Multiple Acquisitions in Telecommunication Companies: 
A Data Envelopment Analysis Approach

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Abstract: This paper analyzed the technical efficiency (TE) of telecommunication companies based in Malaysia which have recently been actively involved in acquisitions. The investigation included the impact of age, acquisitions intensity and sequence of acquisitions on the TE under total asset model and current asset model. The study employed the data envelopment analysis approach to calculate the technical efficiency of individual companies. Subsequently, regression analysis was employed to examine factors that influenced the efficiency of the companies. The findings demonstrated that there exists a significant relationship, of negative value, between sequence of acquisitions and TE, in the total asset model and the current asset model. The results also indicated that the relationship between age and TE in the current asset model is significant and positive whereas the relationship in the total asset model is significant but negative. Based on the findings it might be possible to come out with useful guidelines for companies contemplating acquisitions. In addition, companies can manage age more efficiently by making use of limited resources more prudently so that higher relative efficiencies can be achieved.

Key words: Age • Data envelopment • Efficiency • Telecommunication • Mergers and acquisitions

INTRODUCTION

Acquisitions appear to be favored all over the globe as a means of consolidating assets, thereby sharpening the competitive edge and saving the business from collapse. It is generally felt that acquisitions would lead to greater strength and reduction of business risks through asset fortification. Globally the telecommunications sector has surpassed financial services as the busiest market for acquisitions [1]. Telecommunications sector is one of the three major acquisitions targets in Malaysia [2]. Indeed between the years 2006 to 2008, the telecommunication industry represented the highest value among the top ten completed deals in Malaysia [3]. Hence, this study would entail the evaluation of the efficiency of six public listed telecommunication companies based in Malaysia over a six-year period, from 2005 to 2010.

As for the first objective of this paper, the total asset model and the current asset model will be used to study the trend of technical efficiency of the telecommunication companies. The relative technical efficiency (TE) is estimated against the quantum of revenue generated. Companies carry out acquisitions in order to strengthen themselves by acquiring increased input in the form of additional assets which they hope would result in improved revenue.

A company is considered to have better relative TE compared to other company if it can produce equivalent output even when the input is less than other company. Alternatively a particular company can be deemed to have high relative efficiency if it can produce more output than others even though it has the same quantum of input.

In many cases the TE achieved did not bring about commensurate revenue increase on account of indiscriminate intensity and sequencing of acquisitions. Intensity denotes the number of acquisitions in one year period whereas sequencing refers to the accumulated number of acquisitions over certain given period of years.

Thus, the second objective of this study is to evaluate the impact of acquisitions intensity and sequence of acquisition on the TE. Also investigated was the impact on TE of age of the acquiring companies.
A major multinational publishing house, Wolter Kluwer, showed signs of burnout caused by a failure to integrate the hundred-plus acquisitions [4] as cited in Barkema and Schijven [5]. Meanwhile, Kusewitt [6] in stressing the importance of sequencing stated that companies should by no means carry out acquisitions indiscriminately, without taking into account the results of earlier acquisitions.

It is necessary to approach any subsequent acquisition wisely as each of these acquisitions requires considerable time and effort. Gary [7] stated that acquisitions often causing a burden on the acquirer’s management which has to increase in size as its string of acquisitions grows. While acquisitions can be potential life savers for ailing companies, it is essential for companies to strategize the acquisitions intensity and sequence of acquisitions, so that it would be an asset rather than a liability.

Barkema and Schijven [5] who had studied acquisitions using mere counts, suggested that future researchers should study acquisition sequences in greater detail using year-by-year trajectories, thus this study adopts their recommendation. This study contends that acquisitions can be beneficial if the sequence and intensity of integration is properly strategized. Thus, the findings of this study would alert decision makers on various corporate boards to be mindful of intensity and sequencing when carrying out acquisitions to avoid the many pitfalls that await the unwary company which engages in acquisitions indiscriminately without any reflection on the intensity and sequencing, basing their actions on the belief that older companies have more wherewithal than the younger ones.

The rest of this paper is organized as follows. Section 2 reviews the literatures. Section 3 presents the data, research methodology and develops the hypotheses while Section 4 shows the empirical results. Finally, conclusion is presented in section 5.

