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ANALYSIS OF INVESTMENT OPPORTUNITIES AND CHALLENGES IN THE TELECOMMUNICATIONS SECTOR IN INDONESIA FROM AN INVESTMENT AND PORTFOLIO MANAGEMENT PERSPECTIVE

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Abstract
This study aims to analyze investment opportunities and challenges in the telecommunications sector in Indonesia from an investment and portfolio management perspective. The study uses a qualitative descriptive method with a library research approach , collecting and analyzing data from official government reports, annual reports of telecommunications companies, and various scientific literature related to investment, capital markets, and the development of the telecommunications sector. The study results indicate that the telecommunications sector has good investment prospects along with increasing digital transformation, internet user growth, 5G network development, and government support for accelerating the digital economy. On the other hand, this sector also faces various challenges, such as high infrastructure investment needs, inter-company competition, regulatory changes, fluctuating macroeconomic conditions, exchange rate risks, and rapid technological developments. From an investment and portfolio management perspective, investment decisions in the telecommunications sector not only consider potential *returns* but also pay attention to the level of risk through analysis of company fundamentals, macroeconomic conditions, and portfolio diversification. Therefore, the telecommunications sector remains an attractive investment alternative for long-term investors, as long as it is accompanied by an appropriate risk management strategy.

Keywords: Investment, Telecommunication Sector, Investment Management, Portfolio, Investment Opportunities, Investment Risk.

INTRODUCTION

The telecommunications sector is a strategic sector that plays a crucial role in supporting the development of Indonesia's digital economy. Advances in information technology, increased internet usage, and shifts in social and business activities toward digitalization have led to a continuous increase in the need for telecommunications services. Infrastructure such as *broadband networks* , cellular networks, *data centers* , and 5G technology have become crucial in supporting economic and social activities that increasingly rely on digital connectivity. This situation makes the telecommunications sector function not only as a communications service provider but also as infrastructure that supports the development of various economic activities in Indonesia. The growth of internet usage is one indicator of the growing public demand for telecommunications services. According to the Central Statistics Agency (2025) , 72.78% of Indonesia's population had internet access in 2024, up from 69.21% in 2023. During the same period, 68.65% of Indonesia's population was recorded as using a mobile phone. This increase indicates that digital connectivity is increasingly becoming a part of people's activities, whether for communication, education, work, commerce, entertainment, or the use of public services.

The increasing need for connectivity is also reflected in the performance of the Information and Communications sector in the national economy. The Central Statistics Agency (2025) noted that the Information and Communications sector grew by 7.57% in 2024 and contributed 4.34% to Indonesia's Gross Domestic Product (GDP). This growth indicates relatively strong demand for digital and communications services. Although its contribution to GDP remains lower than that of several other economic sectors, the development of this sector demonstrates the growing importance of information and communications technology in the national economic structure. The growth of the digital economy also creates opportunities for telecommunications companies to expand their business activities. The development of *e-commerce* , digital financial services, *streaming* , online education, application-based services, and digital business activities requires adequate connectivity. With the increasing use of the internet, telecommunications companies have the opportunity to expand their revenue streams through improved data services, *fixed broadband* , *cloud computing* , *data centers* , and various other digital services. Therefore, the development of the digital economy can be a factor supporting the long-term growth prospects of telecommunications companies. On the other hand, the capital- *intensive nature of the telecommunications sector* is a crucial aspect when considering investment. Companies require significant funds to build, expand, and maintain network infrastructure. Indonesia's geographical location as an archipelagic nation also means that network development in remote and underdeveloped areas requires greater costs and infrastructure support. Furthermore, rapid technological developments require companies to make continuous investments to ensure network capacity and quality continue to meet user needs. These conditions indicate that the telecommunications sector's growth opportunities are accompanied by significant capital requirements and business risks.

Industry competition is also a factor that needs to be considered. The Indonesian telecommunications sector involves numerous network and service providers. Data from the Ministry of Communication and Digital of the Republic of Indonesia (2024) shows that there are 661 telecommunications network operating permits held by 531 legal entities. This large number of providers indicates that companies face competition to acquire and retain customers while improving service quality. In this environment, companies' ability to innovate, increase efficiency, and develop infrastructure is crucial to maintaining competitiveness. From an investment perspective, these characteristics create a mix of growth opportunities and risks that require careful consideration. Investors should not simply focus on revenue growth or industry development; they should also consider company profitability, capital structure, macroeconomic conditions, regulatory changes, industry competition, technological developments, and market risks. This approach aligns with investment management principles, which prioritize *return* and risk as inseparable aspects of the investment decision-making process (Bodie et al., 2021) .

