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DOES INTELLECTUAL CAPITAL EXPLAIN THE FINANCIAL PERFORMANCE OF MALAYSIA MFIs?

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ABSTRACT

The performance of microfinance institutions (MFIs) is crucial for ensuring the efficient utilisation of funds deposited into the microfinance programme by donors, as well as for assisting regulators in monitoring the institutions. Assessing the performance of MFIs involves examining its development towards accomplishing its goals. Therefore, MFIs need to ascertain the challenges to maintain their sustainability and sustain their operations. Additionally, MFIs should focus on aspects such as intellectual capital (IC) to ensure future sustainability. The aim of this research is to examine how IC dimensions, specifically, customers, structure, human, and social capital, influence MFIs performance. A cross-sectional survey design was used to gather data from 145 managers (48% response rate) from MFIs in Malaysia. In order to determine the sample size of the study, a purposive sampling method was employed. The research model was analysed by using Partial least square-structural equation (PLS-SEM). Subsequently, the research model was validated using Smart PLS 3.2.5 and the proposed study hypothesis. The findings confirm that structural capital and customer capital positively influence the performance of MFIs, except for social and human capital. The research model explains 67.6% of the substantial amount of variance in MFIs performance. This research theoretically contributes to the extension of resource-based view (RBV) and social capital theory in

predicting the sustainability of MFIs. All the factors of IC were confirmed to improve the performance of MFIs. This study proposed several remarkable recommendations for microfinance institutions which suggested that MFIs' managers should resolve their organisational issues promptly. Furthermore, they should portray sensible consideration for their institutions by taking care of IC and encouraging the practice of recognising intangible assets, especially their employees' expertise and capabilities.

Keywords: *microfinance institutions performance, human capital, intellectual capital, customer capital, structural capital and social capital*

INTRODUCTION

The performance of microfinance institutions (MFIs) is crucial to ensure that the funds deposited in the microfinance programme by donors are utilised efficiently, in addition to assisting regulators in the monitoring of the institutions (Kheder, Mustafa & Saat, 2013). Ineffective MFIs exemplify constraints in the development of the microfinance industry. Hence, performance measurements are used to manage and sustain MFIs. Assessing the performance of MFIs involves examining their development towards accomplishing the institution's goals. In this regard, it is imperative for MFIs to identify the main challenges related to the sustainability of their operations (Kahaso, 2012). As the knowledge-based economy has led to a complete transformation in current business, it is essential to determine the wealth and sustainability of MFIs. The growth of the knowledge-based economy is derived from intellectual capital (IC), and it enhances competitiveness among organisations (Adnan, Kamaluddin & Kasim, 2014). According to Kamukama, Ahiauzu and Ntayi (2010), establishing intangible assets (the IC) against the usage of total assets would lead to better results.

In this modern environment, it is believed that IC is the driver of firm values instead of physical and financial capital (Kamukama, 2013). Thus, disregarding IC would lead MFIs to experience dilemmas including the lack of knowledge, poor customer service, lacklustre service quality, and ineffective employees. The implementation of IC is new not only in Malaysia but also in the global business environment. According to Ulum (2007), business circles generally have still not found the right answers

concerning the enhanced value that is earned by the companies. It has been conclusively shown that sustainable competitive advantage depends on not only physical assets and financial capital but also the unique intellectual assets (Suebert *et al.*, 2001). The key challenge faced by MFIs today is the tendency of employees to resign, stand down, and retire or leave the company for other means. If MFIs are unsustainable in the long run, their most valuable employees will likely leave the company. In this regard, experienced and skilled employees might leave with valuable knowledge and skills without having the opportunity to pass it down to their colleagues (Akpınar & Akdemir, 1999). It is therefore advisable for MFIs to prioritise on their IC to ensure that they progress and remain sustainable in the long term.

LITERATURE REVIEW

MFIs Performance

In this 21st century, microfinance has been recognised worldwide as a developmental tool that assists the unbanked segment of the society to reduce poverty. According to Ahmed, Brown and Williams (2013), MFIs are 'social enterprises' with a common goal to provide finance services to the underprivileged to enhance their quality of life. One of the most popular examples is the Grameen Bank in Bangladesh. MFIs growth and sustainability are dependent on funding from external parties and their efficiency (Ahmed, 2002). Ahmed (2002) posited that MFIs could be operated efficiently when the employees acquire the relevant skills through regular training. Thus, as mentioned by Kahaso (2012), determining the main challenges for MFIs to continue operating is extremely crucial. Current businesses have observed complete transformations due to the knowledge-based economy. Hence, determining the wealth and sustainability of MFIs are crucial.

Intellectual Capital

According to Khalique, Shaari, Isa, and Samad, (2013), intellectual capital (IC) is the centre of the knowledge-based economy. Despite being derived from the word 'intellect' which refers to genuine intellect, J.K.

Galbraith, who introduced IC in 1969, surmised as the word refers to some form of intellectual action. A popular definition of IC is ‘a knowledge that is valuable to an organisation.’ This shows that IC is created through knowledge management or the volume of what known. IC comprises of several aspects including customer capital, human capital, and structural capital (Bontis, Keow & Richardson, 2000). Past studies found that in comparison to firms with low IC, those with high IC possess plenty of resources that provided them with a competitive advantage in the human, structural, and relational capital. This is because high IC firms have stronger positions which allow them to be more competitive in the business than those with only one IC resource (Kamaluddin & Rahman, 2013).

Human Capital

Human capital refers to skill, knowledge, education, experience, attitude, and the staffs’ capability to accomplish their job and achieve the organisation’s objectives (Roos, Roos, Edvinsson & Dragonetti, 1997; Nimtrakoon, 2014). In this regard, compared to other properties or capitals, human resources are often deemed as a company’s most priced assets, but at the same time are often side-lined by a company (Hashim, Osman & Alhabshi, 2015). In other instances, human resource, particularly employees, could be a liability to an organisation (Khan, Farooq & Hussain, 2010). In general, human capital reflects the expertise, skill, experience and knowledge shared within an organisation which add value (Baron, 2011). Consequently, there is a need for MFIs to retain expert and experienced workers, as well as reward them for their hard work. These gestures will make the employees feel more appreciated which in turn, increase their loyalty towards the company. It is argued that MFIs should ensure employees’ job satisfaction to ensure loyalty. In this regard, for MFIs, human capital comprises of higher-level management (including CEOs and managers), executives and other staff members. MFIs’ success is largely dependent on human capitals as their performance could lead to greater financial sustainability and more effective outreach programmes (Hossain, 2012). Thus, it is hypothesised that:

H1: Human capital (HC) is positively related to MFIs performance

Customer Capital

Customer capital or relational capital represents alliance and capability. It includes a company's competitors, its customers, employers, and suppliers (Roos *et al.*, 1997; Bontis, Keow & Richardson, 2000; Ling, 2012). Akpinar and Akdemir (1999) mentioned that customer capital is related to the network of partners a company has, the level of customers and partners' satisfaction, and how loyal are they to the company. As reported by recent works, the performance of Malaysian MFIs are significantly and positively linked to their clients' well-being, and better customer networks would lead to higher performing micro and small enterprises. Having such a positive relationship maximises clients' acquisition of assets and household income generation (Al-Shami, Majid, Rashid & Hamid, 2013). Hence, it is hypothesised that:

H2: Customer capital (CC) is positively related to MFIs performance

Structural Capital

Structural capital can be described as the knowledge entrenched in a firm yet, not owned by employees; such as system, structure, strategy, patents, trademarks, culture, and norms which build the innovative capability of the organisation, hence ensuring success (Ling, 2012; Nimtrakoon, 2014). In other words, an organisation is comprised of different individuals and internal structures. Structural capital will be improved when an organisation's technology is enhanced, or when it develops a process and when it initiates other internal initiatives. Thus, structural capital refers to an organisation's capacity to cater to its customers' demands. Past studies have posited that a microfinance institution's performance could be improved when there are highly efficient and skilled employees who deliver high quality and efficient services as well as a good organisational structure (Kamaluddin & Kasim, 2013). On the other hand, even if an organisation has a knowledgeable and skilled employee, the entire intellectual capital has not reached its full capacity when it offers less than stellar structural capital (Khalique, Bontis, Abdul, Abu, & Isa, 2015). Based on these arguments, it is hypothesised that:

H3: Structural capital (SC) is positively related to MFIs performance

Social Capital

Social capital comprises of the relationships and norms that determine how much and how good an institution interacts with people. Grootaert and Bastelaer (2001) posited that social capital could accelerate the economy and social expansions. Meanwhile, according to Hassan (2014) social capital is critical in rectifying constraints in the financial, human, and natural capital. It is argued that social capital not only strengthens a society, it also plays an important role in unifying them. Scholars have deemed microfinance as a saviour for the poor; Temple and Johnson (1998) stated that ethnic diversity, social mobility, and the prevalence of telephone services in several sub-Saharan African countries act as proxies for the density of social networks. They shared several related items into an index of 'social capability' to explain significant amounts of variation in the national economic growth rates. Poverty was frequently determined by the social rather than financial factor (Rahman & Dean, 2013) because socioeconomic factors concerning customers, such as low numerical skills, different languages, locations of borrowers, customers' unfamiliarity with documentations, accounting practices, and ethnicity, contribute to unproductive operations. Similarly, social capital can enhance economic outcomes indirectly if it appeals to the political interest of the government. Based on these discussions, the following hypothesis is developed:

H4: Social capital (SO) is positively related to MFIs' performance

METHODOLOGY AND MODEL

This research was conducted on 19 MFIs in Malaysia. Structured questionnaires were administrated as the research instrument to collect data from the respondents. The first part of the questionnaires was related to the components of IC (human capital, customer capital, structural capital and social capital). The second part focused on the performance of microfinance institutions, and the third part probed the respondents' profile. All the items in the first and second part used a seven-point Likert scale (where 1 means 'strongly disagree' and 7 means 'strongly agree'). Table 1 presents the measures used in the study and their respective sources. The intellectual capital construct was measured via 29 items which were represented by

four dimensions namely HC, customer capital, structural capital, and social capital, whereas the exogenous variable of MFIs' performance was measured through 11 items. Structured questionnaires were distributed to 300 respondents of MFIs from each of the 15 states in Malaysia. The respondents were senior executives, managers, and higher-level management who work with financial institutions that provide microcredit in Malaysia. The judgemental sampling method was employed to recruit the sample for this study since the responses were limited to financial institutions registered under Bank Negara Malaysia (BNM). The data collection was conducted between October and December 2016. According to Awang, Asyraf and Asri (2015), respondents suitable for representing their company were selected based on the researcher's decision.

Table 1: Operationalisation of Constructs

Constructs	Definitions	Items	Source
Human Capital	The level of education, skills, knowledge, experience, attitude, and ability of employees that allow them to complete their job specification and contribute to the organisation's goal.	6	Ngah (2009); Amrizah and Rashidah (2013); Khalique <i>et al.</i> (2015)
Customer Capital	The cooperation among the external and internal factors of an organisation which consists of staffs, customers, suppliers and competitors.	7	Ngah (2009); Amrizah and Rashidah (2013); Khalique <i>et al.</i> (2015)
Structural Capital	Knowledge entrenched in a firm not owned by employees such as, system, structure, strategy, patents, trademarks, culture and norms, which build the innovative capability of the organisation towards success.	9	Ngah (2009); Kamaluddin & Rahman (2013); Khalique <i>et al.</i> (2015)

Social Capital	An organisation, network, and norm that leads the society towards a quality and efficient social relationship.	7	Khalique <i>et al.</i> (2015)
MFIs Performance	Refers to the ability of MFIs to cover their operating costs and payments for their employees, while consistently making profits without relying on donors, grants, and subsidies from the government, despite possessing the ability to reach more people.	11	Hamoudah (2015)

In this study, the target respondents comprised of senior executives, managers, and higher-level management of MFIs who were involved in the internal management and development of the institutions. The sample size of the respondents for this study was calculated using G-power software, whereby; the minimum sample size required was determined. Since the model had a maximum of four predictors (for the outcome variable of MFIs' performance), the effect size was set to medium (0.15), and the required power was 0.80. In the field of social science, the minimum acceptable has been set to 80% (Gefen, Rigdon, & Straub, 2011). As the sample size required was 85; hence data collected was slightly larger than the required number. A total of 145 managers participated in this study. This accounted for 48% in response rate, which is considered satisfactory (Sekaran & Bougie, 2010). Meanwhile, the model in Figure 1 was measured by using SmartPLS 3.2.5, namely bootstrapping and path modelling (Chin, 2010; Tenenhaus & Esposito, 2005; Wetzels, Odekerken-Schröder & Oppen, 2009).

There are two stages in a PLS analysis; measurement model, and structural model. The measurement model requires the measures' reliability and validity to be assessed where the validity is measured through convergent validity and discriminant validity. Reliability is measured by examining the Composite Reliability (CR). Consequently, structural model testing was conducted after the development of the measurement model to analyse the hypothesised relationships between critical success factors and organisational performance.

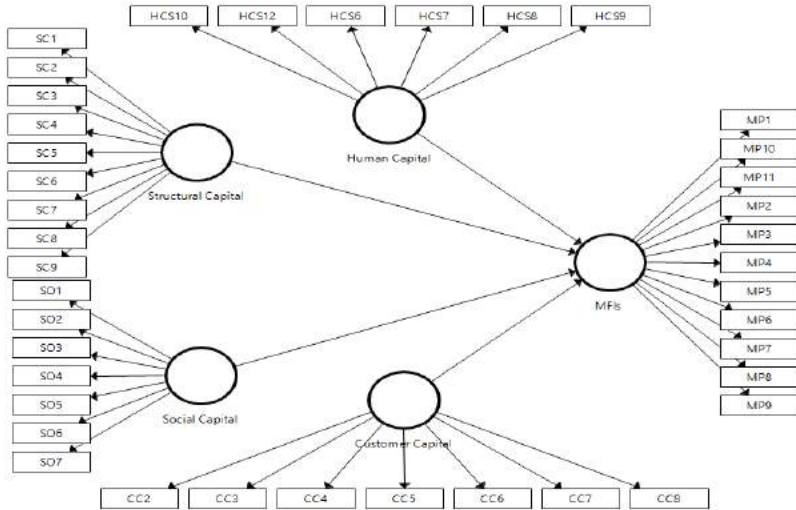


Figure 1: Research Model

THE FINDINGS

Respondent's Profile

Out of 300 surveys instruments distributed, 145 surveys (48.3%) were returned and usable. Table 2 shows that majority (91 or 62.8%) of the respondents held senior management positions, 48 (33.1%) respondents held middle management positions, and 6 (4.1%) respondents held top management positions. Out of the 145 respondents, 86 (59.3%) were male, and the remaining respondents (40.7%) were female. Most of the respondents had Bachelor's Degree (58.6%), 18 respondents (12.4%) obtained Master's Degree/MBA, 32 respondents (22.1%) had Diplomas, and only 10 (6.9%) respondents had *Sijil Pelajaran Malaysia* (SPM). Although this study is comprised of respondents from almost all the 15 states in Malaysia, most respondents were from Kuala Lumpur (38; 26.2%), followed by Selangor (37; 25.5%), Negeri Sembilan (15; 10.3%), Sarawak (13; 9%), Johor (12; 8.3%), and Kedah (five; 3.4%). Perlis, Terengganu, and Perak had four respondents each (2.8%), while Melaka, Pahang, and Kelantan each had three respondents (2.1%). Sabah meanwhile recorded

two respondents (1.4%), and Pulau Pinang and Putrajaya contributed one respondent (0.7%) each. In regards to the MFIs managers that responded, 14 were from Bank Muamalat Malaysia Berhad (9.7%), 13 from Bank Rakyat (9%), 12 from BSN (8.3%), 15 from Maybank Berhad (10.3%), six from Public Bank Berhad (4.1%), 14 from AgroBank (9.7%), five from CIMB Bank Berhad (3.4%), two from United Overseas Bank (1.4%), three from AmBank (2.1%), 13 from TEKUN Nasional (9%), 11 from AIM (7.6%), 15 from Yayasan Hijrah Selangor (10.3%), 11 from SME Bank (7.6%), eight from MARA (5.5%), and two from CGC (1.4%). A summary of the respondents' profile is provided in Table 2.

Table 2: Demographic Profile

Demographic variables	Category	Respondents (N=145)	
		Frequency	Percentage (%)
Position	Top	6	4.1
	Senior	91	62.8
	Middle	48	33.1
Gender	Male	86	59.3
	Female	59	40.7
Academic Qualification	Master's Degree	18	12.4
	Bachelor	85	58.6
	Diploma	32	22.1
	SPM	10	6.9

Location	Johor	12	8.3
	Kedah	5	3.4
	Kelantan	3	2.1
	Kuala Lumpur	38	26.2
	Terengganu	4	2.8
	Perlis	4	2.8
	Perak	4	2.8
	Pulau Pinang	1	0.7
	Putrajaya	1	0.7
	Sabah	2	1.4
	Melaka	3	2.1
	Pahang	3	2.1
	Selangor	37	25.5
	Negeri Sembilan	15	10.3
	Sarawak	13	9.0
List of MFIs	Bank Muamalat Malaysia Berhad	14	9.7
	Bank Rakyat	13	9.0
	Bank Simpanan Nasional	12	8.3
	Maybank Berhad	15	10.3
	Alliance Bank	1	0.7
	Public Bank Berhad	6	4.2
	Agro Bank	14	9.7
	CIMB Bank	5	3.4
	United Overseas Bank	2	1.4
	AmBank	3	2.1
	TEKUN Nasional	13	9.0
	Amanah Ikhtiar Malaysia	11	7.6
	Yayasan Hijrah Selangor	15	10.3
	SME Bank	11	7.6
	Majlis Amanah Rakyat	8	5.5
	Credit Guarantee Corporation	2	1.4

ASSESSMENT OF THE MEASUREMENT MODEL

Confirmatory factor analysis (CFA) was done to determine the measures' reliability, convergent validity, and discriminant validity. To assess the convergent validity, Hair, Black, Babin, and Anderson (2010) suggested the use of factor loadings while Average Variance Extracted (AVE), and Composite Reliability (CR) could be used to assess convergent validity. As shown in Table 3, most item loadings are higher than 0.5 (significant at $p < 0.01$), all Average Variance Extracted (AVE) exceeded 0.5 (Bagozzi, 1988), and the Composite Reliability (CR) for all the variables are more than 0.7 (Gefen, Straub, & Boudreau, 2000). In the meantime, in this study, we have used the Heterotrait Monotrait (HTMT) discriminant criterion to validate discriminant validity as suggested by Henseler, Ringle, and Sarstedt (2015). Henseler *et al.* (2015) posited the correlation value between constructs that is less than one shows that discriminant validity is achieved. However, we have chosen to follow a more conservative threshold of 0.85, indicating a clearer difference between the constructs (Clark & Watson, 1995; Kline, 2011). Table 4 presents the correlation estimates for the HTMT evaluations. The correlation value between the constructs was less than 0.85, hence, confirming that the discriminant validity was met via the HTMT assessment.

Table 3: Result Measurement Model

Constructs	Loadings	CR ^a	AVE ^b
Human Capital			
HC6	0.723	0.895	0.587
HC7	0.743		
HC8	0.779		
HC9	0.838		
HC10	0.762		
HC12	0.748		
Customer Capital			
CC2	0.800	0.930	0.654
CC3	0.759		
CC4	0.842		
CC5	0.837		
CC6	0.845		
CC7	0.779		
CC8	0.797		

Structural Capital			
SC1	0.795	0.949	0.672
SC2	0.768		
SC3	0.850		
SC4	0.877		
SC5	0.817		
SC6	0.796		
SC7	0.787		
SC8	0.854		
SC9	0.829		
Social Capital			
SO1	0.780	0.930	0.654
SO2	0.813		
SO3	0.815		
SO4	0.841		
SO5	0.824		
SO6	0.783		
SO7	0.801		
MFIs Performance			
MF1	0.787	0.956	0.663
MF2	0.838		
MF3	0.794		
MF4	0.795		
MF5	0.852		
MF6	0.814		
MF7	0.830		
MF8	0.800		
MF9	0.814		
MF10	0.774		
MF11	0.851		

Notes: ^a Composite Reliability (CR) = (square of the summation of the factor loadings)/ [(square of the summation of the factor loadings) + (square of the summation of the error variances)]

^b Average Variance Extracted (AVE) = (summation of the square of the factor loadings)/ [(summation of the square of the factor loadings) + (summation of the error variances)]

Table 4: Discriminant Validity (HTMT)

Constructs	HC	CC	SC	SO	MFIs
HC					
CC	0.758				
SC	0.684	0.801			
SO	0.738	0.801	0.828		
MFIs	0.680	0.787	0.812	0.758	

Note: HC=Human Capital, CC=Customer Capital, SC=Structural Capital, SO=Social Capital, MFIs=Microfinance Performance

ASSESSMENT OF THE STRUCTURAL MODEL

In estimating the structural model, this study follows the practice of past researchers (Nor Irvoni & Rosmimah, 2016), who applied the bootstrapping procedures with 5000 iterations. This is to allow a more accurate error estimates. The results of the hypothesis testing are shown in Figure 2.

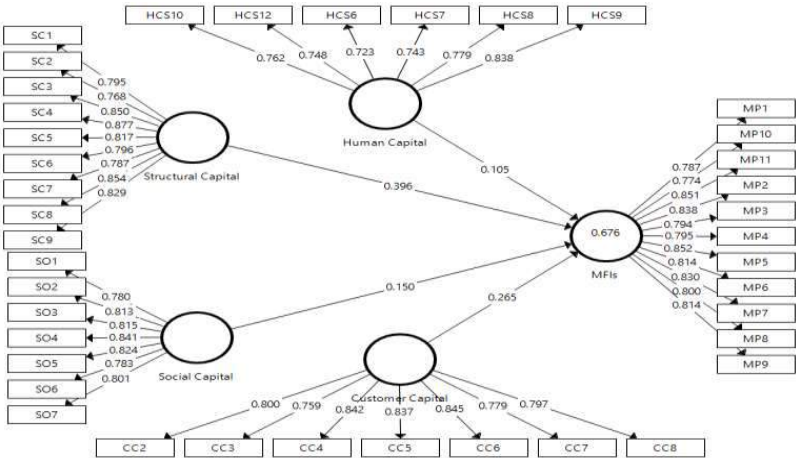


Figure 2: Result of Path Analysis

Table 5 outlines the path coefficients, observed t-statistics, and significance levels for all the hypothesised paths. According to past works such as Hair, Sarstedt, Hopkins, and Kuppelwieser (2014) and Henseler, Ringle, and Sinkovics (2009), the acceptable *t*-values to ascertain the

significance level in the one-tailed test are 1.28 (10% significance level at $p < .10$), 1.645 (5% significance level at $p < .05$), and 2.33 (1% significance level at $p < .01$). Based on the result, we found two variables that showed significant positive relationships with MFIs' performance. In this light, two hypotheses, namely, H2 (customer capital) and H3 (structural capital) are supported while H1 (human capital) and H4 (social capital) are not supported. In this regard, the structural model validation shows satisfactory results. The R² value was significant at 67.6% for the endogenous variable, thus establishing a solid explanatory power.

Table 5: Path Coefficient and Hypothesis Testing

Hypothesis	Relationship	Std Beta	T-value	LL	UL	Supported
H1	HC → MFIs	0.105	1.560	- 0.007	0.204	NO
H2	CC → MFIs	0.265	2.581	0.097	0.440	YES
H3	SC → MFIs	0.396	4.447	0.253	0.548	YES
H4	SO → MFIs	0.150	1.457	- 0.010	0.304	NO

Note: HC=Human Capital, CC=Customer Capital, SC=Structural Capital, SO=Social Capital, MFIs=Microfinance Performance

SUMMARY AND CONCLUSION

Intellectual capital (IC) holds an equally important place with capital investments in creating value and sustainable advantages, particularly for companies in developing countries. Thus, there is a need for developing countries to balance resources when investing in physical investments and IC (Chen, Cheng, & Hwang, 2005), as human capital reflects an individual's economic value. Meanwhile, it is argued that having human intellectuality and competency are not enough to ensure the effectiveness of human resource management and organisational performance. Past studies have shown that human capital alone could not contribute to the core competence of an organisations' performance. Thus, there is a need for human capitals to obtain the required organisational capital, such as structural capital (Bontis *et al.*, 2000). A research by Muhammad and Ismail (2009) have shown that human capital is not significantly related to the performance of a company. Strong processes and organisational values embedded in the structural capital are required to assist in the human capital development. These, in turn, ensures efficiency or quality service that will result in the higher performance of microfinance institutions (Kamaluddin & Kasim, 2013). With regards to an organisation's financial and market performance,

institutions with higher IC components are more capable of competing in the market (Kamaluddin & Rahman, 2013) regardless of the industrial sector they are in (Bontis *et al.*, 2000). As such, companies should balance their human, customer, and structural capitals. It can be concluded that IC has a highly significant relationship with the performance of microfinance institutions.

This study also posits that awareness of the status of IC performance among practitioners within the banking sector, and more rigorous effort among practitioners are needed to enhance MFIs performance and consequently, the entire sector. Furthermore, the results highlight the importance of human element in value creation in the MFI industry; hence, the management of the MFIs need to pay considerable attention to their human capital (Wang & Chang, 2005). Managers can increase profitability and improve performance of their firms by using the value-added IC (VAIC) method for evaluating and managing IC in firms (Hejazi, Ghanbari, & Alipour, 2016). They should portray sensible consideration for their institutions by taking care of their IC and encouraging the practice of recognising intangible assets, especially their employees' expertise and capabilities. Based on the present study's findings, it is suggested that future researchers focus on collection of data for exogenous variables (using survey) from managers of the MFIs, while endogenous variable is collected from the financial statement (secondary data) of the MFIs. This will prevent the issue of common method variance. Besides, it is also recommended for future researchers to organise interview sessions with the managers to obtain definite and more concrete result.

