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A Performance Study on the Potential Improvement of Construction Sector Companies in Malaysia

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ABSTRACT

The construction sector is one of the important contributors to economic growth in Malaysia through Malaysia's GDP significantly. In this research, 35 companies from Bursa Malaysia, which are selected from construction sector under main market covered year 2006-2021 have been studied. The Construction 4.0 Strategic Plan (2021-2025) was launched by CIDB Malaysia to transform construction industry by utilising the innovative technologies to build a more effective, sustainable and integrated system. This research aims to examine the efficiency performance of each construction firm so that it can be advantaged to policymakers, investors, as well as stakeholders. Through these insights, it can assist the stockholders to make wise decisions in term of how to relocate the resource and investment opportunities. This research uses the DEA model with financial ratios, which included three inputs: debt to assets ratio (DAR), debt to equity ratio (DER), current ratio (CR) and three outputs: earning per share (EPS), return on equity (ROE) and return on asset (ROA) to fill the research gap on the effectiveness of construction sector in Malaysia as there has yet to be a comprehensive investigation by other researchers. The efficiency of the companies was analysed by DEA model and only 8 companies: DKLS, KERJAYA, MERCURY, MERGE, MGB, PRTASCO, PTARAS and ZECON are examined as efficient companies. Lastly, the potential improvement for each inefficient company also have been determined.

1. Introduction

The Construction sector not only one of the important contributors to economic growth in Malaysia through Malaysia's GDP significantly, but also providing employment opportunities. The recent overt of Budget Malaysia 2023 was announced on 24th February 2023 expected Malaysia GDP to growth nearly 4.5% [1]. Meanwhile contribution of construction sector GDP in Malaysia is to be forecasted to increase by 6.1 per year [2]. The Construction 4.0 Strategic Plan (2021-2025) was launched with the purpose to transform construction industry by utilizing the innovative technologies to build a more effective, sustainable and integrated system [3]. Hence, this research aims to examine the efficiency performance of each construction firm so that it can be advantaged to policymakers,

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investors, as well as stakeholders. Through these insights, it can assist the stockholders to make wise decisions in term of how to relocate the resource and investment opportunities.

2. Methodology

Bursa Malaysia, in the past was known as Kuala Lumpur Stock Exchange, which is one of the largest stock markets in ASEAN. Bursa Malaysia functioned as a platform for trading of variety market-related of financial products, such as derivatives, shares, and Islamic financial products [4]. Based on the information that shown in Bursa Malaysia website, construction sector is one of the 15 sectors distributed under main market. There are many firms listed on Bursa Malaysia for investors who are interested in the construction sector, for example: Fajarbaru Builder Group Bhd, Bina Puri Holdings Bhd, Gamuda Berhad, and etc. Efficiency performance can be deployed the method known as Data Envelopment Analysis (DEA), which is frequently used in many industries as a popular measuring tool in productivity [5]. The relative effectiveness of decision-making units (DMUs) is assessed by using the non-parametric DEA technique, through utilising the multiple inputs and outputs of the DMUs [6]. DEA has been widely used to assess the effectiveness of several sectors. The banking sector has been be the topic of the most studies using DEA to gauge effectiveness based on the past studies [7-11]. Application of DEA to measure efficiency in other sectors such as agricultural sector, food sector, healthcare sector, education sector and many other sectors in Malaysia as well as other countries had been done by the previous studies [12-20]. It is essential to comprehend the efficiency of the construction sector as it makes a significant contribution to Malaysia's economic development, hence this study is aimed to obtain the efficiency of construction sector in Malaysia, together with the potential improvement of each company. This can be offering insightful information about their operation and suggesting places for future improvement. Overall, DEA continues to be a robust tool for assessing effectiveness and has enormous promise for further study.