Telecommunication company shares are also an alternative for investors to consider, offering exposure to developments in the digital economy through the capital market. However, a positive industry outlook does not automatically imply that all telecommunications companies have the same level of returns and risks. Differences in business models, financial conditions, expansion strategies, infrastructure quality, and the company's ability to adapt to technological developments can result in varying investment performance. Therefore, analysis of the telecommunications sector should be conducted taking into account industry conditions and the characteristics of each company. From an investment and portfolio management perspective, this analysis is increasingly important because investment decisions in telecommunications sector stocks must consider the balance between potential *returns* and risks. Investors need to assess the sector's growth opportunities while identifying factors that could pose risks, such as global economic uncertainty, changes in interest rates and exchange rates, regulations, inter-company competition, infrastructure investment needs, and technological disruption. By conducting a comprehensive analysis, investors can determine a more rational strategy for selecting stocks and managing telecommunications sector exposure in their portfolios.

Based on these conditions, a study of investment opportunities and challenges in the telecommunications sector in Indonesia is crucial. This article aims to analyze the characteristics and development of the telecommunications sector, assess the impact of macroeconomic conditions on the sector, identify investment opportunities and challenges, and analyze investment and portfolio management strategies that can be used to optimize returns *while* controlling investment risks in the telecommunications sector in Indonesia.

LITERATURE REVIEW

2.1 Investment and Investment Management

Investment is the act of placing funds in an asset with the goal of achieving economic benefits or a future rate of return. In the context of capital markets, investments can be made through various instruments, one of which is company shares, which offer investors the opportunity to earn *returns* through share price increases or dividends. Investment decisions are fundamentally related not only to the potential profit but also to the risks involved during the investment period.

Investment management is the process of managing funds by considering investment objectives, risk levels, time horizons, and available asset alternatives. Bodie et al., (2021) explains that the relationship between risk and *return* is a crucial basis for investment decision-making. Investors need to estimate *the expected return* and assess the risk of each asset before determining fund allocation. Thus, investment management helps investors make more informed decisions based on their investment conditions and objectives.

In the context of the telecommunications sector, investment management is necessary because this sector's characteristics offer both growth opportunities and various risks. The growth of internet usage, the development of the digital economy, and technological innovation can enhance company prospects. However, significant capital requirements, technological changes, industry competition, macroeconomic conditions, and regulations can impact company performance. Therefore, investors need to consider both internal and external factors simultaneously before making investment decisions.

2.2 Investment Portfolio and Diversification

An investment portfolio is a combination of several assets held by an investor with the goal of achieving a certain level of return with an acceptable level of risk. The portfolio concept is important because investors generally don't invest all their funds in a single asset. Diversification reduces dependence on the performance of a single asset or sector, thus better managing overall investment risk.

Markowitz (1952) Modern portfolio theory explains that asset selection in a portfolio requires consideration of the relationship between *return* , risk, and correlation between assets. Portfolio risk is determined not only by the risk of each individual asset but also by the correlation between the assets within the portfolio. Therefore, combining assets with different characteristics can help investors achieve a more efficient portfolio.

This principle is relevant to investments in the telecommunications sector. Although the telecommunications sector offers growth prospects supported by digitalization, investors still face risks stemming from changes in economic conditions, interest rates, exchange rates, regulations, competition, and technological developments. By diversifying into other sectors or instruments, investors can mitigate the risks that arise if the telecommunications sector's performance comes under pressure.

2.3 Risk and *Return* in Investment

Return is the return an investor expects from the funds invested in an asset. In stock investments, *return* can come from gains or losses due to changes in stock prices and dividend income. Meanwhile, risk relates to the uncertainty surrounding the expected *return* . The greater the uncertainty surrounding investment returns, the greater the risk an investor must consider.

In the telecommunications sector, stock *returns* can be influenced by both the company's fundamentals and external factors. Research by Sari et al. (2021) on telecommunications subsector companies shows that company financial indicators can be used to analyze stock *returns* . Meanwhile, Karwati and Anindyntha (2022) analyzed the stock risks and *returns* of telecommunications companies listed on the Indonesia Stock Exchange and demonstrated the importance of considering market risk when assessing investments in this sector.

Therefore, investors should not only pursue stocks with high potential *returns* , but also consider the associated risks. Analyzing fundamental conditions, market risks, and macroeconomic factors is necessary to assess whether an investment's potential returns are commensurate with the risks involved.

2.4 Telecommunications Sector as an Investment Object

The telecommunications sector is part of the Information and Communications category of the Indonesian economy. This sector is characterized by being capital-intensive, technology-based, with high service demands, and facing intense industry competition. The significant capital requirements primarily stem from network construction and maintenance, technology development, and infrastructure capacity expansion.

