IMPACT OF INTERNET BANKING AND SOCIAL MEDIA ADOPTION ON PROFITABILITY OF LOCAL COMMERCIAL BANKS IN MALAYSIA

NG HUI CHIN

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NG HUI CHIN

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ABSTRACT

This study investigated the impact of Internet Banking and social media adoption on the profitability of local commercial banks in Malaysia. A sample of eight local commercial banks in Malaysia for the period ranging from1998-2016 was chosen for this study. Multiple regression analysis was used to identify the relationship between the dependent variable namely Net Interest Margin and independent variables including Internet Banking and social media which were in the form of dummy variables. Two control variables namely Loan Deposit Ratio and Loan Loss Provisions over Total Loans ratio were included to assure robustness and comparability in findings. Findings show that there was negative significant relationship between Internet Banking and social media on the profitability of local commercial banks in Malaysia at 0.01 significance levels. Thus, increasing usage of Internet Banking and social media by Malaysia's local commercial banks caused margin compression in banks. Despite the reduction in term of bank profitability associated with Internet Banking and social media adoption, margin compression actually promote market efficiency in the long-term.

Keywords: Malaysia, Internet Banking, social media, multiple regression analysis, dummy variables

ABSTRAK

Kajian ini mengkaji kesan penggunaan Perbankan Internet dan media sosial terhadap keuntungan bank perdagangan tempatan di Malaysia. Sampel kajian terdiri daripada lapan bank perdagangan tempatan di Malaysia teleh dipilih untuk tempoh 1998-2016. Analisis regresi berganda telah digunakan untuk mengenal pasti hubungan antara pembolehubah bersandar iaitu Margin Faedah Bersih dan pembolehubah bebas termasuk Perbankan Internet dan media social dalam bentuk pembolehubah dummy. Dua pembolehubah kawalan termasuk Nisbah Pinjaman-Deposit dan Nisbah Peruntukan Kerugian Pinjaman ke atas Jumlah Pinjaman juga dimasukkan dalam kajian ini untuk memastikan keteguhan dan perbandingan dalam dapatan. Dapatan kajian menunjukkan bahawa hubungan yang signifikan negatif wujud antara Perbankan Internet dan media sosial ke atas keuntungan banks perdagangan tempatan di Malaysia pada 0.01 taraf keertian. Justeru itu, peningkatan penggunaan Perbankan Internet dan media sosial oleh bank perdagangan tempatan Malaysia menyebabkan mampatan margin dalam banks. Walaupun penggunna Perbankan Internet dan media social menyebabkan penurunan keuntungan bank dalam janka pendek, mampatan margin sebenarnya menggalakkan kecekapan pasaran untuk jangka panjang.

Kata kunci: Malaysia, Perbankan Internet, media social, analisis regresi berganda, pembolehubah dummy

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LIST OF ABBREVIATIONS

NIM	Net Interest Margin
IB	Internet Banking
SM	Social Media
LDR	Loan Deposit Ratio
LLPOTL	Loan Loss Provisions over Total Loans

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Traditional internet consumption such as email and general browsing had undergone significant revolution with the introduction of new digital technologies and websites that provide a more interactive and humanize services. Previously, majority of the internet were accessed through fixed-line connection to desktop, however with the emergence of WiFi and the growth of the mobile devices such as smartphones, tablets and laptop, the role of internet has changed.

E-banking is a process of performing banking transaction electronically without the need to visit physical branch. Electronic banking encompasses personal computer (PC) banking, Internet Banking, online banking and phone banking, in which different types of electronic banking are often used interchangeably. Internet Banking provides a mean of transferring funds from savings account to current account as well as third party account. Services provided under Internet banking include balance enquiries, bill payment, fund transfer, account statement and so on. The unique feature of Internet has made banking products and services available to customer across the boundary.

Online banking was first introduced in New York, United States followed by United Kingdom in early 1980s. In New York, online services was introduced as home banking services in four major city, namely Citibank, Chase Manhattan, Chemical and

Manufacturers Hanover (Cronin, 1997). In 1998s, merger and acquisitions wave hit financial industries, and banks customer base significantly expanded since fewer but larger banks remained in the industries. There was huge shift to virtual business as banks deemed Web as an alternative means of maintaining customer base and loyalty. Although financial institutions took initiative to implement e-banking services in mid 1990s, it was opposed by the consumer to conduct financial transactions over the internet. The usage of online payment was actually widespread among online business such as America Online, Amazon.com and eBay. Yet 80% of U.S. banks succeed to engage with e-banking by year 2000 (Sharma, 2014). Subsequently, banks recognized the rising popularity of internet as advertising tools as time goes on. Initially internet was merely used as brochure to deliver information without two ways interaction between consumer and financial service providers. Consumers can only retrieve the image of banks officers or building, the location of branches and ATM, the contact number and information of the products. In 1995, Wells Fargo was the first bank in U.S. to launch account services in their website and other banks followed the step thereafter. Since then, the usages of online banking grow extensively.

In Malaysia, electronic banking started to commence with the introduction of Automated Teller Machine (ATM's) in 1980s, followed by telebanking in 1990s. In 2000, Bank Negara Malaysia (BNM) announced that Malayan Banking Berhad (Maybank) as the first bank that offered Internet Banking services in Malaysia followed by Hong Leong Bank Berhad (Hamid et al., 2007). The tables below illustrate the payment services provided by local commercial banks in Malaysia focusing on Internet Banking as well as mobile banking services for individual and business entity as of 2016.

Table 1.1

Selected e-payment services for Retail as of 2016 provided by local commercial banks

Banks	Interbank GIRO*	Real-time Interbank Fund Transfer*	RENTAS*	Financial Process Exchange	Interbank Direct Debit
Affin Bank Berhad	Yes	Yes	No	No	No
Alliance Bank Malaysia Berhad	Yes	Yes	No	No	No
AmBank (M) Berhad	Yes	No	No	No	No
CIMB Bank Berhad	Yes	Yes	No	Yes	Yes
Hong Leong Bank Berhad	Yes	Yes	No	Yes	Yes
Malayan Banking Berhad	Yes	Yes	No	Yes	Yes
Public Bank Berhad	Yes	Yes	Yes	Yes	Yes
RHB Bank Berhad	Yes	Yes	No	Yes	Yes

Note: Yes = Offering; No = Not Offering; RENTAS = Real Time Electronics Transfer of Funds and Securities; * = only included payment service provided by Internet and mobile banking, the information of payment services from ATM and over the counter are omitted

Sources: Bank Negara Malaysia (2016), retrieved from http://www.bnm.gov.my/index.php?ch=ps&pg=ps_epayment&ac=431&lang=en

Table 1.2

Selected e-payment services for Business as of 2016 provided by local commercial banks

Banks	Interbank GIRO*		Real-time Interbank Fund Transfer*		RENTAS*		Financial Process Exchange	Interbank Direct Debit
	(a)	(b)	(a)	(b)	(a)	(b)		
Affin Bank Berhad	Yes	Yes	No	No	Yes	Yes	Yes	No
Alliance Bank Malaysia Berhad	Yes	Yes	No	No	Yes	Yes	No	No
AmBank (M) Berhad	Yes	Yes	No	No	Yes	Yes	No	No
CIMB Bank Berhad	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Hong Leong Bank Berhad	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Malayan Banking Berhad	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Public Bank Berhad	Yes	Yes	Yes	Yes	No	No	Yes	Yes
RHB Bank Berhad	Yes	Yes	No	No	Yes	Yes	Yes	Yes

Note: Yes = Offering; No = Not Offering; RENTAS = Real Time Electronics Transfer of Funds and Securities; * = only included payment service provided by Internet and mobile banking, the information of payment services from ATM and Over the counter are omitted; (a) = Sole-proprietors, partnerships and SMEs; (b) = Other corporates

Sources: Bank Negara Malaysia (2016), retrieved from http://www.bnm.gov.my/index.php?ch=ps&pg=ps_epayment&ac=431&lang=en

As of 2016, all eight registered local commercial banks in Malaysia provide Internet Banking services and only six of them provide mobile banking services.

Table 1.3
Lists of Local Commercial Banks Offering Internet and Mobile Banking Services

	Internet Banking	Mobile Banking
Affin Bank Berhad	Yes	No
Alliance Bank Malaysia Berhad	Yes	No
AmBank (M) Berhad	Yes	Yes
CIMB Bank Berhad	Yes	Yes
Hong Leong Bank Berhad	Yes	Yes
Malayan Banking Berhad	Yes	Yes
Public Bank Berhad	Yes	Yes
RHB Bank Berhad	Yes	Yes

Note: Yes = Offerings; No = Not Offering

Source: Bank Negara Malaysia (2016), retrieved from http://www.bnm.gov.my/index.php?ch=ps&pg=ps_regulatees

According to the figure as shown below, in Malaysia, Internet Banking subscribers increase substantially in the past 11 years. Individual who subscribed to Internet Banking increased tremendously by 780%, from 2.5 million in 2005 to 22.0 million in 2016. As for business entities, except for zero subscriber in year 2006, the number of subscribers of Internet Banking increased steadily from 0.1 million in 2005 to 0.8 million in 2016. Internet Banking services penetrate only around 10% of the population in Malaysia in the early stage of introduction due to low acceptance among individual and business. Nonetheless, Internet Banking gradually gaining its position among individual and business entities in Malaysia and succeeds achieved 72% population penetration in 2016 (Bank Negara Malaysia, 2016).

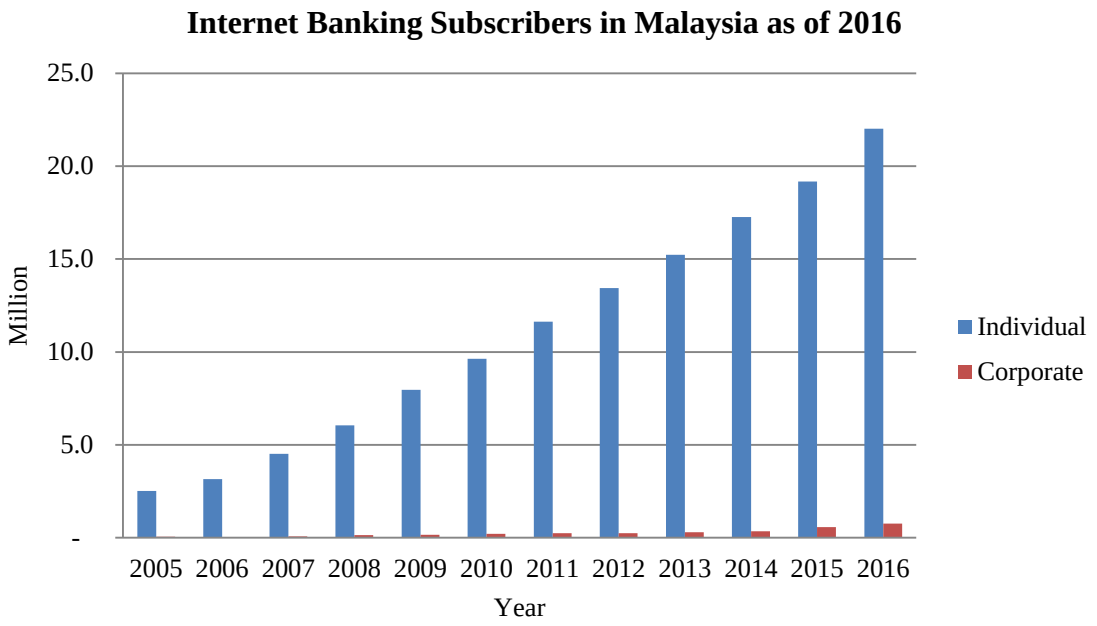

Figure 1.1
Internet Banking Subscribers in Malaysia as of 2016
Source: Bank Negara Malaysia (2016), retrieved from http://www.bnm.gov.my/index.php?ch=ps&pg=ps_stats&lang=en

