

# Calculation of Index and Characteristic of ICT (Information and Communication Technology) Stock Sector in IDX (Indonesia Stock Exchange)

Steven<sup>1</sup>, Tony Irawan<sup>2</sup>, Trias Andati<sup>3</sup>

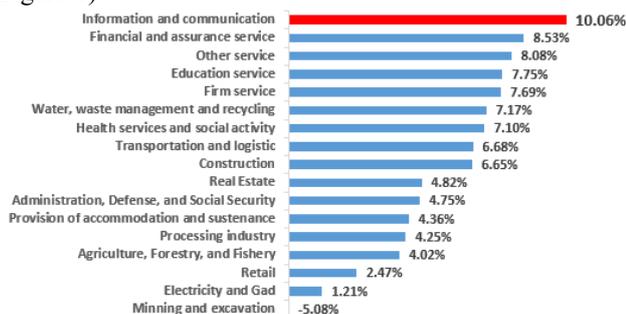
<sup>1,2,3</sup>Management and Business, School of Business, Bogor Agricultural University, Jl. Raya Pajajaran, Bogor, Indonesia

**Abstract:** The ICT sector (Information and Communication Technology) is a sector that is rapidly growing both in Indonesia and in the world. The growth of the ICT sector itself has the highest percentage growth of Indonesian GDP about 10 % by 2015 above other sector. This fact indicates that the ICT sector has grown very quickly compared to other sector. The objectives of this study are assort and calculate ICT stock index and saw the dynamic of stock prices reflected in the ICT sector share price index and analyze the characteristics of shares contained in the ICT stock index. Result of this study show that there was 31 issuers categorized into shares of ICT sector based in ISIC Rev.4. ICT stock index have abnormal movement caused by JECC issuer, if this issuer excluded from ICT stock index then the index movements become more normal. ICT stock index has a fluctuating movement and has a similar trend with JCI. It is known from the high value of the correlation between JCI and ICT stock index (correlation value is 0.9). ICT stock index performance during the research period showed a daily average return is higher than JCI. In addition the largest market capitalization which became the index movers of ICT stock index during the period of the research was JECC and TLKM. The results of the stock analysis characteristic indicates that in General, ICT stock index has defensive characteristic stocks or have beta less than 1. In addition, the fundamental conditions of the company also has a relationship with beta stock, when EPS, BVS, PBV, DER and ROA increased, the beta stock will be increased too.

**Keywords:** ICT stock index, beta, Indonesia Stock Exchange (IDX), Information and Communication Technology

## 1. Introduction

The ICT sector is rapidly growing both in Indonesia and in the world. It is known with the ICT sector of Indonesian GDP which has always increased each year. The GDP increase in the ICT sector are very high amounting to 65% within 6 years from 2010 to 2015. By 2015 the ICT producing sector in GDP amounted to 423 trillion IDR or 3.5% of total Indonesian GDP. Increased from 256 trillion IDR in 2010. The contribution of the ICT sector to total GDP still smaller range 3.50 – 3.73%, this means the ICT sector still potential to grow. Indonesia suffered a decline in GDP growth each year ranging from 6.2% in 2011 to be 4.8% in 2015. But the growth of the ICT sector has always been far above GDP growth in Indonesia for five years from 2011 to 2015. By 2012, GDP growth of ICT sector is very high, namely amounted to 12.3% or 2 times larger than Indonesian total GDP growth while that only reached 6. The growth of the ICT sector has the highest percentage growth of 10.06 % by 2015 above other sectors. This indicates that the ICT sector growing very quickly compared to other sectors (Figure 1).



**Figure 1:** Comparison between ICT GDP growth and the other sector

Companies engaged in the field of ICT in general are experiencing a positive growth during the last few years. These company always get revenue and net profit increased every year. In addition return company stock sector ICT in general are above return JCI (Jakarta Composite Index). The data showed that companies in the ICT sector, Indonesia has a very good chance if investors want to invest in this sector.

## 2. Literature Review

The OECD has issued publications about ICT sector definition in 2007 (ISIC Rev. 4). Definition of ICT is product from the industry must primarily be intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display. Based on that statement, the categorization of ICT sector in this study used ISIC Rev.4 (International Standard Industrial Classification of All Economic Activities).