The development of the telecommunications sector is also closely linked to the growth of the digital economy. In 2024, the Information and Communications sector grew by 7.57% and contributed 4.34% to Indonesia's GDP. Furthermore, the percentage of the population with internet access increased from 69.21% in 2023 to 72.78% in 2024. This data indicates that the use of digital connectivity is expanding and could be a supporting factor for the growth of the telecommunications sector.

In the Indonesian capital market, the telecommunications sector can be an alternative for investors seeking exposure to the development of the digital economy. Some of the key companies discussed in this paper are PT Telkom Indonesia (Persero) Tbk. (TLKM), PT Indosat Tbk. (ISAT), and PT XLSMART Telecom Sejahtera Tbk. (EXCL). All three operate in the telecommunications and connectivity sectors, but have distinct business characteristics and development strategies.

These differences in characteristics are important considerations for investors when analyzing and constructing portfolios. Investors should compare the financial performance, growth prospects, capital structure, *returns* , and risks of each company before making investment decisions. Therefore, the telecommunications sector can be analyzed not only based on industry growth but also on each company's ability to generate value and navigate changes in the business environment.

RESEARCH METHODOLOGY

This study uses a qualitative descriptive approach with a library research method . This approach is used to analyze investment opportunities and challenges in the telecommunications sector in Indonesia based on various information and literature relevant to the development of the telecommunications sector, macroeconomic conditions, company performance, capital markets, and investment and portfolio management. The data used in this study is secondary data obtained from various relevant sources. These sources include official government reports and publications, annual reports from telecommunications companies, capital market information, books on investment and portfolio management, as well as previous articles and research discussing telecommunications company performance, stock *returns* , investment risk, and digital economic development.

Data collection was conducted by identifying and reviewing information related to the Indonesian telecommunications sector. This information was then grouped based on several key aspects, namely macroeconomic conditions, characteristics and contributions of the telecommunications sector, company performance, investment opportunities, and challenges that may influence investor decisions. The telecommunications companies included in the study include PT Telkom Indonesia (Persero) Tbk., PT Indosat Ooredoo Hutchison Tbk., and PT XL Axiata Tbk., as all three are listed on the Indonesia Stock Exchange and are relevant to describing the sector's condition from an investment perspective.

The analysis is conducted descriptively by linking information on telecommunications sector developments with investment and portfolio management concepts. Sector performance analysis includes revenue growth, profitability, market capitalization, stock price trends, historical *returns* , and investment risk. Meanwhile, the opportunity and challenge analysis considers developments in digitalization, the digital ecosystem, the demographic dividend, the green economy, government policies, foreign investment, global economic conditions, regulations, industry competition, political risks, environmental, social *, and governance* (ESG) aspects, and technological disruption. The structure of the analysis follows the discussion in the paper that forms the basis for this article.

Next, the study results are interpreted by considering the relationship between potential *returns* and investment risk. Information on company conditions and sector developments is used to identify factors that could support or hinder investment prospects. This analysis is then linked to the principle of portfolio diversification to examine how investors can manage risk when considering telecommunications sector stocks as part of an investment portfolio. Using this method, the research is expected to provide a systematic overview of the condition of the Indonesian telecommunications sector from an investment perspective. The qualitative descriptive approach allows for an integrated analysis of various information from secondary sources, allowing it to be used to identify opportunities, challenges, and relevant considerations in investment decisions in the telecommunications sector.

RESULTS AND DISCUSSION

4.1 Macroeconomic Conditions and Their Impact on Investment in the Telecommunications Sector

Macroeconomic conditions are a crucial factor in determining investment prospects in the telecommunications sector, as changes in economic conditions can impact service demand, operational costs, company expansion capabilities, and investor behavior in the capital market. Based on the study in this paper, factors to consider include economic growth, inflation, interest rates, exchange rates, government policies, and global geopolitical conditions. These six factors can create both opportunities and risks for telecommunications companies and investors.

Economic growth

Economic growth can increase household consumption, business investment, and the use of digital technology. This situation drives the demand for *broadband internet services* , data communications, *data centers* , and various digital services. With increased economic activity, telecommunications companies have the opportunity to expand their customer base, increase data service usage, and develop digital businesses that have the potential to increase company revenue. The paper notes that this condition is supported by the growth of the Information and Communications category of 7.57% in 2024, contributing approximately 4.34% to Indonesia's GDP.

