Vol 7, No 2, July – December 2022

Print ISSN : 2708-616X
Online ISSN : 2708-6178

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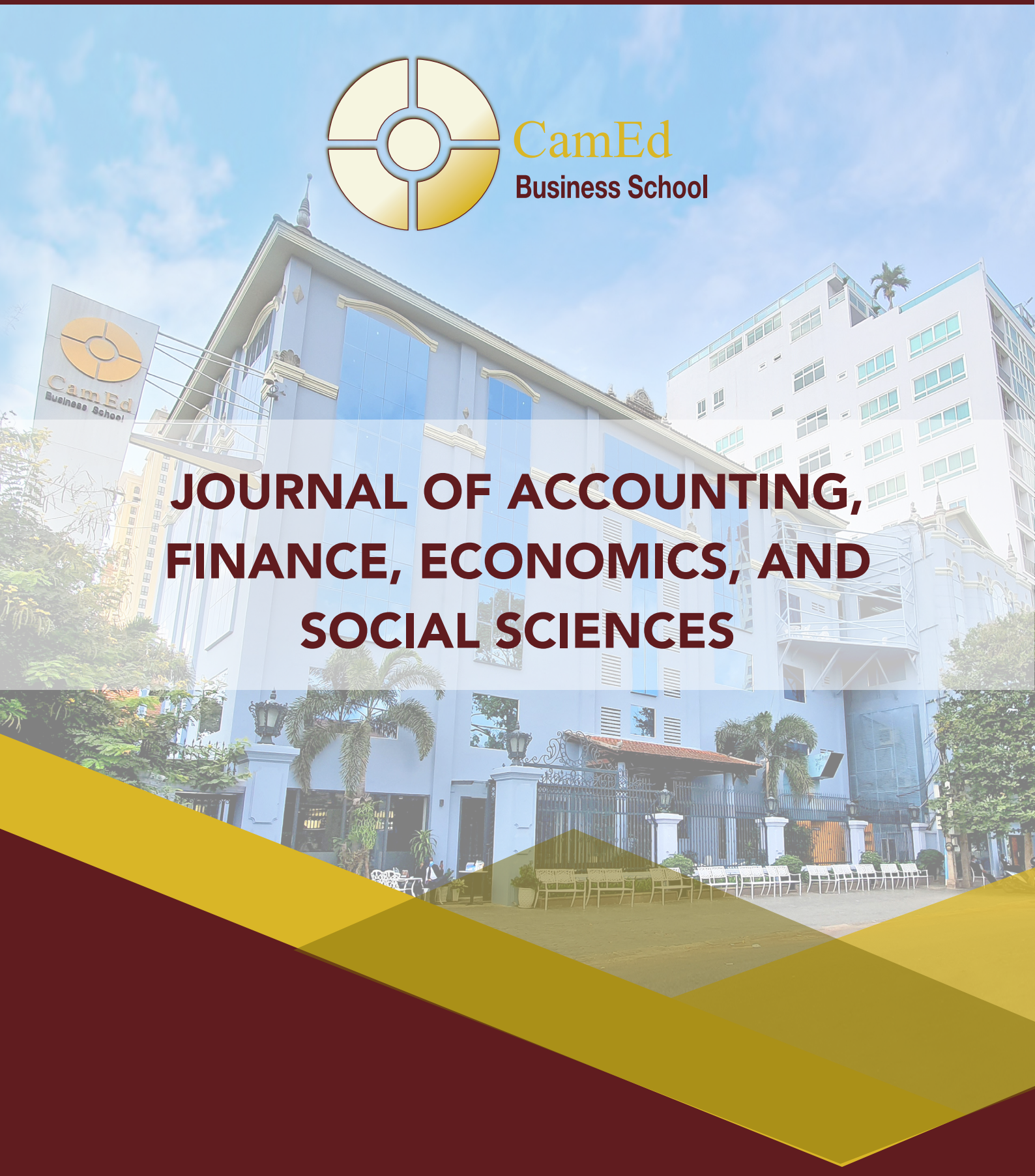

JOURNAL OF ACCOUNTING, FINANCE, ECONOMICS, AND SOCIAL SCIENCES

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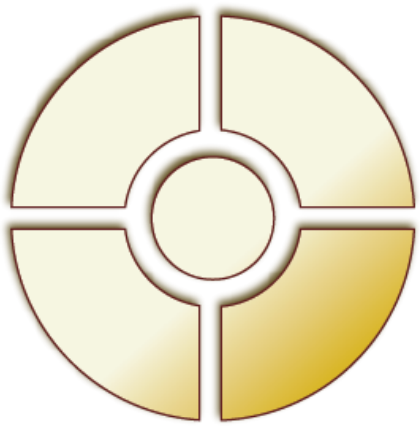

Journal of Accounting, Finance, Economics, and Social Sciences

Publisher
CamEd Business School
Phnom Penh, Cambodia

Printer
CamEd Business School
Phnom Penh, Cambodia

Editor-in-Chief
Prof. Tapas R. Dash
CamEd Business School
Phnom Penh, Cambodia

Printed at
CamEd Business School
64 Street 108, Phnom Penh, Cambodia
Phone: (855)-23 986 522

Membership

Contents

Journal of Accounting, Finance, Economics, and Social Sciences
Vol 7, No 2, July – December 2022, pp. 1-12
Received: Sep 2022 | Revised: Nov 2022 | Accepted: Dec 2022
DOI: https://doi.org/10.62458/jafess.160224.7(2)1-12

The Identification of Factors Influencing Value-Added Tax Revenue Performance in Cambodia

Song Kosal and Lim Siphat*

ABSTRACT

This research investigated the direct effect of a VAT audit, tax education, tax resource, and tax rate on tax revenue performance, including the indirect impact of tax resources on tax revenue performance through VAT audit or tax education. In this study, five latent variables were predicted by twenty reliable manifest variables as referring to confirmatory factor analysis. We analyzed causal relationships among latent constructs based on the structural equation model. The estimation of sample parameters and statistical tests for hypotheses testing of the direct effect of all latent variables on tax resource performance were performed under the maximum likelihood estimation method. From this method, the estimated sample parameters were 0.103 for VAT audit, 0.161 for tax education, 0.014 for tax rate, and 0.583 for tax resource. These variables had a direct statistically significant effect on tax resource performance. The estimation standard errors for the indirect effect hypotheses testing were developed under the maximum likelihood method and bootstrapping technique. The test results indicated that tax resources positively affected tax revenue performance through the mediation of VAT audit or tax education. Tax resources played the most critical latent variable in explaining tax revenue performance.

Keywords: Tax resource performance; CFA; SEM; Maximum likelihood; Bootstrapping

INTRODUCTION

The Value-Added Tax (VAT) accounted for an average of 32.65 percent of the total tax revenues over the last three years. The VAT collected 2019 was 7,057.67 billion Riel; it was 6,288.22 billion Riel in 2020 and 5,645.18 billion Riel in 2021 (MEF, 2022).

As demonstrated, the VAT revenue is approximately one-third of the total tax revenue. As a result, under the supervision of the Ministry of Economy and Finance (MEF), the General Department of Taxation (GDT) has paid enormous attention to controlling this type of tax to ensure sustainable tax revenue collection and achieve the annual target to minimize tax evasion and avoidance. At the same time, the Tax Crime Investigation Department was created to investigate tax fraud. According to the International Monetary Fund's (IMF) technical assistance report for tax administration modernization 2019-23 for Cambodia, it is recommended that to conduct tax fraud investigations and achieve good results effectively, human resource recruitment and appropriate assignment play a key role in supporting tax administration. Besides human resources, technology is also considered a core factor in tax administration. Hence, a Standard Integrated Government Tax Administration System (SIGTAS) should be developed to provide tax administration easy access to all the information needed to execute their job successfully instead of using traditional manual processing. For that reason, this system can also be considered new work automation, which not only helps to speed up the work process of the tax authorities but also increases their effectiveness in successfully executing tasks, especially tax audits.

The information technology platform should develop around three systems to modernize the tax system and provide leniency to the tax administration enforcing tax laws. These include the core system component, the compliance performance system, and the management information system. First, the core system component will support the main tasks of the tax administration, such as taxpayer registration, return processing, taxpayer and revenue accounting, and payment processing. Second, the compliance performance system will support the tax audits based on the risk analysis. Finally, the management information system will help provide accurate information to tax officers for appropriate decision-making (IMF, 2018).

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In Cambodia, a tax audit is performed through the assessment of financial reports and related documents that involve the business activities of taxpayers to certify whether they have a correct tax calculation, declaration, and payment regarding the law and regulation of taxation. A desk audit is conducted at the tax administration office that verifies whether the filing for tax returns declared by taxpayers is consistent with supported documents and information collected by tax officers from other sources. A desk audit is transformed into an on-site audit in case that high risk of systematic compliance is found linked to taxpayer information and documents provided to tax officers while conducting a desk audit. On-site audits will be operated at the business enterprises under investigation to assess the actual business activities of the enterprise via accounting recording and other related documents. The on-site audit is classified into two types: limited and comprehensive. "Limited audit: is a short-term and immediate audit on some kinds of taxes such as a special tax on some goods and services, public lighting tax, value-added tax (VAT) including refund and other taxes except income tax by checking the points that are of risks in accounting records and relevant documents," while "[c]omprehensive audit: is an audit conducted on all kinds of taxes and assess the accounting records of the enterprise by reviewing the actual business operation and verify it with the accounting records, financial reports and documents related to the business to ensure that the enterprise has prepared correct accounting reports and financial reports following the law and duly fulfill the tax obligation under the law and regulations on taxation." The process of tax audit has initiated by the idea of high-ranking government officers of the MEF and GDT and was considered to be one of the strategic policies of the Revenue Mobilization Strategy, which had been established to manage and collect taxes transparently and effectively (MEF, 2019).

Both human resources and information technology systems are considered to be tax resources that the tax administration can adopt to conduct an effective VAT Audit. The main aim of this research is to investigate whether the tax resource positively impacts tax revenue through the mediation of VAT audits or tax education.

LITERATURE REVIEW

VAT audit was a vital mechanism employed by the tax authority to verify whether taxpayers declare taxable liability correctly (Khwaja et al., 2011). A study by Olaoye and Ekundayo (2019) conducted in Nigeria indicated that tax turnover positively correlated with VAT audits. Moreover, the VAT turnover was also closely related to the tax education, tax rate, and relevant technology tax officers could deploy to audit the VAT payment. The effectiveness of tax collection depended heavily on the tax officers' capacity to perform auditing to prevent tax evasion. For instance, strengthening tax officers' capacity helped Ethiopia collect more VAT (Ayele, 2019). Likewise, a study on VAT collection in China indicated that the effectiveness of VAT auditing was realized on the knowledge of taxpayers, audit quality, and the state tax administration of China. The study also showed that the integrated state tax administration also had a positive statistical relationship with the effectiveness of auditing (Mattéo Godin et al., 2017).

The empirical evidence about an expanded model of taxpayer compliance from the United States and Hong Kong showed that tax education had a positive relationship with the effectiveness of the tax collection of tax authorities (Ameyaw et al., 2016). In addition to the studies above, similar research was conducted in Ghana to study the relationship between tax education and tax compliance. The researcher performed multiple regressions among committed compliance (CTC), general tax knowledge (GTK), fear-appealing messages, and compliance convenience. The null hypothesis stated that the GTK positively correlates with the CTC. The empirical results implied that the level of tax education defined the level of tax compliance (Trawule, 2017). This result corresponds to the study by Mochogu and Amayi (2013) in Tanzania. Concerning the method thereof, another study was conducted in Kenya. The result showed that the threat of fines and penalties has a positive relationship with the level of tax compliance. Also, tax compliance depends on the level of convenience to comply (Osebe, 2013).

In contrast, the lack of a tax education program, lack of capable tax officers, inadequate and loosened tax law enforcement, and lack of a mechanism to control the unregistered traders were the significant challenges at Bench Sheko Zone, Ethiopia. Those issues motivated tax evasion, which decreased tax turnover (Tebebu & Yitbarek, 2020). On the other hand, another study was conducted on the intention

of avoiding tax in Malaysia, focusing on education, gender, age, and religion. The empirical result indicated that highly educated older women were less interested in evading tax (Zandi & Rabbi, 2015).

The study in Ethiopia formulated nine variables, including tax audit resources, audit case selection, auditor capacity, tax protection system, tax automation, tax evasion, tax compliance, and amount before and after an audit, to investigate the impact of tax audits on tax turnover. The empirical result of this study showed that three variables had a positive relationship with tax turnover (Desalegn, 2020). To increase the effectiveness of tax collection, some EU members, Austria, Lithuania, Norway, and Portugal, adopted the Standard Audit File for Tax (SAF-T), which integrated the audit data from the accounting system. The study by Podik et al. (2019) confirmed that many authorities worldwide began to adopt the SAF-T thanks to the convenience of e-filing, which enabled taxpayers to easily and quickly file and pay tax. Meanwhile, the SAF-T helped tax officers quickly and easily conduct the audit. Thanks to its built-in feature, which enabled tax officers to easily access the program's audit tools, making the process of paying taxes faster and more efficient. As demonstrated, tax audits played a significant role in enforcing tax compliance. A set of questionnaires consisting of 48 items was created to study the behavior of the tax office in the Bauchi State Board of Internal Revenue, taxpayers, and private entities in Bauchi State, Nigeria. The descriptive statistic was applied to the collected data. The empirical result of this study showed that tax audits helped to reduce tax evasion and increase the effectiveness of tax collection. Likewise, increasing the capacity of tax officers to conduct tax audits remained a priority for the tax authority to strengthen tax law enforcement (Badara, 2012).

Similarly, another study was conducted in Hawassa City Revenue, South Ethiopia. The study surveyed 78 VAT-registered enterprises. The result showed that the knowledge of the taxpayers and tax officers was a significant factor that determined the level of tax compliance (Jerene, 2016). Based on the Pearson Correlation Coefficient, hypothesis testing was adopted to investigate whether the tax audit can help the collection of VAT or not. The null hypothesis was rejected, implying that the tax audit had a negative relationship with tax evasion but had a positive relationship with the tax turnover in Kaduna State, Nigeria. Furthermore, this study also indicated that the effectiveness of tax auditing depended on the resources the tax officers could use, such as computers and integrated VAT systems (Wuyah et al., 2018). Using the regression analysis by keeping the revenue protection system and tax automation constant, the result showed that the tax revenue collection would increase by 0.162 if the tax administration increased by one unit. This study also indicated that the tax audit increases the tax revenue turnover in Rwanda (Harelimana & Nyabirande, 2020).

Based on studies over the last 20 years, Indonesia's VAT turnover to GDP tended to decrease gradually. To explain such a scenario, Heru (2018) put the suspicion on three variables, tax expenditure policy, taxpayers' noncompliance, and the share of aggregate consumption in the economy. A multi-regression between VAT revenue and VAT gap due to noncompliance, VAT gap due to policy, and consumption, all as a percentage of GDP from 1995 to 2014, was conducted. The empirical results of this research indicated that tax expenditure policies and the extent of noncompliance with tax laws had a significant effect on the performance of VAT collection. The result of the research above was consistent with research conducted by Zeljko and Fareed (1993) applying the cross-section analysis in Europe and Central Asia. The study showed that tax administration and law enforcement played a vital role in VAT compliance and improving VAT collection performance. On the other hand, a study in ASEAN showed that the VAT rate significantly impacted tax revenue collection (Wijaya, 2020).

