN, tested separately because of multicollinearity. Additional test results are presented in Table 11.

Table 11. Additional Test – Result
Dependent variable: GFI

	Panel A		Panel B		Panel C		Panel D	
	Beta	Sig	Beta	Sig	Beta	Sig	Beta	Sig.
REM_CFO	-0.83	0.18	-0.83	0.18				
REM_PROD					-0.83	0.03	-0.83	0.03
REM_DISCX	4.31	0.00	4.31	0.00	3.27	0.00	3.27	0.00
DF	0.36	0.27			0.36	0.28		
PR	0.78	0.12	0.42	0.42	0.76	0.13	0.39	0.44
AN			-0.36	0.27			-0.36	0.27
SIZE	0.07	0.44	0.07	0.44	0.08	0.42	0.08	0.42

Table 11 shows that each strategy variable: defender (DF), prospector (PR), and analyzer (AN) is not significant to MD&A readability. However, when interacted with real earnings management variables as presented in Tables 6 – 8, the results are significant and positive. This means that strategy is a moderating variable or it can be concluded that strategy is a contingency factor. Strategy implementation will affect the company's operational activities. This has an impact on the preparation of the MD&A report.

Additional test results regarding the effect of each real earnings management variable on abnormal cash flow operational (REM_CFO), abnormal production costs (REM_PROD), and abnormal discretionary expenses (REM_DISCX) on MD&A (GFI) readability are consistent with the results of equations (1) to (3).

Abnormal cash flow operational (REM_CFO) has a negative effect on the readability of MD&A (GFI). This indicates that the high operating cash flows reported in the financial statements provide external users with sufficient information regarding expected operating cash flows. Thus, it is increasing the readability of MD&A.

Abnormal production costs (REM_PROD) have a negative effect on readability of MD&A (GFI). This indicates that the suppression of fixed costs of production per unit through optimal use of production capacity reduces the cost of goods sold in the financial statements. This cost-efficiency information provides cash flow expectations for shareholders, so that the narrative information MD&A is easy to understand and is complementary to financial information.

The additional tests conclude that companies tend to manage their earnings by using discretionary expenses. It seems logic as discretionary expenses derived from discretionary activities such as employee trainings, advertising, employee scholarship, and so on. These activities could be postponed if the financial condition is not good, and

otherwise. So that, regardless of the business strategy, the earning management will be conducted by manage the discretionary expenses.

Conclusions

The results of this study conclude that first, real earnings management proxied by abnormal: operational cash flow, production costs, and discretionary expenses reduce the readability of MD&A in defender and prospector companies. Second, business strategy is a contextual factor that affects operational activities. Defender and prospector companies tend to manipulate their operational activities so as to reduce the readability of MD&A. Third; companies tend to manipulate activities related to discretionary expenses, thereby reducing the readability of MD&A.

This research has practical implications, namely that companies tend to reduce the readability of MD&A to cover up their actions in carrying out earnings management. This earnings management action is carried out by the company regardless of its business strategy adoption. Therefore, investors must be careful in understanding the MD&A listed in the annual report. If the MD&A is difficult for investors to understand to predict the value of their investment, then investors must be careful in using financial information. This financial information can be manipulated by companies.

This study has limitations, there are: first, the results of the study cannot be generalized to the non-manufacturing sector. Further research can use other sectors, so that the results can be compared with the results of this study. Second, the analyzer strategy measurement has a tendency that is almost the same as the defender strategy. Future research should examine opposing strategies such as: defender and prospector.

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Appendix

Normality tests

	Sig. (> 0.05)			
	Eq. (1)	Eq. (2)	Eq. (3)a	Eq. (3)b
Kolmogorov-Smirnov test	0.85	0.81	0.92	0.89
Conclusion	Normal	Normal	Normal	Normal

Heteroscedasticity test

	Sig. (> 0.05)			
	Eq. (1)	Eq. (2)	Eq. (3)a	Eq. (3)b
Harvey test	0.07	0.10	0.15	0.34
Conclusion	Homoscedasticity	Homoscedasticity	Homoscedasticity	Homoscedasticity

Multicollinearity test



	VIF			
	Eq. (1)	Eq. (2)	Eq. (3)a	Eq. (3)b
REM_CFO	1.23			
REM_PROD		1.18	1.03	1.01
REM_DISCX	1.12	1.02		1.01
REM_CFO*DF	1.17			
REM_CFO*PR	1.12			
REM_PROD*DF		1.12		
REM_PROD*PR		1.20		
REM_DISCX*DF			1.21	
REM_DISCX*PR			1.11	
REM_DISCX*AN			1.19	
SIZE	1.01	1.02	1.01	1.01
Conclusion	No multicollinearity	No multicollinearity	No multicollinearity	No multicollinearity

Determinations test (R^2)

	Eq. (1)	Eq. (2)	Eq. (3)a	Eq. (3)b
R^2	11.3%	11.6%	9.6%	8.4%


Simultaneous test (F-test)

	Sig. (< 0.05)			
	Eq. (1)	Eq. (2)	Eq. (3)a	Eq. (3)b
F test	0.00	0.00	0.00	0.00
Conclusion	Fit	Fit	Fit	Fit

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<p>HOW TO CITE THIS ARTICLE</p> <p>Rachmawati, D., & Janggu, M. (2023). Earnings Management and MD&A Readability: Does Business Strategy Matter? Evidence in Indonesia. <i>International Journal of Management, Accounting and Economics</i>, 10(10), 806-832.</p> <p>DOI: https://doi.org/10.5281/zenodo.10432235</p> <p>URL: https://www.ijmae.com/article_181631.html</p>	 <p>A standard black and white square QR code located in the bottom right corner of the table.</p>

Case Study

The Process of Controlling and Monitoring Operational Risk Using COSO ERM at PT. Agro

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Abstract

PT. Agro is a growing company engaged in the plantation sector. As a growing company, companies need to improve company performance by implementing a risk management process based on the Committee of Sponsoring Organizations of the Treadway Commission (COSO) Enterprise Risk Management (ERM) to reduce disruption to daily operational activities, and companies can allocate resources more effective and efficient so that company goals can be achieved. To implement COSO ERM effectively, companies must conduct a thorough coordination and integration process in their operational activities. This qualitative study aims to analyze the application of COSO ERM in controlling operational risk in the trading division at PT. Agro. The risk management process carries from the risk identification process to the monitoring process. The results of this study indicate that the trading division has significant risks in its primary activities. Hence, it is necessary to carry out a monitoring process and appropriate actions to control these risks not to harm the company.

Keywords: COSO ERM, Enterprise risk management, Operational risk, Risk management.

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Introduction

Along with the rapid development of technology, every company will often face risks in their daily operational activities. Another definition of risk is the possibility of an event that can occur and impact achieving the company's strategy and objectives (Nurlaela & Suhendi, 2021). Risk has several categories, including operational risk, which is the risk that arises due to failure or inadequacy of the company's internal processes or systems. The influence of operational risk is extensive, ranging from chain supply, process execution, source Power people, technology, sustainability effort, satisfied customers, and product or service failures. Another is a standard risk related to a company's financial health condition. As with PT, the operational risk significantly impacts the company's finances if not adequately anticipated. Asuransi Jiwasraya resulted in the company experiencing failure to pay customers in early 2021. The failure of this payment is because Jiwasraya Insurance has a high level of operational risk. After all, it does not have strong corporate governance, and the company does not have a guideline portfolio regulating high-risk product assets. With nothing limits on high-risk investments in the end, Jiwasraya is free to create type high-risk products regardless of the company's financial condition, and this condition is increasingly made worse because Jiwasraya manipulated financial statements (Mola, 2021). PT Kalbe Farma also experiences incident failure anticipating operational risk. Kalbe Farma resulted in two patients dying at the Siloam Karawaci Hospital in February 2015. The deaths of the two patients were due to the injection of drugs that Kalbe Farma should have withdrawn from market circulation, but some hospitals still have supplies of these drugs. From incident 2, companies have proven that the impact of operational risk that is not adequately anticipated will cause loss for the company, both financial risk, loss of customers, loss of good reputation of the company, to the cessation of operations of a company.

Companies that do proper risk management will be expected to make the level of risk that occurs can be reduced or eliminated (Zain, 2022), and one method For controlling risk using the Committee of Sponsoring Organizations of the Treadway Commission (COSO) Enterprise Risk Management (ERM). Understanding COSO ERM is a process carried out by directors and management until personnel others are applied in setting a strategy in the company, and designed to identify incident potential influence entity, manage risk, and provide assurance adequate about achieving company goals (Hock et al., 2019; Zain, 2022). Companies implementing COSO ERM will get several benefits, such as reducing disruption to the company's operational functions, utilizing better power, better cost control, increased ability to achieve goals, and the profit of the existing opportunities (Zain, 2022). The company needs to carry out the process of coordination and integration throughout the company's operational activities at COSO ERM to reach the proper risk control target (Gleim Publications, 2021).

This research is qualitative research with the case study method at PT. Agro. PT. Agro is a growing company in the city of Surabaya engaged in plantations and trade. Trading Division PT. Agro has a relatively sizeable inherent risk in terms of daily operational activities. The trading division's innate risk has risks already attached to operational activities before management does action mitigation (Hock et al., 2019; Zain, 2022). The trading division has a sizeable impact on the company's finances because the company is experiencing a loss of around 20% of the profit net if the operational risk is not adequately

anticipated. So, application risk management is required by the company so that it can provide benefits, effective performance, and cost efficiency.