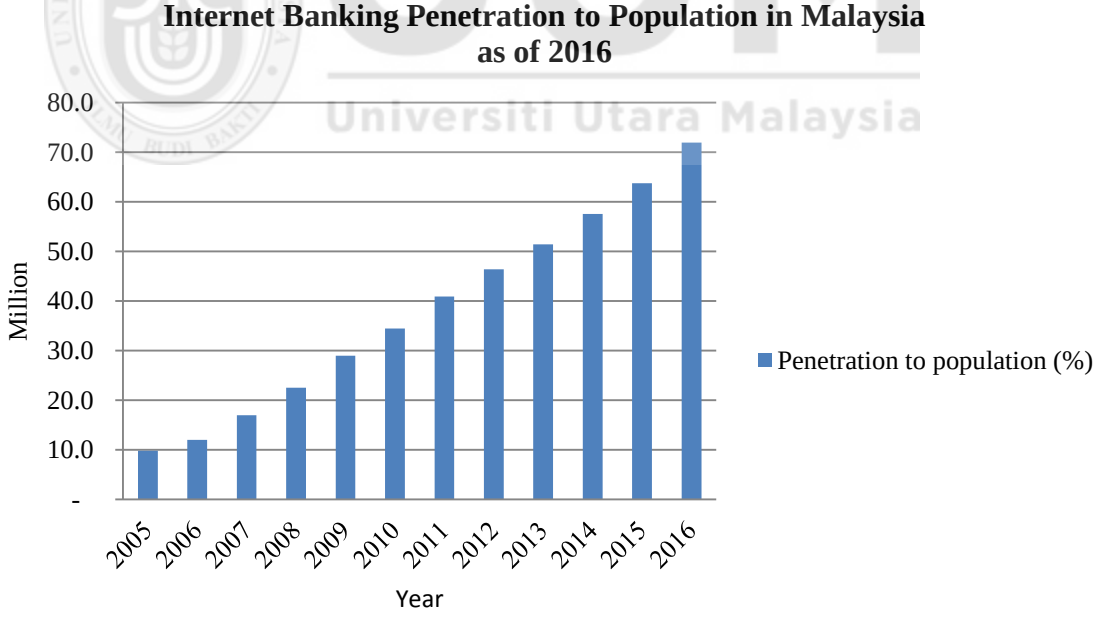

Figure 1.2
Internet Banking Penetration to Population in Malaysia as of 2016
Source: Bank Negara Malaysia (2016), retrieved from http://www.bnm.gov.my/index.php?ch=ps&pg=ps_stats&lang=en

Social media refers to the websites and applications that enable the users to construct and share information or to interact in social networking. Social networking, microblogging, Wikis are among types of social media platforms available for different usage. In 2016, more than 68 per cent of internet users worldwide accessing social media services online and the penetration are expected to increase in the future (www.statista.com). The emergence of mobile apps such as Facebook, Messenger, Twitter, Pinterest, Google and so on, further optimizing the use of mobile social networks.

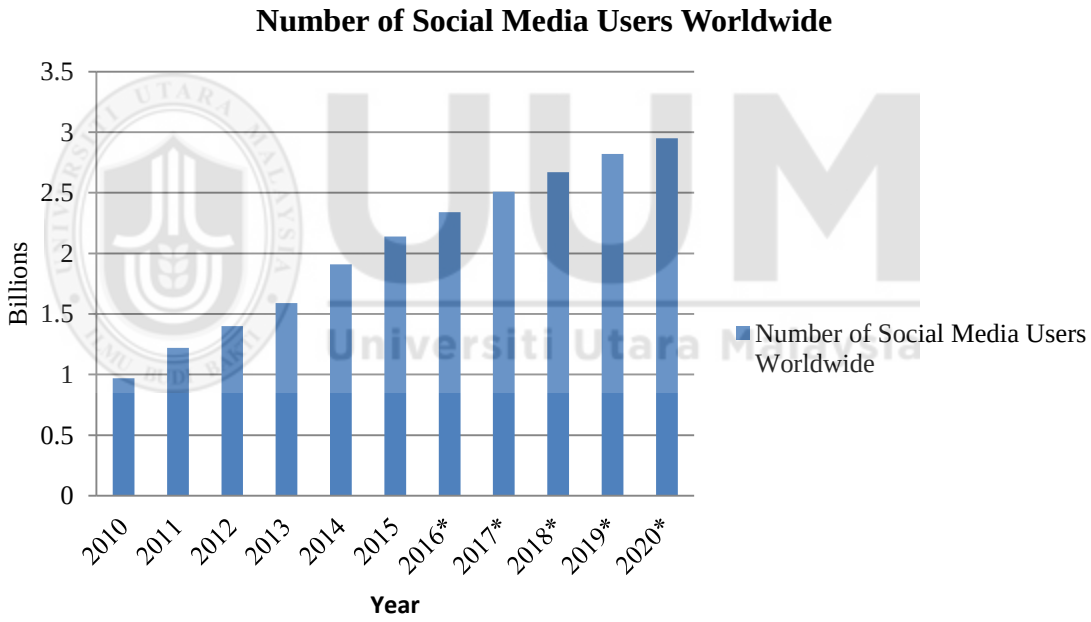

Figure 1.3
Number of Social Media Users Worldwide
Note: * refers to estimated value
Source: Statista (n.d.), retrieved February 23, 2017 from https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/

Traditional media has been use widely as a form of communications strategies and marketing tools in the early century. However, the effect of traditional media for instance, printed media articles and TV coverage are diminishing with the emergence of

the social media (online platforms and forums). Social media has changed people's way of life because of its ease of use whereby people get to access to current trend and news almost instantaneously while in mean time, to stay connected with friends and family at the cheapest and fastest approach. Human desire to keep update with current news or the fear of being not connected to people around them contributed to the increasing usage of social media platform.

Traditional media exerted stronger influence on brand awareness while social media have stronger positive impact on brand image (Bruhn, Schoenmueller & Schäfer, 2012). Moreover, the impacts generated by firm-created social media communication and user-generated social media communication are opposing by which one affects functional brand image while the later one creates major influence on hedonic[1] brand image (Bruhn, Schoenmueller & Schäfer, 2012). Typically, traditional media or firm-created communication transmits only information that generates positive influence on brand awareness as part of attaining corporate's marketing goal. While user-generated communication are more acceptable to the public as this form of communication is more trustworthy, non-bias and free from company influence. However, user-generated communication does not necessarily guarantee positive influence but it will increase consumer awareness towards the brand, regardless the opinion is positive or negative. Furthermore, consumer's purchasing decision of the product advertised on social media is greatly affected by corporate reputation (Boateng & Okoe, 2015), in which consumer will respond positively towards social media advertisement of the company with a good corporate image. Therefore, with the emergence of user-generated communication,

[1] The degree of positive or negative valence associated with a given circumstances, subject or state.

corporation has lost the ability to influence consumer attitude and opinion as well as corporate reputation. Social media is creating an opportunity for consumer to participate and to interact actively with corporation to better address their needs.

The fear of missing out has led to the increasing demand for mobile devices and mobile internet. As of 2015, worldwide mobile phone internet user penetration was 52.7 per cent and this figure is expected to increase in the future (www.statista.com). Internet and mobile device usage has assimilated into the daily life of people nowadays, which in turn lifts the popularity of social network. For instance, Facebook is currently the biggest social network provider with more than 1.87 billion monthly active users globally as of January 2017 (www.statista.com) while Twitter had 305 million monthly active users as of 2015 (www.statista.com). The transitions in the usage of internet have urged business organization to reinterpret their business model. Digital marketing and advertising are gaining popularity with the increasing internet user globally. For instance, Google as the world top search engine, more than 90 per cent of the company revenues are generated through advertising, amounting up to roughly 33.3 per cent of the digital revenues worldwide (www.statista.com).

Social media was initially used as marketing tools by business corporations. In line with that, Central Bank of Malaysia or commonly known as Bank Negara Malaysia as well as Malaysia local commercial banks are keeping in pace with current trend and establish social media platforms to deliver a more interactive customer services. The official website of Bank Negara Malaysia provides user with news, statistics, publications, foreign exchange rates, daily interbank rates, KLSE indices and so on, however the amount of the information that reach consumers is somehow limited as it is

rare for a person to browse Bank Negara website every single day. Hence, Bank Negara Malaysia established social media platforms like Facebook, Twitter, YouTube, RSS, Pinterest, Flickr and Linkedin to increase exposure and awareness of the public as well as to reach the nation directly. Basically, Facebook, Twitter and YouTube are the major social media platforms used by Malaysia's local commercial banks to deliver information about the products and services, updated news or to interact with consumers. Since year 2010, local commercial banks in Malaysia started to engage in social media in order to improve their market presence. For instance, Malayan Banking (Maybank) as the largest bank in Malaysia is actively engaging in social media platforms such as Facebook with about 1.98 million followers as of February 2017. Other than Facebook, Maybank shares and upload commercials, educational, research, products and services or even some useful financial tips for the public in their YouTube channels. Hence, social media serves as an alternative channel for delivering messages and engaging with customer services.

Nonetheless, Malaysian is keen internet user in which the internet penetration among Malaysian was 68.6 per cent as of July 2016 (Statista, 2016). With current 39 per cent of Malaysia's population accessed to social media (www.statista.com), social media can be used as alternative tools in enhancing the relationship between the consumers and financial service providers. Customer relationship management (CRM) is an integrated approach to manage the relationships in combination of people, processes and technology, concentrating on relationship development and customer retention (Chen & Popovich, 2003). Effective CRM will reap the rewards in term of customer loyalty and long run profitability (Chen & Popovich, 2003).

In Malaysia, Bank Negara Malaysia (BNM) released the Financial Sector blueprint 2011-2020 to visualize the direction of financial system over ten years. One of the focus areas of Financial Sector blueprint is to empower consumers through a comprehensive approach towards consumer education and protection. This focus area aims to promote sense of mutual responsibility between financial service providers and consumers. For instance, financial service providers should be fair and responsible in conducting their business while consumers shall be well equipped with financial knowledge and skills to manage their wealth. Apart from that, currently, in Malaysia, Communications and Multimedia Act 1998 is implemented to serve as a benchmark and to monitor the compliance with the standards by the content providers. Therefore, whatever information provided by the banks to the public is being monitored. However, consumers are concerning more about the safety of Internet Banking. Although Personal Data Protection Act 2010 serves to regulate the processing of personal data in commercial transactions, it does not emphasize about the security of Internet Banking. Currently, BNM are reviewing the guidelines on the Provision of Internet Banking Services, and, hopefully this guideline will strengthen internet security for the sake of public.