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SIMPLIFIED RELIABLE ONLINE ESSAY TEST MARKING FOR MASSIVE OPEN ONLINE COURSE (MOOC) USING RASCH MODEL ANALYSIS

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ABSTRACT

Manual practice in formal examination does not assess accurate measure of a student's ability, as it merely counts the score of every question to be considered for the student's grade. There are many educators who have used raw score as a form of measurement for a student's ability, but it never truly measures the right measurement. The raw score should be converted into the right linear metrics for ability measurement. This procedure contains measuring score of accurate student's ability in LOGIT unit, providing of student's result profile, and measuring reliability of the test set and the student's answers. The procedure is designed for massive open online learning and paperless essay-based test which is more difficult to be analysed. This procedure converts the student's answer into rubrical ratio-based scale to be more accurately measured. It is definitely better than the common practice of merely analysis on raw marks for each question. It would show true student's performance of cognitive performance (test) which represents the true student's ability (in LOGIT unit), in order to accurately measure the right outcome. This new paradigm of assessment is fit to be applied for massive numbers on online students. It uses Rasch model which offers reliable solution in producing accurate ability marks for students, together with scientific reliability score for student's answer.

Keywords: student's performance, accurate measure, MOOC, rasch model

INTRODUCTION

Evaluation is an important component of education. The right instrument and right method make assessment easier and more accurate. Outcome-based learning calls for the evaluation of the subject learning outcomes, as specified in every course description. For years, the evaluation method has been largely dependent on student's performance in tests, quizzes or submission of assignments with major assessment in the final examination. Traditionally, marking on papers and accumulating the raw marks are common practice. However, measurement of student's achievement was merely counted from the marks allocated for every question. The observed outcomes remain vague. Very rarely in our practice do we provide the construct validity score or the questionnaire reliability score for the set of questions. It would be more difficult in huge class or massive open online course. This is a conceptual paper which describes a simple procedure for assessing student's online performance using Rasch Analysis that can be used to measure any course's learning outcomes.

PROBLEM STATEMENT

In educational assessment, there are still many educators who use raw scores as a form of measurement for student's ability, but raw scores have never been a true measure (Aziz, A. A., 2012; 2008; Bond, 2007; Wright, 1989). Not all educators are proper researchers. Therefore, there is a crucial need to provide a simplified model as a bridge between accurate scientific analysis in research and raw educational assessment, as well as to upgrade the quality of student's ability assessment to be more accurate and reliable. In addition, it is difficult to analyse student's response especially in essay-based test. In addition to that, online marking and paperless essay test for a huge open number of students like MOOC would be more complicated, as it should be printed and marked one by one. This simplified procedure proposes the method of rubrical marks for student's responses without any need of printed answer script.

RESEARCH OBJECTIVES

- (a) To implement a rubrical analysis or assessment for the massive open online essay-based test using the Rasch Measurement Model.
- (b) To produce a reliable and accurate measurement procedure for students' essay-based performance.

DISCUSSION 1: MOOC ONLINE MARKING AND ANALYSIS PROCEDURE USING RASCH MODEL

MOOC is the massive open online learning which is open to all. It was purposely designed for huge numbers of students and require a procedure that caters to the needs of massive numbers of exercises and tests. We need a new paradigm of test evaluation online marking with simple but reliable steps. The proposed simplified procedure needs only five simple steps to be applied. The answers will be marked online according to designated rubrics. This pilot study was conducted based on the Environmental Ethics (IPK661) June 2016 Final Examination paper of a class of 15 students from the Environmental Technology programme (EVT229), Faculty of Applied Science, Universiti Teknologi MARA Malaysia. The set has one question with four sub questions, and three questions with three sub questions. Each sub question carried one, two or three marks. The answers have been submitted via online drawer and the rubrical marks would be keyed into EXCEL format and saved as prn format. With one click, it opens the .prn file via Bond& Fox Steps. With a few more clicks, it displays the reliability score for the question set and student's answer. The next step is to relook or review the question item to determine if the reliability score is low or not acceptable. With one more click, we have the result of students (in rank order) within log odd unit (logit) unit or probabilistic ratio-based measure. Any kind of human ability measure should be assessed using this kind of measurement, not merely calculating the marks given to each question. This method provides a more comprehensive analysis of each student's unique problems. The last step was to provide percentile marks converted from the logit unit which is based on probabilistic calculation in accordance to norm-based assessment and difficulty level of question set (refer Table 1).

A comprehensive but simplified procedure of measurement has been done and it could be simplified as follows:

Table 1: Five Simplified Steps

STEPS	ACTIVITIES	TOOLS
1 st step	Students' answers scripts will be read online (paperless)	Student's Answer Online
2 nd step	Marks will be given in according to rubrics	Rubrics Table
3 rd step	Reliability Analysis (using analysis by Rasch model)	Excel and Bond& Fox Steps
4 th step	Students' profiling, reliability score will be produced	Bond&Fox Steps
5 th step	Probability Analysis for Percentile Educational Grade	M2M Template

Table 2: Raw Marks vs Rubrical Score

Type	Rubrics Code			
Marks/Answer	1	2	3	4
1 mark	0	0.1 - 0.33	0.34 - 0.67	0.68 - 1
2 marks	0	0.1 - 0.66	0.68 - 1.33	1.34 - 2
3 marks	0	0.1 - 1	1.1 - 2	2.1 - 3

The rubrical value would be keyed in to EXCEL format (refer Table 2) and saved as .prn format. The .prn file would be opened using Bond&Fox Steps. A few clicks resulted in the display of reliability score for the question set and students' answers which were acceptably reliable ($ir=0.56$) and ($pr=0.63$) with Cronbach alpha value at 0.65 (refer Figure 1). In future practice, this result will help teachers and educators to evaluate the quality of test questions before distributing to the students.

TABLE 3.1 FINAL EXAM RESULT					ZOU713WS.TXT Aug 18 12:15 2016				
INPUT: 15 Persons 44 Items			MEASURED: 15 Persons		44 Items 4 CATS			1.0.0	
SUMMARY OF 15 MEASURED Persons									
	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	
MEAN	130.9	44.0	.45	.16	1.02	.0	1.00	-.1	
S. D.	10.6	.0	.29	.02	.24	1.2	.25	1.1	
MAX.	151.0	44.0	1.06	.20	1.49	2.3	1.52	2.1	
MIN.	114.0	44.0	.03	.15	.63	-2.3	.61	-2.1	
REAL RMSE	.17	ADJ. SD	.23	SEPARATION	1.32	Person RELIABILITY		.63	
MODEL RMSE	.16	ADJ. SD	.24	SEPARATION	1.44	Person RELIABILITY		.67	
S. E. OF Person MEAN = .08									
Person RAW SCORE-TO-MEASURE CORRELATION = 1.00									
CRONBACH ALPHA (KR-20) Person RAW SCORE RELIABILITY = .65									
SUMMARY OF 44 MEASURED Items									
	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	
MEAN	44.6	15.0	.00	.29	.98	-.1	1.00	.0	
S. D.	5.7	.0	.47	.06	.44	1.5	.48	1.5	
MAX.	57.0	15.0	.98	.59	1.99	2.6	2.17	2.8	
MIN.	30.0	15.0	-1.62	.24	.28	-3.5	.28	-3.2	
REAL RMSE	.31	ADJ. SD	.35	SEPARATION	1.12	Item RELIABILITY		.56	
MODEL RMSE	.29	ADJ. SD	.37	SEPARATION	1.25	Item RELIABILITY		.61	
S. E. OF Item MEAN = .07									
U-MEAN=.000 USCALE=1.000									
Item RAW SCORE-TO-MEASURE CORRELATION = -.97									
660 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 1536.50									

Figure 1: Summary of Reliability and Cronbach Alpha Values

The last procedure in this study was to analyse the rubrical values of student's answers to be in a linear metrics, which is in logit unit.

Out of the 15 students, 13 passed the examination with scores between 51-80 marks, while two of them failed with 41 and 46.5 marks (refer Figure 3). After all these marks were converted into LOGIT unit, the result showed that all students have positive result, but only six of them exceeded the mean value (0.43) which means above 50%. Student's ability score was between 0.03 to 1.06 logit. It could be concluded that the use of raw marks for every question does not show the real values of student's ability. From the table below (refer Figure 2), we could conclude student with ID S6454 is excellent and able to answer all questions, and all students could answer the mean level of questions.

TABLE 17.1 FINAL EXAM RESULT ZOU713WS.TXT Aug 18 12:15 2016
 INPUT: 15 Persons 44 Items MEASURED: 15 Persons 44 Items 4 CATS 1.0.0

Person: REAL SEP.: 1.32 REL.: .63 ... Item: REAL SEP.: 1.12 REL.: .56

Person STATISTICS: MEASURE ORDER

ENTRY NUMBER	RAW SCORE	COUNT	MEASURE	MODEL S. E.	INFI MNSQ	INFI ZSTD	OUTFI MNSQ	OUTFI ZSTD	PTMEA CORR.	EXACT OBS%	MATCH EXP%	Person
11	151	44	1.06	.20	1.49	1.7	1.52	1.6	.09	38.6	51.0	S6454
12	147	44	.90	.19	1.11	.5	.99	.1	.50	59.1	48.4	S2876
2	143	44	.77	.18	.83	-.7	.78	-.8	.43	52.3	44.5	S4204
8	140	44	.67	.17	1.16	.8	1.19	.8	.17	43.2	42.4	S3678
3	135	44	.53	.16	1.20	1.0	1.14	.7	.30	40.9	37.5	S8264
4	135	44	.53	.16	.85	-.7	.82	-.8	.56	38.6	37.5	S2457
10	130	44	.40	.16	.63	-2.3	.61	-2.1	.44	40.9	37.0	S1634
1	128	44	.35	.16	1.11	.6	1.01	.1	.59	27.3	36.9	S5522
6	128	44	.35	.16	1.45	2.3	1.47	2.1	.01	31.8	36.9	S4537
14	128	44	.35	.16	.93	-.3	.92	-.4	.48	36.4	36.9	S6712
7	127	44	.33	.16	1.02	.2	1.09	.5	.24	43.2	36.2	S8145
5	123	44	.23	.15	.73	-1.7	.66	-2.0	.48	47.7	34.9	S3886
15	118	44	.12	.15	.86	-.8	.85	-.8	.51	25.0	33.0	S3498
9	117	44	.09	.15	1.07	.5	1.11	.7	.08	34.1	31.4	S5116
13	114	44	.03	.15	.84	-1.0	.86	-.8	.56	20.5	31.4	S7568
MEAN	130.9	44.0	.45	.16	1.02	.0	1.00	-.1		38.6	38.4	
S.D.	10.6	.0	.29	.02	.24	1.2	.25	1.1		9.9	5.6	

Figure 2: Person Fit Order

From the above analysis, all students fit into the model, which means those students are normal and their answers are reliable. The rank of student's ability was shown clearly, in which the student with ID S6454 scores 1.06 logit to be the most capable students in answering questions, while the student with ID S7566 scores the lowest value, which is 0.03 logit (refer Table 3).

Table 3: Raw Marks vs Ability Metrics Score

Students	Raw Marks (%)	Ability Metrics (LOGIT)
S2876	80	0.9
S7568	74	0.03
S6454	70	1.06
S4204	66.5	0.77
S8264	62.5	0.53
S3678	62.5	0.67
S2457	61	0.53
S1634	60.5	0.4
S6712	60.5	0.35
S4537	58.5	0.35
S5522	57.5	0.35

S3886	57	0.23
S5116	51	0.09
S8145	46.5	0.33
S3498	41	0.12

Using this procedure, students would be assessed according to their ability, not merely on counting raw marks provided for each question. After the analysis, it was found that the best student with raw marks (80) is not the best able student in logit (0.9). Similar to that finding, the weakest student with raw marks (41) is not the least able student in logit (0.12). The most able student (1.06) is the student who obtained 70 marks, who was the third in rank, while the second best student with raw marks (74) was actually the least able student in logit. For further study, it would be interesting to find the correlation between student's marks in the final examination and student's ability performance using logit unit.

Face validity essentially looks at whether the scale appears to be a good measure of the construct 'on its face'. While construct validity is referring to the analysis or outcome of the theories and ideas on the study being carried out. The actual instrument construct that was developed should reflect the theories initiated or chapters taught, in case of assessing educational course outcomes. For the face validity, the committee endorsed the question set as the valid and reliable instrument for the course assessment. Reliability wise, it was agreed that the use of such instrument would lead the way to understand the course accordingly. In educational practice, students are respondents and their answers could be analysed for the reliability of test questions or instrument's construct (refer Figure 3).

TABLE 3.1 FINAL EXAM RESULT					ZOU713WS.TXT Aug 18 12:15 2016			
INPUT: 15 Persons 44 Items		MEASURED: 15 Persons 44 Items		4 CATS 1.0.0				
SUMMARY OF 15 MEASURED Persons								
	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD
MEAN	130.9	44.0	.45	.16	1.02	.0	1.00	-.1
S.D.	10.6	.0	.29	.02	.24	1.2	.25	1.1
MAX.	151.0	44.0	1.06	.20	1.49	2.3	1.52	2.1
MIN.	114.0	44.0	.03	.15	.63	-2.3	.61	-2.1
REAL RMSE	.17	ADJ. SD	.23	SEPARATION	1.32	Person RELIABILITY		.63
MODEL RMSE	.16	ADJ. SD	.24	SEPARATION	1.44	Person RELIABILITY		.67
S.E. OF Person MEAN = .08								
Person RAW SCORE-TO-MEASURE CORRELATION = 1.00								
CRONBACH ALPHA (KR-20) Person RAW SCORE RELIABILITY = .65								
SUMMARY OF 44 MEASURED Items								
	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD
MEAN	44.6	15.0	.00	.29	.98	-.1	1.00	.0
S.D.	5.7	.0	.47	.06	.44	1.5	.48	1.5
MAX.	57.0	15.0	.98	.59	1.99	2.6	2.17	2.8
MIN.	30.0	15.0	-1.62	.24	.28	-3.5	.28	-3.2
REAL RMSE	.31	ADJ. SD	.35	SEPARATION	1.12	Item RELIABILITY		.56
MODEL RMSE	.29	ADJ. SD	.37	SEPARATION	1.25	Item RELIABILITY		.61
S.E. OF Item MEAN = .07								
UMEAN=.000 USCALE=1.000								
Item RAW SCORE-TO-MEASURE CORRELATION = -.97								
660 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 1536.50								

Figure 3: Reliability of Questions and Students

In this study, the analysis showed that the question set has low reliability which is 0.56 value, student's answer also has low reliability value at 0.63 score. The Cronbach Alpha value also showed that the test reliability is low at 0.65 score. This means, although the examination questions prepared by the university has low reliability and the student's answer is also of low reliability, still it was accepted. In our current practice, the reliability of question paper and student's answers are seldom checked or analysed. Our examination therefore remains untested and possibly unfair for the students.

TABLE 17.1 FINAL EXAM RESULT ZOU713WS.TXT Aug 18 12:15 2016
 INPUT: 15 Persons 44 Items MEASURED: 15 Persons 44 Items 4 CATS 1.0.0
 Person: REAL SEP.: 1.32 REL.: .63 ... Item: REAL SEP.: 1.12 REL.: .56

Person STATISTICS: MEASURE ORDER

ENTRY NUMBER	RAW SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ ZSTD	OUTFIT MNSQ ZSTD	PTMEA CORR.	EXACT OBS5	MATCH EXP	Person
11	151	44	1.06	.20	1.49	1.7	1.52	1.6	.09	38.6 51.0 S6454
12	147	44	.90	.19	1.11	.5	.99	.1	.50	59.1 48.4 S2876
2	143	44	.77	.18	.83	-.7	.78	-.8	.43	52.3 44.5 S4204
8	140	44	.67	.17	1.16	.8	1.19	-.8	.17	43.2 42.4 S3678
3	135	44	.53	.16	1.20	1.0	1.14	.7	.30	40.9 37.5 S8264
4	135	44	.53	.16	.85	-.7	.82	-.8	.56	38.6 37.5 S2457
10	130	44	.40	.16	.63	-2.3	.61	-2.1	.44	40.9 37.0 S1634
1	128	44	.35	.16	1.11	.6	1.01	.1	.59	27.3 36.9 S5522
6	128	44	.35	.16	1.45	2.3	1.47	2.1	.01	31.8 36.9 S4537
14	128	44	.35	.16	.93	-.3	.92	-.4	.48	36.4 36.9 S6712
7	127	44	.33	.16	1.02	.2	1.09	.5	.24	43.2 36.2 S8145
5	123	44	.23	.15	.73	-1.7	.66	-2.0	.48	47.7 34.9 S3886
15	118	44	.12	.15	.86	-.8	.85	-.8	.51	25.0 33.0 S3498
9	117	44	.09	.15	1.07	.5	1.11	.7	.08	34.1 31.4 S5116
13	114	44	.03	.15	.84	-1.0	.86	-.8	.56	20.5 31.4 S7568
MEAN	130.9	44.0	.45	.16	1.02	.0	1.00	-.1		38.6 38.4
S.D.	10.6	.0	.29	.02	.24	1.2	.25	1.1		9.9 5.6

Figure 4: Student's Fit Order

Not only can this procedure verify validity of the examination paper, it can also recognise true normal good students or students with problems, or abnormal (unique) students, individually (refer Figure 4). This is very important to be observed and wisely taken into consideration, as the assessment is done onto human ability. From the above analysis, all students fit with the model, which means they are normal and their answers are reliable. If necessary, this accurate logit unit could be simply converted into percentile marks, as our usual practice in examination grading, using the template below (refer Figure 5).

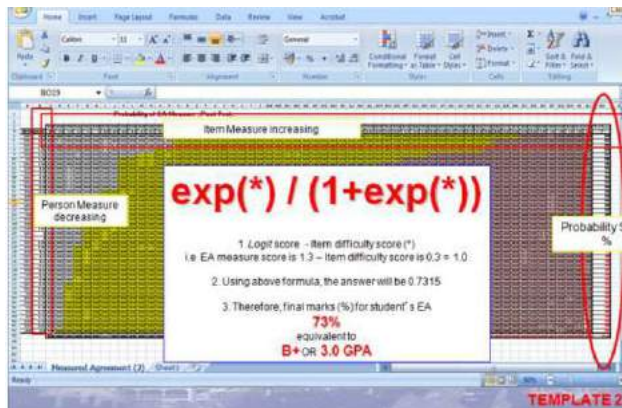


Figure 5: Template for Logit Conversion to Percentile

All these procedures have been done online and paperless, using Excel and Bond & Fox Steps software to measure the accurate student's performance via essay-based examination, as well as for instrument and responses' reliability, and it is simplified.

DISCUSSION 2: WHY DO WE NEED RASCH FOR STUDENT'S PERFORMANCE ASSESSMENT?

Measurement is fundamental in education. A comprehensive and effective education contains of good content, wise objective, positive outcomes, effective instructions and right assessment with fair and accurate measurement (Fisher, 2007; Linacre, 2000). Rasch measurement model (RMM) has been accepted worldwide as a better method to verify the validity of measurement construct (test question construct) and accurate measure of student's ability in logit (log odd unit) scale. Recent years have seen increasing interest among researchers to apply RMM in social science studies, especially on psychometric measurement, but not many teachers, lecturers or educators use RMM in educational assessment. This procedure will help educators to precisely and accurately measure the ability of students within simplified steps. This model is in parallel with the aspiration of the national educational policy which stresses much on outcome-based education. This model has produced comprehensive templates and procedures of analysis for lecturers/ teachers/ educators to use as basic reliable assessment. With Bond & Fox Steps software, educators can transform ordinal data (answer's score/ marks) into equal interval scale (probability of student's ability) which is more precise and accurate in psychometrical result, rather than normal result with calculation of raw score (Linacre, 2000). This should be used for accurate student's performance as a better alternative compared to the current practice which counts merely the raw score marks. This procedure provides linear metrics of ratio-based measurement in LOGIT as practiced in most developed countries. The common practices in our current examination use essay based approach and this rubrical analysis is the most compatible solution. This simplified procedure is easy and friendly for all lecturers without the need to understand the details of Rasch statistical analysis or Bond & Fox Steps software in depth.

The use of Rasch Measurement Model (RMM) is based on the several distinguished reasons, as follows:

1. Rasch offers a new paradigm in education longitudinal research.
2. Rasch is a probabilistic model that offers a better method of measurement construct, hence a scale.
3. Rasch gives the maximum likelihood estimate (MLE) of an event outcome.
4. Rasch reads the pattern of an event thus predictive in nature which ability resolves the problem of missing data. Hence, it is more accurate.
5. Rasch transforms ordinal data into equal interval scale, which is more appropriate for humanities and social science research.
6. Rasch measures item and task difficulties, separately and accurately (Mohd Nor Mamat, 2012; Wu, 2007).

CONCLUSION

A well-designed scientifically reliable set of examination questions will give us valid data of student's ability and performance in any course for meaningful accurate assessment. Rasch offers a new paradigm of accurate assessment on human's ability and performances and provides a means for verifying question items, and subsequently the validity of the question set as well as reliability of student's answers. The instrument that measures outcomes of teaching and learning found in student's understanding, comprehending, applying, analysing, synthesizing and evaluating what has been learned is now scientifically vetted, tested and validated, and more importantly is reliable for the purpose. Logit unit, the probabilistic ratio-based measure scale found in this method is more accurate for human performance assessment. In addition, this essay outlines a simplified procedure that may provide the optimal solution for students' assessment the digital and online era, especially for massive numbers of students, online based course, and paperless test through MOOC.

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INSTRUCTIONAL MATERIAL DEVELOPMENT USING ONTOLOGY LEARNING

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ABSTRACT

In a university setting, lecturers are instructional designers responsible to design and develop instructional materials to be used in class. Textbooks and presentation slides are among the sources used in the delivery of knowledge. However, in order to facilitate different students' learning styles, alternatives for textbooks must be considered, allowing the course content to be organised in smaller chunks. This paper describes the development ontology process using ontology learning technique. Ontology is a set of knowledge which contains objects, concepts, entities, and the relationships among them in a particular domain. In this study, the course chosen to analyse the development of ontology is Fundamentals of Computer Science (CSC401). This is an introductory course taken by students during semester one in the Faculty of Computer and Mathematical Sciences. Textbook is the source used in developing this ontology. The technique chosen in this study is a semi-automatic ontology development that can accelerate the process of producing a new ontology, while the development phases involved are the 'extraction of important concepts' and 'representation of ontology'. The result shows that an ontology can be represented in the form of visual graph such as mind map. This matches the learning preference of visual learners and enrich their learning experiences.

Keywords: *instructional design, instructional material, ontology, ontology learning, ontology development*

INTRODUCTION

Facilitating learners in the age of technology means delivering contents through different medium such as interactive mind map. However, there are barriers involved in order to create useful learning materials, for example it is costly, time consuming, and labour intensive even with the existence of detailed course description (Casey & McAlpine, 2002). In this case, ontology is seen as a potential source of solution. Ontology is described as an explicit specification of conceptualisation of objects, concepts, and other entities in the same domain and the relationship between them (Tim Berners-Lee, James Hendler, & Lassila, 2001). It has been praised for its abilities to share and reuse knowledge communicated between human and software agents (Bontas, Mochol, & Tolksdorf, 2005). Existing studies also support the usage of ontology as instructional material (Boyatt & Joy, 2012). One of the ways in which ontology can be represented is through visual graph which resembles the common mind map. Most relevant for instructional designers, the development of ontology can be accelerated through the usage of tools that automate a lot of processes involved in producing ontology of a particular field. This helps instructional designers to reduce the time and effort needed to prepare new instructional materials.

RELATED RESEARCH

This research is inspired by earlier works from other researchers. In a paper entitled 'Developing Learning Materials Using Ontology of Mathematical Logic', Boyatt and Joy (2012) explained how an ontology of mathematical logic is developed. This ontology, which consists of over 500 concepts and 60 categories and subcategories was used to guide the development of units and materials on mathematical logic topics. Next, in another related research to the usage of ontology in the education field, Saad and Shaharin (2016) posited that ontology represents the knowledge in the lesson plan domain. It serves as a guideline for educators to develop their lesson plan by having a central source of information to refer to, hence eliminating the need to filter the abundant amount of information via search engines. This reduces educators' workload and the time taken for them to prepare the needed lesson plan. Meanwhile, in supporting learners to integrate well in non-formal situations, a group of researchers proposed the usage of STUDIO,

which is a domain of ontology-based solution for knowledge discovery in learning and assessment (Weber, Neusch, & Vas, 2016). STUDIO supports learners in allowing for adaptive learning and self-assessment using domain knowledge via self-assessment, reflection, and learning (Weber *et al.*, 2016).

RESEARCH BACKGROUND

In this study, an introductory course in Computer Science is chosen to develop the ontology. Fundamentals of Computer Science (CSC401). Students take this course during semester one in the Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA Malaysia (UiTM). This course, just like all other courses taught in UiTM, is delivered fully in English. Students enrolling in the course come from various backgrounds of computer and English literacy level. It is therefore important that they are supported with instructional materials that can cater to their diverse needs. Textbook used in this course is a popular textbook for teaching any introductory courses in Computer Science. The study focuses on the first chapter of the book, a comprehensive chapter that summarises all subsequent chapters. It is also part of topic one in CSC401's syllabus.

