Shariah Stock Emitent Efficiency Strategy in Digital Era: Application of DEA Super-Efficiency and Interpretive Structural Modeling

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This study aims to determine the level of efficiency in companies listed on the Jakarta Islamic Index today and find strategies that can be used to achieve optimal levels of efficiency through the use of digital. Analysis using DEA Super Efficiency and Interpretative Structural Modeling. The results show that companies that are consistent on JII have a greater efficiency score than companies that are not consistent, thus showing the importance of a company having an optimal level of efficiency in order to be consistently listed on JII. Based on the sample used, the average *performance* PT Indofood Sukses Makmur is better than other companies that are ranked in the top 5 for three consecutive years with an efficiency score of 1. In addition, efficiency results that can be said to be very good do not guarantee the company's constant conditions in terms of production of inputs and outputs in the form of RTS expected by the company. The average company experiences conditions that tend to be unstable in terms of production. So, it needs attention from management to increase input production capacity for the desired output. Information technology is one of the solutions to achieve an optimal level of efficiency, so ISM found that the best strategy is to prepare sufficient human resources and budget to use information technology in running its business, then the next strategy is to place IT in the main areas of the business so that IT can maximally used.

Keywords: Super Efficiency; Jakarta Islamic Index; ISM; DEA

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INTRODUCTION

Until this year, the development of the Islamic economy in Indonesia continues to show a positive trend. This was triggered by a demographic bonus, in which the middle class is growing rapidly so that the Islamic finance industry has many opportunities to meet the needs of the community both for saving, investing and using financial services, both Islamic banking and the Islamic non-bank financial industry. In fact, according to the Global Islamic Finance Report (GIFR, 2019) it is stated that the Islamic finance industry in Indonesia has risen five rankings from the previous year so that it is in first place in the world. Indonesia's sharia financial industry index score in 2019 was 81.93 while in 2018 it was 24.13 on a scale of 100 and ranks first above Malaysia, Iran and Saudi Arabia. This response gives a signal that the development of Islamic finance provides real benefits that are felt in everyday life.

One type of financial industry that has contributed is the Islamic capital market. Of all the Islamic financial sectors in Indonesia, the Islamic capital market is the biggest contribution. According to data released by the OJK, as of December 31 2018 Indonesia's Islamic financial assets (excluding Islamic stocks) reached IDR 1,287.65 trillion, and IDR 700.84 trillion or 54.43% were Islamic capital markets (excluding Islamic stock capitalization), as well as its contribution to national finance of 15.30% (OJK, 2018). Meanwhile, Islamic stock capitalization data can be seen in Figure 1.

Figure 1: Islamic stock capitalisation

Therefore, the large contribution of the Islamic capital market to both Islamic finance and national finance shows the large role of the Islamic capital market for the Indonesian economy. In practice, the Islamic capital market provides benefits to the community (investors) as a means of investment in the Islamic capital market which is also beneficial for companies that wish to increase funding for their business development through the issuance of Islamic securities. Islamic capital markets tend to be favored by Islamic investors because the transaction mechanism is included in the muamalah group (both equity participation and buying and selling of securities) so that it does not conflict with Islamic law. The activities that are prohibited in the Islamic capital market are those that contain elements of gharar, usury, maisir, risywah, immorality, and tyranny.

The beginning of the development of the Islamic stock index was when the Jakarta Islamic Index (JII) appeared in 2000. Due to its rapid development in the capital market, in 2011 the Indonesian Sharia Stock Index (ISSI) appeared which is a composite of all Islamic stocks on the Stock Exchange. Indonesian securities (without stock selection as in JII). Then in 2018 there was another Jakarta Islamic Index 70 (JII70) with a selection mechanism like JII but 70 shares were taken.

Until now, of the three types of Islamic stock indexes in Indonesia, only JII is the most stringent index because only 30 stocks that have the best liquidity and the largest market capitalization for each share are taken. However, in reality, not all of the companies that are

present at JII are able to survive for a long time due to strict selection from Bapepam-LK and DSN as well as strong competition among companies.

JII is a blue chip sharia stock in Indonesia so investing in JII is highly desired by companies because investors will view that investing in JII is the best investment compared to other sharia stock indices, so companies are competing to increase liquidity to enter the selection of the 60 best stocks then into the top 30 stocks. The intense competition in JII shows that the Islamic capital market is currently in great demand by investors, so that to win the competition in JII, issuers must have good performance.

Efficiency is one measure that can be used to assess the performance of a company, efficiency is commonly used to measure performance (Lin, Lee and Chiu, 2009; Maradin, Draženović, and Benković, 2018). Efficiency can provide an assessment of the use of company-owned resources to be used properly so as to achieve optimal output. Therefore, it is necessary to know about the level of efficiency possessed by companies in the Jakarta Islamic Index sector, especially for companies that are frequently in and out (not consistently listed).

To determine the level of efficiency of each company, the method that can be used is Data Envelopment Analysis (DEA). However, the basic DEA model still has a drawback, namely that it is difficult to determine the best ranking of the DMU when there are several DMU units that have the same value of 1. Therefore, to overcome these deficiencies, Anderson and Petersen (1993) introduced the concept of super-efficiency. The basic concept of super-efficiency is to allow for observed DMU efficiencies greater than 1 or 100%. Super-efficiency is actually a measure of the strength of efficient units used to rank the DMU units that are the object of observation. After calculating through super-efficiency, it will then be known what factors cause inefficiency so that it will make it easier to make strategies that need to be implemented to achieve optimal efficiency.