The key challenges to VAT revenue collection were due to the lack of accounting bookkeeping and the presenting and keeping of receipts related to the business transactions of the taxpayers, especially the lack of resources needed by the tax authority, such as information, communication, and technology (ICT). The lack of tax officers capable of conducting the audit and investigating tax evasion also posed a challenge to VAT revenue collection (Duangchay, 2016).

The reform of tax authority and VAT system helped the Bolivia Government successfully increase the VAT revenue. Bolivia's VAT was closed by improving tax policy and compliance gap (Matteo et al., 2017). Wuyah et al. (2018) found that strengthening the effectiveness of VAT collection took much work, especially for developing countries such as the Philippines, Vietnam, Malaysia, Thailand, and Indonesia. Those countries lacked information

technology for tax administration, particularly information technology to apply to VAT compliance for SMEs.

The literature above review indicates that Tax Revenue Performance (TRP) underlies several variables, including basic tax knowledge of taxpayers, tax rate, tax law enforcement, and particularly the ability of tax officers to audit VAT-registered taxpayers to determine whether their tax declaration and payment practices comply with tax laws. According to the studies conducted in Rwanda, Nigeria, ASEAN countries, Ethiopia, and EU member states, VAT audits positively impacted tax revenue performance. In other words, if tax officials conduct high-quality VAT audits, tax evasion by taxpayers will be as minimal as possible. However, the outcomes and effectiveness of VAT audits depend on more than just the tax expertise of the tax officers; they also require the use of available tax resources, such as computers and the Standard Integrated Government Tax Administration System, for audit purposes. It also depends on the number of tax auditors if it is sufficient to examine tax returns by VAT registered taxpayers, the tax auditors' ability to detect tax evasion and tax avoidance, and whether they are committed to professionally performing their audit activity.

The studied literature concentrates on the direct effects between tax resources and TRP or between VAT audits and TRP, but it ignores the indirect impacts that tax resources have on TRP due to VAT audit or tax education mediation functions. Thus, to fill this gap, this study evaluates the overall impact in Cambodia and the indirect relationship between TRE and TRP. In addition to TRE and VAT audits that could have an impact on TRP, tax education and tax rate will be entered as two other variables in a Structural Equation Model.

METHODOLOGY

This section covers the research methodologies employed in this paper, which include the multiple regression model, the estimated method of the model's parameters, the sampling technique and the determination of appropriate sample size, the development of the structural equation model, and the analysis of the collected data. This research employs a Structural Equation Model (SEM) to investigate the impact of four key factors: VAT Audit (VAU), Tax Education (TED), Tax Resource (TRE), and Tax Rate (TRA) on the Tax Revenue Performance (TRP) in Cambodia. All factors are unobserved variables, but they will be measured using the observed variables collected from the respondents. VAU is measured by five questions, the same as TRE and TRP, while TED and TRA are determined by six and four tools, respectively (See Table 1 for more detail). The general model of this study is presented in Equation 1 below:

$$TRP_i = \theta_1 VAU_i + \theta_2 TED_i + \theta_3 TRE_i + \theta_4 TRA_i + \epsilon_i \qquad (1)$$

Where $\Theta_1, \Theta_2, \Theta_3, \Theta_4$ are parameters to be estimated. ε_i are the residual or error terms. *i* represents individual firm from 1, ..., *n*. The estimated method of Model 1 is the Maximum Likelihood Estimation (MLE).

The likelihood function (LF) has the following form:

$$LF(\theta_1, \theta_2, \theta_3, \theta_4 | TRP_1, TRP_2, \dots, TRP_n) = \prod_{i=1}^{n} \left[\frac{1}{\sqrt{2\pi\sigma_i^2}} exp\left(-\frac{\epsilon_i^2}{2\sigma_i^2} \right) \right] \qquad (2)$$

The likelihood function can also be written as,

$$LF(\theta_1, \theta_2, \theta_3, \theta_4 | TRP_1, TRP_2, \dots, TRP_n) = \frac{1}{\sigma_i^n (2\pi)^n} exp\left(-\frac{1}{2} \sum_{i=1}^{n} \frac{\epsilon_i^2}{\sigma_i^2} \right) \qquad (3)$$

Take the logarithm of the *LF* to get,

$$lnLF(\theta_1, \theta_2, \theta_3, \theta_4 | TRP_1, TRP_2, \dots, TRP_n) = -nln\sqrt{2\pi} - \frac{n}{2} ln\sigma_i^2 - \frac{1}{2} \sum_{i=1}^{n} \left(\frac{\epsilon_i^2}{\sigma_i^2} \right) \qquad (4)$$

$$lnLF(\theta_1, \theta_2, \theta_3, \theta_4 | TRP_1, TRP_2, \dots, TRP_n) = -\frac{n}{2} ln(2\pi) - \frac{1}{2} \sum_{i=1}^{n} ln\sigma_i^2 - \frac{1}{2} \sum_{i=1}^{n} \left(\frac{\epsilon_i^2}{\sigma_i^2} \right) \qquad (5)$$

The calculus is applied to equation 5 in order to find the sample parameters $\hat{\theta}_1, \hat{\theta}_2, \hat{\theta}_3$ and $\hat{\theta}_4$ and that maximize the log-likelihood function.

In addition to studing the direct effect of a VAT audit, tax resource, tax education, and tax rate on tax revenue performance, this research has further investigated the mediation effect of TRE on TRP through the mediation of VAU or TED. The flow of the mediation effect is indicated below:

TRE --> VAU --> TRP

TRE --> TED --> TRP

This research uses primary data utilizing a survey of VAT-registered firms. A standardized questionnaire is developed and distributed to the target respondents through face-to-face meetings. The questionnaire is classified into five sections. Each section represents each factor: VAU, TED, TRE, TRA, and TRP, which all are determined to be unobserved variables. The observed data were collected using a 5-point Likert scale where one represents "Strongly Disagree," and five indicates "Strongly Agree."

The evaluation of the model's fitness is defined by applying the reliability and validity tests. The reliability test is carried out to determine the model's internal consistency. If the composite reliability is more than 0.7, the questionnaire instrument is considered to have good indicator reliability. A convergent validity prerequisite exists when the minimum average variance extraction value (AVE) is 0.5. Moreover, the Confirmatory Factor Analysis (CFA) is adopted to evaluate the model's suitability.

The sample size is determined based on a formula developed by Krejcie and Morgan (1970) as follows:

$$S = X^2NP\ (1 - P) \div d^2(N - 1) + X^2P\ (1 - P) \qquad (6)$$

Where S is the required sample size, X^2 is the table value of chi-square for 1 degree of freedom at the desired confidence level, *N* is the population size, *P* the proportional proportion (0.5), *d* the degree of accuracy expressed as a proportion (0.05). 150 VAT-registered taxpayers were randomly selected from the list to reduce sampling error at a minimal level. The sample size is then established using equation 6, and only 108 VAT-registered taxpayers are chosen at random from the 150- sample for the study.

Five VAT-registered taxpayers are randomly selected to complete the questionnaire in the development stage. The questionnaire was assigned to all of them to fulfill. Any problems or questions raised upon completing the questionnaire were recorded and used to update and improve the questionnaire.

Table 1: Measurement

Factors	Items	Measurement
VAT Audit (VAU)	VAU1	Tax audit takes within the tax office or desk audit, and VAT cross-checks to verify the VAT declared by the supplier and the VAT claim by the purchaser.
	VAU2	VAT audit affords auditors to determine the accurate tax liability of the taxpayers independently
	VAU3	VAT audit requires the taxpayers to be well-informed before the commencement of the audit
	VAU4	VAT audit allows physical verification of taxpayers' claims to confirm the facts and figures of the returns
	VAU5	VAT audit is used to reveal doubtful claims of capital allowance related to the previous or current year
Tax Education (TED)	TED1	Taxpayers' tax education is fundamental for tax compliance awareness
	TED2	Taxpayers' tax education programs reduce errors by empowering taxpayers with tax knowledge
	TED3	Tax education is highly carried out through television and other media channels, workshops, seminars, and forums
	TED4	Tax education proactively encourages voluntary tax compliance
	TED5	Tax education via door-to-door brings about increased tax compliance and broadens the tax base
	TED6	Tax education reduces tax evasion to the best minimum
Tax Resource (TRE)	TRE1	The number of auditors is sufficient to audit VAT return filing
	TRE2	There is a shortage of resource materials, including computers and the Standard Integrated Government Tax Administration System (SIGTAS), for audit purposes
	TRE3	Tax auditors are under the required academic states and attain experience from other tax institutions
	TRE4	The capacity of tax auditors to find out tax evasion and avoidance is a good position.
	TRE5	Tax auditors are committed to performing their audit activity with a good attitude
Tax Revenue Performance (TRP)	TRA1	Underreporting behavior is positively related to a high tax rate
	TRA2	The high tax rate is positively related to tax evasion
	TRA3	The tax rate has no positive or negative effect on tax revenue performance
	TRA4	The current tax rate has served more than 10 years, so it should be revised soon
Tax Revenue Performance (TRP)	TRP1	An Electronic-tax system increases revenue collection
	TRP2	Audits are conducted on a timely basis to verify if the taxpayer has correctly reported and assessed their obligations
	TRP3	Taxation Department provides audit notifications to the taxpayers on time
	TRP4	Tax officer provides notifications to the taxpayers on time
	TRP5	Tax officers can identify tax evaders through audit

Source: Constructed by authors

Hypothesis 1 (H1):	VAT audit has a positive significant effect on tax revenue performance.
Hypothesis 2 (H2):	Tax resource has a positive significant effect on tax revenue performance.
Hypothesis 3 (H3):	Tax education has a positive significant effect on tax revenue performance.

Hypothesis 4 (H4):	Tax rate has a positive significant effect on tax revenue performance.
Hypothesis 5 (H5):	Tax resource has a positive significant effect on VAT audit.
Hypothesis 6 (H6):	Tax resource has a positive significant effect on tax revenue performance through the mediation of VAT audit.
Hypothesis 7 (H7):	Tax resource significantly affects tax education.
Hypothesis 8 (H8):	Tax resource positively affects tax revenue performance by mediating tax education.

EMPIRICAL RESULTS

A Structural Equation Model (SEM) was applied to assess the direct effect of Tax Resource (TRE), VAT Audit (VAU), Tax Education (TED), and Tax Rates (TRA) on Tax Revenue Performance (TRP). This research also tried to measure the indirect impact of tax resources on tax revenue performance by mediating VAT audit or tax education. All variables in this study were determined to be unobserved variables known as latent variables or latent constructs, which are predicted by the observed variables, so-called manifest variables. The five developed latent constructs were observed by twenty-five questions or items classified into five items for VAT audit, six items for tax education, five for tax resource, four for tax rate, and five for tax revenue performance. One hundred thirteen companies participated by responding to the questionnaire, but after getting through the cleaning process, one company was eliminated due to the standard error of the choices selected of that company had a value less than 0.3. With the collected data set, confirmatory factor analysis was initially carried out, and the loading factor of each item must be no less than 0.5. Otherwise, it will be deleted. Regarding CFA results, three questions were omitted from the system because their loading factors needed to pass the threshold. Those items included TRE2-There is a shortage of resource materials, including computers and Standard Integrated Government Tax Administration System (SIGTAS), for audit purposes from tax resources, TED5-Tax education via-door-to-door brings about increased tax compliance and broaden the tax base part of tax education, and TRA3-Tax rate does not have any positive or negative effect on tax revenue performance from the tax rate.

Table 2: The goodness of fit test, CFA

Indices	Value	References	Threshold
IFI	0.915	Meyer et al., 2005	> 0.90
CFI	0.938	Bentler, 1990 & Hatcher, 1994	> 0.90
NFI	0.946	Bentler and Bonett, 1980	> 0.90
RMSE	0.062	Byrne, 2001 & Meyer et al., 2005	< 0.08
SRMSR	0.073	Hair et al., 2009	<0.09

Source: Constructed by authors.

The result of the model fit indicated that the chi-square or CMIN has a value of 283.605 and a degree of freedom (DF) of 199. However, its probability value is smaller than 5 percent, indicating that the hypothesized model differs significantly from the observed model. Yet, the CMIN/DF is 1.425, considered a good result (Hair et al., 2009). Moreover, to assess the model fit, this research used the following indices: Incremental Fit Index (IFI), Comparative Fit Index (CFI), Normed Fit Index (NFI), Root Mean Square Error (RMSE), and Standard Root Mean Square Residual (SRMSR). As compared between all of the indices and concerning its threshold, it can be claimed that the model fits the data well.

It is vital to generate convergent validity, discriminant validity, and reliability when conducting the CFA; otherwise, continuing to run a causal model test is regarded as unfeasible. When we created the construct reliability, composite reliability (CR), and MaxR(H), each construct value must be greater than 0.7. Likewise, in demonstrating convergent validity, CR must have a value greater than the Average Variance Extracted (AVE). Notably, the AVE of each construct must be greater than 0.5, and the correlation between one construct and another must be statistically significant. Furthermore, the heterotrait-monotrait ratio of correlation (HTMT) is adopted to check the discriminant validity. In addition, to guarantee the constructs are discriminated, HTMT must be smaller than 0.9.

Table 3: Validity analysis

	CR	AVE	MSV	MaxR(H)	VAU	TRE	TED	TRA	TRP
VAU	0.907	0.662	0.18	0.928	0.814				
TRE	0.800	0.504	0.439	0.818	0.229*	0.71			
TED	0.835	0.507	0.18	0.857	0.424***	0.356**	0.712		
TRA	0.896	0.748	0.003	0.984	-0.055	0.034	0.014	0.865	
TRP	0.882	0.601	0.439	0.891	0.312**	0.663***	0.420**	0.028	0.775

Source: Estimated by authors using AMOS.

Regarding the validity analysis in Table 3, the CR of all the constructs is more significant than 0.7. The correlation between one construct and another is effective at the 1, 5, and 10 percent significant levels, except for the correlation between VAU, TRE, TED, and TRA, which is insignificant. In conclusion, there are no validity concerns.

The HTMT analysis in Table 4 indicates that the HTMT of all the constructs is lesser than 0.9. Based on this result, all the constructs are assumed to be discriminated. After completing the confirmatory factor analysis, the following process is conducting path analysis using a structural equation model. The objectives of using this model in this research are to assess the direct effect of a VAT audit, tax resource, tax education, and tax rate on tax revenue performance. Other main objectives of the model are to assess the indirect effect of tax resources on tax resource performance through VAT audit or tax education. Before conducting any hypotheses testing, which conclude from SEM, the assessment of the model fit was needed to perform again.

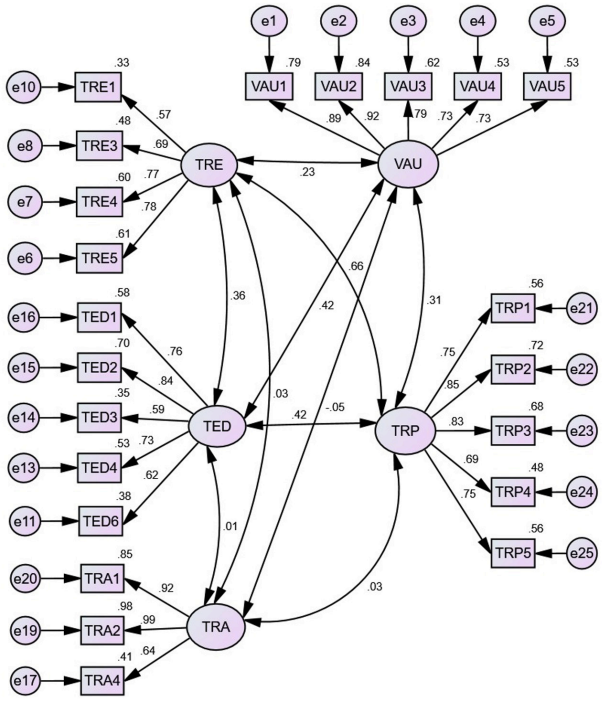

Figure 1: Confirmatory Factor Analysis

Source: Constructed by authors using AMOS.

