

# Enhancing Financial Reporting Quality to Improve Investment Efficiency (Empirical Evidence from Companies Listed in Indonesia Stock Exchange)

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## ABSTRACT

This study is aimed to gain insight about the investment efficiency in companies listed in Indonesia Stock Exchange as emerging market. Company's investment efficiency has important role in the economic growth. Based on the theoretical framework, the high quality of financial reporting will improve the confidence level of decision making in investment. So that, enhancing the financial reporting quality will make the better investment efficiency. This study is conducted to get empirical evidence on the effect of enhanced financial reporting quality on investment efficiency. The secondary data source are the current annual financial statement of companies listed in Indonesia Stock Exchange from various industries. Financial reporting quality is assessed by the level of qualitative characteristic of financial statement. The deviation level of expected investment is used as the measurement of investment inefficiency. This study uses purposive sampling with the criteria used are the willingness of the company to provide an explanation of the process of financial reporting and investment in several focus group discussions. Multiple regression is used to analyze the data for hypothesis testing. The result shows that enhancing financial reporting quality will improve the investment efficiency in the Indonesian companies context. Good financial reporting will produce a good financial statement. Good financial statement will support management's decision making to invest in more efficient way. In the Indonesia companies context, investment inefficiency are still incurred. Underinvestment and overinvestment become common practices in companies listed in Indonesia Stock Exchange.

**Keywords:** *Financial reporting, Financial statement, Quality, Investment efficiency, Underinvestment, Overinvestment.*

**JEL Classification:** *M40, G11, D92*

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### Highlights of this paper

- This study finds that many Indonesian companies still have the problem of investment inefficiency. Some companies experience negative difference from expected investment which is called as underinvestment. Other companies experience positive difference from expected investment which is called as overinvestment. There is no company with zero deviation from expected investment.
- The findings reveal that the most strategy to avoid underinvestment and overinvestment is enhancing the financial reporting quality.

## 1. INTRODUCTION

Investment is a commitment on current treasuries or other resources, with the hope of obtaining benefits in the future (Bodie *et al.*, 2014). The future benefits are incurred for investors' compensation because of: 1) the period of time when funds are pledged, 2) anticipated inflation rates, and 3) unpredictable forthcoming payments (Brown and Reilly, 2009). Investments are made by investors to maximize the benefits of return on investment in accordance with their willingness to take risks (Jones, 2014). The form of investment varies, for example: expenditure for capitalized goods (fixed assets) and inventory is investment for a business company ; the purchase of a house is investment for household, while the expenditure on goods and services is consumption; and expenditure to build and maintain public facilities is another form of investment for government (Rose and Marquis, 2006).

In every form of investment, whether carried out by business companies, households, or the government, investment efficiency is expected to produce a positive net present value (Chen *et al.*, 2011). An investment is considered efficient if the investment does not deviate from the expected investment, where the smaller deviations occur, the more efficient the investment has been made (Gilaninia *et al.*, 2012). Missing investment opportunities out that generate positive net present value is underinvestment, while investing in projects that produce a negative net present value is overinvestment (Biddle *et al.*, 2009). Underinvestment and overinvestment are inefficient investments (Li and Wang, 2010).

In fact there are still many investment inefficiency problems that are carried out by business companies in Indonesia (Sindhunata, 2010; Akbar, 2013; Lant, 2014). The problems of investment inefficiency are occurred in State-Owned Enterprises (SOE), where SOE management is required to increase efficiency in business development both technology efficiency, allocation efficiency and total efficiency, especially because of the level of efficiency in capital expenditure funds or SOE's investments that are considered still not satisfactory, as happened at PT Perusahaan Listrik Negara with inefficiency values reaching the amount of IDR37 trillion as explained by Akbar (2013) as VII Member of the Audit Board of the Republic of Indonesia.

According to Qosasih (2015a) VII Member of of the Indonesian Audit Board for Division of SOE, based on the results of the audit, there are approximately 54% of 138 SOEs suffered losses due to misinvestment. Examples of SOEs that suffered losses in 2014 included: PT Garuda Indonesia Tbk (IDR4.6 trillion), PT Krakatau Steel Tbk (IDR2.5 trillion), PT Merpati Nusantara Airlines (IDR1.5 trillion), PT Antam Tbk (IDR775.2 billion), Bulog Corporation (IDR458.0 billion), PT Rajawali Nusantara Indonesia (IDR281 billion), PT INTI (IDR265.8 billion), PT Dok dan Kodja Bahari (IDR175.9 billion), PT ASEI-REI (IDR128.1 billion), PT Iglas (IDR110.2 billion), PT Barata Indonesia (IDR 96.5 billion), PT Dok dan Shipping Surabaya (IDR89.6 billion), PT Industri Sandang Nusantara (IDR67.9 billion), PT Berdikari (IDR47.9 billion), PT Indonesian Trading Company (IDR 37.4 billion), Penas Air Survai (IDR20.8 billion), PT Indra Karya (IDR9.2 billion), PT Balai Pustaka (IDR8.4 billion), PT Primissima (IDR6.5 billion), PT PDIP Batam (IDR4.8 billion), and State Film Production Corporation (IDR 779 million) (Poernomo, 2015). Many SOEs are misinvesting in the procurement of goods and services (Qosasih,

2015b). The investment is redundant because it is in vain (Qosasih, 2015c). These misinvestments have an impact on the company's burden that is not comparable with the income (Qosasih, 2015d).

Furthermore, the problems related to investment inefficiencies also occurred in mining companies, where on May 26, 2014 PT Renuka Coalindo had invested by purchasing 90% of the shares of PT Surya Global Makmur in order to support performance, but in fact PT Renuka Coalindo actually experienced a decline in revenue 149.28% year on year became USD2.88 million during the first half of the acquisition, even though in the previous year the net income recorded was USD7.18 million as explained by Lant (2014) as President Director of PT Renuka Coalindo.

In banking companies there were also investment inefficiencies, where in June 2003 the Sorak Financial Holding consortium invested in 51% of the shares of Bank Internasional Indonesia (BII), and the following two years BII's profits doubled to above IDR100 million per capita, but next five year after the acquisition BII's profit decreased to IDR63.1 million per capita and in 2009 BII had a deficit of IDR5.7 million per capita as stated by Sindhunata (2010) as Executive Director of the Investment and Banking Research Agency (INBRA). In addition, in 2003 Asia Finance Indonesia Pte. Ltd. had carried out investments in 68% of Bank Danamon's shares, but five years later Bank Danamon's net profit consistently declined from IDR115 million per capita (2003) to IDR92 million per capita (2004) and declined to IDR36.8 million per capita (2009) (Sindhunata, 2010). Then, in November 2004 Standard Chartered Bank and Astra International invested 51% in ownership in PermataBank, but PermataBank was unable to increase its net income, where PermataBank's net profit decreased from IDR100.1 million per capita (2004) to IDR93.2 million per capita (2009) (Sindhunata, 2010).

The latest case of misinvestment occurred at the Indonesian state-owned insurance financial institution, Jiwasraya. Jiwasraya's management places investment fund allocations inappropriately, where with uncertain global economic conditions it invests aggressively in equity instruments because it pursues high returns as described by Sinaga (2018a) as an Insurance Observer and Chair of the College of Risk Management & Insurance (STIMRA) Jakarta. Based on data from the Indonesian Central Securities Depository (Sinaga, 2018b) Jiwasraya owns shares of PT PP Properti Tbk (PPRO). On January 1, 2018 it is worth IDR1.03 trillion. But, the share value is only IDR 556.7 billion on October 10, 2018. This means that the value of Jiwasraya's PPRO shares has dropped by around IDR473.21 billion. Jiwasraya also owns shares of PT Semen Baturaja Tbk (SMBR). On January 1, 2018, Jiwasraya's SMBR value was around IDR 3.46 trillion. The value of the shares became IDR2.09 trillion on October 10, 2018 or decreased by around IDR1.37 trillion.

Most of the equity investment purchased by Jiwasraya are three-tier shares (fried shares). These three-tier stocks are often referred to as junk stocks or small-cap stocks. This stock has a very high price volatility and is often became the target of speculators. The price is also relatively cheap compared to one and two tier stocks. Because the volatility of fried stock prices is very high, the investment risk is also high (Zuhra, 2019). This misinvestment was justified by Trihargo (2019) as Deputy of Financial Services, Survey Services and Consultants of the Ministry of SOE.

Various cases of misinvestments show frequent investment inefficiencies. The most important and most common causes of investment inefficiency come from information disproportionateness and agency problems, where financial reporting has the potential to minimize problems both underinvestment and overinvestment, thereby ultimately increasing overall investment efficiency (Li and Wang, 2010). This study examines the influence of the enhanced financial reporting quality on the investment efficiency for companies listed in the Indonesia Stock Exchange.

Investment decisions are influenced by expectations of returns that can be obtained from an investment and then the expectation of these returns depends on expectations for future growth (McNichols and Stubben, 2008). Future growth expectations are determined by information about revenue and earnings (McNichols and Stubben, 2008). Misstated financial reporting (low quality), for example by hiding actual performance for a particular period, will distort the trend of revenue growth and earnings (McNichols and Stubben, 2008). Investment decision makers in companies may believe in the growth trend that is misreported because they are overoptimistic or uninformed of misstatements in financial reporting, so they eventually invest (McNichols and Stubben, 2008). On the other hand, decision makers in the company may realize the true condition of the firm but still do overinvestment with a high-risk approach as an effort to improve their performance (McNichols and Stubben, 2008).

High quality financial reporting with reliable financial information also affects investment efficiency through the availability of increasingly symmetrical information between managers and shareholders (Li and Wang, 2010). Reliable financial information results in better capital market liquidity because of the decline in the possibility of companies being categorized as bad companies (Li and Wang, 2010). Reliable information improves the supervision ability of shareholders better than before, causes financing costs (due to adverse selection) lower, and allows funding the companies' long-term and high-yield investment projects (Li and Wang, 2010). Finally, high quality financial reporting directly increases investment efficiency for companies (Li and Wang, 2010).