In the era of the industrial revolution 4.0 or the current era of digitalization, companies should have to use information systems in managing their business to support the optimization of efficiency achieved. However, the use of technology needs to be balanced with steps to achieve more optimal goals (Tallon, et a., 2000). So that in the end, whatever form of strategy will be carried out, it must match the existing conditions. Through super-efficiency, the causes of inefficiency will be found and compatibility with the use of technology will be found to encourage efficiency improvements.

Related to the development of the Islamic capital market in Indonesia, a more comprehensive strategy must be made, especially regarding the role of technology. IT implementation strategy must involve internal and external factors. According to Tallon, et al, (2000) internal strategies can reduce costs, increase productivity, and increase the speed of organizational effectiveness, while external strategies can expand markets and increase market reach. For that reason, this research must combine qualitative and quantitative methods in order to find the best strategy regarding the use of technology in companies registered with JII to support increased efficiency in the context of developing Islamic capital markets.

Therefore, in addition to the super-efficiency approach to assess the efficiency level of issuers, interpretive structural modeling (ISM) is also used to develop strategies for using technology to achieve optimal efficiency. It is hoped that the collaboration of these two methods will find the best model for the development of the Islamic capital market in Indonesia.

For more details about this research framework can be seen in Figure 2.

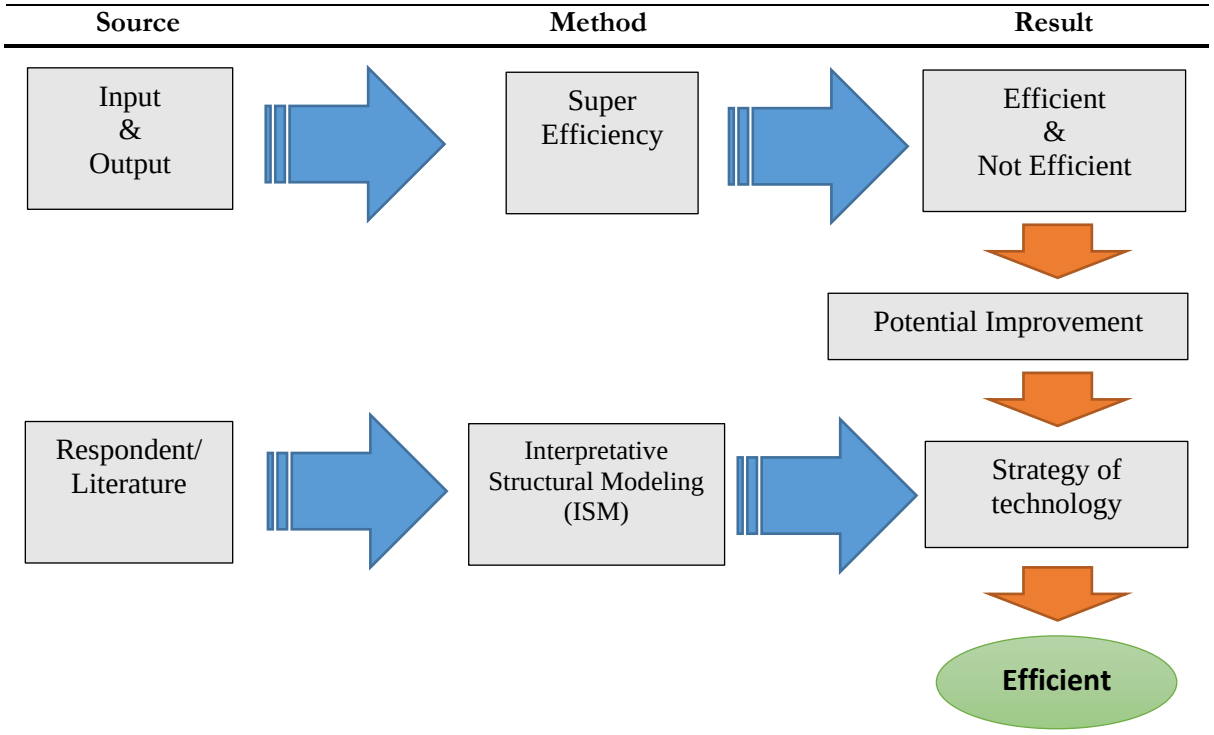

Figure 2: Research framework

METHODOLOGY

This study uses a combination of quantitative and qualitative methods with different objectives. Quantitative methods are used to find the level of efficiency while qualitative methods are used to find strategies to achieve optimal efficiency. The research was conducted on companies registered on the Jakarta Islamic Index (JII) for the 2014-2018 period, so those consistent and inconsistent company would be collected during the study period. Next, we will assess the level of efficiency of all companies and will compare the percentages that have achieved efficiency for consistent and inconsistent companies using quantitative methods. In addition, it will also identify "potential improvement" as a cause of inefficiency. Then, we will examine with a qualitative approach to find the best strategy so that the optimal level of efficiency can be achieved, especially for companies that do not consistently exist in JII.