Table 4: HTMT analysis

Later Variable	VAU	TRE	TED	TRA	TRP
VAU					
TRE	0.268				
TED	0.436	0.357			
TRA	0.067	0.074	0.018		
TRP	0.351	0.659	0.419	0.066	

Source: Estimated by authors using AMOS.

The loading factors of all items used to estimate the latent variables still exceed 0.5 (See Figure 2: Structural Equation Model). These results are consistence with the CFA; the total number of manifest and latent variables remain the same. The calculated value of chi-square is 296.401, and the degree of freedom is 202, which generates a 1.467 ratio of chi-square over the degree of freedom since the calculated ratio is less

than 0.3, as referring to Hair et al. (2005), the model is a good fit. Alternatively, the indices fit, Incremental Fit Index, Comparative Fit Index, Normed Fit Index, Root Mean Square Error, and Standard Root Mean Square Residual all pass the thresholds in Table 5.

Table 5: The goodness of fit test, SEM

Indices	Value	References	Threshold
IFI	0.932	Meyer et al., 2005	> 0.90
CFI	0.931	Bentler, 1990 & Hatcher, 1994	> 0.90
NFI	0.921	Bentler and Bonett, 1980	> 0.90
RMSE	0.065	Byrne, 2010 & Meyer et al., 2005	< 0.08
SRMSR	0.064	Hair et al., 2005	<0.09

Source: Constructed by authors.

The estimated parameters of the model were developed using the Maximum Likelihood Estimation method, and the standard errors for statistical tests were developed under Fisher Information Matrix. The sample parameters and estimated standard errors found based on this method were used in calculating statistical tests for hypotheses testing. The causal relationship among latent variables or latent constructs can be assessed through path analysis. The estimated results of path coefficients are presented in Table 6.

The empirical findings suggested that the slope coefficient of tax education was 0.161 since the critical ratio (CR) was 6.6150, and the probability value (p-value) was 0.000 lower than the significant level of 0.01 or 1 percent. Thus, the null hypothesis was rejected, which claimed that tax education had a positive significant effect on tax revenue performance. The estimated sample parameter of tax rate was 0.014, which was lower than the sample parameter of tax education. Even though the parameter was positive, it was concluded that the tax rate was weakly statistically explained tax revenue performance because the p-value of 0.079 was lower than the level of significance of 0.1 or 10 percent. This research has further shown that the increase in the efficiency of a VAT audit, the better the tax revenue performance because the sample coefficient of VAT audit was found to be 0.103 and statistically significant at 1 percent level due to the probability value associated with CR being close to zero. It is worth recalling that five observed variables determined VAT audit, VAU1-Tax audit takes within the premises of tax officials, VAU2-VAT audit affords auditors to determine the accurate tax liability of the taxpayers independently, VAU3-VAT audit requires the taxpayers to be well-informed before the commencement of the audit, VAU4-VAT audit allows physical verification of taxpayers claims to confirm the facts and figures of the returns, and VAU5- VAT audit is used to reveal doubtful claim of capital allowance related to the previous or current. One of the latent variables which play the most crucial role in this research is tax resource as indicated in the confirmative factor analysis; it had been explained by four manifest variables, including TRE1-The number of auditors is sufficient to audit VAT return filing, TRE3-Tax auditors are under the required academic states and attain experience from other tax institutions, TRE4-The capacity of tax auditors to find out tax evasion is in a good position, and TRE5-Tax auditors are committed to performing their audit activity with a good attitude.

This research has tried to investigate not just only the direct effect which might have happened between tax resources and tax revenue performance but this study has tried to find out the indirect effect which might have incurred between tax resources and tax revenue performance through VAT audit or tax education. Hypothesis 2 (H2) stated that tax resource has a positive significant effect on tax revenue performance, which was highly accepted since the probability value associated with the critical ratio was close to zero, lower than the significant level of 1 percent, especially the estimated parameter of 0.583, which was positive. More interestingly, Hypothesis 5 (H5), which described that tax resource has a positive significant effect on VAT audit, was also accepted, but at a 5 percent considerable level owing to the probability value was 0.016 and the estimated slope coefficient was 0.261. Moreover, the causal relationship between tax resource and tax education were also observed. The estimated slope parameter was 0.381 since the probability value was 0.002, lower than the 1 percent significant level; thus, Hypothesis 7 (H7) described that Tax resource has a positive significant effect on tax education was highly accepted.

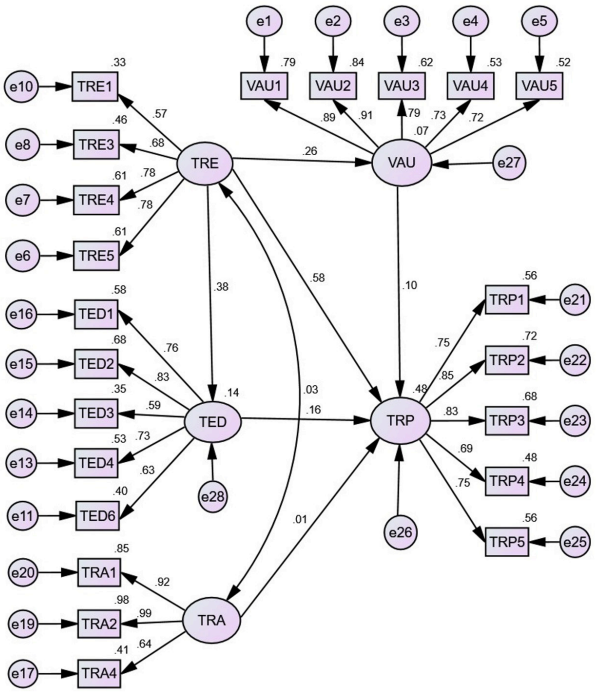

Figure 2: Structural Equation Model

Source: Constructed by authors using AMOS.

This research has also tried to investigate the indirect effect of tax resources on tax revenue performance through VAT audit or tax education. Regarding the technical measurement in the Analysis of Moment Structure (AMOS) software application, the maximum likelihood estimation method produced just only the estimated sample parameters and standard errors for statistical testing of direct effect among variables in the system, but the test of statistics was not available for indirect effect hypotheses testing. Hence, to establish standard errors for hypotheses testing, the bootstrapping technique was combined with the maximum likelihood estimation method to determine the lower and upper bounds of the 95 percent confidence interval.

Table 6: Path analysis

Latent Variable			Estimate	S.E.	C.R.	P
VAU	←	TRE	0.261	0.1088	2.3980	0.016
TED	←	TRE	0.381	0.1215	3.1358	0.002
TRP	←	TED	0.161	0.0243	6.6150	***
TRP	←	TRA	0.014	0.0079	1.7722	0.079
TRP	←	VAU	0.103	0.0197	5.2284	***
TRP	←	TRE	0.583	0.1239	4.7054	***

Source: Estimated by authors using AMOS.

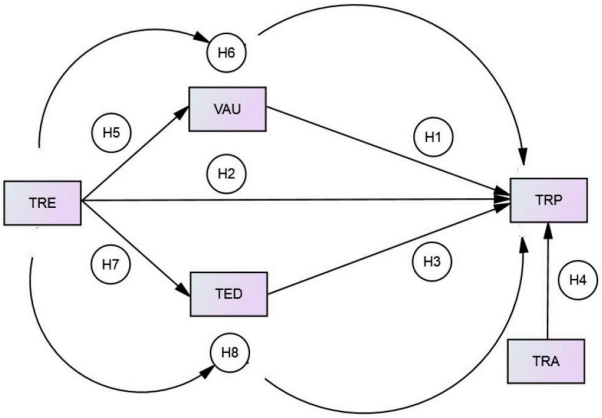

Figure 3: Hypotheses

Source: Constructed by authors using AMOS.

This study conducted 1000 bootstrapping samples. The lower and upper bounds of the 95 percent confidence interval, which represented the indirect effect of tax resources on tax revenue performance through the mediation of VAT audit, were 0.280 and 0.706, respectively. The null hypothesis was set to equal to zero, which fell outside the 95 percent confidence interval. Since the standardized coefficient of the indirect effect was 0.0269, it was concluded that tax resources had a positive significant effect on tax revenue performance through the mediation of VAT audit. In addition, the standardized sample parameter that indicated the indirect effect of tax resources on tax revenue performance through tax education was 0.061. Hypothesis 8 (H8) stated that tax resource has a positive significant effect on tax revenue performance through the mediation of tax education was accepted because the null hypothesis of zero fell outside the lower bound (0.318) and upper bound (0.827).

CONCLUSION

The objectives of this paper were to investigate the direct effect of the value-added tax audit, tax resource, tax education, and tax rate on tax revenue performance. This research further assessed whether there was an indirect effect of tax resources on tax revenue performance through VAT audit or tax education. Five latent variables were developed under the measurement of twenty-five manifest variables. After going through a confirmatory factor analysis, three observed variables were eliminated. The structural relationship between observed and unobserved variables were carried out using a structural equation model. VAT audit, tax resource, tax

education, and tax rate positively affected tax revenue performance. These effects were classified as direct effects. A latent variable, tax resource, was predicted by four manifest variables, including the number of auditors in the staff is sufficient to audit the reported VAT registered taxpayers file, tax auditors are under the required academic states and attain experience from other tax institutions, the capacity of tax auditors to find out tax evasion is in a good position, and tax auditors are committed to performing their audit activity with a good personality, played the most critical indicator in explaining tax revenue performance since it produced the most excellent estimated parameter of 0.583 as compared to other independent variables. This variable had not just a direct effect on VAT audit and tax education; on the other hand, it had an indirect effect on tax revenue performance through the mediation of VAT audit or tax education. In brief, the better the tax resource, the better the tax revenue performance. Another latent variable that was also determined to be one of the most significant players influencing tax revenue performance was tax education; its path coefficient was 0.161, the second highest one. The results of this research were consistent with most of the reviewed literature. The path coefficient of the tax rate latent variable was estimated to be 0.014, the least sample parameter compared to other parameters in the model. Nonetheless, it had a weakly significant effect on tax revenue performance.

For many years, GDT, under the direction of MEF, has developed and implemented various strategic policies designed to improve the efficiency of tax collection. Among the policies that have been implemented, human resource development is a primary strategic objective for GDT. For instance, many tests are administered during recruitment for headquarters and branch personnel to choose only the most qualified applicants. Moreover, before beginning employment, the selected candidates must complete several taxation courses taught by seasoned tax officers with years of experience in the tax sector. In addition to enhancing the tax officers' capabilities, GDT regularly nominated its tax officers to participate in interviews and seminars broadcast on radio, television, and social media to increase public knowledge of tax laws and compliance. Likewise, developing an IT system for managing taxes is a crucial approach for GDT. Over the past few decades, GDT has significantly invested in developing an IT system for managing taxes, enabling firms to quickly register for taxes, declare them, and make payments via a digital system. This technology has substantially improved the effectiveness of the tax officers. The empirical results and hypothesis testing used in this study to determine the factors affecting TRP are compatible with implementing GDT strategic policies, including the tax resource and tax education crucial to enhancing TRP.

Cambodia employs a self-assessment tax system, and the size of the enterprises is categorized into three types, small, medium, and large taxpayers. The GDT has implemented several initiatives that allow taxpayers to submit their tax returns online to boost the efficiency of collecting VAT. This enables tax authorities to carry out the VAT cross-check and makes it easier for taxpayers to disclose and pay their taxes. In the meantime, GDT encourages users to submit their receipts via the GDT Lucky Draw app. The GDT's plan aids in boosting the annual growth of VAT turnover. The diligent effort of the GDT officers, who constantly assist in educating the public about tax registration, declaration, and payment processes, mainly helping educate business owners about the receipts system, is also to be commended. The tax authority's implementation of the VAT administration has produced impressive results, as seen by the yearly rise in tax income. These achievements are consistent with the empirical findings of this study's hypotheses testing.

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Journal of Accounting, Finance, Economics, and Social Sciences
Vol 7, No 2, July – December 2022, pp. 13-28
Received: May 2022 | Revised: Oct 2022 | Accepted: Dec 2022
DOI: https://doi.org/10.62458/jafess.160224.7(2)13-28

Does Applying IFRS 15 Affect the Quality of Earnings of Cambodian-Listed Companies?

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ABSTRACT

In May 2014, the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) issued a joint standard, which is international financial reporting standard no.15 (IFRS 15), entitled "Revenue from contracts with customers." This research aims to identify the new standard, illustrate the new recognition model, and determine the impact of measuring revenues following IFRS 15 on the quality of earnings. A quantitative research approach is used, and the absolute value of discretionary accruals and earnings aggressiveness are utilized as proxies for the quality of earnings. The research sample includes three Cambodian-listed companies with 24 firm-year observations over eight years from 2014 to 2021. The study reveals a statistically significant negative effect of the application of IFRS 15 on the quality of earnings of Cambodian-listed companies. The research represents an extension of the previous studies concerned with studying and analyzing the impact of IFRS 15 on the quality of financial statements. It also adds to these studies as there is a lack of quantitative evidence of this new standard's economic effects after its application date. This study aids professional bodies in determining the impact of adopting international accounting standards on the quality of financial reports of companies in such emerging economies as Cambodia.

Keywords: IFRS 15; Quality of earnings; Absolute value of discretionary accruals; Earnings aggressiveness; Cambodia

INTRODUCTION

Income statement information, especially the one related to the revenue component, is one of the most critical information used in evaluating the performance of units, where revenues are referred to as representing a measure of performance and the main entry through which many indicators can be accessed (Elzahar et al., 2015).

To characterize, measure, and disclose revenue, the International Accounting Standards Committee (IASC) has issued a set of relevant accounting standards to regulate the terms and principles of recognition, measurement, presentation, and accounting disclosure of revenue, starting with International Accounting Standard No. 11 (IAS 11). "Construction Contracts" issued in December 1993, and International Accounting Standard No. 18 (IAS 18) "Revenue" issued in December 1993.

The revenue recognition requirements in IAS 11 and IAS 18 include limited guidance on revenue, which prompts some entities to complete the limited guidance in the international standard through the voluntary application of US Generally Accepted Accounting Principles (US GAAP). Meanwhile, accounting for revenue under US GAAP was increasingly complex since it relies on more than 200 accounting literature publications, most closely related to the business model. Besides, the disclosure requirements under IAS and US GAAP needed to be revised, as they often resulted in insufficient information for users to understand the revenues of enterprises and the judgments and estimates they make when recognizing revenue.

In 2001, IASC was dissolved, and the International Accounting Standards Board (IASB) was formed to issue International Financial Reporting Standards (IFRS). Since then, the issuance of international accounting standards under the name (IAS) has been discontinued, and IFRS has taken effect and been issued. On May 2014, the IASB and Financial Accounting Standards Board (FASB) issued the new joint standard (IFRS 15) entitled "Revenue from Contracts with Customers" after a long period of discussions. The standard replaced all general and special guidelines for revenue recognition in American

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standards and all standards and interpretations related to revenue recognition in international standards.