Measuring productivity efficiency for economic policy makers in an organization was written by academic economist Michael James Farrell [21]. Later, DEA has been developed further by [22] with the initial purpose of examining the nonprofit Decision-Making Unit (DMU)'s efficiencies. Other studies on DEA can be founded on the previous studies [22-27]. DEA is a branch of mathematical linear programming with non-parametric method which employ the ratio of multiply weighted input and weighted output, for each DMU that desire to investigate. The efficiency score will be computed through the financial ratio, which provided the information of efficiency score which equal to 1, the DMU is determined as efficiency, otherwise it will be considered as inefficient company for the efficiency score that less than 1. In this research, the BBC DEA model is applied and formulated as [28] to perform the calculation of efficiency score. A total of 35 companies from Bursa Malaysia, which are selected from construction sector under main market covered year 2006-2021 have been studied in this research. The financial ratios, which are debt to assets ratio (DAR), debt to equity ratio (DER), current ratio (CR), earning per share (EPS), return on equity (ROE) and return on asset (ROA) can be referred to previous studied [29-34] were utilized as the weighted inputs and weighted outputs in the efficiency score computation via LINGO software [35] as well as Microsoft Excel. Later the potential improvement for inefficient companies also will be figured out. This research uses the DEA model with financial ratios to fill the research gap on the effectiveness of construction sector in Malaysia as there has yet to be a comprehensive investigation by other researchers.

3. Results

3.1 Efficiency Score

Table 1 shows the efficiency score for each company from construction sector which covered from year 2006 until 2021. The data has been validated as it was extracted from the financial report of the companies, via Bursa Malaysia.

Table 1
Construction sector Companies Efficiency Score Ranking

DMU	Efficiency	Ranking	Categorization
7145 AGESON BERHAD	0.89687	20	Inefficient
7078 AHMAD ZAKI RESOURCES BHD	0.69382	33	Inefficient
5932 BINA PURI HOLDINGS BHD	0.79004	29	Inefficient
8591 CREST BUILDER HOLDINGS BHD	0.83666	26	Inefficient
7528 DKLS INDUSTRIES BHD	1.00000	1	<i>Efficient</i>
8877 EKOVEST BHD	0.58264	35	Inefficient
7047 FAJARBARU BUILDER GROUP BHD	0.88597	21	Inefficient
9261 GADANG HOLDINGS BHD	0.74568	32	Inefficient
5398 GAMUDA BERHAD	0.84973	23	Inefficient
3204 GEORGE KENT (MALAYSIA) BERHAD	0.94833	15	Inefficient
5169 HO HUP CONSTRUCTION COMPANY BHD	0.84737	24	Inefficient
3336 IJM CORPORATION BERHAD	0.75654	31	Inefficient
8834 IREKA CORPORATION BERHAD	0.91297	17	Inefficient
4723 JAKS RESOURCES BERHAD	0.96857	12	Inefficient
7161 KERJAYA PROSPEK GROUP BERHAD	1.00000	1	<i>Efficient</i>
9628 LEBTECH BERHAD	0.91611	16	Inefficient
8192 MERCURY INDUSTRIES BERHAD	1.00000	1	<i>Efficient</i>
5006 STELLA HOLDINGS BERHAD	1.00000	1	<i>Efficient</i>
7595 MGB BERHAD	1.00000	1	<i>Efficient</i>
9571 MITRAJAYA HOLDINGS BERHAD	0.99396	9	Inefficient
5085 MUDAJAYA GROUP BERHAD	0.87441	22	Inefficient
5703 MUHIBBAH ENGINEERING (M) BHD	0.90946	18	Inefficient
7071 OCR GROUP BERHAD	0.80083	28	Inefficient
5622 PIMPINAN EHSAN BERHAD	0.80092	27	Inefficient
8311 PESONA METRO HOLDINGS BHD	0.89895	19	Inefficient
5070 PROTASCO BERHAD	1.00000	1	<i>Efficient</i>
9598 PINTARAS JAYA BHD	1.00000	1	<i>Efficient</i>
6807 PUNCAK NIAGA HOLDINGS BERHAD	0.75664	30	Inefficient
5054 TRC SYNERGY BHD	0.96588	13	Inefficient
5042 TSR CAPITAL BHD	0.97651	11	Inefficient
7070 VIZIONE HOLDINGS BERHAD	0.98389	10	Inefficient
3565 WCE HOLDINGS BERHAD	0.65893	34	Inefficient
9679 WCT HOLDINGS BERHAD	0.84607	25	Inefficient
7028 ZECON BERHAD	1.00000	1	<i>Efficient</i>
2283ZELAN	0.95012	14	Inefficient