1.2 Problem Statement

International financial markets are susceptible to greater volatility in year 2016 due to the increased downside risks considering the impacts from the EU referendum in United Kingdom. In Asia, although domestic demand remains stable, the dimness in

external sector actually hinders the growth. Hence, in 2016, Bank Negara Malaysia decided to reduce Overnight Policy Rate (OPR) by 25 basis points to 3.00 per cent to withstand the moderating growth momentum of major economies. Reduction in OPR rate will results in the decrease of the base rate which in turn affecting the deposits rate. Hence, banks are foreseen to suffer from margin compression. Net Interest Margin (NIM) of banking sector in Malaysia is expected to be under compression due to higher funding costs and deposit competition (DBS Group Research, 2015). Moreover, the implementation of GST beginning 1st April 2015 caused the prices of general products to increase as producers pass down the full value of taxes to end consumer at the final stage. With the increasing cost of living, people either limit their purchasing power or the ability to save reduced. Hence, banks' core deposit including current account, savings account and fixed deposits account remains fragile due to the financial crisis (DBS Group Research, 2016). Deposits are the major source of income to the banks, especially commercial banks. Banks will eventually lose it core function as financial intermediary if the situation persist, as there is no sufficient surplus to fund the deficit. Low money supply in the market discourages business expansion or investment, reduce in employment rate, limit consumer purchasing power which in turn slow down the economy growth. Thus, banks have to undertake initiative in order to maintain sufficient surplus to enhance banks' performance as well as economy growth.

In year 2016, several local commercial banks in Malaysia, such as Malayan Banking Berhad (Maybank), CIMB Bank Berhad, RHB Bank Berhad closed down the bank with low demand and reduced workforce in order to be more cost-efficient. Banks are emphasizing more on the growth of financial technology (fintech), converting the

traditional physical branch into digital space. Internet Banking together with the use of social media platform is a new wave hitting banking industries. The integration of this two medium in banking services produce pros and cons to banks and consumers. Internet Banking increase the ease of financial transaction, in which the transactions can be conducted virtually anywhere and anytime, require only internet accessibility. Other than the increase in transaction efficiency, the introduction of Internet Banking and social media lead to direct cost reduction. For instance, with the use of Internet Banking, less physical branch is needed while social media allows consumers to interact with banks officer through live chat, emails or forums. The cost savings can be passing down to consumer in the form of higher deposits return or lower interest expenses. Despite the perceived benefits associated with the use of Internet Banking, security is one of the major concerns in Internet Banking services. Internet Banking users are exposed to phishing, malware or the risk of being hacked by unauthorized person. Although banks are doing their best effort to keep its online channel secure, unfortunately no system is prefect, there is still loophole that hackers can hack into user account and gain access to their personal information. As from the bank perspective, the implementation of Internet Banking lowered banks' interest income as the result of increased competition (Onay & Ozsoz, 2013). Furthermore, compared to traditional media, Malaysians spend around 8+ hours per day online (Global Web Index, 2014). Besides, 70% of Malaysian end users would refer to a brand's social media presence before making decision (PwC, 2014). However, 69% of Malaysian businesses are "fairly active" on social media, and merely 42% track its impact on performance (PwC, 2014). Despite highly engaging to online activities, the impact of social media on bank profitability remains unknown.

Research has been conducted to measure the impact Internet Banking on bank's performance (Kombe, & Wafula, 2015; Le, Van, & Le, 2015; Onay, & Ozsoz, 2013; Gautam, 2012 Mohammad, & Saad, 2011). While previous studies also measured the use of social media in business (Jones, Borgman, & Ulusoy, 2015) or banking (Kirakosyan, 2014; Tsitsi Chikandiwa, Contogiannis, & Jembere, 2013). However, very few studies have combined both Internet Banking and social media in analyzing the impact on banks profitability. Besides, previous studies (Jones et al., 2015; Kirakosyan, 2014; Tsitsi Chikandiwa et al., 2013; Mitic and Kapoulas, 2012) measured the impact of social media on business or bank performance through interviews, survey or case study, which focus more on the use of primary data. There is least study that uses secondary data to measure the impact of Internet Banking and social media on bank profitability.

Hence, this study aims to fill the gaps by statistically prove the importance of Internet Banking and social media toward banking industry in Malaysia. This study will focus on the use of secondary data through unbalanced panel data analysis to measure the relationship of Internet Banking and social media on bank performance in Malaysia. In short, limited studies about this issue have been conducted in Malaysia; therefore this paper will contribute toward literature review of Internet Banking and social media influence on banking industry in Malaysia as well as Asia.

1.3 Research Questions

Based on research problem statement above, the research questions are:

i. Does Internet Banking affect the profitability of local commercial banks in Malaysia?
ii. Do social media significantly affect the profitability of local commercial banks in Malaysia?

1.4 Research Objectives

Based on research questions above, the research objectives are:

i. To investigate the relationship between Internet Banking practice and profitability of local commercial banks in Malaysia.
ii. To analyze the relationship between social media adoption and profitability of local commercial banks in Malaysia.

1.5 Significance of Study

The findings of this study aim to contribute toward academic, industry and policy maker. First, apart from the majority previous research that focus on the impact of Electronic-Banking on profitability of the bank, this paper adopt a wider approach by taking both Internet Banking and social media into consideration to analyze their impacts toward Malaysia local commercial bank's profitability as a whole. Since the

usage of social media in Business Corporation and banking industry is gaining popularity recently, the results of this study aim to contribute to the literature regarding the impact of Internet Banking and social media on banking industry in Malaysia and Asia.

Second, the findings of this study will provide some useful insights to the industry player regarding the importance of integrating technology in enhancing the profits of banks. Therefore, the results of this study aim to serve as valuable guiding principles to banking industry to upgrade not only their marketing strategies but also operational efficiency of the banks through latest technology with high security. Besides, this study is also helpful for future research to focusing more in increasing banks' profit using technology and provides a mean for the banks to conduct a more intensive training with bank officers to increase the efficiency and familiarity with technological revolution.

Thirdly, hopefully this research is useful in facilitating the policy maker to draft or to enhance current policy regarding Internet Banking and social media usage by corporations or banking industry. Although in Malaysia, Communication and Multimedia Act 1998, Personal Data Protection Act 2010 and Provision of Internet Banking Services seek to protect consumer in term of the validity and accuracy of the information received, the confidentiality of their personal information as well as the safety of Internet Banking respectively. Nonetheless, the financial awareness of the nation should not be neglected. Hence, policy maker together with the industry player in Malaysia shall conduct workshop, seminar or training to understand the needs and wants

of the public while increasing the awareness of the public regarding the issues of financial scams.

1.6 Scope of Study

This study adopts micro-based approach to examine the impact of Internet Banking and social media adoption on the profitability of local commercial bank in Malaysia. Scope of this study encompasses all eight local commercial banks in Malaysia with the periods of study ranging from 1998-2016. Unbalanced panel data approach in combination with ratio analysis is used in this study. Data is retrieved from the financial statements of respective local commercial bank in Malaysia.

1.7 Organization of Study

The study is organized as follow; chapter two consists of extensive examination on the review of literature. Next, chapter three concentrated on discussing the data description and the methodological aspect of the study. Chapter four provided the results and discussion of the empirical analysis as well as the nature of our findings. Finally, chapter five highlighted the summary by providing the conclusion, policy implications and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews about previous study conducted by scholars and their findings toward bank profitability, the impact of online banking on bank performance, the incorporation of social media in improving the performance as well as the measurement of bank specific determinants.

2.2 Consumer Behavior Theory

Consumer behavior is the study of the process of selecting, securing, using and disposing of products, service, experiences, and ideas by individuals, groups, or organizations to fulfill their needs and wants. Hence, consumer behavior relates to the understanding of by what means purchasing decision is made and in what way products or services are consumed or experienced. There is no single theory which unify in explaining consumer behavior, and each consumer behavior theory serves as a unique piece in explaining the psychological processes of consumer and their consumption patterns.

In keeping pace with current trend, banks are incorporating more technology in banking transactions and customer services. The introduction of Internet Banking and social media in banking industries creates new challenges and opportunities to the banks.

Banks have to deal with digitalized process while fulfilling consumers with different needs and online experience. There are rising expectations in term of time savings associated with the use of Internet Banking. Besides, consumer values including the level of tolerance for personal data abuse, the requirement on quality of the services and engagement to certain brand are the area of focus of banks. Social media provides not only the advertisement about the products and services, but also the reviews on the products and services as well as consumer's experience with the bank. Hence, banks need to keep track on the use of Internet Banking and social media in order to build long-term relationship with their customer.

2.3 Bank Profitability (Dependent Variable)

2.3.1 Net Interest Margin (NIM)

Profitability is the measure of the ability to generate revenue in excess of expenses with available resources (www.myaccountingcourse.com). Hence, banks' profitability is associated with the success of management in managing its assets (loans) and liabilities (deposits). Ratios are use as dependent variables as they are generally inflation-invariant. Previous studies focusing more on the use of Return on Assets (ROA) and Return on Equity (ROE) as the key determinants of banks' profitability (Boadi, Li, & Lartey, 2016; Gizaw, Kebede, & Selvaraj 2015; Shahidul & Shin-Ichi, 2015). However, the use of Net Interest Margin (NIM) is gaining popularity recently (Tan, Floros, & Anchor, 2017; Garcia & Guerreiro, 2016; Menicucci & Paolucci, 2016; Zarrouk, Ben Jedidia, & Moualhi, 2016; Ong & Teh, 2013). As compared to

conservative measures of profitability like Return on Average Equity (ROAE) and Return on Average Assets (ROAA), Net Interest Margin (NIM) is a better measurement of bank profitability (Heffernan & Fu, 2010). Net Interest Margin is the key indicator of bank performance because it includes the cost of lending and borrowing within the financial system (Aysen Doyran, 2013).

Net Interest Margin (NIM) is expressed as net interest income divided by total assets. While net interest income is the differential between interest income generated (i.e. from loans, financial assets, financial investment) and the interest expense paid (i.e. to deposits from customers or financial institution). Net Interest Margin measures not only the profit that banks generate from interest generating business activities, but also the efficiency of the bank in managing their assets and liabilities. High Net Interest Margin seem to be favorable, however higher Net Interest Margin is associated with higher operating expenses (Aysen Doyran, 2013), which in turn lower the earnings of banks. Thus, bank undergoes diversification in term of products and services to reduce the operating costs, to expand their business, to differentiate themselves among the industry players as well as to stay competitive (Menicucci & Paolucci, 2016). Diversification did improve the performance of bank in term of cost reduction via economies of scale, however it imposes negative impact on Net Interest Margin of the bank as less fund are being allocated for traditional loan deposit services (Tan et al., 2017).

2.4 Determinants of Bank Profitability (Independent Variables)

2.4.1 Internet Banking

With network and technology advancement, and the increasing competition between the banks, internet banking has emerged as a virtue mean of conducting financial transaction without a physical branch. Banks with lower market share see Internet Banking as a mean of new delivery channel to attract larger customer base (Malhotra & Singh, 2007). Electronic banking or Internet Banking proved to increase the profitability of banks (Le, Van, & Le, 2015; Gautam, 2012; Acharya, Kagan, & Rao Lingam, 2008). And the decision to adopt Internet Banking is highly influence by the adoption made by other banks (Malhotra & Singh, 2007). Despite the improvement in term of bank profitability, banks have to allocate larger expenses for basic infrastructural costs associated with the implementation of Internet Banking including the costs of hardware and software equipment, training program and the salary of expert (Gautam, 2012). Nonetheless, the introduction of Internet Banking indeed improves bank's performance in term of lower transactions costs, time reductions and enhanced quality of services (Kombe & Wafula, 2015; Gautam, 2012). Internet Banking has made banking services available at any point in time, and thus enhanced customers' loyalty and sense of security (Kombe & Wafula, 2015).