This new standard is considered the most significant event for American and international standards, as it helps to eliminate differences in the current revenue recognition guidelines, unify American and international standards in this regard, and provide a robust framework for solving revenue problems by simplifying the preparation of financial statements and by reducing the number of requirements that the entity must follow.

The standard provides a comprehensive contract-based revenue recognition model that is applied to all transactions and different industries to cover a wide range of commercial transactions to improve the comparability of revenue. The standard also seeks to be less complex and more flexible than the previously issued standards by not containing notable exceptions, as well as eliminating the different approaches to revenue recognition depending on unit's business model or industry-specific guidelines to reduce diversity in revenue recognition practices.

Applying this new standard is argued to influence the quality of earnings, but there are two different viewpoints regarding this effect. On the one hand, it is contended that the application of the new standard provides more appropriate and valuable information compared to the previous international standards, which helps to reduce the phenomenon of information asymmetry between the company and stakeholders, and thus positively impacts on the efficiency of financial markets (Knorovà, 2016). In this context, a group of accounting studies has provided empirical evidence that confirms the potential impact of the application of IFRS 15 on the quality of financial statements, the quality of accounting earnings, and the improvement of the informative content of the financial statements (Trabelsi, 2018; Tysiac, 2017).

On the other hand, it is claimed that applying IFRS 15 requires reliance on personal interpretations and estimates by the senior management of companies, which may lead to wrong accounting treatments (Haggenmůller, 2019). Some studies support this notion (for example, Fangshu, 2015; Khamis, 2016).

It is worth noting that most of the previous studies relied on specific analytical methods and questionnaire surveys as research tools to analyze the potential economic effects of applying IFRS 15 before its effective date on the quality of the financial statements (Kulikova et al., 2014). There need to be more accounting studies that rely on a quantitative approach to study the impact of applying the standard on the quality of companies' financial statements. This led to a controversy among researchers and professionals about the potential economic effects of applying IFRS 15 on the quality of companies' financial statements.

In light of this controversy and the scarcity of quantitative evidence in the accounting literature regarding the economic effects of applying IFRS 15, and as an extension of this trend of studies, this research deals with the analysis of the revenue recognition framework in IFRS 15 to analyze the economic effects associated with the application of the standard, which is essentially the quality of accounting earnings. Besides, there needs to be more studies that examine this issue in emerging countries, such as Cambodia. Then the research problem can be crystallized in the study and analysis of the impact of adopting IFRS 15 on the quality of accounting earnings of Cambodian-listed companies.

Therefore, this study aims to determine the new requirements of accounting, presenting and disclosure of revenue included in IFRS 15; analyze the impact of applying IFRS 15 on the quality of earnings as a measure of the quality of financial reports; and conduct an empirical study through statistical analysis to measure the effect of applying IFRS 15 on the quality of the earnings of a sample of Cambodian listed companies by comparing the quality of earnings of sample companies during the period before and after the application of this new standard.

Based upon the absolute value of discretionary accruals and earnings aggressiveness (EA) as measures of the quality of earnings, accounting data are collected from the financial statements of a sample of Cambodian-listed companies from 2014 to 2021. Since this new standard was begun to be applied in 2018, the years from 2014 to 2017 represent the period before the application of this new standard, while the remaining four years signify the period after the application of the standard.

The level of accrual-based-earnings management (AEM) and EA engagement increased among sample companies after applying this new standard, indicating the negative effect of adopting IFRS 15 on the quality of financial reporting of the Cambodian companies.

This research has both literal and practical contributions. The study derives its importance from revenue recognition in accounting thought as one of the essential elements in financial reports. Thus, the theoretical importance of the study is evident in being an addition to accounting thought and its literature by providing an appropriate analysis of revenue recognition issues in light of current practice. There is also a need for more studies on this subject from the point of view of researchers due to the novelty of IFRS 15 and since its application is mandatory as of January 1, 2018, even if it is permitted for establishments to apply it before that voluntarily. This standard is the focus of the attention of many users of financial statements, as it is considered the most significant event for American and international standards, as it helps to eliminate differences in the current revenue recognition guidelines and unify American and international standards in this regard.

Practically, this research contributes to determining the requirements of IFRS 15 for accounting for revenue and providing empirical evidence of the impact of applying IFRS 15 on the quality of earnings through a statistical analysis of the data of a sample of Cambodian-listed companies. The research shows for professional bodies the impact of developing international accounting standards on the quality of financial statements.

LITERATURE REVIEW

The term "convergence" has recently become the most prominent and used in accounting thought, while "harmonization" was the dominant accounting thought after World War II and until the new millennium. The main difference between the two terms is that "convergence" aims to create one common set of standards applicable to all countries. At the same time, "harmonization" seeks to reduce the differences between domestic and international accounting standards (Howard, 2009). In 2001, the International Accounting Standards Board (IASB) was given a mandate by the major bodies of the global capital markets to develop a single set of high-quality accounting standards through a joint venture of convergence with the Financial Accounting Standards Board (FASB), to eliminate the main difference between American accounting standards and international financial reporting standards. The real work between the two boards began in 2002 through the issuance of a (memorandum of understanding) that followed the conclusion of the Norwalk Agreement to define the meaning of convergence and methods for achieving that convergence to define the goal of convergence for developing high-quality accounting standards based on principles used in all international capital markets, and for increasing the usefulness of information to its users, especially investors so that they can make rational economic decisions to ensure an optimal distribution of wealth and resources to economic sectors (Herz & Petrone, 2004).

The revenue recognition and measurement principle is one of the essential principles on which the financial accounting system is based. At the same time, it is one of the most challenging issues due to the different requirements between U.S. Generally Accepted Accounting Principles (US GAAP) and International Financial Reporting Standard (IFRS), as well as their different scope, while it was limited in International Accounting Standard no. 11 (IAS 11) and International Accounting Standard no. 18 (IAS 18); however, its scope in the US GAAP is relatively broader because it contains a large number of revenue recognition rules, but both were insufficient.

IAS 11 and IAS 18 provide different treatments for similar transactions. One of them results in recognizing revenue based on the transfer of the risks. Meanwhile, the other relies upon the activities (Olsen & Weirich, 2010). At the same time, there are more than 100 different and specific standards by US GAAP, which often result in different treatment for similar economic transactions (Khamis, 2016). Therefore, it has become critical for FASB and IASB to establish a unified set of accounting standards. In January 2002, both boards discussed a significant venture to reform the current revenue recognition standards. These discussions began by defining the objectives and scope of the venture, which led to the development of comprehensive guidelines for revenue recognition in various industries. The venture ensured the amendment of the existence of the Statement of Financial Accounting Concepts (SFACs) and provided new directives.

In June 2002, the IASB added the revenue recognition venture to its technical agenda, and the two boards concluded a formal agreement in September 2002 to work together on this venture. The objectives of the joint venture were removing the contradictions and weaknesses in the previous revenue requirements; providing a more robust framework for dealing with revenue issues; improving the comparison of revenue

recognition practices between units, industries, and capital markets; and simplifying the process of preparing financial statements by reducing the number of requirements that the unit must refer to.

The venture paid attention to presenting a model primarily concerned with the contract, as the contract entails an obligation towards the customer and increases the company's economic benefits by receiving consideration for the commitment. It differentiates between the asset of the contract and its liability, where the asset of the contract is considered if the company's remaining rights exceed the remaining commitments. Still, if the remaining commitments exceed the remaining rights of the company, this is considered a liability. In this case, the company recognizes the revenue according to the changes in the assets and obligations of the contract. The venture presented a proposed model for the accounting steps for the revenue represented in defining the contract with the customer, defining the customer's commitments within the contract, determining and distributing consideration for each pledge, and recognizing the revenue when the company completes pledges.

Finally, on May 28, 2014, after more than 11 years of discussions, the FASB and IASB issued the Common Standard (IFRS 15) entitled "Revenue from Contracts with Customers" to develop a comprehensive conceptual framework to clarify the basic principles of revenue recognition that can be applied consistently in all industries across different countries to improve the comparability of financial statements and to provide more useful information to users of financial statements by improving revenue disclosure requirements, in addition to facilitating the preparation of financial statements by reducing the number of requirements that must be referred to when recognizing revenue.

This new standard aims to set up a comprehensive framework of principles that a company should apply to provide helpful information to financial statements users about the nature, timing, and uncertainty of revenue and cash flows arising from a contract with a customer (IFRS 15, 2014: Para 1), in addition to achieving the objectives of the joint venture of boards that are set in September 2002 (Jonick & Benson, 2018).

To achieve this goal, the framework was based on a fundamental principle, which is that companies must recognize revenue to describe the transfer of pledged goods or services to customers in an amount that reflects the consideration that the company expects to have a right to in exchange for these goods or services. Then the standard included a comprehensive framework for analyzing revenue transactions and providing guidelines to assist companies in making decisions related to measuring the value of revenue from contracts with customers and determining the timing of their recognition.

IFRS 15 replaces IAS 11 "Construction contract"; IAS 18 "Revenue"; International Financial Reporting Interpretations Committee no. 13 (IFRIC 13) "Customer Loyalty Programmes"; IFRIC 15 "Agreements for the Construction of Real Estate"; IFRIC 18 "Transfer of Assets from Customers"; Standard Interpretations Committee no.13 (SIC 13) "Barter Transactions Involving Advertising Services" (Dalkilic, 2014). This standard is applied to all contracts with customers except for leases within the scope of IAS 17 "Leases," insurance contracts within the scope of IFRS 4 "Insurance Contracts," financial instruments, and contractual rights and obligations within the scope of IFRS 9 "Financial Instruments," IFRS 10 "Consolidated Financial Statements," IFRS 11 "Joint Arrangements," IAS 27 "Separate Financial Statements," IAS 28 "Investments in Associates and Joint Ventures," and non-cash exchanges between entities to facilitate sales to current or potential customers.

The FASB has decided to apply this standard to the first interim reporting period falling in fiscal years beginning after December 15, 2016, and the IASB voted on a decision to defer the effectiveness of IFRS 15 to January 1, 2018, instead of January 1, 2017, allowing with early application. The standard maintains three accounting conservatism aspects: revenue is recognized only when the entity fulfills the contract obligation, and the contract obligation is measured at the transaction price. This revenue is recognized only when probable (Barker & McGeachin, 2015).

IFRS 15 sets a new model for accounting for revenue, and it is called the five-step model. Firstly, the contract or contracts with customers should be determined. What is considered a contract within the scope of the standard must fulfill all of the following conditions, which are: there is an agreement between all parties of the contract, there is a possibility of determining the rights of all parties about the transfer of goods or services, the payment terms for the goods or services to be transferred are determined, the contract is about a commercial material, and attention may be

paid to consideration for the goods or services to be collected. Suppose a contract with a customer only meets some of the mentioned conditions. In that caser, the entity will continue to re-evaluate the contract and move forward to determine whether or not the conditions above will be met since the standard will be applied from that point.

Secondly, performance obligations, which are pledges to transfer a good or service that can be separately changed or determined, should be determined. In light of what is stated in the standard, the entity must evaluate the goods or services pledged to a customer at the beginning of the contract and define them as a performance obligation by a seller. Therefore, understanding the company's policies and practices is essential for accurately determining pledges.

Based on the above, every standalone good or service in the contract is a performance. On the contrary, every non-standalone good or service can be considered as an item in a series of non-standalone goods and services, and therefore, a series of goods and services containing non-standalone items as a single or sole performance obligation. There are also some cases where the company supplies standalone goods or services sequentially over time in similar stages, such as daily cleaning services, where it is considered a single performance obligation if it has the same customer supply patterns. For a particular good or service to be described as standalone, two conditions must be met: the good or service must be standalone, and the item of the good or service must be standalone in the context of the contract.

From the above, it is clear that the pledge can be considered a performance obligation if it is a standalone good or service or a separate series of goods and services since the series is a group of goods and services items that may be standalone or not.

Thirdly, the transaction price should be determined, which means the total price agreed upon in the contract, which the seller will receive from the customer (the buyer) in accomplishing the performance obligation.

When determining the transaction price, the amounts collected on behalf of third parties, such as value-added tax, shall be deducted from it. On the other hand, the transaction price may be direct, as if the contract contains a value in exchange for improving goods and services that will be supplied in a relatively short time. The transaction price may be complicated in cases where the consideration is variable, the consideration is not monetary, there is a critical financing component, or consideration is owed to the customer.

Fourthly, transaction prices should be allocated on performance obligations, as the seller sets the transaction price for the entire contract and then allocates the transaction price among the various performance obligations that have been identified. According to the standard, the applicable rule is that "the company shall allocate a transaction price to each performance obligation based on the proportionality between the selling prices of goods and services denominated by the stand-alone selling price."

Finally, revenue should be recognized. The seller assesses when each performance obligation is met, revenue is recognized at the point at which the customer obtains control of the good or service, such as the customer's agreement to receive the asset, the transfer of physical or legal ownership of the entity's asset to the customer, the entity's right to pay for the assets, risks ,and rewards related to the ownership of assets obtained by the client.

IFRS 15 identified two basic methods of recognition. The first is the recognition of revenue at a single point in time, which means that the performance obligation is fulfilled at a specific point in time, such as the delivery of the goods in light of the following determinants: the transfer of ownership of the asset with legal proofs, the creation of an obligation to pay to the seller, the acquisition of an asset, the transfer of ownership risks and benefits to the customer, the acceptance of the asset. The second is the recognition of revenue over a period of time, which means that the fulfillment of the performance obligation takes place over a period of time, that is, the delivery of the goods or the performance of the service is carried out in stages to fulfill the performance obligation, such as cases of providing some services such as auditing, consulting services, or long-term construction contracts under some conditions, such as: when the customer consumes the benefits whenever the work is executed or completed, when a cleaning company provides cleaning services through an annual contract, when the customer controls the asset whenever any stage of it is implemented or manufactured, when the contractor builds a building on a land belonging to the customer, when the seller (the supplier / contractor) manufactures or assembles an asset that has no alternative use

than selling to a specific customer, and therefore the seller has the right to receive payments for the work performed, and when the manufacturer designs a particular machine to manufacture a specific product with characteristics specific to the customer.

By reviewing the steps of IFRS 15, revenue will be recognized as a reflection of the transfer of goods and services to customers in an amount that reflects the revenue the company expects to receive as consideration for these goods and services. Revenue is recognized when the customer is obligated to pay the obligation according to the following steps, which are determining the performance obligations in the contract, determining the transaction price, allocating the transaction price to perform the obligations contained in the contract, and recognizing revenue when the customer is obligated to pay the obligation.

As for the presentation and disclosure in the financial statements in accordance with IFRS 15, contracts with customers are presented in the statement of financial position within the assets (contract asset) or liabilities (contract liability), depending on the relationship between the performance of the entity and the customer's payments. The entity also presents any unpledged rights of consideration independently as receivables. It emphasizes the accounting for contract assets and receivables in accordance with IFRS 9 (Financial Instruments) through the entity's estimating of the contract asset and reducing its value by this standard. Any reduction in the value of the contract asset must be measured, presented, and disclosed by this standard. Any difference between the initial recognition of receivables and the corresponding amount of revenue recognized must be presented as an expense, such as the impairment loss. Suppose the customer pays the consideration before the entity transfers the goods or service to the customer. In that case, the entity displays the contract in the statement of financial position among its liabilities under the name of the contract liability.