Financial reporting is a collection and presentation of historical and current financial information of the company (Drake and Fabozzi, 2012). Financial reporting gives financial information about how a company's business is organized (Drake and Dingler, 2001). Financial reporting is a transaction between two or more parties in which one party becomes the issuer of the report that controls the preparation and provision of reports for other parties, namely reports users that use it to assist in improving their financial decisions relating to the reporting entity as a whole (Rosenfield, 2006).

Quality financial reporting can increase efficiency investment decisions made by managers (Chen *et al.*, 2011). Company investment decisions are perceived to be efficient, if the company takes every positive project which generates a positive net present value magnitude (Chen *et al.*, 2011). Investment efficiency is a symmetrical measure of the expected investment deviation (Gilaninia *et al.*, 2012). Investment efficiency can be measured by investment estimate models which is a function of sales growth chances (Chen *et al.*, 2011). Investment inefficiency is reflected by the negative deviation from underinvestment and the positive deviation from overinvestment (Li and Wang, 2010). Investment efficiency is enhanced by better quality financial reporting through a reduction in information asymmetry (Li and Wang, 2010).

Financial reporting is a multimedia process, where financial statements are the main ways, but for information available to external decision makers, other ways are needed, such as: news conferences, press releases, annual reports, and other information disclosures required by the regulator (Meigs and Meigs, 1993). Financial reporting tools are very broad which consist of financial statements and other information communication tools that relate to information about resources, obligations, profits, and others provided by the accounting system (Riahi-Belkaoui, 2000). Financial reporting tools include general purpose financial statements, press releases, general meeting of shareholders, forecast, management letters, audit reports and webcasts (Wild and Kwok, 2011).

Financial reporting is a way to get the final product of financial reporting, i.e. the presentation of financial information, which is expected to support right decision making (Williams *et al.*, 2010). Financial reporting can be seen as a lens that can be used to pay attention to business broadly (Williams *et al.*, 2010). Financial reporting is related to the communication of any information for financial decision making in any field such as capital expenditure, using idle cash for credit to business (Wild *et al.*, 2009).

Quality financial reporting can be seen from two groups of perspectives namely the view of user needs that focus on the issue of valuation and the view of shareholders protection that focus on issues of corporate governance and stewardship (Jonas and Blanchet, 2000). Based on the viewpoint of user, the financial reporting quality is related to the utility of the information in users' business decision (Jonas and Blanchet, 2000). Based on the viewpoint of shareholder, financial reporting quality is related to full and fair disclosure available for shareholders (Jonas and Blanchet, 2000). In this context, financial reporting quality is financial information that is full and transparent, not intended to mislead users (Jonas and Blanchet, 2000). The company's financial reporting is considered transparent if it makes it easier for users to understand the performance and financial condition of the company (Drake and Fabozzi, 2012).

According to Grace and Ambrose (2013) quality financial reporting is seen from how well financial reporting helps users determine the difference between earnings in the future compared to current profits. Considine *et al.* (2010) state that the presentation of the financial reporting process is judged by how well the outcome of the process reaches its overall objectives, namely 1) effectively collects, summarizes and distributes transaction data; 2) adjust transaction data in accordance with relevant accounting standards and policies accurately and on time; and 3) ensure that all reports are produced in a timely, accurate, valid and complete manner. In the financial reporting process, companies are expected to choose alternative accounting methods, the volume and category of information to be disclosed, and the presentation format by referring to which option providing the most useful information for decision making (Kieso *et al.*, 2014).

Braam and Beest (2013) explained that there are various measurement methods to assess and evaluate financial reporting quality consisting of earnings management, earnings quality, annual reports' disclosed definite financial and non-financial based information, and a comprehensive measurement of decision usefulness. In line with this, Beest *et al.* (2009) presents a various methods commonly used to evaluate the quality of financial reporting, which consists of accrual, value relevance, annual report's definite particular feature, and qualitative characteristics. Furthermore, Tasios and Bekiaris (2012) reiterated that there are four broad and unlimited categories of measurement of the quality level of financial reporting, which include: accrual, value relevance, annual report's definite particular feature, and qualitative characteristic too.

Accrual model was introduced by Jones (1991) who tested earnings management hypotheses by using a company-specific expectation model, to calculate the total accrual normally, where each nondiscretionary accrual change was caused by changes in economic conditions, and finally discretionary accruals were obtained. Another accrual model was introduced by Dechow and Dichev (2002) who succeeded in obtaining an empirical accrual quality measure in the form of residual value from regression for the company specifically, where changes in working capital are a function of past, present, and future operating cash flow. Moeinaddin *et al.* (2012) measured financial reporting quality with earnings quality based on the Dechow & Dichev residual standard deviation models and also based on square abnormal accruals.

Furthermore, McNichols (2002) adapted the Dechow & Dichev's accrual quality model to assess the Jones model specifications, and obtained a new combined model that provides discretionary accrual estimates that are significantly related to cash flows which are substantially nondiscretionary. Chalaki *et al.* (2012) measure the quality of financial reporting using the residual deviancy of the McNichols model. Li and Wang (2010) in addition to using accrual quality, also uses accounting conservatism, and smoothness to compile the financial reporting quality index with a simply weighted percentile assignment methodology. On the other hand, Chen *et al.* (2009) use nonrecurring earnings as a quality degree of financial reporting.

In accordance with the value relevance model, [Collins and Kothari \(1989\)](#) developed a model that proved empirically that earnings response coefficient is a function of interest rate and growth of incomes with no risk. Furthermore, [Chalaki et al. \(2012\)](#) measure the quality of financial reporting in the size of the residual standard deviation of the Collins & Kothari model. In line with this, [Moeinaddin et al. \(2012\)](#) measure financial reporting quality using a model of stock return volatility. Furthermore, [He et al. \(2010\)](#) measure financial reporting quality based on the perceived information of financial reports in the form of correlation between earnings and returns, earnings response coefficients over a specific period, and analyst perceptions about the product of financial reporting.

Research focusing on annual report's particular features conducted by [Nagy \(2010\)](#) uses materially misstated financial statements to measure low financial reporting quality. [Krishnamoorthy et al. \(2002\)](#) explain the factors that determine the quality of financial reporting including the clarity of financial disclosure, degree of efficiency and conservatism in accounting principles, significant decisions on management in financial disclosure, a comparison of current industry practices, and quality of accounting staff. [Balsam et al. \(2003\)](#) also mention financial reporting quality reflected in SEC enforcement, analysts' ranking of disclosure quality, and auditor litigation. In addition, restatements in financial statements, the use of narrative in annual reports, in the annual reports, analysis of auditor's report from the president, auditor's report qualification, and going concern issues are also included in the area of research focusing on particular feature in the annual report ([Tasios and Bekiaris, 2012](#)).

Operational the qualitative characteristic methods used by [Beest et al. \(2009\)](#) which are dividing it into two measurement groups, namely: 1) fundamental qualitative characteristics, i.e. relevance and faithful representation, as the utmost significant qualities that determine the substance of financial information which is the end product of financial reporting process, and 2) enhancing qualitative characteristics, i.e. understandability, comparability, verifiability, and timeliness, which these qualities is perceived can increase the support to business decision making. In order for financial information to be useful, the information must be relevant and faithfully representative of the real condition it purports to represent which is fundamental quality of financial reporting, complemented by enhancing qualitative characteristics, so as to enable differentiation between more useful information from less useful ([Braam and Beest, 2013](#)). Every qualitative characteristic of both fundamental and enhancing contributes to the business decision which depends on financial information, in order to be able to distinguish the more useful accounting information from inferior accounting information ([Kieso et al., 2014](#)).

[Hartman et al. \(2015\)](#) stating that better transparency will cause the market to become more efficient. The same thing was expressed by [Dellaportas et al. \(2005\)](#) that distrust of financial reporting because of creative accounting practices will ultimately reduce productivity in the economy. Furthermore, [Duska et al. \(2011\)](#) explain that in order for the market to function efficiently, the transaction requires an overview of the financial value of the traded entity which is the product of financial reporting.

In line with this, [Li and Wang \(2010\)](#) conducted a study on companies registered in the Chinese capital market with the results that accrual quality and earnings smoothness had a significant impact on underinvestment and overinvestment. Research by [Chen et al. \(2011\)](#) obtained empirical evidence that the high quality level of financial reporting can generate the efficiency of investment in small-scale private companies spread across 21 emerging markets limited to the manufacturing, service, agriculture and construction sectors. By researching public companies in Spain, [Gomariz and Ballesta \(2014\)](#) also found that the extreme high and low quality level of financial reporting affected the degree of investment efficiency. Furthermore, [Biddle et al. \(2009\)](#) conducted a study in the United States with the results that the quality of financial reporting has a important function in resolving information friction that can increase investment inefficiency.

Based on the aforementioned literature studies, the first hypothesis was developed as follows:

*H<sub>1</sub>: The quality of financial reporting has influence the efficiency of investment*

Robinson and Munter (2004) emphasizes that broad-based financial reporting quality is beyond the traditional view of the principle of conservatism and the measurement of income quality, and the quality of financial reporting includes the overall financial statements quality and relevant disclosures to show fair and true presentation of the operations result and financial position of a company.