In Malaysia, the decision to close down the branch with low demand was due to high overhead expenses, to boost revenue and to move toward digital banking (Maybank, 2016). Cost effectiveness is positively associated with the banks' profit (Tan et al., 2017; Zarrouk et al., 2016; Gautam, 2012). In addition, with the transition into a more

technology base operations, banks seek to achieve greater cost efficiency in order to cope with increasing competition among the industry player by implementing measures like career transition scheme (CTS) or mutual separation scheme (MSS) to reduce the workforce. However, employees are the key determinants of bank's revenue as operating costs are associated with the number of employees (Wu & Dash Wu, 2010). Hence, bank managers' decision to penetrate online banking market shall be carefully justify as the inadequate use employees will pose substantial risks to the banks and thus affecting the survival of the banks (Wu & Dash Wu, 2010).

Contrarily, previous studies also proved that Internet Banking has negative impact on bank profitability (Al-Smadi & Al-wabel, 2015; Onay & Ozsoz, 2013; Mohammad & Saad, 2011) as implementation of Internet Banking has resulted in the increase of competition and thus lower interest income of bank (Onay & Ozsoz, 2013). Furthermore, Internet banking adoption does not guarantee reduction in cost and generate less impact on the revenue (Al-Smadi & Al-wabel, 2015; Kombe & Wafula, 2015; Le et al., 2015; Mohammad & Saad, 2011, Wu & Dash Wu, 2010). The effect of Internet Banking on operating costs is insignificant as Internet Banking serve as a delivery channel which complement rather than substitute the function of traditional distribution channels (Le et al., 2015).

2.4.2 Social Media

Social media is a form of communication through which users build online communities to share information, news, thoughts, personal messages, video and other contents (Merriam-Webster, 2016). Given the rise of social media usage and the

growing push of financial technology (fintech), banks integrate more with interactive features such as Facebook, Twitter and so on. Social media has several perceive benefits including; the channel to raise awareness and encourage enquiries, promote customer relationship, attract new customer, expand customer range to international level and improve corporate image (Jones, Borgman, & Ulusoy, 2015). Ages (Durkin, Mulholland, & McCartan, 2015), cultural habits, economic conditions (Kirakosyan, 2014) influence the usage and implementation of social media in banks. Youngsters (15-30 ages) seek to obtain real-time information compared to older generations (31-60 age) who look for the upcoming events or competition from the bank's Facebook (Durkin et al., 2015). Although the usage of social media in banks is still at initial stage, Facebook and Twitter are used as main tools for advertisement and customer services (Tsitsi Chikandiwa, Contogiannis, & Jembre, 2013). Despite the perceived usefulness of social media platform, some customers still reframe from engaging in social media due to lower demand for interaction with bank, security concerns and lack of alignment with current Relationship Marketing strategies (Mitic & Kapoulas, 2012). The use of social media does not confined only to bigger bank, it can serves as an innovative way for smaller or newly establish bank to increase their market position (Mitic & Kapoulas, 2012).

Social media is strongly positively related to organization's performance in term of cost reduction, improved customer relations and services, and enhanced information accessibility (Parveen, Jaafar, & Ainin, 2016). Customers tend to do web search about the services, even they are already near to the premises, and hence web presence is essential to attract local and regional consumers (Jones et al., 2015). Social media and web pages are advantageous compared to conventional approach as it attracts more

customers for free or at relatively lower cost (Jones et al., 2015; Hanna, Rohm, & Crittenden, 2011). With social media platforms such as Facebook reaching billions of users globally, companies can reach and engage with people effortlessly. Despite the ease of use, banks need to follow precisely public responses and comments toward bank. This is because the adverse influences of negative blogs come into effect faster than benefits of positive blogs (Luo, Zhang, & Duan, 2013). Thus, banks have to undertake necessary corrective measure to mitigate potential adverse impact of the negative posts on bank's future performance. Other than higher level of exposure, web pages and social media contributed to the increased sales and repeat sales of the business (Jones et al., 2015). Business get to know customers and address their needs better with the assistance of social media. Besides, social media is a major indicator of bank equity value because it has better predictive value than conventional online behavioral metrics such as Google search engine (Luo et al., 2013).

Often, company that engage in social media platforms such as Facebook, YouTube and Twitter treat this strategies as a stand-alone component rather than part of an integrated system (Hanna et al., 2011). Thus, firm need to define key area associated with firm specific environment and quantifies the related metrics such as sales volume and brand recognition. Firm focusing on increasing consumer ratings and reducing variation of the ratings could reap the return in term of firm future return (Luo et al., 2013). The integration of social media with traditional media is essential (Tsitsi Chikandiwa et al., 2013) although the real economic impact of social media towards bank profitability is yet to be proven.

2.5 Bank Specific Determinants (Control Variables)

2.5.1 Loan Deposit Ratio (LDR)

Loans are major source of interest income to the bank, especially commercial banks. Banks cover interest payment to liabilities (deposits) through the return from assets (loans). Business lending is statistically significant toward bank profits although there are systematic differences among bank (Ekpu & Paloni, 2016). Hence, Loan Deposit Ratio (LDR) measures not only the liquidity of the banks but also the impact of banks' assets on its profitability. Loan Deposit Ratio (liquidity ratio) is expected to impose positive impact on bank profitability as liabilities (deposits) are transformed into assets (loans). Previous study indicated that Loan Deposit Ratio is positively significant towards Return on Assets and Return on Equity of the banks (Laryea, Ntow-Gyamfi, & Alu, 2016). And liquidity risk is proved to be positively related to Net Interest Margin (Tan et al., 2017). Conversely, as against positive expectation, Loan Deposit Ratio is proved to be negatively significant towards Return on Assets and Return on Equity of the banks (Islam & Nishiyama, 2016). Despite the significant relationship proved by some previous studies, Loan Deposit Ratio also proved to be insignificant towards the performance of banks in term of Return on Assets, Return on Equity (Gizaw et al., 2015; Hamid & Azmi, 2011; Kumbirai & Webb, 2010) and Cost to income ratio (C/I) (Kumbirai & Webb, 2010).

2.5.2 Loan Loss Provisions over Total Loans (LLPOTL)

Loan loss provisions are the measure of bank's asset quality as it reflects the level of credit risk the bank is currently holding. Credit risk is proved to have negative

impact on bank profitability (Tan et al., 2017). Loan loss provisions have been used as determinant of bank performance in previous study (Garcia & Guerreiro, 2016; Menicucci & Paolucci, 2016; Gizaw et al., 2015; Ong & Teh, 2013; Staikouras & Wood, 2011; Kumbirai & Webb, 2010). Loan loss provisions can be used as an indicator of bank's asset quality as higher loan loss provisions indicate the possible deterioration of bank's assets. Banks need to allocate portion of its profit to cover expected default and this subsequently lower the net income of banks. Thus, loan loss provisions have negative relationship with bank profitability (Tan et al., 2017; Ekpu & Paloni, 2016; Menicucci & Paolucci, 2016; Zarrouk et al., 2016; Wasiuzzaman & Tarmizi, 2010).

However, the effect of loan loss provisions on different bank profitability measures is inconsistence across the studies. For instance, loan loss provisions are proved to have inverse relationship with Return on Assets, Return on Equity (Ong & Teh, 2013; Zarrouk et al., 2016) and Net Profit Margin (Zarrouk et al., 2016). Contradict to major studies (Tan et al., 2017; Ekpu & Paloni, 2016; Menicucci & Paolucci, 2016; Zarrouk et al., 2016; Wasiuzzaman & Tarmizi, 2010), loan loss provisions are found to be positively significant in improving the performance of bank (Heffernan & Fu, 2010). Loan loss provisions are positively significant toward Return on Assets (Gizaw et al., 2015; Heffernan & Fu, 2010), Return on Equity (Gizaw et al., 2015) and Net Interest Margin (Ong & Teh, 2013; Heffernan & Fu, 2010). The different effects of loan loss provisions on bank profitability could be possibly attribute to the risk appetite or the increasing level of undeclared bad debts of the respective bank (Heffernan & Fu, 2010). Risk adverse bank will be more cautious about loan's quality and thus setting lower loan loss provisions while high risk taking bank would opt for immediate profit return and

allocate larger provisions for losses. Besides, undeclared bad debts will generate a false projection on the bank's income statement at which in fact the profit is overstated. Although high loan ratio contributes toward banks' profit (Menicucci & Paolucci, 2016; Zarrouk et al., 2016), however if the provisions for loan loss is too high, it will net out the banks' profitability (Menicucci & Paolucci, 2016).

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter consists of three main subsections: (i) population and sample of study, (ii) econometric model, theoretical framework and (iii) research design. A combination of appropriate analysis will generate clear and concise findings.

3.2 Population and Sample Size

A sample of eight local commercial banks in Malaysia is selected to determine the impact of Internet Banking and social media adoption on bank profitability. Financial data is retrieved from publicly disclosed financial statement of local commercial banks in Malaysia for a period ranging from 1998 to 2016. While the period on which the respective bank started to implement Internet Banking services and engaging in social media platform (Facebook, YouTube, or Twitter) are recorded in the form of dummy variables. The ratios used in this study and the period of Internet Banking commencement are retrieved manually from balance sheet, income statement as well as chairman's statement or announcement of the respective bank. While the period on which the respective bank engaged in social media is retrieved directly from social media platform (Facebook, YouTube or Twitter). SPSS software is used to conduct

quantitative analysis to explain the relationship between dependent variable and independent variables.

Table 3.1
Period of study for each respective local commercial bank

Bank	Period	No. of Years
Affin Bank Berhad	1998-2015	18
Alliance Bank Malaysia Berhad	2000-2016	17
AmBank (M) Berhad	1999-2016	18
CIMB Bank Berhad	1998-2015	18
Hong Leong Bank Berhad	1999-2016	18
Malayan Banking Berhad	1999-2015	17
Public Bank Berhad	2003-2015	13
RHB Bank Berhad	1999-2015	17

Therefore, unbalanced panel data is used in this study due to the availability of the data.