Quantitative method

The quantitative method used in this study is Data Envelopment Analysis (DEA) through the development of DEA super-efficiency. DEA is a nonparametric method that uses a linear programming model to calculate the ratio of output and input for all units being compared. The advantage of using DEA is that this approach does not require explicit specification of the function form and only requires a little structure to form the frontier efficiencyWeaknesses that may arise are self-identifier and near self-identifier. DEA was first developed by Farrell (1957) which measures the efficiency of a one-input and one-output technique into multi-input and multi-output.

Efficiency refers to a good or bad measure of the use of resources in achieving goals. Efficiency is the ratio of the actual output achieved to the expected standard output. However, because an ideal efficient condition with an efficiency value of 1 or 100% is difficult to achieve, the term relative efficiency is known. So a unit is said to be relatively efficient if the unit has a better efficiency value than other units.

DEA is a non-parametric deterministic approach which is basically a technique based on linear programming. DEA works by identifying the unit to be evaluated, namely the input required and the output produced by the unit. Furthermore, these inputs form the efficiency frontier for the available data set and calculate the productivity value of units that are not included in the efficiency frontier. DEA is also able to identify which units are not using inputs efficiently, relative to the best performing units of the data set being analyzed.

To achieve an optimum level of efficiency, each unit tends to have a pattern of assigning high weights to inputs that are used a little and to outputs that are produced a lot. The selected weight does not merely describe an economic value but rather is a quantitative quantity to maximize the efficiency of the unit concerned.

DEA uses a mathematical model to evaluate units based on data and past performance for future planning. There are 2 mathematical models commonly used, namely the primal model and the dual. The primal model is the main model used to calculate the relative efficiency value of each unit. Meanwhile the dual model is a supporting model for calculating the relative efficiency value of a unit and knowing which units are used as a reference, to increase the efficiency of inefficient units.

Charnes, et al (1978) developed the DEA model with the constant Return to Scale (CRS) method and was developed by Banker, Charnes and Cooper with the variable Return to Scale (VRS) method, finally known as CCR (Charnes-Cooper-Rhodes) and BCC (Banker-Charnes-Cooper). The DEA basic model classifies decision-making units or Decision Making Units (DMU) into 2 major groups, namely efficient and inefficient units. Efficient units are worth 1 or 100%, while units that have a value below 1 are included in the inefficient group. However, the drawback of the basic DEA model is that it will be difficult to determine the best ranking of the DMUs when there are several DMU units that have the same value of 1.

Anderson and Petersen (1993) then introduce the concept of super-efficiency. The basic concept of super-efficiency is to allow for observed DMU efficiencies greater than 1 or 100%. Super-efficiency only affects units that are considered equally efficient with the constraint removed. Meanwhile, inefficient units are not affected because efficiency is less than 1. Super-efficiency is actually a measure of the strength of efficient units used to rank the DMU units that are the object of observation.

The model used is in accordance with Andersen and Petersen which takes the CCR form to avoid the possibility of non-solution related to the convexity constraint on the BCC model, so that the standard super-efficiency model is described as follows:

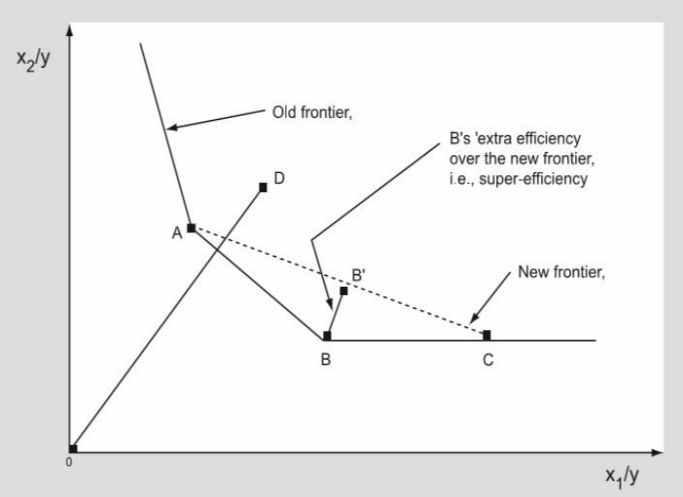

Figure 3: Standard Super-Efficient DEA
Source: Yawe, 2010

In its development, the frontier efficiency measurement model has improved, both theoretically and practically conceptually. In general, the efficiency level measurement model is divided into two parts, namely parametric and nonparametric.

Table 1: Development Model of Frontier Efficiency Measurement

No	Model	Year	Author	Type
1	Stochastic Frontier Approach als77	1977	Aigner, Lovell, Schmidt	Parametric
2	SFA Model mvb77	1977	Meeusen & van den Broeck	Parametric
3	Data Envelopment Analysis CCR	1978	Charnes, Cooper, Rhodes	Nonparametric
4	SFA Model stev80	1980	Stevenson	Parametric
5	SFA Model mlti	1981	Pitt & Lee	Parametric
6	Malmquist Productivity Index	1982	Caves, Christensen, Diewert	Nonparametric
7	DEA Model BCC	1984	Banker, Charnes, Cooper	Nonparametric
8	Free Disposal Hull [FDH]	1984	Deprins, Simar, Tulkens	Nonparametric
9	SFA Model fe	1984	Schmidt & Sickles	Parametric
10	SFA Model regls	1984	Schmidt & Sickles	Parametric
11	DEA Additive Model	1985	Charnes,Cooper,Golany,Seiford,Stutz	Nonparametric
12	DEA Window Analysis	1985	Charnes, Clarke, Cooper, Golany	Nonparametric

