# Information Technology Investment Announcements and Firms' Value: The Case of Indonesian Firms in the Financial and Non-Financial Sectors

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## ABSTRACT

This study aims to investigate the impact of information technology (IT) investment announcements on firms' value in the Indonesian financial and non-financial sectors. Specifically, this study examines the excess return in both sectors separately, to measure market reaction after the announcement. This study uses event study methodology to capture 91 events of IT project announcements from the period of 2000 to 2007 that consist of 52 events announced by financial firms and 39 events announced by non-financial firms. By using Z test to analyse the data, the results reveal indifferent market reaction to the IT investment announcements by firms in the financial and non-financial sectors. These results imply that in the context of Indonesian investors, IT investments made by these firms do not actually provide positive signals for potential wealth increase.

**Keywords:** Efficient Market Hypothesis, Event Study, Firm Value, Productivity
**JEL Classification:** G14

## 1. Introduction

The extensive use of Internet based applications in business enterprises leads to a new business model called electronic-business (e-business). It has changed how firms are managed and operated. It also enables firms to penetrate foreign markets and to connect directly with customers,

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suppliers, and other business partners globally. E-business is now a key factor for being competitive. Therefore, many business enterprises have evolved from the traditional brick-and-mortar firm into a digital firm that is also known as a click-and-mortar firm. Digital firms may adopt a wide range of e-business applications, from stand-alone applications to enterprises systems that integrate all intra firm functions.

The potential benefits of Information Technology (IT), especially the Internet, have been the key factors that drive IT investment. Among others, IT can lead to having a positive impact on a firm's products, services, internal processes and last but not least, performance (Santos, Peffers, & Mauer, 1993; Porter & Millar, 1985). Firms adopt IT to attain cost efficiency and productivity by streamlining and integrating internal business process, which is the case in Enterprise Resource Planning (ERP). ERP enables a firm to integrate all processes that exist in the firm's functional areas, amongst departments and in different locations. ERP integrates all data from all enterprise applications to a central storage data bank that can be easily accessed by all parties. ERP can help a firm to make quick decisions since it can provide financial analysis, on-time sales reporting, inventory and production reports (Gupta, 2000) quickly. Hence, firms that invest heavily on IT, especially ERP systems (Jelassi & Enders, 2004) grow tremendously. Further, in the case of *Intel*, Phan (2003) claims that e-business deployment enables the firm to gain competitive advantages. *Intel* became the fifth most profitable firm in the US in the year 2000, after its initial deployment of an e-business pilot system in 1998. *Intel* achieved its competitive advantage through operational efficiency and strategic positioning.

IT investment needs performance metrics to measure corporate operational effectiveness and efficiency in e-business implementation. Some of the performance metrics are Information of Economics, Total Cost of Ownership (TCO), Total Value of Ownership (TVO), Information Value Added, and Information Productivity. In general, these measures can be categorised into return on investment (ROI) and return of customer satisfaction (RoCS). According to Dehning and Richardson (2002), IT investment evaluation can be classified into budget allocation for IT (IT Spending), types of IT acquisition/implementation (IT Strategy), and how IT assets are managed (IT Management/Capability). One of the ways to measure the ROI of IT implementation is to use the event study method to measure market reaction assessment on IT implementation as a corporate strategy. In addition, it is common that listed firms announce major IT investments and implementations to the public as part of good corporate governance practice. In Indonesia, such announcements can be

seen in respected newspapers, for example, Bisnis Indonesia and Kontan, and online media like Infovesta (www.infovesta.com).

Literature suggests that factors such as industry sector and investment timing determine market reaction towards IT investment announcements. A study by Nagm and Kautz (2008) investigated the impact of ICT investment announcements on Australian firms' stock prices. The study categorised the sample firms based on IT and Non-IT sectors. Furthermore, Santos et al. (1993) found industry characteristics as one of the determinants of market reaction towards IT investment announcement. Specifically, they argue that "*IT investments may have different effects on firms' value in the financial services industry than in manufacturing industry*" (p.3). In addition, according to Yap (1990), firms in the financial sector adopt IT earlier than firms in the non-financial sectors. Such an argument is plausible because the financial industry is information intensive. Therefore, firms in the financial sector, theoretically, will invest and announce their IT investments more frequently than their counterparts from the non-financial sectors. Based on the studies by Yap (1990) and Santos et al. (1993), there is an opportunity to extend prior studies by investigating the effect of IT investment announcements on firms' value on the basis of financial and non-financial sectors. Hence, the current study attempts to examine whether IT investment announcements have information content to trigger market reaction. Such a reaction is indicated by the rise of stock price that results in abnormal returns (Santos et al., 1993). The current study investigates market reaction towards IT investment announcements in financial and non-financial sectors in Indonesia. Specifically, this research addresses the following research question: "Do IT investments announcements affect firms' market value in financial and non-financial sectors in Indonesia?"

## 2.    Literature Review and Hypothesis Development

The benefits of the use of IT in business entities are widely known. Santos et al. (1993) found that IT implementation can lead to some direct benefits that contribute to future cash flows. IT investments and implementations are also expected to gain operating efficiency and business effectiveness. In addition, there are indirect benefits which may be obtained from IT usage. It can be in the form of future income opportunity due to capability to utilise the technology. Muhanna and Stoel (2010) state that superior IT capability is rewarded by investors through high share value. They also suggest that IT capability appears to be value relevant for firms that operate in the Internet era.

IT is an enabler to attain a firm's mission and strategy. Therefore, IT should not be separated from corporate strategy. It is positioned as part of strategic management process. It plays a vital role in the business and strategic planning process. In the context of small and medium enterprises (SMEs), adoption of an e-business model often requires significant changes in the business processes and in the way they interact with customers and suppliers (Cote, Vezina, & Sabourin, 2005). Inability to prepare for these changes may threaten the existence of the enterprise. Hence, successful implementation of an e-business application may improve a firm's competitiveness.

According to Hendratmoko and Achjari (2008), implementing e-business applications requires significant investment. These applications, for instance, Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Supply Chain Management (SCM), Business Intelligent (BI), and E-Commerce, are usually adopted by medium and large companies. Companies that adopt these applications need to reconfigure their business process comprehensively so that they can integrate their business process both internally and externally. Usually the business process reengineering is complex and thus, a firm that intends to apply e-business strategy (or e-strategy) will conduct deep analysis and evaluation on each e-business investment.