Stock price index is a reflection of the changes in a certain period of time which is a summary of a variety of variable influence especially in economic variables [1], [18]. The index serves as an indicator of market trends means the movement of an index describing market conditions at any given time, whether the market is active or being passivity. By knowing the index then investors get information about market conditions and will eventually affect the value of the investor's portfolio [20].

In this study, the calculation of the index used market value weighted index. Market value based index is the most widely used by many countries in the world. The index based on the value of this index is the change reflects the change in market

capitalization [8], [10], [12], [13], [14], [19].

Beta stock is a stock level of sensitivity towards market conditions in General [11]. The greater the beta of the stock then the greater the expected return on these shares [6]. Most commonly used approach is to use the historical market beta. Beta calculation is used by many large companies in the United States [15]. Empirical evidence indicates that beta is able to provide historical information about the beta of the future [4].

Beta is determined by way of comparing the level of risk that owned a stock against the risk of the entire stock. The risk is reflected by the price fluctuations of the stock and the market price average of all shares listed. Stocks with a beta value shares > 1 is very sensitive to market changes, usually called sensitive or aggressive stock shares. In addition shares value < 1 is called defensive stocks [2], [3], [5], [16], [17]. So the beta is a measure of the systematic risk of a stock or stock portfolio relative to the market risk [9].

Fundamental analysis defined as a method of stock analysis based on data and information relating to performance or the performance of the company [21]. Financial report data that is most widely used for analysis because the financial ratio information is very important in fundamental analysis. Research on fundamental analysis has been widely performed and then note that the *EPS, BVS, PBV, DER and ROA* effect significantly to stock prices [22], [23], [24], [25].

### 3. Methods

#### 3.1 Types and Sources of Data

The necessary data in this study is secondary data obtained from various sources of time series data. The collection of data obtained by downloading from ICAMEL (Indonesian Capital Market Electronic Library) and studies of the literature that supports the understanding of the concepts related to the study of scientific papers, books and literature, international journal.

#### 3.2 Categorization of ICT Index

Calculated ICT index done by selecting stocks listed on the IDX and entered in the category of shares of ICT based on ISIC Rev. 4 (International Standard Industrial Classification of All Economic Activities). The following is a selection criteria the stocks that go into the ICT sector on this research:

- 1)The company recorded in the IDX
- 2)The field of ICT based on ISIC Rev. 4.
- 3)At least 50% of issuer revenue comes from the ICT sector or product.

#### 3.3 Calculate Method of ICT stock index

The calculation of the index used to use value weighted. The calculation of indices in this research was conducted with the following formula:

Where:

Index of ICT t : average value of stocks in the t period

$$\text{Index ICT } t = \frac{\text{Market Value}}{\text{Basic Value}} = \frac{\sum(Pit \times Qit)_{\text{market}}}{\sum(Pit \times Qit)_{\text{basic}}} \times 100$$

P t : share price i stock in period t

Q t : number of shares i stock in period t

n t : number of issuers i stock in period t

Source: Guide book index (IDX)

IDX always make adjustments on the basis of the value of the index if there are issuers who do corporate action record keeping or adding new shares. A new basic value adjustments needed to eliminate the influence of factors that are not changes in stock prices, so the index will reflect the price movements of shares only. The formula for calculating the new grounds due to a corporate action or the addition of recording new shares are:

$$\text{NBV} = \frac{(\text{PMV} + \text{Ajd})}{\text{PMV}} \times \text{PBV}$$

Where:

NBV : New Basic Value

PMV : Previous Market Value

PBV : Previous Basic Value

Adj : Adjusted Value

#### 3.4 Beta Stock

Beta in this study were calculated using the following formulation:

$$\beta_i = \frac{\text{Cov}(R_i, R_m)}{\text{Var}(R_m)}$$

Where:

B : Beta Stocks

Rm : Daily return of market index (JCI)

Ri : Daily return of stock i

Cov : Covariance

Var : Variance

### 4. Result

#### 4.1 Mechanism of ICT stock index Calculation

Companies listed in IDX until the end of 2015 are 521 issuers. Preparation of ICT stock index begins with selection against the issuers which are categorized into shares of ICT according to categories by using ISIC Rev. 4 The result are obtained 35 issuers included into the category of ICT. Average income from ICT sector is 87.7%. So this study used 75% for lower limit. However there are 4 issuers that have income below 75% (EMTK: 1%, FORU: 1%, KBLV: 58%, LINK: 56%) so it should be removed from ICT stock index. After finished the categorization obtained 31 issuers that belongs to ICT index calculation is done using the method of Market Value Weighted. The next step is done by basic value adjustments due to corporate action of each issuers. During the period of the study there were 35 times the basic value adjustment and 4 times the stock split. Basic price adjustments need to be made so that it can reflect the price movement of stocks in accordance with the state of the

original.