Then, Robinson and Munter (2004) defines good financial reporting quality as the inclusive financial reporting, including any relevant disclosure, to show a faithfully presentation of operation result (profit/loss and cash flow) and financial position of the company. Furthermore Robinson and Munter (2004) explains that low financial reporting quality can occur because various activities include the following:

- 1) Prepare financial statement in accordance accounting standard but use the option of method inappropriately, so that have a bias and error in the end of report because of the desired result (e.g., use depreciation method which makes higher profit in the current year).
- 2) Use ambiguity in the accounting standard (e.g., a capital lease if the payment present value in the border of the market value of the fixed asset), so that have a bias and error in the end of report because of the desired result (e.g., lessor's ability to make immediate sale causes the lessee's record it as off balance sheet).
- 3) Use unsuitable estimation and expectation, so that have a bias and error in the end of report because of the desired result (e.g. long useful life of an asset and low bad debt allowance).
- 4) Adjust the accounting standards, so that have a bias and error in the end of report because of the desired result (e.g., use scheme of a special-purpose entities (SPEs) to avoid consolidation treatment).
- 5) Conduct a fraudulent financial reporting, so that have a bias and error in the end of report because of the desired result, and there is no quality of financial reporting at all.

In line with this, Biddle *et al.* (2009) describe that a good financial reporting has the exactness presented information in the financial statement and the real cash flows expected by the stockholder.

Yoo *et al.* (2013) provide a similar definition that financial reporting quality is the degree to which financial statement gives accurate information on operation result of the company.

Tasios and Bekiaris (2012) explains that financial reporting quality is wide-ranging concept and it includes all kind information which is very important tool to support the right decision making. Financial reporting must meet certain criteria in order to prevent a low quality and make sure the goal of supporting business decision is gained (Tasios and Bekiaris, 2012).

With reference to previous studies (Jonas and Blanchet, 2000; Robinson and Munter, 2004; Biddle *et al.*, 2009; Tasios and Bekiaris, 2012; Yoo *et al.*, 2013) the quality of financial reporting in the context of this study is defined as a conformity of the process of producing financial information that is really valuable for the business decision made by users.

Cohen *et al.* (2004) state that the quality of financial reporting is a nebulous construct. In general, the financial reporting quality is assessed on the difference between reported current income and future income (Kariuki and Ambrose, 2013). The good quality of financial reporting makes the available information become useful for feedback on a company's financial position, performance and adaptability (Madani *et al.*, 2013).

Financial reporting is the same meaning with financial accounting (Anthony *et al.*, 2011). There are five quality groups for the purpose of accounting quality assessment, namely: 1) standard quality, 2) audit quality, 3) standard implementation quality, 4) operation quality, and 5) disclosure quality (Penman, 2007).

As a process, financial reporting will be assessed relatively based on how the designated inclusive objective is accomplished by the whole process, i.e. to collect, recapitulate and communicate every operational data consistent with the standards precisely and timely (Considine *et al.*, 2010).

Qualitative characteristics of accounting information can be exploit to scrutinize the quality level of financial reporting by constructing the measurement of both fundamental and enhancing qualities (Beest *et al.*, 2009). Furthermore, Beest *et al.* (2009) explain further that the fundamental qualities are the most vital characteristics that set the substance of accounting information must be presented relevant and faithfully. On the other hand, the enhancing qualities are kinds of support to decision making count on accounting information which is easy to understand, capable of being compared, able to be verified, and well timed (Beest *et al.*, 2009).

The company must picked the alternative method of treatment, level of disclosure, and the presentation arrangement in the financial reporting to make sure that the output will be useful in the decision making (Kieso *et al.*, 2014). Both fundamental qualities and enhancing qualities will improve the degree of usefulness of the financial information in decision making (Kieso *et al.*, 2014).

This is in accordance with the opinion of Mackenzie *et al.* (2012) which states that qualitative characteristics are divided into fundamentals and enhancing qualities. The fundamental qualities consist of relevance and faithful representation. Meanwhile, the enhancing qualities consist of comparability, verifiability, timeliness, and understandability.

Beyersdoff *et al.* (2013) states that the qualities of fundamentals and enhancing are the most useful types of information for capital providers.

Carmichael *et al.* (2007) emphasize that the quality level of financial reporting is degree of quality that make accounting useful information so called as "qualitative characteristics."

Gaffikin (2008) explains that these qualitative characteristics are the features that create information more useful for all of users. Subramanyam and Wild (2009) refer to these characteristics as necessary accounting information qualities.

Gibson (2011) adds that those characteristics of accounting information is a desirable goods which can be viewed as a grading qualities. The qualitative characteristics of accounting information are highly considerable in judgment of the selection of alternative accounting treatment and financial reporting (Stice and Stice, 2012).

The qualitative characteristics of accounting information is the result of high quality financial reporting, which is reflected transparency. With maximum transparency, the market will work well (Hartman *et al.*, 2015). The more information available, the easier to set the level of risk (Hartman *et al.*, 2015). Increased transparency makes market more efficient (Hartman *et al.*, 2015). Transparency is in line with the trust strategy where relationship trustiness will provide a higher competitive advantage for companies that it is become more efficient and less cost (Hartman *et al.*, 2015).

In line with this, Dellaportas *et al.* (2005) explain that creative accounting is a deviation from what should be and will cause various serious allocation problems both for the company itself and the economy as a whole. The distrust of financial reporting as a consequence of creative accounting will reduce the number of active investors, both in the value of capital and distribution of ownership, and ultimately this condition will increase the company's cost of capital and reduce productivity in the economy (Dellaportas *et al.*, 2005).

For the sake of efficiency, every transaction must be accurately described in accordance with the financial value transacted by the entity (Duska *et al.*, 2011). This description was prepared by accountants (Duska *et al.*, 2011). Power affairs, property rights, ownership interest valuations, receivables, and payables are constructed socially that



define rights and obligations (Duska *et al.*, 2011). The entire construct is identified and recorded by accountants (Duska *et al.*, 2011).

This is aligned with the explanation given by Biddle *et al.* (2009) that the quality of financial reporting can mitigate the information friction that impedes investment efficiency to a lower level. Their study was conducted with a sample of 34,791 observational data from 1993 to 2005 (Biddle *et al.*, 2009). The financial reporting quality is measured by Biddle *et al.* (2009) based on the accrual score with estimation of discretionary accruals using the Dechow and Dichev (2002) model, and the readability of financial statement FOG Index. Biddle *et al.* (2009) measure investment efficiency with the residual value which is unaccomplished expected investment based on the investment model as a function of growth prospects (measured by sales growth). Biddle *et al.* (2009) classify the efficiency of investment into three groups, i.e. underinvestment, benchmark, and overinvestment.

Li and Wang (2010) find the same thing that the financial reporting quality which is measured by combined indexes of accrual and earnings management has influenced underinvestment and overinvestment significantly. The study was conducted with a sample of Chinese companies listed on the China Security Market from 1998 to 2006 (Li and Wang, 2010). Investment efficiency is measured by the residual value in the expected investment calculated based on investment estimate models as a function of growth opportunity (Li and Wang, 2010). The investment prediction model used by Li and Wang (2010) is the Richardson (2006).

Another study conducted by Chen *et al.* (2011) also find that good financial reporting quality had increased the investment efficiency. The study was conducted using data from the World Bank's Enterprise Survey (WBES) from 2002 to 2005 for 79 countries covering low-income countries (Chen *et al.*, 2011). The quality of financial reporting is measured using performance-adjusted discretionary, discretionary revenue, and residual values in Dechow and Dichev (2002) model which had been modified by McNichols (2002) and Francis *et al.* (2005). Investment efficiency is measured by the residual value of expected investment calculated based on investment forecast models which is determined by growth opportunities (Chen *et al.*, 2011). The investment prediction model that is used includes differential predictability for the increasing revenue and the decreasing revenue (Chen *et al.*, 2011).

Gomariz and Ballesta (2014) examined the same thing and obtained results that financial reporting quality is a mechanism that can improve investment efficiency, especially for companies that have extreme low (high) current position of liability, which the degree of financial reporting quality affects the efficiency level of investment. Financial reporting quality was measured by Gomariz and Ballesta (2014) with earnings management based on discretionary revenue (McNichols and Stubben, 2008) discretionary accrual (Jones, 1991) and accrual quality Dechow and Dichev (2002). Investment efficiency is measured by Gomariz and Ballesta (2014) based on a deviation that is reflected in the residual value of investment prediction models as a function of growth opportunity (sales growth) which is also used by Biddle *et al.* (2009). For robustness testing in the measurement of investment efficiency, Gomariz and Ballesta (2014) use an investment prediction model developed by Chen *et al.* (2011).

Based on the description above, it can be determined that the quality of financial reporting consisting of fundamental quality and quality enhancing influences investment efficiency, so that the second and third hypotheses are developed as follows:

*H<sub>2</sub> : The fundamental quality of financial reporting has influence the efficiency of investment.*

*H<sub>3</sub> : The enhancing quality of financial reporting has influence the efficiency of investment.*

## **2. METHOD**

Research method is a method used to conduct an investigation in order to solve problems (Kothari, 2004). The research methods used in this study are described as follows:

### *2.1. The Purpose of Study*

This study can be classified as applied research which aims to apply, test and evaluate the ability of a theory to explain and solve practical problems (Sugiyono, 2008). Survey methods are used to obtain data from certain real environment (not artificial), by doing treatment in data collection, for example by distributing questionnaires (Sugiyono, 2008). In the survey method, investigations are held to obtain facts from existing symptoms and to find out some information in fact about social, economic, or political institutions of a group or region (Nazir, 2011).

### *2.2. The Type of Investigation*

This research is causality study, which is testing the causal relationship between several independent variables on the dependent variable, with the criteria (Sekaran and Bougie, 2013):

- a) The variable should not controlled by another.
- b) The independent variable should go before the dependent variable.
- c) No other factor has a possible effect for the variation in the dependent variable.
- d) There is a theory explain that the independent variable influences the dependent variable.

This study fulfills all above criteria which the relationship among dependent variable and independent variables are explained by the grand theory so that it can explain that the quality of financial reporting defines the investment efficiency level. This study get through a explanatory survey method which aims to explain causal relationships and hypothesis testing, then through the data analysis, a causal relationship between variables will be explained through hypothesis testing (Singarimbun and Effendi, 1995).