Out of 35 companies, 8 companies are obtained the efficiency score at 1, which are DKLS, KERJAYA, MERCURY, STELLA, MGB, PRTASCO, PTARAS and ZECON. This reflected that these 8 efficient companies have fully employed their three inputs: debt to assets ratio (DAR), debt to equity ratio (DER), current ratio (CR) in order to produce the maximum three outputs: earning per share (EPS), return on equity (ROE) and return on asset (ROA). The other 27 companies are considered inefficient as they obtained the efficiency score less than 1. MITRA, VIZIONE, TSRCAP, JAKS, TRC, ZELAN, GKENT, LEBTECH, IREKA and MUHIBBAH had been captured the efficiency score at 0.99396, 0.98389, 0.97651,

0.96857, 0.96588, 0.95012, 0.94833, 0.91611, 0.91297 and 0.90946 respectively at the rank of 9, 10, 11, 12, 13, 14, 15, 16, 17, 18 and 19 which are close to the efficiency score at 1. However, they are still categorized under inefficient companies based on the criteria of efficiency. The other companies such as AZRB, WCHEHB and EKOVEST ranked at last three position, that are 33, 34 and 35 with the efficiency score 0.69382, 0.65893 and 0.58264.

3.2 Benchmarks for Inefficient Companies

As shown in Table 2, the eight companies: DKLS, KERJAYA, MERCURY, STELLA, MGB, PRTASCO, PTARAS and ZECON are labelled as efficient companies act as a benchmark for inefficient companies. For instance, the inefficient company, AGESON in order to turn into efficient company, it required two efficient companies as reference set, namely MERCURY and MBG with the optimal coefficient 0.30079 and 0.69921, respectively, to serve as benchmarking for achieving better performance based on DEA model.

Table 2
 Set of benchmarks for inefficient companies

Inefficient Companies	Efficient companies (optimal coefficients)							
	7528 DKLS	7161 KERJAYA	8192 MERCURY	5006 MERGE	7595 MGB	5070 PRTASCO	9598 PTARAS	7028 ZECON
7145AGESON			0.30079		0.69921			
7078 AZRB					0.71031			0.28969
5932 BINAPURI					0.49293			0.50707
8591CRESBLD	0.02592		0.09391		0.88017			
7528 DKLS	1.00000							
8877EKOVEST	0.60438				0.39562			
7047FAJAR	0.76781		0.13613		0.09606			
9261GADANG	0.62897				0.37104			
5398GAMUDA	0.59050				0.40950			
3204GKENT	0.29178		0.51610		0.19212			
5169HOHUP					0.69482			0.30518
3336IJM	0.53774				0.46226			
8834IREKA			0.02590	0.03160	0.39600			0.54650
4723JAKS	0.04669		0.24892		0.70439			
7161KERJAYA		1.00000						
9628 LEBTECH		0.51552	0.38324				0.10124	
8192MERCURY			1.00000					
5006STELLA				1.00000				
7595MGB					1.00000			
9571MITRA			0.92253		0.07747			
5085MUDAJYA	0.35579				0.64421			
5703MUHIBAH					0.62624			0.37376
7071OCR			0.75280	0.05542	0.19178			
5622PEB				0.38647	0.10266			0.51087
8311PESONA				0.28454	0.23946			0.47600
5070PRTASCO						1.00000		
9598PTARAS							1.00000	
6807PUNCAK					0.82148			0.17852
5054TRC	0.93302				0.06698			
5042TSRCAP	0.22519		0.13369		0.59661	0.04451		
7070VIZIONE	0.75232		0.21244		0.02908	0.00616		
3565WCHEHB	0.15315				0.84685			
9679WCT	0.08673				0.91327			

