Commercial Bank Performance in the Digital Era: Evidence from Malaysia

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ABSTRACT

The bank, which is a financial institution, plays an important role in Malaysia. In order to ensure connectivity, the banking sector explores technology as market demand increases. In early 2000, banks started to develop new banking instruments using new innovative technology innovation and connectivity. Technology in the banking sector offers cost saving opportunities, expand productivity and reduces operational risk compared to traditional banking. Nevertheless, this result does not reflect the situation in some less developed countries because merge infrastructure investment and customers' preference towards the traditional banking method in their country. Hence, this study aims to investigate the bank's internal, macroeconomic and technology factors and their relationship with Malaysian commercial banking performance. Secondary data were collected from eight local commercial banks that acted as samples of this study and the data is collected over a period of 12 years (2005 to 2017 with 84 observations). Data went through the descriptive analysis, correlation analysis, assumption testing and Ordinary Least Square (OLS) regression analysis using the SPSS software in order to achieve the research objectives. Findings show that bank internal factors consisting of bank size, credit risk, and capital adequacy play a significant role in a bank's performance. It also indicated that there is a significant relationship between technology and bank performance. This shows that banks are certainly affected by technology innovation, which indicates that banks have to make clear strategic plans to observe sustainability in this sector and improve their performance.

1 INTRODUCTION

Time and technology have changed the banking industry but efforts are still expanded in exploring new methods, instruments, products and services for their customers. Technology in the banking sector offers opportunities for proper cost management, expanding productivity and lowering operational risk compared to traditional banking. Moreover, Chai, Tan & Goh (2016) found that there is sufficient customer demand for technology-based banking products and perform as a good short-term investment for banks. An experimental study by Akhisar, Tunay & Tunay (2015) found that electronic banking services enhance a bank' 's performance. However, this finding does not reflect the situation in some less developed countries because low infrastructure investment and customers' preference for traditional banking methods in their country.

Akhisar, Tunay & Tunay (2015) revealed that the effect of technology banking service shows that innovation or

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digitalisation brings positive performance into bank. Hence, it is evident that technology plays an essential role in boosting and strengthening banking performance. In other words, technology enables the banking sector to endure or sustain the current competitive market. Moreover, globalisation brings in innovative advancements in the banking sector (Robin, Salim, & Bloch, 2018). Currently, Malaysia's banking sector is going digital. It creates a new prospect through core banking service worldwide, which only can be done by innovative banking technology.

Conversely, in Asian countries (Sadr & Mohammad, 2013), and Romania (Gutu, 2014), findings show that electronic banking has a negative impact on e profitability. At the same time, Gutu (2014) stated that banks position did not change inspired of depositing on higher advertising budget for internet banking. Although the young generation prefers internet banking, however, the older generation prefers the traditional method of banking, where most of the bank clients belong to the older generation.

In Malaysia, commercial banks play an important role in the banking sector as they are the largest fund providers (Sufian, Kamarudin & Nassir, 2016). Traditionally, commercial banks accept deposits from depositors, provide loans or financing, custody facilities and bank guarantees, which includes retail banking services. As time develops, commercial banking services have become more comprehensive, which includes bank acceptance, involvement in foreign exchange markets, treasury facilities and remittance services (Sufian, Kamarudin & Nassir 2016). This permits constant money circulation in the economy through investing and loans.

Almost 70 per cent part of the financial system in Malaysia is controlled the banking sector (Sufian, Kamarudin & Nassir, 2016). As Malaysia continues its good progress towards a developed nation, the technology factor should be considered an option to stay competitive in the banking sector. Although technology mitigates new risks in the system, it encourages innovation and creative thinking to ensure cost efficient services.

In this study, the term banking technology is composed of computer science together with information and communication advancement used to empower banks to provide better services for their customers. Banking is one of the divisions that attracts advanced technology innovation, which should be monitored closely. In a financial institution, innovation and development are somethings that can be developed though with some difficulty. Previously, the ATM and telephone banking were advancements that have been contributed much to banks as well as banking clients. However, these advancements have been replaced with better technology, such as internet and mobile banking. Thus, even though banking technology has developed, but there are still greater possibilities for humans to come out with a better innovation in future.