Santos et al. (1993) state that the decision to invest in IT is expected to have a significant positive impact on the firm's performance, which in turn, increases the firm's value. The beneficial IT investment decision is indicated by positive net present value (NPV). Previous studies show positive impact of IT investment announcements by firms. For example, Henderson, Kobelsky, Richardson, and Smith (2010) focused on ERP system. Their findings show that investors react positively to IT-related announcements. Such findings are in line with past studies in ERP and accounting information system. ERP implementation can lead to substantial changes in accounting information. Changes occur in how accounting information is processed, prepared, audited and disseminated. For example, prior to the implementation of the ERP, financial reports were created and prepared using manual processes, now it can be produced immediately whenever required because the data are available electronically. Similarly, ERP implementation can provide financial information anytime it is needed (Dillon, 1999). The ability of ERP to integrate with other systems has reduced the information barriers amongst organisational functions.

Studies on stock market reactions on IT investment announcements have been investigated across countries. A study by Ferguson, Finn, and Hall (2005) on the stock market reactions on e-commerce projects in Australia, found that the Australian stock market also appears to react positively to IT investment announcements. In contrast to the United States, non-innovative investments in Australia seem to be perceived as more valuable than the innovative ones. Further, an announcement about the appointment of a new Chief Information Officer (CIO) also provides a good signal to the market as evidenced in the movement of the share price. Chatterjee, Richardson, and Zmud (2001) show that the market reacts positively to the appointment of the new CIO, especially if the firm is undergoing IT-based business transformation. Investors expect that IT will be managed better by the new CIO and this will increase the firm's value. The same is true in regard to information system (IS) outsourcing announcement. Hayes, Hunton, and Reck (2000) found that there is an impact of information system (IS) outsourcing announcement on firm's value, depending on the size and type of business. In their study, they found significant impact on small firms and also on firms in the service industry. However, most studies on market reaction focused on firms in developed countries.

Hendratmoko and Achjari (2008) conducted a study in the context of a developing country, namely Indonesia. They investigated the impact of IT investment announcements on Indonesian firms' value by collecting IT investment announcement events from year 2000 to year 2004. Interestingly, their results reveal that in terms of average abnormal return, there is no significant difference between one day before announcement ($t$-1) and one day after announcement ($t$+1). The study suggests that in Indonesia, investors may not see IT investments as signals that can lead to better productivity and higher values for shareholders. In addition, statistics show interesting figures, whereby 75 per cent of samples are from the financial sector and 25 percent samples are from the manufacturing sector. Given that the majority of samples are from the financial sector, it is surprising that the study fails to reveal the relationship between IT investments and productivity. Hence, it is important to further investigate this phenomenon to provide further insight and understanding of the market reaction on the announcement of IT investment.

The Efficient Market Hypothesis (EMH) theory (Fama, 1970) has long been applied to investigate the stock market reaction to forthcoming information, for instance IT investment announcement. Fama (1970)

suggests that a market is efficient if the stock price fully incorporates forthcoming information. The investors' reactions towards the information are assumed as random behaviour and normally distributed. Therefore, the net effect cannot be reliably utilised by particular investors to create abnormal returns (Hamid, Suleman, Syah, & Akash, 2010). According to Malkiel (1992), a market is considered as efficient if the information to all market participants does not lead to price changing.

The problem of value creation in IT investments is known as a productivity paradox. Solow (1987) in Dehning and Richardson (2002) states "*We see the computer age everywhere except in the productivity statistics*". He seems to doubt the capability of IT assets productivity. Since then, the term "productivity paradox" emerges to describe the phenomenon. There are reasons why IT investments do not significantly affect a firm's performance nor increase its value. Among others, is the inability of a firm to create competitive advantage and innovation based electronic-strategy (e-strategy). Further, according to Dehning and Richardson (2002), economics and industry condition are the external factors that contribute to the existence of a productivity paradox. They support the notion of a productivity paradox in which IT investments do not result in expected returns, yet cause negative returns. Chakrabarti (1988) in Santos and Peffers (1995) argues that significant productivity gains may not follow IT investments.

Performance measures are required to investigate the impact of IT investments on firms' value. These indicators, among others, are Information of Economics, Total Cost of Ownership (TCO), Total Value of Ownership (TVO), Information Value Added, and Information Productivity. Along with these measures, many researchers attempt to analyse the impact of IT implementation on firms' value using an event study methodology (Santos et al., 1993; Hayes et al., 2000; Subramani & Walden, 2001; Chavez & Lorenzo, 2008; Dehning, Richardson, & Stratopoulos, 2005; Ferguson et al., 2005; Roztocki & Weistroffer, 2007). Hence, firm value measurement using market approach is considered to be advantageous, since it considers all future benefits, both short-term and long-term (Dehning et al., 2005).

A research by Hendratmoko and Achjari (2008) suggests that in Indonesia, the banking industry dominates IT investment announcements compared to other sectors. The study shows that 41 IT investment announcements were made by 12 firms. Interestingly, nine out of the 12 firms were from banking sector. The figures provide external validity for previous studies which argue that the banking sector is an early

adopter (Yap, 1990). Other sectors that show high IT investments are the telecommunication and manufacturing industries. The firms in these sectors invest on e-business application projects such as ERP, CRM, and SCM as part of their ERP application, E-Commerce, Business to Business (B2B), and Business to Customer (B2C). In the context of developing countries, the association of IT investment and firm's performance has also been investigated. For instance, Bucar, Stare, and Jaklic (2006) found that Slovenian firms that use information and communication technology (ICT) intensively attain better business performance. However, as a result of a lack of systematic approaches to ICT projects, many Slovenian firms are reluctant to make ICT investment an integral part of their business strategy. Indjikian and Siegel (2005) suggest that to maximise social returns to IT investments, policymakers in developing countries must address two key deficiencies. First, there is a lack of knowledge of "best practice" in IT usage and second, there exist IT-related skill deficiencies in the workforce. Commander, Harrison, and Filho (2009) conducted a study that investigates the relationship between ICT and productivity in developing countries by using samples from manufacturing firms in Brazil and India. The study found a strong positive association between ICT capital and productivity in both countries. In addition, Motohashi (2005) in Commander et al. (2009) surveyed manufacturing firms in China between the years 1995-2002 and found that IT investment associates with firm's productivity, especially in foreign firms.

In terms of the impact IT investment announcement on a firms' value, Santos et al. (1993) show that there is no difference between the financial and manufacturing industries. However, Yap (1990) found there is a significant difference between the financial sector and the other four business sectors (i.e., transport and communication, wholesale distribution, retail distribution, and miscellaneous services). The current study follows Yap (1990) that identifies organisational characteristics in the United Kingdom in terms of computer usage. As such, this study extends the previous work by Hendratmoko and Achjari (2008) as well as Santos et al. (1993), and modifies sample classification on the basis of two industry sectors namely financial and non-financial sectors. Also, this study expands the sample events for the period of 2000 to 2007 and lengthens the estimation period of market model into 100 days. Based on the above mentioned literature, the current study develops the following hypotheses:

$H_1$:  There is positive impact of IT investment announcement on firm's market value in the financial sector.