13	DEA Assurance Region [DEA-AR]	1986	Thompson, Singleton, Thrall, Smith	Nonparametric
14	DEA Cross Efficiency	1986	Sexton, Silkman, Hogan	Nonparametric
15	DEA Facet Model	1988	Bessent, Bessent, Elam, Clark	Nonparametric
16	SFA Model mlti	1988	Battese & Coelli	Parametric
17	SFA Model fecss	1990	Cornwell, Schmidt, Sickles	Parametric
18	SFA Model kumb90	1990	Kumbhakar	Parametric
19	DEA Cone Ratio	1990	Charnes, Cooper, Huang, Sun	Nonparametric
20	TFA [Thick Frontier Approach]	1991	Berger & Humphrey	Parametric
21	SFA Model bc92	1992	Battese & Coelli	Parametric
22	Fuzzy DEA	1992	Sengupta	Nonparametric
23	DFA [Distribution Free Approach]	1993	Berger	Parametric
24	SFA Model fels	1993	Lee & Schmidt	Parametric
25	DEA Super Efficiency	1993	Andersen & Peterson	Nonparametric
26	SFA Model bc95	1995	Battese & Coelli	Parametric
27	Network DEA	1996	Fare & Grosskopf	Nonparametric
28	Hierarchical/Nested Model DEA	1998	Cook, Chai, Doyle, Green	Nonparametric
29	Bootstrapped DEA	1998	Simar & Wilson	Parametric
30	DEA Russell Measure [ERM]	1999	Pastor, Ruiz, Sirvent	Nonparametric
31	Imprecise Data [IDEA]	1999	Cooper, Park, Yu	Nonparametric
32	Parallel Model DEA	2000	Cook, Hababou, Tuenter	Nonparametric
33	Dynamic DEA	2000	Fare & Grosskopf	Nonparametric
34	DEA Slack Based Measure [SBM]	2001	Tone	Nonparametric
35	Meta Frontier	2003	Rao, O'Donnel, Battese	Nonparametric
36	Context-Dependent DEA	2003	Seiford & Zhu	Nonparametric
37	SFA Model gre03	2003	Greene	Parametric
38	SFA Model tfe	2005	Greene	Parametric
39	SFA Model tre	2005	Greene	Parametric
40	Game Cross Efficiency	2008	Liang, Wu, Cook, Zhu	Nonparametrik

In practice, DEA is widely used to measure the level of technical efficiency, scale and economics of the banking industry and financial institutions (Coelli et.al, 2005; Cooper, 2010), as has been done by Ozdemir (2013), Shahreki et al. (2012), Rusydiana & Marlina (2019), Firmansyah and Nasrulloh, (2016), and Rusydiana & Nugroho (2017). Since then, however, the basic DEA model has been widely applied and extended to measure the performance of various types of DMUs (Banker et al. 1986; Andersen and Petersen 1993; Al-Shammari, 1999; Steinmann and Zweifel 2003; Zelenyuk and Zheka 2006; Mustafa, 2007). While research using super-efficiency DEA is also widely used by researchers in various types of companies (Hadad, 2003; Yawe, 2010; Pan et al, 2011; Wu, Fan, and Pan, 2014).

In this study, the data used were 30 companies listed on the Jakarta Islamic Index which existed and which did not consistently exist with the benchmark year of research being 2014. The input variables used were labor costs (I_1), marketing costs (I_2), other operational costs (I_3), and assets (I_4), while the output variables are income (O_1) and gross profit (O_2). The software used to measure super-efficiency is *Banxia Frontier Analyst 4*.

Qualitative method

To map the development strategy of the Islamic Capital Market in Indonesia within the framework of increasing the level of efficiency and productivity, researchers used the Interpretive Structural Model (ISM) method developed by Saxena (1992). *Interpretative Structural Modeling* (ISM) is a modeling technique

developed for strategic policy planning (Marimin, 2004). ISM was first created by J. Warfield in 1973, where Warfield defines ISM as a computer-assisted learning process that allows individuals or groups to develop complex relationship maps between the various elements involved in complex situations.

ISM is a method of making decisions from complex situations by connecting and organizing ideas in a visual map (Rusydiana, 2019). In terms of decision making, ISM has little in common with the Analytic Network Process (ANP) method developed by Thomas L. Saaty (2006). For example, research conducted by Rusydiana & Devi (2013) and Firmansyah (2019). The basic idea is to use experienced experts and practical knowledge to decompose a complex system into sub-systems (elements) and construct a multilevel structural model. ISM is often used to provide a basic understanding of complex situations, as well as formulate actions to solve problems (Gorvett and Liu, 2007).

In implementing the ISM method, discussions were first carried out with experts (*brainstorming*) to gather ideas for organizational development consisting of people who understand the concept of ISM, understand the problems of developing Islamic capital market development models. From the discussion regarding the development strategy, several ideas or variables were obtained that would be processed using ISM.