IFRS 15 requires that an entity disclose sufficient information to enable users of financial statements to understand better the nature, amounts, timing, and uncertainty of revenue and cash flows arising from customer contracts. To achieve this objective, the entity shall disclose qualitative and quantitative information about revenue recognized from contracts with customers, which is disclosed independently of other sources of revenue. The entity should also disclose recognized impairment losses of any of the receivables under IFRS 9 of contract assets resulting from the entity's contracts with customers, which the entity discloses independently of the reduction losses from other contracts. The entity must also disclose the opening and closing balances of receivables, contract assets, contract obligations from contracts with customers, revenues recognized in the reporting period included in the contract liability balance at the beginning of the period, and known revenues in the reporting period from performance obligations fulfilled in previous periods as changes in the transaction price.

Under the application of IFRS 15, an entity must classify the revenue recognized from contracts from customers into categories that describe how the nature, quantity, timing, and uncertainty of revenue and cash flows are affected by economic factors. The entity must also disclose the disclosures presented outside the financial statements and annual report of the entity about the gains and present the information that the primary operating decision maker regularly reviews to assess the financial performance of the operating sectors and disclose any other similar information with the knowledge of the entity or the users of the financial statements to assess the financial performance or take resource allocation decisions. Furthermore, suppose the entity applies IFRS 9 (operating segments). In that case, the entity shall disclose information sufficient to enable users of financial statements to understand the relationship between the revenue classification and the revenue information disclosed for each segment in the report.

In accordance with IFRS 15, an entity must disclose when performance obligations will be fulfilled. For performance obligations that the entity meets during a specific period, the entity must disclose the methods used to recognize revenue and whether these methods provide a complete description of the transfer of goods and services. While for performance obligations that are satisfied at a point in time, the entity must disclose significant judgments employed in the evaluation when the customer obtains control of the pledged goods or services. The closing balances of the recognized assets, the costs incurred to obtain or fulfill the contract with the customer according to the asset's main class, the depreciation amount, and the impairment loss recognized in the reporting period must also be disclosed. If the entity chooses to use a practical means about a significant financing location or the additional costs of obtaining the contract, the entity must disclose this.

THEORETICAL FRAMEWORK

Agency theory explains the relationship between the behavior of the senior management of companies and stakeholders in light of the separation of corporate ownership from its management. In the ideal world, the objective of the agent (such as senior management) should make decisions that can maximize the function of the benefits of the principal (such as the owners) or other stakeholders (Jensen & Meckling, 1976). However, in practice, the self-benefit conflict arises between the senior management of the company and the stakeholders, leading to information asymmetry between the senior management of the company and the stakeholders. In light of this phenomenon, the company's senior management may adopt an opportunistic behavior when making its decisions related to the financial reporting process to maximize its self-benefit or a non-opportunistic behavior to maximize the value of the company and then maximize the self-benefit of the stakeholders (Dahlén & Lindberg, 2017).

In this context, the term economic consequences was used by Zeff (1978) to reflect the effects of the information disclosed in the financial statements on the market value of companies and the wealth of stakeholders. Zeff (1978) emphasized that one of the causes of the economic consequences of the information disclosed in the financial statements is that accounting standards are more neutral than necessary. Therefore, the commitment to objectivity when making decisions related to the financial reporting process is a complex process in many accounting areas, which include revenue recognition. In light of the adoption of the application of the IFRS, the process becomes more complex as these standards are based on principles, and therefore personal judgments and estimates have a significant role in making decisions related to efficiency and effectiveness to achieve the purpose of their issuance (Dahlén & Lindberg, 2017; Farichah, 2017; Kulikova et al., 2014; Rutledge et al., 2016). In this context, the flexibility included in IFRS may lead the senior management of companies to practice a degree of opportunistic behavior when making decisions related to the financial reporting process to maximize their benefits, which leads to an increase in the phenomenon of information asymmetry between the company's senior management and stakeholders and the agency costs, which are reflected in its adverse effects on the participants of the financial markets and the efficiency of those markets.

At the same time, the flexibility included in IFRS may lead the senior management to adopt rational behavior when making decisions related to the financial reporting process to maximize the company's value. In this regard, agency theory can be relied upon to analyze and predict the potential economic consequences of implementing IFRS 15.

Reporting revenue in the financial statements requires the senior management of companies to make three fundamental decisions: when to recognize revenue, how to measure its value, and finally, determining the nature and quality of revenue information that must be disclosed in the financial statements. In this regard, IFRS 15 includes a framework of five consecutive steps to guide corporate management on how to formulate and make decisions to measure the value of revenue from contracts with customers and determine the timing of their recognition, regardless of the size of the company or the nature of the activity to which it belongs. However, the decision-making process associated with the application of any of the five steps, or the so-called environment of revenue reporting from contracts with customers, is characterized by two main characteristics, which are that the decision-making process associated with the application of any of the five steps of the framework takes place in the light of incomplete information or uninsured conditions, in addition to the existence of many alternatives to make these decisions.

Therefore, applying the revenue recognition framework contained in IFRS 15 requires the company's senior management's dependence on its judgment to form and issue decisions related to the applying the five steps in this framework. For example, paragraph 22 of the standard requires that the company's senior management, upon the establishment of the contract with the customer, identify each pledge to transfer a good or service that can be self-distinguished or a series of goods or services that can be self-distinguished, are very similar and have the same transfer pattern to the customer that are contained in the contract as performance obligations.

It is worth noting that if the timing of the transfer of control over two or more goods (services) differs, the proper identification and separation of performance obligations, whether implicit or explicit, in the contract with a customer will represent the focus of management decisions related to the measurement and recognition of revenue from contract on a reasonable time. Where the failure to identify and

account for the various performance obligations included in a contract leads to the recognition of revenue from the contract at an incorrect timing, the financial statements lose the appropriate timing characteristics. Explicit performance obligations reflect explicit contract pledges that include the company's transfer of goods or services to the customer. In contrast, implicit performance obligations reflect contract pledges that are implicitly understood through the company's usual business practices. Therefore, it may be easy to separate contract obligations with customers in some industries (such as retail trade), while identifying distinct goods and services in other industrial sectors (such as telecommunications, information technology and real estate development) requires senior management to exercise personal judgment based on facts and circumstances relevant to the contract and the industry to which it belongs.

HYPOTHESIS DEVELOPMENT

In terms of improving the quality of financial reports, it is argued that the application of IFRS 15 would enhance the comparability and transparency of accounting information, as well as provide decision-makers with high-quality information, as the measurement and recognition of the assets and liabilities of contracts following IFRS 15 is characterized as more relevant and reliable, where the contract asset is recognized when the entity's right in exchange for the transfer of goods and services is conditional on something other than the passage of a specified period, such as the future performance of the entity. Therefore, the application of IFRS 15 has a significant role in simplifying the preparation of financial statements by significantly reducing recognition and measurement errors, leading to better understandability.

Since IFRS 15 eliminates the inconsistency and drawback of revenue requirements in previous standards, this new standard establishes mechanisms for management to limit choices, which affects administrative decision-making; hence, it would enhance the comparability of revenue recognition practices as the principles of revenue recognition are applied consistently across transactions, industries, and capital markets.

Based on the above arguments, it can be claimed that applying IFRS 15 can reduce earnings management (EM) practices. There is an association between the quality of financial reporting and EM since such procedures are undesirable for management to influence earning figures by employing accounting policies and methods. Minimizing the levels of EM will enhance the quality of financial reporting (Wartin & Ullman, 2012). IFRS 15 unifies comparability bases and measurement methods to eliminate information asymmetry and enhance the quality of earnings by providing reliable information to financial statement users in making their different decisions. The uncertainty of the future cash flow will be reduced as the quality of earnings is enhanced, distortions of earnings are eliminated, and current earnings are not deferred in favor of future earnings.

Since the essence of IFRS 15 is to improve the quality of accounting information by improving its characteristics such as relevance, reliability, comparability, and understandability, it is expected that the application of this standard will lead to providing more useful information to users of financial statements by improving disclosure requirements, which contributes to a better understanding of amounts, timing, and uncertainty of revenue and future cash flows compared to previous revenue standards and thus improving the quality of financial reporting. IFRS can enhance the quality of financial reporting through principles of reporting about the nature, amount, and timing of revenue and cash flow resulting from customer contracts.

On the other hand, senior management relies to a great extent on personal judgment to make decisions related to the application of the five steps of the revenue recognition framework contained in IFRS 15 in general and the second, third, and fourth steps in particular, in addition to the presence of some accounting options when applying these steps. This may lead the company's management to practice opportunistic behavior when creating and issuing estimates to maximize its benefits by recording fictitious revenues or recognizing revenues without charging them until the end of the financial period and other methods of manipulating the revenue component of the financial statements, which is reflected in its adverse effects on the quality of corporate earnings (Haggenműller, 2019).

In this regard, a group of accounting studies dealt with the investigation and analysis of the extent to which the preparers and auditors of the financial statements are aware of the requirements of the application of IFRS 15, as well as the possible economic effects of applying this model on the quality of the information disclosed in the financial statements. For example,

Fangshu (2015) illustrated that the application of IFRS 15 will increase in personal judgment of management in making decisions related to revenue recognition, and it will lead to a change in the timing and form of revenue recognition in several economic sectors.

Khamis (2016) aimed to test the perception of Egyptian preparers and auditors on the application of IFRS 15, where the focus is on the level of understanding and clarity of revenue measurement and ease of application across different sectors in Egypt. He relied on the distribution of a questionnaire to workers in the field of accounting. He concluded that accountants and auditors must be ready to apply the standard. They need to gain sufficient knowledge about IFRS 15. They are afraid of the new revenue recognition conditions that give freedom of action and professional judgments in revenue recognition and the possibility of its impact on different industries.

Knorovà (2016) found that applying IFRS 15 will improve the revenue information disclosed in the financial statements compared to the information disclosed following IAS 18. Many studies (e.g., PWC, 2016; Tysiac, 2017) also confirmed that the impact of implementing IFRS 15 will not be material to the comprehensive income statement information, but it is expected that the disclosures will be more comprehensive in the financial statements.

Trabelsi (2018) also provided empirical evidence that the early application of IFRS 15 has fundamental effects on the accounting figures published in the financial statements of real estate development companies, as the early application of the standard led to positive and significant effects on the financial indicators represented in both the value of annual earnings and ownership equity of real estate development companies. Okhramovich and Tokareva (2018) also highlighted that the application of IFRS 15 will positively affect the value of the reported revenues and the financial performance indicators of companies.

Hameed et al. (2019) examined the impact of adopting IFRS 15 on the quality of earnings in Iraq. They relied upon a questionnaire sent to a group of researchers and professionals who teach the application of international financial reporting standards. They discovered that the impact of IFRS 15 has no meaningful impact on the quality of earnings. Furthermore, Marco et al. (2019) examine whether the impact of IFRS 15 on EM behaviors differs among industries. They depend upon a sample of telecommunications and utilities Italian listed companies from 2001 to 2017. They found that telecommunication companies, which are greatly influenced by the application of IFRS 15, commonly engage in EM practices.

Al-Tahat et al. (2021) showed how IFRS15 has an intellectual impact on EM in Jordanian public shareholding firms by distributing questionnaires to audit offices. They discovered that IFRS 15 has an intellectual effect on EM. In addition, Morawska (2021) examined whether the application of IFRS 15 in Poland impacted EM in a sample of 80 firms listed on the Warsaw Stock Exchange (WSE) from four sectors from 2016 to 2019. The revenue-based model of Caylor (2010) was used, and she disapproved that the introduction of IFRS 15 in Poland affected revenue-based EM.

Based on the preceding, it can be said that there is almost agreement between researchers and professionals that the application of IFRS 15 would have a positive impact on improving disclosure requirements, and this contributes to a better understanding of the value and timing of revenue and its cash flows, compared to previous accounting standards for revenue recognition, in addition to enhancing the quality characteristics of accounting information, which leads to improving the efficiency and effectiveness of investment and financing decision-making in the financial markets. There is also a claim that applying IFRS 15 will increase senior management's judgment in recognizing revenue from contracts with customers in several economic sectors. Thus the central issue of the application of IFRS 15 is whether senior management will follow an opportunistic manner when making decisions related to executing the five steps of revenue recognition, which might result in increasing discretionary accruals and hence reducing the quality of accounting earnings or it will follow rational manner when making such decisions, which might result in an increase in the quality of accounting accruals and hence enhancing the quality of accounting earnings disclosed in the financial statements.

It is worth noting that most of the previous studies that investigated the impact of the application of IFRS 15 on the nature and quality of the revenue information disclosed in the financial statements are exploratory or proactive studies for the date of application of the standard, which is 1/1/2018. They depend upon questionnaires as a research tool to provide descriptive field evidence from the financial

statements' viewpoint of the preparers and auditors. In light of the researcher's knowledge, there is also a scarcity of previous studies that provided quantitative evidence for the impact of applying the standard on the quality of accounting earnings disclosed in the financial statements prepared starting from December 31, 2018. Therefore, the research question of this paper is investigating whether the application of IFRS 15 enhances the quality of accounting earnings.

Given the mixed results of previous studies about the impact of IFRS 15 on the quality of earnings and the need for such studies in emerging countries, this paper examines the Cambodian scenario. The National Accounting Council (NAC) was founded in 2002 under the Ministry of Economy and Finance of the Royal Government of Cambodia to create and control accounting and auditing standards in Cambodia in preparation for applying IFRS. All IFRSs, including IASs, and all interpretations provided by the International Financial Reporting Interpretation Committee (IFRIC) were fully adopted by the Cambodian Accounting Standards Board of the NAC in 2012 without any changes. As a result, the standards were changed to Cambodian International Financial Reporting Standards (CIFRS). These standards were authorized for use in the Ministry of Economy and Finance jurisdiction by proclamations (Prakas No. 068 MEF/BK and No. 097/09 MF-NAC). The date for adopting IFRS in Cambodia was established for periods starting on or after January 1, 2012.

In line with the issuance of IFRS 15, CIFRS 15 Revenue from Contracts with Customers replaces CIAS 11 Construction Contracts and CIAS 18 Revenue for annual periods beginning on or after January 1, 2018. The quality of earnings of Cambodian listed companies is expected to be influenced by the application of CIFRS 15. Based on the above discussion, the following two contradictory hypotheses are formulated:

H_{1a}: The application of CIFRS 15 positively influences the quality of earnings of Cambodian listed companies.

H_{1b}: The application of CIFRS 15 negatively influences the quality of earnings of Cambodian listed companies.

RESEARCH METHODOLOGY

The sample

This study's sample includes Cambodian non-financial companies listed on the Cambodian Securities Exchange (CSX). Financial firms are excluded in line with previous research due to the unique nature of their reporting policies. They are exposed to various reporting regulations that make assessing discretionary accruals difficult (Hong & Anderson, 2011; Kim et al., 2012). There are eight non-financial companies listed on CSX. However, only three companies have complete data. Therefore, the final sample includes only 24 firm-year observations after excluding firms with incomplete data.

Variable measurement

There are one independent variable, one dependent variable, and four control variables. This section discusses the way of measuring these variables. The independent variable in this research is the application of IFRS 15. A dummy variable is employed to measure the effect of the application of this standard, where "1" is used for the data of the period after the adoption of this standard from 2018 to 2021 and "0" otherwise.