7028ZECON		1.00000
2283ZELAN	0.30578	0.69422

The optimal coefficient for inefficient company AGESON, for example, MERCURY (0.30079) and MBG (0.69921) are used in performance calculation for target value. The targeted value for AGESON can be obtained through the calculation as summation of the product between the optimal coefficient MERCURY (0.30079) and MBG (0.69921) with the three inputs and three outputs of MERCURY and MBG respectively. The inefficient companies, such as MITRA, VIZIONE, TSRCAP, JAKS, TRC, ZELAN, AZRB, WCHEHB, EKOVEST, etc also can be furthered to examine the potential improvement for inefficient companies throughout the three inputs and three outputs mentioned earlier. The inefficient companies that shown in Table 2 also can be transformed to efficient companies based on the optimal coefficient correspondingly.

3.3 Potential Improvement

Table 3 showed the proposed potential improvement for 27 inefficient companies. Based on the calculation DEA model to get the optimal solution, the inefficient companies are listed as AGESON, AZRB, BINAPURI, CRESBLD, EKOVEST, FAJAR, GADANG, GAMUDA, GKENT, HOHUP, IJM, IREKA, JAKS, LEBTECH, MITRA, MUDAJYA, MUHIBAH, OCR, PEB, PESONA, PUNCAK, TRC, TSRCAP, VIZIONE, WCHEHB, WCT and ZELAN can be extended to investigate more thoroughly on the financial ratios, that is three inputs and three outputs.

Table 3
 Potential Improvement for inefficient companies

Inefficient DMU	Input and Output Variable	Actual Value	Targeted Value	potential improvement (target data-actual data)
7145 AGESON	CR	1.51373	1.35888	-0.15486
	DAR	0.57900	0.49846	-0.08054
	DER	1.13615	1.01992	-0.11623
	EPS	1.84894	6.11624	4.26730
	ROA	1.45000	3.13489	1.68489
	ROE	3.47118	5.75322	2.28205
7078 AZRB	CR	1.41883	0.98529	-0.43354
	DAR	0.85553	0.59411	-0.26142
	DER	5.92196	1.59718	-4.32478
	EPS	1.60010	3.09365	1.49356
	ROA	0.30892	1.35121	1.04228
	ROE	2.13837	3.26486	1.12649
5932 BINAPURI	CR	1.09707	0.86716	-0.22991
	DAR	0.80222	0.63410	-0.16811
	DER	4.05529	1.91433	-2.14096
	EPS	1.91132	3.61999	1.70867
	ROA	0.55429	1.17644	0.62215
	ROE	2.80202	3.13320	0.33118
8591CRESBLD	CR	1.47566	1.23525	-0.24041
	DAR	0.62367	0.52206	-0.10160
	DER	1.82540	1.10844	-0.71696
	EPS	3.65580	3.65580	0.00000
	ROA	0.57754	2.05863	1.48109
	ROE	1.76214	4.11996	2.35782
8877EKOVEST	CR	2.95963	1.72680	-1.23283
	DAR	0.70596	0.41189	-0.29407