**Literature Review:** Beccalli et al. [8] used the DEA besides the parametric model stochastic frontier approach (SFA); they estimated efficiency measures of the banking cost to a sample of European banks. When the authors have done the regression of the annual scores of efficiency in relation to the respective performances in the stock market, the findings indicated that changes in the prices of banks’ stocks mirror changes in the cost of efficiency, especially the ones derived from the DEA.

According to Yeh [9], a set of weights for each decision making unit (DMU) is calculated in order to show the best possibility. DEA measuring the relative efficiency for each DMU which maximizes the ratio of the weighted sum of the products divided by the inputs with a condition that similar ratios for each DMU are not bigger than one.

Oliveira and Tabak [10] and Sufian and Haron [11], concluded that the trend is not clear when using the SFA model. Meanwhile, Salleh et al. [12], Salleh et al. [13] and Salleh et al. [14] adopted DEA to analyze the trend of technical efficiency of companies. Therefore, this study employed DEA to analyze the trend of technical efficiency of companies involved in multiple acquisitions activities.

DEA is adopted to determine the relative efficiency among peer entities such as the health sector [15], Malaysian banks [16] and pharmaceuticals [17]. DEA is also capable for estimating the impact of acquisitions activities on the relative efficiency among competitors such as Malaysian banks [18] and US Insurers [19].

There are limited studies on efficiency measurement in the telecommunication industry, these include studies by Cooper et al. [20], Zhu [21] and Majumdar et al. [22]. However, Salleh et al. [14] evaluated the impact of acquisitions on the efficiency of telecommunication companies while Kwon et al. [23] examined the trend of the technical efficiencies of wireless communication companies involved in mergers. Hence, the technique used by Kwon et.al. [23] is extended by evaluating the acquisitions intensity and sequence of acquisitions pertaining to the telecommunication industry in Malaysia.

Cummins and Xie [19] who used cost and revenue efficiency stated that the market-value response to acquisitions is estimated using a standard market model event study. In addition, Abuzayed et al. [24] stated that efficiency is linked to market valuation and it has a positive relationship. Since efficiency is important to market value, this study will look into the factors which may have an impact on efficiency. However, this study does not focus on the market value.

According to Kwon et al. [23] and Salleh et al. [14], asset utilization is important for the companies to be competitive in the market. They benchmarked the companies involved in merger for the relative efficiencies under the total asset and current asset models in conjunction with revenues. Thus, this study measures the efficiency under the total asset and current asset models in generating revenue.
McDonald [25] postulated that Tobit estimation is not appropriate when the data are not fractional in nature because the dependent variable data is obtained by a censoring data generating process but the ordinary least squares (OLS) is an unbiased and consistent estimator. He added that the efficiency score generating process can best be described as a process of normalization because the efficiency score data are not censored nor are they corner solution data.

He also pointed out that the efficiency score data are not censored nor corner solution data. Hoff [26] stated that the OLS may actually replace tobit estimation as a sufficient second stage analysis following the DEA model. Thus, this study prefers to use OLS in order to analyses the factors that have an impact on the technical efficiency of the companies.

**MATERIALS AND METHODS**

For the first objective, the study has examined the technical efficiency of telecommunication companies that have been involved in acquisitions during the time period 2005 to 2010. As mentioned earlier, the DEA model is adopted in this study to analyze the trends in technical efficiency. The DEA model was first developed by Charnes et al. [27]. It is written in the form of a fractional programming problem:

$$E_0^0 = \text{max} \sum_{f=1}^{F} U_f^0 y_f^0 \sum_{i=1}^{I} V_i^0 x_i^0$$

Subject to

$$\sum_{f=1}^{F} U_f^0 x_f^0 \leq 1 \text{ for all } k$$

$$U_f^0, V_i^0 > 0$$

- $E_0^0$ is the efficiency score for the base DMU 0
- $Y_fk$ is the observed quantity of output $f$ generated by unit $k = 1, 2, \ldots N$
- $X_ik$ is the observed quantity of input $i$ by unit $k = 1, 2, \ldots N$

$U_f^0 = \text{Is the computed weight given to output } f \text{ by the base unit 0}$