However, economic growth cannot be the sole basis for investment decisions. Positive economic growth does not necessarily translate into improved performance for all telecommunications companies. Investors still need to combine macroeconomic analysis with fundamental analysis, such as revenue growth, profitability, operational efficiency, cash flow, and capital structure. This approach is necessary to tailor portfolio stock selection to each company's prospects and risk level (Bodie et al., 2021 ; Reilly et al., 2019)

Inflation

Inflation impacts the telecommunications sector primarily through changes in operational costs and consumer purchasing power. Rising energy prices, infrastructure maintenance, technology equipment, and network development costs can increase company expenses. If these cost increases are not offset by revenue growth, company profitability can be under pressure. On the consumer side, inflation can also encourage people to adjust spending and prioritize essential needs, impacting the consumption of additional services such as premium data packages and certain digital services (Sulastri & Suselo, 2022) .

Despite this, telecommunications and internet services are increasingly becoming essential needs for the public and businesses. This situation means that demand for connectivity remains relatively high despite inflationary pressures. Companies with extensive networks, operational efficiency, and the ability to maintain profitability tend to be more resilient to macroeconomic pressures. Therefore, investors need to assess the impact of inflation alongside fundamental indicators such as revenue, net income, cash flow, and debt levels (Reilly et al., 2019) .

Interest rate

Bank Indonesia's benchmark interest rate influences corporate funding costs and investor preferences when selecting investment instruments. When interest rates rise, corporate borrowing costs can increase, making network expansion, *data center construction* , and technology development more expensive. This can put pressure on profits if rising funding costs are not offset by increased revenue (Kreshnadjati & Nursito, 2022) .

Changes in interest rates can also influence investor behavior. When interest rates rise, fixed-income instruments can become more attractive, potentially leading some investors to reduce their allocation to stocks. Conversely, lower interest rates can lower the cost of capital and support corporate expansion. Research by Kreshnadjati and Nursito (2022) examines the BI Rate, exchange rates, and *returns.* The stock price of PT Telekomunikasi Indonesia Tbk. shows that these macroeconomic factors are relevant in evaluating the risks and opportunities of investing in telecommunications stocks.

Rupiah exchange rate

The rupiah exchange rate is a crucial factor because some telecommunications equipment and technology still rely on foreign products and components. A weakening rupiah against the US dollar can increase the procurement costs of network equipment, transmission equipment, *data center technology* , and companies' capital expenditure requirements. If companies are unable to implement efficiency measures or adjust service prices, these cost increases can put pressure on profitability (Djamaluddin & Hosea, 2021) .

For investors, exchange rate fluctuations can also increase uncertainty regarding stock *returns* . However, the impact varies across companies. Companies with sound currency risk management, strong cash reserves, and improved operational efficiency are better able to withstand Rupiah depreciation. Therefore, exchange rates should be analyzed alongside revenue growth, profitability, debt structure, and cash flow generation when investors select telecommunications stocks for their long-term portfolios.

Government policy

Government policies have a significant impact on the telecommunications sector because this industry is linked to frequency spectrum usage, infrastructure development, business competition, data security, and national digital transformation. Regulations that provide certainty can support long-term corporate investment, while unpredictable policy changes can increase business risk and influence investor decisions (Verhoef et al., 2021 ; Warner & Wäger, 2019) .

Government policies encouraging *broadband development* , 4G and 5G networks, equitable internet access, and the development of digital ecosystems also create opportunities for telecommunications companies. Increased connectivity can drive demand for *data centers* , *cloud computing* , and other digital services. However, companies still face obligations related to infrastructure development, consumer protection, cybersecurity, and personal data protection, which can increase investment requirements and compliance costs.

Global Geopolitical Conditions

Global geopolitical conditions are among the external factors that can impact economic stability, international trade, and technology supply chains. The telecommunications sector is closely linked to global conditions because networking equipment, electronic components, 5G devices, and *data center technology* are all involved in international supply chains. Tensions between countries and restrictions on technology trade can disrupt equipment supplies and increase companies' investment costs (Verhoef et al., 2021) . Disruptions in international trade can also increase the price of technological equipment, affect exchange rates, and raise the cost of infrastructure development. These conditions are risks that investors should consider when assessing a company's ability to maintain expansion and profitability. However, geopolitical uncertainty can also create opportunities through the growing need for cybersecurity, data centers, technological independence, and more secure digital infrastructure. Companies that can adapt to the changing global environment can benefit from these growth opportunities.

Overall, these six macroeconomic factors indicate that investment in the telecommunications sector is closely linked to the external economic environment and policies. Economic growth and digital policies can drive demand and expansion, while inflation, interest rates, exchange rates, and geopolitical uncertainty can increase company risks and costs. Therefore, investors should combine macroeconomic analysis with fundamental analysis of companies before determining which telecommunications stocks to include in their portfolios.