The dependent variable in this study is EM, which is defined by Healy and Wahlen (1999, p.368) as "*Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company, or to influence contractual outcomes that depend on reported accounting numbers*." Despite several methodologies used in the literature to estimate AEM, the absolute value discretionary accruals, estimated using the modified Jones model, are used as a proxy for AEM (Dechow et al., 1995; Kothari et al., 2005). Instead of using the firm-specific time-series technique, the cross-sectional approach to the modified Jones model is used. The cross-sectional technique, as stated by Bartov et al. (2000), performs better in detecting earnings manipulations. The current discretionary accruals are used instead of the total discretionary accruals, consistent with Teoh et al. (1998).

To calculate the current discretionary accruals, we need first to compute the total current accruals ($TCA_{i,t}$) for company I at year t as follows:

$$TCA_{i,t} = (\Delta CA_{i,t} - \Delta Cash_{i,t}) - (\Delta CL_{i,t} - \Delta STDebt_{i,t}) \quad (1)$$

Where $\Delta TCA_{i,t}$ represents the change in current assets, $\Delta Cash_{i,t}$ represents the change in cash, and the cash equivalent, $\Delta CL_{i,t}$ represents the change in current liabilities, and $\Delta STDebt_{i,t}$) represents the change in short-term debt.

Second, for all sample firms in each industry for whom at least ten observations are available in year t, the following regression is done using ordinary least squares:

$$\frac{TCA_{i,t}}{TA_{i,t-1}} = \alpha_0 \left(\frac{1}{TA_{i,t-1}}\right) + \alpha_1 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{TA_{i,t-1}}\right) + \varepsilon_{i,t} \quad (2)$$

Where $TCA_{i,t}$ represents the total current accruals for firm i at year t-1, ΔREV_{it} represents the change in net revenues in year t from year t-1, ΔREC_{it} represents the change in net receivables in year t from year t-1. To account for heteroscedasticity, each variable is flattened by the deferred value of the firm i's total assets (TA_{i-1}).

Third, each firm's non-discretionary (NDACi,t) component of total current accruals is computed as follows, using industry- and year-specific estimations of α0 , α1, and α2 as follows:

$$NDAC_{i,t} = \hat{\alpha_0}\left(\frac{1}{TA_{i,t-1}}\right) + \hat{\alpha_1}\left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{TA_{i,t-1}}\right) \quad (3)$$

Fourth, for each company i and year t, the current discretionary accruals ($DAC_{i,t}$) component is calculated by deducting the non-discretionary part ($NDAC_{i,t}$) from the total current accruals ($TCA_{i,t}$):

$$DAC_{i,t} = \frac{TCA_{i,t}}{TA_{i,t-1}} - NDAC_{i,t} \quad (4)$$

As a proxy for earnings quality, the absolute value of current discretionary accruals is employed:

$$ABDA_{it} = \left|\frac{TCA_{i,t}}{TA_{i,t-1}} - NDAC_{i,t}\right| \quad (5)$$

In principle, the greater the absolute value of discretionary accruals, the greater the extent of AEM, and, thus, the poorer the quality of earnings.

Besides depending upon the absolute value of discretionary accruals, earnings aggressiveness (EA) is also used as another measure of the quality of earnings. EA is one of the ambiguous earning behaviors (Bhattacharya et al., 2003). These management practices delay loss recognition and accelerate income, affecting earnings quality (Altamuro et al., 2005). It relates to managerial decisions involving earnings manipulation (Bedard & Johnstone, 2004). To calculate EA, total accruals for the current period must be included as the numerator, and total assets from the prior period ($TA_{i,t-1}$) must be included as the denominator as follows:

$$EA = \frac{\text{Total accruals}_t}{TA_{t-1}} = \frac{\Delta CAi,t - \Delta CLi,t - \Delta CASHi,t - \Delta LTDi,t - DEPAMi,t + \Delta TPi,t}{TA_{i,t-1}}$$

Where ($\Delta CA_{i,t}$) is the change in the current assets, ($\Delta CL_{i,t}$) is the change in current liabilities, ($\Delta Cash_{i,t}$) is the change in cash, ($\Delta LTD_{i,t}$) is the change in the long-term liabilities, (DEPAM) is depreciation and amortization, and (ΔTP) is the change in tax payable.

About control variables, this paper encompassed firm characteristics that have been recognized in the literature as being linked to the AEM to avoid the problem of correlated missing variables. The firm size (SIZE) is used to represent political costs. Past research has found a link between (SIZE) and AEM. However, the association has not been apparent, as prior studies have shown mixed results (Pincus & Rajgopal, 2002; Roychowdhury, 2006). As a result, the data is used to determine the eventual link between SIZE and AEM.

Dechow et al. (1995) clarified that AEM relates to performance. Hence, firm performance is another control variable used in this study. Return on equity (ROE) is used as a representation for this variable. Leverage (LEV) is also introduced to control debt contracting incentives for AEM. When a company is on the verge of breaching a debt lease, it has a greater motivation to use AEM (Klein, 2002).

Furthermore, previous research has shown that organizations with better growth probabilities have greater incentives to control their earnings to meet their earnings targets (Skinner & Sloan, 2002). As a result, the influence of firm growth is included in the model. Sales Growth (GROWTH) was used as a proxy for business growth. The method of measuring all variables used in this paper is shown in Table 1 below.

Table 1: Research variables measurement

Variable	Measure
Dependent variable	
ABDA	The absolute value of discretionary accruals (calculated through the modified Jones cross-sectional model adjusted for performance)
EA	Earnings aggressiveness
Independent variable	
IFRS15	A dummy variable, where 1 is denoted for the data of the period after the adoption of IFRS 15 and 0 otherwise
Control variable	
Size	The natural logarithm of total assets
ROE	Net earnings before tax / total equity
Leverage	Total liabilities / total equity
Grow	Changes in sales

Empirical model

The following regression equations are tested to assess the two competing hypotheses:

$$ABDA_{i,t} = \alpha_0 + \alpha_1 IFRS15_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 ROE_{i,t} + \alpha_4 LEV_{i,t} + \alpha_5 GROW_{i,t} + \varepsilon_t$$

$$EA_{i,t} = \alpha_0 + \alpha_1 IFRS15_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 ROE_{i,t} + \alpha_4 LEV_{i,t} + \alpha_5 GROW_{i,t} + \varepsilon_t$$

Where:

$ABDA_{i,t}$ = The absolute value of discretionary accruals (calculated through the modified Jones cross-sectional model adjusted for performance);

$EA_{i,t}$ = Earnings aggressiveness;

$IFRS15_{i,t}$ = A dummy variable, where "1" denotes the data of the period after the adoption of IFRS 15, and "0" denotes otherwise;

$SIZE_{i,t}$ = The natural logarithm of total assets;

$ROE_{i,t}$ = Net earnings before tax scaled by the total equity;

$LEV_{i,t}$ = Total liabilities divided by total assets; and

$GROW_{i,t}$ = The change in sales.

RESULTS

Descriptive of Statistics

The comparative descriptive statistics of the research variables between the periods before and after the adoption of IFRS 15 are shown in Table 2. The average scores of both ABDA and EA are more prominent in the second study period than those scored in the period before the application of the new standard. ABDA is increased from 0.069 to 0.303, while EA is raised from -0.056 to 0.041, indicating that the AEM and EA engagement level increases after adopting IFRS 15.

In terms of control variables, it is observed that there is a rise in the size, leverage, and growth of sample companies in the period after the application of IFRS 15 as the average scores of those variables have increased in the second period than the first period. On the contrary, the financial performance of the sample companies has slightly weakened after applying this new standard, as the average score of ROE decreased from 0.086 to 0.075.

Table 2: Comparative descriptive statistics

	N	Mean	SD	MIN	MAX
Before the application of IFRS 15					
ABDA	12	0.0691	0.0669	0.0024	0.2002
EA	12	-0.0557	0.0546	-0.1566	0.0227
SIZE	12	19.9009	0.8010	19.0951	21.0322
ROE	12	0.0863	0.0858	0.0104	0.3188
LEV	12	0.4953	0.2971	0.1022	1.1132
GROW	12	0.0254	0.2513	-0.4242	0.4413
After the application of IFRS 15					
ABDA	12	0.3026	0.2308	0.0543	0.7761
EA	12	0.0407	0.1160	-0.0958	0.3101
SIZE	12	20.2590	0.7770	19.6726	21.5591
ROE	12	0.0749	0.0808	-0.0018	0.2823
LEV	12	0.5654	0.2722	0.2139	0.9773
GROW	12	0.2914	0.5534	-0.5562	1.5588

The correlation matrix

Table 3 employs pairwise correlation to realize the trend of connection between research variables and attest to the possibility of multicollinearity. If the coefficient value is more than 0.80, this problem can be shown in such an analysis (Gujarati, 2003). All the coefficient values are less than 0.80, with the most significant coefficient being 0.682, which lies between the ROE and the LEV. As a result, multicollinearity does not appear to be a concern in the investigation.

IFRS15 is robustly and positively associated with both ABDA and EA, implying that adopting this new standard negatively affects the quality of earnings of Cambodian listed companies. Furthermore, there is a significant and negative correlation between SIZE and both ABDA and EA, illustrating that firms with bigger sizes are more likely to present earnings of higher quality. Meanwhile, LEV is shown to be firmly and negatively connected with ABDA, indicating that

highly leveraged companies are less likely to engage in AEM.

Table 3: Correlation matrix

	ABDA	EA	IFRS15	SIZE	ROE	LEV	GROW
ABDA	1						
EA	0.7342***	1					
	0.000						
IFRS15	0.5831***	0.4855**	1				
	0.003	0.016					
SIZE	-0.3457*	-0.3713*	0.2306	1			
	0.098	0.074	0.278				
ROE	-0.3378	-0.1145	-0.0713	-0.0009	1		
	0.107	0.594	0.741	0.997			
LEV	-0.4442**	-0.1413	0.1275	0.379*	0.6824***	1	
	0.030	0.510	0.553	0.068	0.000		
GROW	0.2528	0.2751	0.3076	0.0134	0.4489**	0.1405	1
	0.233	0.193	0.144	0.951	0.028	0.513	

*, **, *** indicate the significance at the 0.10, 0.05, and 0.01 levels, respectively.

A paired sample t-test

A paired sample t-test is used to determine whether there is a statistically significant difference between the mean scores of both ABDA and EA from 2014 to 2017 and 2018 to 2021. Compared to the time before the introduction of IFRS 15, Table 4 demonstrates that the increase in ABDA and E.A. following the application of IFRS 15 is statistically significant at the 1 percent level.

The non-parametric Wilcoxon signed rank test supports these results. Consistent with H1b, the findings show that listed companies in Cambodia have increased their involvement in AEM and E.A. after adopting IFRS 15.

Table 4: Paired sample T-Test and non-parametric Wilcoxon Signed Rank test of ABDA and EA

	ABDA	EA
Paired sample T-Test		
Mean difference	-0.2335029	-0.0963871
SD	0.2187369	0.0982392
Lower	-0.3724817	-0.1588052
Upper	-0.0945242	-0.0339689
t-statistic	-3.6979	-3.3988
Df	11	11
Significance	0.0035	0.0059
Non-parametric Wilcoxon Signed Rank test		
Z	-3.118	-2.309
Significance	0.0018	0.0209

Multivariate regression results

The regression findings of IFRS 15 on ABDA are shown in Table 5. As shown in this table, three models of regression are run. The first model is OLS regression shows the effect of IFRS 15 and control variables on ABDA; robust regression is run in the second model, while the random effect is employed to run this regression in the last model. It can be observed that the results are the same across the three regression models. The R-squared value is 0.7923, indicating that the variables involved in these models can explain 79 percent of the ABDA. Furthermore, the CSR coefficient is found to be positive (0.3103969) and significant across the three models. This finding is consistent with H1b, demonstrating that the application of IFRS 15 has increased the level of AEM among Cambodian-listed companies.

Concerning control variables, only SIZE has a significant and negative connection with ABDA, illustrating that companies with smaller sizes are more likely to engage in AEM practices.

Table 5: The relationship between IFRS 15 and ABDA

Absolute value of discretionary accruals (ABDA)			
	Model 1	Model 2	Model 3
	Pooled OLS	Robust	Random Effect
	Coef.	Coef.	Coef.
	(t-stat)	(t-stat)	(z-stat)
IFRS15	0.3103969**	0.3103969*	0.3103969**
	0.032	0.079	0.015
SIZE	-0.0976199**	-0.0976199**	-0.0976199**
	0.034	0.028	0.017
ROE	-0.4261461	-0.4261461	-0.4261461
	0.558	0.594	0.547
LEV	-0.2326494	-0.2326494	-0.2326494
	0.222	0.314	0.198
GROW	0.0748624	0.0748624	0.0748624
	0.432	0.489	0.416
Year effects	Yes	Yes	Yes
Cons	2.197296	2.197296	2.197296
	0.017	0.016	0.006
N	24	24	24
F/Wald Chi2	4.16	9.06	45.78
Prob > F	0.011	0.000	0.000
R	0.7923	0.7923	0.7923

*, **, *** indicate the significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 6 shows the regression findings of IFRS 15 on EA. Like ABDA, three regression models are run to demonstrate the impact of IFRS 15 and control variables on EA. The variables in this model may explain 70 percent of the EA, according to the R-squared value of 0.6987. Furthermore, the IFRS15 coefficient is positive (0.2117354) and significant across the three models. This finding supports H1b, demonstrating that the level of earnings aggressiveness among Cambodian listed companies increased after adopting IFRS 15.

Concerning control variables, Only SIZE has a significant connection with EA. The assessed SIZE coefficient is negative and significant (-0.0669363, $p < 0.05$), suggesting that the level of EA is lower in Cambodian companies with bigger sizes.

Table 6: The relationship between IFRS 15 and EA

Table 6: The relationship between IFRS 15 and EA			
	Model 1	**Model 2**	**Model 3**
	Pooled OLS	**Robust**	**Random Effect**
	Coef.	**Coef.**	**Coef.**
	(t-stat)	**(t-stat)**	**(z-stat)**
IFRS15	0.2117354**	0.2117354**	0.2117354***
	0.017	0.054	0.005
SIZE	-0.0669363**	-0.0669363**	-0.0669363***
	0.018	0.018	0.006
ROE	-0.1156703	-0.1156703	-0.1156703
	0.789	0.8	0.784
LEV	-0.0006989	-0.0006989	-0.0006989
	0.995	0.996	0.995
GROW	0.0330714	0.0330714	0.0330714
	0.558	0.575	0.547
Year effects	Yes	Yes	Yes
Cons	1.280849	1.280849	1.280849
	0.02	0.021	0.007
N	24	24	24
F/Wald Chi2	2.53	4.64	27.83
Prob > F	0.063	0.007	0.003
R	0.6987	0.6987	0.6987

*, **, *** indicate the significance at the 0.10, 0.05, and 0.01 levels, respectively.

The application of IFRS 15 gives managers of Cambodian-listed companies the freedom to rely upon their judgment, and hence the level of AEM and EA engagement is increased. Descriptive statistics, pairwise correlation, paired sample t-test, and multivariate regression analyses confirm this result. Therefore, applying this new standard negatively affects the quality of earnings of Cambodian-listed companies.

CONCLUSION

The purpose of this study is to investigate the effect of the IFRS 15 entitled "Revenue from Contracts with Customer," which was issued by IASB and FASB in 2014 in replace of different American and international standards related to revenue recognition, on the quality of earnings of a sample of Cambodian-listed companies during the period from 2014 to 2021.