### *2.3. Study Setting*

There is no intervening treatment in observation so that this research can be classified as a field study. The collection of data is conducted cautiously and there is no specific action that affect the results, where various factors are observed in natural settings as usual happenings (Sekaran and Bougie, 2013).

### *2.4. Time Horizon*

This study is cross-sectional because data for each variable are collected at once (Sekaran and Bougie, 2013). The data of this study were collected only for a specific period of year with the intention of answering research questions (Sekaran and Bougie, 2013).

In this study the variables are abstract so they must be operationalized so that they can be measured appropriately and the testing of hypotheses can be done. Sekaran and Bougie (2013) states the initial step in the operationalization process is to define each construct and the measurement of variables used.

The following is the operationalization of each of research variables:

1) Financial reporting quality. From the definitions that have been put forward by several scholars (Jonas and Blanchet, 2000; Robinson and Munter, 2004; Biddle *et al.*, 2009; Tasio and Bekiaris, 2012; Yoo *et al.*, 2013) hence in this study the definition of financial reporting quality referred to the suitability of the process of producing financial information which supports the business decision making made by users. Furthermore, financial reporting quality is divided into two group, namely fundamental quality represented by variable  $X_1$  and enhancing quality variable  $X_2$ . The measurements used for the concept of financial reporting quality in this study are:

- a) Fundamental qualities  $X_1$  (Mackenzie *et al.*, 2012; Beyersdoff *et al.*, 2013; Kieso *et al.*, 2014).
  - (1) Relevance (Carmichael *et al.*, 2007; Gaffikin, 2008; Beest *et al.*, 2009; Subramanyam and Wild, 2009; Gibson, 2011; Mackenzie *et al.*, 2012; Stice and Stice, 2012; Beyersdoff *et al.*, 2013; Braam and Beest, 2013; Kieso *et al.*, 2014).

(2) Representation faithfulness (Carmichael *et al.*, 2007; Beest *et al.*, 2009; Subramanyam and Wild, 2009; Mackenzie *et al.*, 2012; Beyersdoff *et al.*, 2013; Braam and Beest, 2013; Kieso *et al.*, 2014).

b) Enhancing qualities  $X_2$  (Mackenzie *et al.*, 2012; Beyersdoff *et al.*, 2013; Kieso *et al.*, 2014).

(1) Comparability (Carmichael *et al.*, 2007; Beest *et al.*, 2009; Gibson, 2011; Mackenzie *et al.*, 2012; Braam and Beest, 2013; Kieso *et al.*, 2014).

(2) Verifiability (Carmichael *et al.*, 2007; Beest *et al.*, 2009; Subramanyam and Wild, 2009; Gibson, 2011; Mackenzie *et al.*, 2012; Beyersdoff *et al.*, 2013; Braam and Beest, 2013; Kieso *et al.*, 2014).

(3) Timeliness (Beest *et al.*, 2009; Subramanyam and Wild, 2009; Mackenzie *et al.*, 2012; Stice and Stice, 2012; Beyersdoff *et al.*, 2013; Braam and Beest, 2013; Kieso *et al.*, 2014).

(4) Understandability (Gaffikin, 2008; Beest *et al.*, 2009; Mackenzie *et al.*, 2012; Stice and Stice, 2012; Beyersdoff *et al.*, 2013; Braam and Beest, 2013; Kieso *et al.*, 2014).

c) Investment efficiency. From the definitions of efficiency and investment that have been put forward by several scholars (Simons, 2000; Reider, 2002; Rose and Marquis, 2006; Anthony and Govindarajan, 2007; Brown and Reilly, 2009; Peil and van Staveren, 2009; Boatright, 2012; Velasquez, 2012; Bodie *et al.*, 2014; Jones, 2014) then in this study the definition of investment efficiency referred to the accuracy of fulfilling investment needs based on existing opportunities with the lowest possible cost. Furthermore, investment efficiency is represented by variable  $X_3$ . The measurement used for the concept of investment efficiency in this study is over / under investment, namely the residual value ( $\varepsilon_{i,t+1}$ ) investment prediction (Biddle *et al.*, 2009) as shown in Equation 1.

$$\text{Investment}_{i,t+1} = \beta_0 + \beta_1 \text{Sales Growth}_{i,t} + \varepsilon_{i,t+1} \quad (1)$$

Notes:

$\text{Investment}_{i,t+1}$  = the total investment value of firm  $i$  in year  $t$ , which is the net increase in current total assets and scaled by lagged total assets.

$\text{SalesGrowth}_{i,t-1}$  = the rate of change in sales of firm  $i$  from  $t-2$  to  $t-1$ .

The independent variables of Financial Reporting Quality ( $X_1$  and  $X_2$ ) and the dependent variable Investment Efficiency ( $X_3$ ) is measured using secondary data obtained from the issuer's company and the authorized authority (Indonesia Stock Exchange and Financial Services Authority). To assure the high validity level of the data collected, the variables Financial Reporting Quality ( $X_1$  and  $X_2$ ) are measured by three parallel people and only the same result is used.

This study uses purposive sampling comprise of 87 listed companies listed in Indonesia Stock Exchange. The criteria used are the willingness of the company to provide an explanation of the financial reporting process and investment in the company. This is intended to gain a deeper understanding of financial reporting quality and investment efficiency. Interviews with representatives from companies were conducted by holding Focus Group Discussions for several rounds. The interview guide has been prepared in advance so that the focused discussion is in accordance with the research objectives.

The data collected is then analyzed. The quantitative analysis uses multiple regression analysis, a method that analyzes the influence of two or more independent variables on the dependent variable. The regression equation of this study is shown in Equation 2 as follows:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 \quad (2)$$

Notes:

$Y$  = Investment efficiency.

$X_1$  = Fundamental quality of financial reporting.

$X_2$  = Enhancing quality of financial reporting.

$X_3$  = Total Asset.

a = Constanta.

$b_1, b_2, b_3$  = Regression coefficient of  $X_1, X_2,$  and  $X_3$ .

This study uses Total Asset as a control variable which is measured by the natural logarithm of it. The research model is shown in Figure 1 as follows:

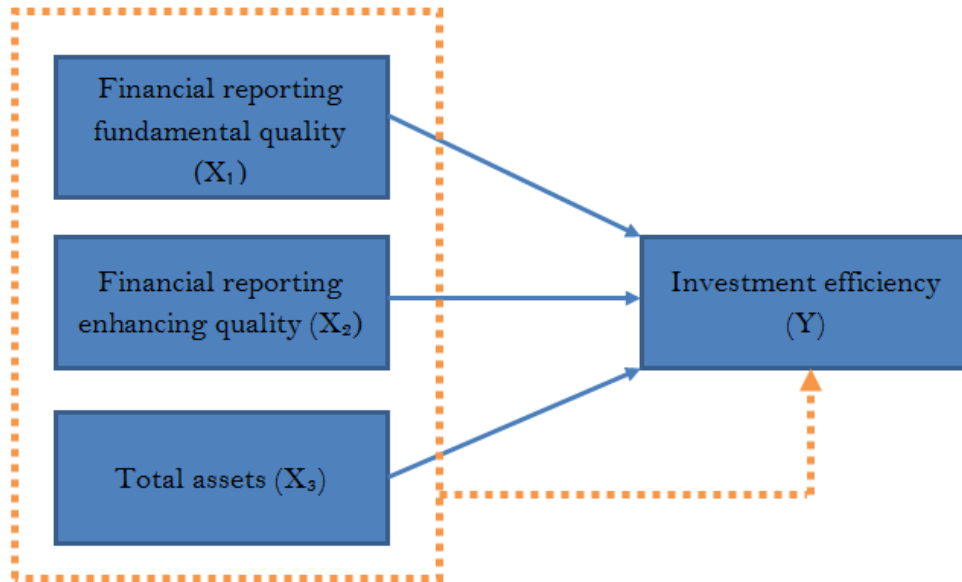


Figure-1. Research model.

Source: Developed based on previous researches and theories.

Before conducting a regression analysis, the conditions for classical assumptions must be fulfilled first. This study tested the assumptions of normality, heterocedasticity, and multicollinearity. Normality test is conducted to ensure that data analyzed by parametric statistics are following a normal distribution. The normality test is done by using a normal probability plot, where the distribution of data is located around the diagonal line. Heterocedasticity test ensures that the residual variant is not constant in regression so that the accuracy of the spread results does not form a certain pattern. Heterocedasticity test is carried out by looking at the pattern of scatterplot models that are not patterned and do not in one area. The multicollinearity test is intended to detect the correlation between one independent variable and the other independent variables in the regression analysis. The multicollinearity test is done by looking at the Variance Inflation Factor score that is away from 1. The first hypothesis testing is completed by the F statistical test. While the second hypothesis testing is completed by the t statistical test. The significance value used in this study is 0.05. The coefficient of determination test is done to determine the degree of changes in the dependent variable explained by the changes in independent variable. The coefficient of determination is seen from the adjusted R square.

### 3. RESULTS

#### 3.1. Financial Reporting Quality

The quality of financial reporting is measured by 2 dimensions and divided into 6 indicators which are operationalized to 33 items. The following is the recapitulation of average score for each dimension of financial reporting quality.

Table-1. The recapitulation of average score for financial reporting quality.

No.	Dimension	Average score	Category
1)	Fundamental qualities	3.55	High
2)	Enhancing qualities	3.42	High
	Financial reporting quality	3.49	High

Source: Processed results.

When viewed from the average score of the assessment, the quality of financial reporting in companies is high. Then when viewed based on dimensions, fundamental qualities are counted in the high category, as are enhancing qualities, including high. Furthermore, company distribution based on financial reporting quality is presented in the following figure.