The technique used to develop the ontology chosen in this study is semi-automatic ontology development. Semi-automatic ontology development is less costly and saves a lot of time compared to manual development (Brusa, Caliusco, & Chiotti, 2006). The ontology learning tool used in the ontology development is Text2Onto since the system calculates a confidence for each learned object which is suitable in CSC401's ontology development and can be used for the extraction of important terms (Cimiano & Völker, 2005). Discussions on the rationale and background of these decisions had already been discussed in a previously published paper on a similar project (Ismail, Shahbudin, & Ahmadon, 2017). This paper's focus is on the ontology development stage.

CSC401 ONTOLOGY DEVELOPMENT

The ontology development stage consists of two phases namely the 'extraction of important concepts' and 'representation of ontology' as illustrated in Figure 1.

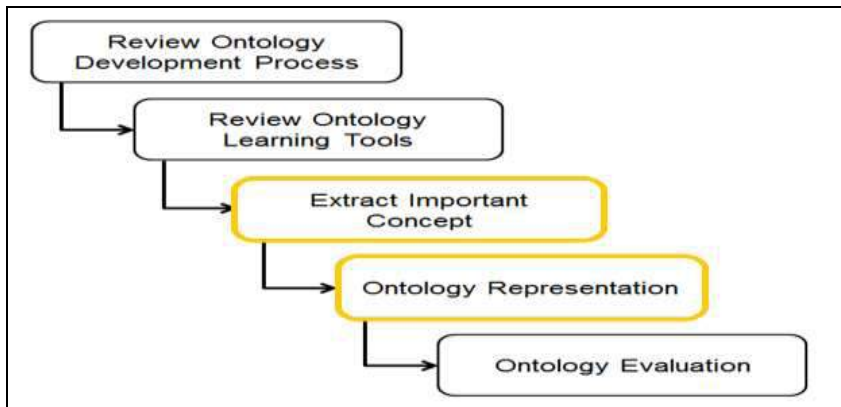


Figure 1: CSC401's ontology development Phases

Phase 1: Extraction of Important Concepts

In this phase, important concepts were extracted and instructional designers were assisted with the usage of Text2Onto as shown in Figure 2. This ontology learning tool is capable of automatically extracting important concepts within the pages of knowledge source.

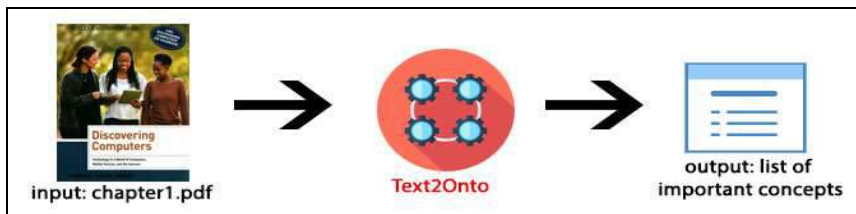


Figure 2: Extracting Important Concepts using Text2Onto

In this study, a softcopy file of the chapter from the textbook was fed into Text2Onto as input. As illustrated in Figure 3, Text2Onto then processed the file and produced an important output list of concepts.

Next, as shown in Figure 4, Text2Onto suggested relevant percentage in determining the concept selection. This phase was done automatically with little input needed from user. From the 92 pages of chapter one from the textbook, Text2Onto highlighted 139 concepts as important.

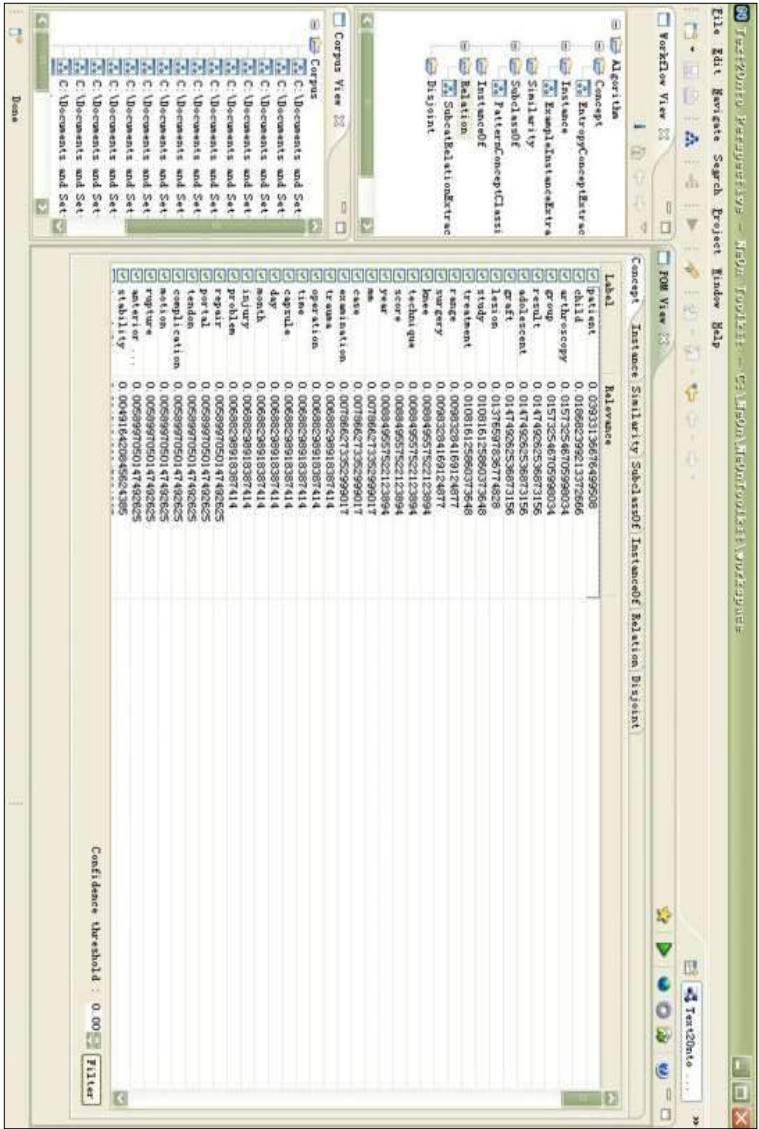


Figure 4: Suggestion of Relevance Percentage in Text2Onto Interface

Phase 2: Representation of Ontology

While the extraction of important concepts phase was done automatically, in the representation of ontology phase, instructional designers as the subject domain experts must manually define the relationships between concepts extracted in previous phase using a selected ontology editor. In this study, Protégé was selected as the ontology editor and the process is visualised in Figure 5.

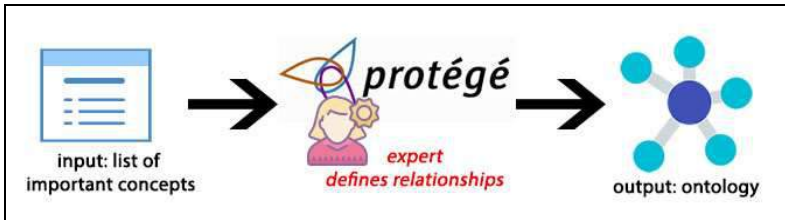


Figure 5: Representation of Ontology using Protégé

The important concepts extracted by Text2Onto from the previous phase were imported into the Protégé ontology editor. Once the concepts were already inside the editor, lecturers teaching CSC401 (subject domain experts) were asked to define relationships between each concept in Chapter One as illustrated in Figure 6. In this study, the subject domain experts adopted 124 out of 139 concepts extracted by Text2Onto and used the relationships *hasTopic* in defining the ontology.

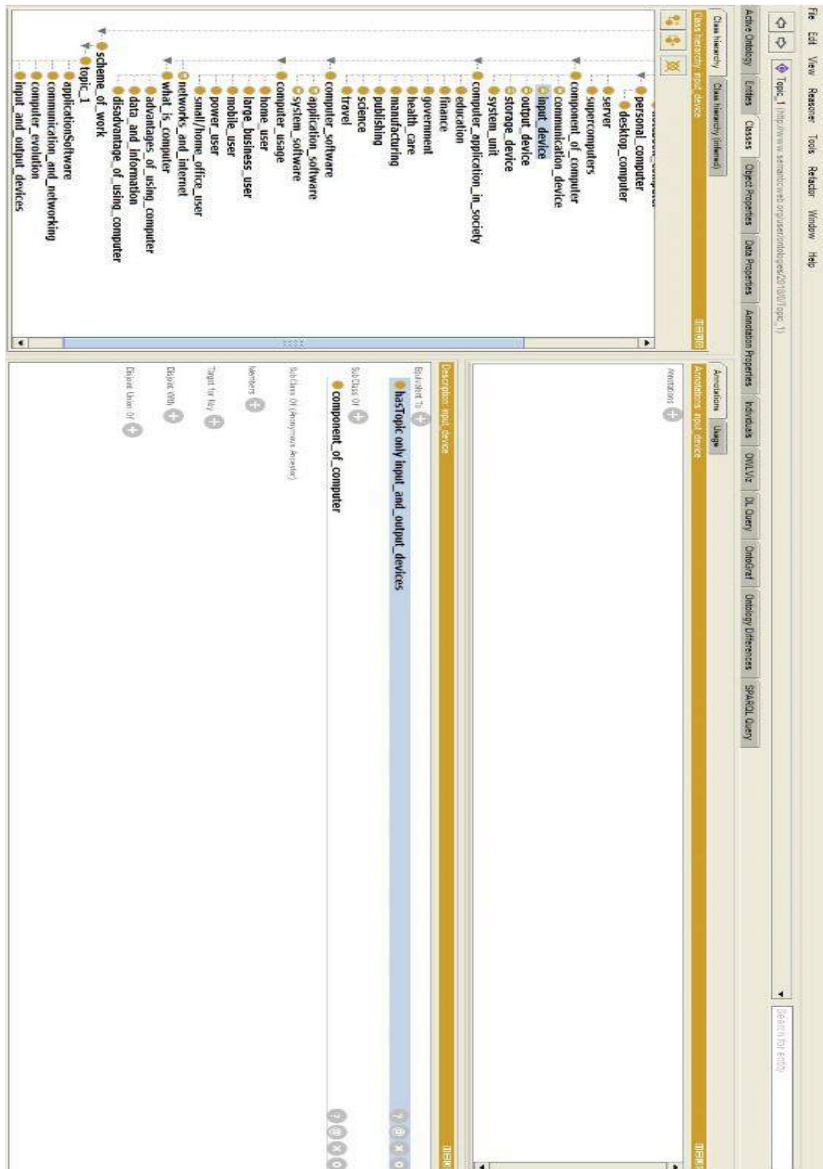


Figure 6: Defining the Relationships Between Concepts in CSC401 Ontology

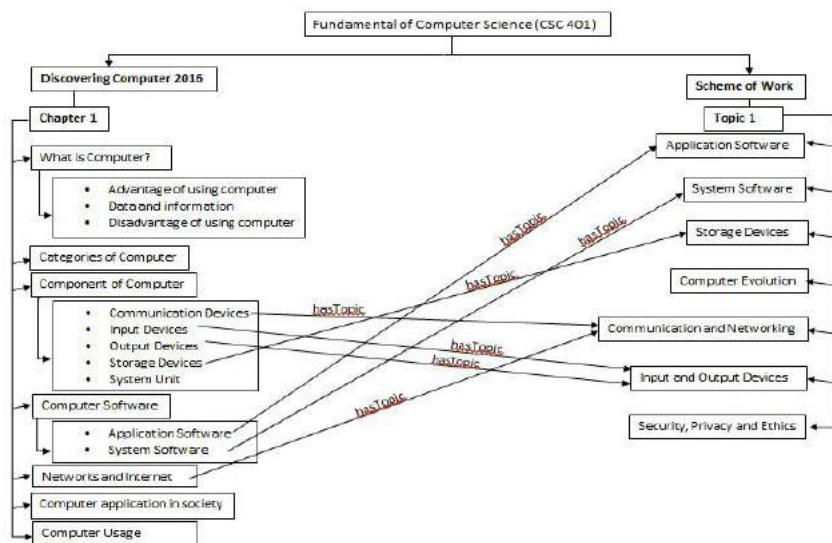


Figure 8: Taxonomy of CSC401 Ontology

CONCLUSION

This paper describes two important phases involved in the development of ontology for an introductory topic in the field of computer science. In total, there are five phases involved; the first two phases focus on deciding suitable methods and tools and were discussed in a previous paper. The third and fourth phases that are the focus of this paper, are centred on the development process of ontology itself. They relate to the ‘extraction of important concepts’ and ‘representation of ontology’ and describe the development of ontology using semi-automatic approach. The extraction of important concepts uses Text2Onto as the ontology learning tool and it automatically extracts important concepts from the textbook. Next, subject matter experts use Protégé ontology editor to manually define relationships and produce the ontology in the representation of ontology phase. This ontology, when viewed in the form of visual graph, resembles a mind map which is helpful for visual learner students.

In short, there is a learning curve for instructional designers wanting to employ ontology as a source of learning materials. Ontology enables common understanding of information and the reuse of domain knowledge. The usage of semi-automatic development method in ontology learning also enables the development time to be reduced compared to manual ontology development method. Thus, development of instructional materials via ontology serves as an alternative for instructional designers looking for methods to support their students' learning styles.

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ETHNICITY, SOCIAL INFLUENCE, ECO-LABEL AND PURCHASE INTENTION OF CONSUMERS OF GREEN HOME ELECTRONIC PRODUCTS

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ABSTRACT

Today green consumers are creating a new economy around the globe. Indeed, the 'green consumer' idea was the focus of academicians and manufacturers at the end of 1980s and in the early 1990s. Likewise, rising knowledge on the various environmental problems has led a change in the way consumers go about their life. People are insistently trying to reduce their impact on the environment and living a 'green lifestyle'. As a result, business has seen this change in consumer attitudes and is trying to sell many green products by exploiting the potential in the green market industry. Using green home electronic products are environmental initiatives for consumers to become green consumers. Research, although limited in the areas of ethnicity and green electronic home products, does suggest that a consumer's ethnicity will influence their attitude toward home electronic choices, which in turn will affect their purchase decision. Therefore, the goal of the present study was to expand the body of research concerning ethnicity and its influence on purchase of green home electronic products. Therefore, this study examines if there exist differences in ethnic groups for the intention to purchase home electronic products, namely air conditioner, refrigerator and television. A total of 251 self-administered questionnaires were collected from respondents living within the cities of Klang Valley,

Malacca and Penang. Results of the study show eco-label information is important in all three ethnic groups while social influence was not important to the Indians when purchasing green home electronic products. The results of the study indicate the importance of viewing ethnic consumer groups as unique markets and suggest some possible areas for further research.

Keywords: *social influence, eco-label, ethnicity, home electronic products, Malaysia*

INTRODUCTION

The green intention supports a person, modify their views, actions and practices from the source where the key intention drives their actions. Due to the increase in environmental awareness since 1970's a lot of positive change within users' behaviour can be seen towards environmental related products. This change saw the need to save the environment from more damages. For many consumers' qualities, attributes and characteristics of green goods are introduced with the help of green marketing and green awareness to guide them into buying environmentally friendly products very easily.

The accountability of companies for the quality of the environment while meeting customer needs, demands and satisfaction is associated with green marketing awareness (Chan *et al.*, 2012). Due to the high number of environmental awareness and the purchasing power of Asian consumers, Asian countries become the primary target by international marketers to sell green products (Noor & Muhammad, 2012). Today, the movement of 'going green' has expanded all over the world due to intensified awareness. The need for a healthy lifestyle and the emergence of eco-friendly products reflects consumers' growing concern for the environment (Norazah, 2013; Soye, 2012; Thøgersen *et al.*, 2015). However, the lack of information on green products in many countries has made the local and international marketers face difficulties in developing adequate and effective marketing strategies (Aman *et al.*, 2012). In Malaysia, there is limited study on the influencing factors of green purchase behaviour, more so for the green purchase of green electronic products (Shahnaei, 2012).

Many studies on environmental concern, social norms/influence and self-image have been investigated (Lasuin & Ng, 2014). However, research is still lacking on different outcomes in different demographic context can be found because of the complexity in green purchase behaviour of consumers (Ali & Ahmad, 2012). According to the Department of Statistic Malaysia (2017) the population of Malaysia is approximately at 32 million. The number of Bumiputra was at 68.8 per cent of total population of citizens, Chinese at 23.2 per cent while Indians and others remained at seven per cent and one per cent respectively.

Many studies have explored, primarily in Western contexts, consumption behaviour across various ethnic groups in consumer decision-making and brand loyalty (Dimofte *et al.*, 2010; Verbeke & López, 2005). However, due to the diversity in ethnic dimensions including race, religion and language, marketers encounter difficulties in using mass media strategies to target ethnic consumers (Cui & Choudhury, 2002). This contention is supported by research that suggests that compared to mainstream consumers; ethnic consumers differ in their consumption patterns, media usage patterns and perceptions of marketing activities targeted at them (Cleveland *et al.*, 2012; Crockett, 2008; Gerlich & Gopalan, 1993; Lavin, 1996; Mokhlis, 2009; Ouellet, 2007; Webster, 2011).

Thus, this paper investigates green purchase intention toward green home electronic product among ethnic groups in Malaysia. The objectives of this paper are:

- (i) To determine if social influence and eco-label influence green purchase intention.
- (ii) To examine if there are any significant differences in purchase intention in green home electronic products across ethnicity.

GREEN HOME ELECTRONIC PRODUCTS

Chen and Chai (2010) defined a green product as a product which has less effect on environment and the product incorporates strategies with recycled materials, reduced packaging and use less harmful substances. However, according to Kawitkar (2013), green product is the product which is friendly to the environment or ecology. Many green products from developed

countries have been studied previously (Luzio & Lemke, 2013). However, to increase a better understanding of differences and similarities that exist in various cultural setting, continuous efforts are being made to broaden the horizon of green products in developing countries (Ritter *et al.*, 2015). To date, research on green purchase intention toward green home electronic products is limited especially in Malaysia.

SOCIAL INFLUENCE

There are many definitions of social influence which can be found from previous studies. Venkatesh *et al.* (2012) defined social influence as how consumer perceives the approval of them using certain products from their family and friends as well as peers. In order to be granted the consumer as part of a community or social group, this acceptance is crucial. Escalas and Bettman (2005) stated that a consumer evaluates the product based on opinions of others and sometimes from peer pressure. Subsequently, based on preference and tastes (Dholakia *et al.*, 2014), an approval from others will become one of the factors a consumer tend to buy the green products (Lee, 2008).

Nowadays, living in an environmentally friendly lifestyle has become common for consumers (Grier & Despande, 2001) and one self's image and social acceptance among family and peers increases through this lifestyle. Griskevicius *et al.* (2010) expressed that this lifestyle is preferred to consumers who understand the benefits of green products and as a result they tend to purchase green products.

ECO-LABEL

In the field of green consumerism, eco-labelling which is also known as green labelling is among the most researched area. European Commission (2007) purported that to show the advantages and authorisation of being a green product in a tangible manner, eco-label of products is made compulsory. The European Commission (2007) has considered green labels as 'EU eco-labels', 'International eco-labels' and 'Privately Sponsored eco-labels'. In addition, to assist consumers in their decision making, eco-labels must

provide specific environmental information of a particular green product. Thøgersen *et al.* (2012) believed that eco-labels help consumers learn about specific environmental information before they make their purchase decision. In Malaysia, Standards and Industrial Research Institute of Malaysia (SIRIM) has launched its own eco-labelling schemes which also known as National Eco-Labelling Programme of Malaysia (Lasuin & Ng, 2014).

In addition, a study in China identified how green labels (eco-labels) are pivotal indicator for consumers' willingness to pay more for green products (Xu *et al.*, 2012). Eco-labels are considered as an attractive instrument in informing consumers with regards to the environmental impact of their purchasing decisions (Nik, 2009). The eco-labelling schemes were initiated to help consumers to identify products that are more environmentally preferable than other similar products and also to promote environmental consumerism.

SOCIO-DEMOGRAPHICS AND PURCHASING INTENTION OF GREEN HOME ELECTRONIC PRODUCTS

The influence of socio-demographic variables is important as it determine consumers' attitude and purchase intention. The preference of consumers towards green home electronic products can be described by socio-demographic variables. Previous research shows there is a strong correlation between environmental purchase behaviour and the level of income, education and gender. However, research to investigate the relationship for the purchase of green home electronic products and ethnicity is scarce (Zakersalehi & Zakersalehi, 2012). Thus, this study aims to examine the role of ethnicity in their purchasing intention of green home electronic products. The investigation on ethnicity is important as Malaysia is made up of three main ethnicity groups, namely Malay, Chinese and Indian.

RESEARCH DESIGN

Sampling and the Measurement Instrument

The unit of analysis in this research is individual consumer aged 20 years and above living in the urban areas of Klang Valley, Penang and Melaka. For this study, 400 self-administered questionnaires were issued via direct distribution to relatives and friends and direct distribution to working adults at their workplace. To ensure respondents understand the context of the study, the definition of green home electronic appliances was presented at the very beginning of the questionnaire and a photo of the home electronic products was shown. The questionnaire of this study was designed to contain four main parts. Part I aimed at collecting correspondents' demographic information. Part II measured the social influence factors that affect respondents' attitude towards green home electronic products. Part III measured eco-labels and the purchase intention for green home electronic appliances is measured in part VI.

The questionnaire survey for this study was adopted from established questionnaires from studies by Roberts and Bacon (1997); Chan (2001); Lichtenstein *et al.* (2004); D'Souza *et al.* (2006); Barber (2010); Cheah and Pau (2011); Biswas and Roy (2015); Lin and Huang (2012); Lien and Qian (2010); Khan *et al.* (2016); Valentine *et al.* (2014); Kong *et al.* (2014);

Many past literatures have adopted the five points Likert scale as the measurement method used in the questionnaires (Petschnig *et al.*, 2014; Kim *et al.*, 2010). A five-point Likert-type scales (1 - strongly disagree to 5 - strongly agree) were used to measure all constructs and the scales were adopted and adapted from previous studies. The measurement scale items used in the study were adopted and adapted from the past studies which have been validated. 251 responses were used for the analysis which represents 63% response rate. According to Goyder (1985), the acceptable range could vary between 30% and 70%. The green home electronic products for this study are air conditioner, refrigerator and television.

Data Analysis

The data was analysed using the Statistical Package of the Social Science (SPSS). The descriptive and inferential analysis techniques (correlation analysis, multiple regression analysis and ANOVA were both employed using the SPSS version 23.

RESULT AND DISCUSSION

Respondents' Demographic Analysis

From Table 1, the dominant ethnic group was Malays (69.3%) followed by Chinese (20.3%) and Indians (10.4%). Most of the respondents were females (69.7%). Most of the respondents were also married (63.7%). Almost 80% of the respondents were from the ages of 20 years old to 49 years old. Table 1 also show that majority of the respondents earn between RM2500 to RM7500 (56.6%).

Table 1: Demographic Profile of Respondents (N=251)

Characteristics	Percentage (%)
Gender	
Male	30.3
Female	69.7
Race	
Malay	69.3
Chinese	20.3
Indian	10.4
Marital Status	
Married	63.7
Single	29.1
Divorced/Separated	7.2
Age	
20-29 years old	12.7
30-39 years old	39.8
40-49 years old	27.5

50-59 years old	15.9
More than 60 years old	4.0
Income	
< RM2500	20.7
RM 2501- RM 5000	29.5
RM 5001-RM 7500	27.1
RM 7501- RM 10000	17.1
More than RM 10000	5.6

Reliability Test

To test the reliability of a survey instrument, Cronbach's alpha is used since it determines the internal consistency or average correlation of items as be shown in Table 2. Social influence, eco-label and purchase intention showed the value of 0.736, 0.908 and 0.874 respectively which indicates the strength of each instrument from moderate to excellent.

Table 2: Reliability Statistics

Variables	Cronbach's Alpha	N of items
Social Influence	0.736	5
Eco-label	0.908	7
Purchase Intention	0.874	5

Regression Test

A multiple regression analysis was conducted on social influence and eco-label to determine their significant influence on purchase intention of green home electronic products. Model 1 from Table 3 could explain 74.3 per cent of the variance in purchase intention. The results also unveiled that social influence ($\beta = 0.209$, $p < 0.001$) and eco-label ($\beta = 0.581$, $p < 0.001$) were found to have significant positive influences on green purchase intention (see Table 4).

Table 3: Model Summary of Green Purchase Intention

Model	R	R Square	Adjusted R Square	F	Sig.
1	0.743 ^a	0.552	0.548	152.771	0.000

a. Predictors: (Constant), Eco-Label, Social Influence

Table 4: Regression between Social Influence, Eco-label and Green Purchase Intention

Variables	Std. Beta	t	Sig.
Social Influence	0.209	3.421	0.001
Eco-label	0.581	9.527	0.000

Analysis of Variance (ANOVA)

From Table 5, an Analysis of Variance (ANOVA) was conducted on each ethnic group and the factors to determine their influence on purchase intention.

Table 5: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	99.365	2	49.683	3.809	.023
Within Groups	3234.770	248	13.043		
Total	3334.135	250			

Table 6: ANOVA for each ethnic group

Race	Mean Difference	Std. Error	Sig.
Malay	1.51694*	.57546	.024
	-.25648	.74732	.937
Chinese	-1.51694*	.57546	.024
	-1.77342	.85956	.100
Indian	.25648	.74732	.937
	1.77342	.85956	.100

Dependent Variable: Purchase Intention

A one way between groups of ANOVA was conducted to explore the impact of ethnicity on purchase intention of green home electronic products. Ethnicity was divided into three groups (Group 1: Malay; Group

2: Chinese; Group 3: Indian). There was a statistically significant difference at the $p < .05$ level in purchase intention scores for the three ethnicity groups [F (2, 248)=3.8, $p = .02$]. Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. The effect size, calculated using the eta squared, was .03. Post-hoc comparison using the Tukey HSD test indicated that the mean score for Malay (M=18.59, SD=3.57) was significantly different from Chinese (M=17.07, SD=4.06). The Indian (M=18.85, SD=2.92) did not differ significantly from either the Malay or the Chinese.