Bank customers feel that banking technology makes work more convenient and saves transaction time compared to the traditional banking method. Moreover, customers ae mostly attracted by its nice-looking features and applications, which then increases the number of new customers into business. The utilisation of banking technology by the banking sector ensures cheaper banking products and 24-hour operations all year round. Thus, the dependence on bank branches is decreasing. This urges banks to provide technology-based instruments to clients who are increasing day-by-day. The increase in demand for this type of services contributes greatly to the banking industry.

Conversely, technology also has its downfall. The most important security risk associated with technology is the possibility of losing personal data and money from accounts caused by hacking or unauthorised entry. This address the bankers not to be a software expert but need to better understand the technology landscape to manage these challenges.

Therefore, technology introduces strict conditions into the banking sector, which they must grapple and lower down the profit margin. The banks have to cut down on bonuses and dividends to cover the swelling cost of adopting technology, which affects the banking performance. This forms different growth patterns on ROE (Abaenewe, Ogbulu & Ndugbu, 2013). These initiatives have brought development as well as challenges to banks in their efforts to stay relevant in current progressive conditions.

Hence the objectives of this study are to investigate the relationship between the bank''s internal factors and the performance of Malaysian commercial bank , analyse the connection between macroeconomic factors and the performance of Malaysian commercial banks and examine the relationship between technology factors and the performance of Malaysian commercial bank.

2   LITERATURE REVIEW

The Technology Acceptance Model (TAM) is significant for this study as it clarifies what makes potential adopters like or dislike the utilisation of a technology. The theory guides us in understanding what impacts the utilisation of different technology segments by the banking sector. Banks utilise all or a portion of accompanying technology segments, like internet banking, mobile banking and ATM machines.

The theory influences the research gap for understanding why banks may receive different ICT segments that could impact their performance. According to Davis (1989), most of the community tends to utilise innovations with the goal of improving work performance. Hence, the theory directs this study to discover the impact of zutilizing a technology on the performance of Malaysian commercial banks. Furthermore, the Innovation Diffusion Theory (IDT) by Rogers, (1962) is also related to this study as this theory discusses uncertainty in reducing behaviour among potential adopters of the first technological innovation.

It explains the new technology's influence and the adoption process. ICT is also connected to the investigation on the effects of technology on the performance of commercial banks. The theory states that appropriation of information and communication technology provides hypothetical help in the innovation of banking instruments. As indicated by the theory, financial performance seems to have a strong connection with technology reception.

Akhisar et al. (2015) discovered that development in banking technology influences bank performance. The impact of new era banking suggests that innovation or digitalisation tremendously enhances the banking institution's performance. Similarly, Chai, Tan, & Goh, (2016) showed that bank performance can be further enhanced if banks adopt higher levels of technology. Furthermore, DeYoung, Lang, & Nolle, (2007) found that technology adoption boosted bank profitability mainly through elevated revenues from deposit service fees.

The findings recommended that technology adoption was related to an economically and statistically vast development in bank profitability. In Europe and the United State, advanced technology has boosted the overall profitability of the banking sector (Akhisar, Tunay & Tunay, 2015).

As for Malaysia, which is a developing country, some survey studies suggest that technological innovation is a matter that should be considered by the Malaysian banking sector (Chai, Tan & Goh, 2016) in order for the country to have well-organised and developed banking infrastructures. Banks have to replicate technology development into their products and services according to customer needs.

One positive impact of technology adoption by the banking sector is cost efficiency. This is consistent with Akhisar *et al.* (2015), who stated that transaction cost could become cheaper by 40 per cent to 80 per cent by using internet banking compared to the traditional method. This indicates that technology adoption by banking systems in developing countries reduces operational costs, which could affect bank performance.