3.3 Econometric Model

A multiple regression model is formulated based on the objective of the study to determine the impact of Internet Banking and social media adoption on the profitability of local commercial banks in Malaysia.

$$\boldsymbol{NIM_{it} = \alpha_0 + \delta_1 IB_{it} + \delta_2 SM_{it} + \beta_3 LDR_{it} + \beta_4 LLPOTL_{it} + \varepsilon_{it}}$$

Where

$i = 1, \ldots n$ *is the individual* $(group)$*index*

$t = 1, \ldots T$ *is the time index*

$\varepsilon_{it} = random\ disturbance\ term\ of\ mean\ 0$

$\alpha_0 = constant\ term$

$\delta_n =\ \delta\ is\ the\ coefficient\ of\ dummy\ variables; n = 1,2,3,4\ ....$

$\beta_n =\ \beta\ is\ the\ coefficient\ of\ variable; n = 1,2,3,4\ ....$

$NIM_{it} =\ Net\ interest\ margin\ at\ a\ period\ of\ time\ t$

IB_{it}

$=\ Dummy\ variable\ that\ equals\ 1\ \ for\ Internet\ Banking\ adoptions\ and\ 0\ otherwise\ \ at\ a\ period\ of\ time\ t$

SM_{it}

$=\ Dummy\ variable\ that\ equals\ 1\ for\ social\ media\ adoptions\ and\ 0\ otherwise\ \ at\ a\ period\ of\ time\ t$

$LDR_{it} = Loan\ deposit\ ratio\ at\ a\ period\ of\ time\ t$

$LLPOTL_{it} =\ Loan\ loss\ provision\ o\ at\ a\ period\ of\ time\ t$

3.4 Theoretical Framework

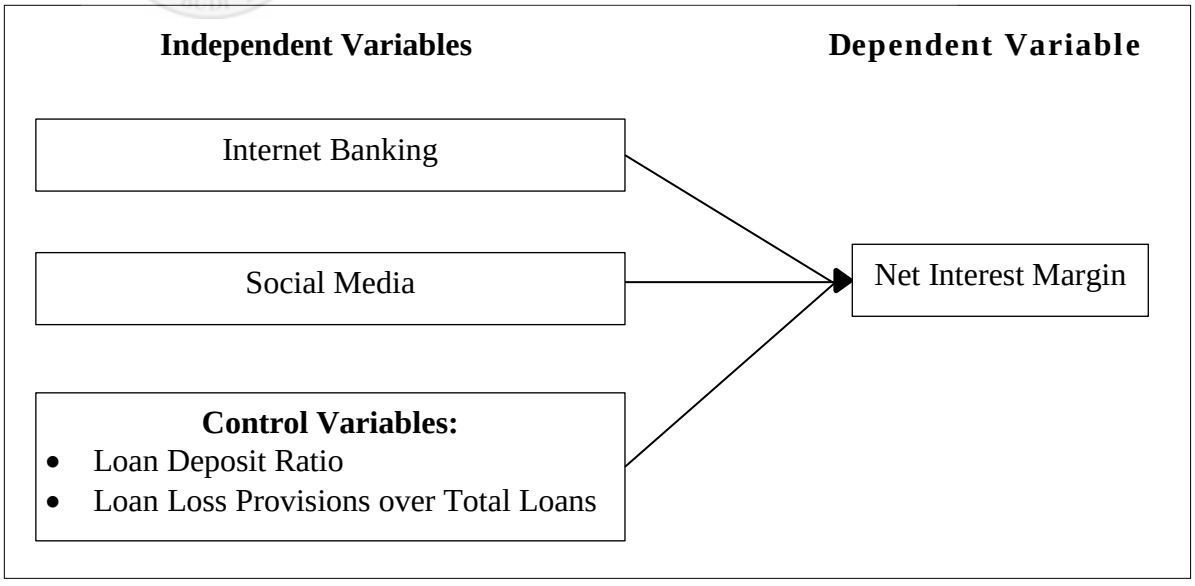

Figure 3.1
The relationship between the Dependent Variable, Independent Variables and Control Variables

Table 3.2
Description of Variables

Variable	Measure	Expected effect on profitability	Author(s)
Dependent Variable			
Net Interest Margin	Net interest income/ Total assets	N/A	Tan, Floros, and Anchor (2017); Garcia and Guerreiro (2016); Menicucci and Paolucci (2016); Zarrouk, Ben Jedidia, and Moualhi (2016); Ong and Teh (2013); Aysen Doyran (2013); Heffernan and Fu (2010)
Independent Variables			
Internet Banking	Dummy variable that equals 1 if bank adopts Internet Banking and 0 otherwise	+	Al-Smadi and Al-wabel (2015); Kombe and Wafula (2015); Le, Van, and Le (2015); Onay and Ozsoz (2013); Gautam (2012); Mohammad and Saad (2011); Acharya, Kagan, and Rao Lingam (2008)
Social Media	Dummy variable that equals 1 if bank adopts social media and 0 otherwise	+	Parveen, Jaafar, and Ainin (2016); Durkin, Mulholland, and McCartan, (2015); Jones, Borgman, and Ulusoy (2015); Kirakosyan (2014); Luo, Zhang, and Duan (2013); Tsitsi Chikandiwa, Contogiannis, and Jembre (2013); Mitic and Kapoulas (2012); Hanna, Rohm, and Crittenden (2011)
Control Variables			
Loan Deposit Ratio	Total loans/ Deposits from customer	N/A	Tan, Floros, and Anchor (2017); Ekpu and Paloni (2016); Islam and Nishiyama, (2016); Laryea, Ntow-Gyamfi, and Alu (2016); Gizaw, Kebede, and Selvaraj (2015); Hamid and Azmi (2011); Kumbirai and Webb (2010)
Loan Loss Provisions over Total Loans	Loan loss provisions/ Total loans	N/A	Tan, Floros, and Anchor (2017); Ekpu and Paloni (2016); Garcia and Guerreiro (2016); Menicucci and Paolucci (2016); Zarrouk, Ben Jedidia, and Moualhi (2016); Gizaw, Kebede, and Selvaraj (2015); Ong and Teh (2013); Staikouras and Wood (2011); Kumbirai and Webb (2010); Wasiuzzaman and Tarmizi, (2010); Heffernan and Fu (2010)

3.5 Variables and Hypotheses

This section outlines the financial ratios and dummy variables used in this study.

3.5.1 Dependent Variable

Profitability ratio namely Net Interest Margin (NIM) is chosen as dependent variable for this study to measure the performance of eight local commercial banks in Malaysia.

3.5.1.1 Net Interest Margin (NIM)

Net Interest Margin measures the ratio of net interest income generated from bank's interest earning assets. Net interest income is the spread between interest income and interest expense. Bank's major source of funds originate from depositors, hence banks' earnings depend not only the income generated, but also the amount of interest paid to depositors. Although Return on Assets and Return on Equity provide useful information about bank profitability, Return on Assets measure only the efficiency in generating profits using bank's assets while Return on Equity measure only bank's earnings based on equity investment. Bank issues liabilities and use the proceeds to purchase income-earning assets. Thus, effective asset-liability management is very crucial as banks seek to maximize their profits by ensuring higher interest income return from assets and lower interest paid to liabilities. Hence, Net Interest Margin is chosen for this study because it measures the how well the bank manages its assets and liabilities.

$$Net\ Interest\ Margin = \frac{Net\ interest\ income}{Total\ assets}$$

3.5.2 Independent Variables

The independent variables used in this study consist of dummy variable to identify the period of commencement of Internet Banking services and engagement in social media platform by local commercial banks in Malaysia.

3.5.2.1 Internet Banking (IB)

Internet Banking is an electronic payment system that allows customer to conduct range of financial transactions without the need to visit physical branch. Previous studies proved that the implementation of Internet Banking or electronic banking is positively related towards bank's profitability (Le, Van, & Le, 2015; Gautam, 2012; Acharya, Kagan, & Rao Lingam, 2008). Besides, benefits such as lower transactions costs, time reductions and enhanced quality of services are associated with the implementation of Internet Banking (Kombe & Wafula, 2015; Gautam, 2012). Thus, the introduction of Internet Banking is perceived to increase the volume of assets-liabilities of the bank. Therefore, dummy variable takes a value of 1 at the year on which the respective bank implement Internet Banking or 0 otherwise, to indicate the year at each local commercial bank in Malaysia started to launch Internet Banking services. The use of dummy variable in this study resembles previous studies of Al-Smadi and Al-Wabel (2015) in the case of Jordanian banks. A positive sign is expected for this variable as Internet Banking has the potential to increase banks' profit. The hypothesis for Internet Banking is illustrated as shown below:

H_1: *There is a significant relationship between Internet Banking adoption and bank's profitability (Net Interest Margin)*

3.5.2.2 Social Media (SM)

Social media is a form of communication through which users build online communities to share information, news, thoughts, personal messages, video and other contents (Merriam-Webster, 2016). Social media platform serves as a channel on which banks can increase their market presence and deliver some message such as financial tips, latest products and services or news about upcoming events to the public at cheaper and faster approach. Performance of commercial banks is closely related to its media reputation as the result of overall assessment of the firm by media (Deephouse, 2000). Furthermore, commercial banks in Malaysia compete in a single market by offering similar products to similar range of customers. Hence, bank that actively engages in social media platforms is deem to reach the potential customers more effectively than those who are inactive. The usage of Facebook, YouTube and Twitter are chosen as the area of focus in this study as these social platforms are those which are widely used by local commercial banks in Malaysia. Hence, for social media engagement, dummy variable equals to 1 at the year on which the respective bank involved in social media platform (Facebook, YouTube or Twitter), or 0 otherwise. A positive sign is expected for this variable as social media is used as advertising tool which in turn increase the profitability of the banks. The hypothesis for social media is illustrated as shown below:

H_2: *There is a significant relationship between social media adoption and bank's profitability (Net Interest Margin)*

3.5.3 Control Variables

Two control variables are included in this study to assure robustness of findings and to differentiate whether Internet Banking or social media coverage, rather than the bank-specific determinants, which affect the profitability of local commercial banks in Malaysia. Those control variables are Loan Deposit Ratio (LDR) and Loan Loss Provisions over Total Loans (LLPOTL).

3.5.3.1 Loan Deposit Ratio (LDR)

Loan Deposit Ratio is the measure of bank liquidity and short term viability. Bank accepts deposit and giving out loan. However, loans to customer are generally a longer term investments, therefore it is usually a non-liquid assets of the bank. Thus bank has to maintain a certain level of liquidity to sustain normal day to day operations. Higher Loan Deposit Ratio is deeming to contribute higher profit to the banks; however it does not consider the impact of default loan, non-performing loan or the withdrawals made by customer. While low value of ratio indicates that the bank is under performing. Despite maximizing asset-liability management, bank need to ensure that there is sufficient liquidity to cover possible bank run problem. Loan Deposit Ratio is chosen as control variables in this study because it comprises both the assets and liabilities of the bank.

$$Loan\ Deposit\ Ratio = \frac{Total\ loans}{Deposits\ from\ customer}$$

3.5.3.2 Loan Loss Provisions over Total Loans (LLPOTL)

Loan Loss Provisions over Total Loans is the measure the of bank's asset quality. A higher ratio indicates a reduction in bank's credit quality, and thus lower profitability. Loan loss provisions are related to default risk as banks will account for default loan based on the expectation on loan's quality. Hence, when bank allocates higher loan loss provisions, the bank is expecting higher potential loan losses due to loans default, bad loans, or loans renegotiation based on historical default rates. Loan Loss Provisions over Total Loans is chosen as control variable in this study because banks with high loan loss provisions indicate that there is possible deterioration of banks' asset-liability management.

$$Loan\ Loss\ Provisions\ over\ Total\ Loans = \frac{Loan\ loss\ provision}{Total\ loans}$$

3.6 Research Design

This section illustrates the statistical analysis applied in this study including missing value, outliers, autocorrelation, normality, linearity, multicollinearity, heteroskedasticity, descriptive statistics, Pearson's correlation and multiple regression analysis.

3.6.1 Missing values

The data is first screen for missing value a due to possible non-availability of the information. There are two way to deal with missing data: (i) leave the cell blank or (ii)

assign it with missing values codes. Missing value is tested using frequency analysis in SPSS.