DISCUSSION AND CONCLUSION

The findings suggest that eco-label information have positive influence on the purchase of home electronic products among the three ethnic groups in Malaysia. As this study focus on home electronic products, eco-labels are important because consumers seek information before purchasing. This is consistent with a study by Taufique *et al.* (2016) which found eco-label to influence pro environmental behaviour. The current study contributes to existing literature by confirming that eco-label is important for ethnic groups in Malaysia before they purchase home electronic products. In addition, relevant information in eco-labels act as a communication tool to promote green behaviour. For home electronic products specific information indicating economic and environmental benefits together with logos of green certification and electricity consumption should be included in the eco-label. Manufacturers of these products must ensure information contained in the eco-labels are correct and environment benefits for the products must be part of the information. Findings from this study also found social influence important for the Malay and Chinese ethnic groups in their purchase intention. Therefore, family, friends and peers do play a role in the decision-making process. However, this study found social influence was not significant for the Indian ethnic group. This may be because in Indian households the husband is dominant in making decisions and all decisions are made by the husband (Yusof, 2015). However, marketers of green products should continue with their green campaigns and intensify marketing activities to promote home electronic products for all consumers. One of the limitations of this study was the survey was conducted in only three cities in Malaysia. Secondly, the study covers only three home electronic

products. Testing the model with other home electronic products would provide potentially useful insights. Finally, because this study uses cross sectional research design, future research should employ a longitudinal design to measure changes in behaviour.

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ACHIEVING DATA SATURATION: EVIDENCE FROM A QUALITATIVE STUDY OF JOB SATISFACTION

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ABSTRACT

The concept of saturation is deemed necessary in qualitative research; however, existing literature discussing the point of saturation is relatively scant. Previous qualitative studies tend to describe the point of saturation but fail to demonstrate how the saturation occurred. This article provides evidence on how qualitative research might report the point of data saturation. The original study consists of a mixed method approach to develop and validate an instrument for measuring offshore catering employees' job satisfaction. Notably, this paper reports a part of the qualitative portion of a mixed-method study. Using the data from a study involving 13 in-depth, semi-structured interviews, this study documents the degree of data saturation over the course of thematic analysis and demonstrates how data saturation was operationalised. Although the study reported 13 interviews, the saturation occurred within 12 interviews. The study findings are not extensively discussed; however, adequate information about the study background, data collection and sample characteristics are included. The technique presented in this paper provides practical guidance for qualitative researchers in reporting point of saturation. However, it is recommended that the evidence of data saturation occurred after 12 interviews should be applied with caution due to several factors.

Keyword: *qualitative, interview, data saturation, offshore catering, job satisfaction*

INTRODUCTION

In a qualitative study, there are general guidelines of how many interviews should be conducted to ensure quality data. Creswell (2009) recommends five to 25 interviews, while Morse (2000) suggests 30 to 50 interviews. Apart from that, Bertaux (1981) argued that 15 interviews are set as the minimum requirement for a qualitative study. Kuzel (1992) suggests six to eight interviews are required for a study of the homogenous sample. The suggested sampling size is helpful at a conceptual level and could not be determined precisely ahead of time, but it gives the idea of how many participants to be included in a study. However, Kumar (2005) highlights that the number of participants is not the primary concern if the focus of the study is to explore and describe issues of the phenomenon in determining new evidence. Although the number of participants plays an important part, a point of saturation should be prioritised in qualitative research. It is appropriate to ensure the data is saturated (Dibley, 2011), rather than the number of participants (Burmeister & Aitken, 2012). Therefore, the number of participants involved in the qualitative research should depend on the breadth and depth of the data. In this study, the research objective was to explore and identify the attributes of job satisfaction among offshore catering employees.

Determining the saturation point of the data is crucial as it indicates a comprehensive process of data collection and analysis. Morse (1995) emphasizes that saturation is the key to excellent qualitative work, highlighting its importance to provide an evidence of how a study reached the data saturation and when the interviews ceased. The idea of saturation originates from grounded theory (Creswell, 2014). Glaser and Strauss (1967) were the first who defined the milestone as the point, which no new insights or data emerged during the interviews. Similarly, a point of saturation reached when the data collected no longer offer new insights (Charmaz, 2006) and where no new codes are generated from the interviews. In a recent study of scale development, Bavik (2016) found that 18 interviews have occurred to reach the point of saturation. Moreover, Guest, Bunce and Johnson (2006) determine that, in their study, they conducted 60 interviews from two countries and systematically documented the degree of saturation reached within 12 interviews.

The concept of saturation is frequently stated in qualitative studies. However, limited evidence was shown to indicate how the saturation point occurred (Bowen, 2008). Moreover, little is known about how saturation might be determined (Guest *et al.*, 2006). The authors affirmed the needs after reviewing 24 research method books and several databases. In most qualitative studies, authors might state ‘participants were recruited until data saturation was achieved’ or ‘recruitment continued until data are saturated’ to indicate the occurrence of the saturation. This implied that previous researchers describe the data saturation in their studies but fail to demonstrate how the point of saturation was reached. Thus, the process to indicate the saturation point remains unclear. In response to the issue, this study attempted to indicate how the data saturation is reached. Using data from a study involving 13 semi-structured interviews, the findings demonstrated the data saturation over the course of the analysis. Apparently, through the process, it can be concluded that the interview ceased after no new codes are generated, suggesting data saturation.

The study outcomes supported the qualitative results and proved the importance of data saturation in providing quality of the findings. This methodological article specifically explains how the study achieved the data saturation with adequate information about the study background, data collection and sample characteristics to inform about the study.

BACKGROUND OF STUDY

The full study consists of an exploratory sequential mixed method design to understand and explore offshore catering employees’ job satisfaction to develop and subsequently validate a bespoke job satisfaction instrument. The current paper reports on the qualitative portion of the study in which demonstrates explicitly how the study achieved saturation through the qualitative interviews. The second phase of the study, which is the quantitative research, is still ongoing.

The qualitative phase of this study investigated perceptions of offshore catering employees with their job. These employees usually perform a repetitive task in which required to provide sufficient meals for 24 hours,

housekeeping and laundry services. Mainly, current research on job satisfaction of offshore catering employees is weak at its best, despite their significant roles in the success of the offshore businesses. There are very few examples of research efforts involving offshore catering employees. In Krohne and Magnussen's (2011) study among offshore catering employees on sickness presenteeism within the Norwegian context, they revealed that the understanding of participants on the concept of job satisfaction appeared to embrace elements that are different from onshore workers. Although a study (e.g., Majid, Othman, Mohamad & Lim, 2017) identified satisfaction of offshore catering employees with their job, the investigation was a pilot work.

Other than that, studies in offshore catering have devoted on adoption of collective bargaining (Buchan, 1985), the role of offshore catering in the work organisation (Holter, 1987), the importance of food hygiene and critical areas in offshore catering (Chalk, 1987), and changes in food preparation and presentation (Lockie, 1991). These studies showed that there are potential areas for further research, especially on job satisfaction that receive little attention. Therefore, due to the dearth of recent and empirical evidence in the literature, the research area requires further investigation (Majid, Othman, Abdullah & Derani, 2016).

METHODS

Permission to conduct the study was submitted to the Ethics Committee for Research Involving Human Subjects of the researcher's institution. The formal ethical approval was obtained (Ethical protocol reference: JKEUPM(FSTM-P121)2017) and all participants provided their informed, written consent. Informed by basic qualitative inquiry, semi-structured interviews with 13 offshore catering employees in Malaysia were conducted. An interview is widely acknowledged as a suitable technique for basic qualitative study to seek insights of those who have experienced or are experiencing the phenomenon (Collingridge & Gantt, 2008; Wimpenny & Gass, 2000). Data were collected between March and September 2017. Non-probabilistic, purposive sampling was employed. Creswell (2014) supports the notion of using purposive sampling technique for a qualitative study. Since qualitative researchers are less concerned with generalisation

(Harding, 2013, p.17), the researchers chose those participants who were best fit the aim of the study. Similarly, the sample must be appropriate to ensure the informants best represent and have knowledge of the research objective (Morse, Barrett, Mayan, Olson, & Spiers, 2002).

Inclusion criteria of the participants were those who were active employees in the industry, able to communicate in either English or Malay and have working experience of more than four trips in the sector. The reason this study chose informants that had an experience of more than four trips was to ensure that each informant understood and had familiarity with the job and job environment. This study assumed a certain degree of informant homogeneity because, by definition of purposive sampling, informants were selected based on the shared criteria. On the other hand, the exclusion criteria were those who had poor English or Malay language skills and suffering from sickness. The reason this study did not choose informants based on the criteria as mentioned above was that both interviewer and interviewee might have difficulties in having mutual understanding and the information might not reflect the true experience. Therefore, by choosing the participants that were currently working in the offshore catering, it was anticipated that they could reflect on their experiences and give the opportunity to accomplish research purpose.

DATA COLLECTION AND ANALYSIS

All interviews were conducted in the Malay language with the occasional use of English. All interviews were tape recorded and transcribed later for analysis purposes. The interview framework included the following main areas: (1) employees' description of their background and their involvement in the industry; (2) descriptions of their work attitudes and experiences, particularly on job satisfaction; and (3) conclusion. It began by asking the participants about their demographic backgrounds and how they became involved in the sector. The focus of inquiry then shifted to their experiences within the sector. In this segment of the study, the study was interested in learning how they defined job satisfaction and their feeling about their current job. Moreover, the participants were queried to recall a situation when they felt happy with the job. Probing questions were used regarding the issues raised from the previous interviews to elicit deeper explanation

and seek clarification. It was found that the probing questions were useful to explore these issues further to prompt deeper insights (Harding, 2013). Before the researchers ended the interview sessions, participants were enquired to provide pseudonym to represent themselves in which it was used to protect participants' true identities, and the researchers made full effort to secure this throughout the research work. Table 1 presents the characteristics of the study participants.

Table 1: Characteristics of Study Participants

Characteristics	Value
Age	
Mean	32.3
Range	23-51
Marital status	
Single	7
Married	6
Educational level	
Diploma	9
Secondary school	2
Bachelor's degree	1
Certificate	1
Position	
Camp boss (catering supervisor)	5
Cook/ chief cook	3
Baker	2
Assistant cook	2
Chief steward	1
Years of experience in the sector	
Mean	5.5
Range	1-24

All participants took part in the study are male. Their age ranges between 23 and 51 years. Of the 13 participants, six of them in their 20's, four in their 30's and two in their 40's and one participant aged 51. Seven participants (53.8%) are single and six (46.2%) are married with a child/ children. Concerning educational level, the majority of them (69.2%)

have a diploma from various institutions such as public and private universities, polytechnics, institutes and colleges. One of the participants had a bachelor's degree, one participant had a national vocational training council qualification, and the other two participants had secondary school qualification. Of the 13 participants, five (38.5%) held the position of camp boss and two (15.4%) were assistant cooks. Camp boss is a term used in offshore catering in which similar as catering supervisor. The other participants, whom each of them is holding positions of chief steward, baker, Western cook, Eastern cook, cook/ baker, and chief cook.

In the analysis, the study followed the six phases of thematic analysis proposed by Braun and Clarke (2006) with the aid of QSR International's NVivo 11 Software. The analysis started with familiarising with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and finally, producing the report. The researchers created the code development and updating the codebook after each analysis. The first transcript was analysed and then moved to the second interview, and the process continued until the researchers had completed 13 interviews. In short, the researchers finished analysing the particular transcript before moving to the next interview. However, the process of analysis was iterative rather than linear. The process is comprehensively iterative where it requires the researcher to moving back and forth between the entire set of data (Vaismoradi, Jones, Turunen & Snelgrove, 2016; Braun & Clarke, 2006). The codes were checked backed against each transcript to ensure it relates to the original text in a systematic way (Soilemezi, Drahota, Crossland, Stores & Costall, 2017). The codes were grouped to reveal a similar theme and the themes were revised when necessary.

The interviews ceased when there were no new data emerged during the data collection. Although 12 interviews already indicated a point of saturation in which no new codes identified, the researchers decided to conduct another interview to ensure the confidence and verification of data saturation. Evidently, interviews were ceased after 13 participants as the data provided clear evidence of the saturation point. Initially, 96 new codes were generated from the interviews. However, after several discussions and amendments, the number of new codes was decreased to 70 due to redundancy and similarities among the codes. The researchers were able to conceptualise 11 themes, including the relationship with co-workers,

salary, fairness, teamwork, fringe benefit, and equipment and facilities. The themes obtained in this study were similar to the previous research (e.g., Chin-Siang, Talib, Juhari & Madon 2014; Spector, 1985; Hackman & Oldham, 1974; Smith, Kendall & Hulin, 1969; Weiss, Dawis, England & Lofquist, 1967). Figure 1 illustrates the evidence of data saturation of the present study.

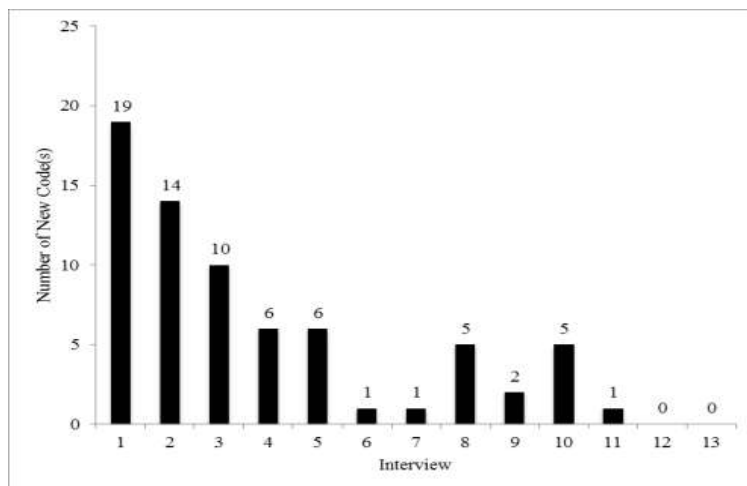


Figure 1: New Codes Generated Across Data Analysis

After analysing 13 transcripts, the codebook contained a total of 70 codes. At least one code had been found in at all except last two interviews. From these codes, 55 (78.6%) new codes were identified within the first five interviews. It is shown that most of the new codes were created at the earlier stage of the analysis. An additional of 15 new codes (21.4%) was later identified in the next six interviews. Through the coding process, the number of new codes created was seemingly decreased, with a slight fall and rise irregularly between seventh and tenth interviews. However, the number of new codes decreased after the tenth interview, indicating not much happened to the number of codes. At the 12th interview, no new code was identified. Similarly, no new code was identified at the 13th interview.

The data reached its saturation point after the 12th interview, displaying no new code created from the interview. It demonstrated that the thematic analysis identified 70 codes from the 13 interviews, indicating no new

additional codes generated. The full range of thematic finding occurred completely within the first 11 interviews. This research made an effort by describing a point of estimation at which the development of codes saturated and made explicit the process was undertaken to ensure data saturation. The evidence provides a clear indication of data saturation, where no new substantive code was being added and identified. Thus, data saturation of this study is reached through a thorough and transparent process.

DISCUSSION AND RECOMMENDATION

The qualitative interviews showed that this study reached a point of data saturation after 12 interviews and proceeded with another interview to verify the evidence. The technique presented in this paper offers a practical guideline to qualitative researchers to report or display data saturation. Using a simple graphical chart, this study able to display how the saturation occurs based on purposive sampling technique. By definition, the saturation occurs when no new codes emerged from the interviews as conceptualised by Glaser and Strauss (1967). Therefore, in this study, it indicated that 12 interviews are enough to reach saturation point. The evidence of data saturation indicates that the findings from the thematic analysis provided a breadth and depth of job satisfaction attributes among offshore catering employees. Achieving data saturation is necessary in the context of this study because it assisted in ensuring the content validity of the quantitative phase of the full study. The researchers believed that failure to achieve data saturation might not provide comprehensive and quality findings on the phenomenon being examined. Thus, achieving saturation point is crucial in any qualitative research, regardless of traditions.

However, the evidence should be applied with caution. Several factors might differentiate this particular research from another and number of interviews might differ to reach saturation in different studies. First, this paper is a part of a mixed-method research in which the applicability of the qualitative components would not be extensive as a full-scale qualitative study. It is reasonable to think that the full study was a mixed-method project; however, application of data saturation in the current study is significant to indicate quality findings. If a study adopts a similar research design, 12 interviews might suffice. Use of other qualitative traditions such as grounded

theory, phenomenology or narrative might offer more profound variations and richness to the development of the data coding. Thus, the number of participants involve in the study might vary. Second, the data collection in this study was solely from qualitative interviews. Hence, a qualitative research that incorporates triangulation such as observation and focus group discussion should show a discrepancy of when the saturation occurs. Third, the sample of this study comprised of offshore catering employees in which the group was relatively homogenous. This might affect the richness of the data if a study focuses on participants with heterogeneous characteristics. Guest *et al.* (2006) suggest that a research might need a larger sample if the objective is to examine the variation among the participants, or else the data findings might not be adequate.

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A PROPOSED MODEL ON THE IMPACT OF INTERNAL CONTROL QUALITY ON ACCOUNTING INFORMATION SYSTEM EFFECTIVENESS IN NIGERIA

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ABSTRACT

The overwhelmingly rapid adoption of e-business technology in the Nigerian banking sector has resulted in new challenges particularly in the area of internal control. Although there are conflicting findings on the use of Accounting Information System and internal problems in the banking sector, the fact remains that internal control is associated with fraud. In this regards, for banks to effectively detect and prevent fraud, the use of Accounting Information System as tool for effective internal control is necessary. This study aims to propose a model of the effect of internal control quality in Nigerian banking sector. it is hypothesised that administrative control, data control, and output control has significant influence on internal control quality. The study further hypothesised that internal control quality would significantly influence AIS effectiveness uses organisation as unit of analysis with commercial banks that are listed on the Nigerian Stock Exchange as the target population. A quantitative data will be gathered using cross-sectional survey approach. Ordinary least square will be used for data analysis. The findings of this study will provide a solution to bank managers and other stakeholders in the banking sector regarding internal control weakness experiences over the years.

Keywords: accounting information system, internal control quality, Nigerian banks

INTRODUCTION

Information system has played a vital role in the transformation of the Nigerian banking sector in terms of collection, processing, and management of information. Today it is widely recognised that a robust Accounting information system (AIS) is critical to the success of organisations locally or at international level. Accounting information system is a tool that is incorporated in the field of IS which is believed to improve the function of administrative accounting, increase their ability to take appropriate decisions, facilitate the proper application of new accounting practice, assist in reducing costs, establishing linkages with suppliers and reduce response time to customer needs (Despina, Gravas, & Stavropoulos, 2010). Thus, AIS are important tools for effective management decision and control within organisations (Shagari, Abdullah, & Saat, 2015).

Accounting information systems are faced with serious security threat which arises from the weakness of internal control (Hayale & Abu-Khadra, 2006). Such risk has negative consequence on the reliability, accuracy, and integrity of the financial report generated by AIS which eventually affect the organisation's relationship with trading partners (buyers, suppliers and other stakeholders) (Ramazani & Zanjani, 2012). Although there are conflicting findings on the use of AIS and internal problems in the banking sector, the fact remains that internal control is associated with fraud (Ekwueme, Egbunike, & Okoye, 2012). Fraud is one of the major factors that cause bank distress and finally the closures in Nigeria (Onyemenam, 2013). The Central bank of Nigerian (CBN) (2009) reports postulated that internet-based fraudulent activities are growing fast in the daily business operations of banks. Also, Ogah (2013) opined that there is an alarming rate of embezzlement of resources, fraud, and inefficiency in the Nigerian banks. In support of this claimed, Shazali (2015) report revealed that electronic payment transactions fraud in Nigeria rises to \$310 million in 2014 in which case is indicating the extent of how banks are exposed to huge risks as result of AIS ineffectiveness. On this note, Iskandar (2015) stated that investment in AIS is less effective because it fails to deliver according to users' expectation. Despite the challenges experienced and opportunities offered by IT revolution, studies on AIS have contributed very little research to theory and practice (Ismail, 2009). Therefore, based on this argument it can be concluded that having an effective internal control

will have an impact on AIS effectiveness. Thus, this study will examine the relationship between internal control quality and AIS effectiveness in the Nigerian banking sector.

However, this has resulted in new challenges more especially in the area of internal control (Ogah, 2013). Internal control is a process designed by an organisation which provides reasonable assurance in terms of achieving their objectives in the following areas; reliability of financial reports, efficiency and effectiveness in transaction processing, and compliance with relevant laws and regulations (Bodnar & Hopwood, 2010). A good internal control structure could protect the AIS from problems such as fraud, error, and issues related to system failure (Hall, 2010). Given the above argument, Stefanoul and Athanasaki (2012) contended the lack of internal control affect AIS effectiveness in organisations.

This paper is structured as follows; the next section discussed the past literature of AIS and internal control quality. This is followed by a discussion on the methodology adopted for the study. Then a discussion on research findings, conclusion, limitations and direction for future study are presented.

LITERATURE REVIEW

Accounting information system is considered as the primary tool which produces and distribute information to different types of user to enable adequate decision-making. Accounting information system comprises of qualified individuals, hardware, software databases and a set of procedures which interact together to provide useful information for effective decision making within an organisation (El-Dalabeeh & Al-Shbiel, 2012). Considering the definitions, AIS is view as a systematic way of capturing information and processing data by the user(s) using systems for decision-making purposes. Also, Dehghanzade, Moradi, and Roghibi (2011) viewed AIS as a component of the organisation which provides its users with warning information and information relating to financial events in the organisation for control purposes. Also, Wilkin and Chenhall (2010) noted that AIS is concerned with the production of accurate, relevant, cost-effective and timely information to a business in order to assist organisations to compete favorably in a business environment.

Besides technical issues of AIS, information security has become another issue of concerns in AIS adopted environment; this is because the success of organisations depends on the extent of accuracy, integrity, and confidentiality of system (Mohammed, Ridzwan, Daud, Baharin, & Ismail, 2012). The quality of AIS is contingent on the existence and the quality of implemented internal control procedures of the banks. However, industry reports and academic studies have revealed that electronic transactions fraud in Nigeria rise to \$310 million in 2014, while 19,531 frauds cases were reported in 2016 as against 10,743 reported in 2015 with increased of loss to \$696 million in 2016 (Shazali, 2015; Olawoyin, 2017). In which case indicating the extent of how banks are exposed to huge risks as result of poor internal control. Such risk of internal control weaknesses increases the chances for; theft of data services, hardware failure, workstation access penetration, password failure, data leakage, computer virus, the threat of service, unauthorised access to data and information of modification (Tijjani & Ogundeji, 2013). Thus, leading to large-scale unproductivity and financial losses to the banks.

The needs for internal quality control is particularly important to banks since most of their transactions are conducted online. The current study posits that having good internal control can be critical to the effectiveness of the systems. AIS implementation is a complex exercise in technology innovation. Hence, requires the synchronisation of many activities of an organisation and close cooperation with top management, employees, IT specialists, external consultant and the likes in order to achieve the needed results (Grabski & Leech, 2007).

Furthermore, many studies have attempted to examine the relationship between internal control quality and AIS in different countries. For example, Study by Al-Qudah (2011) examines impact of AIS on effectiveness of internal control in Jordanian commercial banks. A descriptive survey research was used and the data collected from bank employees (control department) were analysed using SPSS. The findings of the study indicated that AIS has significant relationship with the effectiveness of internal control in the banks. He concluded that AIS has a positive impact on internal control, and its enable banks to generate more accurate and timely information for strategic and operational decision making.

Similarly, Alshbiel (2013) aimed to identify the risks of communication between the internal control and computer departments and its impact on the efficiency of the accounting information systems at the commercial banks. Descriptive analytical approach was used in analysing the survey data collected from employees (internal control). The results revealed significant effect for risk of communication between the IT unit and internal control on the efficiency of AIS in the banks. The results further revealed that all the dimensions of internal control (centralisation of decision, external environment and inadequate laws and legislation) have positive influence on the efficiency of AIS in Jordan commercial banks. However, one of the limitations of the study is lack of theoretical support, thus prone to generalisation issues.

On the same note, study by Alzoubi (2011) involves financial managers and accountants of organisations in Jordan. The study aimed to determine AIS effectiveness in ERP adopted environment. The empirical evidence showed that information quality and internal control have significant influence on AIS effectiveness. The author concluded that the integration of AIS has led to significant improvement in the quality of information produce and internal control of banks. Nevertheless, the study lacks theoretical and also the sample size of the study is small. Thus the research findings are prone to generalisability issues. Hayale and Abu-Khadra (2006) investigated on the level of internal control effectiveness of AIS in banks. A survey instrument was administered to staff (head of internal audit and IT unit) of the bank headquarter. Data collected were analysed using simple percentage and Z-test. The results indicated that banks used effective fraud and error reduction control measures in one hand and banks do not have an effective control measures on the other. Although there were no comments from the researchers on the lack of internal control effectiveness as the results revealed, one possible answer cannot be disassociated with the inappropriateness of distributing the research instruments, because the researchers focused on banks headquarter which are mere policymakers. Thus, there is need to consider the policy implementers (bank branch), and employ alternative approach as well as an integrated model to investigate the relationship.

Research Model and Hypotheses Development

The research model of current research is developed based on a review of previous studies.