RESULT AND DISCUSSION

Analysis of Issuer Efficiency in the Jakarta Islamic Index with Super-Efficiency DEA

Before entering into the discussion of efficiency in companies listed on the Jakarta Islamic Index (JII), Table 3 in this discussion is an overview regarding the input and output variables that used in this research. This variable is used to measure the efficiency score of each company at JII during the 2015-2018 period. There are 4 input variables used in this study, namely, labor costs, marketing costs, other operational costs and total assets. As for the output variables used are revenue and gross profit. The following are descriptive input and output statistics used in this study.

Tabel 3: Descriptive statistic of sample, 2015-2018 (million IDR)

Variable	Average	Min	Max
Input:			
HR cost	2,737,396	11,797	20,090,000
Marketing cost	2,685,480	1,000	10,222,000
Other operating cost	6,511,009	117,359	74,557,000
Total Asset	64,449,400	3,889,291	344,711,000
Output:			
Income	42,896,328	5,397,948	239,205,000
Gross profit	16,718,311	89,239	130,794,000

From table 3 it can be seen that the average labor cost incurred by companies is IDR 2.7 trillion, with a minimum and maximum value of IDR 11.8 billion and IDR 20 trillion. For marketing costs, the average cost incurred is IDR 2.7 trillion, where the minimum value is IDR 1 billion and the maximum value is IDR 10.2 trillion. Furthermore, for other operational costs (BOP), the average amount incurred by the company is IDR 6.5 trillion, with a maximum value of IDR 74.6 trillion and a minimum value of IDR 117.3 billion. Finally, on the input side, total assets where the average company has is IDR 64.4 trillion with a minimum asset value of IDR 3.9 trillion and a maximum total asset value of IDR 344.7 trillion.

On the output side, there is revenue with an average revenue earned by the company of IDR 42.9 trillion with a minimum value of IDR 5.38 trillion and a maximum of IDR 239.2 trillion. Meanwhile, the gross profit earned by the company averaged IDR 16.7 trillion with a maximum value of IDR 130.8 trillion and a minimum value of IDR 89 billion.

The next step is an efficiency analysis using super-efficiency DEA by dividing into two groups, namely the first group of companies that were consistently registered with JII from 2015 to 2018, and the second

group of companies that were registered in 2015 but were unable to be consistent until 2018.

Table 4: Efficiency score of all DMU

DMU Name	2015		2016		2017		2018		Mean
	EFF	Rank	EFF	Rank	EFF	Rank	EFF	Rank	
Consistent 2015-2018									
PT Adaro Energi	79,30%	25	76,50%	22	106,70%	7	152,20%	7	103,68%
PT AKR Corporindo	112,80%	4	87,40%	19	93,30%	20	174,50%	5	117,00%
PT Astra	106,20%	8	102,00%	11	103,70%	11	300,00%	1	152,98%
PT Bukit Asam	79,00%	26	78,60%	21	136,10%	2	100,80%	21	98,63%
PT Bumi Serpong Damai	42,40%	29	41,00%	28	90,20%	21	39,20%	30	53,20%
PT Indofood CBF	100,00%	16	124,30%	5	109,30%	5	107,60%	13	110,30%
PT Indofood Sukses Makmur	103,70%	13	156,60%	3	105,70%	8	119,60%	9	121,40%
PT Kalbe Farma	103,70%	14	104,60%	8	103,20%	12	99,90%	22	102,85%
PTMatahari Dept Store	119,80%	3	102,30%	10	100,60%	16	100,90%	19	105,90%
PT Perusahaan Gas Negara	83,90%	24	63,70%	25	80,80%	25	100,80%	20	82,30%
PT PP	146,00%	2	103,80%	9	112,20%	3	105,50%	15	116,88%
PT Semen Indonesia	85,50%	19	70,30%	24	60,40%	28	72,80%	26	72,25%
PT Summarecon Agung	47,60%	29	38,90%	29	42,70%	29	40,70%	29	42,48%
PT Telekomunikasi Indonesia	109,70%	5	300,00%	1	102,40%	14	103,00%	6	153,78%
PT Univeler Indonesia	99,50%	17	108,30%	7	100,40%	17	100,90%	18	102,28%
PT United Tractors	101,90%	15	92,10%	15	104,20%	10	196,00%	4	123,55%
PT Vale Indonesia	250,50%	1	101,40%	12	104,90%	9	118,50%	10	143,83%
PT Wijayakarya	92,40%	18	73,30%	23	102,80%	13	163,80%	6	108,08%
Average	**103,55%**		**101,39%**		**97,76%**		**122,04%**		**106,18%**
Inconsistent 2015-2018									
PT Alam Sutera Reality	85,00%	21	87,60%	18	96,60%	18	85,70%	25	88,73%
PT Astra Agro Lestari	84,30%	22	93,90%	14	102,40%	15	102,70%	17	95,83%
PT Indocement Tunggal Prakarsa	52,20%	28	54,40%	27	69,50%	27	89,30%	24	66,35%
PT Jasa Marga	103,80%	11	127,00%	4	110,10%	4	106,20%	14	111,78%
PT Lippo Karawaci	30,10%	30	31,50%	30	29,90%	30	40,80%	28	33,08%
PT Mitra Keluarga Karyasehat	83,90%	23	90,30%	17	96,90%	19	239,00%	3	127,53%
PT Pakuwon Jati	106,40%	7	79,90%	20	84,70%	24	114,40%	12	96,35%
PT Perusahaan Perkebunan London	104,00%	10	117,60%	6	106,90%	6	114,60%	11	110,78%
PT Sawit Sumbermas Sarana	109,20%	6	99,10%	13	78,90%	26	64,50%	27	87,93%
PT Siloam Internasional Hospital	65,60%	27	62,10%	26	87,60%	23	130,70%	8	86,50%
PT Surya Citramedia	105,70%	9	174,30%	2	89,90%	22	94,60%	23	116,13%
PT Waskita Raya	85,10%	20	90,40%	16	192,30%	1	266,50%	2	158,58%
Average	**84,61%**		**92,34%**		**95,48%**		**120,75%**		**98,29%**