3.6.2 Outliers

Outliers are the extreme cases in a random sample of a population that might have considerable impact on regression analysis and thus need to be treated to minimize its impact. Outliers of a sample can be identified by computing boxplots. Boxplots is a graphical presentation of the sample data in the form of median, 25^{th} and 75^{th} percentiles while the maximum and minimum value of the sample data are represented by horizontal lines at either end of the box. Extreme cases within the sample will appear in the form of asterisk or circle outside the range of maximum and minimum values. Outliers can be treated through variable transformation.

3.6.3 Autocorrelation

Autocorrelation, also known as serial correlation refers to circumstances in which the errors are correlated with each other. Durbin-Watson (DW) is used to detect the existence of autocorrelation between errors in a regression analysis. Tests statistic range between 0 and 4 and the closer the *d* is to 2, meanings that there is no autocorrelation problem. The value of *d* greater than 2 and closer to 4 indicates a negative correlation while a value less than 2 and closer to 0 indicates a positive correlation.

3.6.4 Normality

Normality test assumes the error term follows normal distribution with zero mean and constant variance for any given independent variable. Hence, normality test is conducted to determine whether the sample is drawn from a normally distributed population. Normality of a sample can be identified through (i) graphical presentation like histogram, stem-and-leaf plot, box plot, normal probability plot and detrended normal plot or (ii) statistical analysis like Kolmogorov-Smirnov and Shapiro-Wilk statistics, skewness and kurtosis.

In this study, skewness and kurtosis are chosen to test for normality. Skewness is the measure of the symmetry for a given distribution. Hence, a symmetrical distribution has skewness of zero, while an asymmetrical distribution can be a positive or negative skew depending whether the distribution is skewed to right or left. A value greater than 2.0 or less than -2.0 indicate that the skewness of the distribution is deviated away from normal distribution (Hair, Black, Babin, & Anderson, 2010). Meanwhile, Kurtosis is the measure of the distribution of the sample round the mean. A normal distribution has a kurtosis of ± 2. The positive or negative of the kurtosis depends on the peakedness or flatness of a distribution.

3.6.5 Linearity

Linearity refers to the linear relationship between dependent variable and independent variables. Linear relationship is expected between the dependent variable and independent variables. Linearity can be verified by examining scatterplots for each group.

3.6.6 Multicollinearity

Multicollinearity occurs when two or more independent variables in a multiple regression model are highly correlated, in which one can be linearly predicted from the others with no randomness. Variance Inflation Factor (VIF) is a measure of multicollinearity to identify the linear association between the independent variables. VIFs greater than 10 indicate that there is high multicollinearity problem, while VIFs between 5 and 10 signal a likely multicollinearity problem.

3.6.7 Heteroskedasticity

Heteroskedasticity refers to circumstances whereby the error term does not have constant variance, in which the variance of the error term changes according the change in the value(s) of independent variable(s). The presence of heteroskedasticity causes the standard errors of the coefficients to be biased, resulting in unreliable hypotheses testing. The existence of heteroskedasticity can be verified through scatterplot analysis. The spread of the scatterplot is uneven and irregular if heteroskedasticity problem exist.

3.6.8 Descriptive Statistics

Descriptive statistics is a method of summarizing and presenting a given set of data (sample) into a meaningful form that represent a bigger population. Descriptive statistics is used to measure the central of tendency and variability. Central of tendency are the measures of mode, median and mean, while the measure of variability includes range, interquartile range, variance and standard deviation.

3.6.9 Pearson's Correlation

Pearson's correlation is used to measure the level and direction of association between dependent variable and independent variables namely, Net Interest Margin as dependent variable and Internet Banking and social media as independent variables. Pearson's correlation determines how strongly the two variables are correlated.

Table 3.3
Pearson's Correlation relationship

r	Description
-1	A perfect negative linear relationship
0	No linear relationship
+1	A perfect positive linear relationship

Positive one indicates that the two variables are strongly positively correlated while negative one indicates that the two variables are strongly negatively correlated. Zero correlation revealed that the two variables are totally not related to each other

3.6.10 Multiple Regression Analysis

Multiple regression analysis justifies the relationship between several independent variables and a dependent variable. Significance values illustrate whether the independent variable is significant towards the dependent variable for a given significance level. F-test is used to determine the overall significance of the model. The null hypothesis can be rejected if *p value* is smaller than 0.01, 0.05 and 0.10 significance levels, and concluded that it is statistically significant in overall and vice versa.

Hypothesis test is considered statistically significant when the *p value* is less than or equal to 0.01, 0.05 and 0.10 significance level respectively. The value of coefficient

indicates that one unit increase (decrease) in the independent variable will cause the dependent variable to increase (decrease) accordingly.

Following, adjusted R-squared (Adj R^2) measures how well the data fitted the regression line. In other words, Adj R^2 measures the percentage of total variation in dependent variable is explained by the variation in the independent variables. Standard Error of Estimate (SE) measures the dispersion of sample data around the regression line.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the empirical results of this study. Results from descriptive statistics, Pearson's correlation and multiple linear regression analysis are organized and tabulated in this chapter. The objective of this study is to investigate the relationship between Internet Banking and social media adoption toward the profitability of local commercial banks in Malaysia.

4.2 Data Screening

This section describes missing value, outliers and autocorrelation results for this study.

4.2.1 Missing values

The result of frequency analysis using SPSS showed that there was no missing value for the data set collected from eight local commercial banks in Malaysia.

4.2.2 Outliers

The boxplot illustrated below summarizes the distribution of the dependent variable (Net Interest Margin). The lower boundary of the boxplot is 25^{th} percentiles, while the upper boundary represents 75^{th} percentile. Median of the distribution is

represented by the horizontal line lie within the central of the boxplot. The minimum and maximum value of the data within the distribution is represented by the two lines at end of the box. According to the figure below, the distribution had several extreme scores represented by asterisk (*) symbol, which was considered as outliers. Therefore, the variables namely Net Interest Margin, Loan Deposit Ratio and Loan Loss Provisions over Total Loans were then undergone natural logarithmic transformation. Despite the existence of the outliers, median of the distribution situated more or less at the center of the box, indicating that the distribution was approximately symmetrical.

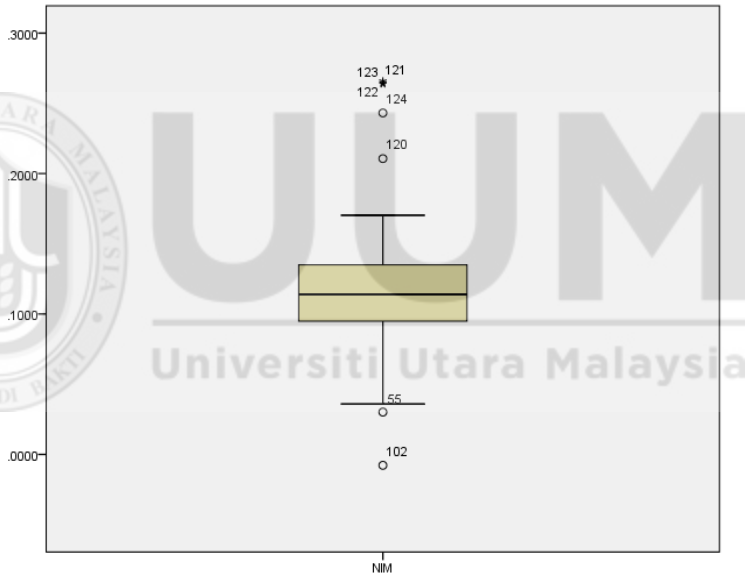

Figure 4.1
Boxplot of dependent variable (Net Interest Margin)

4.2.3 Autocorrelation

The value of Durbin-Watson (DW) generated was 1.073, fall in between the test statistic of 0 and 2, and near to 2, indicating that there was no autocorrelation problem in this study.

4.3 Assumptions Analysis

This section consists of the result of normality, linearity, multicollinearity, heteroskedasticity analysis.

4.3.1 Normality

According to table 4.1, the analysis of skewness showed that all the variables were normally distributed with the skewness range between 2.0 and –2.0. Net Interest Margin and social media were positively skewed while Internet Banking, Loan Deposit Ratio and Loan Loss Provisions over Total Loans were negatively skewed. Besides, all the variables had positive kurtosis except for social media, indicating that social media's distribution was flatter. However, Net Interest Margin's kurtosis value was larger than normal distribution kurtosis of ± 2, indicating that the distribution was slightly peaked (leptokurtic).

Table 4.1
Normality test

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Net Interest Margin	1.041	0.208	4.211	0.413
Internet Banking	-1.785	0.208	1.204	0.413
Social media	0.800	0.208	-1.381	0.413
Loan Deposit Ratio	-0.182	0.208	1.997	0.413
Loan Loss Provisions over Total Loans	-0.684	0.208	0.499	0.413

N = 136

4.3.2 Linearity

Linearity was used to predict the dependent variable namely, Net Interest Margin through independent variables (Internet Banking & social media) and control variables (Loan Deposit Ratio and Loan Loss Provisions over Total Loans). From the normality plot as shown below, the data was plotted along the theoretical normal distribution, indicating that the distribution was near to normality. Other than normality test, the graph also shows that there was linear relationship between the two variables.

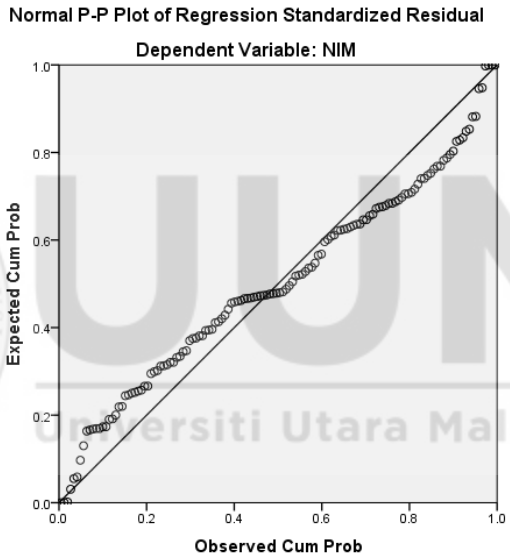

Figure 4.2
Normal Probability Plot

4.3.3 Multicollinearity

In this study, Variance Inflation Factor (VIF) was calculated by 1 over tolerance. Tolerance is an indication of the percentage of variance in the variable that cannot be accounted for by other variables. Small tolerance value indicates that the variable is redundant and a value less than 0.10 require additional investigation. The VIF for all independent variables and control variables used in the this study was less than 5,

indicating that there was less likely for the variables to be highly correlated to each other, therefore the assumption for multicollinearity problem was violated.

Table 4.2
Multicollinearity

Dependent variable: Net Interest Margin	Collinearity Statistics	
	Tolerance	VIF
Internet Banking	0.836	1.196
Social media	0.523	1.914
Loan Deposit Ratio	0.873	1.145
Loan Loss Provisions over Total Loans	0.470	2.127

N = 136

4.3.4 Heteroskedasticity

Heteroscedasticity test was used to test the variability of the variance of error term across observations in this study. The scatterplot below shows that the spread clearly concentrated on one spot, indicating the existence of heteroscedasticity problem. Thus, heteroscedasticity problem existed in this model.