4.2 Historical *Returns* and Investment Risks in the Telecommunications Sector

returns are one indicator investors can use to evaluate investment performance in the telecommunications sector. Stock *returns* essentially reflect the returns investors receive from changes in stock prices and other income, such as dividends. When assessing telecommunications stocks, historical *returns* are assessed not only by the amount of profit earned but also by their consistency and level of fluctuation. Relatively stable *returns* indicate a company's ability to maintain business performance, while highly volatile *returns* indicate greater uncertainty for investors.

Differences in *returns* between telecommunications companies can be influenced by fundamental conditions, business strategies, and the company's ability to adapt to digital technology developments. Companies with stronger fundamentals and the ability to maintain their financial performance tend to have a better ability to provide *returns* to investors. Research by Sari et al. (2021) shows that *Return on Equity* (ROE) and *Earnings per Share* (EPS) influence stock *returns* in telecommunications subsector companies listed on the Indonesia Stock Exchange. These findings demonstrate that a company's fundamental condition is a critical aspect in assessing potential investment returns.

Besides fundamentals, market risk is also a factor that needs to be considered. Karwati and Anindyntha (2022) found that market risk significantly influences stock *returns* in telecommunications companies listed on the Indonesia Stock Exchange. This suggests that changes in market conditions and investor sentiment can impact the level of returns received by investors. Therefore, assessing historical *returns* should be accompanied by a risk analysis so that investors consider not only potential returns but also the level of uncertainty involved.

Investment risks in the telecommunications sector can stem from both internal and external factors. One major risk is business competition. Fierce competition between operators can encourage companies to offer lower rates, increase promotions, and make additional investments to retain customers. These strategies can increase company costs and squeeze profit margins. Therefore, intense competition can impact profitability and ultimately influence investor perceptions of a company's prospects.

Technological risk is also a key characteristic of the telecommunications sector. The development of 5G networks, *the Internet of Things* (IoT), *cloud computing* , *Artificial Intelligence* (AI), and *data centers* requires companies to continuously invest to stay ahead of competitors. However, technology investments require significant capital. If companies fail to translate these investments into increased revenue and profits, the investment burden can increase financial risk. Conversely, companies that effectively utilize technology have the opportunity to expand revenue streams and increase competitiveness.

Regulatory risk also needs to be considered, as telecommunications sector activity is heavily influenced by government policies. Regulation of frequency spectrum, interconnection tariffs, licensing, personal data protection, and information security can impact a company's business strategy and operational costs. Unexpected regulatory changes can increase business uncertainty, making them a crucial factor for investors to consider when evaluating the prospects of telecommunications stocks.

Furthermore, changes in macroeconomic conditions can impact the risks and *returns* of the telecommunications sector. Inflation, interest rates, exchange rates, and economic growth can influence people's purchasing power, companies' financing costs, and investor decisions in the capital market. Rising interest rates, for example, can increase the attractiveness of lower-risk investment instruments, leading some investors to reduce their stock holdings. This situation has the potential to increase pressure on telecommunications companies' stock prices.

Financial risk is also a concern because the telecommunications sector requires significant capital for infrastructure development and expansion. Using debt as a source of financing can help companies expand, but at the same time increases interest expenses and financial risk. Therefore, investors need to pay attention to ratios such as *the Debt-to-Equity Ratio* (DER), *Current Ratio* (CR), and *Interest Coverage Ratio* (ICR) to assess a company's ability to meet its financial obligations.

Market risk is then related to stock price fluctuations due to economic conditions, company information, corporate actions, regulatory changes, and investor sentiment. Research by Karwati and Anindyntha (2022) shows that market risk is significantly related to stock *returns* in telecommunications companies. These findings reinforce the need for investors to consider stock price volatility when allocating funds to the telecommunications sector.

Despite its various risks, the telecommunications sector remains an attractive investment prospect, supported by the growth of the digital economy, increasing internet usage, the development of digital services, and the need for connectivity infrastructure. Therefore, investment strategies in this sector must consider the balance between *return* and risk. Investors can conduct fundamental and technical analysis and implement portfolio diversification to ensure that the risk from a single company or sector does not completely determine the overall performance of the portfolio.

Thus, historical *returns* and risk are two inseparable aspects of investment decisions in the telecommunications sector. Good financial performance can increase potential *returns* , but investors still face competitive, technological, regulatory, macroeconomic, financial, and market risks. Therefore, rational investment decisions must consider the company's fundamental quality and its ability to handle various sources of risk over the long term.

4.3 Investment Challenges in the Telecommunications Sector in Indonesia

Although the telecommunications sector offers growth prospects supported by the development of the digital economy, investment in this sector still faces various challenges. Based on the study in this paper, these challenges include global economic uncertainty, commodity price fluctuations, regulatory changes, inter-company competition, political risk, the implementation of *Environmental, Social, and Governance* (ESG) principles, as well as technological disruption and changes in consumer behavior. These factors can impact a company's cost of capital, operations, profitability, expansion, and risk level.