H$_2$:    There is positive impact of IT investment announcement on firm's market value in the non-financial sector.

H$_3$:    The impact of IT investment announcement on firm's value is higher in the financial sector than in the non-financial sector.

## 3.    Methodology

Many studies, for instance, Subramani and Walden (2001), Chavez and Lorenzo (2008), and Dehning and Richardson (2002), have been conducted to solve the IT productivity puzzle using various approaches and research methods. In addition to the more traditional approaches such as case studies and surveys, the event studies have also been used by information system (IS) researchers (Daniel, Kodwani, & Datta, 2009; Konchitchki & O'Leary, 2011). The Efficient Market Hypothesis theory provides the foundation for the event study method. According to the theory, all available information to investors is reflected in the stock prices (Fama, 1970). Thus, in the current study, the event study methodology is employed to obtain empirical evidence with regard to the impact of IT investment announcements on firms' value. This method is applied because it has been widely used in business research areas such as accounting, finance, and strategic management.

### 3.1.  Population, Sample and Data

The population comprises Indonesian Stock Exchange-listed firms that published IT investments announcements for the period from 2000 to 2007. This timeframe was chosen because of the Indonesian macroeconomics condition during this period, especially the capital market was relatively stable. It was also the period between two major financial crises in 1998 and 2008 respectively. The inclusion of data across these two years into the sample can be problematic since the stock market is considered to be abnormal. Therefore these two years were excluded.

The samples were selected using the purposive sampling method. The selected press release events must satisfy the determined criteria. It should solely contain IT investment announcements. It cannot contain other information that may affect market reaction, such as dividend announcements, merger or acquisition activities, management policy, and so forth. Secondary data were obtained from paper-based mass media, web-based magazines and newspapers, and websites, such as Yahoo! Finance's composite stock price index and firms' stock prices (http://finance.yahoo.com), and from the Data Center of the Faculty of Economics and Business, Universitas Gadjah Mada.

The data were collected using the following steps. First, search engine was utilised. Several key words were used, such as "IT implementation news and public company", "ERP implementation news and public company", and "SCM implementation news and public company". Second, corporate websites were visited and explored to obtain IT news. Third, Bisnis Indonesia daily newspaper was used to seek IT news. Finally, the results acquired from previous steps were categorised into financial and non-financial sectors. Having followed the procedures mentioned above, this study captured 91 events of announcement of IT application projects for the period 2000 to 2007. It consisted of 52 events announced by financial firms and 39 events announced by non-financial firms.

### 3.2. Data Analysis

This study conducted a step by step data analysis to test $H_1$ and $H_2$, for both financial and non-financial firms groups. First, the announcements of IT investments were identified. Then, each announcement was examined to identify the presence of other corporate activities that might influence a firm's value. An event was included into the sample if it was isolated from other corporate activities. This was followed by the definition of the estimation period. This study used a 100-day estimation period which started from two (2) days before the announcement date ($t_{-2}$) to 101 days before the announcement date ($t_{-101}$).

The event window was defined next. The event window period included one (1) day before the announcement ($t_{-1}$), the day of the announcement ($t_0$) and one (1) day after the announcement ($t_{+1}$). After determining the estimation period and event window, the daily closing stock prices of sample firms during the estimation period and event window period were collected. In addition, the daily closing composite stock price indices during the estimation period and event window period were also collected. Next, the rate of return that was the actual return for firm $j$ on day $t$ was also calculated for the estimation period and the event window period using the following formula:
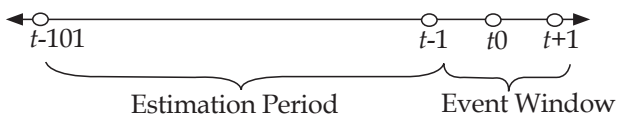


$$R_{j,t} = \frac{P_t - P_{t-1}}{P_{t-1}} \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$

$R_{j,t}$ = rate of return for firm $j$, on day $t$
$P_t$ = common stock closing price on day $t$
$P_{t-1}$ = common stock closing price on day $t-1$

Next, the market returns for the estimation period and the event window period were also calculated as below:

$$R_{mt} = \frac{P_{mt} - P_{mt-1}}{P_{mt-1}} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(2)$$

$R_{mt}$ = return on a market portfolio (Jakarta Composite Index) on day $t$
$P_{mt}$ = closing composite stock price index on day $t$
$P_{mt-1}$ = closing composite stock price index on day $t-1$

The value of $\alpha_j$ and $\beta_j$ were determined using the market model technique as follows:

$$R_{j,t} = \alpha_j + \beta_j \cdot R_{mt} + e_{j,t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(3)$$

$R_{j,t}$ = return on firm $j$, on day $t$
$\alpha_j$ = regression coefficient representing the intercept term for stock $j$
$\beta_j$ = coefficient representing the slope of the regression, the expected change in stock $j$'s return for a 1 per cent chang e in the market return
$R_{mt}$ = return on a market portfolio (Jakarta Composite Index) on day $t$
$e_{j,t}$ = error term on the regression (reflecting factors other than the stock market that impact the return on a stock $j$)

After the value of $\alpha_j$ and $\beta_j$ were determined, the estimated (normal) stock returns for each firm during the event window period were computed using the above mentioned market model technique. Thus, $\alpha_j$ and $\beta_j$ that were the results from Equation 3, were applied in Equation 4 below to produce the estimated return (ER).

$$ER = \alpha_j + \beta_j \cdot R_{mt} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(4)$$

The final step was to test the notion of abnormal return (excess return) in the event period. It was carried out by subtracting the average estimated return from the average (actual) return. If the result is different from zero, then it indicates the presence of abnormal return. To do so, this study examined the significance of the abnormal returns mean difference between the average estimated return and average (actual) return for both financial sector sub-sample ($H_1$) and non-financial sector sub-sample ($H_2$) by using Z test ($n > 30$):

$$Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(5)$$

$\bar{x}$    = average (actual) return (R) in event window period

$\mu$    = average estimated return (ER) in event window period

$\sigma$    = variance

n    = number of event

To test $H_3$, the same steps as $H_1$ and $H_2$ above were followed, except for the final step to test the ratio of abnormal return (excess return) in the event period. For $H_3$, the abnormal return (excess return) for firm $j$ on day $t$ in each day in the event period was computed as follows:

Abnormal Return = Actual Return – Estimated Return

$$AR = R_{j,t} - (\alpha_j + \beta_j \cdot R_{mt}) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(6)$$

While, the abnormal (excess) return for firm $j$ on particular day $t$-1, $t$0 dan $t$+1, where $t$-1 is the day before the announcement in a daily periodical, was computed:

$$CAR_j = \sum_{t=-1}^{1} AR_{jt} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(7)$$

$CAR_j$ = cumulative abnormal return for firm $j$.