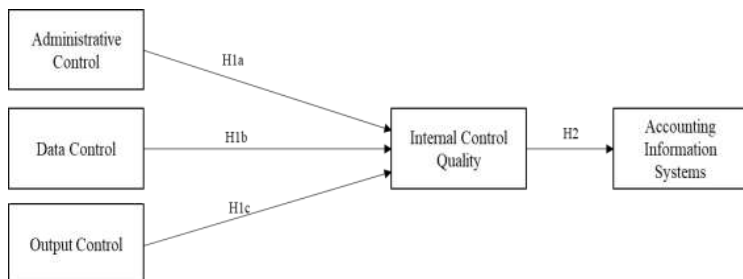


Figure 1: Conceptual Framework

The three factors highlighted in the conceptual framework captures the key factors that influence internal control quality which eventually affect the AIS of banks in Nigeria.

Internal control quality

Internal control quality as the mechanism adopted by the banks to safeguards evaluates the accuracy and reliability of its accounting information system that ensures operational efficiency of the banks (Shagari, Abdullah, & Saat, 2017). Effective internal control enables banks to generate accurate and reliable information for strategic and operational decision-making. Warren (1999) concluded that internal control policies and procedures should protect the misuse of organisational assets, to ensure the accuracy of financial information and compliance with relevant laws and regulations. It is a process that is influenced by the internal management of an organisation which provides reasonable assurance of its operational efficiency and effectiveness (Ramdany, 2015).

According to a study conducted by Abdallah (2013), found that the use of IS has a positive impact on the internal control in organisations which leads to increase in revenue generation. Abiola (2014) study indicated that the use of IS has a significant improvement in the effectiveness of internal control of banks in Nigeria. Similarly, a study by Al-Qudah (2011) revealed

that AIS has a positive influence on the internal control, and its enable banks to generate more accurate and timely information for strategic and operational decision-making. Moreover, Sajady, Dastgir, and Nejad (2008) concluded that successful implementation of AIS has a positive effect on the internal control system which leads to quality report and facilitation of financial processes of the organisations.

Conversely, poor internal control might have adverse effects on AIS effectiveness (Acklesh, Peter, & Jon, 2013). To further substantiate the above findings, Alzoubi (2011) found that AIS has a significant and positive impact on the internal control effectiveness of banks. Also, Hayale and Abu-Khadra (2006) attempted to investigate the level of internal control systems effectiveness of AIS in Jordan Banks. A survey instrument was administered to staff (head of the internal audit and IT unit) of the bank headquarter. Data collected were analysed using simple percentage and Z-test. The findings indicated that banks have strong internal control which reduces fraud and error.

On the other hand, Rajeshwaran and Gunawardana (2013) examined the effect of AIS on the prevention and detection of security breaches. The results indicated that AIS security controls were adequately implemented in all organisations. However, their findings further revealed that there is weak internal control of AIS. The authors cautioned that breaches in internal control of companies could cause severe damage, thus recommended that companies should implement but short and long-term security measures to address the internal control weakness. They further classified internal control into many categories including administrative control, data control, and output control, etc.

Administrative control refers to the measures taken by organisations to restrict recognised access to confidential information within the organisation. Data control are concerns the steps adopted by organisations to prevents leakage or loss of sensitive information. Output control refers to the set of the mechanism employed by organisations to ensure that the output is carefully handled and disseminated to the appropriate user(s). Based on the above reviewed, this study posits that having internal quality control can be critical to the quality of the systems. Therefore, this study offers the following hypotheses:

H1a: Administrative control has a significant relationship with internal control quality

H1b: Data control has a significant relationship with internal control quality

H1c: Output control has a significant relationship with internal control quality

H2: Internal control quality has a positive relationship with AIS

RESEARCH DESIGN

This study is quantitative in nature, and a cross-sectional survey research approach will be adopted to collect and test the model proposed.

Population and Sample

The population of the study will comprises of all commercial banks that are listed on the Nigerian Stock exchange. Currently, there are 21 commercial banks with more than 1,500 branches across the six geopolitical region of Nigeria. The research instruments will be administered to the frontline staff of the banks to represent the bank. Thus, making the units of the analysis of this study organisations. Frontline, staff are chosen because they are those that operates the system on daily basis, via serving customer demands or in the process of carrying out daily routine. Therefore, they are in a better position to response to the research instrument.

Measurement of Constructs

The items of each construct are taken from previous literature. The table below indicates sources of each item within the construct.

Table 1: Sources of Constructs and Measurement Items

Construct	Items	Sources
Administrative Control	Management attitude toward internal control is positive. Rotation of duties assists in identifying errors and irregularities. Mandatory vacations assist in reducing fraud resulting from the increased chance of exposure. Personel policies including background checks assist in hiring honest employees.	Rajeshwaran and Gunawardana (2013)
Data Control	There is adequate internal control over the manual handling of input and output data within the organisation. Data backups are routinely prepared. A copy of backups is placed in off-site storage. Backups are normally encrypted to minimise recognised access of sensitive information.	Rajeshwaran and Gunawardana (2013)
Output Control	Visual access to sensitive information is controlled and restricted to authorised users only. Printing of sensitive information outside the organisation is under strict security control. Hardcopy of sensitive information is secured in a locked cabinet. Printing and distribution of data and information are done by authorised persons under proper control system within the organisation.	Rajeshwaran and Gunawardana (2013)

Internal Control Quality	<p>Our AIS does not improve the controls of breaking through or trespassing of the system.</p> <p>Our AIS regulates the access of employees to the system according to their level of authorisation.</p> <p>Our AIS contributes in segregating the discrepant tasks among employees in the bank.</p> <p>Our AIS does not enable the linkage across all branches of the banks properly and appropriately.</p> <p>Our AIS is in-effective in safeguarding against internal and external threats.</p> <p>Our AIS does not provide the documents needed to follow up work and evaluate performance.</p> <p>Our AIS provides an appropriate method that ensures proper data entry and processing in order to obtain the required output.</p> <p>Our AIS provides a library and archive of all files, programmes, and data which can be stored in separate tools.</p>	Shagari <i>et al.</i> (2017)
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Accounting Information Systems	<p>System Benefits</p> <p>The AIS assist our bank in achieving competitive advantage.</p> <p>The use of AIS helps in satisfying our customers.</p> <p>The use of AIS does not facilitate effective integration between departments in our bank.</p> <p>The use of AIS does not assist in reducing cost.</p> <p>The use of AIS issues a periodic report on all the organisation activities for decision making.</p> <p>The use of AIS allows our bank to save much time.</p> <p>The use of AIS enables us to manage our task effectively.</p>	Shagari <i>et al.</i> (2017)
	<p>Added Value</p> <p>AIS reduce the uncertainty situation and confirm the expectation.</p> <p>AIS contribute to managed customer relationship with top management.</p> <p>AIS explain the tasks to employees which is assist them to understand organisation goals.</p> <p>AIS support knowledge management activities.</p> <p>AIS support business strategies in the organisation.</p>	Shatat, Yusof, and Abdulaziz (2013)

Data Analysis

The data of this study will be analysed using SPSS and PLS. The SPSS will be used to determine the descriptive statistic of the constructs and demographic information of the respondents. Smart PLS version 2 will be used to analyse the hypotheses of the study. This will be achieved by following the two steps analytical procedures recommended by Anderson and Gerbing (1998). The measurement model will first be evaluated and then followed by the structural model.

CONCLUSION

This paper is conducted to investigate the effect of administrative control, data control and output control on internal control quality which eventually influence AIS effectiveness in Nigerian banking sector. The results of current study are expected to provide insight on the problem of internal control weakness that leads to significant financial loss to the Nigerian banks. However, this study has some limitations. Current study focus on commercial banks listed on the NSE only. Thus, the results cannot be generalized to other sectors of the economy. Another limitations of current study is the contextually, the findings of this study will reflect the Nigerian context only. This implies that findings from different region of the world could yield different results, as a result of cultural and environmental differences that exists.

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PLANNING FIELD TRIPS AS A TEACHING AND LEARNING STRATEGY IN LEGAL EDUCATION: SOME POINTS FOR CONSIDERATION

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ABSTRACT

Field trips can be a valuable tool in making learning more engaging and provide unique opportunities for learning certain concepts, including legal concepts by putting them into a more realistic and relevant context. Research studies have shown that there is a significant increase in participants' factual knowledge and conceptual understanding after participation in a well-designed field trip. However, due to differences in academic disciplines, elements which constitute a well-designed field trip vary according to the learning objectives of the field trip. Thus far, in legal education, there has been a dearth of both theoretical and empirical research into the elements necessary in the planning of field trips as a successful pedagogic tool. Therefore, in this article, the authors seek to analyse the important elements that should be emphasized in designing a successful field trip for legal educators. Drawing upon literature from other disciplines, the article concentrates its review on Myers and Jones' field trip planning model in the determination of the elements that should be present in a well-designed field trip. Some thoughts and considerations in the application of the model into planning field trips for legal education are also discussed and recommendations are made appropriately in adapting the model.

Keywords: *learning design, field trip, elements, teaching and learning strategy, legal education*

INTRODUCTION

The use of educational field trips has long been a major part of teaching and learning strategy. Krepel & Duvall (1981) consider a field trip to be a school or class trip with an educational purpose, in which students interact either with the setting, displays, or exhibits to gain an experiential connection to the ideas, concepts, and subject matter. Field trips take students to locations that are unique and cannot be duplicated in the classroom.

Research studies have shown that there is a significant increase in participants' factual knowledge and conceptual understanding after participating in well-designed field trips, including in higher education (Behrendt & Franklin, 2014; Greene, Kisida, & Bowen, 2014; Kennedy, 2014; Leatherbury, 2011; Nabor *et al.*, 2009; Tal, 2001). Several surveys conducted by Shakil *et al.* (2011) in different universities in Pakistan, found that respondents in their research claimed that educational field trips are not only helpful in effective learning but also in promoting the qualities of leadership, discipline and self confidence among the students. Therefore, field trips can provide an integral part of the learning experience if they are planned well.

In fact, field trips have been regularly encouraged as part of teaching and learning strategy in legal education (Behrendt & Franklin, 2014; George, Lim, Lucas, & Meadows, 2015). Higgins *et al.* (2012) stress that law is a reflection of the norms of society, and it cannot be studied separately from interaction with the subjects, enforcers and creators of the law. Law schools regularly employ a wide range of pedagogical techniques and strategies which facilitate experiential learning, such as clinical programmes, moot courts and field trips. Visit to courts, prisons and other legal institution, including parliaments and tribunals are conducted as part of the common form of field trips for law courses. However, field trips' planning and usage in legal education as part of teaching and learning strategy are rarely systematically discussed. Notably, these trips are mostly conducted on an ad hoc basis, outside the official curriculum with little or no research to support their planning and the efficacy of the field trip. In other words, although field trips can be a useful teaching and learning tool, but its effectiveness can never be fully materialised if planning is also done on an ad hoc basis.

Thus far, there has been a dearth of both theoretical and empirical research into the elements necessary for planning a well-designed field trip as part of a successful teaching and learning strategy in legal education. Nevertheless, field trips could be a valuable pedagogical tool in making learning more engaging and provide unique opportunities for learning certain legal concepts by putting them into a more realistic and relevant context. This article, therefore seeks to analyse the important elements that should be emphasized in designing a successful field trip for legal educators.

Strong models for a field trip design do not appear readily in the literature. One particular model deliberated by Myers and Jones (2015) provided a helpful outline of a well-designed field trip. Several other models reviewed, including Orion's (1994) and Tal's (2001) model mainly addresses scientific field trip in a natural environment, while Brett, Atchison, Feig, & Stokes' model (2015) specifically concentrates on designing field-based learning requirements which caters for students with disabilities. Some other field trip designs focus only on the role of teachers and improving their function for the field trips (Alon & Tal, 2017; Morentin & Guisasola, 2015). Compared to these models, Myers and Jones' model specify elements that may be applied to most academic disciplines, including law but cover sufficiently aspects that should be present in a well-designed field trip. The model is certainly not exhaustive, but serves as a good starting point for teachers to consider when planning experiences for their students. Many of the elements are explored further below. Some points for consideration in the application of the planning model into field trips for legal education are also discussed and recommendations made appropriately in adapting them.

MYERS AND JONES' FIELD TRIP PLANNING MODEL

Several studies have documented that the key factor to a well-designed and eventually a successful field trip is planning (Kennedy, 2014; Krepel & Duvall, 1981; Myers & Jones 2015). Evidently, field trips must be carefully planned so that they support the curriculum and most importantly achieve the objectives for which they were intended for.

According to Myers and Jones (2015), organisers planning a field trip must focus on three important stages: pre-trip, trip, and post-trip as shown in Figure 1 below.

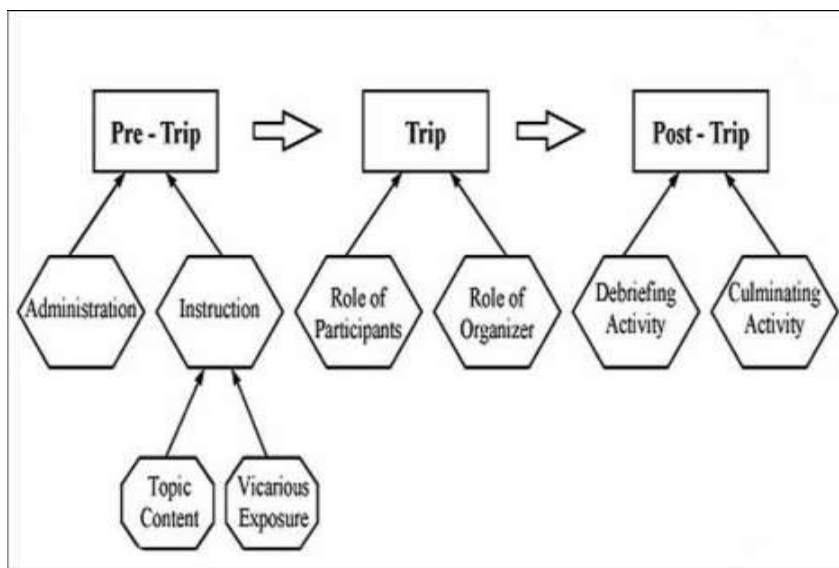


Figure 1: Field Trip Planning Model (Myers & Jones, 2015)

PRE-TRIP STAGE

This stage involves two major elements: administration and instruction. The administration element usually involves all of the steps taken by the field trip organiser to arrange the logistics of the trip, including securing permission from the relevant authorities, organising transportation for the field trip, and contacting the field trip location to verify the schedule and activities.

However, Myers and Jones (2015) argue that, many organisers are too concerned with the administrative aspects during the pre-trip stage, that most would neglect the instruction element of the pre-trip stage. The instruction element of the pre-trip stage actually plays an important part in ensuring an educationally successful field trip. This element focuses on prepping the mind sets of the participants for the experience. Myers and Jones (2015) acknowledge the importance of this element due to the fact that participants may experience high levels of anxiety, especially when visiting unfamiliar settings or locations, which may then hinder the learning process. Therefore, in order to overcome this concern and increase overall trip effectiveness,

the field trip organisers need to make participants feel comfortable and safe at the location of the field trip, for example by providing participants with ‘vicarious exposure’ (Myers & Jones, 2015) to the field trip site as part of pre-trip instruction. Such exposure could involve merely showing the participants photographs, drawings, or a video screening of the site to be visited or suggesting reading important field trip information of the location on the Internet prior to the event.

The field trip organisers should also focus on reviewing, as part of instruction issues involving the safety and behaviour rules and expectations, and the ‘content topics and concepts’ (Myers & Jones, 2015) that participants will be investigating during the field trip. Such pre-trip instruction, according to Myers and Jones (2015) makes it easier for participants to focus on the educational goals of the trip. For a more effective learning strategy and activity during the field trip itself, small groups of two to three participants should be assigned at the pre-trip stage.

TRIP STAGE

Two elements should be emphasized during the trip stage itself: the role of the participant and the role of the organiser. Myers and Jones (2015) maintain that the role of the participant during the field trip should centre on a field trip agenda and having this agenda and the field trip objectives shared with all participants. They suggest a three-phased agenda for a field trip.

Phase one of the agenda should start with a brief amount of free time for participants to explore the field trip site on their own. Although, this open exploration may not be appropriate in all locations but it allows participants to get comfortable with their surroundings and prepare participants to be better focus on the content topics to be learned.

Phase two of the agenda is often comprise of a whole-group guided tour. It is during this point of the agenda that specific items that relate to the educational goals of the trip should be pointed out by the organiser or tour leader. Opportunities should also be provided for participants to ask any questions they may have developed during their phase one exploration time.

The third phase of a suggested field trip agenda should include a small group learning activity, whereby pre-assigned groups of two to three participants are given some tasks to complete, which should clearly relate to the educational goals of the field trip.

Myers and Jones (2015) also highlight the importance of the role of the organiser during the trip stage. Mostly, the organisers should play an active role, acting more as facilitators or guides, in order to increase student interest and learning.

POST-TRIP STAGE

The final stage of a well-designed field trip is the post-trip stage. This stage also contains two elements: debriefing and a culminating activity. According to Myers and Jones (2015), both activities should be conducted as soon as possible after the trip.

Debriefing activity involves encouraging all the participants to share and discuss their experiences during the field trip. As noted by Myers and Jones (2015), this session could include sharing and discussing data or results of the assigned small group activities during the trip stage, as well as sharing feelings about specific aspects of the trip, including highlighting any problems encountered during the field trip or overall thoughts.

A culminating activity involves granting the participants opportunity to apply the content knowledge learned during the field trip and tie them together with the content they covered in regular educational program sessions. Culminating activities can be conducted as a whole group or small group experiences sessions.

Clearly, planning and organising a successful field trip involves a great deal of work for the organiser. However, much can be learned from Myers and Jones' Field Trip Planning Model (2105), which could be of useful assistance in the design of a well-developed field trip plan.

SOME POINTS FOR CONSIDERATION: PLANNING FIELD TRIPS IN LEGAL EDUCATION

Myers and Jones' model (2015) although not exhaustive, serves as a good guide of the elements that should be looked into by organisers in planning a well-designed field trip. The elements of the model are presented in a simple three stage approach – Pre-Trip, Trip and Post-Trip Stage, which made for a non-complicated application of the planning model.

The model's pre-trip stage focuses on two major elements: administration and instruction. The administration element usually encompasses steps taken by organisers to arrange the logistics of the trip, including securing permission from the relevant authorities, organising transportation for the field trip, and contacting the field trip location to verify the schedule and activities. For legal educators, the choice of the settings and locations of field trip, especially involving legal institutions may include certain other restrictions, including the number of participants and time allocation. Therefore, organisers when planning such field trips must not only consider settings or locations that can best achieve the learning objectives but also settings or locations that may accommodate the number of participants planned for the educational field trip.

While the administration element involves mostly logistics issues, the instruction element is concern with preparing students for the field trip experience. Myers and Jones emphasized the importance of this element in order to reduce the levels of anxiety that may be experienced by the participants, especially when visiting unfamiliar settings or locations, which may then hinder the learning process. In field trips involving a formal setting or locations as in the case with most trips organised for law courses, this is especially true. Field trips commonly conducted for law courses include visits to parliament, courts, tribunals, prisons and other legal institutions. These legal institutions often come with their own sets of formalities and regulations to be adhered to by visitors. For most participants, field trips to such settings or locations would be their inaugural visit. Understandably, participants would be overwhelmed by a high level of anxiety due the unfamiliar settings or locations and probably even apprehensive of the protocols and formalities involved.

Myers and Jones (2015), therefore, proposed that in order to overcome this concern and increase the trip's efficacy, the field trip organisers need to make participants' comfort and safety assured of at the location of the field trip. Participants should also be provided with 'vicarious exposure' to the field trip site as part of pre-trip instruction. Vicarious exposure could involve showing the participants photographs, drawings, or a video screening of the site to be visited or suggesting reading important field trip information of the location on the Internet prior to the event. Notably, in case of field trips to legal institutions, we are also of the view that participants should also be briefed of the protocols, formalities and regulations involved when visiting such institutions by the organisers as part of the pre-trip instructions. In other words, part of the pre-trip instructions should include not only issues involving safety, but also behaviour rules and expectations of the participants to adhere to the protocols, formalities and regulations of the chosen field trip's site.

As part of the pre-trip instructions, field trip organisers are recommended to focus on the 'content topics and concepts' that participants will be investigating during the field trip. Such pre-trip instruction, which may include assigning small group learning activities, according to Myers and Jones makes it easier for participants to focus on the educational goals of the trip. We opined that in terms of designing activities and experiences involving the content topics and concepts the location and time constraint must also be taken into consideration so as to ensure the feasibility of the activities planned for the participants especially for field trips to legal institutions.

In the trip stage itself, two elements are considered in the model, i.e. the role(s) of the participant and the role(s) of the organiser. Myers and Jones maintain that the participants and the facilitator should know their roles, in ensuring a smooth flowing trip. This may be done by providing and sharing with all participants a clear agenda and objectives of the field trip.

Myers and Jones' three-phased agenda for a field trip involves briefing and open exploration phase, guided tour phase and small learning activity phase. This three-phased agenda may be readily applicable into field trips at a general and informal setting or locations. However, for legal education we believe that some part of the suggested agenda may need to be amended

or adapted depending on the location of the field trip and the allocated timeframe. Organisers may also need to be prepared with some alternative plans (which may be included in the third phase) when visiting such places in order to ensure that the learning objective of the field trip is achievable. The third phase agenda of a suggested field trip, i.e. having small groups learning activity should not be an issue to be implemented. Myers and Jones also insisted on the importance of the organiser's role during the trip stage, being active in acting more as facilitators or guides, in order to increase student interest and learning.

The post trip stage of the model involves planning for two elements: debriefing and a culminating activity that should be conducted as soon as possible after the conclusion of the trip. Debriefing involves participants reflecting, sharing and discussing their experiences from the field trip. As for culminating activity, it is where everything experienced during the trip is shared and discussed, as well as experiences and lessons related back to the curriculum. Any form of assessments and tasks, including activity, assignment, or project used as a form of continuum of the lessons learned during the experience, and provide for further reflection on the subject and experience.

A successful and quality field trip requires preparation and interaction, yet often educators are not equipped to, with all necessary supports to make them prepared for a successful field trip. Myers and Jones' model, grants educators some guide into the elements that is necessary for a well-designed field trip, even for law courses. Myers and Jones' model also allow organisers to anticipate some of the challenges that the organiser may face during the field trip. To a certain extent, the model gives us, legal educators some solutions and guidelines to prepare ourselves for the field trip and the alternative plan if the initial objectives of the field trip are compromised.

CONCLUSION

The use of short-term experiential learning techniques, such as field trips, has long been recognised as an important tool for education in the social sciences, providing significant benefits for both students and lecturers. The use of field trips in legal education is commonplace but both theoretical and

empirical research into the elements necessary for planning a well-designed field trip in legal education have rarely been systematically discussed. Evidently, effective use of field trip as a form of teaching and learning strategy in legal education requires careful planning and consideration especially when the field trip's location involved formal visiting procedures, for example courts, prisons, tribunals, Parliament and other relevant legal institutions. Planning and organising such fields' trip can be a great deal of work for the organiser. However, Myers and Jones' Field Trip Planning Model, although not exhaustive may provide useful assistance in the design of a well-developed field trip experiences for students. Field trip organisers should give emphasis amongst others to pre-trip instructions' vicarious exposures and learning activities to avoid any field trip to merely become a day of lost learning. Although planning and organising a successful field trip involved a great deal of preparation, it would definitely benefit participants and should be made an integral part of teaching and learning strategy for legal education.

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HIGH FAILURE RATE IN MATHEMATICS SUBJECT: INFLUENCING FACTORS AND STUDY STYLES

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ABSTRACT

The objectives of this study are to determine factors that contribute to the Engineering Calculus subject failures and to analyse the study styles of students taking this course. Based on the literature search, these factors are categorised into three domains which are students' attitude, students' background and teacher-related factors. A survey research was done to a sample of engineering degree students who are taking Engineering Calculus subject at their third semester. It was found that non-systematic study style is the greatest factor which has been claimed by the respondents as the main reason for their failures. Besides this, a majority of the students are comfortable with studying alone, as compared to taking part in study group or seeking help from lecturers. These findings suggest that corrective actions should be taken by the students, lecturers, as well as the faculty in order to cope with the alarming failure rate of mathematics subject.

Keywords: *failure rate, engineering calculus, mathematics, study style, students' attitude*

INTRODUCTION

Mathematics is very important in our daily lives as many activities, directly or indirectly, deal with mathematics. A good understanding in mathematics is essential for obtaining good employment. Individuals with high mathematical competency are needed to ensure a continued production of highly-skilled people to fulfil the demand by the industry, science and technology. Having a strong background in mathematics is crucial as it is a basic requirement in variety of university courses at tertiary level study. Among the group of mathematics subject taught in universities, Engineering Calculus is a core subject which is compulsory for all undergraduate engineering degree courses. Despite of being the prerequisite for engineering courses, a preliminary research has found that many students perceived calculus as high level of difficulty among any other mathematics courses. An analysis of Engineering Calculus results over a number of semesters in a local university has shown an alarming rate of failure in the subject. The students' performance in selected engineering courses indicates that the passing rate is low. This is against the entry requirement in engineering degree courses which demands them to have a very strong mathematics skill. From the researchers' point of view, there has been not much research conducted in the university, focusing on mathematics high failure rate. In light of this matter, there is a need for some investigations on the factors which contribute to this problem. The objectives of this study are to determine the reasons for Engineering Calculus subject failures and to analyse the study styles of the students taking this course. This research focuses on a group of selected engineering students in a local university.