This paper depends upon the absolute value of discretionary accruals and earnings aggressiveness as proxies of the quality of earnings. The empirical results indicate the negative influence of adopting IFRS 15 on the quality of earnings of Cambodian-listed companies.

Focusing on companies of one country and a low sample size are considered the main drawbacks of this research. Future research can investigate this issue by considering extensive data from different countries.

Despite this, this research has some theoretical and practical contributions. It is one of the first studies that has examined the effect of adopting IFRS 15 on the quality of financial reports among Cambodian listed companies. Since IFRS 15 is new, and its application is required as of January 1, 2018, even though establishments are allowed to apply it before that date voluntarily, there are few studies on this topic from the perspective of scholars.

Based on the statistical analysis conducted by drawing on a sample of Cambodian-listed firms, this study provides empirical evidence of the impact of applying IFRS 15 on the quality of earnings. The study has demonstrated the effect of applying international accounting standards on the quality of financial statement figures.

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Journal of Accounting, Finance, Economics, and Social Sciences
Vol 7, No 2, July – December 2022, pp. 29-36
Received: June 2022 | Revised: Oct 2022 | Accepted: Dec 2022
DOI: https://doi.org/10.62458/jafess.160224.7(2)29-36

Cloud Adoption in Accounting Information Systems in Asia & SOC 2® Report – An Empirical Study on Industry's Perspective

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ABSTRACT

Many business and technology organizations see cloud adoption and migrating existing systems to the cloud as an accelerator of digital transformation. The benefits of cloud adoption are perceived as increased scalability and cost reduction. At the same time, there are concerns about whether the information on cloud-based systems is secure and whether the privacy of the data in a cloud environment is at risk. This research brings out the industry's perspective, both from an end-user perspective as well as IT transformation and IT procurement decision makers of accounting information systems and enterprise resource planning systems in Asia geography, on the preference for cloud-based or on-premise systems, top enablers for cloud adoption and importance of SOC 2® as an assurance for information security and data privacy concerns. The findings of this research indicate that decision-makers for IT transformation and IT procurement prefer cloud-based accounting information systems and enterprise resource planning systems over on-premise systems. Scalability, cost reduction, business agility, business continuity and disaster recovery, and enhanced collaboration are top enablers for cloud adoption. This research also indicates that the SOC 2® report is increasingly seen to address information security and data privacy concerns.

Keywords: SOC 2®; Trust services criteria; Information security; Data privacy; Cloud computing; Accounting Information Systems

INTRODUCTION

Migration to cloud-based systems and solutions has significantly increased in the last decade. Cloud adoption enables and accelerates organizations' journey of digital transformation. There are significant benefits of cloud adoption ranging from cost reduction to scalability. There are also concerns about data privacy and information security for the data and information stored on cloud-based systems. To accelerate the digital journey, organizations continue to adopt the cloud and, at the same time, address security, privacy, and other concerns through various assurance mechanisms. Some assurance mechanisms are based on seeking ISO 27001 certifications focusing on information security. SOC 2® provides more comprehensive assurance as it covers principles related to security, availability, processing integrity, confidentiality, and privacy embodied in the trust services criteria (AICPA, 2021; Borangiu et al., 2019; Vasiljeva et al., 2017; Ulas, 2019).

This research aims to gather the industry's perspective on their preference for cloud-based or on-premise applications, top enablers for cloud adoption, and usage of SOC 2® report as an assurance mechanism. Industry practitioners from user organizations were asked to respond to a survey questionnaire. Those practitioners covered those in the role of end users in the user organizations and those involved in making decisions related to cloud adoption.

LITERATURE REVIEW

Accounting Information Systems help organizations collect, store, and record data related to business transactions of the organizations and process it into meaningful information that aids both strategic and operational management teams. Accounting Information Systems provide insights into the effectiveness and efficiency of organizational business processes and make data-driven decisions. An Accounting Information System consists of Transaction Processing System supporting, a General Ledger System & Financial Reporting System, and the Management Reporting System. When integrated with other systems of organizations, accounting information systems provide a holistic view to enable effective decision-making (Belfo & Trigo, 2013; Bhatt, 2001; Salehi et al., 2010; Soudani, 2012).

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The Accounting Information System's design significantly impacts the ability of the Accounting Information System to support its ability in strategic decision-making. Research has investigated the relationship of management control systems' effectiveness to design considerations (Chenhall, 2003).

Past research also establishes that if the design of the Accounting Information System is not appropriate, it can significantly negatively impact the firm's performance, in addition to the money and time spent on the design and implementation of the Accounting Information System itself (Boulianne, 2007). Another research study conducted on Small and Medium Sized Enterprises indicates that when the processing capability and capacity of an Accounting Information System match its requirements, reflecting the quality and appropriateness of the design of the Accounting Information System, the firm reflected a higher level of performance as well as more effective utilization of information technology by its managers (Ismail & King, 2005). Studies have indicated that the technology systems (specifically, enterprise resource planning systems) are easy to implement and institutionalize with a focus on standardization and integration. In contrast, business needs are shifting more towards agility and flexibility. As an extension of such studies, it can be stated that systems that are easier to create flexibility in implementation despite standardization in design will enable more alignment between business and technology priorities (Mancini et al., 2013).

Technological advances have led to how organizations acquire and use accounting information systems. Recent advances in cloud computing and its widespread adoption have profoundly impacted Accounting Information Systems delivery models. Research indicates that with many such accounting information systems being offered as part of enterprise resource planning software in a SaaS (Software as a Service) model, multiple organizations can have their accounting information systems within the same cloud, enabling faster electronic data interchange. There is also an overall cost reduction and increased flexibility due to pay-per-use pricing models. Research also indicates that while most of the cloud service providers implement state-of-the-art security solutions, there are risks of data loss, privacy, availability, and loss of intellectual property that are still inherent and shall be mitigated (Asatiani & Penttinen, 2015; Brandas et al., 2015).

The Internet has been revolutionizing both the technology and business space in an unprecedented manner. Technological advances have made the impact of the Internet revolution more profound and accelerated. One of the leading enablers in this has been Cloud Computing. Cloud computing services are delivered through service models such as IaaS (Infrastructure as a Service), PaaS (Platform as a Service), and SaaS (Software as a Service). In an Infrastructure as a service model, the cloud provider provides the consumer organization's capability to process, store, network, and compute resources to the consumer organization. In the Platform as a service model, the cloud provider provides the cloud infrastructure (consisting of processing, storage, network, and compute resources) and the environment (consisting of programming languages and other related tools) over which consumer organizations can deploy the applications built by them or built for them by a third-party provider or providers. In the Software as a Service model, the cloud provider provides the running application to the consumer organization that they can use over the web (Puthal et al., 2015; Sunyaev, 2020).

The National Institute of Standards and Technology (NIST) classifies cloud deployment into private, public, community, and hybrid clouds. As the name suggests, a private cloud is exclusively used by the organization for which it is deployed. In the Public cloud, the cloud services are shared by a group of users. Community cloud is used to define scenarios where the cloud is shared by several organizations and/or groups that share a common mission or objective. A cloud deployment model that imbibes more than one of the above three deployment models is termed a hybrid cloud. Cloud adoption comes with its own set of benefits and risks. Benefits related to the lower overall cost of IT, lower initial investment in IT hardware and IT Infrastructure, scalability, and flexibility are expected when the cloud is adopted. The risks and issues related to cloud adoption revolve around data security, privacy, availability, and intellectual property exposure. While adopting the cloud, keeping information secure is of utmost importance. Security on the cloud consists of three significant dimensions of security: computer security, network security, and information security. Data security and privacy are the most prominent risk factors critical for cloud adoption decisions (Chou, 2015; Rao & Selvamani, 2015; Sun, 2018).

Exciting research on data breaches over 15 years, from 2000 to 2015, indicate that the risk of personal data breaches is taking alarming dimensions. This research indicates that such breaches can also lead to mass identity fraud. With an ever-increasing amount of data (and personal data) being used and stored by organizations, this risk is becoming predominant and concerning. The research proposes, amongst many aspects that need to be addressed, decentralization of IT systems in big organizations to stop/reduce the significant breach events and their cascading impact (Wheatley et al., 2016).

Another research on 9000 data breaches made public since 2005 shows that these data breaches led to the loss of 11.5 billion individual records. This study indicates that hacking breaches significantly impact the volume of stolen data among various kinds of breaches. The study also indicates that most such breaches are financially motivated and target, as a priority, the organizations that are least prepared to deal with such attacks. Another research study conducted over five years, from 2009 to 2014, indicated that external consequences of cybercrime are business disruption, equipment damage, information loss, and revenue loss. Another research evaluated the impact of 441 data breach announcements from 2005 to 2017. This research covered multiple industries, with the finance and insurance industry contributing 37.4 percent of total data breach announcements. Analysis done in this research demonstrated that the performance of the breached companies suffered in the quarter when such breaches were announced. Another research conducted through a laboratory experiment demonstrated that privacy is considered extremely important to build trust. Hence privacy violation leads to some erosion in the trust factor. However, security breaches have a direct impact on the actual behavior. Security breaches have a higher impact on actual decision-making. This research explains this finding to be in alignment with the "privacy paradox," which suggests that people do not act according to their privacy concerns. This research highlights the importance of investment in security in order to address the mitigate the security risks faced by organizations across the world (Hammouchi et al., 2019; Hemphill & Longstreet, 2016; Juma'h & Alnsour, 2020; Nofer et al., 2014).

Several research studies have analyzed the trust barriers to cloud adoption. One of the research projects on data privacy and trust in cloud computing identifies the predominant factors/risks that are inherent in and also drive the decision to adopt and migrate to the cloud. This research identifies privacy and security as essential challenges and barriers in cloud adoption for those considering and those already relying on the cloud. Another research on the barriers to cloud adoption indicated that perceived security is a significant factor driving cloud adoption. The research found it more of a cloud adoption driver than a barrier. Additionally, this research identified customer service and user-friendliness as barriers to cloud adoption. This research also indicates that information security is crucial when deciding on cloud adoption. Another study developed a model for cloud adoption and tested it on 149 Australian SMEs. The findings of this research indicated that SMEs were more focused on factors such as relative advantage, quality of service, and awareness, that help them gain advantages similar to the larger organizations. The risk factors related to security, privacy, and flexibility were less significant amongst the participating SMEs. The research also indicated that awareness of the technology landscape also impacts cloud adoption. One of the challenges with this research was that only 27.5 percent of the respondent organizations were using some cloud service. Another research was conducted to examine the factors affecting adopting cloud enterprise resource planning (ERP) in small and medium-sized developing countries. This research analyzed four contexts, namely diffusion of innovation context, technological context, organizational context, and environmental context. Technological context, in this research, consisted of technology readiness, security concerns, and technical barriers. The findings of this research indicated that technology readiness and technical barriers were significant factors, whereas security concerns were insignificant (AL-Shboul & Moh'd, 2018; Lynn et al., 2021; Senarathna et al., 2018; Townsend et al., 2020).

Despite all the challenges, cloud investment and adoption are growing. New vulnerabilities and threats to information assurance have also accompanied this growth. Cloud service providers have used various certifications and attestations to assure their clients utilizing third-party assessments and auditing their systems and internal controls. ISO 9001:2015 is one such leading certification focused on information security. SOC 2® - SOC for Service Organizations: Trust Services Criteria report, part of Systems and Organization Controls (SOC), is another such report. A type 1 report provides management's description

of a service organization's systems and the suitability of the design of controls. A type 2 report provides management's description of a service organization's systems and the suitability of design and operating effectiveness of controls. These are restricted-use reports (AICPA, 2021; Giulio et al., 2017).

CURRENT STATUS AND RESEARCH QUESTIONS

As evident from the above analysis, security and privacy are important considerations that some consider barriers to cloud adoption, while some research establishes them more as drivers for decisions regarding cloud adoption. Previous research does indicate that security and privacy have an impact on cloud adoption decisions. Despite all these concerns, there has been phenomenal growth in organizations leveraging the benefits of cloud adoption to reduce their overall technology cost and get the desired scalability to grow and diversify their businesses. To address these concerns, cloud service providers use certifications and attestation services to assure their client's security and privacy. One of the leading attestations, SOC 2®, is based on Trust Services Criteria. Trust Services criteria include security, processing integrity, availability, confidentiality, and privacy. There has not been any research that provides insights into the industry's perspective on what reports and certifications they consider to provide sufficient assurance to address their security and data privacy concerns, especially SOC 2®. Hence, in the context of accounting information systems and enterprise resource planning systems, this research aims to answer the following questions:

(1) Is there a preference (amongst Accounting Information Systems user organizations) for an on- premise accounting information system over a cloud-based accounting information system (or vice versa)?

(2) What would be (or are) the top enablers for their decisions to adopt a cloud-based accounting solution?

(3) Have Accounting Information Systems user organizations used (or will consider using) SOC 2® for their cloud adoption decision?

RESEARCH METHODOLOGY

The research involved a questionnaire-based survey (conducted online) of end users of accounting information systems and those involved in decisions related to acquiring accounting information systems/ enterprise resource planning systems and decisions related to transformation through cloud adoption. The industry coverage was Banking & Financial Services covering both banking and insurance, Retail, Pharmaceuticals, and Manufacturing organizations. The geographic scope of the survey (based on responses received) was mainly Asia, some from North America (US & Canada), and very few from Europe.

The survey questionnaire was designed to gather insights on the following dimensions:

- Preference amongst end-users/decision makers for on-premise information systems versus cloud-based information systems (Usage-based or Perception-based)
- Factors considered necessary (by the decision makers) in driving the decisions for cloud adoption
- Perception about security and privacy concerns in an on-premise system versus a cloud-based system
- What certification/report/evidence is sought as an assurance that information stored on the cloud will be secured and data privacy will be ensured
- Their experience with cloud service providers when they have adopted a cloud-based information system

Out of 300 persons reached out to, the total number of responses received was 207. The distribution of the respondents' geographic coverage, industry coverage, and roles category is shown in Tables 1, 2, and 3.

Table 1: Survey respondents – Geography

Geography	Count	% Distribution
Asia (including Australia)	165	80%
North America (US & Canada)	32	15%
Europe	10	5%
Total	**207**	**100%**

Table 2: Survey respondents – Industry

Industry	Count	% Distribution
Banking & Financial Services	29	14%
Retail	94	45%
Pharmaceuticals	37	18%
Manufacturing	47	23%
Total	**207**	**100%**

Table 3: Survey respondents – Role

Role	Count	% Distribution
End-user	140	68%
Decision Maker - Transformation/ Procurement	67	32%
Total	**207**	**100%**

RESULTS ANALYSIS

Preference analysis - On-premise versus Cloud-based Information Systems

From the survey responses, it is evident that from an end-user perspective, most of them are indifferent to whether the information systems are on-premise or cloud-based. From the remaining, the majority preferred on-premise compared to cloud-based information systems. This is summarized and reflected in Table 4.

Table 4: On-Premise versus Cloud-based – Preference analysis for end-users

On-Premise v/s Cloud-Based	Count	Percentage
Does not Matter	80	57%
On-premise	43	31%
Cloud-based	17	12%
Total	**140**	**100%**

Further, it is evident from the survey responses that from decision makers (both those involved with transformation responsibility and those entrusted with procurement decisions), most prefer cloud-based information systems, followed by on-premise options. Only a minor percentage (21 percent) of them are indifferent to whether it's on-premise or cloud-based information systems are on-premise or cloud-based. This is summarized and reflected in Table 5.