Following Dos Santos (1993), the Cumulative Abnormal Return (CAR) is an average of excess return for firm $j$ on day $t$. The average of three day abnormal return for firm $j$ and $N$ firms sample was computed as follows.

$$CAR_j = \frac{1}{N} \sum_{t=-1}^{1} AR_{jt} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(8)$$

Meanwhile the null $H_3$ implies that financial firms CAR equal to non-financial firms CAR. Therefore, alternative $H_3$ needs to determine whether financial sector's CAR was higher than non-financial sector's CAR during the window period.

Financial firms CAR – Non financial firms CAR > 0   ....................(9)

Finally, the significance of CAR difference (Equation 9) was tested using Z test (i.e., two samples) that is computed as follows:

$$Z = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}} \quad \text{..................................................................(10)}$$

$\bar{x}_1$ = CAR for financial sector on event windows period

$\bar{x}_2$ = CAR for non-financial sector on event windows period

$\mu_1$ = predicted return for financial sector firm on event windows period

$\mu_2$ = predicted return for non-financial sector firm on event windows period

$\sigma$ = variance

n = number of event

## 4. Findings

To test all the hypotheses, the data were analysed by comparing cumulative abnormal returns. The results of predicted, actual and cumulative abnormal return calculation for each industry can be seen in Table 1a and Table 1b (Financial Sector); and Table 2a and Table 2b (Non-Financial Sector).

### 4.1. Hypothesis 1 ($H_1$)

$H_1$ proposes that there is positive impact of IT investment announcement on firm's value in the financial sector. The calculation of average abnormal return during the event window period for the financial sector is described in Table 1. Below is the Z-test procedure to test the $H_1$:

1. $H_{1o}$ : Abnormal Return = 0
   $H_{1a}$ : Abnormal Return > 0
2. Alpha ($\alpha$) = 0.05
3. Critical value (one-tailed; 0.05)
   $Z_{(0.05)}$ = 1.65
4. Decision criteria :$H_{1o}$ is rejected if Z score >1.65

5. Z score = $\dfrac{0.0000513 - 0.00477}{0.2986/\sqrt{52}}$ =-0.114

As the Z score is -0.114 which is <1.65, $H_{1o}$ is not rejected. Thus, it can be concluded that as the abnormal return for the financial sector is not significantly higher than zero, $H_1$ is not supported.

Table 1a:   Common Stock Return - Financial Sector

| Stock | Common Stock Return | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | t-1 | | | t0 | | | t+1 | | | Cummulative | | |
| | Predicted | Actual | AR | Predicted | Actual | AR | Predicted | Actual | AR | Predicted | Actual | AR |
| BII | 0.014574 | -0.17 | -0.18457 | 0.011355 | 0 | -0.01136 | 0.010581 | 0 | -0.01058 | 0.01217 | -0.05666667 | -0.06883667 |
| BCA | 0.006724 | 0.014 | 0.007276 | 0.000893 | -0.01 | -0.01089 | -0.000509 | 0 | 0.000509 | 0.00236933 | 0.00133333 | -0.001036 |
| Lippo Bank | 0.001784 | 0 | -0.00178 | -0.004483 | 0 | 0.004483 | -0.005989 | 0 | 0.005989 | -0.002896 | 0 | 0.002896 |
| BCA | 0.112391 | -0.01 | -0.12239 | 0.138116 | 0 | -0.13812 | 0.135321 | -0.02 | -0.15532 | 0.12860933 | -0.01 | -0.13860933 |
| BII | -0.003937 | 0 | 0.003937 | -0.007423 | 0 | 0.007423 | -0.007044 | -0.2 | -0.19296 | -0.0061347 | -0.06666667 | -0.060532 |
| BCA | 0.00292 | 0.014 | 0.01108 | 0.007211 | 0.055 | 0.047789 | 0.002517 | 0.013 | 0.010483 | 0.004216 | 0.02733333 | 0.023117333 |
| BNI | 0.005449 | 0.045 | 0.039551 | 0.002776 | 0 | -0.00278 | 0.004176 | 0 | -0.00418 | 0.00413367 | 0.015 | 0.010866333 |
| BCA | 0.006442 | -0.04 | -0.04644 | 0.00587 | 0.026 | 0.02013 | 0.006032 | -0.01 | -0.01603 | 0.00611467 | -0.008 | -0.01411467 |
| BCA | 0.007865 | -0.09 | -0.09787 | 0.008038 | 0 | -0.00804 | 0.008564 | -0.02 | -0.02856 | 0.00815567 | -0.03666667 | -0.04482233 |
| BII | -0.012681 | 0 | 0.012681 | -0.009762 | 0 | 0.009762 | -0.000862 | 0 | 0.000862 | -0.0077683 | 0 | 0.007768333 |
| BNI | -0.11469 | -0.06 | 0.05469 | -0.060897 | 0 | 0.060897 | 0.051753 | 0.031 | -0.02075 | -0.041278 | -0.00966667 | 0.031611333 |
| BCA | 0.011106 | 0 | -0.01111 | 0.001028 | -0.02 | -0.02103 | 0.00229 | 0 | -0.00229 | 0.004808 | -0.00666667 | -0.01147467 |
| BNI | 0.012358 | 0 | -0.01236 | -0.00008 | 0 | 0.00008 | 0.001478 | 0 | -0.00148 | 0.00458533 | 0 | -0.00458533 |
| BII | 0.010326 | 0.333 | 0.322674 | -0.009803 | 0 | 0.009803 | -0.007283 | 0 | 0.007283 | -0.0022533 | 0.111 | 0.113253333 |
| Danamon Bank | 0.004739 | 0 | -0.00474 | 0.005152 | -0.04 | -0.04515 | 0.004999 | -0.08 | -0.085 | 0.00496333 | -0.04 | -0.04496333 |
| BNI | -0.004464 | 0.045 | 0.049464 | 0.001114 | 0 | -0.00111 | -0.009618 | -0.04 | -0.03038 | -0.0043227 | 0.00166667 | 0.005989333 |
| Danamon Bank | -0.000309 | 0.083 | 0.083309 | -0.004611 | 0.015 | 0.019611 | -0.001233 | -0.03 | -0.02877 | -0.002051 | 0.02266667 | 0.024717667 |
| Danamon Bank | 0.039151 | 0 | -0.03915 | 0.036845 | 0 | -0.03685 | 0.03857 | 0.06 | 0.02143 | 0.03818867 | 0.02 | -0.01818867 |
| Danamon Bank | 0.040887 | -0.04 | -0.08089 | 0.035256 | 0.018 | -0.01726 | 0.029562 | -0.02 | -0.04956 | 0.035235 | -0.014 | -0.049235 |
| BNI | 0.017075 | 0.097 | 0.079925 | 0.010357 | -0.03 | -0.04036 | -0.000998 | -0.03 | -0.029 | 0.00881133 | 0.01233333 | 0.003522 |
| Danamon Bank | 0.003562 | -0.02 | -0.02356 | 0.000392 | -0.02 | -0.02039 | 0.00045 | 0 | -0.00045 | 0.001468 | -0.01333333 | -0.01480133 |
| Niaga Bank | 0.000433 | 0 | -0.00043 | 0.010872 | -0.17 | -0.18087 | 0.017459 | 0.2 | 0.182541 | 0.009588 | 0.01 | 0.000412 |
| Niaga Bank | -0.000666 | 0.041 | 0.041666 | -0.001236 | -0.06 | -0.05876 | -0.001359 | 0.084 | 0.085359 | -0.0001087 | 0.02166667 | 0.022753667 |
| Lippo Bank | 0.001742 | 0 | -0.00174 | -0.001713 | 0 | 0.001713 | 0.001656 | 0.05 | 0.048344 | 0.00056167 | 0.01666667 | 0.016105 |
| Danamon Bank | 0.005829 | 0.033 | 0.027171 | 0.006591 | 0 | -0.00659 | 0.001117 | -0.01 | -0.01112 | 0.00451233 | 0.00766667 | 0.003154333 |
| Niaga Bank | 0.013752 | -0.02 | -0.03375 | -0.005573 | -0.02 | -0.01443 | -0.00553 | 0.016 | 0.02153 | 0.000883 | -0.008 | -0.008883 |
| Lippo Bank | -0.006381 | 0 | 0.006381 | -0.003726 | -0.05 | -0.04636 | 0.000351 | 0.05 | 0.049649 | -0.003252 | 0 | 0.003224667 |
| Mandiri Bank | -0.000242 | -0.02 | -0.01976 | -0.000242 | 0 | 0.004977 | -0.002157 | 0 | 0.002157 | -0.0008803 | -0.00666667 | -0.004208 |
| Lippo Bank | -0.003281 | -0.05 | -0.04672 | -0.003644 | 0.05 | 0.054318 | -0.000814 | 0.048 | 0.048814 | -0.0025797 | 0.016 | 0.018804333 |