Global Economic Uncertainty

Global economic uncertainty is a major challenge for the telecommunications sector because it can impact financial market stability, exchange rates, capital costs, and economic growth prospects. This situation can be triggered by a global economic slowdown, inflation, changes in monetary policy in developed countries, geopolitical conflicts, trade wars, and disruptions to global supply chains (Bank Indonesia, 2024) . This uncertainty increases investment risk because companies face unpredictable economic conditions when making long-term investment decisions (Krugman & Obstfeld, 2018) .

The impact is even greater for the telecommunications sector due to its capital-intensive nature. Network development, fiber optic expansion, base station procurement, 5G deployment, *data center construction* , and digital service development require significant investments with relatively long payback periods. As international interest rates rise, companies' financing costs can also increase, limiting their ability to finance network expansion and modernization (Mankiw, 2021) . A weakening rupiah can also increase the prices of network equipment, servers, antennas, and technology components, some of which are still imported, increasing *capital expenditure* and potentially depressing company profitability (Samuelson and Nordhaus, 2019) .

Global uncertainty can also influence investor behavior. In uncertain economic conditions, investors tend to be more cautious and may shift funds to lower-risk instruments. This situation has the potential to slow investment flows to capital-intensive sectors such as telecommunications. Furthermore, geopolitical conflicts and trade restrictions can disrupt supply chains, causing delays in device deliveries, shortages of electronic components, and increased logistics costs (World Bank, 2024) .

However, global economic uncertainty isn't entirely negative. The acceleration of digital transformation actually increases the need for the internet, *cloud computing* , AI, and IoT. Telecommunications companies that are able to adapt through technological innovation, operational efficiency, revenue diversification, and risk management still have the opportunity to maintain long-term growth (Schwab, 2017) .

Commodity Price Fluctuations

Fluctuations in commodity prices can also impact investment and operational costs for telecommunications companies. This industry requires various materials and components, such as steel, aluminum, copper, silicon, lithium, and rare earth metals, for the construction of towers, fiber optic cables, network equipment, *data centers* , and other supporting infrastructure. Changes in commodity prices can increase companies' procurement costs and capital expenditures (Mankiw, 2021) .

Rising raw material prices that are not matched by increased revenues can squeeze profit margins and reduce the telecommunications sector's attractiveness to investors (Porter, 1990) . In addition to raw materials, changes in energy prices also have an impact, as base stations, *data centers* , and transmission equipment require a continuous supply of electricity. Rising fuel and energy prices can increase a company's operating costs (International Energy Agency, 2024) .

Supply chain disruptions due to geopolitical conflict, export restrictions, or disruptions to international distribution can also lead to delays in equipment procurement and increased logistics costs (World Bank, 2025) . From an investor perspective, these conditions increase risk because they can reduce company efficiency and profitability. Companies with sound procurement strategies, long-term contracts, and supplier diversification tend to be better able to maintain cost stability (Hill et al., 2020) .

To mitigate the impact, companies can improve energy efficiency, use more energy-efficient technologies, diversify suppliers, and strengthen supply chain management. Utilizing renewable energy can also help reduce dependence on fossil fuels, the price of which fluctuates (International Energy Agency, 2024) .

Regulatory Changes

Regulatory change is a significant challenge because the telecommunications sector faces a high level of government oversight. Regulations regarding frequency spectrum, network licensing, digital infrastructure development, personal data protection, and digital service governance can impact a company's business strategy, operational costs, and investment plans (Hill et al., 2020) .

The government also continues to adjust policies to technological developments such as 5G, IoT, AI, and *cloud computing* . These adjustments are aimed at supporting digital transformation and increasing the competitiveness of the telecommunications industry (Ministry of Communication and Digital of the Republic of Indonesia, 2024) . One regulation that impacts investment is the frequency spectrum allocation and auction policy. Changes in frequency usage fees and licensing requirements can increase investment needs and affect investors' expected *return on investment* (ITU, 2023) .

Personal data protection also requires companies to improve cybersecurity, *data center capacity* , and human resource competency. While increasing costs, good data management can boost customer and investor confidence (Laudon & Laudon, 2022) . Furthermore, certainty regarding foreign ownership limits, investment incentives, taxation, and the use of domestic components also influence international investor decisions. Consistent regulations and legal certainty can boost investor confidence, while frequent policy changes can increase perceived risk (OECD, 2024) .

Competition between Telecommunication Companies

Competition is a major challenge because the telecommunications industry is dynamic and characterized by rapid technological change. Companies compete to acquire and retain customers through network quality, innovation, price, and service. According to Porter (1990) , high competition can impact profitability as companies seek to gain market share through various competitive strategies.