The trading division has the primary function of looking for raw materials at relatively low prices and having the quality of goods expected by the company, after which the goods are sold back to the customer potential. From the difference in the buying and selling price, the company will get profits, and of course, the selling price has been considered with shipping costs, employee salaries, and so on. In daily activities, there is a case in the trading division where raw material purchases still do not follow Maximum Standard Operational Procedure (SOP). The company's SOP is informed that for every purchase, laboratory trials are carried out before the goods are purchased because laboratory tests will determine whether the quality of the goods follows the specifications set by the company. After passing the laboratory test, the trading team can submit a purchase price for goods that the superior trading team determines and approves. However, in events in the field, the trading team can make purchases of goods before carrying out the analysis process laboratory with limited reasons for raw material products in the field and the factor of fighting over goods with competitors. Operational risk in the trading division arises because the trading team does not carry out the SOP properly, which can ultimately result in financial risk for the company with the impact that the company can buy raw materials at higher prices or the company has to buy goods of poor quality.

This research will conduct simulations from the identification process to the response to risks in each division that faces risk opportunities. The results of this research attempt to control operational risk by implementing COSO ERM. Anticipating operational risks is crucial for the survival of PT. Agro. Based on the analysis description in the background above, they can be presented as follows: What is the process of implementing COSO ERM in controlling operational risk in the trading division at PT. Agro?

Theoretical Foundations

Definition of Corporate Risk

Enterprise risk has the meaning of two words, namely the words risk and company. Risk defines all the opportunities for events that influence achieving the expected goals (Hock et al., 2019). According to Sukirno (2010), the company earns profits because each individual and group can meet their needs. From this understanding, company risk means the company's opportunity to suffer losses or gain profits smaller than the expected target (Hurley et al., 2019; Verbano & Venturini, 2013). Risk can occur due to 2 factors (Hock et al., 2019), namely:

1. Volatility can be interpreted as inconsistent results obtained by the company, such as the level of sales that suddenly rises or falls drastically. Volatility can increase the probability of the worst future outcome.
2. Time is one factor that has a vital role in risk. The longer the project is carried out, the project will have a higher level of risk compared to projects that are carried out in a shorter time.

Based on their scope, risks can be grouped into two categories (Hock et al., 2019), namely:

1. Internal risk, namely the risk that occurs within the company's internal.
2. Risks, namely risks that occur outside the company's internal.

Definition of Operational Risk

Operational risk arises due to insufficiency or incompetence of the company's internal processes, failure of human resources, or failure of the company's systems. Operational risk can also be defined as a risk that arises from the type of work performed by a person or company and has the nature of a low-risk opportunity but has a significant impact (Anderson, 2013; Popov et al., 2016). To minimize operational risks, adequate management supervision is needed because poor supervision will be the main factor causing poor risk management (Anderson, 2013). Improper decision-making by individuals or small groups within a company can cause significant losses for the company, such as fraud or simple mistakes in doing work (Musallam, 2023). To avoid this, companies need an adequate control system, such as effective performance monitoring by company managers.

COSO Enterprise Risk Management

Risk management can be interpreted as identifying, assessing, managing, mitigating, and controlling potential situations to provide acceptable assurance to achieve company targets and reduce negative impacts on the company (Hock et al., 2019; Zain, 2022). The definition of risk management, according to the COSO ERM, is a combination of culture, capabilities, and practices integrated with strategy determination and implementation that an organization relies on in managing risk to create, preserve, and realize corporate value (Zain, 2022). Risk management uses a holistic approach to risk, where risk is identified as a combination of environmental issues, programs, and company situations (Adiputra, 2021) (Pritchard, 2014) so that it can provide several benefits (Hock et al., 2019) such as:

1. Increase shareholder value by minimizing losses and increasing opportunities to achieve company goals.
2. Reduce the surprise of unwanted events.
3. Better cost control.
4. Do better strategic planning.
5. Reducing disruption to the company's operational activities.
6. Better utilization of resources.
7. Increase ability to meet goals and take advantage of opportunities.
8. Increase the trust of employees, stakeholders, and the government.

Implementing COSO ERM means integrating strategy and company performance to implement risk management throughout the company's organization. The implementation of risk management is carried out throughout the corporate environment because the risk is inherent in each department in the company and can affect the strategy and performance of that department, which can impact the company's overall performance (Karanja, 2017). Five components in COSO ERM are interrelated, as shown in Figure 1 below:



Figure 1. COSO ERM Framework

Risks that may affect the achievement of business strategies and objectives need to be identified and assessed. Risks are prioritized by severity and still fall into the context of risk appetite (Saeidi et al., 2023). In this framework, management looks at the risk portfolio based on the number of risks that have been identified and assumed and determines the risk response to be taken. All results of this process are reported to the board of directors.

The performance component has five principles in determining risk management, namely:

1. Risk identification: In this principle, the company identifies risks that can affect the company's performance.
2. Risk analysis or evaluation: In this principle, the company assesses the probability and impact of risk.
3. Risk priority: In this principle, the company prioritizes risks to select responses to risks.
4. Risk response: In this principle, the company identifies and chooses a response to risks that have been previously analyzed.
5. Risk monitoring: In this principle, the company develops and evaluates the risk portfolio that has been carried out.

The performance process must cover the entire company and involve all parties at all levels and units without any restrictions, whether the company has a small or large scale or geographical factors (Moeller, 2011; Población García, 2018).

Risk Identification

The board of directors and management will analyze internal business, the environment outside the company, the company's business processes, the control system implemented, and all areas that could be a potential risk to the company (Santos et al., 2023). The risk identification process is to know what risks have an impact on the company to reach the goal, starting from the risks inherent in the individual as well as risks inherent in the company, and these risks have a nature of the emergency or experiencing change (Hock et al., 2019; Zain, 2022). The identification process requires several approaches to viewing potential risks in each area of the company, and within a specific time, risk identification can be made. The effective way is to start by starting risk identification with the management section executive, who will assess the risk outline, and then next more detailed risk identification at the bottom (e.g., for example, management executive prioritizes room scope about effectiveness customer on space the exact scope of IT division just prioritizing from a customer data security perspective and the marketing division is prioritized at the level sale customer). So, the executive function determines risk priorities globally, and operational managers will focus on risk in detail in each part (Moeller, 2011; Pamungkas, 2019).

There are several techniques for identifying risks, including:

1. The brainstorming method is carried out by meeting employees, management, and directors who gather to discuss the risks and develop solutions to these problems. This method has the advantage of finding the risks faced by the company in general; a group will be formed with members who already have experience with operational activities per respective division, and a moderator is needed who can direct the problems faced and decisions taken can be made by consensus or based on voting (Tang & Karim, 2019).
2. Interviews and independent assessments involve an interview process with the management of the relevant department to find existing problems (Kraus et al., 2023). It can then be continued with a joint discussion process in the risk identification.
3. Based on previous incident data, this method is carried out by collecting all details of incidents experienced by the company or similar companies. With this method, the company can find out what mistakes have been made and the impact that occurred because of these mistakes (Haggenmüller et al., 2023; Soltanizadeh et al., 2016).
4. SWOT (strengths, weaknesses, opportunities, and threats) analysis method identifies risks based on strengths, weaknesses, opportunities, and threats (Helms & Nixon, 2010).
5. Risk questionnaires and surveys: This method identifies risks by sending several questions regarding certain risks, both internal and external risks. The information can be in satisfaction surveys, customer comments, or exit interviews with resigning employees. The questionnaire is a simple approach distributed independently to

parties with the knowledge or experience to assess each identified risk. From the questionnaire results, a risk analysis can be made based on the level of impact and chance of a risk occurring (Chairani & Siregar, 2021).

6. Scenario analysis prioritizes managers determining or simulating what risks could occur and impact the company (Haggenmüller et al., 2023).

Every company cannot find or plan for every type of risk. However, companies are obliged to continuously analyze the various potential risks that the company may face (Ramadhan et al., 2020).

Risk Analysis and Evaluation

Risk assessment has the objective of assessing the risks that have been identified based on the level of intensity of the risk (likelihood) and the magnitude of the impact of the risk (impact); the impact of the risk can be negative or positive (Gleim Publications, 2021). Company risk is assessed at various levels of the company and linked to the company's strategy and goals; then, the impact of risk can vary at all levels. The risk assessment process can use two methods, namely:

In a qualitative method, where the risk assessment process is based on qualitative or subjective descriptions rather than numerical or statistical data, sufficient information is needed to develop a risk assessment (Deloitte & Touche LLP et al., 2012; Popov et al., 2016). Qualitative method assessments have less diverse/limited assessments because judgments are subjective (e.g., low, medium, and high) when assessing an existing risk, as shown in Figure 2 below.