Table 1b: Common Stock Return - Financial Sector

| Stock | t-1 | | | t0 | | | t+1 | | | Cummulative | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Predicted | Actual | AR | Predicted | Actual | AR | Predicted | Actual | AR | Predicted | Actual | AR |
| Niaga Bank | -0.004977 | 0.028 | 0.032977 | -0.004977 | 0 | 0.004977 | -0.010885 | -0.01 | 0.000885 | -0.0069463 | 0.006 | 0.01296333 |
| Niaga Bank | -0.005232 | 0 | 0.005232 | -0.004318 | 0 | 0.004318 | -0.009681 | -0.01 | -0.00032 | -0.0064103 | -0.00333333 | 0.003077 |
| BCA | 0.004011 | 0 | -0.00401 | 0.004011 | 0 | -0.00401 | 0.005277 | -0.02 | -0.02528 | 0.004433 | -0.00666667 | -0.01109967 |
| BNI | 0.002777 | 0 | -0.00278 | 0.002777 | 0 | -0.00278 | 0.005408 | 0 | -0.00541 | 0.003654 | 0 | -0.003654 |
| Permata Bank | 0.002706 | 0 | -0.00271 | 0.002706 | 0 | -0.00271 | 0.003128 | 0 | -0.00313 | 0.00284667 | 0 | -0.00284667 |
| Lippo Bank | 0.003535 | 0.04 | 0.036465 | 0.003535 | 0 | -0.00354 | 0.001654 | -0.04 | -0.04165 | 0.002908 | 0 | -0.002908 |
| Mandiri Bank | -0.00771 | -0.03 | -0.02229 | -0.010105 | -0.03 | -0.0199 | -0.003798 | -0.03 | -0.0262 | -0.0072043 | -0.03 | -0.02279567 |
| Niaga Bank | 0.014793 | 0.011 | -0.00379 | 0.015228 | 0 | -0.01523 | 0.013733 | 0.011 | -0.00273 | 0.01458467 | 0.00733333 | -0.00725133 |
| Mandiri Bank | 0.010048 | 0.055 | 0.044952 | 0.009406 | 0 | -0.00941 | 0.002894 | 0 | -0.00289 | 0.00744933 | 0.01833333 | 0.010884 |
| BRI | 0.006564 | -0.01 | -0.01656 | 0.005569 | -0.04 | -0.04557 | 0.003943 | 0 | -0.00394 | 0.00535867 | -0.01666667 | -0.02202533 |
| BNI | 0.00443 | 0 | -0.00443 | 0.001433 | 0.024 | 0.022567 | 0.002367 | -0.01 | -0.01237 | 0.00274333 | 0.00466667 | 0.001923333 |
| OCBC NISP | 0.005123 | -0.01 | -0.01512 | 0.003061 | 0 | -0.00306 | 0.003388 | -0.01 | -0.01339 | 0.00385733 | -0.00666667 | -0.010524 |
| Danamon Bank | 0.000354 | -0.03 | -0.03035 | -0.019464 | -0.02 | -0.00054 | 0.029314 | 0.02 | -0.00931 | 0.00340133 | -0.01 | -0.01340133 |
| BCA | 0.001199 | 0 | -0.0012 | -0.005687 | -0.02 | -0.01431 | -0.000493 | 0.008 | 0.008493 | -0.0016603 | -0.004 | -0.00233967 |
| BCA | -0.007026 | -0.04 | -0.03297 | 0.003106 | -0.01 | -0.01311 | 0.004002 | 0 | -0.004 | 2.7333E-05 | -0.01666667 | -0.016694 |
| Danamon Bank | 0.003793 | 0.032 | 0.028207 | -0.003419 | 0.021 | 0.024419 | 0.000941 | 0 | -0.000094 | 0.00043833 | 0.01766667 | 0.017228333 |
| Mandiri Bank | 0.007613 | 0.024 | 0.016387 | 0.012258 | 0.023 | 0.010742 | 0.001806 | -0.01 | -0.01181 | 0.00722567 | 0.01233333 | 0.005107667 |
| Danamon Bank | 0.001883 | 0.037 | 0.035117 | 0.002056 | 0 | -0.00206 | -0.000494 | 0.053 | 0.053494 | 0.00114833 | 0.03 | 0.028851667 |
| Mandiri Bank | -0.009508 | -0.03 | -0.02049 | 0.013052 | 0.027 | 0.013948 | 0.010723 | 0.009 | -0.00172 | 0.00475567 | 0.002 | -0.00275567 |
| Mandiri Bank | 0.003237 | -0.04 | -0.04324 | 0.004191 | 0 | -0.00419 | 0.004429 | -0.01 | -0.01443 | 0.00395233 | -0.01666667 | -0.020619 |
| Mandiri Bank | 0.005046 | 0.036 | 0.030954 | 0.003337 | 0 | -0.00334 | -0.001479 | -0.01 | -0.00852 | 0.00230133 | 0.00866667 | 0.006365333 |
| Danamon Bank | -0.025843 | -0.02 | 0.005843 | 0.025714 | 0.047 | 0.021286 | -0.006334 | -0.02 | -0.01367 | -0.0021543 | 0.00233333 | 0.004487667 |
| Permata Bank | 0.002088 | -0.01 | -0.01209 | -0.004138 | -0.01 | -0.00586 | -0.0085 | 0.011 | 0.0195 | -0.0035167 | -0.003 | 0.000516667 |
| Average | 0.00368 | 0.004385 | 0.000705 | 0.00438471 | -0.00469 | -0.00897 | 0.0062466 | 0.000462 | -0.00579 | 0.00477045 | 5.1282E-05 | -0.00468502 |