Competition in Indonesia is intensifying with growing internet demand and digital transformation. Operators continue to expand their 4G and 5G networks and develop services such as *cloud computing* , IoT, digital financial services, and *data centers.* (ITU, 2023) . Competition can also drive *price wars* through cheap internet packages, large quotas, and promotions. While this can increase market share in the short term, price wars have the potential to depress companies' revenues and profit margins.

In addition to other operators, telecommunications companies face competition from *Over-The-Top* (OTT) services, such as instant messaging apps, internet calls, and *streaming services* . This situation encourages companies to diversify their businesses by developing value-added digital services (OECD, 2024) . For investors, high competition does increase business risk, but it can also encourage innovation and efficiency. Therefore, competitive position, brand strength, innovation capabilities, and business strategy are important considerations in assessing a company's prospects (Porter, 1990) .

Political Risks to the Investment Climate

Political risk relates to changes in government, public policy direction, political conflict, security stability, and regulatory changes that can impact business activities. Political stability and institutional quality are crucial factors in building investor confidence for long-term investments.

The telecommunications sector is closely linked to government policies, particularly those related to investment, frequency spectrum, digital infrastructure development, and taxation. Policy changes due to political dynamics can alter projected costs, revenues, and returns on investment (Hill et al., 2020) . Foreign investors also tend to consider political stability, legal certainty, and governance before investing in sectors requiring large, long-term investments.

Consistent government policy is crucial for creating a conducive investment climate. In Indonesia, government support for digital transformation, telecommunications infrastructure development, and increased national connectivity are factors that can support sector development. However, investors must remain mindful of political dynamics that could influence the direction of future policies and regulations (Ministry of Communication and Digital of the Republic of Indonesia, 2024).

***Environmental, Social, and Governance* (ESG) Risks**

ESG aspects are increasingly important in investment decisions as investors consider not only financial performance but also how companies manage the environment, social responsibility, and governance. Companies with strong ESG performance tend to be perceived as having a better ability to manage long-term risks and create sustainable value (Friede et al., 2025).

From an environmental perspective, telecommunications companies face high energy consumption and e-waste issues. Base stations (BTS), *data centers* , fiber optic networks, and telecommunications equipment require continuous electricity consumption. Therefore, companies need to improve energy efficiency, reduce carbon emissions, and increase the use of renewable energy (International Energy Agency, 2024) .

From a social perspective, companies need to maintain service quality, data security, customer privacy, and equitable internet access. Failure to fulfill these responsibilities can erode customer trust and loyalty. Data protection and information security are crucial for maintaining customer trust in the digital age (Laudon & Laudon, 2022) .

Meanwhile, *governance aspects* relate to transparency, accountability, independence, responsibility, and fairness in company management. Good governance can improve decision-making effectiveness and strengthen risk management, while weak governance can increase legal risks, conflicts of interest, and regulatory violations. Consistent ESG implementation can also help companies address reputational and regulatory risks and support sustainable financial performance (Eccles et al., 2014) .

Technological Disruption and Changing Consumer Behavior

The development of 5G, AI, IoT, *cloud computing* , *edge computing* , and *big data analytics* has transformed the way companies provide services and run business models. These changes require telecommunications companies to continuously innovate to remain competitive (Schwab, 2017) . Companies need to allocate significant investments to develop digital infrastructure, modernize networks, and enhance *data centers* , as well as develop human resources. Large investments can increase financial risk if the technology developed does not deliver the expected benefits. Therefore, companies need to balance investment costs with potential long-term benefits (Hill et al., 2020) .

Changes in consumer behavior have also increased demands for internet speed, network stability, ease of access, data security, and *customer experience* . Consumers have more choices, so companies that fail to meet expectations can lose customers. This situation is driving companies to innovate products and improve service quality (Laudon & Laudon, 2022) . Furthermore, the emergence of OTT services has reduced reliance on conventional telecommunications services and encouraged companies to diversify into *cloud computing* , *data centers* , cybersecurity, and AI-based digital solutions. For investors, this situation creates the risk of *technology obsolescence* , but also opens up opportunities for companies that are able to adapt and innovate sustainably (Rogers, 2003) .

Overall, the challenges of investing in the telecommunications sector demonstrate that investment decisions cannot be based solely on potential *returns* . Investors also need to assess a company's ability to navigate economic uncertainty, cost fluctuations, regulatory changes, competition, political risk, ESG demands, and technological disruption. Companies with adaptability, strong fundamentals, continuous innovation, and good governance will be better positioned to weather these risks.