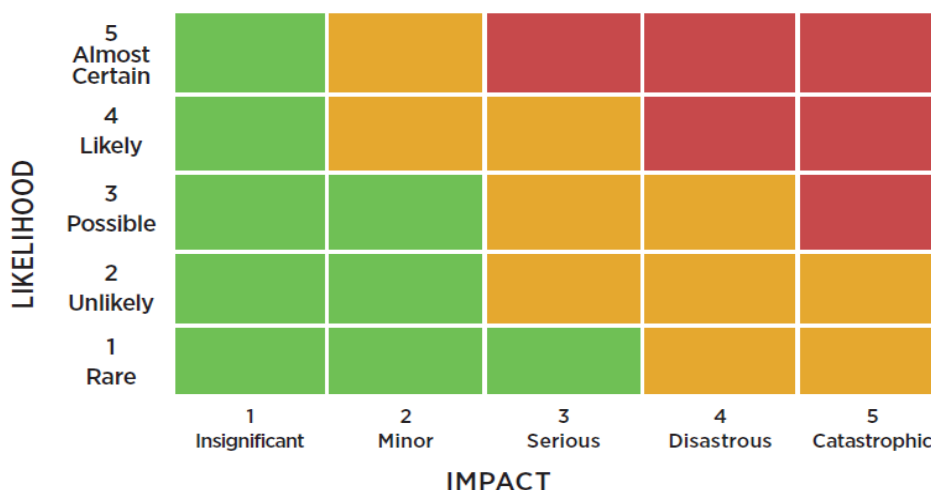


Figure 2. Risk Assessment Map

Risk Priority

After the risks have been identified and assessed, management is required to rank the risks that have the most significant impact and opportunities, as shown in Table 1 below:

Table 1. Risk Priority

A	B	C	D	E
Likelihood	Impact	Total Score (A x B)	Risk Assessment	Risk Rating
Almost Certain (5)	Catastrophic (5)	25	High	1
Likely (4)	Catastrophic (5)	20	High	2
Almost Certain (5)	Disastrous (4)	20	High	3
Likely (4)	Disastrous (4)	16	High	4
Possible (3)	Catastrophic (5)	15	High	5
Almost Certain (5)	serious (3)	15	High	6
Possible (3)	Disastrous (4)	12	Middle	7
Likely (4)	serious (3)	12	Middle	8
Unlikely (2)	Catastrophic (5)	10	Middle	9
Almost Certain (5)	Minors (2)	10	Middle	10
Possible (3)	serious (3)	9	Middle	11
Unlikely (2)	Disastrous (4)	8	Middle	12
Likely (4)	Minors (2)	8	Middle	13
Unlikely (2)	serious (3)	6	Middle	14
Possible (3)	Minors (2)	6	Middle	15
Rare (1)	Catastrophic (5)	5	Middle	16
Almost Certain (5)	Insignificant (1)	5	Middle	17
Rare (1)	Disastrous (4)	4	Low	18
Unlikely (2)	Minors (2)	4	Low	19
Likely (4)	Insignificant (1)	4	Low	20
Rare (1)	serious (3)	3	Low	21
Possible (3)	Insignificant (1)	3	Low	22
Rare (1)	Minors (2)	2	Low	23
Unlikely (2)	Insignificant (1)	2	Low	24
Rare (1)	Insignificant (1)	1	Low	25

Risk Response

Management will consider several factors to determine the response to risk. Some of these considerations are the level of risk that occurs, losses arising from risks that arise, and costs and benefits derived from the expected risks. Companies can choose four responses to risk, as shown in Figure 3 below:

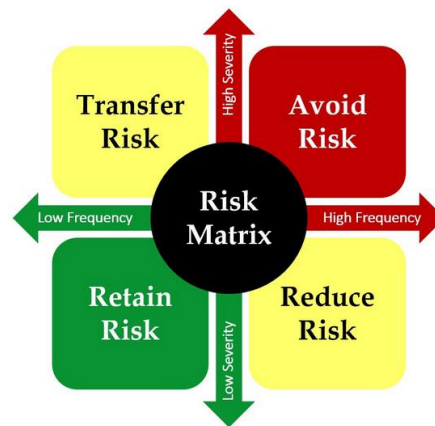


Figure 3. Risk Response Matrix

And this explanation for all of those risk responses:

1. Avoid or eliminate risks. This option can be taken if the probability of a risk is high and the resulting impact is also high.
2. Reducing or mitigating risk. In this option, management can accept the risk but is still looking for alternatives or solutions to reduce the impact of the risk (for example, management purchases software to optimize fraud prevention and detection functions in the company).
3. Transferring or sharing risks. In this option, management transfers the impact of risk losses to third parties (e.g., purchasing insurance policies for building fires, life insurance policies for employees, and so on).
4. Accept the risk or self-insuring. In this option, management can accept the risk that has been determined and believes the actual cost of the risk is still smaller than budgeted.

Risk Monitoring

Situations may change at any time, new risks may emerge, or risks that have been identified may have a more significant impact than expected. With such incidents, management must conduct regular inspections and monitoring activities and report current risk conditions to the board of directors. In addition to timely and consistent reporting, companies also need to use adequate office equipment and facilities to identify problems that may occur, such as installing fire alarms or smoke detectors to monitor the risk of fire occurring within the company's environment (Romanosky & Petrun Sayers, 2023). So, risk monitoring has the goal that the company can continue to operate effectively while taking into account the risks that will occur in the future (Moeller, 2011).

Previous Research

Nurlaela and Suhendi (2021) revealed that implementing COSO ERM at a tertiary institution can provide high awareness of the risks that employees will face at that tertiary institution. COSO ERM also benefits all employees to prepare themselves to face risks. Previously, employees at this university tended to need to prepare to face risks. The research results of Safitri and Rufaedah (2020) explain that companies implementing ERM can anticipate risks by producing a matrix company control to improve company control.

COSO ERM also has benefits in the field of internal control, such as the results of research produced by Soetedjo and Sugianto (2018), which revealed that internal auditors could improve their performance in the process of preventing fraud by conducting inspections and evaluating internal control systems based on potential risks that can occur in the company. Handoko (2019) has research shows that using COSO ERM can help companies identify weaknesses in the company's internal controls, and with COSO ERM, these risks can be anticipated by how companies implement SOPs. Adiputra Adiputra 2021 who conducted the same thing, analyzed the use of COSO ERM for the internal control process in the company's inventory system. This study showed that the company had not implemented good risk management in the inventory system, so the internal control system also did not work effectively. Research by Mujannah and Wondabio (2010) explains that by implementing a good ERM, companies can improve effectiveness, especially in the internal control of the purchasing department at a company in Central Kalimantan.

Research Method

This research uses a qualitative approach with a case study method. This case study at PT. Agro, especially in the trading division, Case on the trading division has operational risks that can significantly impact the company's finances if not correctly anticipated. Therefore, it is necessary to carry out risk management to benefit the company's performance effectiveness and cost efficiency. The risk management applied to research is based on the Committee Of Sponsoring Organizations Of The Treadway Commission (COSO) Enterprise Risk Management (ERM). The implementation of COSO ERM is focused on the performance component. Namely, the company's directors and management view the risk portfolio based on the number of risks that have been identified, assumed to determine the risk response. On components performance, there are five principles, where the process is as follows:

1. Risk identification On the principle of risk identification, data is needed to identify what risks exist in the trading division by conducting interviews with the trading operations manager.

2. Risk analysis or evaluation, at the risk evaluation stage, is the process of distributing questionnaires to employees of PT. Agro, especially trading staff, to determine the degree of opportunity and impact of risk. Types of operational risks are derived from interviews with trading operations managers at the risk identification stage.

3. Risk priority: At the risk priority stage, a risk calculation will be carried out based on the level of opportunity for the risk to occur up to the resulting impact.

4. Risk Response: At this stage, management and directors identify and select responses against the risks that have been previously analyzed.

5. Risk Monitoring: At this stage, management and directors develop and evaluate the existing risk portfolio.

After doing these five processes, the company can evaluate as well as conclude whether the company has successfully implemented COSO ERM for operational risk control.

Research Approach

The formulation of this research problem can only be answered using a naturalist paradigm approach. The naturalist or naturalist paradigm is the main idea of understanding human behavior according to the frame of reference of the behavior itself. It requires understanding and adapting to the social situations faced in research activities. Thus, research on the trading division can only be carried out at PT. Agro only because the problems of these trading divisions do not necessarily occur or can occur in other companies, the solution to this research problem cannot be generalized.

Research Subjects

This research has informants at the managerial level for the operational division of the trading team and finance. The selection of these subjects was based on the consideration that managers interact and face all company operational problems directly through the decision-making process to resolve these problems. The types and criteria of informants can be seen in Table 2.

Table 2. Informant Criteria

Position	Criteria
Finance Manager	Be aware of incidents/problems that occur.
	As the party who carries out the process of monitoring (controlling) the costs and expenditure of company funds
	Be more independent and objective in the problems that occur.
Trading Manager	Be aware of incidents/problems that occur.
	Feel the impact of the risks that occur.
	Get involved directly with the problem.
	Can make decisions according to their capacity
	Feel the impact of the risks that occur.
	Get involved directly with the problem.

Types and Sources

The data used in this research is qualitative, including standard operating procedures, job descriptions, implementation of activities in the field, and so on. Quantitative data

includes financial reports, billing invoices, purchase orders, inventory reports, Etc. Data was obtained from primary and secondary. Primary data was obtained from observations and interviews. Secondary data is obtained from financial report documents, inventory reports, purchase order reports, Etc.

Data Collection Instruments and Procedures

This research's instruments and data collection process was conducted using interviews, observations, and surveys.

1. **Interview.** The interview process conducted in this research aimed at directors and management of PT. Agro carries out the process of risk identification, risk analysis, risk prioritization, risk response, and risk monitoring. This research conducted interviews with PT's trading and finance managers. Agro is described in the interview questions with the following details:

Table 3 . Interview guidelines

Risk Management Stage	A list of questions
Risk Identification	Can you describe what operational risks have occurred and could occur in the trading division?
	Are the staff concerned aware of this risk?
Risk Evaluation	How often can this risk occur?
	How significant is the impact if this risk occurs?
	Does this risk have an impact on other divisions?
	Do the staff concerned understand the impact of these risks?
Risk Prioritization	Which risks will be prioritized, from highest to lowest?
Risk Treatment	What actions will be taken on prioritized risks?
Risk Monitoring	How do we monitor these risks?