An empirical study by Sathye (2005) and Sullivan (2000) found that banking technology does not have a huge affiliation with bank performance. Recent studies in Romania (Gutu, 2014) and several Asian countries (Hossein, 2013) found that technology has a negative impact on a bank's profitability, but some technology infrastructure acts as a barrier to a bank's performance. Similarly, Ugwueze & Nwezeaku (2016) highlighted that Nigerian banks' financial performances did not have a significant relationship with technology.

In summary, technology impact the banking sector's profitability and effectiveness (Chai *et al.*, 2016; Akhisar *et al.*, (2015). In general, technology used in the banking sector is reliable on this competitive business activity. At the same time, Weigelt & Sarkar, (2012) stated that the bank encouraged or required to be on track with technology advancement in order to fulfil customer needs and their profitability. Hence, it is relevant to study the impact of technology on the performance of Malaysia's commercial banking sector.

Furthermore, on the macroeconomic level, GDP is used to evaluate total economic activities (Robin *et al.*, 2018 and Oluwaseyi, Ahmad, & Kamil, (2017). Meanwhile, Robin, Salim, & Bloch (2018) demonstrated that bank size, as a total asset in Malaysia, reflects on bank profitability. According to Sufian *et al.*, (2016), the bank plays a significant role in Malaysia' 's financial system as a loan provider, which indicates that the bank operates in a high credit risk environment. Thus, it is essential to study the effects of credit risk on bank performance. Lastly, several studies (Robin *et al.*, 2018 and Abdullah *et al.*, 2014) agree that the bank specified factor, namely capital adequacy, has impacted the financial institution's financial performance. Although there are some arguments regarding the whether it has a positive or negative effect, it is still reliable to evaluate capital ratio as a bank specified factor in this research.

3 METHODOLOGY

This study applied the quantitative research method by employing secondary data, which was collected over a 12-year period spanning from 2005 to 2017. The study sample comprises eight local commercial banks. The independent variables were categorised into three parts, namely technology, macroeconomic and bank-specific variables. As for technology variables, the 'Internet Banking Subscribes' was used as a proxy for technology. Data for the technology variables were obtained from the Bank Negara website and annual reports of each bank.

The annual reports were accessed from the Bursa Malaysia website or the individual bank's official website. As for the macroeconomic variables, GDP data were extracted from the World Bank database for the period spanning from 2005 until 2017. Justification for using GDP as a macroeconomic indicator was based on Robin et al., (2018), where the GDP indicator reflects the capacity of a borrower in a bank loan or debt servicing.

Consequently, higher economic growth may encourage loan repayment and reduce the credit risk, while economic growth towards low economic growth might lower the strength of debt servicing where an increase in non-performing loans negatively affect banking performance. Thus, it uses GDP as a macroeconomic variable on commercial banking performance is relevant and significant. The bank-specific variables were mainly credit risk, bank size and capital adequacy variables, which used ratio measurements.

Therefore, the financial ratio for related variables calculated by the researcher had referred to the bank's balance sheet, cash flow, profit & loss statements and other related items in the respective bank's annual report. Meanwhile, the dependent variable is ROE, measured as bank performance. In total, the sample size in this study is 84 observations.

The theory applied in this study is the Innovation Diffusion Theory (IDT) by Rogers, (1962). The theory discusses uncertainty in reducing behaviour among potential adapters during the first technological innovation. It explains the influence of a new technology and the adoption process. Another theory applied in this study is the Technology Acceptance Model (TAM), which clarifies what makes potential adopters like or dislike the utilisation of technology. The theory guides us in understanding what impacts the utilisation of different technology segments by the banking business.