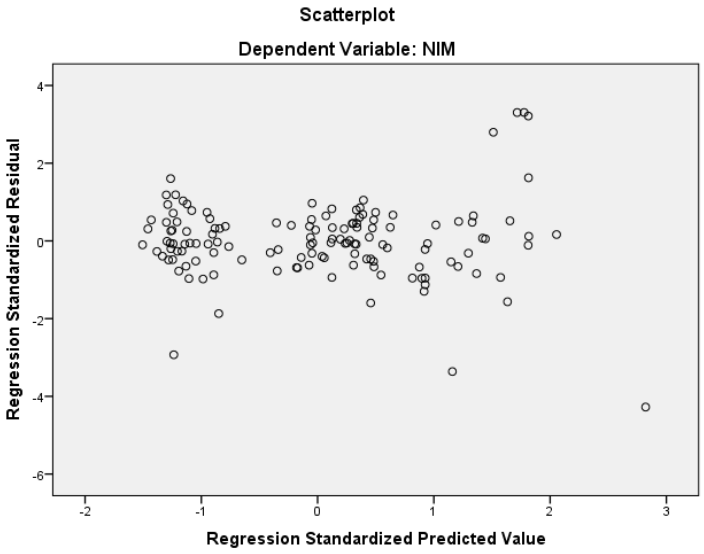

Figure 4.3
Scatterplot

4.4 Descriptive Statistics

Table 4.3 below shows that Net Interest Margin had a minimum value of -0.0078 and maximum value of 0.2659, representing the smallest and largest value within the data set of this variable. Mean of Net Interest Margin was 0.1169, calculated by adding all the observations and divided by total number of observation (N = 136).

Meanwhile, the data for Internet Banking and social media was collected in the form of dummy variables (1 or 0). Hence, the maximum and minimum value for Internet Banking and social media variables took the value of 1 or 0 respectively. The value of 1 represents adoption of Internet Banking services and social media platform by respective bank, while 0 represent otherwise. For dummy variables of Internet Banking, the mean value of 0.8300 indicated that there was higher percentage of the dummy variable with the value of 1 because the mean was nearer to 1. While social media variable had a mean score of 0.3200, indicating that larger percentage of the sample was nearer to 0.

Additionally, Loan Deposit Ratio's recorded the minimum value of -0.1461 and a maximum value of 0.0937 within the dataset with a mean of -0.0340. Finally, Loan Loss Provisions over Total Loans displayed a minimum and maximum value of -3.5229 and -1.1113 respectively with mean of -2.1619.

Dispersion or the spread of the data from the mean was identified by examining the standard deviation. Higher standard deviation indicates greater spread of the data. Comparing all the variables in this study, social media had the largest standard deviation (46.70%), indicating that social media dataset were farthest away from the mean.

Contrarily, Loan Deposit Ratio recorded a standard deviation of 3.72%, indicating that the data were concentrated around the mean.

Table 4.3
Descriptive Statistics

Variables	Minimum	Maximum	Mean	Standard Deviation
Net Interest Margin	-0.0078	0.2659	0.1169	0.0394
Internet Banking	0	1	0.8300	0.3760
Social media	0	1	0.3200	0.4670
Loan Deposit Ratio	-0.1461	0.0937	-0.0340	0.0372
Loan Loss Provisions over Total Loans	-3.5229	-1.1113	-2.1619	0.4521

N = 136

4.5 Pearson's Correlation

Association between the dependent variable (Net Interest Margin) and the independent variables (Internet Banking and social media) as well as control variables (Loan Deposit Ratio and Loan Loss Provisions over Total Loans) was measured using Pearson's correlation. Internet Banking was negatively correlated to Net Interest Margin, r = -.382, p < .01. Similarly, social media also negatively correlated to Net Interest Margin, r = -.440, p < .01. Contrarily, Loan Deposit Ratio and Loan Loss Provisions over Total Loans were positively correlated to Net Interest Margin at p < .01. However, the relationships between dependent variable and independent variables were moderate as none of the Pearson's r was closer to +1 or -1.

Table 4.4
Correlation Coefficients of Variables

N = 136	Net Interest Margin	Internet Banking	Social Media	Loan Deposit Ratio	Loan Loss Provisions over Total Loans
Net Interest Margin	1.000				
Internet Banking	-0.382 [0.000]***	1.000			
Social media	-0.440 [0.000]***	0.307 [0.000]***	1.000		
Loan Deposit Ratio	0.211 [0.007]***	-0.097 [0.129]	0.064 [0.229]	1.000	
Loan Loss Provisions over Total Loans	0.421 [0.000]***	-0.399 [0.000]***	-0.655 [0.000]***	0.222 [0.005]***	1.000

Notes: The figures in the parentheses are t-statistic. ***, ** and * denote statistically significant at 0.01, 0.05, 0.10 levels, respectively.

4.6 Multiple Linear Regression Analysis

Data collected for this study is unbalanced panel as each of the group (commercial bank) has unequal number of observations. A total of 136 observations for each variable were collected for the period span between years 1998-2016.

Multiple linear regressions analysis was analyzed to predict dependent variable (Net Interest Margin) based on independent variables (Internet Banking and social media). A significant regression equation was found ($R^2 = .307, F(4,131) = 14.488, p < .000$). The result of hypothesis testing showed that there was significant negative relationship between Internet Banking adoption and bank profitability (Net Interest Margin) at $p < .01$. Also, the result of hypothesis proved that there was negative significant relationship between social media adoption and bank profitability

(Net Interest Margin) at $p < .01$. T-statistic for control variables showed that Loan Deposit Ratio was statistically significant at 1 percent level, while Loan Loss Provisions over Total Loans were insignificant. The result of hypothesis testing is summarized as shown in table 4.5 below.

Table 4.5
Results of Hypothesis Testing

Hypothesis	Expected Sign	Result	Sig.	Decision
Internet Banking: H_1	+	-	***	H_1 was accepted
Social media: H_2	+	-	***	H_2 was accepted

Notes: The figures in the parentheses are t-statistic. ***, ** and * denote statistically significant at 0.01, 0.05, 0.10 levels, respectively.

According to the table 4.6 as shown below, adjusted R-squared revealed that only 28.6% of the variations in dependent variable were explained by the variations in independent variables. Standard Error (SE) of this model was 0.033, which was very close to zero, indicating that there was least variation corresponding to the regression line and the correlation was near to perfect.

The coefficient of Internet Banking was -0.234 indicated that when Internet Banking adoption increases by 1 unit with the assumption that other variables remain constant, Net Interest Margin will decreases by 0.234 units. Whereas coefficient of social media of -0.342 indicated that 1 unit increased in social media adoption, Net Interest Margin decreased by 0.342 units, holding the assumption that other variables remain constant. The negative sign of the coefficients of Internet Banking and social media revealed that they move in opposite direction against Net Interest Margin. Contrarily, Loan Deposit Ratio with positive coefficient of 0.197 indicates that when Loan Deposit Ratio increases by 100% with the assumption that other variables remain

constant, Net Interest Margin will increases by 19.7%. Loan Loss Provisions over Total Loans were insignificant.

Table 4.6
Regression Analysis

N = 136	Coefficient	$t-value$	$p-value$
Constant		9.571	0.000***
Internet Banking	-0.234	-2.942	0.004***
Social media	-0.342	-3.403	0.001***
Loan Deposit Ratio	0.197	2.529	0.013**
Loan Loss Provisions over Total Loans	0.059	0.559	0.577
R^2		0.307	
Adjusted R^2		0.286	
SE of the estimate		0.033	
Durbin-Watson		1.073	
F-statistic	14.488		0.000

Notes: The figures in the parentheses are t-statistic. ***, ** and * denote statistically significant at 0.01, 0.05, 0.10 levels, respectively.

4.7 Discussion

As against expectation, Internet Banking was found to be negatively significant towards bank profitability at 1 percent significance levels, indicating that the implementation of Internet Banking appears to cause a reduction in the profitability of local commercial banks in Malaysia measured in term of Net Interest Margin. The result of this study was in line with some of the previous studies that proved the negative relationship between Internet Banking adoption and bank profitability (Al-Smadi & Al-wabel, 2015; Onay & Ozsoz, 2013; Mohammad & Saad, 2011). However, the result of this study was contradicts to some of the previous studies which proved that Internet

Banking or Electronic Banking was positively related to the bank profitability (Le, Van, & Le, 2015; Gautam, 2012; Acharya et al., 2008).

Net Interest Margin is actually the difference between the interest income a bank receives on loans and the interest expense a bank pays to deposits. Negative relationship between Internet Banking adoption and bank profitability indicates that increasing usage of Internet Banking will cause the compression in Net Interest Margin. While deterioration of Net Interest Margin can be attributed to smaller spread between interest income and interest expense as a result of increased competition. Implementation of Internet Banking lowered interest income of bank as a result of increased competition (Onay & Ozsoz, 2013).

The compression in Net Interest Margin of local commercial banks in Malaysia can be attributed to either the reduction in interest income or the increase in interest expense. The effect of the smaller spread of Net Interest Margin is differing during the period of high interest rate or low interest rate. Generally, one will deems that banks favor higher interest rate as their interest income is likely to be higher with higher lending rates or higher interest return from investments. However, banks' funding costs also increase accordingly when the market rate is high as most of the banks finance their assets (loans and investments) by issuing debt, particularly in the form of deposits. Hence, banks need to re-price lending rate cautiously in order to encourage lending even during the period of high interest rate to ensure continue stream of interest income. Hence, higher interest rate does not necessarily contribute to the Net Interest Margin of the banks although high interest rate is usually more favorable as it increases depositor's incentive to save than to spend.

Furthermore, although Internet Banking was found to be negatively related to the profitability of local commercial banks in Malaysia, it might improve market efficiency as a whole in the long-term especially in period of low interest rate. During the period of low interest rate, banks charge lower rates for lending as well as for deposits. And the spread between interest income and interest expense will probably reduce during the period of low interest rate as bank can charge lower rate for lending but not negative rate for deposits. Low interest rate is more beneficial to the borrowers and the banks compared to high interest rate in the long-term although it tends to reduce banks' profit and customer's interest return in the short-term. Despite the perceived reduction in profit return, benefits associated with lower interest rate include increase in consumer spending and reduce in probability of default compare to high interest rate. While in mean time, banks pay lesser to the funding cost and enjoy more profits in the long-term as the result of increased inflation due to low interest rate. Besides, banks can eventually benefits from rising asset prices in the future. In short, although Internet Banking adoption reduced bank profitability in the short-term, it improves market efficiency in the long-term.

Similarly, social media was found to be negatively significant towards bank profitability at 1 percent significance levels, indicating that social media adoptions appear to cause a decline in the Net Interest Margin of local commercial banks in Malaysia. Previous study stated that web pages and social media contributed toward sales improvement and repeat sales in business (Jones et al., 2015). Social media helps to improve banks' market exposure in term of increased awareness and customer enquiries, enhance customer relationship and business expansion (Jones et al., 2015).

Hence, banks are perceived to receive positive response associated with the increased market exposure through social media. However, as against expectation, engagement in social media platforms by Malaysia's local commercial banks happened to cause a reduction in bank profitability. The deterioration of Net Interest Margin could also probably due to the compression in net interest income. Since January 2015, with the commencement of new BR, banks determine interest rates based on Statutory Reserve Requirement (SRR) and cost of funds. Besides, other components such as credit risk, liquidity risk, operating costs and profit margin also considered in loan pricing which will be reflected in a spread of BR. Banks gain interest spread arising from deliberate mismatch in assets and liabilities through gapping[2] activities. Hence, though banks are generally free to determine the interest rate for loan pricing, they need to take competition into account.