2. **Observation.** The observation activities carried out in this research aim to better understand the situation and conditions of operational activities in the trading division, such as observing raw materials to be purchased, determining the purchase price of raw materials, taking samples of raw materials, the process of recording raw material purchases, the process of selling raw materials to customers to create invoices, tax invoices and travel documents/handover of goods.

3. **Survey.** The survey uses an instrument called a questionnaire. The questionnaire used in this research aims to determine the level of possibility of risk occurring and the impact of the risks that have been identified. The method used is that the Trading division staff selects/checks the column in the range of numbers 1 to 5 in the probability column and selects/checks the column in the range 1 to 4 in the impact column. The higher the value chosen, the higher the possibility of risk or impact. Risks, as seen in Figure 4.

OPERATIONAL RISKS										
Risk Findings	Likelihood					Impact				
	Rare	Unlikely	Possible	Likely	Almost Certain	Insignificant	Minor	Serious	Disastrous	Catastrophic
	1	2	3	4	5	1	2	3	4	5
Risk 1										
Risk 2										
Risk 3										

Figure 4. Risk Assessment Questionnaire

Data Analysis Technique

The process of data analysis techniques carried out in this research is guided by the statement by Miles and Huberman in Sugiyono (2010:338), which consists of 4 stages, namely:

1. Data collection, where this process collects data from the field by conducting interviews, surveys, observations, and documentation.
2. Data reduction, where the data reduction process means summarising, taking the main points, focusing on the critical things, looking for themes and patterns, removing unnecessary ones, and organizing the data in one way so that the conclusions can be explained and verified.
3. Data presentation, where the data presentation process is a collection of information that is reported and explained in writing. The data presented in this research summarises the interviews, observations, and questionnaire results after the data collection and processing process compared with the existing theoretical basis.
4. Conclusions are drawn at this stage based on the data reduction results, which is the answer to the problems discussed in the research.

The series of data analysis can be seen in Figure 5 below:

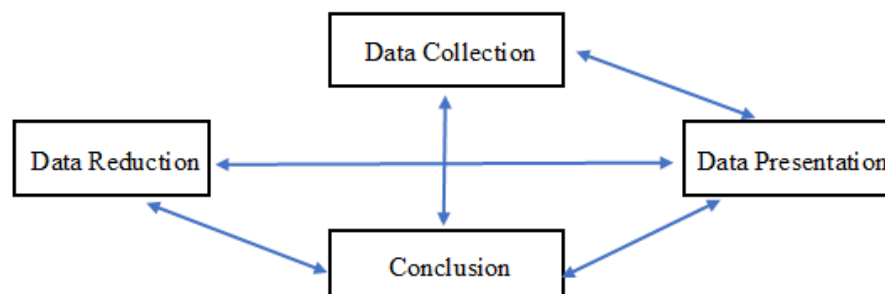


Figure 5. Data Analysis

Data Validity / Validity Criteria

Data validity or data validity criteria must meet the following criteria:

1. Internal validity. Internal validity can be obtained if researchers conclude the occurring problems or events. The process carried out in internal validity is as follows:

- Triangulation. This research uses source triangulation, namely collecting and searching for the truth of certain information through various sources. This research conducted interviews by asking questions to certain parties with an essential role and who is responsible for PT. Agro's operational activities, namely at the managerial level for the trading division, financial managers, and staff trading team. It was done to obtain accurate interview results in implementing COSO ERM at PT. Agro, so that valid data and information will be obtained from different sources.



Figure 6. Triangulation of Three Data Sources

- Confirmability. Testing for certainty can be done by seeking agreement from several people. In this research, apart from determining the risks identified and assessed using the interview method, it is compared with the results of a survey given to trading division employees. It is done to provide a more accurate assessment between assessments carried out in the managerial line and employees who deal directly with these risks.

2. External validity

External validity results from the sustainability of research findings that can be generalized beyond the case studies used in this research to form a unique interpretation of an event or incident. This research uses the COSO ERM theory, which has had quite a lot of research using this theory, and if PT. As in previous studies, Agro has successfully implemented COSO ERM-based risk management in the trading division to obtain validity.

3. Reliability

Reliability aims to gain confidence that this research can be replicated or repeat the process by following data collection procedures, applying triangulation, and data analysis to minimize errors and bias in research (Yin, 2021, p. 45). The results of this research can

be used as material for further research on the same topic, namely examining the implementation of COSO ERM in each company's division.

RESULTS AND DISCUSSION

Data Collection Process

In this study, the data collection process used the interview method, and the informants interviewed were trading managers responsible for the day-to-day operations of the trading division to carry out the process of buying and selling raw materials. Interviewing the trading manager is carried out to determine what types of risks can affect the division's performance. Determining these risks is included in the Committee of Sponsoring Organizations of the Treadway Commission (COSO) Enterprise Risk Management (ERM) performance component of the risk identification section using qualitative methods. Then, the results of the risk identification are followed by carrying out a risk analysis or evaluation by assessing the probability of the occurrence of the risk and the resulting impact. For the interview results to be acceptable, a questionnaire was distributed to staff and supervisors to assess the level of risk occurrence and the resulting impact based on the results of risk identification from the interview process.

Risk Identification

The risk identification process in COSO ERM aims to identify risks, followed by risk analysis to the risk response process. The first process is identifying the trading division's operational risk by interviewing the manager of the trading operational division. From the results of the interview, nine risks were obtained. The results of risk identification and an explanation of operational risks carried out by the trading operations manager can be seen in Table 4 below.

Table 4. Operational Risk Identification

Index	Operation Risk	Risk Explanation
O1	The trading team needed to appropriately and correctly check the quality of raw materials according to the specified SOP.	The trading team did not carry out a Standard Operating Procedure (SOP) where every time they purchased goods, they were required to take samples of the goods to be purchased and then send them to the laboratory so that the results of the quality of the goods to be purchased were found according to the specified standards or not.
O2	The trading team should have carried out a careful and thorough physical examination of the items purchased.	The trading team did not conduct a thorough physical inspection of the goods, so purchases of goods, including the existing waste, could occur.

Index	Operation Risk	Risk Explanation
O3	The lack of information owned by the trading team regarding the quantity and price of commodity goods	The trading team often asked for the price of raw goods from farmers, but no goods purchase transactions occurred. So, the farmers are only asked for price information; this ultimately makes the farmer partners lazy or reluctant with the trading team because they feel they are only being used for price information without realizing the purchase of goods.
O4	The trading team's communication with suppliers/farmer partners needs to be improved.	The trading team does not routinely make intensive visits to partner farmers, so communication is mostly done by telephone, even though it is hoped that regular visits can improve communication and better relations with farmer partners.
O5	The administrative process of purchasing raw materials is quite long	Every time a purchase occurs, farmer partners are asked to fill out non-PKP statement forms, partner registration forms, and commitment forms, not to give bribes/gratifications, etc. After that, the document is submitted to the administration to be registered with the program, after which a Purchase Order can be made.
O6	The trading team can purchase raw materials without making PR first	The trading team never makes a Purchase Requisition (PR) in existing programs whenever they buy goods.
O7	Making a PO is done after the raw material purchase transaction occurs	The trading team has never made a Purchase Order (PO) before a purchase transaction.
O8	The company needs to gain knowledge of trading staff regarding commodity goods or raw materials.	There are still trading staff who need to gain knowledge about existing raw materials. For example, the trading staff was assigned to look for dry cloves, but because of the lack of knowledge and experience in this field, the staff did not know the difference between wet cloves and dry cloves.
O9	The condition of the warehouse for storing goods needs to be cleaner or in better condition.	The trading team does not carry out routine maintenance of the warehouse; it can cause damage to buildings and the cleanliness that needs to be maintained.

The results of the identification of operational risks have been confirmed to the finance manager to ensure whether the results of the identification of risks are following events that have occurred or events that are of concern to management, and the results of the confirmation state that the results of identification of operational and financial risks are following reality and company management concern.

The results of the risk identification are still very subjective because risk identification is based on the experiences and events experienced by each of these managers. To make the risk identification process more diverse, company management can use several methods as follows:

1. Joint discussion, in this process, the entire management of PT. Agro can gather together to discuss and discuss risk management, starting from identifying any problems that occur within the company, the latest issues regarding the company's operational activities, what risks may arise in the future, and how big these risks will impact the company. In this process, it is also expected that the existing managers provide suggestions and solutions to deal with the risks that have been identified. This process can create synergy for each division in dealing with company risks.

2. Using a SWOT analysis (strengths, weaknesses, opportunities, and threats). It is a qualitative method of identifying strengths, weaknesses, opportunities, and threats owned by the company. In this section, it is expected that each company's management will analyze the strengths and weaknesses of the organization, such as organizational structure, financial resources, employee competence, corporate culture, and so on. In addition, management also analyses opportunities and threats from outside the company, such as political conditions, socio-cultural and technological developments of competitors, or innovations made by competitors.

3. Conduct risk surveys for company employees. This method performs risk identification by distributing several questions related to specific risks to employees of PT. Agro. From the survey results, a risk analysis can be carried out based on the responses and responses from employees who have answered the survey.

Risk Analysis and Evaluation

After carrying out the risk identification process, the following process is the operational risk analysis and evaluation process carried out by the trading manager's assessment of the level of risk occurrence and the impacts arising from the risk identification results, described in Table 4. The trading division risk analysis and evaluation results can be seen in Table 5, and the risk map in Figure 7.