From 30 companies registered on JII in 2015, only 18 companies were able to consistently register until 2018 (see table 4), so we classify them based on this. We present the results of data processing regarding the level of efficiency based on these two groups. Efficiency companies are companies that have a value of 100, while super-efficiency gives a reassessment to companies that have efficiency, so that the final efficiency score is more than 100, finally it is known the level of companies that have achieved this efficiency.

Based on the average score, companies that are consistently registered with JII have scores above 100 in 2015, 2016, and 2018 while those that are inconsistent only in 2018. Likewise, based on the overall average, those that are consistent on JII have a score of 106 .18% and those that are inconsistent in JII have a score of 98.29. We also present the percentage of companies that have achieved efficiency and those that have not in each group. The results can be seen in Figure 4.

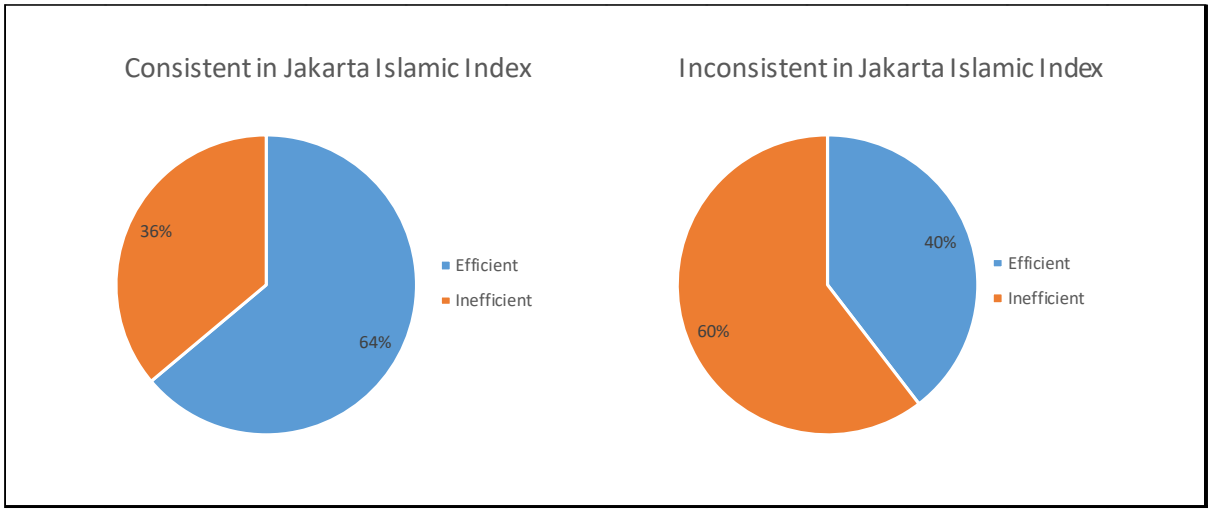

Figure 4: Percentage of efficient companies

Figure 4 shows that in companies that are consistent in JII, as many as 64% have achieved efficiency and only 36% have not been efficient. Whereas in companies that are not consistent in JII, only 40% are efficient and as much as 60% are not efficient.

From all the explanations above, it can be concluded that companies that are consistently listed on JII have a better efficiency score than those that are inconsistent. There are various types of companies registered on JII, so we group them based on identifiable types and at the same time we present the efficient and inefficient percentages based on these types (see figure 5).

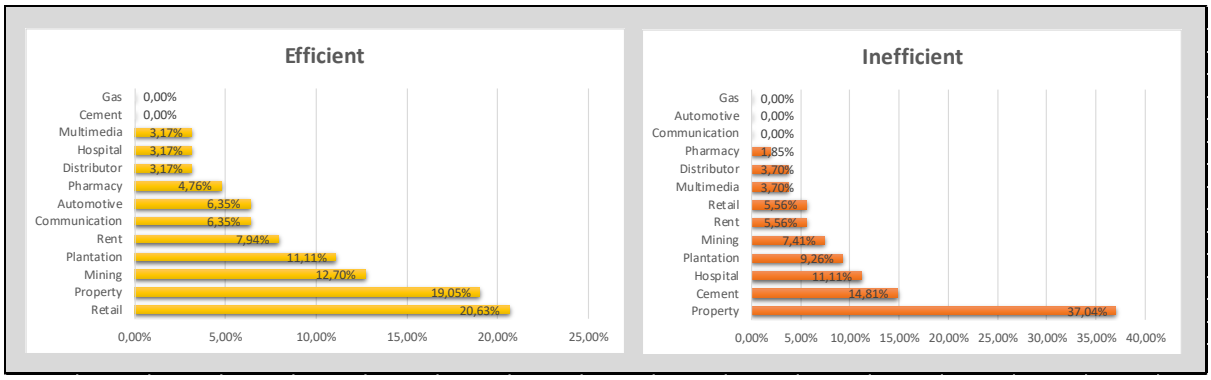

Figure 5: Efficient and inefficient companies based on type (percentage)