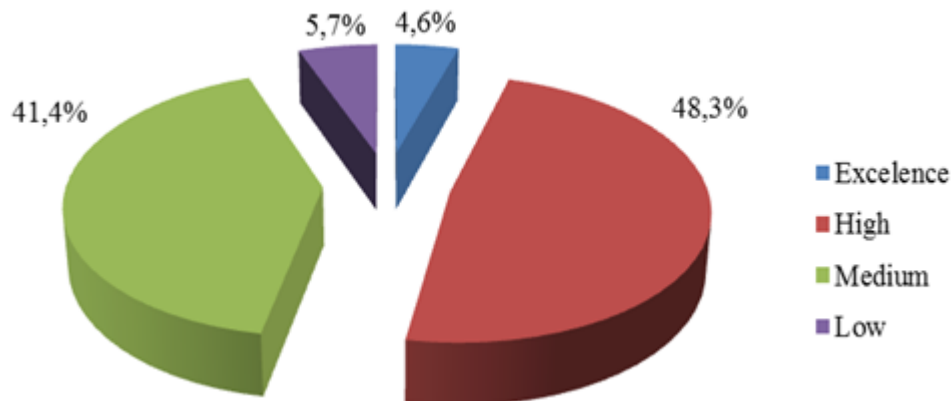


Figure-2. Distribution of companies based on the financial reporting quality.

Source: Processed results.

In Figure 2 it can be seen that most companies (48.3%) have financial reporting quality which is counted in the high category, then 41.4% of companies have financial reporting quality which is counted in the sufficient category. But there are 5.7% of companies have financial reporting quality which is counted in the low category. Even though 4.6% of companies have financial reporting quality which is counted in the very high category. Furthermore, an explanation of each dimension of financial reporting quality is presented below.

### 3.2. Fundamental Qualities

The fundamental qualities dimension consists of 2 indicators and is operationalized into 18 items. The distribution of companies based on fundamental qualities is presented in Table 2 and Table 3. Distribution of valuations based on relevant indicators is presented in Table 2. While the distribution of valuations based on faithful presentation indicators is presented in Table 3.

Table 2 shows the each average score of the first indicator statements of relevant. Relevant indicators show an overall average score of 3.58 (71.6%) which means it is in the high category. Even so, there is still a gap of 1.58 to reach the highest score, which means that there are still 28.4% of companies have financial reporting less relevant. The company's financial reporting has not fully presented the exact disclosures of extraordinary profits and losses (poor category), because of the extraordinary gain and loss indicating that the company's risk management is not functioning well so that uncertainty causes extraordinary gain and loss. The company's financial reporting also does not present the disclosure of off-balance activities (low category). Examples of off-balance activities include agreements/contracts that have an impact on the future, guarantees / guarantees, unused credit facilities, and important cases that are still in process. Companies are reluctant to disclose off-balance activities because of their uncertainty.

Table-2. Measurement distribution of relevance.

#	Statement	Assessment score					Average	Category	
		5	4	3	2	1			
1)	The extent to which financial reporting in the company's annual report uses fair value compared to historical value	n	0	23	53	11	0	3.14	Medium
		%	0.0	26.4	60.9	12.6	0.0		
2)	The extent to which financial reporting in the company's annual report presents various non financial information such as business prospect and risk as supplement to the financial information	n	5	36	28	18	0	3.32	Medium
		%	5.7	41.4	32.2	20.7	0.0		
3)	The extent to which financial reporting in the company's annual report presents the risk explanation section provides good guidance on the company's risk profile	n	32	24	10	20	1	3.76	High
		%	36.8	27.6	11.5	23.0	1.1		
4)	The extent to which corporate financial reporting presents predictive information in the future	n	8	40	20	16	3	3.39	Medium
		%	9.2	46.0	23.0	18.4	3.4		
5)	The extent to which financial reporting in the company's annual report presents information on corporate social responsibility (CSR)	n	37	26	13	9	2	4.00	High
		%	42.5	29.9	14.9	10.3	2.3		
6)	The extent to which corporate financial reporting presents precise disclosures of extraordinary profits and losses	n	2	1	1	6	77	1.22	Poor
		%	2.3	1.1	1.1	6.9	88.5		
7)	The extent to which financial reporting in the company's annual report presents information on personnel policies	n	18	45	13	8	3	3.77	High
		%	20.7	51.7	14.9	9.2	3.4		
8)	The extent to which financial reporting in the company's annual report presents division information	n	31	13	29	10	4	3.66	High
		%	35.6	14.9	33.3	11.5	4.6		
9)	The extent to which financial reporting in the company's annual report presents cash flow analysis	n	40	27	19	1	0	4.22	Excellence
		%	46.0	31.0	21.8	1.1	0.0		
10)	The extent to which financial reporting in the company's annual report presents intangible assets	n	60	9	7	2	9	4.25	Excellence
		%	69.0	10.3	8.0	2.3	10.3		
11)	The extent to which financial reporting in the company's annual report presents disclosures of off-balance activities	n	10	5	26	26	20	2.53	Low
		%	11.5	5.7	29.9	29.9	23.0		
12)	The extent to which financial reporting in the company's annual report presents disclosures of financial structures	n	53	23	10	1	0	4.47	Excellence
		%	60.9	26.4	11.5	1.1	0.0		
13)	The extent to which financial reporting in the company's annual report presents information on the company's going concern	n	73	13	0	1	0	4.82	Excellence
		%	83.9	14.9	0.0	1.1	0.0		
Overall average						3.58	High		

Source: Processed results.

**Table-3.** Measurement distribution of faithful representation.

#	Statement	Assessment score					Average	Category
		5	4	3	2	1		
14)	The extent to which audit results are presented in financial reporting in the company's annual report	n	0	87	0	0	4.00	High
		%	0.0	100.0	0.0	0.0		
15)	The extent to which financial reporting in the company's annual report presents information about corporate governance	n	27	20	38	2	3.83	High
		%	31.0	23.0	43.7	2.3		
16)	The extent to which financial reporting in the company's annual report uses "comply or explain" approach	n	25	2	0	59	2.90	Medium
		%	28.7	2.3	0.0	67.8		
17)	The extent to which financial reporting in the company's annual report presents contingency disclosures both positive and negative	n	9	9	26	28	2.64	Medium
		%	10.3	10.3	29.9	32.2		
18)	The extent to which financial reporting in the company's annual report presents information about bonuses for the board of directors	n	41	25	2	13	3.94	High
		%	47.1	28.7	2.3	14.9		
Overall average						3.46	High	

Source: Processed results.

Based on Table 3, the each average score of the second indicator statements of faithful representation is depicted. The faithful representation indicator shows an average score of 3.46 (69.2%) which means it is in the high category. Even so, there is still a gap of 1.54 to reach the highest score, which means that there are still 30.8% of companies has financial reporting in less faithful representative way.

In general, the fundamental qualities dimension has an average score of 3.55 (71%), which falls into the high category. Nevertheless there is still a gap of 1.45 to get the highest score. Thus it can be said that there are still 29% of the companies have the complete fundamental qualities.

### 3.3. Enhancing Qualities

The enhancing qualities dimension consists of 4 indicators and they are operationalized into 15 statements. The distribution of companies based on enhancing qualities is presented in Table 4 till Table 7. Distribution of measurement based on comparability indicators is given in Table 4. Distribution of measurement based on verifiability indicators is given in Table 5. Distribution of assessment based on timeliness indicators is given in Table 6. Whereas the distribution of assessment based on understandability indicators are presented in Table 7.

Table 4 shows the each average score of the first indicator statements of comparability. Comparability indicator has an average score of 2.66 (53.2%) which means that it is counted in the medium category. Thus there is still a gap of 2.34 to reach the highest score, which means that there are still 46.8% of companies has financial reporting less comparable. Corporate financial reporting has not fully presented changes in accounting policies (low category). If there is an accounting policy change with a significant impact, it requires the presentation of restatement figures so that the financial statements remain comparable.

**Table-4.** Measurement distribution of comparability.

#	Statement	Assessment score					Average	Category	
		5	4	3	2	1			
19)	The extent to which financial reporting in the company's annual report presents accounting policies changes information	n	13	2	8	22	42	2.10	Poor
		%	14.9	2.3	9.2	25.3	48.3		
20)	The extent to which financial reporting in the company's annual report presents changes in accounting estimates	n	9	7	4	11	56	1.87	Poor
		%	10.3	8.0	4.6	12.6	64.4		
21)	The extent to which financial reporting in the company's annual report presents comparisons and consequences of any accounting policies changes	n	0	1	27	13	46	1.80	Poor
		%	0.0	1.1	31.0	14.9	52.9		
22)	The extent to which financial reporting in the company's annual report presents financial index numbers and the company's current ratio	n	22	33	25	6	1	3.79	High
		%	25.3	37.9	28.7	6.9	1.1		
23)	The extent to which financial reporting in the company's annual report presents information about company shares	n	27	25	23	11	1	3.76	High
		%	31.0	28.7	26.4	12.6	1.1		
24)	The extent to which financial reporting in the company's annual report presents benchmark information related to competitors	n	6	10	28	32	11	2.63	Medium
		%	6.9	11.5	32.2	36.8	12.6		
Overall average							2.66	Medium	

Source: Processed results.

Companies are reluctant to present changes in accounting policies because they consider the impact to be insignificant. Corporate financial reporting has not provided adequate changes in accounting estimates (low category). The source and amount of estimation should be clearly presented so that any users are not misinterpreting the current financial condition of the company compared to the previous period. The company considers the user to understand the general estimates used in the industry, even though not all user understand. The company's financial reporting has not presented a comparison and the effects of accounting policies changes accordingly (very low category). The presentation of comparisons and effects of changes in accounting policies is evident if the company presents financial information for at least 3 consecutive years. Common practice of comparison is carried out in 2 years (current year and previous period). The level of comparability can be improved with more periods of financial information presentation so users can better analyze trends.