Table 5. Trading Division Risk Analysis and Evaluation Results (Trading Manager)

Index	Trading Division Risk Types	A	B	C (A x B)
		Likelihood	Impact	Risk Score
Operational Risk				
O1	The trading team did not properly and correctly check the quality of raw materials according to the specified SOP	4	5	20
O2	The trading team should have carried out a careful and thorough physical examination of the items purchased.	3	5	15

Index	Trading Division Risk Types	A	B	C (A x B)
		Likelihood	Impact	Risk Score
O3	The lack of information owned by the trading team regarding the quantity and price of commodity goods	4	3	12
O4	The trading team's communication with suppliers/farmer partners is not effective	2	3	6
O5	The administrative process of purchasing raw materials is quite long	3	3	9
O6	The trading team can purchase raw materials without making PR first	4	2	8
O7	Making a PO is done after the raw material purchase transaction occurs	4	3	12
O8	The company needs to gain knowledge of trading staff regarding commodity goods or raw materials.	2	5	10
O9	The condition of the warehouse for storing goods is not clean or in damaged condition	2	4	8

Source: Interview results from Trading Manager, June 2023

LIKELIHOOD	IMPACT				
	Insignificant (1)	Minor (2)	Serious (3)	Disastrous (4)	Catastrophic (5)
Almost Certain (5)					
Likely (4)		O6	O3, O7		O1
Possible (3)			O5		O2
Unlikely (2)			O4	O9	O8
Rare (1)					

Figure 7. Trading Division Risk Map (Trading Manager)

Apart from that, to ensure whether trading team members understand the risks that the trading manager has identified, a survey was conducted using a questionnaire Figure 4 where trading division staff and supervisors assessed the level of risk occurrence and the impact of the risks that the trading manager had identified. Survey results from 5 respondents (1 supervisor and four staff) can be seen in Table 6 and the risk map in Figure 8.

Table 6. Trading Division Risk Analysis and Evaluation Results (Survey Result)

Operational Risk													
Risk Index	Likelihood (A)					Impact (B)					Average Calculation		Risk Score
	Respondents					Respondents					Likelihood	Impact	
	1	2	3	4	5	1	2	3	4	5	(C = A ÷ 5)	(D = B ÷ 5)	
O1	3	4	3	4	4	4	4	5	4	5	4	4	16
O2	3	3	2	3	3	4	4	5	4	5	3	4	12
O3	5	5	4	4	5	2	3	4	3	2	5	3	15
O4	2	2	1	2	2	3	3	5	4	4	2	4	8
O5	4	4	5	4	3	2	3	2	2	4	4	3	12
O6	4	4	4	5	4	2	2	3	2	2	4	2	8
O7	5	4	4	4	4	2	2	2	3	2	4	2	8
O8	2	3	2	3	3	4	4	4	4	3	3	4	12
O9	1	2	3	3	2	5	5	4	5	3	2	4	8

LIKELIHOOD	IMPACT				
	Insignificant (1)	Minor (2)	Serious (3)	Disastrous (4)	Catastrophic (5)
Almost Certain (5)			O3		
Likely (4)		O6, O7	O5	O1	
Possible (3)				O2, O8	
Unlikely (2)				O4, O9	
Rare (1)					

Figure 8. Trading Division Risk Map (Survey Result)

Then, the final validation is based on the assessment results of the risk occurrence level and its impact carried out by the finance manager as the fourth informant. The results of this assessment can be seen in Table 7 and the risk map in Figure 9.

Table 7. Trading Division Risk Analysis and Evaluation Results (Finance Manager)

Index	Trading Division Risk Types	A	B	C (A x B)
		Likelihood	Impact	Risk Score
Operational Risk				
O1	<i>the trading</i> team did not check the quality of raw materials properly and correctly according to the specified SOP	4	4	16
O2	<i>the trading</i> team needs to carry out a careful and thorough physical inspection of the goods purchased.	5	5	25
O3	<i>the trading</i> team has minimal information regarding the quantity and price of commodities	4	3	12
O4	<i>The trading</i> team's communication with suppliers/farmer partners is ineffective	1	4	4

Index	Trading Division Risk Types	A	B	C (A x B)
		Likelihood	Impact	Risk Score
O5	The administrative process for purchasing raw materials is quite long	4	2	8
O6	<i>the trading</i> team can purchase raw materials without doing homework first	5	2	10
O7	PO creation is carried out after a raw material purchase transaction occurs	4	4	16
O8	Limited knowledge of <i>trading staff</i> regarding commodity goods or raw materials needed by the company.	2	5	10
O9	The condition of the warehouse where goods are stored is unclean or in a damaged condition	2	5	10

LIKELIHOOD	IMPACT				
	Insignificant (1)	Minor (2)	Serious (3)	Disastrous (4)	Catastrophic (5)
Almost Certain (5)		O6			O2
Likely (4)		O5	O3	O1, O7	
Possible (3)					
Unlikely (2)					O8, O9
Rare (1)				O4	

Figure 9. Trading Division Risk Map (Finance Manager)

The results of the risk assessment that has been carried out using the survey are compared with the results of the risk assessment of the financial manager and also the trading operations manager himself so that the results of the risk assessment comparison will be obtained, which can be seen in Table 8

Table 8. Risk Comparison Between Trading Manager, Finance Manager, and Survey Results

Index	Trading Manager		Finance Manager		Staff Trading Survey	
	Score	Assessment	Score	Assessment	Score	Assessment
O1	20	High	16	High	16	High
O2	15	High	25	High	12	Middle
O3	12	Middle	12	Middle	15	High
O4	6	Middle	4	Middle	8	Middle
O5	9	Middle	8	Middle	12	Middle
O6	8	Middle	10	Middle	8	Middle
O7	12	Middle	16	High	8	Middle
O8	10	Middle	10	Middle	12	Middle
O9	8	Middle	10	Middle	8	Middle

From the results of this comparison, the risk assessment carried out by the trading manager is similar to the finance managers' assessment and survey results. The following

conclusion is that the trading division staff has a relatively good understanding of the risks that their managers have identified.

Risk Priority

After all operational and financial risks have been carried out through risk identification to risk assessment, the next step is to determine the ranking of risks, starting from the risk with the highest risk value to the risk with the smallest value.

Table 9. Risk Rank or Risk Priority

Risk Rating	Risk Index	Risk Score	Risk Assessment
1	O1	20	High
2	O2	15	High
3	O3	12	Middle
4	O7	12	Middle
5	O8	10	Middle
6	O5	9	Middle
7	O6	8	Middle
8	O9	8	Middle
9	O4	6	Middle

From the recapitulation results, out of 9 operational risks, there are two risks in the high category and 7 in the moderate category. In the trading division, there is no risk in the low category; this shows a relatively high risk for the company regarding its operational activities.

Risk Response

In the next stage, after prioritizing risks, the management team will determine the actions or responses to be taken to overcome these risks. Overall, the trading manager chooses actions by reducing risk (reducing risk) in response to the overall operational and financial risks, where the details are shown in Table 10 below.

Table 10. Risk Response for Trading Operation Risks

Risk Index	Risk Assessment	Risk Response
O1	High	A clear SOP will be made regarding the procedure for inspecting goods
		Provide training to the trading team regularly.
		Providing a punishment system such as issuing warning letters will impact cutting bonuses and reducing salaries so that trading staff is expected to be more careful in carrying out their work.

Risk Index	Risk Assessment	Risk Response
O2	High	Will make a more detailed and precise SOP regarding the procedure for inspecting goods from the initial stage to the process of purchasing goods
		Providing a punishment system such as giving warning letters will impact cutting bonuses and reducing salaries.
O3	Medium	Conduct intensive communication and outreach to partner farmers. The trading team is obliged to make a list of regular visits.
O7	Medium	Make clear SOPs regarding the procedure for purchasing goods, including the PO-making process that the trading team must carry out.
O8	Medium	Providing periodic training to the trading team so that they can have sufficient knowledge and insight
		Ensuring prospective employees have sufficient knowledge during the hiring process for new employees
O5	Medium	Conduct intensive communication and outreach to partners or suppliers so that they understand the procedures that the trading team must carry out.
O6	Medium	Make clear SOPs regarding the procedure for purchasing goods, including the process of making PR that the trading team must carry out.
O9	Medium	Make a routine schedule for periodic maintenance of building assets
O4	Medium	Make a schedule of visits to partner farmers or suppliers and make reports on the results of these visits.

The risk treatment process carried out by the trading division is quite good, in the sense that the trading operational manager has good attention and response to existing risks, but requires a strong commitment from all members of the trading team and also managers so that risk management can run effectively so that achieved the expected goals.

Risk Monitoring

The last part of the risk management process is the risk monitoring process, in which the company's management is expected to supervise the response or treatment of all risks that have been determined together. In addition to monitoring these risks, management must pay attention to the level of risk, whether the level of risk has decreased, increased, or remained constant.

Table 11. Risk Monitoring for Trading Operation Risks

Risk Index	Monitoring Process
High Risk	
O1	By comparing sales reports regularly, because in this sales report, you can see how the trading team's sales activities are progressing. If the number of sales decreased, then it can be asked why. Is it because the quality of the goods is not good? Alternatively, monitoring can be carried out from information on how much the company has lost potential buyers. In addition, it can be monitored through the Bad Stock report; if there is an increase in insufficient stock, it is feared that an error has occurred in purchasing the type of goods or the quality of the goods is poor.
O2	By comparing sales reports regularly, because in this sales report, you can see how the trading team's sales activities are progressing. If the number of sales decreased, then it can be asked why. Is it because the quality of the goods is not good? Alternatively, monitoring can be carried out from information on how much the company has lost potential buyers. In addition, it can be monitored through the Bad Stock report; if there is an increase in insufficient stock, it is feared that an error has occurred in purchasing the type of goods or the quality of the goods is poor.
Medium Risk	
O3	It can be monitored when the trading manager approves the purchase of goods. If the quoted price significantly differs from the information previously provided, then the trading manager can question the difference to the trading staff.
O4	The trading manager can request information from partner farmers or suppliers on whether the trading staff has a good communication process.
O5	By looking at the completeness of the registration process for partner farmers or new suppliers, if the registration process is carried out with complete documents, it can be considered that the risk control process has been carried out effectively.
O6	This can be monitored through the verification process of the finance division; if PR and PO do not accompany payment invoices to farmer partners or suppliers, the payment can be postponed.
O7	This can be monitored through the verification process of the finance division; if PR and PO do not accompany payment invoices to farmer partners or suppliers, the payment can be postponed.
O8	It can be monitored through bad stock reports; if there is an increase in the number of lousy stocks, then it is feared that an error has occurred in purchasing the type of goods or the quality of the goods is poor.