The results of the calculation of all efficient companies, the type of retail company is controlling as much as 20.63%, followed by property as much as 19.05%, then mining and plantation companies respectively as much as 12.7% and 11.11%. Meanwhile, the most inefficient companies were property companies, namely 37.04%. This value is very far compared to other types of companies, namely cement companies with 14.81%, then hospitals with 11.11%. The large percentage of both efficient and inefficient properties is due to the fact that the property sector is the most listed company on JII.

To find out the causes of inefficiencies and to achieve optimal levels of efficiency, we can identify them based on the input and output variables used in super-efficiency calculations. What needs to be done is to reduce labor costs by 15.6%, reduce marketing costs by 13.36%, reduce other operational costs by 18.28%, and have too many assets that cannot be utilized properly, namely 14.52%. Then, based on the resources owned, it is necessary to increase revenue by 13.08% and increase gross profit by 25.17%. Gross profit can be increased through cost efficiency of each company's main income.

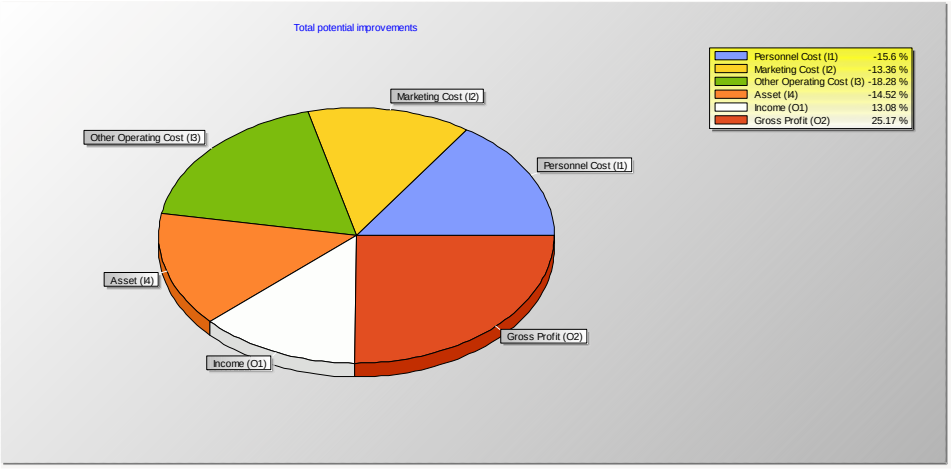

Figure 6: Total Potential Improvement

If all costs that cause inefficiency are counted, then the amount of 61.76% needs to be reduced. This data is large enough to require a specific strategy to achieve an optimal level of efficiency. Therefore, in the era of the industrial revolution 4.0, the use of digitalization through the provision of an information system can be used as a solution to solve this problem so that it will replace the wasteful burdens that are currently occurring. For this reason, this research is continued with a qualitative approach to developing strategies through the use of Interpretative Structural Modeling (ISM) methods.

Strategies for utilizing digitalization to achieve an optimal level of efficiency for issuers at JII

The first stage is the collection of literature studies and interviews with respondents who understand strategies for optimizing the use of technology to increase efficiency in business. The following is a summary of the results of the initial research to identify the use of information technology as a strategy to increase the business efficiency of issuers in JII:

1. Companies must formulate an information technology strategy framework so that it is effective and directed according to needs so as to create product excellence
2. Exploration of external strengths that show the advantages and disadvantages of new information technology so that the right technology application will be known to be used
3. Identify the strengths and weaknesses of the company's internal information technology that is currently running so that it is appropriate in carrying out system development.
4. Prepare sufficient budget and resources as a commitment to use and develop IT in achieving business efficiency
5. Placing information technology in the main business area, not as a support
6. Place a special top manager who manages information technology so that it is easy to direct and integrate with business strategy
7. Always use information technology in planning business strategy

From these 7 elements, elements are then made notation for data processing needs as follows: (E1) IT strategy to be directed & effective, (E2) Exploration of external strengths, (E3) Identification of internal strengths & weaknesses, (E4) Budget and resources, (E5) IT in key business areas, (E6) Capable IT Manager, and (E7) Business strategy with IT. The results of ISM processing for the elements of needs can be seen below, with the following details:

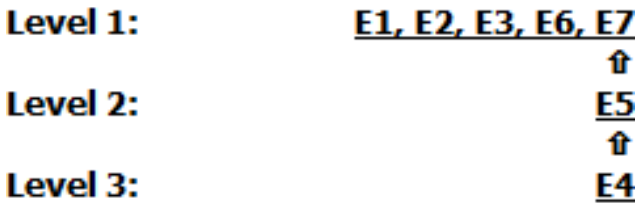

Figure 7: Structural Model

Figure 7 above shows the sequence of stages of need in implementing an efficient Islamic capital market development strategy in Indonesia. The most recent level, namely level 3, is a key sub-element of the needs element, meaning that the budget and resources (E4) and IT elements in the main business areas (E5) have the greatest influence in implementing the Islamic Capital Market development strategy in Indonesia. So it is expected that if there are conditions that support the budgeting and IT conditions in the core business, it cangenerate other variables and elements at the level above it.