$\delta = \text{Is a very small positive number}$

To appraise efficiency, the above equation is transformed into the usual components of a linear programming equation. The denominator is fixed as a constant whereas the numerator is maximized under the CCR multiplier DEA models.

$$E_0^0 = \sum_{f=1}^{F} U_f^0 y_f^0 \quad \text{subject to} \quad \sum_{i=1}^{I} V_i^0 x_i^0 = 1$$

$$\sum_{f=1}^{F} U_f^0 y_f^0 - \sum_{i=1}^{I} V_i^0 x_i^0 \leq 1$$

$$U_f^0, V_i^0 \geq \delta$$

Whereas the second objective would encompass the evaluation of how the technical efficiency of the acquiring companies is impacted by factors such as; acquisitions intensity, sequence of acquisitions and also age of the acquiring companies. Regression analysis was used as a second stage analysis following the DEA model to examine the influence of the factors that impact on the technical efficiency of the companies. Table 1 show the factors considered in this study.

The study referred to Thomson Reuter and Osiris data based to confirm that at least five out of the six companies comprising the sample have actually involved in acquisitions. The six Malaysian public listed telecommunication companies used in the present studied are Telekom Malaysia Berhad, Time Dotcom Berhad, DiGi.Com Berhad, Axiata Group Berhad, Redtone International Berhad and Green Packet Berhad. Out of the six only DiGi.Com Berhad has not taken part in acquisitions. Other companies such as Nasioncom Holdings Berhad and XOX Berhad are not included in the sample because the relevant data needed for this study is insufficient for these companies and therefore a study of the variables over a 6-year period is not possible. Table 2 shows the number of acquisitions for each company throughout the period.

According to Mohd Jamarudi et al. [30], any data found too far back historically may no longer be germane. Therefore, this study would focus on the acquisitions activities between the dates of 1st January 2005 and 31st December 2010.
Table 1: Factors and Definitions

<table>
<thead>
<tr>
<th>Factors</th>
<th>References</th>
<th>Definitions Considered in This Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (log)</td>
<td>Agiomirgianakis et al. [28]</td>
<td>No. of years from the year of establishment</td>
</tr>
<tr>
<td></td>
<td>Singh and Mogla [29]</td>
<td></td>
</tr>
<tr>
<td>Acquisitions Intensity</td>
<td>Barkema and Schijven [5]</td>
<td>The number of acquisitions in one year period</td>
</tr>
<tr>
<td></td>
<td>Salleh et al. [14]</td>
<td></td>
</tr>
<tr>
<td>Sequence of Acquisitions</td>
<td>Barkema and Schijven [5]</td>
<td>The accumulated number of acquisitions over certain given period of years</td>
</tr>
<tr>
<td></td>
<td>Salleh et al. [14]</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Number of Acquisitions

<table>
<thead>
<tr>
<th>Companies/Year</th>
<th>Telekom</th>
<th>Green Packet</th>
<th>Redtone</th>
<th>Axiata</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2007</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2008</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2009</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 3: Input and Output Variables.

<table>
<thead>
<tr>
<th>Input Variable</th>
<th>Output variable</th>
<th>Examine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total asset model</td>
<td>Revenue</td>
<td></td>
</tr>
<tr>
<td>i. Current assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. Property and equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current asset model</td>
<td>Revenue</td>
<td></td>
</tr>
<tr>
<td>i. Cash</td>
<td>Efficiency on working capital</td>
<td></td>
</tr>
<tr>
<td>ii. Cash and cash equivalents</td>
<td>in conjunction with revenue and impact firms' cash flow</td>
<td></td>
</tr>
<tr>
<td>iii. Accounts receivable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chen et al. [31] noted that the numbers in financial statements reveal that the performance and efficiency of the firms where the financial statement data can be used to find out which among the firms are more efficient. This method proved rather successful in previous studies and is generally used to evaluate the efficiency of banking and firms. In order to obtain information which would enable the researcher to ascertain the efficiency, the acquiring companies’ annual balance sheet assets and income statements from data stream will be used and scrutinized.

As previously used by Kwon et al. [23] the models employed in this are total assets and total current assets as inputs. The inputs are paired with the output variable, annual revenue, for analysis. According to Feroz et al. [17], DEA will not work suitably with negative numbers because the approach of unambiguous modelling net income will not be proper. For that reason, this study used revenue as the dependent variable.