Table 2a: Common Stock Return - Non Financial Sector

| Stock | Common Stock Return | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | t-1 | | | t0 | | | t+1 | | | Cummulative | | |
| | Predicted | Actual | AR | Predicted | Actual | AR | Predicted | Actual | AR | Predicted | Actual | AR |
| PT Astra International | 0.015141 | 0.009 | -0.00614 | -0.00046 | -0.05 | -0.04954 | -0.00012 | -0.05 | -0.04988 | 0.00485367 | -0.03033333 | -0.035187 |
| PT Telkom | 0.012328 | 0.011 | -0.00133 | -0.00017 | -0.02 | -0.01983 | 0.015659 | 0.022 | 0.006341 | 0.00927233 | 0.00433333 | -0.004939 |
| PT Kimia Farma | -0.00082 | -0.05 | -0.04918 | -0.0004 | 0.028 | 0.0284 | -0.00166 | 0.027 | 0.02866 | -0.0096 | 0.00166667 | 0.00262667 |
| PT Prima Alloy Steel Universal | 0.007724 | 0 | -0.00772 | 0.003729 | 0 | -0.00373 | 0.018679 | 0 | -0.01868 | 0.010044 | 0 | -0.010044 |
| PT Indosat | -0.00641 | -0.01 | -0.00359 | -0.00732 | -0.01 | -0.00268 | -0.00391 | 0.033 | 0.03691 | -0.00588 | 0.00433333 | 0.010213333 |
| PT Smart | 0.00666 | 0.333 | 0.32634 | -0.00419 | 0 | 0.00419 | -0.00202 | 0 | 0.00202 | 0.00015 | 0.111 | 0.11085 |
| PT Astra International | 0.001859 | -0.01 | -0.01186 | 0.001669 | -0.01 | -0.01167 | 0.003982 | 0.013 | 0.009018 | 0.00250333 | -0.00233333 | -0.00483667 |
| PT Kalbe Farma | -0.00105 | 0.011 | 0.01205 | 0.006765 | 0.022 | 0.015235 | -0.0002 | -0.03 | -0.0298 | 0.00183833 | 0.001 | -0.00083833 |
| PT Indosat | 0.002737 | 0.009 | 0.006263 | 0.002747 | 0.009 | 0.006253 | 0.002738 | 0 | -0.00274 | 0.00274067 | 0.006 | 0.003259333 |
| PT SemenGresik (Persero) | 0.010405 | 0.032 | 0.021595 | 0.005548 | 0.005 | -0.00055 | 0.008375 | -0.01 | -0.01838 | 0.00810933 | 0.009 | 0.000890667 |
| PT Charoen Pokphand | 0.005988 | -0.01 | -0.01599 | 0.004947 | 0 | -0.00495 | 0.006058 | 0.012 | 0.005942 | 0.00566433 | 0.00066667 | -0.00499767 |
| PT Indosat | -0.0004 | 0 | 0.0004 | 0.0003 | 0.021 | 0.0207 | 0.00049 | 0.046 | 0.04551 | 0.00013 | 0.02233333 | 0.022203333 |
| PT Telkom | -0.00426 | -0.02 | -0.01574 | -0.00677 | -0.03 | -0.02323 | 0.004621 | 0.009 | 0.004379 | -0.0021363 | -0.01366667 | -0.01153033 |
| PT Indosat | 0.000924 | -0.02 | -0.02092 | 0.000978 | 0 | -0.00098 | 0.001012 | -0.05 | -0.05101 | 0.00097133 | -0.02333333 | -0.02430467 |
| PT Siwani Makmur | 0.005506 | -0.06 | -0.06551 | 0.011932 | -0.06 | -0.07193 | -0.00389 | -0.02 | -0.01611 | 0.004516 | -0.04666667 | -0.05118267 |
| PT Indosat | 0.002376 | 0.019 | 0.016624 | -0.00323 | 0 | 0.00323 | -0.00126 | 0 | 0.00126 | -0.0007047 | 0.00633333 | 0.007038 |
| PT Telkom | 0.000599 | -0.02 | -0.0206 | -3.099E-05 | -0.02 | -0.01997 | 0.000303 | -0.03 | -0.0303 | 0.00029034 | -0.02333333 | -0.02362367 |
| PT Indosat | 0.00067 | -0.02 | -0.02067 | -0.000776 | 0.009 | 0.009776 | 0.000657 | 0 | -0.00066 | 0.00018367 | -0.00366667 | -0.0385033 |
| PT Mandom Indonesia | -0.01804 | 0.029 | 0.04704 | -0.000819 | -0.01 | -0.00918 | -0.02672 | -0.04 | -0.01328 | -0.015193 | -0.007 | 0.008193 |
| PT Telkom | 0.011893 | 0.044 | 0.032107 | 0.0005663 | -0.01 | -0.01057 | -0.01044 | -0.03 | -0.01956 | 0.0006731 | 0.00133333 | 0.000660233 |
| PT Indosat | -0.00738 | -0.03 | -0.02262 | -0.000948 | 0 | 0.000948 | -0.00324 | 0.006 | 0.00924 | -0.003856 | -0.008 | -0.004144 |
| PT Telkom | 0.010988 | 0.032 | 0.021012 | 0.0083584 | 0 | -0.00836 | 0.005975 | -0.01 | -0.01598 | 0.00844047 | 0.00733333 | -0.00110713 |
| PT Telkom | 0.002842 | -0.01 | -0.01284 | -0.0018 | -0.01 | -0.0082 | -0.00341 | 0 | 0.00341 | -0.0007893 | -0.00666667 | -0.00587733 |
| PT Telkom | 0.003554 | 0.006 | 0.002446 | 0.003454 | -0.01 | -0.01345 | 0.00799 | -0.02 | -0.02799 | 0.00499933 | -0.008 | -0.01299933 |
| PT Pembangunan Jaya Ancol | 0.007022 | -0.04 | -0.04702 | 0.0032448 | -0.01 | -0.01324 | 0.00312 | 0 | -0.00312 | 0.00446227 | -0.01666667 | -0.02112893 |
| PT Tira Austenite | 0.004068 | 0 | -0.00407 | 0.0052085 | 0 | -0.00521 | 0.004023 | 0 | -0.00402 | 0.00443317 | 0 | -0.00443317 |