Research Design

A descriptive analysis delivers a summary of the quantitative data sample. Commonly, it generates measurements of tendency like mean, median and mode. It also provides variance or standard deviation and variables with the lowest

and highest values. This study also applied the correlation analysis. In order to proceed with the regression analysis, data should be analysed with some assumptions to fit the model, such as normality, homogeneity, linearity and multicollinearity. Ordinary Least Square (OLS) is known as the coefficient model and is part of the panel regression model for panel data analysis. This was based on Siddik et al. (2016), and Binuyo and Aregbeshola (2014), who had employed POLS in their studies related to technology and bank performance. As for the constant variables, Oluwaseyi, Ahmad & Kamil (2017) had also used the same method in their study. This model is appropriate since the bank samples in this study had similar performance and characteristics, which fulfils the assumptions in the OLS model. Moreover, the OLS model is an appropriate model for this study for determining the true relationship between the variables chosen and bank performance, where different bank slopes do not disturb the relationship between dependent and independent variables. The regression analysis was conducted using SPSS software.

Figure 1
The Theoretical Framework of the Study
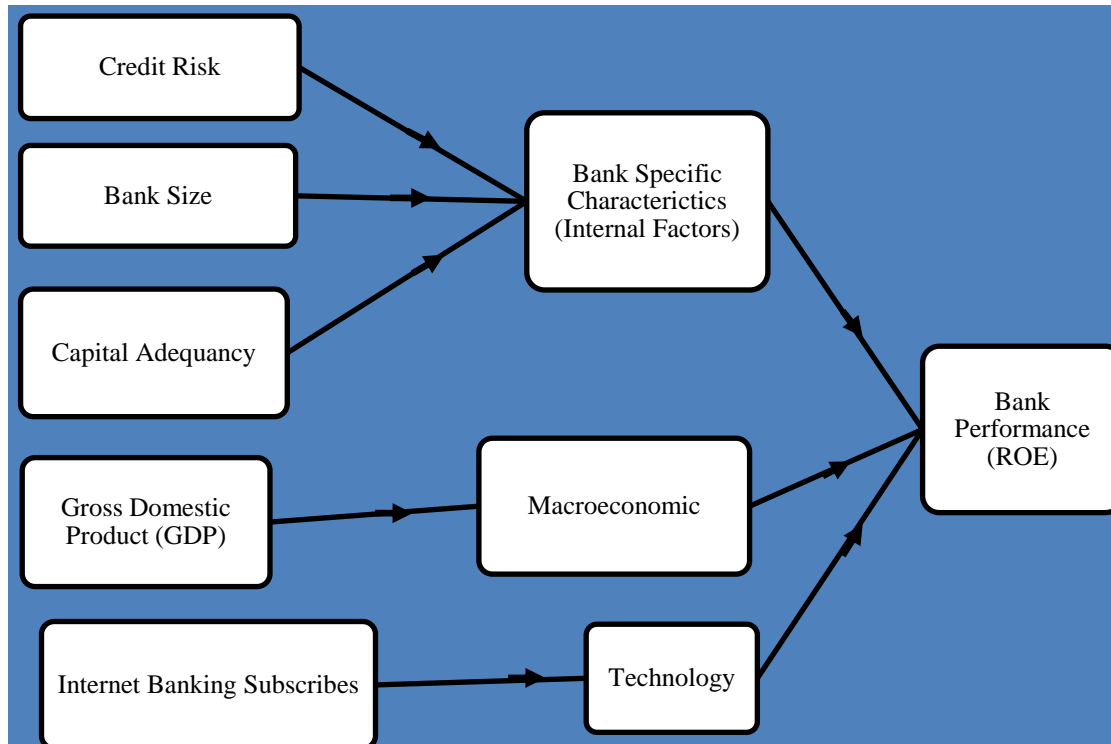
Econometrics Framework

To examine the effect of technology factor, macroeconomic factor and bank internal factor towards bank performance the Pooled Ordinary Least Squares (POLS) Regression Model is executed as below,

$$Y = \beta_0 + \beta_1\, Technology + \beta_2\, GDP + \beta_3\, Bank\ size\ + \beta_4\, Credit\ Risk + \beta_5\, Bank\ adequacy + e \qquad \dots (i)$$

where,
Y= Bank performance in terms of ROE.
β_1= Technology
β_2= Gross domestic product,
β_3= Bank size
β_4= Credit risk
β_5= Bank adequacy