Feroz et al. [17] interpreted an income efficient firm as one that produces the maximum total revenue while consuming the minimum of resources relative to the firm’s competitors in the same industry. The researchers should be aware of this important choice of the three models and revenue for ascertaining input and output respectively.

Table 3 shows the two models with input and output variables. Banker et al. [32] suggested a rough rule of thumb where the number of outputs used in the analysis, then the sample size n should satisfy the condition, $n \geq \max \{p \times q, 3(p + q)\}$. This study does not infringe Banker’s rule of thumb where the sample size n=6 is larger than the product of input and output.

In certain cases, the technical efficiency achieved did not bring about commensurate revenue increase on account of indiscriminate intensity of acquisitions. Integrating a certain number of acquisitions over a period may decrease the degree and quality of integration and hence, the amount of synergy realized [33]. Given bounded rationality, the integration after acquisition will be subject to diseconomies of time compression [34]. Thus, an establishment has limited information, attention and processing ability [35]. Meanwhile, Barkema and Schijven [5] stated that a company undertaking a high number of acquisitions within a single year may experience greater inefficiency. Therefore, we propose the following hypothesis.

H1a: The higher the acquisitions intensity of acquiring companies, the lower the technical efficiency under total asset model.

H1b: The higher the acquisitions intensity of acquiring companies, the lower the technical efficiency under current asset model.
entity arising from the acquisitions [7]. Hence, each subsequent acquisition magnifies inefficiencies in an acquirer’s company. Based on the available corpus of data, we may hypothesis that higher sequence of acquisitions may actually result in lower technical efficiency.

**H2a:** The higher the sequence of acquisitions of acquiring companies, the lower the technical efficiency under the total asset model.

**H2b:** The higher the sequence of acquisitions of acquiring companies, the lower the technical efficiency under the current asset model.

In addition to the intensity of acquisitions and sequence of acquisitions, size and age have been the other important factors which have impacted the technical efficiency of the companies especially involved in acquisitions. The efficiency theory considers acquisitions as being planned and implemented to heighten synergies [36]. The concept, which is always referred as ‘synergy’ happens when two or more companies are managed more efficiently and effectively after acquisitions by allocating scarce resources more appropriately.

On the other hand, Agiomirgianakis et al. [28] stated that older firms are prone to inertia, bureaucracy and lack of flexibility to adjust to change, thus inhibiting higher performance as opposed to younger and more flexible firms. Therefore, we can form the following hypothesis pertaining to the relationship between age and technical efficiency.

**H3a:** The age of the acquiring companies are negatively related to technical efficiency under total asset model.

**H3b:** The age of the acquiring companies are negatively related to technical efficiency under current asset model.

**RESULTS**

**Finding from Data Envelopment Analysis:** According to Cullinane et al. [37], all selected production combinations can be scaled up or down proportionally by using constant returns to scale for CCR model. For the scope of this paper, the researcher employed CCR-Input Oriented Model and CCR-Output Oriented Model based on the selected variables as shown in Table 4.

This study adopted the CCR-Input (CCR-I) oriented models for current asset model. Whereas the total asset model that includes fixed assets, the researcher selected a CCR-Output (CCR-O) oriented model to provide freedom in output projections. Table 5 shows the summary of the CCR efficiency scores of two different models. Six companies studied over six years would entail 36 decision making units (DMUs) for each individual model.

Comparing between the companies, we find that Digi, which did not involve in any acquisition showed perfect efficient scores throughout the observation period, displaying that it is able to fully utilize its assets in order to generate revenue. Meanwhile, Time which only partook in a single acquisition during the observation period was able to show an increase in efficiency in the current asset model, two years after acquisitions respectively.

The finding is in agreement with Kwon et al. [23] who found that Verizon, a wireless communication company which is not involved in mergers showed perfect efficient scores throughout the observation period in the current asset model. They also found that Cingular, a company involved in a single merger has showed an increase in efficiency score one year after the merger.

However, companies which partook in acquisitions involving varying intensity over a sequence of years such as Telekom and Green Packet showed lower efficiency scores in the total asset model and current asset model at the end of period of study in 2010 when compared with Axiata and Time which were involved in only single acquisitions. Therefore, it is vital that they improvise so that they can either reduce assets or increase revenue in order to boost efficiency.