Table 5 depicts the each average score of the second indicator statements verifiability. Verifiability indicators have an average score of 3.03 (60.6%), which means that it falls into the medium category. Thus there is still a gap of 1.97 to reach the highest score, which means that there are still 39.4% of companies has their financial reporting unverified. Corporate financial reporting has not fully presented valid contentions for particular estimation and calculation in the annual report (low category). Certain assumptions and estimates are usually explained by the source. The more tangible the source, the more valid the arguments for assumptions and estimates.



Table-5. Measurement distribution of verifiability.

#	Statement	Assessment score					Average	Category	
		5	4	3	2	1			
25)	The extent to which financial reporting in the company's annual report presents valid contentions for particular estimation and calculation in the annual report	n	5	5	7	67	3	2.33	Poor
		%	5.7	5.7	8.0	77.0	3.4		
26)	The extent to which financial reporting in the company's annual report presents the basis for selecting certain accounting principles in valid arguments	n	6	57	20	2	2	3.72	High
		%	6.9	65.5	23.0	2.3	2.3		
Overall average							3.03	Medium	

Source: Processed results.

If the company uses the services of an independent third party to support assumptions and estimates, users will feel that the numbers presented in the financial statements can be verified properly. Other practices are carried out by disclosure that existing assumptions and estimates refer to specific practices in a particular industry and also for certain account estimates. However, this is still less of a concern for companies in preparing their financial statements, because the assumption is that user do not need to verify financial information because they have trusted the company's management as a reliable supplier of information.

Table-6. Measurement distribution of timeliness.

#	Statement	Assessment score					Average	Category	
		5	4	3	2	1			
27)	The extent to which the company's annual financial report (audited) is available	n	24	61	2	0	0	4.25	Excellence
		%	27.6	70.1	2.3	0.0	0.0		

Source: Processed results.

Table-7. Measurement distribution of understandability.

#	Statement	Assessment score					Average	Category	
		5	4	3	2	1			
28)	The extent to which financial reporting in the company's annual report is presented in a good order	n	8	74	0	0	5	3.92	High
		%	9.2	85.1	0.0	0.0	5.7		
29)	The extent to which financial reporting in the company's annual report presents graphs and tables	n	19	29	16	21	2	3.48	High
		%	21.8	33.3	18.4	24.1	2.3		
30)	The extent to which financial reporting in the company's annual report presents technical terms	n	84	0	3	0	0	4.93	Excellence
		%	96.6	0.0	3.4	0.0	0.0		
31)	The extent to which financial reporting in the company's annual report presents a list of terminology	n	8	79	0	0	0	4.09	High
		%	9.2	90.8	0.0	0.0	0.0		
32)	The extent to which financial reporting in the company's annual report presents information about the mission and strategy	n	13	59	0	15	0	3.80	High
		%	14.9	67.8	0.0	17.2	0.0		
33)	The extent to which financial reporting in the company's annual report can be understood	n	71	14	2	0	0	4.79	Excellence
		%	81.6	16.1	2.3	0.0	0.0		
Overall average							4.17	High	

Source: Processed results.

Table 6 shows that the average score of the third indicator timeliness at 4.25 (85%) which means it is in the very high category. However, there still seems to be a gap of 0.75 to reach the highest score, which means that there are still 15% of companies has not delivered financial reporting in a timely manner. Based on Table 7 the each average score of fourth indicator statement understandability is given. The understandability indicator has an average score of 4.17 (83.4%) which means it is counted in the high category. Even so, there is still a gap of 1.54 to reach the highest score, which means that there are still 16.6% of companies present financial report in such a way which is hard to understood. In general, the enhancing qualities dimension has an average score of 3.42 (68.4%), which is in the high category. Nevertheless there is still a gap of 1.58 to get the highest score. Thus it can be said that there are still 31.6% of companies have not fully fulfilled enhancing qualities.

### 3.4. Investment Efficiency

Investment efficiency is measured through a regression of sales growth towards investment in the next period. The following figure is a description of the company's distribution based on investment efficiency.

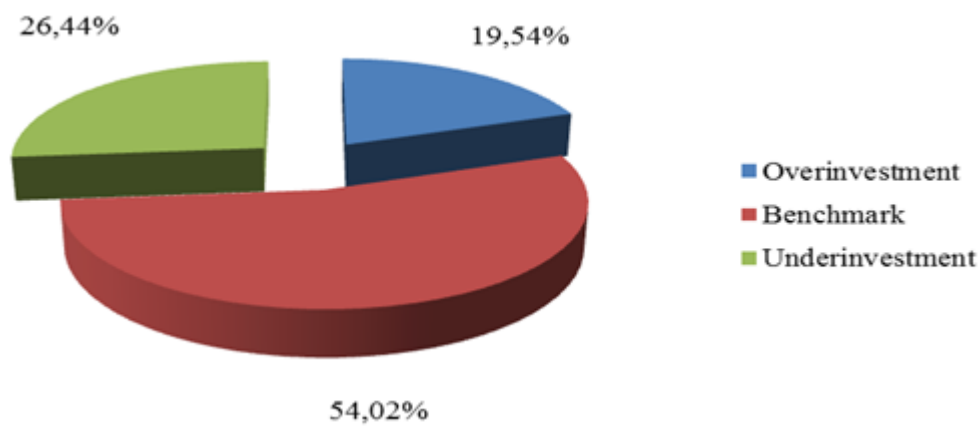


Figure-3. Companies distribution based on investment efficiency.

Source: Processed results.

The Figure 3 shows that investment in companies is still not in line with the expectation, which means that companies' investment is still not efficient. Companies that experienced overinvestment are more than underinvestment. The following Table 8 are descriptive statistics regarding investment efficiency:

Table-8. Descriptive statistic of investment efficiency.

No.	Category	Minimum	Maximum	Mean	Std. Dev
1)	Overinvestment	0.11281	5.20117	0.63911	1.22729
2)	Benchmark	-0.22564	0.09904	-0.04464	0.08532
3)	Underinvestment	-1.03255	-0.24155	-0.41145	0.20197

Source: Processed results.

The measure of investment efficiency is obtained from the residual value of the investment prediction equation based on Biddle *et al.* (2009). The closer to the zero score, the higher the investment efficiency. Based on result shown in Table 8, the average investment efficiency is 0.63911 for overinvestment, -0.04464 for benchmarks, and -0.41145 for underinvestment shows that the investment made by companies is still not efficient. Therefore investment efficiency still needs to be improved.

The verification analysis in this study does not distinguish between overinvestment and underinvestment. Both are inefficient investment. Between overinvestment and underinvestment there is nothing better. Overinvestment is

making excessive investments that produce negative returns. Underinvestment is discharging investment opportunities that generate positive returns. Both are equally unexpected suboptimal conditions.

*3.5. The Enhanced Financial Reporting Quality Improves Investment Efficiency*

After all classical assumptions are fulfilled by tests of normality, heterocendasticity, and multicollinearity, the results of multiple regression are shown in **Table 9** as follows:

**Table-9. The coefficient of determination, F-test and the t-test results.**

<b>Var</b>	<b>Sign</b>	<b>Coeff</b>	<b>t-Stat</b>	<b>Prob</b>	<b>Hyp</b>
X1	+	0.345807	2.10748	0.038094	H2 Accepted
X2	+	0.02267	0.11736	0.906858	H3 Rejected
X3	+	0.028295	0.981805	0.329049	
R-squared		0.116387			
Adjusted R-squared		0.08445			
Prob (F-statistic)		0.015952			H1 Accepted

Source: Processed results.

F-test is conducted to define the simultaneous influence of independent variables to the dependent variable. Based on the test, the probability value of F-statistic 0.015952 is smaller  $\alpha$  (0.05). This reflect that financial reporting quality both fundamental and enhancing quality have a significant influence on investment efficiency. The first hypothesis is accepted.

The next test is a t-test to determine the influence of respectively independent variable individually (partial) on the dependent variable. Based on the analysis, for the financial reporting fundamental quality, the probability value of t-statistic 0.038094 is smaller than  $\alpha$  (0,05). Thus, the second hypothesis is accepted. The financial reporting fundamental quality has influenced the investment efficiency significantly.

Then, for the enhancing quality of financial reporting, the probability value of t-statistic 0.906858 is larger than  $\alpha$  (0,05). The third hypothesis is rejected. The enhancing quality of financial reporting does not have a significant influence on investment efficiency. The results of this study provide empirical confirmation that the better financial reporting quality will improve the investment more efficient. In other words, it can be interpreted that investment efficiency can be upgraded if the company improves financial reporting quality, both fundamental qualities and enhancing qualities. The quality of financial reporting has low contribution of 8.445% on investment efficiency. The low contribution of the quality of financial reporting on investment efficiency can be explained based on the description of research results, where the average fundamental qualities are categorized as high. However, it cannot be said that the fundamental qualities of corporate financial reporting are fully adequate because not all companies have good fundamental qualities. Both the relevance and faithful representation quality in financial reporting are the most important basis to get high quality of financial reporting. An relevance information has an influence in decision making. Information with faithful representation is in accordance with reality, which is not biased and it does not mislead users. Similarly, enhancing qualities are categorized as high on average. However, the enhancing qualities of corporate financial reporting cannot be said to be fully adequate because not all companies have good enhancing qualities. The quality of comparability and verifiability in corporate financial reporting has not been fully adequate. Only the quality of timeliness and understandable can be considered in a good level. High quality of financial reporting produces high quality information for users to support their decision making. High quality information will encourage the right decisions. Therefore it is very essential to improve the quality of companies' financial reporting in order to provide information to support decision making and in particular it will result in better efficiency level of investment. This study shows that good financial reporting quality has reduced investment

inefficiency which is confirming previous studies conducted by [Biddle et al. \(2009\)](#) which explain that that the quality of financial reporting can mitigate information friction that impedes the efficiency level of investment. Furthermore, [Li and Wang \(2010\)](#) who found the same thing that the financial reporting quality which is measured by combine index of accrual score and earnings management has influence the condition of underinvestment and overinvestment significantly. Then, another study conducted by [Chen et al. \(2011\)](#) also found that better financial reporting quality make investment more efficient. Likewise, the results of research by [Gomariz and Ballesta \(2014\)](#) state that financial reporting quality is a mechanism that can improve investment efficiency, where for companies that have extreme low (high) current liabilities, high level of financial reporting quality will increase investment efficiency.