Table 2b: Common Stock Return - Non Financial Sector

| Stock | Common Stock Return | | | | | | | | | | | |
| | t-1 | | | f0 | | | t+1 | | | Cummulative | | |
| | Predicted | Actual | AR | Predicted | Actual | AR | Predicted | Actual | AR | Predicted | Actual | AR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PT Asahimas Flatt Glass | -0.00101 | -0.01 | -0.00899 | 0.0018201 | 0 | -0.00182 | -0.00371 | 0 | 0.00371 | -0.0009666 | -0.00333333 | -0.0023667 |
| PT Semen Gresik (Persero) | 0.000742 | -0.03 | -0.03074 | 0.0025275 | -0.01 | -0.01253 | 0.004765 | 0 | -0.00477 | 0.00267817 | -0.01333333 | -0.0160115 |
| PT Metrodata | 0.01084 | -0.03 | -0.04084 | 0.0048208 | 0 | -0.00482 | 0.00678 | -0.03 | -0.03678 | 0.0748027 | -0.02 | -0.02748027 |
| PT Panasia Filament | 0.009702 | 0.169 | 0.159298 | 0.0094641 | 0.044 | 0.034536 | 0.011599 | 0 | -0.0116 | 0.01025503 | 0.071 | 0.060744967 |
| PT Telkom | 0.000537 | -0.01 | -0.01054 | 0.0017601 | 0 | -0.00176 | 0.000236 | 0 | -0.00024 | 0.00084437 | -0.00333333 | -0.0041777 |
| PT CMNP | 0.000543 | 0.093 | 0.092457 | 0.0012591 | 0.043 | 0.041741 | -0.00134 | -0.01 | -0.00866 | 0.00015403 | 0.042 | 0.041845967 |
| PT Bakrie Telecom | 0.004057 | 0 | -0.00406 | 0.0043059 | 0 | -0.00431 | 0.005007 | -0.01 | -0.01501 | 0.00445663 | -0.00333333 | -0.0077899 |
| PT Apexindo Pratama Duta | 0.002054 | 0 | -0.00205 | -0.005104 | -0.03 | -0.0249 | 0.004744 | 0 | -0.00474 | 0.00056467 | -0.01 | -0.01056467 |
| PT Telkom | 0.006436 | 0.022 | 0.015564 | -0.005731 | -0.02 | -0.01427 | 0.005969 | -0.01 | -0.01597 | 0.00222467 | -0.00266667 | -0.00489133 |
| PT ANTAM | -0.00438 | -0.07 | -0.06562 | 0.0017791 | -0.01 | -0.01178 | -0.00089 | 0.036 | 0.03689 | -0.0011636 | -0.01466667 | -0.01350303 |
| PT Tigaraksa Satria | 0.000578 | 0 | -0.00058 | 0.0200605 | 0 | -0.02006 | 0.022704 | 0 | -0.0227 | 0.0144475 | 0 | -0.0144475 |
| PT Sumi Indo Kabel | 0.010571 | 0.011 | 0.000429 | -0.002047 | 0 | 0.002047 | 0.005923 | 0.01 | 0.004077 | 0.00481567 | 0.007 | 0.002184333 |
| PT Telkom | 0.000376 | 0 | -0.00038 | -0.000334 | 0.015 | 0.015334 | -0.00109 | -0.01 | -0.00891 | -0.0003493 | 0.00166667 | 0.002016 |
| Average | 0.0029736 | 0.009744 | 0.00677 | 0.00172088 | -0.00318 | -0.0049 | 0.00224382 | -0.00374 | -0.00599 | 0.00231276 | 0.00094017 | -0.00137259 |

## 4.2. Hypothesis 2 (H₂)

$H_2$ argues that there is positive impact of IT investment announcement on firm's value in the non-financial sector. To validate the notion, the data were analysed using the above mentioned procedures. The calculation of average abnormal return during event window period for the non-financial sector is shown in Table 2. The Z-test procedure to test the $H_2$ is as follows:

1.  $H_{2o}$ : Abnormal Return = 0
    $H_{2a}$ : Abnormal Return > 0
2.  Alpha ($\alpha$) = 0.05
3.  Critical value (one-tailed, Z test)
4.  $Z_{(0.05)}$ = 1.65
5.  Criteria of decision : $H_{2o}$ is rejected if Z score is greater than 1.65

6.  Z score = $\dfrac{0.00094 - 0.00231}{0.16/\sqrt{39}}$ =- 0.05

The Z score is -0.05 which is <1.65, therefore $H_{2o}$ is not rejected. As the abnormal return for the non-financial sector is not significantly higher than zero, $H_2$ is also not supported.

## 4.3. Hypothesis 3 (H₃)

$H_3$ proposes that the impact of IT investment announcement on a firm's value in the financial sector is higher than in the non-financial sector. Below is the procedure to test the hypothesis:

1.  $H_{3o}$ : CAR of financial sector is the same with those of non-financial sector ($\mu_1 - \mu_2 = 0$)
    $H_{3a}$ : CAR of financial sector is higher than those of non-financial sector ($\mu_1 - \mu_2 > 0$)
2.  Determined alpha ($\alpha$ = 0.05)
3.  Critical value of $Z_{(0.05)}$ = 1.65
4.  Criteria of decision : $H_{3o}$ is rejected if the Z score is greater than 1.65

5.  $Z = \dfrac{(x_1 - x_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{\sigma_1}{n_1} + \dfrac{\sigma_2}{n_2}}} = \dfrac{(-0.00469 + 0.00137) - 0}{\sqrt{\dfrac{0.2986}{52} + \dfrac{0.16}{39}}} = $ -0.03

The Z score is -0.03 which is <1.65. Therefore, $H_{3o}$ is not rejected. The CAR of the financial sector is not significantly higher than those of the non-financial sector and hence, $H_3$ is not supported.