O9	Looking at the damaged goods inventory report, the warehouse is expected to be in excellent and clean condition if the number of damaged goods is negligible. Alternatively, by being able to monitor through cost analysis, if there is a large amount of repair costs incurred, it can be questioned whether the trading division has carried out routine checks on warehouse conditions.
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The trading division cannot only carry out the monitoring process, so supervision from the finance division is also needed. The division is essential in identifying, analyzing, and evaluating all financial transactions within the company because all documents will lead to the finance department. Thus, the trading division has carried out all stages in COSO ERM for the performance component, and it is hoped that PT. Agro can continue the risk management process not only for the trading division but can be applied as a whole to the company.

Conclusion

PT. Agro has a trading division that has an essential role in the company's operational activities, but the trading division also has relatively significant operational risks. From the results of data analysis and previous discussions, the trading division has carried out a risk management process based on the Committee of Sponsoring Organizations of the Treadway Commission (COSO) Enterprise Risk Management (ERM), especially on the performance component.

The trading division has nine operational risks, of which nine are 2 in the high category and 7 in the medium category. The trading division has the most risk because it carries out many activities, starting from taking samples, observing and inspecting goods, conducting negotiations, monitoring the price of goods, and so on. An example of an operational activity in the trading division that can have a high impact is purchasing materials whose quality does not comply with standards because purchasing materials that are not suitable will hinder the process of reselling the goods to customers because the quality is not good, which will result in poor inventory turnover. And detrimental to company finances.

The implementation of risk management based on COSO ERM, which the trading division has carried out, has provided several benefits for the company, including:

1. Companies can utilize or allocate resources better, for example, by identifying risks to avoid purchasing low-quality materials, which results in hampered inventory turnover.
2. Carrying out better cost control, such as identifying risks in warehouse maintenance schedules for raw materials, by carrying out routine warehouse maintenance, damage to raw materials can be avoided and does not become a cost to the company.
3. Companies can carry out more effective strategic planning; for example, by knowing the risk of fluctuating commodity prices, the company can determine its next strategic plan, whether to wait for prices to stabilize or buy and sell other commodities.

4. Companies can be better prepared for surprises or undesirable events; by implementing risk management, the company will continue to monitor both risks that have been identified and new risks that may arise in the future.

5. There will be less disruption to operational activities because, after the risk identification process, the company will also assess and respond to these risks, which is expected to reduce the level of existing risks so that the company's goals can be achieved well.

6. Provides confidence for employees because by implementing COSO ERM risk management, employees will better understand risks and be better prepared to face existing risks.

Limitations

The research can provide benefits for companies to face the operational risks that are being or will be experienced. The risk management process using COSO ERM emphasizes the risk identification and risk assessment process carried out in previous research and prioritizing risks so that the company will focus more on activities with significant/high risks than management responses. Alternatively, determining what action will be taken regarding the risk to the monitoring and reporting process.

The research used qualitative methods and primary data from interviews and survey results. Limitations in this study include subjectivity in trading managers to financial managers who provide high enough risk assessments so that the risk assessment results tend to be in the medium-risk and high-risk categories. This risk assessment is based on experience and personal benchmarks, so this assessment cannot become a standard. The following limitation is that the research was only conducted at PT. Agro, in which all operational and financial activities only occur in that company. Therefore, data analysis to suggestions for improvement can only be used at PT. Agro only and cannot be generalized to all other companies.

Suggestion

Based on the research process that has been carried out, the academic advice that can be given is that apart from using qualitative methods, you can use quantitative methods in the risk management process to carry out a risk identification process based on data or financial reports. Using quantitative methods, the risk identification and assessment process will use monetary units to make the results more measurable. One quantitative method used in risk identification and assessment is cash flow analysis value at risk (VaR) analysis.

Meanwhile, practical advice that can be given is to reduce the bias of interview results when carrying out the risk identification and risk assessment process; you can use other triangulation methods, such as theoretical triangulation, method triangulation, and so on.

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Case Study

Calendar Anomalies: A Case Study of the Vietnam's Stock Market

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Abstract

This study empirically investigated the existence of Calendar effects by using closing daily data for the Vietnam index (VN-index) before and during the Covid-19 pandemic. Daily returns of the VN-Index from 2 January 2018 to 12 August 2022 are used in this study to ascertain calendar anomalies in Ho Chi Minh Stock Exchange (HOSE). To test these effects, the entire study period is divided into two sub-periods: during and before the Covid-19 crisis. Then, the ordinary least square (OLS) method and the Generalized Autoregressive Conditional Heteroskedasticity [GARCH (1,1)] regression model were employed. The empirical results from the OLS model support the occurrence of calendar anomalies for the HOSE both before and during the Covid-19 pandemic while the results of GARCH (1,1) only confirmed the positively significant effect on Friday during the Covid-19 periods. Regarding stock returns, positive returns were found only on Friday, during the Covid-19 pandemic. It implies that Covid-19 has changed the nature of the stock market from efficient to inefficient. The study's findings suggest that the Covid-19 crisis significantly impacted the daily returns anomaly in Vietnam's HOSE.

Keywords: Calendar anomalies, Covid-19, GARCH, Ho Chi Minh Stock Exchange, The day-of-the-week effect, VN-Index.

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Introduction

Recent studies have provided empirical evidence on stock market responses to major systemic events. The impact of major events on the capital market is inevitable. Many studies focused on the effect of major events on the stock market, such as the severe acute respiratory syndrome (SARS) pandemic was considered by Chen et al. (2007) and Chen et al. (2018). The effect of the recent Covid-19 outbreak is also detected. In the initial phase, extensive studies proposed significant evidence of the negative impact of widespread Covid-19 on stock markets (Al-Awadhi et al., 2020; Liu et al., 2020; Ahmar & Val, 2020; & Zhang et al., 2020). In the Vietnam context, some studies have examined this issue and found that the Covid-19 pandemic has a negative effect on stock returns (Anh & Gan, 2020; Hung et al., 2021; Nguyen et al., 2021).

The presence of anomalies has been investigated extensively in the capital markets. Calendar effects (market anomalies) have been well studied in different financial markets, including the day-of-the-week effect, January effect, Monthly effect and Turn-of-the-month effect. The day-of-the-week effect seem to be more ubiquitous. Some anomalies appear once and then disappear, while other anomalies are frequently observed. The study by Paital & Panda (2018) indicated that the efficiency of the stock market is held when all private and public information reflects in the stock price itself. Gormsen & Koijen (2020) also showed that in the short run, it is usual to find the adverse reaction in stock markets to this outbreak, but they will correct themselves and go up again in the long run. The day-of-the-week effect patterns have been widely observed in many markets. Some studies indicated that there is the existence of the day-of-the-week effect (Cabello & Ortiz, 2003; Seif et al., 2017). Other studies did not find any proof of these calendar effects (Sharma, 2011; Kristjanpoller, 2012a). In Vietnam, there seems to be a limitation of studies in this research area. Only some focused on the day-of-the-week term (Loc, 2006; Le Hau, 2010; Luu et al., 2016; Truong & Friday, 2021).

The impact of the Covid-19 crisis is not examined yet in the above-mentioned studies when they focused on the day-of-the-week effect on stock returns or volatility. This limitation leads to the motivation of the present study.

This paper intends to investigate whether the presence of calendar anomalies, specified, the day-of-the-week effect, on stock returns for the HOSE before and during the Covid-19 crisis; then, it is possible to know the impact of Covid-19 outbreaks on stock returns. The case of the HOSE provides an excellent natural experiment for some reasons: first, the HOSE is the first and official largest stock exchange of Vietnam; second, it was almost operated ten years earlier than the Ha Noi Stock Exchange (HNX); in addition, there are 601, updated in 2022, listed stocks on HOSE in compared with 330 listed ones on the HNX; moreover, the Vietnam government has planned to finish transferring all of the HNX's stocks into the HOSE in 2025 (GOV, 2020). The research utilizes the two subsamples of the daily index to determine the calendar anomalies specified as the day-of-the-week effect. The findings contributed to the literature on frontier markets, the Vietnam stock market.

Literature Review

Attracted to market anomalies, following up on the studies carried out by French (1980) and Gibbons & Hess (1981), many studies have detected the existence of the day-of-the-week effect which shows abnormally higher returns on some days of the week than on other days. In other words, there is a difference in average stock returns throughout the different days of the week. It is often to see the negative effect on Monday and the positive effect on Friday on average returns.