	DER	2.40087	0.75899	-1.64189
	EPS	0.54338	4.74388	4.20051
	ROA	0.12912	1.35874	1.22962
	ROE	0.43913	2.44958	2.01044
7047FAJAR	CR	2.23650	1.98258	-0.25393
	DAR	0.40369	0.35785	-0.04584
	DER	0.74739	0.57665	-0.17074
	EPS	2.44925	7.06523	4.61598
	ROA	1.74387	1.99967	0.25579
	ROE	3.22847	3.22847	0.00000
9261GADANG	CR	2.34601	1.75056	-0.59545
	DAR	0.54497	0.40665	-0.13832
	DER	1.22525	0.74209	-0.48317
	EPS	1.71326	4.83954	3.12629
	ROA	0.62840	1.34957	0.72118
	ROE	1.41282	2.40928	0.99645
5398GAMUDA	CR	2.01436	1.71338	-0.30097
	DAR	0.48773	0.41485	-0.07287
	DER	0.95208	0.76854	-0.18355
	EPS	0.03198	4.68986	4.65788
	ROA	0.00608	1.36392	1.35784
	ROE	0.01187	2.47234	2.46047
3204GKENT	CR	1.89024	1.79559	-0.09465
	DAR	0.42728	0.40589	-0.02139
	DER	0.74598	0.70863	-0.03735
	EPS	1.82402	9.91732	8.09330
	ROA	1.15460	4.13620	2.98160
	ROE	2.01580	6.93060	4.91480
5169HOHUP	CR	1.15260	0.97687	-0.17573
	DAR	0.70435	0.59696	-0.10739
	DER	2.38241	1.61978	-0.76263
	EPS	2.34533	3.13117	0.78583
	ROA	0.92964	1.33875	0.40911
	ROE	3.14442	3.25547	0.11105
3336IJM	CR	2.19494	1.66240	-0.53254
	DAR	0.56261	0.42611	-0.13650
	DER	1.11959	0.80481	-0.31478
	EPS	0.02785	4.48460	4.45675
	ROA	0.00822	1.38359	1.37537
	ROE	0.01423	2.55881	2.54459
8834IREKA	CR	0.96188	0.87821	-0.08367
	DAR	0.69609	0.63554	-0.06054
	DER	2.29042	1.94905	-0.34137
	EPS	4.24208	4.24208	0.00000
	ROA	1.08926	1.43589	0.34663
	ROE	3.58413	3.58413	0.00000
4723JAKS	CR	1.40940	1.36673	-0.04267
	DAR	0.51128	0.49580	-0.01548
	DER	1.04615	1.01448	-0.03167
	EPS	0.93228	5.65574	4.72346
	ROA	0.45164	2.85005	2.39842
	ROE	0.92411	5.27783	4.35371
9628 LEBTECH	CR	2.66125	2.43871	-0.22254
	DAR	0.34145	0.31290	-0.02856
	DER	0.51850	0.46877	-0.04973
	EPS	4.38655	6.80875	2.42220

	ROA	3.26845	3.26845	0.00000
	ROE	4.96314	5.18674	0.22359
9571MITRA	CR	1.81163	1.80570	-0.00593
	DAR	0.42618	0.41089	-0.01529
	DER	0.70262	0.70032	-0.00230
	EPS	1.17541	13.81399	12.63858
	ROA	0.70844	6.34045	5.63201
	ROE	1.16798	10.53416	9.36619
5085MUDAJYA	CR	1.69899	1.48656	-0.21243
	DAR	0.53136	0.46492	-0.06644
	DER	1.13382	0.92991	-0.20391
	EPS	1.11378	3.77663	2.66286
	ROA	0.46241	1.45144	0.98903
	ROE	0.98669	2.85707	1.87038
5703MUHIBAH	CR	1.03246	0.93960	-0.09285
	DAR	0.66982	0.60958	-0.06024
	DER	2.02863	1.71984	-0.30879
	EPS	1.23751	3.29721	2.05970
	ROA	0.17322	1.28362	1.11040
	ROE	0.52461	3.21394	2.68933
7071OCR	CR	2.12994	1.70803	-0.42191
	DAR	0.53745	0.43099	-0.10646
	DER	1.16193	0.77092	-0.39101
	EPS	2.59451	12.07386	9.47935
	ROA	4.49250	5.74180	1.24930
	ROE	9.71247	9.71247	0.00000
5622PEB	CR	1.29108	1.03466	-0.25643
	DAR	0.75908	0.60832	-0.15076
	DER	3.15078	1.80377	-1.34701
	EPS	3.71083	6.14857	2.43774
	ROA	1.56652	3.10114	1.53462
	ROE	6.50227	6.50227	-0.00001
8311PESONA	CR	1.12167	1.00888	-0.11278
	DAR	0.67696	0.60889	-0.06807
	DER	2.09561	1.78352	-0.31209
	EPS	1.36985	5.39962	4.02976
	ROA	1.82004	2.62070	0.80066
	ROE	5.63414	5.63414	0.00000
6807PUNCAK	CR	1.38079	1.04570	-0.33509
	DAR	0.75749	0.57366	-0.18383
	DER	3.12355	1.43499	-1.68856
	EPS	1.24210	2.82449	1.58239
	ROA	0.09388	1.44058	1.34671
	ROE	0.38711	3.33219	2.94508
5054TRC	CR	2.11530	2.04441	-0.07089
	DAR	0.35364	0.34178	-0.01185
	DER	0.95416	0.53303	-0.42113
	EPS	1.52982	6.02262	4.49280
	ROA	0.52451	1.23619	0.71168
	ROE	1.41521	1.91085	0.49565
5042TSRCAP	CR	1.50679	1.47148	-0.03531
	DAR	0.48602	0.47463	-0.01139
	DER	0.94561	0.92345	-0.02215
	EPS	4.41454	4.88442	0.46988
	ROA	2.06185	2.14798	0.08613
	ROE	4.01156	4.01156	0.00000