RELATED WORKS

The root causes of high student failures in mathematics have been extensively studied in literatures. Naidoo and Naidoo (2007) used a computer laboratory to create a learning environment that promoted interactive learning together with traditional learning. It is observed that among the reasons are lack of understanding in mathematics, large class size, wrong manipulation of approaches in problem solving and insufficient class hours. Tachie and Chireshe (2013) have identified that a shortage of teaching aid materials, incompetency of teachers and lack of students'

efforts in studying mathematics are the reasons that contribute to the high failure rate. To deal with this problem, the basic concept of teaching and learning mathematics must be understood by both students and lecturers. Otherwise, learning mathematics will be full of errors and misconceptions (Makonye, 2013). A study done by Eng, Li and Julaihi (2013) has found that students depend very much on lecture notes as basis for learning. Despite of the students' participation in small groups and classroom which were above average, other instructional systems such as students' participation in laboratory and usage of concrete materials for mathematical exploration were below average.

Allen *et al.* (2013) identified specific features of teacher-student interaction in classroom using a standardised scoring system. The scales are organised into three domains, namely emotional support, classroom organisation and instructional support. It was found that emotional support and instructional support were strongly related to achievement in small classroom. This is because the sensitivity to student needs or high quality feedback to students might have great effect when they are concentrated among fewer students. Sakiz, Pape and Hoy (2012) explored the importance of perceived teacher affective support in relation to sense of belonging, academic enjoyment, academic hopelessness, academic self-efficacy and academic effort in mathematics school classrooms. It was reported that greater sense of belonging in mathematics class has led to higher academic enjoyment. In addition, there is a negative correlation between sense of belonging and academic hopelessness. Other than this, academic enjoyment has direct relations with academic hopelessness and academic self-efficacy due to the presence of perceived teacher affective support and perceived sense of belonging.

Mata, Monteiro and Peixoto (2012) investigated the interrelationship between some selected variables that could influence student attitudes towards mathematics. Among the variables are individual background, motivation and social support. The results show that students had positive attitudes towards mathematics even though their score is around midpoint scale. In addition, medium achievers show gradual decrease in attitudes towards mathematics across the school years. Besides this, teacher support shows closer relationships to attitudes. It represents the third strongest relationship that shows the importance of teachers in the development

of positive attitudes towards mathematics. Mijs (2016) study students' attributions of failure in mathematics subject among secondary school students in 24 countries. A student's inability, poor support from teacher and bad luck are the three factors which emphasis the potential explanation for the students' failure to do well in mathematics.

Factors related to successful completion in mathematics course are explored by Bagley (2015). Factor of gender was found to have little effect on the course. Other factors which have significant effect are the students' prior preparation for the course, high school background, students' anxiety, attitude and mind-set toward mathematics. Nur (2010) studied teacher-related factors and student-related factors that influence student performance in mathematics course. The teacher-related factors focus on the teachers' attitude towards mathematics, the teachers' qualification and the teaching method and material used. On the contrary, the student-related factors are looking at the students' attitudes towards mathematics and their background, in terms of curriculum and motivation.

Table 1 presents the summary of the relevant works that focus on the factors that contribute towards the high failure rate in mathematics courses. By examining the various factors covered by these literatures, Table 1 categorises them according to three large aspects, which are students' attitudes, students' background and teacher-related factors.

Table 1: Cross Analysis on Factors Underlying High Failure Rate in Mathematics

		Students' Attitudes	Student Background	Teacher-related Factors
1.	Mijs (2016)		√	
2.	Bagley (2015)	√	√	
3.	Allen <i>et al.</i> (2013)		√	√
4.	Eng <i>et al.</i> (2013)		√	
5.	Taichie and Chireshe (2013)	√		√
6.	Mata <i>et al.</i> (2012)	√	√	
7.	Sakiz <i>et al.</i> (2012)	√		
8.	Nur (2010)	√	√	√
9.	Dewitt (2000)	√		

METHOD

From the literatures, there are three main factors which contribute to the high failure rate in mathematics courses. Therefore, this survey is aimed to understand the problems encountered by students in learning mathematics course at a selected local university. In this context, this research looks at how these three factors affect the learners in their experience taking the subject. The survey research is conducted on a sample of engineering degree students who are taking Engineering Calculus course at their third semester. These students come from a wide range of social and economic backgrounds. Figure 1 presents the student distribution according to their degree courses.

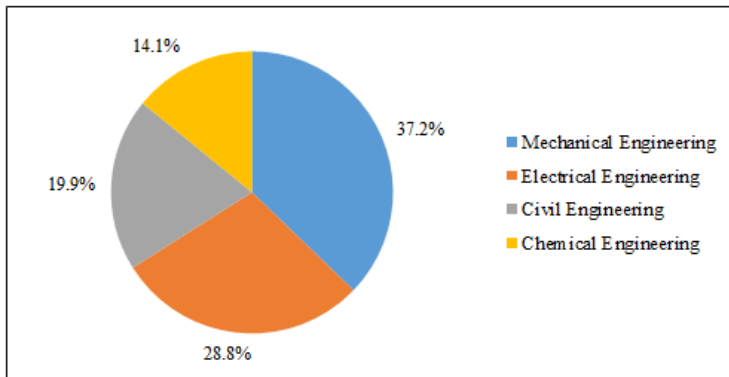


Figure 1: Student Distribution According to Degree Courses

A total of 836 engineering students in 61 classrooms of 25 mathematics lecturers in four engineering degree courses participated in this survey. Data were collected during class hours. Besides the demographic profiles, the questionnaire seeks to collect information on students' perceptions towards mathematic, factors that contribute towards high failure rate and the students' study styles. There are also open-item questions given in the questionnaire to obtain students' suggestions. Questionnaires were administered in the classroom under the supervision of a lecturer. Students then returned the questionnaires to the lecturer, before the questionnaires were handed over for data analysis purposes.

RESULT AND DISCUSSION

In this paper, findings obtained from the questionnaires are presented in two sections. The first section is the analysis on the factors that contributes to the failure of Engineering Calculus subject, namely students' attitude, students' background and lecturer-related factors. The second section is the students' learning style when they study this subject.

Factors contributing to the failure of Engineering Calculus subject

Based on the literature review, factors contributing to students' failure in mathematics courses can be grouped into three large aspects, namely students' attitudes, students' background and teacher-related factors. As these aspects are crucial and seriously affect the students' performance in the colleges or universities, this research attempts to focus on these aspects in the survey. The results presented in Table 2 focus on the three main factors contributing to students' failure in the Engineering Calculus subject.

A total of 836 engineering students responded to the survey. They were asked to share their perception on the Engineering Calculus subject. From the entire respondents taking part in this study, 17.9% of them are repeating students who have at least failed once in the subject. They are asked to choose the factors that contribute to their failure in the past. These factors are shown in Table 2. The learners are allowed to choose more than one factor, whichever they believe had significantly contributed to their failure.

Table 2: Learners' Reasons for Engineering Calculus Subject Failures

Students' Attitude:	
Study Style	79.3%
Class Absenteeism	12.0%
Students' Background:	
Course is difficult	51.3%
Unable to understand problem	38.0%
Personal Problems	6.2%
Lecturer-related Factor:	
Change Lecturer	22.0%

Students' Attitude

A large percentage of 79.3% of the learners in the survey attributed their failure to the non-systematic study style. They admitted that they do not have a systematic way of study, such as having daily or weekly group discussions, consistently working out the tutorial questions or seeking help whenever in doubt. Many of these students devote their time studying mathematics when the examination is around the corner. This last-minute preparation only leads them to experience fear, anxiety and nervous as they are afraid that they could not score in the examination. Furthermore, the absorption of the mathematical concepts and formulae is less effective at this stage.

There is a percentage of 12% of the students who admitted that class absenteeism also contributes to the high failure rate. As the syllabus is heavy, a large amount of lesson is covered in each single day lecture. When students are absent from a class, they are not able to catch up in the subsequent class because of the missed lecture earlier. As a result, they become frustrated, feeling left behind and disappointed with the course.

Students' Background

51.3% of these repeaters believed that mathematics is difficult by nature. Some of them claim that there is very little they can do to pass the subject due to their weak basic foundation of mathematics. Having a weak mathematical basis, they are not able to identify suitable method to solve a particular problem, which normally has more than one solution method. They are easily confused with the various solution techniques and these reasons have made them claim that the course is difficult. Normally, they get confuse because of the way the formula is written. Mathematics formula can be written in different ways, yet carries the same meaning. In many cases, wrong values are substituted into the formula and hence, wrong answer is obtained.

Besides this, there is also relatively a large percentage of 38% of the respondents who find that they face difficulties to understand the given problem. They are unable to understand the concept of the mathematics question in the context of the realistic real world problem and fail to identify the correct skills to answer the given question. These difficulties largely refer to the subtopic of double and triple integral, in which solution steps always

involve lengthy procedures. These students face difficulties in visualising 3-dimensional functions. These questions involve 3-dimensional functions such as sphere, paraboloid, cone and cylinder. Such questions usually require them to visualise, draw and finally solve the given problem. In understanding the given problem, language barrier is not found to be a significant problem for the students who took part in the survey. Students are familiar with mathematics vocabulary as many local schools are teaching mathematics in English. This may have equipped them with the ability to understand mathematics concept in English, communicate using mathematical terms in English and translate them into their problem solving workings.

There is a small number of respondents who attributed their failures to personal problems. The personal problems sighted include health, family, financial and social problems accounting for 6.2% of the entire number of repeaters. When students are unable to cope with their personal problems, they tend to lose focus in class and their motivation level declines. Some of their personal problems are discussed with the academic advisors of the faculty in which some cases are successfully solved. However, some students choose to keep the problem to themselves and no efforts are done to solve it. This leads to a deterioration of the students' performance in class and contributes to the high failure rate in the subject.

Lecturer-related Factors

A change in the Mathematics lecturer during the middle of the semester is another factor which contributes to the failure rate among repeating students. The change of lecturer is due to lecturers' teaching load, where some classes are assigned two lecturers in which each of them would teach the class for half semester. 22% of the students surveyed are not happy with this method of class arrangement. They find difficulties in adapting to the different teaching style of each lecturer. Generally, there are no other lecturer-related factors recorded from the survey and the students are happy with the lecturers and their teaching style.

Students' Learning Style

From the survey done on the repeating students who have failed the subject at least once, 79.3% of them claimed that they are practicing a non-systematic study style. This factor forms the largest proportion among other reasons given for the failure. Therefore, the other objective of this research

is to analyse the study style of the students in the survey. The learners are allowed to choose more than one learning style, whichever they practiced in learning the Engineering Calculus course. The result obtained is presented in Figure 2.

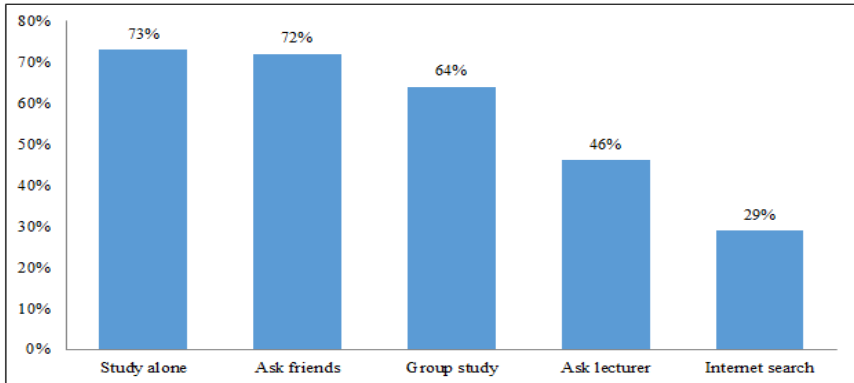


Figure 2: Students' Learning Style

The survey results indicate that there are some obvious variations in the students' learning style among the Engineering Calculus learners. Among the learning styles that are widely practiced are studying alone, seek friends help, group study, consult lecturer and internet search.

Every student has their own style of studying. Majority of the students choose to study alone. They believe that they find comfort and peace and are able to retain more information in a quiet setting. Besides studying alone, a large number of students also prefer to seek help from friends whenever in doubt. Friends are the closest people they look for, when they need clarification on any uncertainties on the subject matter. As long as the friends are able to discuss and explain the subject matter, then asking friends could be a good learning style. In the case if the friends are unable to answer their queries, then this will lead to frustration and disappointment which will demotivate them.

A proportion of 64% of the respondents practice study group for the subject. The study group is used as a platform for them to share information, change ideas, attempt the problem solving with others and identify any working errors. Group study also helps to reinforce ideas and improve knowledge retention and enhance thinking skills.

46% of the students choose to seek help from the lecturer when they face problems. In general, many students refused to approach the lecturer as they are shy, afraid of asking questions or claim that lecturers are too busy to attend to them. Apart from this learning style, a small percentage of 29% of the students use internet search to look for further clarification regarding the subject matter.

One learning style is not necessarily better than the other. One style might be better for a certain group of students but not for the other groups of students. It all depends on the individual, as to which study style is suitable and effective for him or her. What is important is finding an effective study method where they are able to concentrate, stay focused and grasp the subject matter better.

CONCLUSION

This study investigates reasons that led to the high failure rate in Engineering Calculus subject. In this paper, three domains are looked into namely students' attitude, students' background and lecturer-related factors. A survey research was done on a sample of engineering degree students who are taking Engineering Calculus subject at their third semester. It was found that non-systematic study style is the greatest contributing factor for their subject failures. This aspect lies in the category of students' attitude. Another significant reason is due to the nature of the calculus mathematics course itself, which students claimed to be difficult. Upon investigating the students' study style, it is discovered that a majority of the students choose to study alone, rather than taking part in group study or seeking help from lecturers. The present study only examined the reasons for the high failure rate for the course. Further research could be focused on the corrective actions that should be taken by the students, lecturers, as well as the faculty in order to tackle the problem of high failure rate.

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PRECARIOUS WORK BEHAVIOUR ON CAREER SATISFACTION

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ABSTRACT

The development of information technology, along with globalisation, has changed today's workplace. The impact of dramatic changes in technology as well as globalisation has led to an increase in precarious work behaviour. There are positive associations between precarious work behaviour and career satisfaction. The literature showed satisfaction with work had exhibited an impressive effect on more worldwide regions, for example, satisfaction with a career. Therefore, this paper reviews the literature on precarious work behaviour on career satisfaction. Data were collected using a questionnaire conducted on online entrepreneurs. The data were analysed using Structural Equation Modelling (SmartPLS) to assess the respondents. Results show that precarious work behaviour has a positive influence on career satisfaction. The findings have implications for increasing our understanding of precarious work behaviour on career satisfaction. Implications and conclusions will highlight the challenges faced by online entrepreneurs.

Keywords: *precarious work behaviour, career satisfaction, online entrepreneur*

INTRODUCTION

This study aims at exploring precarious work behaviour on career satisfaction. In this study, precarious work behaviour has been said to influence people to pursue self-employment for their career development strongly. In order to understand career satisfaction, it is crucial to get a better understanding of how people consider precarious work behaviour when overseeing their careers and of what such thought infer for career satisfaction. The degree to which these precarious work behaviours are related to career remains unexamined. It is important to address this gap since precarious work behaviour on careers urges researchers to examine whether individuals who take considerations of precarious work behaviour experience greater satisfaction in their careers. Wilkin (2012) commented that the precarious work behaviour affects nearly everyone's work experience.

PRECARIOUS WORK BEHAVIOUR

The standard employment refers to a state where an employee has single employer; works in a permanent, full-time designation; enjoy employee benefits and expects to be employed over a long time span (Vosko, Zukewich, & Cranford, 2003). Any work arrangement that varies from this definition is referred to a non-standard (precarious employment). According to Benach and Muntaner (2007) precarious employment is becoming more common in developed countries and is widespread in developing economies. In today's modern economy, conventional labor appears to be diminishing where employees are choosing to have freedom at work and are independently (Vaiman, Lemmergaard, & Azevedo, 2011). For example, downsizing, globalisation, and outsourcing are nurturing a significant development in the number of precarious work behaviour. Even though numerous of today's employment facing unstable such as low-paying, nevertheless, the number of precarious employees is steadily rising. As a consequence, this type of work lacks security and has limited benefits.

Career Satisfaction

Satisfaction can be defined as the state of being satisfied; contentment. Career satisfaction is important for career development such as occupations,

work dynamics, and individual adjustment. Career satisfaction is often regarded as a key outcome variable representing career success and personal fulfilment (Spurk, Abele, & Volmer, 2014). Meanwhile, Oh (2013) indicated that career satisfaction had become a vital issue within the organisation since individual satisfaction leads to more dedicated and enthusiasm employees. In addition, Leavell (2013) argued that career satisfaction had demonstrated a considerable effect on individuals' overall life satisfaction and well-being.

Precarious Work Behaviour and Career Satisfaction

Sisco (2014) mentioned that motivations influence the choice to be self-employed instead of choosing paid, conventional employment as a career. Those motivational factors include the potential for higher pay in self-employment and the potential freedom self-employment in allowing the workers to be innovative. Schneck (2014) found that the self-employed are more satisfied with their employments when compared to waged employees. Similarly, numerous research demonstrates that self-employed people are more satisfied with their employments rather than paid employees (Benz & Fray, 2008; Blanchflower & Oswald, 1998; Bradley & Roberts, 2004; Hundley, 2001; Katz, 1993; Thompson, Kopelman, & Schriesheim, 1992). The most clarification given for this distinction is when self-employed enjoy working independently and having a high decision in terms of autonomy (Benz & Fray, 2008; Hamilton, 2000; Hundley, 2001). Numerous researchers have found that the most persistent factor for career satisfaction is having an engaging work. Different work has different elements in order to achieve career satisfaction. One of these determinants is independence. Individuals may determine fulfilment from other viewpoints of work than pay, such as having satisfying work or adaptability at work (Millan, Hessels, Thurik, & Aguado, 2013). In addition, Ayranci and Ayranci (2015) indicated that self-employed are more fulfilled than others as a result of having autonomy in their job. Li (2011) pointed that self-employed who choose to run their own business will bring more passion towards their work involvement such as a feeling of achievement, working autonomously, creativity and inventiveness, and administering others than working for an organisation. Meanwhile, Carree and Verheul (2011) argued that self-employed are more fulfilled than paid employees with their autonomy, but are not with their pay and work security.

Online Entrepreneur

Tran and Korflesch (2016) noted that an entrepreneur is an individual who runs a business, assuming all the risks and rewards of the venture and commonly seen as an innovator. Elenurm (2012) reported that an entrepreneur acts as a creator, starting changes and producing new chances within the long run that effect their financial development. Evans and Volery (2001) suggested that the Internet is a powerful medium to provide business development services much needed by entrepreneurs. Anwar and Daniel (2016) indicated that doing online commerce have been considered the low cost to operate. Numerous online businesses are based from home (Mason, Carter & Tagg, 2011). Online businesses are not visible to clients where employees are placed, nor do clients anticipate to be able to visit a physical shop (Anwar & Daniel, 2016). Therefore, entrepreneurship is a crucial implies of business, boosting economy development, and advancement for empowering products quality, competition, and financial adaptability.

METHODOLOGY

This research employs quantitative which focuses on survey method to allow it to be more definite.

Sample and Procedure

The respondents for this study were online entrepreneurs. The survey was carried through an online survey. Data were collected through an online survey format, using existing, validated instruments. The online survey method provided economy of design and the ability to have a rapid turnaround in data collection.

Precarious Work Behaviour

Precarious work behaviour was assessed with 13 items by using the measure from (Knight *et al.*, 2006). Respondents were asked to answer perceptions of online business. Responses were measured on a 1 to 7 Likert scale (1 = strongly disagree, 7 = strongly agree), and yielded a coefficient alpha of 0.952.

Career Satisfaction

Career satisfaction was surveyed with the scale from (Greenhaus, Parasuraman, & Wormley, 1990). The scale comprises of five statements such as ‘Overall, I am satisfied with my job’ answered on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree), and yielded a coefficient alpha of 0.914.

RESULTS

100 of respondents participated in this study. The total sample composed of 37 men (37%) and 63 women (63%). The participants were less than 25 of age (52%), between 25 to 35 years old (37%), between 36 to 45 years old (9%), and more than 45 years old (2%). As for their education level, 56% of respondents have a diploma, 28% has a bachelor degree, 14% has a master’s degree, and 2% has a doctorate degree. As for marital status, the respondents, 68% were single and 32% were married. The study employed PLS-SEM to test measurement and structural model by using the SmartPLS 3 Software. The data was first screened to identify whether there is any missing data, to identify outliers, to assess normality and to check for common method variance. The measurement model was test first preceding to the structural model assessment. Each construct in the model were inspected for its validity and reliability. Construct validity was assessed to ensure the measurements are valid. In convergent validity, the factor loadings and the average variance extracted (AVE) were checked (Hair, Hult, Ringle, & Sarstedt, 2014). Convergent validity is achieved when the factor loadings are above 0.70 and the AVE is above 0.50 (Marcoulides & Chin, 2013). As for discriminant validity, a construct should be clearly distinct from other constructs which have been theoretically shown to be different. Construct reliability and AVE of the reflective constructs are shown in Table 1. Results from the outer loadings showed no indicators found to be below 0.40. The construct reliability was assessed by calculating Cronbach’s α coefficients for each of the multi item constructs. All the scales were above the suggested value of 0.70. Therefore, it is decided that the instrument used in this study are valid and internally consistent.

Table 1: Factor Loadings, Composite Reliability, and Average Variance Extracted

Constructs	Items	Outer Loadings	Composite Reliability	Average Variance Extracted
PWB	PWB1	0.768	0.936	0.745
	PWB2	0.788		
	PWB3	0.754		
	PWB4	0.847		
	PWB5	0.743		
	PWB6	0.873		
	PWB7	0.857		
	PWB8	0.865		
	PWB9	0.825		
	PWB10	0.782		
	PWB11	0.716		
	PWB12	0.757		
	PWB13	0.732		
CS	CS1	0.836	0.957	0.635
	CS2	0.898		
	CS3	0.876		
	CS4	0.879		
	CS5	0.824		

Inspection on AVE showed all constructs were above 0.50. The constructs were also checked on discriminant validity, the square root of the AVE each construct and all another construct (Fornell & Larcker, 1981; Hair *et al.*, 2014). The Heterotrait-Monotrait ratio of correlations (HTMT) approach is to determine the discriminant validity of the constructs (Henseler, Hubona & Ray, 2016). The HTMT value should not be greater than the HTMT value of 0.85 to achieve discriminant validity (Kline, 2016). The value of precarious work behaviour is 0.456. It is, therefore, passed HTMT measures indicating that each construct in the model measures a unique subject and captures phenomena not presented by other constructs in the model. After running the PLS algorithm in SmartPLS to assess the measurement model, the variable scores were utilised to calculate the mean scores and the standard deviation scores. The mean scores reported for

precarious work behaviour ($M=0.456$, $SD=0.076$). Multicollinearity refers to the degree to which a variable can be explained by the other variables in the analysis (Hair *et al.*, 2014). It is difficult to ascertain the effect of any single variable, the variance inflation factors (VIF) were used to examine multicollinearity (Hair *et al.*, 2014). The VIF values were below the standard criteria (precarious work behaviour = 1.000) indicating no multicollinearity issue. The next analysis done was to assess the structural model. The structural model was assessed to test the relationships between precarious work behaviour and career satisfaction. The coefficient of determination (R^2 value) and path coefficients (beta values) were parameters to determine how well the data supported the hypothesized relationships (Hair *et al.*, 2014). A bootstrapping process with 500 iterations was performed to generate t-values and standard errors to confirm the statistical significance (Hair *et al.*, 2014). R^2 measures the predictive accuracy of the model and represents the percentage of variance in the dependent variable as explained by the independent variable in the model (Hair *et al.*, 2014). As shown in Figure 1, precarious work behaviour explains about 19% of the variance in career satisfaction ($R^2=0.192$).

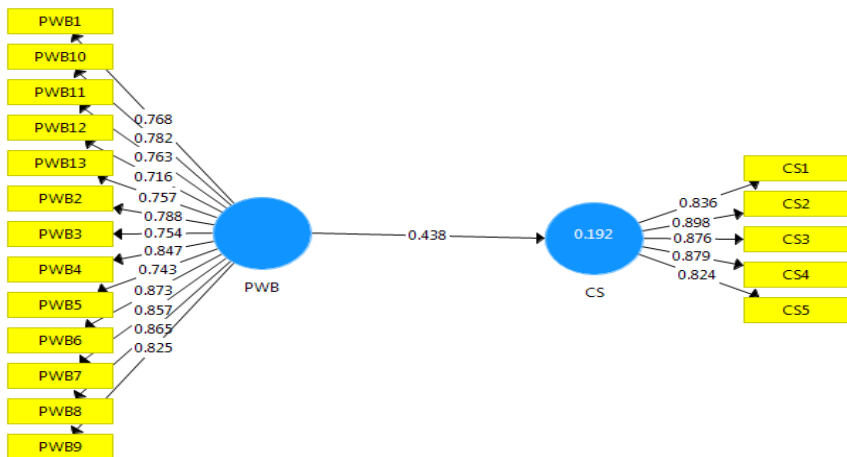


Figure 1: Measurement Model Framework

Path coefficients (B) indicate the degree of change in the dependent variable for the independent variable (Hair *et al.*, 2014). As shown in Table 2, the path coefficients for precarious work behaviour and career satisfaction was significant.

Table 2: Hypothesis Testing

Path	B	t	Decision
PWB -> CS	0.438	5.779	Supported

The predictive relevance (Q2) and effect size (f2) are also reported in Table 3. The guidelines of Cohen were used to assess the f2, whereby 0.02, 0.15, 0.35 indicate small, medium and large effects respectively. The f2 values show that has a medium effect in producing R2 for career satisfaction. Also, the predictive relevance of the model is examined using the blindfolding procedure, if the Q2 value is larger than 0, the model has predictive relevance for career satisfaction. The Q2 value for career satisfaction is 0.125 which is larger than 0 indicating the model has sufficient predictive relevance.