The findings of this study is similar to those of Barkema and Schijven [5] who stated that every following acquisition magnifies “inefficiencies” in an acquirer’s organization. A certain number of acquisitions in a period of time may reduce the degree and quality of integration and hence, the amount of synergy realized [33].

Wolters and Kluwer, a major multinational company, failed to integrate properly a hundred-plus acquisitions over a decade and therefore showed signs of burnout resulting in a decreasing trend in its financial performance [4] as cited in Barkema and Schijven, [5]. Therefore, the experience of Wolters and Kluwer should stand out as a stark reminder to companies.

Hence, by analyzing the trend of technical efficiency, we are able to see that when companies partook in acquisitions in two subsequent years, there will be
lowered efficiency even though the intensity of acquisitions was lower in the latter year. The experiences of many companies which partook in acquisitions should prove a useful lesson for companies aspiring to get involved in acquisitions.

**Pearson Correlation:** Correlation helps in indicating the presence of a relationship between two variables; it does not however indicate a causal relationship between the variables. Nonetheless in order to obtain a precise and reliable indicator of the magnitude of the relationship between two variables, there should be as wide a range of scores as possible, on each of the two variables [38].

In reference to Table 6, the TE, age, acquisition intensity and sequence of acquisitions stated low correlation amounting below 67 percent in the total asset model and current asset model. Therefore, those factors can be further analyses. According to Pallant [38], the effect of having a non-normal distribution is to transform your variable. Barkema and Schijven [5] indicate that similar results were obtained irrespective of whether the variables were non-transformed or transformed.

This study sought to find out if any variance in the independent variables would affect the dependent variable which is technical efficiency (TE). Further regression analysis would shed light on whether there exists a significant difference in the manner in which the three independent variables affected the dependent variable which is TE.

When a small sample is used, the Rsquare value in the sample inclines to be a rather favourable overestimation of the actual value in the population [39]. The adjusted R square statistic would nullify any errors in the value thus providing a more accurate estimate of the actual population value.
Table 7: Result of Model Summary and ANOVA (Regression Analysis)

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Model Summary</th>
<th>ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant), age, Acquisition intensity and Sequence of acquisitions</td>
<td>Adjusted R Square</td>
<td>F</td>
</tr>
<tr>
<td>(Constant)</td>
<td>Total asset model</td>
<td>.506</td>
</tr>
<tr>
<td></td>
<td>Current asset model</td>
<td>.407</td>
</tr>
</tbody>
</table>

* Dependent Variable: TE

Table 8: Result of Coefficients (Regression Analysis)

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard Coefficients</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total asset</td>
<td>(Constant)</td>
<td></td>
<td>7.331</td>
<td>.000</td>
</tr>
<tr>
<td>Model</td>
<td>Age</td>
<td>-.313</td>
<td>-2.590</td>
<td>.014</td>
</tr>
<tr>
<td></td>
<td>Acquisition of intensity</td>
<td>.060</td>
<td>.454</td>
<td>.653</td>
</tr>
<tr>
<td></td>
<td>Sequence of acquisitions</td>
<td>-.642</td>
<td>-4.750</td>
<td>.000</td>
</tr>
<tr>
<td>Current asset</td>
<td>(Constant)</td>
<td></td>
<td>.952</td>
<td>.348</td>
</tr>
<tr>
<td>Model</td>
<td>Age</td>
<td>.306</td>
<td>2.311</td>
<td>.027</td>
</tr>
<tr>
<td></td>
<td>Acquisition of intensity</td>
<td>.048</td>
<td>.328</td>
<td>.745</td>
</tr>
<tr>
<td></td>
<td>Sequence of acquisitions</td>
<td>-.680</td>
<td>-4.593</td>
<td>.000</td>
</tr>
</tbody>
</table>

In the case of having a small sample size one may prefer reporting this value, as opposed to the normal R square value [38].

Table 7 shows that when the predictors of age, acquisitions intensity and sequencing were considered, the total asset model and current asset model indicated values of 50.6% and 40.7% variance in TE, respectively. Therefore, the total asset model and current asset model can be considered viable for examining the effect of the variance of the independent variables on TE.