4.4 Prospects and Investment Strategies in the Telecommunications Sector

Based on the study's findings, the telecommunications sector still offers positive investment prospects in the medium to long term. The development of digital technology has increased public demand for communication and internet services, which are increasingly integrated with economic, educational, health, trade, banking, and government activities. This situation demonstrates that digital connectivity has become a vital part of people's lives, creating sustainable growth opportunities for telecommunications companies (Schwab, 2017) .

Growth opportunities are also supported by increasing internet usage and technological developments such as 5G, *the Internet of Things* (IoT), *Artificial Intelligence* (AI), *cloud computing* , and *data centers* . These developments provide opportunities for companies to expand revenue streams beyond conventional communications services. Digital transformation also encourages companies to create new, value-added services while increasing market competitiveness (ITU, 2023) . In Indonesia, the government is also encouraging investment in fiber optic networks, data centers, telecommunications towers, and other digital infrastructure to meet the growing need for connectivity.

From a corporate strategy perspective, the ability to innovate is a crucial factor in capitalizing on these opportunities. Telecommunications companies actively developing 5G networks, *cloud computing services* , *data centers* , IoT, and digital solutions have a greater opportunity to increase revenue and maintain a competitive advantage. The ability to adapt to technological developments is also crucial for creating sustainable growth (Porter, 1990) .

For investors, sector growth prospects are not sufficient basis for immediately selecting stocks. Investors still need to conduct fundamental analysis, which includes revenue growth, profitability, cash flow, capital structure, ability to meet obligations, and management effectiveness in managing assets. This analysis helps investors assess a company's financial condition and estimate whether the stock price fairly reflects the company's value (Damodaran, 2012) .

In addition to fundamental analysis, investors need to consider external conditions such as economic growth, inflation, interest rates, exchange rates, government policies, and regulatory developments. These factors can impact operational costs, a company's ability to obtain funding, and demand for telecommunications services. Therefore, regular monitoring of macroeconomic conditions is necessary to adapt investment decisions to changes in the business environment (Hill et al., 2020) .

From a portfolio management perspective, investors are also advised against investing all their funds in a single company or sector. Diversification can be used to reduce risk by allocating funds across multiple assets with different risk characteristics and rates of return. This strategy aligns with Markowitz's (1952) modern portfolio theory , which emphasizes the importance of asset combination in achieving a return commensurate with the investor's risk tolerance.

Investors also need to consider the implementation of *Environmental, Social, and Governance* (ESG) when selecting companies. Companies that have good governance, prioritize environmental sustainability, protect customer data, and consistently implement social responsibilities tend to be better able to manage long-term risks. Friede et al. (2025) demonstrated a positive relationship between ESG factors and corporate financial performance.

Thus, the prospects for the telecommunications sector remain attractive, but investment strategies require careful selection. Investors should not only consider industry growth but also compare company fundamentals, innovation capabilities, competitive position, macroeconomic risks, governance quality, and the company's ability to navigate technological change. This strategy allows investors to gain a more comprehensive picture of potential *returns* and risks before determining their portfolio composition.

CLOSING

Based on the results of the study, the telecommunications sector is a strategic sector with positive investment prospects in the medium and long term. The development of digital transformation, increasing internet usage, the development of 5G networks, and the development of *the Internet of Things* (IoT), *Artificial Intelligence* (AI), *cloud computing* , and *data centers* are factors supporting the growth of the telecommunications sector in Indonesia.

Furthermore, government support for digital infrastructure development and equitable internet access also strengthen the sector's attractiveness to investors (Schwab, 2017 ; ITU, 2023 ; Ministry of Communication and Digital of the Republic of Indonesia, 2024) .

On the other hand, investments in the telecommunications sector continue to face various risks, such as global economic uncertainty, commodity price fluctuations, regulatory changes, inter-operator competition, political risk, ESG implementation, and technological disruption. These factors can impact company performance and investment returns, making a company's ability to adapt, manage risk, innovate, and maintain financial performance crucial (Hill et al., 2020) .

From an investment and portfolio management perspective, investment decisions cannot be based solely on expected *returns . Investors need to consider the company's fundamentals, growth prospects, financial structure, profitability, management quality, macroeconomic conditions, and the company's ability to cope with technological developments. This principle aligns with the concept of the balance between return* and risk in portfolio theory (Markowitz, 1952) .

Thus, the telecommunications sector can remain an attractive long-term investment alternative, but companies must be selected selectively. Companies with strong financial fundamentals, high innovation capabilities, adaptive business strategies, good governance, and the ability to manage risk have a greater opportunity to create sustainable growth and provide value to investors. The application of ESG principles also needs to be considered because it is related to business sustainability and long-term company performance (Friede et al., 2025 ; Porter, 1990) .

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