4   DISCUSSION OF THE RESULTS

Descriptive Analysis

Table 4.1 shows eight commercial banks in Malaysia as well as the maximum (32.450) and minimum (-10.960) values of ROE. Findings indicate that the standard deviation is at 6.728, the mean value is 17.148 and the mean value for technology variable is 16.115. The higher and lower numbers for the technologies factor is 17.0542 and 14.771, respectively, while the standard deviation is 0.719. As for the macroeconomic variables, GDP had a maximum value of 26.546, mean value of 26.246 and a standard deviation value of 0.273. The analysis shows that the average capital adequacy is 15.435 per bank and average bank credit risk is 0.005 per bank. The standard deviation value for both capital adequacy and credit risk is 1.726 and 0.006, respectively. Bank size is explained with the largest value being 20.455 and the lowest value being 16.971. The mean value for bank size is 18.824 per bank. Diagnostic testing consists of normality, linearity, multicollinearity and homogeneity tests and they were not violated; therefore, further analysis can be done.

Table 4.1
Descriptive Analysis

Variables	n=84	Minimum	Maximum	Mean	Std. Deviation
ROE		-10.960	32.450	17.148	6.728
TECHNOLOGY		14.771	17.054	16.115	.719
GDP		25.690	26.546	26.246	.273
BANK SIZE		16.971	20.455	18.824	.915
CREDIT RISK		-.002	.037	.005	.006
CAP		11.050	21.760	15.435	1.726

Diagnostic testing consists of normality, linearity, multicollinearity and homogeneity test being tested and they are not been violated, therefore further analysis can be done.

Correlation Analysis

Table 4.2 shows the correlation analysis between independent variables and dependent variables. Result indicate that technology, GDP, bank size and credit risk have a correlation with ROE. The correlation values for technology, GDP, bank size is correlated .0257, .385 and .296, respectively. The highest correlation value for the credit risk variable was -.563. In addition, findings also show that capital adequacy does not correlate with ROE.

Table 4.2
Correlation Analysis

		ROE	Technology	GDP	Bank Size	Credit Risk	CAP
ROE	Pearson Correlation	1	.257***	.385***	.296***	-.563***	-.044
	Sig. (2-tailed)		.008	.000	.002	.000	.658
Techonolgy	Pearson Correlation	.257***	1	.940***	.419***	-.631***	.352***
	Sig. (2-tailed)	.008		.000	.000	.000	.000
GDP	Pearson Correlation	.385***	.940***	1	.393***	-.646***	.272***
	Sig. (2-tailed)	.000	.000		.000	.000	.005
Bank Size	Pearson Correlation	.296***	.419***	.393***	1	-.247**	.188
	Sig. (2-tailed)	.002	.000	.000		.011	.056
Credit Risk	Pearson Correlation	-.563***	-.631***	-.646***	-.247**	1	-.280***
	Sig. (2-tailed)	.000	.000	.000	.011		.004
CAP	Pearson Correlation	-.044	.352***	.272***	.188	-.280***	1
	Sig. (2-tailed)	.658	.000	.005	.056	.004	

Note: ***. Correlation is significant at the 0.01 level (2-tailed), **. Correlation is significant at the 0.05 level (2-tailed) and *. Correlation is significant at the 0.10 level (2-tailed)

Regression Analysis

Table 4.3 shows that the adjusted R-square value is 37.9%, which means independent variables significantly describe dependent variables. Additionally, the ANOVA analysis displays variables at a significant level of $p < 0.01$ level with a F-value of 21.953. This shows that variables used in this study are statistically related to bank performance.