Hypothesis Testing and Discussion from Regression Result: Table 8 presents the relevant coefficient values. Regarding hypothesis 1a, total asset model report that the coefficient of acquisitions intensity obtained is positive and insignificant (p>0.1). Whereas hypothesis 1b, current asset model report the coefficient of acquisitions intensity obtained is negative and insignificant (p>0.1). Thus, these relationships are weak and rule out acquisitions intensity effects technical efficiency (TE).

While in the total asset model, sequence of acquisitions negatively influences TE indicating that the higher the sequence of acquisitions, the lower TE in the total asset model. It is highly significant (p<0.001) and hence, hypothesis 2a is strongly supported.

Strongly supported is also found for hypothesis 2b, as the current asset model also showed lowered TE with higher sequence of acquisitions, indicating that the relationship is highly significant negative (p<0.001).

Meanwhile age was found to have a significant (p<0.05) but negative relationship with TE under the total asset model. Meaning that the older the age, the lower will be the TE. Thus, hypothesis 3a is supported.

Whereas in the current asset model, age was found to have a positive relationship with TE, meaning that an older age would result in an increase in TE. The relationship is significant (p<0.05). However, the findings are opposite the hypothesis claim about the effects in TE in the current asset model. Hence, hypothesis 3b is partially supported.

The finding of the regression analysis indicates that the sequence of acquisitions results in lower efficiency. The finding of this study is similar to those of Salleh et. al [14] who stated that the higher the sequence of acquisitions, the lower the TE. Thus, the companies should space out the acquisitions over a certain period of time, or delay subsequent acquisitions. This would enable the companies to resolve any inefficiency or prevent the inefficiency from becoming worse. Barkema and Schijven [5] suggested that time interval between acquisitions can be increased to lower intensity and increase the companies’ performance.

The effect of company age on efficiency under the current asset model found that older company is generally more efficient than the younger ones, agreed with Singh and Mogla [29] stated that age affected the profitability positively. He added that older companies may have benefited by their experience and lack of liabilities and newness.

Whereas the effect of company age on efficiency under the total asset model found out that younger company is more efficient than older ones. Agiomirgianakis et al. [28] stated that older firms are prone to inertia, bureaucracy and lack of flexibility to adjust to change, thus inhibiting higher performance as opposed to younger and more flexible firms.
According to Wan Mahmood and Mohammad [40], a combination of companies can create efficiency after acquisitions by utilizing scarce resources more appropriately. Therefore, this paper suggests that when a company is involved in acquisitions, it needs to capitalize on the total asset model and current asset model in order to reduce relative assets or increase revenue or both to be efficient. Consequently, it is pertinent and very important to study the relative efficiencies of the competitive set ups in various industries together with the effects of acquisitions.

**CONCLUSION**

Traditionally, acquiring companies have an expectation of synergy effects in the coming years as a result of acquisitions [23]. However, this study intends to provide a broad view of the effects acquisitions. The analysis consists of two stages. Firstly, the study applies the Data Envelopment Analysis (DEA) approach which calculates the technical efficiency using the total asset and current asset. Subsequently, regression analysis was used as a second stage analysis following the DEA model to examine the influence of the factors that impact on the technical efficiency of the companies.

The new 2010 code which replaces the Malaysian Code on Take-Overs and Mergers 1998 will require companies that are disposing their asset and liabilities to secure 75% shareholder approval [41]. Thus, it is felt that this study is crucial and essential for shareholders to have a broad idea of the impact of acquisitions in order to agree or not with their companies to acquire or merge with the other companies. In addition, the shareholders would be able to understand the source of inefficiency for managers in order to vote whether allowing the managers to continue holding the position or replace by someone else who can perform better.

The limitations of this study includes its relatively short period of observation and scarcity of data because most of the telecommunication companies involved in acquisitions only recently underwent public listing in the Malaysian Bursary. Redtone and Green Packet got listed in 2004 and Axiata in 2005. Notwithstanding the limitations, the empirical findings of this study provide valuable insight into the operating status of companies which would enable the formulation of a future approach towards strategic intensity and sequence of acquisitions so that higher relative efficiencies can be realized.

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