By utilizing a GARCH in mean (GARCH-M) model to examine the day-of-the-week effect on the Greek stock market for the period from January 1985 to February 1994, Alexakis & Xanthakis (1995) found significant positive returns on Mondays for both the total period and first subperiod. Moreover, significant negative returns on Tuesdays were also indicated in this study. Zhang et al. (2017) employed GARCH (1,1) to consider the day-of-the-week patterns in 28 stock markets, including developed and emerging countries. The author concluded that the anomaly effects were confirmed in all markets examined. An Autoregressive Integrated Moving Average (ARIMAX) model was applied by Tadepalli & Jain (2018), who also evaluated the day-of-the-week anomaly in several indices of the Indian equity market and found a widespread existence of this anomaly on stock returns. Some extensive studies concentrated on this research area in the Mexican stock market. The studies of Cabello & Ortiz (2003) and Winkelried & Iberico (2018) had the same conclusion that average returns on Mondays were statistically the lowest of the week or significantly negative. The evidence of the anomaly effect of other days of the week was also determined in many studies. Zhang et al. (2017) found a significant positive impact on stock returns on Wednesdays in the MSE between 1994 and 2016. Seif et al. (2017) recognized the highest average returns on Fridays.

Contrastly, some studies confirmed the absence of the day-of-the-week effect on stock returns. The results of the study by Kristjanpoller (2012a) showed no proof of the day-of-the-week effect in the returns of the MSE from 1993 to 2007. Sharma (2011) and Plastun et al. (2019) had similar findings when their studies demonstrated that the day-of-the-week effects do not exist in the Indian stock market, which can be considered informationally efficient.

Mixed results were also found in this area of research. The study of Gbede & Peprah (2018) is a typical example. By employing the OLS method, GARCH (1,1), threshold GARCH (TGARCH) and Exponential GARCH (EGARCH) model for GSE and NSE index, the study obtained the findings that there is no evidence of day-of-the-week effect in GSE, whereas this effect was found on Friday in NSE.

Regarding measuring the Covid-19 impact, Sahoo (2021) investigated the existence of the day-of-the-week effect by using closing daily data for some subindices (Nifty 50, Nifty 100...) before and during the Covid-19 health crisis. The output of GARCH (1,1) indicated a difference in the day-of-the-week effect between pre and post Covid-19 appearance. Negative returns were found on Mondays during the Covid-19 pandemic. Conversely, positive returns were represented on Mondays before the Covid-19 period. In addition, significant positive effects on index returns were reported for all indices during the Covid-19 outbreak.

In the Vietnam context, Loc (2006) used OLS regression and GARCH model to consider the VN-index from 2002 to 2004. The OLS model exhibited positive returns on Fridays, while the GARCH models confirmed a negative return on Tuesdays. Continuously, Le Hau (2010) also did a study on VN-index. The author found the day-of-the-week effect only for volatility. Recently, Truong & Friday (2021) examined the impact of the introduction of the VN30-Index futures contract on the stock returns anomaly for the HOSE. The methodology of OLS, GARCH (1,1), and EGARCH (1,1) were applied to ascertain the day-of-the-week anomaly on stock returns. The study found the presence of the day-of-the-week effect on stock returns; specifically, a negative effect was only observed for Monday in stock returns for the pre-index futures period.

In general, numerous studies evaluated the day-of-the-week effect on stock returns, however, the findings were still various. Especially in the Vietnam stock market, there are limited studies in the documented literature. Thus, the day-of-the-week effect is considered as a dummy variable in the present paper, and the two first hypotheses are proposed as follows:

Hypothesis 1. There are differences in the stock returns across the days of the week during the Covid-19 crisis.

Hypothesis 2. There are differences in the stock returns across the days of the week before the Covid-19 crisis.

Data and Methodology

Data Description

To test for the day-of-the-week and January effect, and the impact of the Covid-19 crisis on the daily returns anomaly in the HOSE, the data are obtained from January 2, 2018, to August 12, 2022, from the website of Vietstock company (www.vietstock.vn). According to Brooks (2019), one way to obtain a time series of daily continuously compounded returns, which are computed as follows:

$$ret_t = \ln\left(\frac{pr_t}{pr_{t-1}}\right) = \ln(pr_t) - \ln(pr_{t-1}) \quad (1)$$

Where: ret_t stands for index return at time t ,

\ln is the natural logarithm,

Pr_{t-1} and pr_t are two consecutive daily closing market indexes.

Table 1 reports the basic statistics of daily stock return over the observed sample period. The mean of stock returns is positive and very small both before and during the Covid-19 crisis. The maximum stock returns during the Covid-19 health pandemic were a bit higher than before the Covid-19 crisis. While the minimum stock returns during the Covid-19 period were smaller than before the Covid-19 crisis. It means that investors got a big loser during the Covid-19 pandemic. The normality test was also employed to avoid misleading inferences and due to the error term assumed to follow non-central t

distribution. The skewness of stock returns both before and during the Covid-19 pandemic are all significant at the 1% level and not equal to zero. Likewise, the kurtosis terms are all significant for both before and during the Covid-19 crisis at the 1% level, and they are very different from the three. Additionally, the two Jarque-Bera test statistics, which are also significant at the 1% level, rejected the null hypothesis that stock returns are normally distributed.

Table 1. Basic Descriptive statistics

Before Covid-19 Crisis			
Mean	9.31e-07	Std. Dev.	0.012735
Median	0.000428	Skewness	-0.78267*
Maximum	0.040365	Kurtosis	5.7539*
Minimum	-0.060083	Jarque-Bera	214.0679*
Sample size	512	Probability	0.00000
During Covid-19 Crisis			
Mean	0.00043	Std. Dev.	0.0142
Median	0.0018	Skewness	-1.191*
Maximum	0.0486	Kurtosis	7.249*
Minimum	-0.0691	Jarque-Bera	629.72*
Sample size	637	Probability	0.00000

Notes: 1. * (**) (***) denote 1% (5%) and (10%) level of significance.

Methodology

Tests for the day-of-the-week anomaly in the HOSE were first performed using an OLS regression. A dummy variable regression model is fitted to detect the day-of-the-week effect as follows:

$$ret_t = \alpha_0 + \alpha_1 D_{1t} + \alpha_2 D_{2t} + \alpha_3 D_{3t} + \alpha_4 D_{4t} + \varepsilon_t \quad (2)$$

Here, D_{1t} , D_{2t} , D_{3t} , D_{4t} are dummy variables for Monday, Tuesday, Wednesday and Thursday at time t , respectively (D_{1t} , D_{2t} , D_{3t} , D_{4t} are equal 1 if the t observations fall on Monday, Tuesday, Wednesday, and Thursday, respectively or 0 for the remainder).

The error term ε_t is assumed to be independent and identically distributed. The homoscedasticity assumption for a financial time series is often violated, therefore, the OLS model may contain auto-correlated error terms that give misleading inferences. Then, it is necessary to perform Durbin Watson and ARCH-LM tests to detect autocorrelation and heteroscedasticity, respectively. The ARCH model proposed by Engle (1982) allows a model where the variance of errors varies through time as a function of past errors. Later, Bollerslev (1986) developed GARCH from ARCH (Autoregressive Conditional Heteroscedasticity) to allow conditional variance to depend on prior lags. When the autocorrelation and heteroscedasticity from the simple regression model are detected, the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model should be fitted to resolve these problems. Particularly, the GARCH model takes the form as follows:

$$ret_t = a_0 + a_1 D_{1t} + a_2 D_{2t} + a_3 D_{3t} + a_4 D_{4t} + \sum_{i=1}^n b_i ret_{t-i} + \varepsilon_t \quad (3)$$

$$\varepsilon_t \sim T(0, \sigma_t^2) \quad (4)$$

$$\sigma_t^2 = \omega + \sum_{i=1}^m \lambda_i \varepsilon_{t-i}^2 + \sum_{j=1}^n \phi_j \sigma_{t-j}^2 + \varepsilon_t \quad (5)$$

In equation (3), the term of ret_{t-i} was added to consider the effect of return on stock returns at time $t-i$. n is the lag order of stock returns and determined based on AIC or SBC. Equation (4) contains the error term ε_t assumed to follow the non-central t distribution. In equation (5), λ_i is the ARCH coefficient which measures the influence of past squared residuals (ε_{t-i}^2) on recent volatility. The coefficient, ϕ_j is the GARCH term which measures the influence of the recent past period's volatility (σ_{t-j}^2) on current volatility at time t .

Empirical Results

Table 2 provides the results of AIC and SBC in three main unit root hypotheses (time trend, constant term and neither constant term nor time trend). Unit root test helps to avoid spurious estimation and nonsense results. Dickey-Fuller (DF) approach of Dickey-Fuller (ADF) test was used to follow the process of the unit root test. The ADF test statistics in table 2 instructed that the stock returns of all three cases are stationary at level both before and during the Covid-19 crisis. Order 1 was selected based on the minimum AIC and SBC results for both subsamples.

Table 2. The results of unit root test

Before Covid-19 Crisis						
Lag	Intercept		Trend and Intercept		None	
	AIC	SBC	AIC	SBC	AIC	SBC
1	-5.91*	-5.89*	-5.91*	-5.88*	-5.92*	-5.90*
2	-5.91	-5.87	-5.91	-5.87	-5.92	-5.89
3	-5.91	-5.87	-5.91	-5.86	-5.92	-5.88
During Covid-19 Crisis						
Lag	Intercept		Trend and Intercept		None	
	AIC	SBC	AIC	SBC	AIC	SBC
1	-5.68*	-5.66*	-5.68	-5.65*	-5.68*	-5.67*
2	-5.68	-5.65	-5.67	-5.64	-5.68	-5.66
3	-5.67	-5.64	-5.67	-5.63	-5.67	-5.65

Notes: * 1. denotes minimum value.

Table 3 provides the test statistics of diagnostic and ARCH effects. For model diagnosing, the Ljung-Box Q test results show that Q (6), Q (12) are significant at the 5% level; Q^2 at lag 6 and lag 12 are significant at the 1% level before the Covid-19 crisis.