The findings in $H_1$, $H_2$ and $H_3$ can be seen graphically in Figure 1. It shows that the CAR of the financial and non-financial sectors fall into negative area on the day of announcement and a day after. Theoretically, market reaction towards IT investments announcements can be seen in positive cumulative abnormal return.

Figure 1: Cummulative Abnormal Return (CAR) of Financial and Non-Financial Sectors in Window Period
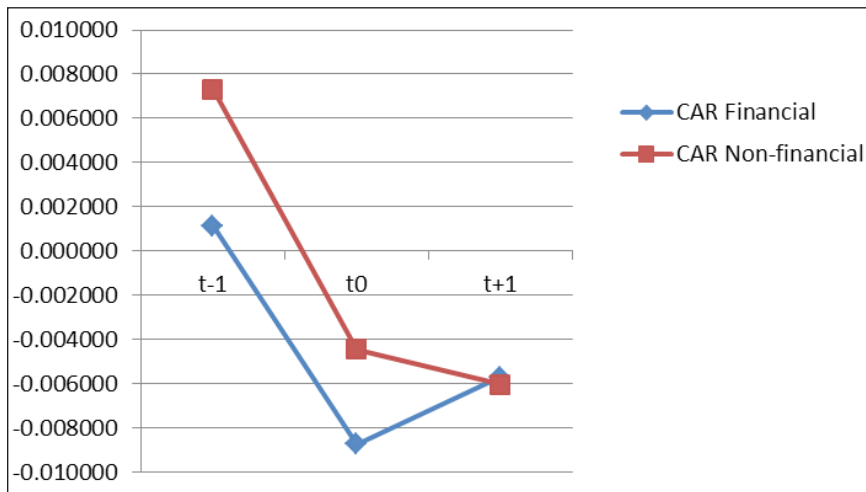


## 5. Discussion and Implication

The data analysis results show that all the three hypotheses of this study are rejected. $H_1$ that proposes there is positive impact of IT investment announcement on firm's value in the financial sector is not supported. The financial sector tends to be among the first to adopt IT compared to other business sector, unfortunately, it does not seem to have an impact on the firm's future value. Market reaction is too weak (Z score is -0.114, $\alpha = 0.05$, one tailed) to capture the excess return phenomena. Cumulative Abnormal Return (CAR) value should be positive and significant to suggest that there is an impact of IT investment announcement on the firm's future value.

Further, for the non-financial sector, the data analysis shows that an IT investment announcement does not correlate positively with investors' perception on the firm's future value (Z score = -0.05, $\alpha$ = 0.05, one tailed). Therefore, $H_2$ is also rejected. The results suggest that the market – for both financial and non-financial sectors - does not value IT investment announcement as a positive signal for potential wealth increase for investors in the future. Hence, it validates the previous study by Hendratmoko and Achjari (2008) that used data from the Indonesian market.

Assuming relatively efficient market hypothesis, the insignificant Z scores from both financial and non-financial sectors lead to some possibilities. Based on Figure 1, graphically, the financial sector shows CAR increases one day after the event date ($t$+1). Although abnormal return increases on $t$+1, the value is still less than zero. Therefore the increase of abnormal return is too weak to support the notion. The increasing price of stocks on the day after an announcement date indicates there is a chance that the information reaches the market or investors slowly and unequally. In this regard, Hartono (2004) states that there is so called market inefficiency due to a high cost of information and unequal spread of information to market participants. With regard to the non-financial sector, Figure 1 shows that the pattern of the CAR declines during the window period. Thus, the pattern of the non-financial sector is somewhat different from the financial sector. Theoretically, in both sectors, there will be a stock price increase after the investment announcement responding to anticipated future benefits (Santos et al., 1993; Ferguson et al., 2005; Henderson et al., 2010; Muhanna & Stoel, 2010).

In terms of $H_3$, the CAR from firms in financial and non-financial sectors, as seen in Table 1 and Table 2, are compared using Z test. The statistical analysis results demonstrate there is no strong evidence to claim that the CAR of firms in the financial sector is higher than that in the non-financial sector (Z score = -0.03, $\alpha$ = 0.05, one tailed). Thus, $H_3$ is not supported. This suggests that in Indonesia, investors do not see differently the impact of IT investment announcements on future value of financial and non-financial firms. Hence, industry classification has no effect on the value of IT investment. This finding validates the work of Santos et al. (1993).

The results of this study suggest that IT investment announcements may not be value relevant. The results do not conform to the study of Chavez and Lorenzo (2008), Subramani and Walden (2001), Muhanna and Stoel (2010), Henderson et al. (2010) and Hayes et al. (2000). Unlike

their counterparts in the United States, Europe and Australia, Indonesian investors may not consider IT investment announcements as basis for investment decision. Nevertheless, the results imply that investors in Indonesia do not see net present value (NPV) from IT investment higher than zero. In other words, an IT investment project has zero expected NPV. This expectation of the IT investment project may be due to the following reasons. First, it could be that Indonesian investors do not have adequate understanding of the role of IT capabilities in increasing a firm's future value. They may perceive that there are some other factors that are more dominant such as Government policy. Second, Indonesian investors could be short term investors and thus, they do not expect long term gain such as dividend and higher share price due to business growth. They may prefer to earn short term gain derived from stock price fluctuation.

There are some limitations that may be present in this study. Among others, information of IT investment announcements in Indonesia is relatively difficult to obtain since there is no single authoritative media where the researchers can find such announcements. This study employed multiple sources to obtain the data. Therefore, it is possible that some data were not captured. Further, this study used data for the period of year 2000 to year 2007 which is between two financial crises (i.e., in years 1998 and 2008). It would be interesting to know the market reaction across times of financial crises. Therefore, it is recommended that future research should lengthen the estimation period for the market reaction model. Moreover, future study can address issues pertaining to the insignificance of stock price change during the window period that possibly could indicate thin trading effects that may lead to bias in beta securities. Also, the beta estimation for each security in the window period should be corrected (Hartono & Surianto, 2000). Thus, future research can be conducted to correct estimated beta for thin trading securities. Finally, this study assumes relatively efficient market hypothesis but leakages could happen in markets. Future study can examine and identify leakages that may occur before an announcement date.

The main contribution of this study is related to the relationship between market reaction and the forthcoming information (i.e., IT investment announcements) in both the financial and non-financial sectors in Indonesia. Unpredictably, the results show indifferent market reactions between both sectors. It seems that in both sectors, Indonesian investors apparently do not see announcements of IT investment as being value relevant. These results are surprising, given that the financial sector is known as IT intensive and an early IT adopter. This study

externally validates previous studies in the Indonesian market context
(Hendratmoko & Achjari, 2008) as well as the use of financial sector
category (Santos et al., 1993).

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