#### 4.2 ICT Index

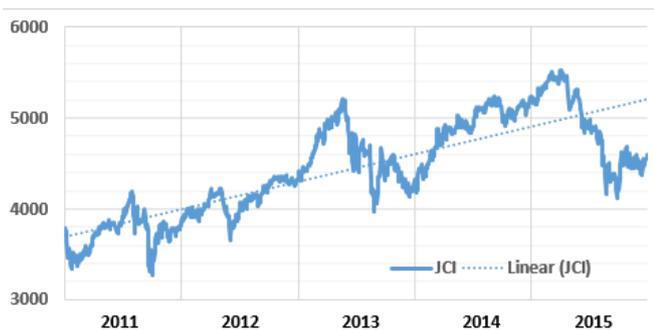


Figure 2: Jakarta Composite Index (JCI)

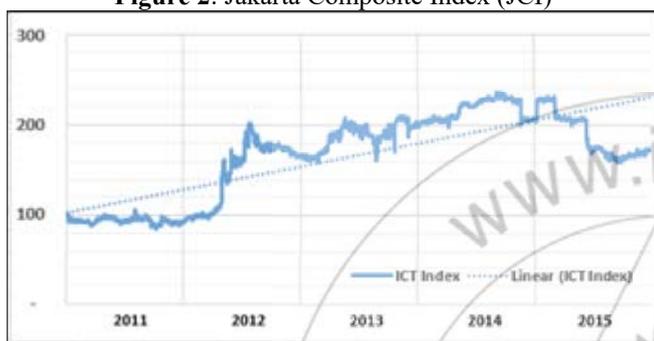


Figure 3: ICT Index

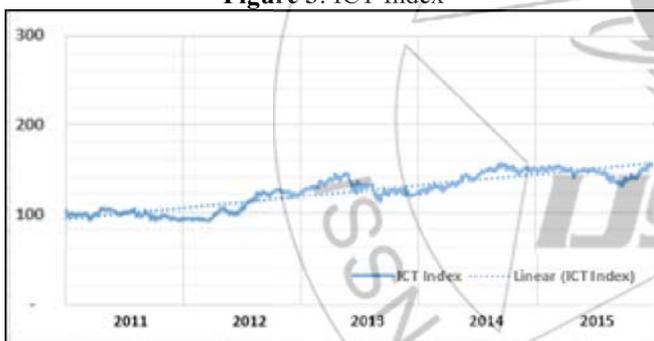


Figure 4: ICT Index exclude JECC

ICT stock index in 2011 to 2015 have fluctuating movement. ICT stock index has a high return if compared to JCI. ICT stock index has an average daily return of  $0.061 \pm 1.801\%$  for 5 years while the JCI only has average daily return  $0.024 \pm 1.154\%$ . ICT stock index has return almost 3 fold compared to JCI. This indicates that investors still have a great opportunity in investing in ICT sector Indonesia.

There are a few dates on the increase and decrease of the ICT index which is abnormal (Figure 3). This is due to the behavior of stock investors who purchase shares of JECC. ICT stock index have abnormal movement caused by JECC issuer, if this issuer excluded from ICT stock index then the index movements become more normal (Figure 4).

JECC and TLKM is index movers in ICT Index, if seen movements in market capitalization for 5 years then known TLKM and JECC is the one who always have the highest market capitalization among other issuers. For example by 2015 TLKM and JECC each have market capitalization of 33.11% and 38.46% of total ICT sector's shares. Both of this

stock is index movers in ICT Index.

#### 4.3 Beta of ICT issuers

Beta data shows that in general of issuers included in ICT Index have a beta  $< 1$  which means that the movement of ICT Index categorized as stocks are defensive. There is only 1 issuers that have aggressive with beta  $> 1$  is. If the beta stock is 1.3 which means if the return of the market increased by 10% then return of the stock increased by 13% so vice versa in case of a downturn. Beta data can show the behaviors of investors who invest in it.