Table 3: R2, f2, and Q2

Path	R2	Q2	f2
Precarious work behaviour	0.438		0.238
Career satisfaction		0.125	

DISCUSSION

This study examined the precarious work behaviour on the career satisfaction of online entrepreneurs. The study's results are consistent with our predictions. The overall results indicate that online entrepreneur tends to have higher levels of career satisfaction. Career satisfaction is one of the foremost imperative variables in selecting work. Previous studies have shown that self-employed people are happier and more engaged with their jobs than those working in any other profession. Therefore, this research supports the hypothesis that higher career satisfaction of the self-employed, compared with paid employees, can be clarified by orientation to their inclinations for freedom and autonomy. The online entrepreneurs enjoyed their work when they had flexibility and independence in their work. With autonomy, it can increase motivation and happiness. This can lead to their career satisfaction. In addition, this study also found that most of online entrepreneur is the young generation which is generation Y. This result is consistent with the previous study where online entrepreneurs in common

have been found to be more youthful than other business visionaries (Betts & Huzey, 2009; Colombo & Delmastro, 2001; Mason *et al.*, 2011). Many entrepreneurs are drawn to online businesses because of the freedom. Most people, particularly the young generation are preferred to have freedom over their jobs. Young generation has different priorities in the workplace. For example, they are preferred to have a life outside of work and freedom to work flexible hours. Martin (2005) agreed that generation Y do need clear instructions and supervisory support, but they moreover request the flexibility and adaptability to induce for getting the work done in their way. Attitudes toward flexible work and the technology development can support them to pursue self-employment. Furthermore, this study also found that online entrepreneurs were more likely to be single. Consistent with these findings on marital status, online entrepreneurs were less likely to have children instead of offline entrepreneurs or non-entrepreneurs (Deschamps, Dart & Links, 1998; Fairlie, 2006). The findings suggest that it is not necessary for people with or without commitments to pursue their career as an online entrepreneur. Therefore, this study provides a theoretical contribution by advancing to the understanding of whether precarious work behaviour is related to career satisfaction.

LIMITATIONS AND FUTURE RESEARCH

This research inevitably consists of some limitations, which, however, open interesting possibilities for future research. This research is limited to the variables; precarious work behaviour and career satisfaction. The research also limited to online entrepreneurs. The respondents of this study consist of all fields such as cosmetics, clothing, food and so forth. Hence, this study is not focused on any specific field of online entrepreneur since it is a challenge to this research to get them to participate. Thus, future research should address the possible limitations of the current study. Future research should be specific to getting online entrepreneur participation. Future research also might address different satisfaction domains in extending the analysis. Therefore, it can provide interesting avenues for future research.

IMPLICATIONS FOR PRACTICE AND CONCLUSION

This study has some important implications for human resource functions. This study provides knowledge to get a more comprehending about career satisfaction which related to precarious employment. Precarious employment forms have gained in importance in recent years. This type of employment is a growing trend in today's societies due to many factors such as outsourcing, globalisation, a saturated job market, shifts from manufacturing to the service sector and jobs also being replaced by computerised units.

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DIGITALISATION SUCCESS IN LEARNING ORGANISATION: PRELIMINARY OUTLOOK

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ABSTRACT

The use of digital information tools in our daily life, demands technical competencies to navigate through digital information successfully. Every learning organisation today, facing a lot of challenges to keep their institutions going, increasing in growth and sustainable effectively in a modest world. Knowledge is the main resource and the important essence in any of learning organisations. Knowledge management nowadays is practically accessible through digital tools. The need on which digital competency level and resources availability, are the key factors on digitalisation success process. This only a concept paper, hence the purpose of this paper is to reveal that in a learning organisation, the digitalisation process maybe success with the help of technology, resources and the competences of the users. The concept is developed by an extensive literature review of on digitalisation and analysis of different knowledge sources in a learning organisation. The key concept can be used by practitioners in developing a learning organisation to guide them to choose a sufficient subset of tools that covers the digitalisation processes to ensure that no process is overlooked. The result of successful digitalisation is an interesting area for further research. However, the current view on value underlies in it offering practitioners in giving at least a starting point. The paper can be used by educational organisations to guide on successful in digitalisation process effectively and efficiently. The paper addresses some of the social elements related to successful in learning organisations. However, it is more

technically targeted. Researchers have analysed that holistic overview and the effect of digital competence towards the successful of digitalisation process. Furthermore, limited research addresses the successful of digitalisation process because of the constraints in resources.

Keywords: digitalisation, IT business, technology, learning organisation, business intelligent

INTRODUCTION

Every organisation today is dying to keep their businesses going, increasing in growth and sustainable effectively in a competitive world. Some of these challenges are high employee turnover, significantly demand on digitised information, also known as big data and cloud management, the requirement to make fast and accurate decisions, the need to eradicate redundancy of efforts, and the need for strong teamwork among employees are vital. These challenges can be flattened in learning organisations by implementing the effective and efficient of knowledge management and business intelligent practices using technological solutions.

Among of all the challenges in learning organisations, there are two issues on the handling and preservation of organisational knowledge, which have gained much attention. Knowledge management in learning organisation shall be in line with the needs of the current environment. According to Singh T. (2010), is it appealed that performance and improvement in the learning organisations are reliant on the amounts of knowledge and information sharing that take place by all the members; and that an organisation's value may depend on the organisation's ability to build and succeed the knowledge management.

The definition of knowledge, according to the literature, is the experiences, communication or inference which is accumulated through time (Zack, 1999). It is supported by (Sousa *et al.*, 2010; Nonaka *et al.*, 2000), and considered in any organisation; this is one of the most important assets. Knowledge can be identified as either tacit or explicit. Tacit knowledge known as highly personal or inner self and subjective, it is based on feelings. Emotions and experiences and learning. This knowledge which is only

understood and applied by the person and it is difficult to eloquent with others. Tacit knowledge is developed from the person's direct experiences and actions, and the person is usually shared through highly interactive conversations, story-telling, forums, table talk, and shared experience. While explicit knowledge, on the other hand, is logical, codified, systematically arranged, more precisely and formally articulated. It is like a manual that everybody can follow straight forwards. When it is explicit, (Mayweg *et al.*, 2011), it is simply documented, easy to communicate and everybody can share, using methods such as manuals and formal reports. Polanyi (1967) was first introduced the terms of tacit and explicit knowledge, been using until this recent years.

Knowledge management nowadays is practically accessible through digital tools by intelligent business people. The use of digital information such as data, tools, and systems, demands technical competencies to navigate through out the digital information successfully. Within learning organisation, online learning programs rely on multiple technological components and systems to operate for course delivery. Usova's (2011), where the successful of the integration of on-site and online instruction should have a similar commitment.

RESEARCH QUESTIONS

There are various essentials in digital competencies to develop and handling digital information within learning organisations. Below are the research questions as a guideline in this study:

- RQ1. What are the digital competencies required in the successful of digitalisation in learning organisations?
- RQ2. What is the level of readiness in the successful of digitalisation in learning organisations?
- RQ3: What are the key sources to make the successful of digitalisation in learning organisations?

PROBLEM STATEMENT

There is a great demand for digitalisation alert, among learning organisation

for developing and managing digital content to stay relevant in this 21st century information environment. Learning organisation is struggling in providing the various types of digital content the digital medium, required to work in a digital environment.

Trepanier (2012), stated that digital skills are the competence to use computer hardware and software in managing digital information systems. It also needs to comply with applicable security measures, ethical aspect and to safeguard digital information. Therefore, there is a crucial to identify essential skills digital competencies that may acquire skills to fulfil the digital information needs. It is also important to measure the status of digital competencies among users to address the challenges as well as the constraints of the digitalisation process. There is a view of the related literature showed that only a few studies had been conducted to measure digital competencies in a learning organisation.

Learning organisations need not only to adopt technologies and services but also to align organisational structures and cultures to provide services in the context of rapidly changing demographics and demands in learning organisation context. Roth *et al.* (2015) at UC San Diego described their need to create a scalable orientation activity on an online, and it is a mobile platform. In spite of the significant contributions of technology adoption and continuous research on understanding the digitalisation process in a learning organisation, there are unknown resources on technological readiness. The questions on the successfully digitalise on individuals and the learning organisations itself, whether they are ready to embrace high-tech innovations have remained unrequited. To successfully in digitalisation this is a very important aspect to look into, to parallel with the technology readiness research.

Digitalisation process is the ability to make progress on digital collections with currents resources that contribute to society. Digitalisation in the definition is the integration of products as physical objects, people and processes through the internet of things. It may not require permanent staff or sustained funding, and the use of volunteers can incite the perception 'that volunteers are viable replacements for the progress on the digitalisation process' (Bartlett, 2013). Therefore, it is crucial in learning organisation to successfully implementing the digitalisation process for the benefit of its

learning organisations itself. There is a view of the related literature showed that only a few studies had been conducted to measure the key sources on the successful digitalisation process in a learning organisation. This study attempts to find the answer.

LITERATURE REVIEW

Digital content is any content that exists in the form of digital data. Digital content is created by digital media, it is stored in either digital or analogue, and it has the specific format, according to the origin. Forms of digital content may include information that is digitally broadcast, streamed, or contained in computer files that may be accessed through digital media. In other terms, the example of digital content which is usually created by popular media types, such as a computer, handheld, tablets, and smartphone. While in a broader approach it may conclude any digital information, an example of digitally updated on weather forecasts, tracking system, humidity sensory and any others information, stored in digital content. In a learning organisation, the digital content is the knowledge management where all the academic resources such as books, forms, manuals, module and non-academic such as event, advertisement or any related content that is vital within the learning organisation. To create digital content creation, it requires deliberate leadership, sustainability strategies, and awareness of best practice in the field. During the creation of digital content, the valuable skills of the competence individuals are crucial to build, coding, create and upload digital content. The new audience is coming in when this types of materials being uploaded to the world. The latest digital content may be useful in the learning organisation, that it is important for them to have the updated knowledge on the current issued. However, it is expensive, with the high-quality digital content if it is considered (McMenemy D., 2007).

Internet access has made easy to everybody. Digital content can be viewed anywhere and everywhere by households who have accessed the Internet. Contra with the traditional platforms, digital content has made it easier for an individual to receive their news and watch TV online, and it is increased. Increased access to the Internet has also led to the mass publication of digital content through individuals in the form of eBooks, blog posts, and even Facebook posts.

In a learning organisation, digital content mostly applied in case of digitalisation of materials, such as books, newspapers, journals, reports, modules, syllabus and any other materials to make easy to users to access anywhere and everywhere.

Digital competence, during this recent years, has become a key concept in the discussion of what kind of skills and understanding every people should have in the knowledge society. Every people has a different level of understanding, implementing and using digital tools. Therefore, digital competence is the most topical concept in labelling technology-related skills. Recently, many words or terms are used to describe the skills and competence of using digital technologies, such as IT skills ICT skills, technology skills, information technology skills, 21st century skills, information literacy, digital literacy, and digital skills. These terms are also often used as synonyms; e.g., digital competence and digital literacy.

According to the Internet World Statistics, Asia is the biggest internet users in the world, specified by Geographic Regions, recorded on last June 2017. There are 1,938M of Asia users, followed by 659M Europe users and other regions are actively using the internet for specific usage and needs. It showed that Asia spent longer time using internet compared others.

There is a believed that individual nowadays, usually express themselves more in digital writing, because they fear to face the crowd. With this platform, digital content or online is the learners more favour the best way of learning either partial or full. There is a claim that it will give an individual's chance to write their views in learning organisation, they will express unrelatedly, unethically of the reactions of the instructors. Currently, almost every university student in any leaning organisations, has one form of digital device or media, no matter what the dimension is. It made the practitioner as well as the lecturer, persuade the student experience in digital literacy skills through assignments or work related that require the using digital information in web search. It is also to support a green environment, especially in these days printed materials are abundant. Statistics on internet penetration by ITU-T stated that Malaysian users using the internet and the percentage is 78.8%. Malaysia internet users by the end year 2016 is 24M and from that 19M are Facebook subscribers.

The terms digital competence is known as the set of skills, knowledge, and attitudes to empower the confident, with the use of technologies and systems through creative and critical ways. A confident digital user is a person that able to interact and collaborate digitally, able to produce work digitally and confident in handling digital data and computational thinking as well to solve a problem that requires the digital media. It is the vital skill that digital competence needs to have. Digital competence is a creative and critical way to use of technologies and systems in an increasingly digital world. The digital user may be competences differently with other users. A user with digital competence can exploit the opportunities offered by ICT and use them critically and innovatively in education and work. They can use digital technology to communicate, manage and create information to contribute knowledge to the society.

“Technology has slowly but surely in the last decade made significant inroads into education especially in the mainstream, urban schools,” Sampath Kumar B.T., Basavaraja M.T., (2014), as well as other regions. Students require new skills to work effectively in this digital environment and to meet the challenges in digital. “Digital technologies provide a great opportunity to make students more active participants in classroom learning, to tailor learning better to individual students’ needs and to give students access to the worlds current research and thinking,” said Barbara Ischinger (2015).

The terms ‘fourth industrial revolution’ and ‘Industry 4.0’ often make an appearance during conferences and in media coverage. Malaysia is one of the countries support the IR 4.0. Malaysia is moving towards Education 4.0, whereby the important issues need to emphasize are more on ‘Knowledge, Industry, and Humanity’ as is the theme of the 2018 mandate from Higher Education Minister Datuk Seri Idris Jusoh on Malaysia’s higher education ecosystem. The mandate looked at how higher education institutions in Malaysia are to remain relevant and competitive in the Fourth Industrial Revolution (Industry 4.0). To address the challenges of Industry 4.0, he said that the process of teaching and learning at higher education institutions must be changed (Rozana Sani, 2018).

“In 50 years’ time, as we reach artificial intelligence, computers will be more prevalent. Companies will need to change processes and train

people to help them transition. Without training, companies doing business the way they have for the past ten years may become obsolete,” said the Chief Executive Officer of Knowledgecom, Rubaneswaran, S. T. in the Digital New Asia.

According to global consulting firm McKinsey, Industry 4.0 “is the next phase in the digitisation of the manufacturing sector, driven by four disruptions: the astonishing rise in data volumes, computational power, and connectivity, especially new low-power wide-area networks; the emergence of analytics and business-intelligence capabilities; new forms of human-machine interaction such as touch interfaces and augmented-reality systems; and improvements in transferring digital instructions to the physical world, such as advanced robotics and 3-D printing.”

Today’s revolution on big data comes from sensors in objects, which implemented in engineering fields, such as machines industry, household equipment, cars, mobile phones, and other technology related equipment. Smartphones could track your location, social networks through social media platform could make you popular, wireless networking and make payment by pay wave credit cards. All these data are too huge and intricate to make sense to humans, but with the AI technologies, they can extract some conclusions and can suggest the solutions as well.

SUMMARY

In conclusion, the successful digitalisation in a learning organisation, support from different sources and the organisational learning culture itself is needed. The helps technology, finances, and demographics will only further the digital transform of the learning organisation. The learning cultures development within the learning organisations that produce trends, skills and local institutional will dynamically deliver services and value to users and the decision makers. The professionals, the employees, will also need a new set of skills to adapt to the evolving environment of digitalisation of higher education. The learning organisation shall be responsive today and even more, in the future will rely on a culture that embraces user awareness and engagement. User populations will continue to evolve. The management and professionals need to think dynamically on how digital

collections and digital content could be collected, organised, completed and manage differently due to the changing environments. Without a qualified digital skilled people, it may slower the process, investment on manpower, additional on infrastructure. Thus it may result in the unsuccessful of digitalisation in the learning organisation.

It is to suggest that further effort could be made to assess the involvement regarding readiness in regards to the adoption of digitalisation that suits the learning organisations.

Even it is in decline in resources, the implementation of digitalisation continues with the strategic navigation and fast decision to make sure in sustaining and growing of digital collections. Important resources such from financial, people, support form organisational itself, the institutional and users as well, will determine the adaptable of scalable services to support the digitalisation. Overall, even with declining resources, with skills n supportive organisation, the digitalisation will increase success, sustain, growth and maintain. Learning culture within the organisations shall be developed to produce developments, abilities in providing service and value to users and institutional decision makers.

The successful of digitalisation process in a learning organisation is based on what they have learned and what they do now, will better position tomorrow's learning environment.

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THE SIGNALLING VALUE OF PUBLIC ISSUE AND OFFER FOR SALE RATIOS ON THE PERFORMANCE OF INITIAL PUBLIC OFFERS

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ABSTRACT

Investors of initial public offers (IPOs) rely on the prospectus for important information about the company. But the motivation of the issuers (original shareholders) for going public is unknown and hidden from the investing public, making the IPO investment a risky venture. Based on the Signalling Theory, we postulate that the public issues (PI) and offer for sale (OFS) ratios to contain properties to signal the intention of the issuers at time of listing. Our samples are collected from the Bursa Malaysia from 2002 to 2008 and the performances are tracked till 2011. The regression results are consistent with the Signalling Theory which stipulates that when issuers sell down their stakes, it sends a gloomy signal, even though the offer of OFS does not cause any dilution to company's value. In addition, small companies with high OFS ratio record weaker long-run performance than large companies.

Keywords: *IPO, public issue ratio, offer for sale ratio, performance*

INTRODUCTION

Initial public offers (IPOs) are shares or stocks of companies that are offered to the general public for the first time upon listing on the stock exchange. There are many reasons why private companies go for public listing. The most common reasons are the need for funds for business expansion, to facilitate merger and acquisition and for prestige reasons which are expected to have positive effects on firm's value (Brau & Fawcett, 2004). However, there are other reasons behind the floatation ambition that could bring negative repercussions such as the exit intention of the issuers or the expected downturn of the industry. It may even be possible that the real intention of going public is concealed by the issuer in order to maximise returns at the expense of investors (Ang & Brau, 2003).

The shares offered for subscription during IPO come from two sources, the first is the public issue (PI) and the second is the offer for sale (OFS). The former refers to the issuance of new shares to the public while the latter are shares owned by the original shareholders (pre-IPO owners). While PI enlarges the capital base and these shares are commonly referred as primary shares, OFS on the other hand are secondary shares whereby the proceeds belong to the pre-listing owners. Past studies have shown that information on the quantum of shares offered from the PI and the OFS sources carry hidden messages and thus, affect the post-IPO performance of the company differently. This is due to the fact that the proceeds from PI flow into the company's balance sheet while those from OFS goes into the private pockets of the pre-listing owners. Several past studies examine the signalling effects on this type of information on the post-listing performance of the IPO (Butler, Keefe & Kieschnick, 2009; Michaely & Shaw, 1994).

When an IPO is open for subscription, investors are faced with a challenging task of evaluating the future prospect of the subject company before making the decision whether to participate. They hinge on the IPO prospectus for information on company's past and current financial performance as well as its projected future prospect. Nevertheless, prospectus excludes other pertinent information such as goodwill, technical knowhow and original shareholders' real motivation for public listing. This type of information is rarely available and disclosed to the public. Past studies have shown that the issuer's decision on the quantum of shares

designated for PI and OFS contain some useful signals to the investing public. In lieu of that, this study employs the PI and the OFS ratios in the IPO offerings as the proxies for the issuer's motivation that affect the post listing performance of IPOs. Using proven statistical method, the intention of this study is to utilise ex-ante information (Bazeet & Nurwati, 2018), which are readily available to prospective investors during the IPO offering period to predict the post-listing performance of firm's values.

Our data comprise of 89 and 106 Malaysian IPOs listed on the Main and Second Board of Bursa Malaysia respectively from the years 2002 until 2008. However, the short and long terms post-listing performance utilizing the abnormal returns methodologies are conducted up till 2011. We exclude the MESDAQ counters because the Securities Commission of Malaysia (SC) prohibits the offering of OFS shares by the MESDAQ IPOs. Our regression results suggest that the OFS ratio has a significant signalling power on the future performances of IPOs.

The rest of the paper is organised as follows; Section 2 provides the literature reviews, Section 3 describes the data collection process while Section 4 and 5 explain the methodology and the findings respectively. Finally, the conclusion is presented in Section 6.

LITERATURE REVIEW

According to Huyghebaert and Van Hulle (2006), companies that issue primary share are mainly young and small firms with high market to book and low return on asset ratios. The motive of these firms issuing primary shares is to boost working capital especially when the industry valuation is high. Another characteristic of firms offering primary shares is to pare-down on bank borrowings. Brau, Li and Shi (2006) confirm that in a bullish market where the demand for shares is strong, firms issue more shares and raise more capital than initially planned. Therefore, companies issuing PI shares are mainly for business expansion and to take advantage of the favourable market condition. Therefore, it is unlikely that there is any other motive or hidden agenda. Another study by Loughran and Ritter (2002) examine the effect of the PI ratio on the first day return (D1) based on 6169 US IPOs between 1980 and 2000. A dummy variable is used to represent the pure

primary issue. The correlations between the first day return and the primary issue dummy is -1.95% between 1980 and 2000 and -3.24% between 1990 and 1998, both coefficients are significant. They conclude that the pure primary offer IPOs underperform the market on the first day, however the long-term relationships are not established. Similar study by Durukan (2002) who examines the performance of 173 IPOs in the Istanbul Stock Exchange between 1990 and 1997 reports insignificant relationship on Day 1 while the beta coefficients for the PI ratio of Month 12 and Month 24 are -2.89% and -2.41% respectively, both significant. In addition, according to Dolvin and Pyles (2005), the issuance of a large number of new shares should have a short-run and long-run negative impact due to the effect brought about from the dilution of stock ownership. Evidently, most empirical studies report that the relationships between PI ratio and IPO performance are mildly negative. Therefore, a high PI ratio is expected to portray a negative signal to the IPO's market.

Apart from the PI offer, there is the offer for sale (OFS) tranche whereby shares held by pre-IPO shareholders are offered to the public. Since these proceeds do not increase the issued and paid-up capital of the company, investors have no worry about the dilution of ownership. Instead, these issuances carry information on the selling down of the company's share by the original owners which should have negative implications on the future performance of IPOs. The reasons for the off-loading may range from non-financial (personal) or financial reasons namely, the original shareholder's pessimism on the company's future prospects. For example, Jain, Jayaraman and Kini (2007) are convinced that the extent of insider selling their shares provides an effective signal to infer the future performance of the firm. However, Brau, Li and Shi (2006) explain otherwise, they argue that the PI and OFS ratios have little impact on the post-listing IPO performance of the US companies. But they find that, when the seller of the OFS tranche is from the manager or director, the long-term post listing performance of firms are bound to be negative. Their observations are supported by the Agency and the Asymmetry Information theories.

Furthermore, when the informed insiders sell their stake, the market tends to treat the information as bad news, resulting to lower stock price. This is evident in the study by Bessler and Kurth (2007) that utilised 307 German IPO samples from 1998 and 2001. They observed that substantial

selling of existing shares (OFS) by the bankers and venture capitalist just before the listing is very often followed by the poor performance. The market participants view the sell down as a move to exit by the insider and when coupled with a long lock-up period, send a negative signal to the market. Zingales (1995) argues that the decision to go public could be viewed as a decision to sell out the company. Studies by Rydqvist and Hogholm (1995) confirm that 36% of Sweden and 34% of UK IPOs change control within five years from listing while Mikkelsen, Partch and Shah (1997) discover that 29% of established firms and 13% of young start-up change owners in USA within five years post listing.

The negative effect of the OFS offer is widely anticipated by the market participants. Ang & Brau (2003) carry out an analysis with 1837 USA IPOs of which 762 are pure OFS IPOs between 1980 and 1997. The authors find that in a hot market when demand for shares is strong, the number of shares offer from the OFS tranche can be six times higher than the PI tranche. Aware of the negative signalling effect that comes with OFS, issuers often conceal their intention by filling a lower level of OFS shares in the initial filling papers to the Securities Commission but upon obtaining the approval for listing and when demand is still strong, seek approval to inflate the OFS tranche at the last moment to maximise proceeds (Wealth Maximise Hypothesis). As the proceeds from OFS goes towards private pockets, issuers have the motivation and incentive to conceal the negative impact of the OFS signal by manipulating the level of OFS, at the expense of IPO investors.

Nevertheless, there are empirical studies which find that the level of OFS do not cause poor IPO performance. Such studies include Durukan (2002) in a Turkey study, points out that the OFS tranche outperforms the PI tranche in all windows in a univariate regression. However, in the regression of the full model, the pure OFS offers underperform only on Day 1 but not over the long-term.

A study of Malaysian IPOs by Yong, Yatim and Sopian (2001) based on 93 Main Board IPOs and 134 Second Board IPOs between 1991 and 1995, discovers that the first day returns of the pure PI, pure OFS and the mixed mode IPOs for the Main Board to be 87.28%, 93.34% and 64.28% respectively. For the Second Board, the returns are 71.51%, 79.21% and

65.70% respectively. The differences in the performance although are not statistically significant but the trend is clear that Main Board IPOs outperform the Second Board IPOs, the pure OFS IPOs outperform the pure PI offers and the mixed offers have the worst returns on Day 1. Their findings clearly show that the PI and OFS ratios have dissimilar effect on the performance of Malaysian IPOs. The long-term effect on performance however, has not been carried out in this study. In addition, the negative correlation on Day 1 has been found to be -0.167 ($p=10\%$) by Norliza *et al.* (2017) in the Malaysian market based on 419 IPO samples between 2000 and 2015.

Turning to studies of a long-term nature, Dolvin and Pyles (2002) find that high OFS IPOs demonstrate long term superior return in their empirical study which uses 3190 US IPOs between 1986 and 2000. According to the authors, when the PI ratio increases, the number of issued and paid-up shares dilute the value of the shares and that lead to lower performance in the future. On the other hand, the shares from the OFS tranche do not have the dilution effects thus, its issuance leads to improved long-term returns. The best long term investment strategy recommended by the authors is to buy shares that have low first day and first month appreciation, coupled with the association with high underwriter reputation and companies from the high technology industry.