7070VIZIONE	CR	2.05614	2.02453	-0.03161
	DAR	0.35598	0.35050	-0.00548
	DER	0.55276	0.54426	-0.00849
	EPS	0.70855	7.94423	7.23568
	ROA	2.39311	2.39311	0.00000
	ROE	3.71592	3.82848	0.11256
3565WCHEHB	CR	1.95695	1.29072	-0.66623
	DAR	0.77044	0.50815	-0.26229
	DER	3.34298	1.06923	-2.27375
	EPS	0.80826	2.98816	2.17990
	ROA	0.33094	1.52700	1.19606
	ROE	1.44161	3.18925	1.74765
9679WCT	CR	1.44847	1.22653	-0.22194
	DAR	0.61683	0.52232	-0.09451
	DER	1.60982	1.11490	-0.49492
	EPS	0.45595	2.72972	2.27377
	ROA	0.07658	1.55177	1.47519
	ROE	0.19985	3.29813	3.09828
2283ZELAN	CR	0.80528	0.76546	-0.03982
	DAR	0.70725	0.66853	-0.03872
	DER	2.30114	2.18737	-0.11377
	EPS	0.94056	4.07311	3.13255
	ROA	0.62703	1.02599	0.39896
	ROE	2.14187	3.01986	0.87799

Based on Table 3, the inefficient a, ZELAN need to reduce their current ratio by 0.03982 from 0.80528 to 0.76546, decrease the debt to assets by 0.11377 from 0.70725 to 0.66853, diminution in the debt to equity by 0.11377 from 2.30114 to 2.18737. Meanwhile, the potential improvement for ZELAN on EPS, ROA, ROE as 3.13255, 0.39896 and 0.87799. This indicates that ZELAN should increase the three outputs EPS, ROA, ROE. The inefficient companies are suggested to reduce the inputs and increase the outputs in order to make the company to be efficiency. In this case, AGESON might considered how to increase their company profit in order to increase the output. For example, the company may look into its own company expenses such as reduce operation costs, increase sale revenue and so on.

4. Conclusions

Construction sector in Malaysia is one of the important economy contributions. The development and performance of the companies from construction sector in Bursa Malaysia show significant investment prospects in the sector. DEA model has been applied to evaluate the efficiency of the companies that listed in the construction sector of Bursa Malaysia. The objective of this study had been achieved. The results show that approximate to 22.85%, that is 8 companies out of 35 companies of the companies are considered efficiency, whereas the 27 companies are inefficient. Meanwhile, the potential improvement for inefficient companies also have been determined based on the reference set. As MGB appears the most time as optimal coefficient, hence it can be the benchmark for other inefficient companies. This research study is significant as it provides valuable information that can assist in boosting the construction sector in Malaysia and support the nation's overall economic development.

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