#### 4. DISCUSSION

Corporate governance can be realized by a excellence quality of financial reporting. The financial reporting quality has implication for the efficiency of corporate investment. Efficient investment is an investment that gives the right results in line with expectations. Companies must make investments that produce positive net present value. However, agency problems between owners and managers can lead to investment inefficiencies. Inefficient investment is investment that does not succeed as expected. Investment inefficiency can be in the form of overinvestment and underinvestment.

Adverse selection can lead to underinvestment investment inefficiencies through high cost of raising funds, because managers are not motivated to properly manage company investments. Moral hazard can lead to inefficiencies in investment over investment and underinvestment, where managers behave opportunistically by implementing value-poor activities and high cost of raising funds for their personal interests. Moral hazard and adverse selection can be minimized by good financial reporting process which is generating high quality information. The results of this study provide confirmation that investment inefficiency can be reduced by increasingly financial reporting quality. Nevertheless, there are still many other factors that can affect the efficiency of company's investment, such as organizational culture ([Zhang et al., 2015](#)) ownership interest ([Dollar and Wei, 2006](#); [Chen, 2009](#)) labor unions ([Zhang, 2015](#)) independent auditor ([Chen et al., 2015](#)) disclosures ([Lai et al., 2014](#)) financial accounting standards ([Biddle et al., 2012](#)) and financial constraints ([Luxi et al., 2013](#)).

Based on the results obtained, it was concluded that enhanced financial reporting quality make the investment more efficient. The poor efficiency level of investment is triggered by the low quality of financial reporting. The efficiency level of corporate investment will increase along with increasing fundamental qualities and enhancing qualities of the financial reporting. To improve financial reporting quality, companies should always maintain that the entire financial reporting process meets the financial accounting standards and common financial reporting practices, so that it can produce output in the form of information that meets fundamental qualities and enhancing qualities. To improve investment efficiency, companies must plan investment by using external specialty consultants in the financial sector or recruiting special personnel who are experts in the financial field. Efficient investment can be achieved if there is no underinvestment nor overinvestment. This can be avoided by adequate investment planning with the support of information from a high quality of financial reporting process.

#### REFERENCES

Akbar, B., 2013. Bpk: Soes not efficient in investment. Available from <http://m.bisnis.com/finansial/read/20131031/9/183990/bpk-bumn-belum-isien-in-in-investments> [Accessed 10/15/18].

- Anthony, R.N. and V. Govindarajan, 2007. *Management control system*. 12th Edn., Singapore: McGraw-Hill Companies, Inc.
- Anthony, R.N., D.F. Hawkins and M. K.A, 2011. *Accounting: Text and cases*. 13th Edn., Singapore: McGraw-Hill Companies, Inc.
- Balsam, S., J. Krishnan and J.S. Yang, 2003. Auditor industry specialization and earnings quality. *Auditing: A Journal of Practice & Theory*, 22(2): 71-97.
- Beest, V.F., G. Braam and S. Boelens, 2009. *Quality of financial reporting: Measuring qualitative characteristics*. Nijmegen Center for Economics (NiCE) Working Paper 09-108. Institute for Management Research, Radboud University Nijmegen.
- Beyersdoff, M., M. Bonham, W.L. Chan, A. Covic, M. Curtis, T. Danmola, M. Davies, T. Denton, J. Frykowska, O. Halloum, B. Hamilto, B. Kremp, M. Lloyd, J. Luke, E. Moll, R. Moore, V. O'Leary, M. Pankhurst, I. Qureshi, H. Richards, T. Rogerson, S. Seah-Tan, A. Sirocka, S. Vaidison, T. Waring, M. Williams and M. Zeller, 2013. *International GAAP 2013: Generally accepted accounting practice under international financial reporting standards*. United Kingdom: John Wiley & Sons, Ltd, 1.
- Biddle, G.C., C.M. Callahan, H.A. Hong and R.L. Knowles, 2012. Does mandatory adoption of international financial reporting standards increase investment efficiency? China: The University of Hong Kong.
- Biddle, G.C., G. Hilary and R.S. Verdi, 2009. How does financial reporting quality relate to investment efficiency? *Journal of Accounting and Economics*, 48(2-3): 112-131. Available at: <https://doi.org/10.1016/j.jacceco.2009.09.001>.
- Boatright, J.R., 2012. *Ethics and the conduct of business*. 7th Edn., New Jersey: Pearson Education Inc.
- Bodie, Z., A. Kane, A.J. Marcus and R. Jain, 2014. *Investments. Asia global*. 9th Edn., Singapore: McGraw-Hill Education (Asia).
- Braam, G. and V.F. Beest, 2013. A conceptually-based empirical analysis on quality difference between UK annual reports and US 10-K reports. *Journal of Modern Accounting and Auditing*, 9(10): 1281-1301.
- Brown, K.C. and F.K. Reilly, 2009. *Analysis of investments and management of portfolios*. 9th Edn., Canada: South Western Cengage Learning.
- Carmichael, D.R., O.R. Whittington and L. Graham, 2007. *Accountants' handbook volume one: Financial accounting and general topics*. 11th Edn., New Jersey: John Wiley & Sons, Inc.
- Chalaki, P., H. Didar and M. Riahinezhad, 2012. Corporate governance attributes and financial reporting quality: Empirical evidence from Iran. *International Journal of Business and Social Science*, 3(15): 223-229.
- Chen, C.J., X. Su and X. Wu, 2009. Forced audit firm change, continued partner-client relationship, and financial reporting quality. *Auditing: A Journal of Practice & Theory*, 28(2): 227-246. Available at: <https://doi.org/10.2308/aud.2009.28.2.227>.
- Chen, F., O.-K. Hope, Q. Li and X. Wang, 2011. Financial reporting quality and investment efficiency of private firms in emerging markets. *The Accounting Review*, 86(4): 1255-1288. Available at: <https://doi.org/10.2308/accr-10040>.
- Chen, P., S. He and K. Novoselov, 2015. *Auditing, investment efficiency, and equity value*. America Accounting Association Annual Meeting and Conference on Teaching and Learning in Accounting.
- Chen, T., 2009. Informational efficiency: Which institutions matter? *Asia-Pacific Financial Markets*, 16(2): 141-168. Available at: <https://doi.org/10.1007/s10690-009-9090-8>.
- Cohen, J., G. Krishnamoorthy and A. Wright, 2004. The corporate governance and financial reporting quality. *Journal of Accounting Literature*, 23(1): 87-152.
- Collins, D.W. and S. Kothari, 1989. An analysis of intertemporal and cross-sectional determinants of earnings response coefficients. *Journal of Accounting and Economics*, 11(2-3): 143-181. Available at: [https://doi.org/10.1016/0165-4101\(89\)90004-9](https://doi.org/10.1016/0165-4101(89)90004-9).

- Considine, B., A. Parkes, K. Olesen, D. Speer and M. Lee, 2010. Accounting information systems: Understanding business processes. 3rd Edn., China: John Wiley & Sons Australia, Ltd.
- Dechow, P.M. and I.D. Dichev, 2002. The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review*, 77(s-1): 35-59. Available at: <https://doi.org/10.2308/accr.2002.77.s-1.35>.
- Dellaportas, S., H. Gibson, R. Alagiah, M. Hutchinson, P. Leung and D. van Homrigh, 2005. *Ethis, governance, & accountability: A professional perspective*. Australia: John Wiley & Sons Australia, Ltd.
- Dollar, D. and S. Wei, 2006. *Das (Wasted) capital: Firm ownership and investment efficiency in China*. Cambridge: National Bureau of Economic Reserach.
- Drake, P.P. and F.J. Fabozzi, 2012. *Analysis of financial statements*. 3rd Edn., USA: John Wiley & Sons, Inc.
- Drake, S.M. and R.G. Dingler, 2001. *The practical guide to finance and accounting: A plain-language, non-technical explanation of all key concepts, terms, practices, and procedures that anyone can use*. USA: Prentice Hall Press.
- Duska, R., B.S. Duska and J.A. Ragatz, 2011. *Accounting ethics*. 2nd Edn., Singapore: John Wiley & Sons, Ltd.
- Francis, J., R. LaFond, P. Olsson and K. Schipper, 2005. The market pricing of accruals quality. *Journal of Accounting and Economics*, 39(2): 295-327.
- Gaffikin, M., 2008. *Accounting theory: Research, regulation, and accounting practice*. Australia: Pearson Education Australia.
- Gibson, C.H., 2011. *Financial statement analysis*. 12th Edn., Canada: South-Western, Cengage Learning.
- Gilaninia, S., M.G. Chegini and E.M. Mohtasham, 2012. Financial reporting quality and investment efficiency of Iran. *Interdisciplinary Journal of Contemporary Research in Business*, 4(7): 218-222.
- Gomariz, M.F.C. and J.P.S. Ballesta, 2014. Financial reporting quality, debt maturity and investment efficiency. *Journal of Banking & Finance*, 40(March): 494-506.
- Grace, K. and J. Ambrose, 2013. Institutional investors' perceptions on quality of financial reporting in Kenya. *International Journal of Humanities and Social Science*, 3(21): 144-156.
- Hartman, L.P., J. DesJardins and C. MacDonald, 2015. *Business ethics: Decision making for personal integrity & social responsibility*. 3rd Edn., New York: McGraw-Hill Education.
- He, L., R. Labelle, C. Piot and D.B. Thornton, 2010. Board monitoring, audit committee effectiveness, and financial reporting quality: Review and synthesis of empirical evidence. *Journal of Forensic & Investigative Accounting*, 1(2): 1-41.
- Jonas, G. and J. Blanchet, 2000. Assessing quality of financial reporting. *Accounting Horizons*, 14(3): 353-363. Available at: <https://doi.org/10.2308/acch.2000.14.3.353>.
- Jones, C.P., 2014. *Investments*. 12th Edn., Asia: John Wiley & Sons Singapore Pte Ltd.
- Jones, J.J., 1991. Earning management during import relief investigations. *Journal of Accounting Research*, 29(2): 193-228. Available at: <https://doi.org/10.2307/2491047>.
- Kariuki, G. and J. Ambrose, 2013. Institutional investors' perceptions on quality of financial reporting in Kenya. *International Journal of Humanities and Social Science*, 3(21): 144-156.
- Kieso, D.E., J.J. Weygandt and T.D. Warfield, 2014. *Intermediate accounting IFRS edition*. 2nd Edn., China: John Wiley & Sons, Inc.
- Kothari, C.R., 2004. *Research methodology: Methods and technique*. 2nd Edn., New Delhi: New Age International (P) Ltd.
- Krishnamoorthy, G., A. Wright and J. Cohen, 2002. Audit committee effectiveness and financial reporting quality: Implications for auditor independence. *Australian Accounting Review*, 13(29): 3-13. Available at: <https://doi.org/10.1111/j.1835-2561.2003.tb00206.x>.
- Lai, S.-M., C.-L. Liu and T. Wang, 2014. Increased disclosure and investment efficiency. *Asia-Pacific Journal of Accounting & Economics*, 21(3): 308-327. Available at: <https://doi.org/10.1080/16081625.2012.741791>.