The empirical evidence of OFS on firm's performance discussed so far have produced mixed results. In addition, some find that the OFS ratio is a poor predictor of performance. Kim and Weisbach (2008) use 17226 IPOs across 38 countries between 1990 and 2003 to study the post listing performance of IPOs. They show that high OFS offers lead to wealth transfer between the existing shareholders and the new investors. The level of OFS is highly correlated with the market or industry's Market to Book Ratio. Therefore the decision to offer OFS shares depends on the market demand and the actual number of OFS share allocated to the public is affected by the market valuation. Brau, Li and Shi (2006) concur with USA samples that the level of OFS and the OFS price revision have no implication on the share price performance. The decision on the level of PI and OFS offered to the public during IPO solely depends on the market demand. Goergen and Renneboo (2003) use 52 Germany and UK IPOs between 1981 and 1988, reinforce that the retention and the OFS Ratios do not have any significant influence on the long-term performance of companies.

Relating to the Malaysian IPO market, pure PI and pure OFS are rare occurrence. Most IPOs consist of a mixture of both PI and OFS at various proportions. In view of the literature surveyed, so far, the PI and OFS ratios are expected to carry negative signals on the performance due to the following reasons. Firstly, as the PI and the OFS ratios increase, the dilution of ownership of the original owners occur, causing the owners to own less of the companies. Secondly, as the OFS ratio increases, the market begins to doubt the issuer's sincerity to be a corporate builder who looks after minority shareholder's interest. The above postulations are consistent with the Signalling Theory proposed by Leland and Pyle (1977) and Grinblatt and Hwang (1989) that high PI and OFS ratios (leading to low retention) are negatively correlated with firm's post-listing performance. Therefore, we hypothesise that when the PI and OFS ratios are high, it carries a warning to investor, to expect lower future firm values. The negative effect of the OFS ratio is likely to be more severe than the PI ratio because of the likely moral hazard on the part of the issuers.

DATA AND RESEARCH METHODOLOGY

Our secondary data are collected from the Bloomberg financial data service provider and the Bursa Malaysia. Stock market related information of the sample companies such as the offer prices, daily closing prices, the entitlement announcements and market indices are downloaded from Bloomberg. However, the closing prices collected from Bloomberg are raw and are unsuitable to be used to calculate the returns of the sample companies directly. These raw data have to be adjusted for various corporate announcements such as the dividend, bonus and right issues, share consolidation and split to compute their actual returns before they are deemed usable. The adjusted returns of the companies constitute the components to derive the dependent variables calculated by CAR and BHAR which are illustrated in sub-section 3.1.

On the other hand the Bursa library keeps copies of the IPO prospectus which contain information on the number of shares offered via the PI and OFS arrangements which form the independent variables. The derivation of this set of data is discussed in detail in sub-section 3.2.

Sub-section 3.3 illustrates the regression models and this is followed by the justification for the sample period selected for this study in sub-section 3.4.

The Derivation of CAR and BHAR as the Dependent Variables

The two set of dependent variables in our regression models are the Cumulative Abnormal Return (CAR) and the Buy and Hold Abnormal Return (BHAR). The function of CAR and BHAR is to uncover whether the sample returns outperform the market returns following the IPO event. The resulting net positive return is termed abnormal profit and the opposite is referred to as abnormal loss. These two methods utilise the Market Adjusted Abnormal Return (MAAR) as the common platform to derive the over and under performance of the sample companies using FBMEMAS as the market index to benchmark the market returns. The FBMEMAS has the broadest coverage as it consists of all the companies on the Main Board. This index is best suited to represent the market movement as the samples in this study cover a wide range of companies.

To calculate CARs and the BHARs, we first have to compute MAARs which are the difference between the closing price movements and the market index changes over various windows. The objective behind the derivation of MAARs is to determine whether the sample firm has over or underperformed the market. The essential components to this calculation are the adjusted daily closing prices and the synchronised daily market indices up to three years post listing, as in Nurwati, Campbell and Goodacre (2007). A positive MAAR means this stock has beaten the market returns and vice versa. This process is repeated using daily data for each sample IPO firm up to three years (Y3). There are approximately 21 day trading days in a calendar month and the windows of study for the short-term are for day 1 (D1), one month (M1), three month (M3) and six month (M6). The long-term windows are one year (Y1), two years (Y2) and three years (Y3).

The function of the market adjusted Cumulative Abnormal Return (CAR) adjusted by the FBMEMAS involves the accumulation of the daily MAARs for the seven short and long-term windows. The formula is depicted below:

$$CAR_{(i,t)} = \sum_{t=D1}^{Y3} MAAR_{i,t} \dots \dots \dots \text{Eq.1}$$

i = Sample IPO, t = D1*, M1, M3, M6, Y1, Y2 & Y3 windows. *D1 uses the Offer Price as base.

An important point to note, most methodologies used to calculate the long-term ARs suffer from some form of deficiency. CARs in the study of stock market performance suffer from measurement bias, new listing bias and rebalancing bias.

Another common method to measure the abnormal returns of stock market is the market adjusted Buy and Hold Abnormal Return (BHAR). The BHAR methodology utilises the same data source as the CAR to derive the performance of IPOs. Instead of arithmetically adding up the gains and losses of the daily MAARs as in CAR, the BHAR assumes that investors hold on to the investment and only cash out at the end of a specific window periods. The formula of BHAR is depicted next:

$$BHAR_{i,t} = [\prod_{t=D1}^{Y3} (1 + R_{i,t})] - [\prod_{t=D1}^{Y3} (1 + R_{mt})] \dots \text{Eq.2}$$

i = sample IPO, t = D1*, M1, M3, M6, Y1, Y2 & Y3 window. * D1 uses the Offer Price as base.

Rit is the raw return for firm i at window t and Rmt is the corresponding market return. Similar to other methods used to calculate the abnormal market returns especially for long-term windows in access of six months, severe discrepancies in the results may arise from the methodology adopted. This is the findings of Moshirian, Ng and Wu (2010) after analysing IPOs performance of six Asia countries between 1991 and 2004. Although BHAR is able to reflect the investor's experience better, it too suffers from the new listing, rebalancing and rather severe skewness biases. Thus, cares are recommended when deriving the long-term abnormal returns.

The Derivation of PI and OFS Ratios as the Independent Variables

The PI and OFS ratios are computed by dividing the number of shares offered through the PI and the OFS arrangements by the enlarged number of shares of the company during the IPOs. These two ratios form the independent variables in the regressions. The extent of the PI and OFS shares are offered in the Main and the Second Boards are illustrated in Table 4.

Regression Models of the PI and OFS Ratios

The first stage of the analytical exercise involves regressing each of the independent variable PI and OFS ratios with the abnormal returns measured by CAR and BHAR individually in a set of univariate regression for the seven windows. These simple models are listed below:

$$1a) \quad \text{CAR [D1, M1, M3, M6, Y1, Y2, Y3]} = \beta_0 + \beta_1 \text{ PI Ratio} + \varepsilon$$

$$1b) \quad \text{BHAR [D1, M1, M3, M6, Y1, Y2, Y3]} = \beta_0 + \beta_1 \text{ PI Ratio} + \varepsilon$$

$$2a) \quad \text{CAR [D1, M1, M3, M6, Y1, Y2, Y3]} = \beta_0 + \beta_1 \text{ OFS Ratio} + \varepsilon$$

$$2b) \quad \text{BHAR [D1, M1, M3, M6, Y1, Y2, Y3]} = \beta_0 + \beta_1 \text{ OFS Ratio} + \varepsilon$$

The regression process are followed by the pair-wise multivariate analysis consisting both the PI and OFS ratios against the abnormal performance of CAR & BHAR. These models are as follow:

$$1) \quad \text{CAR [D1, M1, M3, M6, Y1, Y2, Y3]} = \beta_0 + \beta_1 \text{ PI Ratio} + \beta_2 \text{ OFS Ratio} + \varepsilon$$

$$2) \quad \text{BHAR [D1, M1, M3, M6, Y1, Y2, Y3]} = \beta_0 + \beta_1 \text{ PI Ratio} + \beta_2 \text{ OFS Ratio} + \varepsilon$$

After the two sets of regression are completed, the coefficients obtained are used to interpret the relationships.

Justification of the Study Period Selected

Prior to the year 2002, the Malaysian market was recuperating from the negative impact of the Asian Financial Crisis which resulted in a severe drop in the number of companies going public. The number of IPOs for the Main and Second Boards which dropped from the height of 88 in 1997 to only 28 in 1998. The full blown effect was felt in 2001 when only 20 IPOs

listing is reported in that year, down from 38 the year before. Table 1 gives an account on the number of IPOs successfully listed on the Malaysian stock market and the number of usable sample collected for analyses purpose. The MESDAQ IPOs are excluded in this study because the Securities Commission of Malaysia (SC) prohibits them from offering OFS shares.

Table 1: The Number of Main and Second Board IPOs on Bursa between 1997 and 2010

Year	Main Board					
2010	3					
2009	12					
	Main Board		Second Board		Total	
	No. of IPOs	Usable Sample	No. of IPOs	Usable Sample	No. of IPOs	Usable Sample
2008	7	4	8	8	15	12
2007	15	15	8	8	23	23
2006	10	9	8	7	18	16
2005	16	13	17	15	33	28
2004	15	13	26	27	41	40
2003	16	14	22	22	38	36
2002	22	21	22	19	44	40
Subtotal	101	89	111	106	212	195
2001	6		14		20	
2000	12		26		38	
1999	10		11		21	
1998	6		22		28	
1997	25		63		88	

Note: The sample period between 2002 and 2008 is selected is due to the higher IPO frequency. The sample number columns indicate the number of usable sample collected in this study. The Second Board is made redundant and companies are absorbed into the Main Board from 2009. (Source: <http://www.bursamalaysia.com/market/>)

The year 2002 is chosen as the beginning of the study period because the IPO activity surges in 2002 after a four-year decline. However, the study period ends in 2008 are due to two reasons. Firstly, the number of IPO slows down to a near halt after 2008 to 12 and three in the years 2009 and 2010 respectively. The reason for the drastic decline is due to the adverse

effect of the 2007-2008 Global Financial Crisis on the Malaysian stock market. Although the Malaysian market was shielded from this calamity as the Sub-Prime products were not traded in Malaysia back then, the sentiments of the local IPO market were severely affected by the global market which resulted in a big drop in the IPO activity. The second reason is the termination of the Second Board in the year 2009. The Second Board was setup in 1989 to assist small companies to seek public funds. With the introduction of the MESDAQ in the later period, the Second Board was deemed to be a duplication of duty and was terminated by the authority. As a result, all the Second Board companies were absorbed into the Main Board, thus the inter-board comparison between the Main and the Second Boards is not feasible beyond the year 2008.

The regression results of the equations presented in this section are used to the test null hypotheses. The data collected, adjusted and compiled are analysed with the EViews statistical software. The descriptive statistics and the regression results are illustrated in sub-sections 4.1 and 4.2 respectively.

FINDING AND DISCUSSION

Descriptive Statistics

Over the study period of 2002 to 2008, Bursa consists of three independent boards with different set of listing rules. While the Main Board caters for the sizeable company with consistent track record, the Second Board consists of smaller companies with steady returns. The MESDAQ IPOs are not discussed in this study because the SC prohibits them from offering OFS shares. The differences in the criteria laid down by the SC for these two boards have resulted in the differences in the magnitude of the mean and the median of the IPO abnormal returns among other things. Table 2 and 3 illustrate the descriptive statistics of the abnormal returns computed by CAR and BHAR from window D1 to Y3 for the Main Board and the Second Board respectively.

Table 2: The Descriptive Statistics of the IPO Performance for the Main Board

Main Board 89	Mean	Median	Maximum	Minimum	Std. Dev.
CARD1	0.186868	0.09424	1.81202	-0.28005	0.31408
CARM1	-0.03496	-0.05222	0.5641	-0.38783	0.150358
CARM3	-0.02225	-0.0604	0.59614	-0.67254	0.21696
CARM6	-0.04183	-0.06491	0.65441	-0.75442	0.273271
CARY1	-0.03991	-0.08144	0.82593	-0.95699	0.355472
CARY2	-0.0565	-0.06401	1.4329	-1.9496	0.532841
CARY3	-0.13113	-0.12778	1.42408	-2.19241	0.618675
BHARD1	0.186868	0.09424	1.81202	-0.28005	0.31408
BHARM1	-0.03187	-0.05678	0.64766	-0.33313	0.154463
BHARM3	-0.01608	-0.06623	0.72881	-0.49677	0.216414
BHARM6	-0.02947	-0.06405	1.00374	-0.43509	0.283654
BHARY1	-0.03284	-0.12432	1.29516	-0.78841	0.397504
BHARY2	-0.07484	-0.21305	3.0575	-0.96965	0.666885
BHARY3	-0.1836	-0.36283	3.32735	-1.28242	0.732521

Note: The abnormal returns by CAR & BHAR adjusted by FBMEMAS based on 89 IPO samples of the Main Boards between 2002 and 2008 for windows from Day 1 to Year 3.

Table 3: The Descriptive Statistics of the IPO Performance for the Second Board

Second Board 106	Mean	Median	Maximum	Minimum	Std. Dev.
CARD1	0.226369	0.10072	2.41762	-0.30306	0.392081
CARM1	-0.03546	-0.05268	0.52942	-0.51642	0.151882
CARM3	-0.03192	-0.03676	0.80896	-0.67246	0.237045
CARM6	-0.02647	-0.06888	1.97868	-0.63986	0.348171
CARY1	-0.0032	-0.05235	1.78373	-0.90872	0.430095
CARY2	-0.06426	-0.12368	1.7762	-1.28607	0.566852
CARY3	-0.11274	-0.21699	2.36577	-1.68899	0.647461
BHARD1	0.226029	0.10072	2.41762	-0.30306	0.392467
BHARM1	-0.03877	-0.05911	0.42538	-0.44636	0.141477
BHARM3	-0.02997	-0.04132	1.25316	-0.47084	0.239928
BHARM6	0.012923	-0.10594	6.47376	-0.53129	0.702705

BHARY1	-0.009	-0.16675	4.56226	-0.65105	0.636355
BHARY2	-0.14143	-0.33312	4.42647	-1.13587	0.754716
BHARY3	-0.26911	-0.53214	9.20053	-1.21608	1.180638

Note: The abnormal returns by CAR and BHAR adjusted by FBMEMAS based on 106 IPO samples of the Second Board between 2002 & 2008 for windows from Day 1 to Year 3.

From Table 2 and 3, we observe that:

- (i) IPOs of the two boards exhibit a high degree of IRs (D1 return) regardless of the method used to calculate the abnormal returns. The mean of IR ranges from 18.7% in the Main Board to 22.6% in the Second Board. With the maximum and the minimum of 181% & -28% for the Main Board and 242% & -30.3% in the Second Board respectively.
- (ii) The long-term performances beyond the first year are generally poor for the two boards especially for the Second Board. The worst performance of -53.2% is recorded in the median Y3 for the Second Board utilising BHAR.
- (iii) The disparities between CAR and BHAR to derive the abnormal returns remain small up to 6 months (M6) post-listing. The discrepancies become large after one year with BHAR producing more negative returns than CAR.

The above results are consistent with the findings of Norliza *et al.* (2017) where they find that the average IR of 419 Malaysian IPOs from 2000 to 2015 to be 29%, with 360% as the maximum and -68% to be the minimum.

Table 4: The Descriptive Statistics of the PI and OFS Ratios for the Main & Second Boards

Main Board	Mean	Median	Maximum	Minimum	Std. Dev.
PI Ratio	0.19652	0.1744	0.85	0	0.150426
OFS Ratio	0.129119	0.072	0.67406	0	0.148109
Second Board					
PI Ratio	0.169443	0.16052	0.43685 0	0	0.081174
OFS Ratio	0.126195	0.10221	0.37083	0	0.104951

Note: The percentage of shares allocated to investor from the PI and OFS source which form

the independent variables in the regression. Samples are collected from 89 Main Board and 106 Second Board companies listed between 2002 and 2008.

The descriptive statistics of the independent variable listed in Table 4 illustrates that the Main Board IPOs allocates a higher ratio of PI to investors. The mean PI is at 19.6% and 16.9% for the Main and Second Boards respectively. On the contrary, the Second Board IPOs allocates a higher portion of OFS to investors, this is evident by the median of 10.2% versus 7.2% in the Main Board. In generally, the ratios between the two boards are within a small range.

The univariate regressions results for the PI and the OFS ratios are reported in Tables 5 and 6 respectively. This is followed by the pair-wise multivariate analysis of both the independent variables in Table 7.

Table 5: The Univariate Results of the Public Issue Ratio for the Main and Second Boards

	OLS : CAR = $\beta_0 + \beta_1$ PI Ratio		OLS : BHAR = $\beta_0 + \beta_1$ PI Ratio	
	Main Board	Second Board	Main Board	Second Board
D1	0.130	-0.667	0.130	-0.668
M1	-0.021	0.085	-0.018	0.077
M3	-0.166	0.124	-0.155	0.066
M6	-0.009	-0.028	-0.011	-0.331
Y1	-0.174	0.478	-0.199	0.128
Y2	-0.096	0.910	-0.270	1.144
Y3	0.076	1.205	0.091	2.352*

*Note: The univariate results of PI as the sole independent variable against the performance of IPOs between 2002 and 2008. The dependent variables are the two methods of performance measurements, CAR & BHAR adjusted by FBMEMAS for windows between D1 and Y3. The number of samples for the Main Board & the Second Board are 89 & 106 respectively. The probability significance of 10, 5, & 1% are represented by *, ** and *** respectively.*

Judging by the univariate regression results for the PI ratio against the two performance measuring methods for the Main and Second Board, the trend is clear that PI is more negatively correlated with the performance of IPO in the Main Board in the medium terms but the relationships are positive in D1 and Y3. The correlations of the Second Board are mixed with only one coefficient of 2.352, significant at 10% on Y3 when measured by BHAR. Overall, the PI ratio does not correlate strongly with firm's performance.

Table 6: The Univariate Results of the Offer for Sale Ratio for the Main and Second Boards

	OLS : CAR = $\beta_0 + \beta_1$ OFS Ratio		OLS : BHAR = $\beta_0 + \beta_1$ OFS Ratio	
	Main Board	Second Board	Main Board	Second Board
D1	-0.382*	-0.352	-0.382*	-0.355
M1	-0.038	-0.163	-0.027	-0.138
M3	0.034	-0.264	0.069	-0.323
M6	-0.103	-0.493	-0.093	-1.076*
Y1	-0.123	-0.536	-0.197	-0.902
Y2	0.344	-0.505	0.112	-1.170*
Y3	0.349	-0.283	0.184	-1.908*

*Note: The univariate results of OFS as the sole independent variable against the performance of IPOs between 2002 and 2008. The dependent variables are the two methods of performance measurements, CAR & BHAR adjusted by FBMEMAS for windows between D1 and Y3. The number of samples for the Main Board and the Second Board are 89 & 106 respectively. The probability significance of 10, 5 and 1% are represented by *, ** and *** respectively.*

In Table 6, the univariate regression results of the OFS ratio on the Main Board are mixed, with only one coefficient of -0.382 ($p=10$) on D1 which is consistent with the finding of Norliza *et al.* (2017), where the authors uncover a coefficient of -0.167 ($p=10$) on D1 with 419 Malaysian IPO samples. However, the trend in the Second Board is clearly negative for all windows. Measured by BHAR, there are three coefficients which are significant at 10%. These coefficients are 1.076 on M6, -1.170 on Y2 and -1.908 on Y3, indicating that the OFS ratio is negatively correlated with the long-term performance of the Second Board IPOs. So far, the two sets of the univariate regression demonstrated that the Second Board's OFS ratio are negatively correlated with firm's performance over the long-term windows.

Table 7 reports the results of the pair-wise multivariate regression of both the PI and OFS ratios. The relationships between the different performance measurements in all windows are consistent with the univariate results shown in Table 5 and 6. The results of the multivariate regression confirm that the intertwining relationships of the two signals produce mixed outcome except the OFS ratio in Second Board measured by BHAR. The coefficients of the OFS Ratio in the Second Board by BHAR are consistently negative for all the windows and only one significant coefficient is found in M6.

Table 7: The Multivariate Regression Results of the PI Ratio & OFS Ratio

	OLS : CAR = $\beta_0 + \beta_1 \text{ PI Ratio} + \beta_2 \text{ OFS Ratio}$				OLS : BHAR = $\beta_0 + \beta_1 \text{ PI Ratio} + \beta_2 \text{ OFS Ratio}$			
	Main Board		Second Board		Main Board		Second Board	
	PI	OFS	PI	OFS	PI	OFS	PI	OFS
D1	-0.084	-0.425	-0.836*	-0.516	-0.084	-0.425	-0.838*	-0.519
M1	-0.054	-0.065	0.034	-0.157	-0.042	-0.048	0.034	-0.131
M3	-0.202	-0.07	0.04	-0.256	-0.162	-0.015	-0.043	-0.331
M6	-0.083	-0.146	-0.203	-0.533	-0.079	-0.134	-0.731	-1.219*
Y1	-0.319	-0.289	0.323	-0.473	-0.405	-0.407	-0.179	-0.938
Y2	0.104	0.398	0.795	-0.349	-0.289	-0.038	0.812	-1.011
Y3	0.341	0.525	1.188	-0.05	0.002	0.185	1.845	-1.546

*Note: The OLS results of the pair-wise analysis for the independent variables PI and OFS Ratios against CAR and BHAR between 2002 and 2008 for windows from Day 1 to Year 3. The Main and the Second Boards consist of 89 and 106 samples respectively. The probability significance of 10, 5 and 1% are denoted by *, ** and *** respectively.*

Hypotheses Testing and Discussion

The regression results illustrated in sub-section 4.1 are used to test the two null hypotheses.

H1 : The Public Issue Ratio has no effect on the post listing performance of IPOs.

H2 : The Offer for Sale Ratio has no effect on the post listing performance of IPOs.

Since the univariate and the multivariate regression results illustrated in Table 5 and 7 respectively demonstrate mixed and weak relationships between the PI ratio and the IPO returns measured by both CAR and BHAR for most windows, H1 cannot be rejected and therefore PI is not a good signalling tool for investor to deploy when considering IPO investment proposal. Most studies which conduct the performance analysis of the PI ratio conclude that pure PI companies marginally underperform the market post listing but the relationships are not significant (refer Loughran & Ritter, 2002 ; Yong, Yatim & Sopian, 2001). In most cases, the offer of PI shares is the normal cause of raising capital for business expansion when companies go public. The additional shares issued naturally lead to the dilution of firm's value thus, according to Dolvin and Pyles (2002), the share prices adjust

downward in tandem. This natural phenomenon is especially true during the hot market as Brau, Li and Shi (2006) noted that companies tend to issue extra PI shares when valuation is high but subsequently, prices retract to the equilibrium level.

The result obtained in this study is consistent with the other studies which find that the offer of shares from the PI tranche does lead to marginal underperformance due to the dilution effect. However, because the negative relationships are weak, the PI ratio cannot act as a credible signaller to infer the future firm's values for both the Main and the Second Board IPOs on Bursa Malaysia.

On the other hand, based on the univariate regression analysis on the OFS ratio reported in Table 6, it is safe to reject H2. Hence, the OFS ratio is a credible signaller to infer the poor long-term post-listing performance of the IPOs. Conversely, the pair-wise multivariate regression does not yield many significant coefficients, however the coefficients are mostly negative, supportive of the results obtained by the univariate regression. The rejection of the null hypothesis H2 comes as no surprise as studies have shown that the extent of insider selling their shares at the time of the IPO provides an effective signal in a negative way (Jain, Jayaraman & Kini, 2007). The negative relationships from the regression results are consistent with the Signalling Theory which stipulates that when issuers sell down their stakes, it sends gloomy signals, even though the offer of OFS shares do not cause dilution to firm's values. In a Malaysian study, Wan Nordin (2005) confirms that when the owners' participation ratio (OFS) is high, the short-term performance usually suffers and the negative correlation of the OFS ratio is found to be concentrated among the smaller IPOs. Based on the results presented by the univariate regressions and confirmed by the multivariate regressions, the OFS ratio has the credential to act as a signaller to predict the dismal long-term performance of the Second Board IPOs.

CONCLUSION

The regression results of the PI ratio indicated that this variable produced weak relationship therefore is not capable of acting as a credible signaller to IPO investors to infer the future performance of IPOs. The null hypothesis of the OFS Ratio however is rejected for the Second Board, indicating that the smaller IPOs with high OFS ratio perform badly when the windows are stretched beyond six months. The OFS ratio is therefore a credible signal to infer the negative medium to long-term performance of the Second Board IPOs.

From the IPO investor's perspective, the implication of this finding is to caution the investing public when faced with the decision to invest in a Second Board IPOs with high OFS ratio. This conclusion is consistent to the findings of Jain, Jayaraman and Kini (2007) and Wan Nordin (2005) where they envisage that high OFS ratio indicates negative future outlooks for companies. Although the Second Board has since been absorbed into the Main Board but this small firm phenomena is expected to continue to manifest in the small scale IPOs. The result is also consistent with the Signalling Theory advocated by Leland and Pyle (1977) where owners retained less during IPO, it usually signals dismal future performance.

In summary, Bursa investors are advised to avoid the small capitalised IPOs with high OFS ratio. Furthermore, the strong negative correlations of the OFS ratio are confined to the BHAR methodology of deriving the abnormal returns. The discrepancies in the results obtained between the two methods of deriving the abnormal returns are due to the biases inherent in both the methodologies especially when the windows of studies are stretched. As a consequence, the interpretation of the long-term relationship requires extra care.

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