Additionally, Q (6), Q (12) are significant at the 5% level during the Covid-19 crisis. Q² at lag 6 and lag 12 are significant at the 1% level during the Covid-19 crisis. These results indicate a serial correlation in the standardized residuals of the two simple regression models for two subsamples.

For the ARCH effect, the ARCH (with 1 lag) statistics for both subsamples are greater than the critical Chi-square value ($\chi_{(1)} = 6.635$) at 1% level of significance. Thus, the null hypothesis that all q lags of squared residuals of each regression have coefficients that are not significantly different from zero, is rejected. It mentions that the market returns have ARCH effect or the two models of market returns have heteroscedasticity.

Table 3. Ljung-Box Q and ARCH statistics

Before Covid-19 Crisis			
Q(6)	12.349**	Q(12)	22.198**
Q ² (6)	104.21*	Q ² (12)	164.68*
ARCH(1)		30.16*	
During Covid-19 Crisis			
Q(6)	13.551**	Q(12)	24.161**
Q ² (6)	91.659*	Q ² (12)	164.18*
ARCH(1)		24.757*	

Notes: 1. * (**) (***) denote 1% (5%) and (10%) level of significance.

GARCH (1,1) can capture both symmetry and asymmetry volatility of stock returns. Accordingly, the GARCH (1,1) model is fitted on market returns for both before and during the Covid-19 pandemic. The GARCH (1,1) is given as follows:

$$ret_t = a_0 + a_1 D_{1t} + a_2 D_{2t} + a_3 D_{3t} + a_4 D_{4t} + b_1 ret_{t-1} + \varepsilon_t \quad (6)$$

$$\varepsilon_t \sim T(0,) \quad (7)$$

$$\sigma_t^2 = \omega + \lambda_1 \varepsilon_{t-1}^2 + \phi_1 \sigma_{t-1}^2 + \varepsilon_t \quad (8)$$

Table 4. Sign-bias Test and Model Diagnostic

Method	ARCH(1)	SBT	NSBT	PSBT	JT
Before Covid-19 Crisis	0.0227	0.338 (1.191)	5.395 (0.298)	-19.892 (-0.820)	(5.162)
	Q(6)	4.291		Q(12)	10.677
	Q ² (6)	1.275		Q ² (12)	2.447
During Covid-19 Crisis	0.1953	0.341 (1.189)	4.149 (0.365)	-20.284 (-1.037)	(6.067)
	Q(6)	3.963		Q(12)	8.959
	Q ² (6)	0.171		Q ² (12)	13.226

Notes: 1. * (**) (***) denote 1% (5%) and (10%) level of significance

Table 4 demonstrates the results of the sign-bias test and model diagnostic. The sign-bias test statistics show that the statistics of SBT, NSBT, PSBT and joint test are all insignificant. The joint test statistics (JT) are smaller than the critical Chi-squared value of 7.82 with 3 degrees of freedom at the 5% level of significance for both before and during the Covid-19 pandemic. Consequently, the null hypothesis of no asymmetric effect is accepted; the market returns are not asymmetric both before and during the Covid-19 pandemic. It means that other GARCH models, such as EGARCH and TGARCH, should not be additionally tried to apply. Moreover, the model diagnostic tests indicate that GARCH (1,1) is adequate due to no more serial correlation or conditional heteroscedasticity in the standardized residuals of the fitted model based on the insignificance of ARCH (1), Q and Q^2 statistics.

The empirical findings derived from OLS before and during the Covid-19 crisis show that the day-of-the-week effect is present in market returns for the HOSE. The results also indicate a difference in the day-of-the-week effect on market returns before and during the Covid-19 pandemic. Particularly, there was a negative Thursday effect (-0.8245) on stock returns before the Covid-19 crisis, while it exhibited a negative Monday effect (-0.00404) on stock returns during the Covid-19 pandemic. However, It is noted here that the OLS method ignores the time-varying volatility detected in the observed series. Thus, the results of GARCH (1,1) are more appropriate.

In terms of the conditional mean equation, the results of GARCH (1,1) report that the day-of-the-week effect did not exist on market returns before the Covid-19 crisis when the statistics of coefficients were all insignificant. This finding is supported by many studies which do not confirm the day-of-the-week effect on stock returns, such as Le Hau (2010), Kristjanpoller (2012a), Sharma (2011) and Plastun et al. (2019). Conversely, the weekend effect was present on market returns for the HOSE during the Covid-19 outbreaks, specifically, positive Friday effect was detected based on its significant statistic at the 5% level. It means that the impact of Covid-19 changes the the weekend effect on market returns for the HOSE. This result is consistent with some findings, for instance, French (1980), Seif et al. (2017). The findings are also suitable with the theory of behavioral finance, weekend effect which supposes investors usually being optimistic at the weekend after the stock prices going down on Monday. Therefore, the findings seem to be supported for the conclusion of Truong & Friday (2021), who indicated a negative effect of Mondays on stock returns for the pre-index futures period. Overall, the results of present study support the evidence that the Vietnam stock market is impacted by calendar effects such as the day-of-the-week effect during the Covid-19 pandemic, however, this anomaly was not found before the period of Covid-19 outbreaks. This finding is a meaningful proof for the big impact of the Covid-19 crisis when it makes an efficient market becoming inefficient. In other words, this study once again confirms that the Vietnam stock market is not totally follow the efficient market hypothesis theory or it facilitates the efficient market hypothesis in the period of Covid-19 appearance.

Table 5. The Estimation Results of GARCH (1,1) Model

Before Covid-19 Pandemic		
	GARCH (1,1)	OLS
Conditional mean equation		
Constant	0.00107 (1.4192)	0.00164 (1.5349)
Monday	-0.00786 (-0.7592)	-0.00146 (-0.9551)
Tuesday	-0.00090 (-0.8313)	-0.00223 (-1.4646)
Wednesday	-0.00077 (-0.6903)	-0.00125 (-0.8245)
Thursday	-0.00051 (-0.4913)	-0.00329 (-2.1762**)
Ret(-1)	0.0269 (0.6219)	
Conditional Variance equation		
C	2.00E-06 (1.6841***)	
RESID(-1)^2	0.1009 (2.9871*)	
GARCH(-1)	0.8834 (27.9869*)	
During Covid-19 Pandemic		
	GARCH(1,1)	OLS
Conditional mean equation		
Constant	0.001775 (2.122**)	-0.00044 (0.3560)
Monday	0.00037 (0.3386)	-0.00404 (-2.3064**)
Tuesday	-0.000106 (-0.0881)	0.00180 (1.0345)
Wednesday	0.000447 (0.3711)	0.00186 (1.0649)
Thursday	0.000446 (0.3949)	0.00028 (0.1616)
Ret(-1)	0.02107 (0.5179)	
Conditional Variance equation		
C	2.77E-05 (2.7239*)	
RESID(-1)^2	0.2999 (2.8810*)	
GARCH(-1)	0.6359 (8.0903*)	

Notes: 1. * (**) (***) denote 1% (5%) and (10%) level of significance.

In terms of the conditional variance equation, the statistics of constant are all significant at the 10% and 1% level for both periods, before and the Covid-19 pandemic, respectively. Additionally, the coefficients, λ , and ϕ are all positive and significant at the 1% level for both subsamples. It concludes that the past squares residuals lead to bigger recent volatility and the past volatility positively affects current volatility as well. The findings also imply that the impact of the Covid-19 health crisis seems to increase the volatility of market returns.

Conclusion

Considering the calendar anomalies combined with the impact of Covid-19 will help investors and policymakers react rightly when making their financial decisions. This present study aims to investigate the effect of calendar anomaly, specified by the day-of-the-week, on market returns pre and during the Covid-19 period. Closing daily data in two sub-periods for the Vietnam stock market (VN- index), the OLS method and GARCH (1,1) model were employed. The findings additionally contributed evident proof for the Vietnam stock market – a frontier market. Regarding stock returns, positive returns were found only on Friday, during the Covid-19 pandemic. It implies that Covid-19 has changed the nature of the stock market from efficient to inefficient. However, the positive effect on Friday during the Covid-19 crisis is also a signal that facilitates or makes efficiency back in the short run. This finding again supports previous studies that mentioned the day of the week affected on stock returns in the Vietnam stock market (Loc, 2006; Truong & Friday, 2021). In addition, this finding may partially support the conclusion that weak-form efficiency does not hold in the Vietnam stock market (Dong Loc et al., 2010; Phan & Zhou, 2014; Shaik & Maheswaran, 2017; Vo & Truong, 2018; Le & Duong, 2022) and the Vietnam stock market is efficient in the periods before and during Covid-19 pandemic (Kok & Geetha, 2023).

This explanation based on the argument of Gormsen & Koijen (2020) that stock markets adversely react to this outbreak in the short run but they will correct themselves and go up again in the long run. The present finding is also supported by the study of Phan Tran Trung & Pham Quang (2019), which mentioned that the efficiency of the Vietnam stock market varies over time and is influenced by market conditions.



The present research only uses a market index (VN-Index) to evaluate the day-of-the-week effect before and during the Covid-19 pandemic. Therefore, the day-of-the-week impact on specific sectors before and during the Covid-19 pandemic has not yet been detected. This may lead to a limitation of conclusion. Hence, to get a precise view in this context, future research needs to consider more sector indices and may apply more GARCH family models. On the other hand, the day of the week is not the only factor which affects stock returns; thus, future research can add more variables such as the January effect, monthly effect, etc. These variables will help to explain more in the case of market anomaly.

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