Table 4.3
Coefficient analysis

Model	B	Std. error	t	P-value
(Constant)	31.006	16.479	.677	.500
CREDIT RISK	-.582	96.685	-7.046***	.000
TECHONOLOGY	-.212	1.008	-1.971*	.051
GDP	-.005	5.352	-.050	.960
BANK SIZE	.198	.594	2.447**	.016
CAP	-.244	.318	-2.993***	.003
Adjusted R-square		0.379		
F-value		21.953		
Sig		.000		

*Note: * denotes significant at $p<0.10$, ** denotes significant at $p<0.05$, and *** denotes significant at $p<0.01$*

For technology variables indicates beta value of -0.212 (t-statistics= -1.971) of standardized coefficient. These findings explain that technology is significantly and negatively related to ROE by -21.2%. This indicates that an increase in a bank's technology factor will reduce bank performance. This result is in line with Gutu (2014), who finds that technology brings a negative impact on banking performance. This is because a higher level of banking technology increases the operational cost and lower down the local commercial bank profitability in Malaysia.

This result supports the findings by Hossein (2013). Although Malaysians welcome technology, banks are facing a hike in cost, which affects its performance. Currently, banks are still at the developing competitive technology stage, where most of the capital is used for research and development. At the current stage, there is a rise in expenditure, but the future outcome of better performance is predicted.

Meanwhile, standardized coefficient for credit risk is -0.582 (t-statistic= -7.046). This illustrates that credit risk is negatively related to ROE by 58.2%. According to Miller & Noulas (1997), non-performing loans would turn into credit risk if overlooked, and this situation will affect bank performance. Abdullah *et al.,* (2014), Miller & Noulas (1997) and Edirisuriya *et al.*, (2015) also found that credit risk causes a reduction in bank performance. Hence, credit assessment methods such as 5C, CAMPARI and others need to be in line and assessed wisely by industry players, especially the credit section.

Furthermore, capital adequacy is significant and negatively related to the performance of local commercial banks in Malaysia. Based on Table 4.2, the standardised coefficient for capital adequacy is -0.244 (t-statistic= -2.993) with a significance level of 0.01. In line with Mathuva (2009), Barnor & Odonkor (2012) and Aremu *et al.* (2013), who found that capital adequacy has a negative relationship with bank performance, although lower capital reserve amounts indicate a riskier position, lower capital reserves create higher chances to gain more returns under risk exposure.

Conversely, bank size is positively and significantly related to ROE at 19.8% (t-statistic= 2.447) and with a significance level of 0.05. Abdullah et al. (2014) showed that bank size positively impacts bank performance. This shows that a larger bank size tends to increase bank performance and in Malaysia, a larger bank seems is more economical and convenient for the customer. However, there was no significant relationship between GDP and ROE.

5   CONCLUSION

Although Malaysians welcome technology, banks are facing a hike in cost, which affects performance. Currently, the banks are still developing competitive technology, where most of the capital is used for research and development. At this stage, there would be a rise in the expenditure, but overall enhanced performance could be realised in the future. Conversely, this study aims to provide insight, attract and encourage more studies on innovation of technology for the future of the banking sector. Consistent with the 11th Malaysia Plan (RMK-11) that intends to achieve Vision 2020, this study had engaged policymakers to focus and contribute towards banking innovations by creating a platform for further development of banking technologies t. This study also contributes to the effects of technology on Malaysia's commercial banking performance. It provides the most current findings and technological knowledge concerning the banking sector. New technology innovation in the banking industry would be able to mitigate new risks, operational efficiency and operational cost, which could help boost future banking performance.   Thus, this study believes in providing a strategic plan for industry players, including Malaysia's banking sector, in order to improve their performance in line with advancement in banking technology. Even though the finding indicates that banking performance and technology has a negative relationship; however, the Malaysian government is committed to achieving Vision 2020 and IR4.0. Therefore, the involvement of Malaysian commercial banks in

technology advancement in order to compete, upgrade and sustain as well as develop innovative products in the banking industry is vital. The role of Malaysia's Central Bank is important in ensuring the strength of local banks when facing the digitalisation era.

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