In his research, Godet (1986) has popularized the matrix of cross impact multiplications applied to classification (MICMAC) to classify the system variables studied. The basis of this classification is 'driving power' and 'dependence power' which are calculated in the final reachibility matrix. In addition, MICMAC analysis can be used to examine direct and latent relationships among enablers derived from ISM techniques. So, based on 'driving power' and 'dependence power', the enablers in this study are classified into four groups, as shown and explained below:

(1) Autonomous Variables: These variables do not have high leverage or high dependability. They are detached from the system, where they have some links that may be very strong. Quadrant I represents autonomous variables (autonomous). In this study, there are no variables included in this category.

(2) Independent Variables: These variables have high influencing power and low dependency. They represent Quadrant IV. In this study, enabler 4, namely Budget and resources, and enabler 5, namely IT in the main business areas, are included in this category. This enabler is the most important variable in the ISM model in this study.

(3) Linkage Variables: These variables have high influence as well as high dependence. Its characteristic is that any action on them will have an effect on the variables above their level and a feedback effect on themselves. Quadrant III is a linkage variable. In this study, enablers 1, 2, 3, 6, and 7 are included in the linkage variable category.

(4) Dependent Variable: Quadrant II is the dependent variable that has low power of influence and high dependency. From the MICMAC analysis, none of the variables fall into this category.

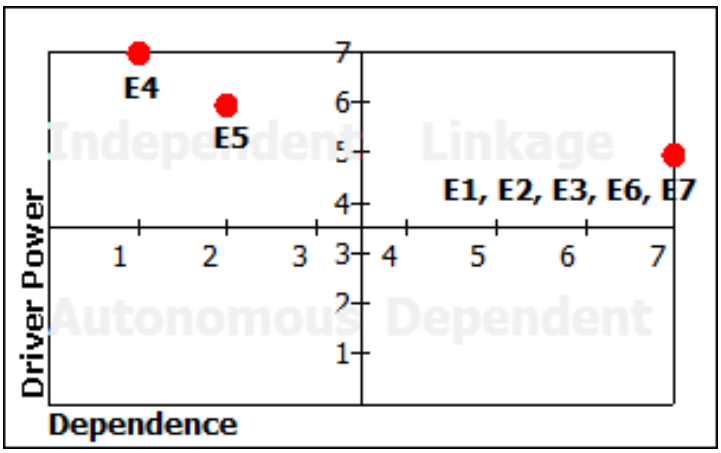

Figure 8: MICMAC Analysis

The results of the analysis above show that currently the existence of HR is very important in the realm of modern business because it requires high creativity and innovation to win the competition. The application of digitalization in business can be achieved if the human resources that are owned support the building and implementation of it, of course HR must be supported with an optimal budget because it is a very

important factor in collaborating between the two. In addition, another important factor is that the information technology that has been built must be applied to the main areas of the business so that it can be optimally optimized and will produce an optimal level of efficiency that will replace the wastes that occur, especially in operational expenses. ISM analysis has proven that if HR and budget are optimized and then IT is placed in the main areas, then both of them will support the other five factors in increasing efficiency.

CONCLUSION

This research was conducted to analyze the efficiency of companies listed on the Jakarta Islamic Index (JII) during the 2015-2018 period. In addition, this research was conducted to determine the level of efficiency with the BCC or VRS method with an input approach in companies using super-efficiency *Data Envelopment Analysis* (DEA). From this study it can be seen that companies that are consistently on JII have a greater efficiency score than companies that are not consistent, thus showing the importance of a company having a high level of efficiency in order to be consistently listed on JII. The causes of inefficiency in general are labor costs, marketing costs, and other operational costs that are too large.

In this study, conclusions can be drawn from the sample used. First, it is known that the average efficiency of *Indofood* CBF Sukses Makmur is better compared to other companies, because it is in the top 5 for three consecutive years with an efficiency score of 1. Second, efficiency results which can be said to be very good do not guarantee the company in constant conditions in terms of production of inputs and outputs in the form of RTS expected by the company. The average company experiences conditions that tend to be unstable in terms of production. So, it needs attention from management to increase input production capacity for the desired output.

To achieve an optimal level of efficiency, ISM found that the best strategy was to prepare sufficient human resources and budget to use information technology in running its business, then the second strategy was to place IT in the main areas of the business so that IT can be used optimally. The importance of having an optimal level of efficiency has been proven by this research that a company that is stable on JII is a company that is able to have an optimal level of efficiency every period. Therefore, this study provides a recommendation to create an independent institution that gives a rating regarding the performance of the use of technology in the operations of companies in the capital market. The use of technology will increase efficiency because it can replace wasteful loading. Labor costs, marketing costs, and other operational costs are contributing factors to inefficiencies according to this study.

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APPENDIX

SSIM (Structural Self Interaction Matrix) & RM (Reachability Matrix)