- Lant, S., 2014. Expected acquisition can boost performance. Available from <http://investasi.kontan.co.id/news/akuisisi-diharap-bisa-dongkrak-kinerja> [Accessed 10/15/14].
- Li, Q. and T. Wang, 2010. Financial reporting quality and corporate investment efficiency: Chinese experience. *Nankai Business Review International*, 1(2): 197-213. Available at: <https://doi.org/10.1108/20408741011052591>.
- Luxi, C., L. Chunlei and G. Wang, 2013. Financial constraints, investment efficiency and corporate governance: Empirical evidence from China. *Service Systems and Service Management (ICSSM) 10th International Conference*. pp: 445-449.
- Mackenzie, B., D. Coetsee, T. Njikizana, R. Chamboko, B. Colyvas and B. Hanekom, 2012. 2012 interpretation and application of international financial reporting standards. New Jersey: John Wiley & Sons, Inc.
- Madani, M., M.M. Addin and A.A. Rad, 2013. Impact of family ownership, state ownership and major shareholders on the financial reporting quality of the firms listed on the Tehran stock exchange. *Interdisciplinary Journal of Contemporary Research In Business*, 5(5): 50-63.
- McNichols, M.F. and S.R. Stubben, 2008. Does earnings management affect firms' investment decisions? *The Accounting Review*, 83(6): 1571-1603. Available at: <https://doi.org/10.2308/accr.2008.83.6.1571>.
- McNiols, M.F., 2002. Discussion of the quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review*, 77(2002): 61-69.
- Meigs, R.F. and W.B. Meigs, 1993. *Accounting: Basis for business decisions*. 9th Edn., USA: McGraw-Hill, Inc.
- Moeinaddin, M., F. Heirani and A. Mirhosseini, 2012. The relationship between financial reporting quality and return volatility and the role of institutional and accounting factors. *Interdisciplinary Journal of Contemporary Research In Business*, 4(6): 150-163.
- Nagy, A.L., 2010. Section 404 compliance and financial reporting quality. *Accounting Horizons*, 24(3): 441-454. Available at: <https://doi.org/10.2308/acch.2010.24.3.441>.
- Nazir, M., 2011. *Research methods*. Bogor: Ghalia Indonesia.
- Peil, J. and I. van Staveren, 2009. *Handbook of economics and ethics*. UK: Edward Elgar Publishing Limited.
- Penman, S.H., 2007. *Financial statement analysis and security valuation*. 3rd Edn., Singapore: McGraw-Hill Education (Asia).
- Poernomo, T., 2015. This is a list of SOEs that are losing. Available from <http://ekubis.beritaprima.com/ini-daftar-perusahaan-bumnyang-merugi/> [Accessed 05/30/15].
- Qosasih, A., 2015a. BPK Says SOEs are losing due To incorrect investment. Available from <http://katadata.co.id/berita/2015/01/15/bpk-sebut-bumn-merugi-akibat-salah-investasi#sthash.pBTbYT2L.dpbs> [Accessed 01/30/15].
- Qosasih, A., 2015b. BPK says many BUMN are wrong -nvestments. Available from <http://bisnis.liputan6.com/read/2158166/bpk-sebut-banyak-bumn-salah-investasi> [Accessed 01/30/15].
- Qosasih, A., 2015c. Many SOEs are losing due to misinvestment. Available from <http://akuntanonline.com/showdetail.php?mod=art&id=1304&t=Banyak%20BUMN%20Merugi%20Karena%20> [Accessed 01/30/15].
- Qosasih, A., 2015d. BUMN loss due to investment. Available from <http://surabaya.tribunnews.com/2015/01/14/kerharm-bumn-kibat-salah-investment> [Accessed 30/01/18].
- Reider, R., 2002. *Operational review: Maximum results at efficient costs*. 3rd Edn., New Jersey: John Wiley & Sons, Inc.
- Riahi-Belkaoui, A., 2000. *Accounting theory*. 4th Edn., UK: Thomson Learning.
- Richardson, S., 2006. Over-investment of free cash flow. *Review of Accounting Studies*, 11(2-3): 159-189. Available at: <https://doi.org/10.1007/s11142-006-9012-1>.
- Robinson, T.R. and P. Munter, 2004. Financial reporting quality: Red flags and accounting warning signs. *Commercial Lending Review*, 19(1): 2-15.

- Rose, P.S. and M.H. Marquis, 2006. Money and capital market: Financial institutions and instruments in a global marketplace. 9th Edn., New York: McGraw-Hill Companies, Inc.
- Rosenfield, P., 2006. Contemporary issues in financial reporting: A user-oriented approach. New York: Routledge.
- Sekaran, U. and R. Bougie, 2013. Research methods for business a skill-building approach. 6th Edn., Italy: John Wiley & Sons Ltd.
- Simons, R., 2000. Performance measurement & control system for implementing strategy: Text & cases. USA: Prentice-Hall, Inc.
- Sinaga, H., 2018a. The old management of Jiwasraya was considered to have mismanaged the investment. Available from <https://keuangan.kontan.co.id/news/management-lama-jiwasraya-dinilai-salah-urus-investment> [Accessed 10/15/18].
- Sinaga, H., 2018b. Incorrect investment makes failure to pay. Available from <https://keuangan.kontan.co.id/news/salah-invest-bikin-gagal-bayar> [Accessed 10/15/18].
- Sindhunata, B., 2010. Non-guaranteed foreign acquisition. Available from <http://www.infobanknews.com/2010/08/akuisisi-asing-bukan-jaminan/> [Accessed 01/30/15].
- Singarimbun, M. and S. Effendi, 1995. Survey research methods. Jakarta: Institute for Economic and Social Research, Education and Information.
- Stice, E.K. and J.D. Stice, 2012. Intermediate financial accounting. 18th Edn., China: South-Western Cengage Learning.
- Subramanyam, K.R. and J.J. Wild, 2009. Financial statement analysis. 10th Edn., Singapore: McGraw-Hill Education (Asia).
- Sugiyono, 2008. Qualitative and quantitative research methods and R&D. Bandung: CV. Alfabeta.
- Tasios, S. and M. Bekiaris, 2012. Auditor's perceptions of financial reporting quality: The case of Greece. *International Journal of Accounting and Financial Reporting*, 2(1): 57-74. Available at: <https://doi.org/10.5296/ijaf.v2i1.1286>.
- Trihargo, G., 2019. Ministry of SOEs commitment in saving Jiwasraya. Available from <https://keuangan.kontan.co.id/news/begini-komitmen-kementerian-bumn-terhadap-asuransi-jiwasraya> [Accessed 01/30/15].
- Velasquez, M.G., 2012. Business ethics concepts and cases. 7th Edn., USA: Pearson Education, Inc.
- Wild, J.J. and W. Kwok, 2011. Financial accounting: Information for decisions. Singapore: McGraw-Hill Companies, Inc.
- Wild, J.J., K.W. Shaw and B. Chiappeta, 2009. Financial accounting principles. 19th Edn., USA: McGraw-Hill Companies, Inc.
- Williams, J.R., S.F. Haka, M.S. Bettner and J.V. Carcello, 2010. Financial & managerial accounting: The basis for business decision. 15th Edn., USA: McGraw-Hill Companies, Inc.
- Yoo, Y., J. Lim and J. Chang, 2013. Financial reporting quality and acquisition profitability: Evidence from Korea. *Journal of Applied Business Research*, 29(6): 1737-1750. Available at: <https://doi.org/10.19030/jabr.v29i6.8211>.
- Zhang, M., W. Zhang and S. Zhang, 2015. National culture and firm investment efficiency: International evidence. *Asia-Pacific Journal of Accounting & Economics*, 22: 1-21.
- Zhang, Y., 2015. The effect of labor unionization on corporate investment efficiency. Boston: University of Massachusetts.
- Zuhra, W.U.N., 2019. Old management Eats Jiwasraya through investment funds. Available from <https://tirto.id/management-lama-undermining-jiwasraya-lewat-dana-invest-dffb> [Accessed 2/15/19].

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