Returning to Net Interest Margin, banks' return is derived from the difference between short-term and long-term interest rates. Banks prefer to lend long and borrow short when banks anticipate the fall in interest rate in near future and vice versa if the interest rate is expected to increase in near future. Hence, to encourage customer spending, banks need to offer an attractive rates so that customer willing to finance for a longer term when banks expect interest rate to fall in near future. Contrarily, when interest rate is expected to rise in the future, banks need to counteract by offering attractive rates to lift the incentive to save for longer term. Hence, for banks to stay competitive especially in the current context with high media exposure, each measure mentioned above will minimize the spread of Net Interest Margin regardless the interest rates is going to rise or fall in the future. Banks obtain profit yield from the spread

[2] Banks' activities arising from deliberate mismatch the maturities of assets and liabilities

between interest income and interest expense with a proper estimation on the interest rate while customer benefits from either a better financing term or savings rate. Hence, although social media is negatively related to bank profitability, it creates a fair market in the long-term.

In this study, Loan Deposit Ratio was positively significant toward Net Interest Margin at 1 percent significance levels. Although most of the studies measured the impact of Loan Deposit Ratio towards bank profitability in term of Return on Assets and Return on Equity rather than Net Interest Margin, the result was inconsistence. Often, the profitability ratios are used interchangeably; hence the result of previous study on Loan Deposit Ratio can be used as proxy for result in this study using Net Interest Margin. The result of this study was found to be similar to study of Laryea et al. (2016) that proved positive relationship between Loan Deposit Ratio and bank profitability (Return on Assets and Return on Equity). Contrarily, result in this study was contradicted to study of Islam & Nishiyama (2016) that proved otherwise. While Loan Deposit Ratio also proved to be insignificant toward profitability of banks (Gizaw et al., 2015; Hamid & Azmi, 2011; Kumbirai & Webb, 2010). Next, Loan Loss Provisions over Total Loans were proved to be insignificant in this study. The result of this study was contradicted to the negative findings from the study of Zarrouk et al. (2016) and positive results from the studies of Ong & Teh (2013); Heffernan & Fu (2008) in investigating the relationship between loan loss provisions and Net Interest Margin.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Introduction

This study aims to identify the impact Internet Banking and social media adoption on the profitability of local commercial banks in Malaysia. A sample of eight local commercial banks was chosen for this study to ascertain the relationship between Net Interest Margin (NIM) and Internet Banking (IB) and social media (SM) adoption by Malaysia's local commercial banks. This chapter consists of the summary of findings, practical and policy implications, limitations and recommendations of research.

5.2 Summary of Findings

From the result of regression analysis, several general conclusions can be inferred based on the research questions. First, as against expectation, Internet Banking was found to be negatively related to profitability of local commercial banks in Malaysia at 0.01 significance levels. The result of this study was against with some of the previous studies that proved positive relationship between Internet Banking or Electronic Banking on bank profitability (Le, Van, & Le, 2015; Gautam, 2012; Acharya et al., 2008). With the evolution of technology and the increasing number of internet user, Internet Banking emerged as a mean of new delivery channel to attract larger customer base without physical branch (Malhotra & Singh, 2007). Thus, with Maybank taking the lead, local

commercial banks in Malaysia started to implement Internet Banking since year 2000 to keep in pace with current technology, to enhance cost efficiency and to stay competitive. Despite the perceived benefits associated with Internet Banking services, the impact of Internet Banking adoptions by local commercial banks in Malaysia turn out to be negative. Although the result of Internet Banking adoptions was against expectation, it was consistence with some of the previous studies (Al-Smadi & Al-wabel, 2015; Onay & Ozsoz, 2013; Mohammad & Saad, 2011). The implementation Internet Banking had resulted in the increase of competition and thus lower interest income earned by bank (Onay & Ozsoz, 2013). Besides, the effect of Internet Banking on operating costs was insignificant as Internet Banking serve as a delivery channel which complement rather than substitute the function of traditional distribution channels (Le et al., 2015). Furthermore, there were large infrastructural costs associated with the implementation of Internet Banking, including the costs of hardware and software equipment, training program and the salary of expert (Gautam, 2012), which in turn lowers the net income.

Returning back to this study, negative relationship was found between Internet Banking and Net Interest Margin, indicating that increasing usage of Internet Banking reduced banks' profitability due to margin compression. Furthermore, higher Net Interest Margin was associated with higher operating expenses (Aysen Doyran, 2013), which further reduce banks' earnings. Although banks suffered in term of profits reduction in the short-term, margin compression might improve market efficiency in the long-term. The reduction in the spread of interest income can be attributed to either the decrease in interest income or the increase in interest expense as a result of increased competition due to the introduction of Internet Banking services. During the period of

high interest rate, banks' funding costs are higher despite higher possible interest earned from loans. Futhermore, banks have to pay interest to depositors regardless any possible default loan, bad loans or loans renegotiation. Contrarily, during the time of low interest rate, banks can charge lower rate for loans but not negative rate for deposits. In year 2016, Bank Negara Malaysia announced to reduce Overnight Policy Rate (OPR) by 25 basis points to 3.00 percent. Both lending rates and deposits rates were adjusted accordingly following the reduction in the Overnight Policy Rates. Hence banks receive less interest income from borrower and pay lesser to the depositors during the time of low interest rate. Though banks receive less interest income in the short-term, banks can eventually enjoy the benefits of rising asset prices in the future. Furthermore, lower interest rate actually encourages consumer spending and there is less likely for a borrower to default. Thus, nor matter the market is currently in high or low interest rate, smaller spread of Net Interest Margin will benefits both the banks and the consumer. Thus, in the context of Malaysia's local commercial banks, Internet Banking merely serves as a complementary channel rather than substitute for traditional branch. Instead of contributing to the profitability of bank, Internet Banking serves as alternative delivery channels that promote greater convenience in the provision of financial services at lower transaction costs. In short, although Internet Banking adoption reduced bank profitability in the short-term, it improves market efficiency in the long-term.

Next, results of regression analysis revealed that, as against expectation, social media was found to be negatively related to Net Interest Margin of local commercial banks in Malaysia at 0.01 significance levels. Social media improved banks' market exposure in term of increased awareness and customer enquiries, enhance customer

relationship and business expansion (Jones et al., 2015). Hence, the usage of social media had contributed to the improve sales and repeat sales of business (Jones et al., 2015). Despite the perceived benefits associated with the used of social media, engagement in social media platform by local commercial banks was found to produce negative response. The negative impact of social media on bank profitability can be attributed to the increased competition as a result of higher market exposure. Beginning January 2015, with the new BR rate, banks are allowed to set their own rate base on Statutory Reserve Requirement (SRR) and cost of funds. Hence, in order to attract more customers, banks usually set a competitive rate in loan pricing after taking other components such as credit risk, liquidity risk, operating costs and profit margin into consideration. Thus, the spread of Net Interest Margin of the banks will be smaller in order for the banks to stay competitive. Furthermore, instead of monetary return, returns from social media engagement might in the form of customer behaviors tied to particular social media platforms (Hoffman & Fodor, 2010). Thus, the returns from social media investment consider not only the short-term goals such as sales increase or costs reduction, but the long-term brand awareness and brand engagement. Although banks' interest income reduced in the short-term, banks still able to generate a continue stream of interest income through deliberate mismatch in assets and liabilities. In short, although the social media reduced bank profitability in measured in term of Net Interest Income, it creates a fair market in the long-term.

5.3 Practical and Policy Implications

The findings of this study aim to contribute towards academic, industry and policy maker. First, this study contributes to literature regarding the impact of Internet Banking and social media adoption on bank profitability in Malaysia. Previous study focusing more on either the impact of Internet Banking on bank performance or the usage and applicability of social media on business expansion, hence, there is least study that combine both determinants to study about bank performance.

Secondly, although the impact of Internet Banking and social media adoption on bank profitability turn out to be negative, the findings of this study are important in facilitating the industry player to determine the appropriateness of integrating technology to improve bank profitability. Banks are urged to reconsider the usage intensity of the technology in banking transactions before moving on into fully technology-based banking. Besides, this study identifies the need for the industry player to recognize that the return of social media investment might not translated into monetary return in near-term but the likelihood of the brand engagement in the long-term.

Thirdly, the findings of this research are important to the policy maker in Malaysia in supporting the area which currently not covered by Communication and Multimedia Act 1998, Personal Data Protection Act 2010 and Provision of Internet banking Services. Hence, continue assessment on the use of Internet Banking and social media is essential to create a safe, fair and transparent financial markets and institutions.

5.4 Limitations and Recommendations of Research

This study focused on a single geographical area and is one industry focus (banking industry); hence generalization of the results to different context should be taken care. Future research shall consider expanding this research to other Asian country to identify the applicability of the result. A comparative study by including a sample of commercial banks in other Asian country would provide an in depth discussion to what extent Internet Banking and social media adoption influence profitability of bank.

Furthermore, this study includes only bank specific determinants as control variable to assure robustness and comparability in findings, hence future research might consider the inclusion of industry specific and macroeconomics specific determinants of bank profitability. The inclusion of different determinants of bank profitability can further ensure structural validity of the regression in which the regression result is not sensitive to alternative measures of the independent variables.

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APPENDICES

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
NIM	136	-.0078	.2659	.116899	.0394394	1.041	.208	4.211	.413
IB	136	0	1	.83	.376	-1.785	.208	1.204	.413
SM	136	0	1	.32	.467	.800	.208	-1.381	.413
LDR	136	-.1461	.0937	-.033989	.0372013	-.182	.208	1.997	.413
LLPOTL	136	-3.5229	-1.1113	-2.161883	.4520581	-.684	.208	.499	.413
Valid N (listwise)	136								

Correlations

		NIM	IB	SM	LDR	LLPOTL
Pearson Correlation	NIM	1.000	-.382	-.440	.211	.421
	IB	-.382	1.000	.307	-.097	-.399
	SM	-.440	.307	1.000	.064	-.655
	LDR	.211	-.097	.064	1.000	.222
	LLPOTL	.421	-.399	-.655	.222	1.000
Sig. (1-tailed)	NIM	.	.000	.000	.007	.000
	IB	.000	.	.000	.129	.000
	SM	.000	.000	.	.229	.000
	LDR	.007	.129	.229	.	.005
	LLPOTL	.000	.000	.000	.005	.
N	NIM	136	136	136	136	136
	IB	136	136	136	136	136
	SM	136	136	136	136	136
	LDR	136	136	136	136	136
	LLPOTL	136	136	136	136	136

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.554[a]	.307	.286	.0333365	1.073

a. Predictors: (Constant), LLPOTL, LDR, IB, SM

b. Dependent Variable: NIM

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.064	4	.016	14.488	.000[b]
	Residual	.146	131	.001		
	Total	.210	135			

a. Dependent Variable: NIM

b. Predictors: (Constant), LLPOTL, LDR, IB, SM

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.165	.017		9.571	.000		
	IB	-.025	.008	-.234	-2.942	.004	.836	1.196
	SM	-.029	.009	-.342	-3.403	.001	.523	1.914
	LDR	.209	.083	.197	2.529	.013	.873	1.145
	LLPOTL	.005	.009	.059	.559	.577	.470	2.127

a. Dependent Variable: NIM