Investors in telecommunications companies, received dividends in the long run more interesting than receive annual dividends. Allegedly this also happens to telecommunications issuers in Indonesia where investors are more interested to receive dividends in the long term so that the beta of ICT issuers more defensive. In addition to the attention of most investors is corporate spending in this expenditure for research and development of technology. For investors, the size of the expenditure of the company become a signal to invest with the expectation that the company will evolve and have a product or service that can compete [7].

#### 4.4 Correlation between ICT Stock Index and Others Index

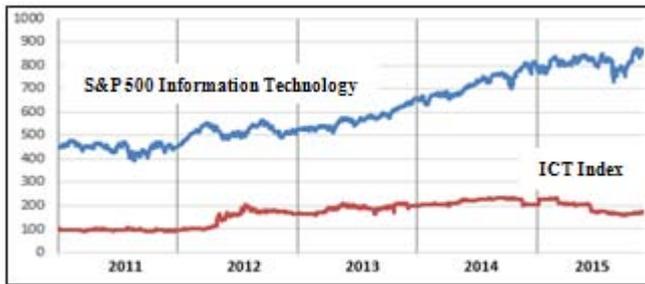
Table 1: Correlation between ICT Stock Index and JCI

Correlation	JCI	ICT	JCI day-1	ICT day-1
JCI	1*			
ICT	0.898*	1*		
JCI day-1	0.996*	0.897*	1*	
ICT day-1	0.896*	0.995*	0.989*	1*

\*significant at 99% confidence level

Table 1 shows that ICT stock index and JCI have a high correlation. The value between both of these indexes is 0.9. Correlation between ICT and JCI at confidence level 99% is significant. This indicates that ICT index has a relationship with JCI. The value of this correlation can be a hint for investors to observe that there is a very strong relationship between JCI and ICT Index. The index before the day also have a correlation with the index on that day so that from previous day index value can be reflected index value on that day.

ICT index and S&P 500 Information Technology have a same trend that is a positive trend. But the growth of S&P Information Technology is higher than ICT index. Growth of ICT index during the period of this research is 71% while the growth of S&P 500 Information Technology amounted 91%. Similar symptoms occur on both index. Growth of both the index is tend to static before 2012, but after the year of 2012 both of the index start to growth significant.



**Figure 5:** ICT index and S&P 500 Information Technology

The correlation between ICT index and S&P 500 Information Technology have a high correlation. The correlation value is about 0.7 and has a significant correlation (Table 2). This could be a hint for investor with respect to S&P 500 Information Technology.

**Table 2:** Correlation between ICT Stock Index and S&P 500 Information Technology

Correlation	ICT	S&P	ICT day-1	S&P day-1
ICT	1*			
S&P	0.717*	1*		
ICT day-1	0.998*	0.718*	1*	
S&P day-1	0.716*	0.999*	0.718*	1*

\*significant at 99% confident level

The index before the day also have a correlation with the index on that day so that from previous day index value can be reflected index value on that day.

## 5. Conclusion and Suggestion

### 5.1 Conclusions

Result of this study show that there was 31 issuers categorized into shares of ICT sector based in ISIC Rev.4. ICT stock index have abnormal movement caused by JECC issuer, if this issuer excluded from ICT stock index then the index movements become more normal. ICT stock index has a fluctuating movement and has a similar trend with JCI. It is known from the high value of the correlation between JCI and ICT stock index (correlation value is 0.9). ICT stock index performance during the research period showed a daily average return is higher than JCI. In addition the largest market capitalization which became the index movers of ICT stock index during the period of the research was JECC and TLKM.

The results of the stock analysis characteristic indicates that in general, ICT stock index has defensive characteristic stocks or have beta less than 1.

### 5.2 Suggestion

Further research can be conducted the research by analyzing factors that affect both the internal factors of the company ICT Index, national, international, and macroeconomic factors. Review of performance is good then ICT stock index can do a comparative analysis of performance with other sectors that are in IDX.

Event research study can be done to see if there is an impact of the corporate action.

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### Author Profile



**Steven** received the bachelor degree in Aquaculture, Faculty of Fisheries Marine Science, Bogor Agricultural University in 2014. He continued his study in Management and Business, School of Business at Bogor Agricultural University from 2015.