Table 5: On-premise versus Cloud-based – Preference analysis for decision makers (Transformation/ procurement)

On-Premise v/s Cloud-Based	Count	Percentage
Does not Matter	14	21%
On-premise	16	24%
Cloud-based	37	55%
Total	**67**	**100%**

Top enablers for decisions on cloud-based accounting solution adoption

Based on survey responses, the top enablers for deciding whether to migrate to a cloud-based accounting solution were scalability, cost reduction, business agility, business continuity and disaster recovery, and enhanced collaboration. The response analysis is summarized in Table 6.

Table 6: Enablers for Cloud-based accounting solution adoption

Top Reasons	Percentage
Scalability	88%
Cost Reduction	81%
Business Agility	79%
Business Continuity & Disaster Recovery	70%
Enhanced Collaboration	67%
Other factors	59%

Usage of SOC 2® reports for cloud-based accounting solution adoption decisions

Based on survey responses of decision-makers involved in transformation and/or procurement decisions, 76 percent have used or considered using the SOC 2® report. An almost similar number of respondents (75 percent) mentioned that they are also using other certifications for getting assurance regarding their security and privacy concerns. The response analysis is summarized in Table 7.

Table 7: Summary of usage of SOC 2® report

Usage of SOC 2® reports	Count	Percentage
Used SOC 2® report	28	42%
Considering using SOC 2® report	23	34%
Used Other Certifications (with or without SOC 2® report)	50	75%
Not used SOC 2® report or any other certification	16	24%

CONCLUSION AND FUTURE WORK

Research findings indicate that since 80 percent of respondents were from Asia geography, many end-users (57 percent) are still determining whether their accounting information systems and/or enterprise resource planning systems are on-premise or cloud-based. Thirty-one percent of the respondents had a preference for cloud-based systems.

From the perspective of decision-makers – both those involved in transformation and those entrusted with responsibilities of IT procurement, there was a clear preference for cloud-based systems, with 55 percent responding in favor of cloud-based systems.

Regarding top enablers for deciding migration to cloud-based accounting information systems or enterprise resource planning systems, scalability, cost reduction, business agility, business continuity & disaster recovery were identified as top reasons and enablers.

Regarding information security and data privacy, most respondents (76 percent) mentioned using or considering the SOC 2® report. A similar number of respondents (75%) said they are also using other certifications.

The findings of the report indicate that adopting cloud-based solutions has gained significant preference among IT-related decision-makers in organizations. The benefits of scalability, cost reduction, business agility, business continuity, and disaster recovery are seen as very important and relevant. Information Security and data privacy did not come out as barriers to cloud adoption. However, assurance for information security and data privacy is being addressed by using reports such as SOC 2® report and other certifications. Further, SOC 2® is seen as becoming the leading mechanism to address information security and data privacy concerns.

One of the limitations of this research is that the majority of respondents are from Asia geography. Hence the results of this report reflect the Asian perspective only. Researchers shall conduct studies focusing on other geographies for a more global perspective. Another essential aspect that can be addressed in future research is to gain insights and understand the industry's perspective on the relative importance of each of the principle of trust services criteria: security, availability, processing integrity, confidentiality, and privacy.

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Journal of Accounting, Finance, Economics, and Social Sciences
Vol 7, No 2, July – December 2022, pp. 37-45
Received: Oct 2022 | Revised: Nov 2022 | Accepted: Dec 2022
DOI: https://doi.org/10.62458/jafess.160224.7(2)37-45

The Past, Present, and Future of Management Consulting: Findings from A Global Survey

Huseyin Güngör*

ABSTRACT

This article summarizes the developments in Management Consulting (MC) over the last century and explores several questions frequently appearing in MC research: Does MC add value? Does MC accelerate innovation? How digitization and advanced technologies will impact MC? What is the level of trust that business professionals put in MC? Although research questions are derived mainly from scholarly research, answers are sought from a managerial point of view based on a global survey with 122 participants. Results showed a positive tendency about MC among participants, where consultants are slightly more optimistic about their influence; also, the impact of advanced technologies, such as AI, on MC is confirmed, possibly explaining the high growth rate of technology-driven consulting over the last few years.

Keywords: Management consulting; MC research; Artificial Intelligence; Machine Learning

INTRODUCTION

Definition and Scope of Management Consulting

Management consulting as we know it today originates from the 1930s with Frederik Taylor, promoting scientific management to help firms analyze workflows (Kipping & Clark, 2012), and when the number of consulting firms quadrupled in only ten years (McKenna, 1995). Their role was, and to this day still is, to advise and assist on large company projects that are well defined, with a clear beginning and end, and are always aimed to improve the strategy, structure, and performance of organizations (Cerruti et al., 2019; Larsson et al., 2020).

The term 'business consulting' needs to be more consistently defined in the literature (Nissen, 2019). With diverse origins in management, organizational development, accounting, strategy, and information technology, the definition of MC is diverse and far from a homogenous phenomenon (Schein, 2009). However, there is a consensus that MC firms provide expertise through advice by facilitating change and legitimating client decisions based on independence and credibility (McKenna, 2006; Markham & O'Mahoney, 2013).

Greiner and Metzger (1983) define MC as "*an advisory service contracted for and provided to organizations by specially trained and qualified persons who assist, in an objective and independent manner, the client organization to identify management problems, analyze such problems, recommend solutions, and help, when requested, in the implementation of solutions.*" In a more recent definition (Baaij, 2022), MC is "*a knowledge-intensive service which independent business professionals provide to managers of client organizations and consists of objective advice on management's decisions regarding the solutions to the client organization's problems and opportunities and may, in some cases, also consist of assistance with the management's tasks regarding the implementation of these solutions.*"

According to the European Federation of Management Consultancies Associations (FEACO, 2022), the MC market is organized by the following primary service lines (Figure 1): Strategy, operations, sales & marketing, finance & risk management, people & change, technology, and other services. The MC market is also segmented by clients from various sectors, such as consumer and industrial products, financial services, energy & utilities, telecom & media, business services, and the public sector. The majority of consultants work at large and mid-sized MC firms. However, regarding the number of MC enterprises, these firms typically represent less than 15 percent of the total, with most enterprises active as freelance consultants consultancy.uk (accessed in July 2022).

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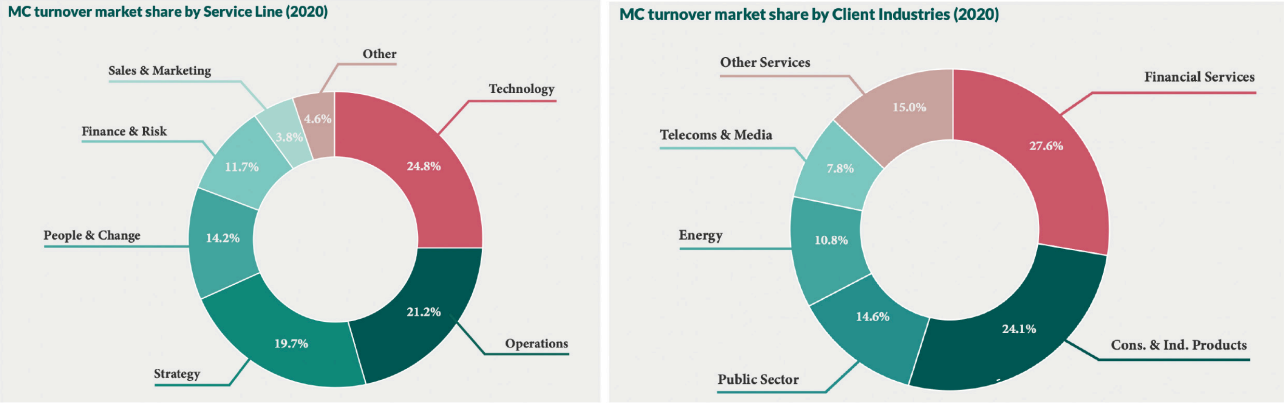

Figure 1: MC market share by service line and client industries

Source: European Federation of Management Consultancies Associations (FEACO, 2022)

In the last couple of decades, the MC industry has shown continuous and significant growth (Nissen, 2019). It has become one of the most mature sectors in the professional services industry, generating between $100 billion and $300 billion in revenues, according to consultancy.uk and Statista.com (accessed in July 2022). The exact estimate cannot be made due to different definitions used as consulting revenue, and client data confidentiality, and privacy of many MC firms' financial information. The figure below uses the estimated revenues per consultant per annum as a proxy for average rates and the number of consultants for firm size.

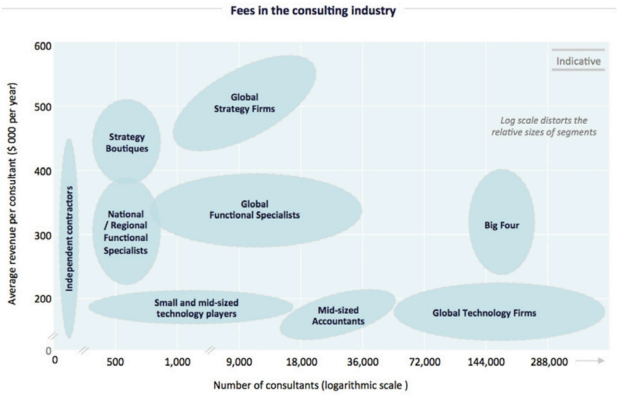

Figure 2: Fee structures in the MC industry

Source: Consultancy.uk (accessed in July 2022)

What is the Impact and Value of Management Consulting?

Organizations rely on consultants to solve their strategic and operational problems and to explore potential improvements and growth opportunities. Costa et al. (2021) argue that in current business conditions with high volatility, uncertainty, complexity, and ambiguity, MC firms play a critical role in helping companies to transform their business models. MC firms also play a central role in business model innovation and digital transformation (Birkinshaw et al., 2008; Osterwalder & Pigneur, 2010; Curuksu, 2018). Corporate professionals see the role of MC as essential to their work as they bring an outsider's perspective (Lovejoy & Simmons, 2003; Kitay & Wright, 2004). Organizations hire consultants due to insufficient in-house expertise (Simon & Kumar, 2001) but also to avoid taking responsibility for a project failure; therefore, hiring external consultants as scapegoats (Alvesson & Johansson, 2002; Baaij, 2022).

Sturdy et al. (2020) suggest that the growing use of external MC services, especially by public sector organizations, has negative implications for client organizational efficiency - as Ylönen and Kuusela (2019) called it, a consultocracy. Moreover, amid this controversy, sometimes consultants are hired to get rid of consultants, as the government in the UK asks consultants for advice on ending the use of consultants (The Telegraph, November 19, 2020).

Measuring the value and impact of MC firms is a broad subject where the value of MC can be categorized into three main areas: value creation, value proposition, and value capturing (Clauss, 2017; Tavoletti et al., 2021). In the past, the concept of value was solely created by the MC firm without the client's involvement (Oesterle et al., 2020). This concept has evolved towards co-creation between the MC firms and the clients (Järvi et al., 2018; Demirezen et al., 2020; Fuentes et al., 2019; Eriksson, 2022). However, there is also a possibility that some consulting engagements do not create value but create potentially adverse consequences leading to value co-destruction (cf. Plé & Cáceres, 2010).

Articles appearing in business-related journals over a half-century have questioned and challenged the

benefits or drawbacks of MC, while the impact of MC firms and consultants has been understated and overstated (Solomon, 1997; Wright & Kitay, 2002; Sturdy, 2011). Johnston's (1963) research showed that companies in the UK could expect 200 percent returns for every pound they spent on consultants. Solomon's (1997) study showed that there appears to be a correlation between MC engagement and the differences between actual and expected stock prices. On a critical note, Sorge and van Witteloostuijn (2004) argued that consulting advice is typically associated with unsubstantiated claims. MC does not deliver advanced value for organizations since consultants offer over-generalized approaches to individual businesses. Moreover, according to Vermeulen (2017), nothing happens when strategy consultants come in: they develop a new strategy in a PowerPoint, organize town hall meetings, tell people to change behavior, adjust balanced scorecards, and allocate budgets accordingly.

For several reasons, it is challenging to establish a relationship between MC activities and business outcomes for several reasons. First, it is very difficult to isolate a cause-and-effect relationship between companies hiring consultants and increasing the value of those companies. The second problem is defining and determining the (intangible) value, such as a culture change (Donnelly, 2011). A third problem is acquiring the necessary data as MC firms do not share their financial information (Solomon, 1997).

(NEW) TECHNOLOGIES, ARTIFICIAL INTELLIGENCE, AND THE MANAGEMENT CONSULTING INDUSTRY

Christensen (2013) already suggested a decade ago that the MC industry is on the verge of disruption. The recent developments in new technologies and digital disruption, such as Artificial Intelligence (AI) and Machine Learning (ML), put more pressure on MC firms, as many researchers consistently confirmed this trend over the years (Cecere, 2016; Dotch, 2016; de Man et al., 2017; Krüger & Teuteberg, 2018; Nissen, 2018; Tavoletti et al., 2021).

MC firms are facing a digital transformation process that will lead to partially or entirely virtualized processes, new organizational structures, and digital business models (Nissen, 2018; Curuksu, 2018; Davenport et al., 2018; The Economist, 2018; Haslam, 2021). Indeed, we live in an era of digitalization where Big Data, AI & ML algorithms change how people work (Leonardi & Treem, 2020), and even more so in large organizations (Steiber et al., 2020). Consequently, the transformation of the MC is still in progress, especially in the (post) Covid period with virtualization and remote working, which are increasingly accepted both by clients and MC firms (Collina, 2021; Manyika et al., 2021; Laffitte, 2022).

Consultants have long relied on judgment to develop a deductive reasoning hypothesis and use data to prove or disprove the hypothesis. AI & ML algorithms change this approach through data-based inductive reasoning (Libert & Beck, 2017). Davenport et al. (2018) argue that traditional consultants will likely stay. However, robo advisors and quant consultants complementing humans will create a hybrid form of consulting, possibly in virtual platforms (Lee et al., 2020). Czerniawska (2017) estimates that nearly three-quarters of the traditional consulting industry could be taken over by a new breed of "*intelligent machines*," particularly around commodity consulting.

New technologies such as AI & ML provide relevant insights and make predictions based on the available information (Güngör, 2020). And a growing number of open data and analytical tools are publicly available. Thus, MC clients can also analyze their data (Larsson et al., 2020). As the clients are equipped with data and analytics tools, they will likely explore partnerships with smaller, more agile MC firms (Nissen, 2019). Not surprisingly, "technology-driven consulting" is Europe's fastest-expanding service practice (Cerruti et al., 2019). Even the top-tier MC firms moved to the technology and analytics space to provide end-to-end digital solutions. For example, McKinsey acquired a data and analytics company *QuantumBlack* to develop their AI branch. Boston Consulting Group (BCG) has also taken a similar step with its data and analytics institution, *Gamma.*

While MC firms are struggling to cope with technology advances, and to build competence centers, big technology firms are also increasingly competing with MC firms, according to a special report by The Economist (28 March, 2018). Google, Amazon, and Microsoft are already moving into the consulting market with their cloud computing infrastructure, large in-house data lakes, and unlimited capital - by providing ease of use, well-designed interfaces, and improved algorithms. Beard (2022) states that The Big Five (Google, Amazon, Meta, Apple, and Microsoft), with revenues exceeding $1 trillion, have the financial power to enter the MC market, and they even have the potential to hoover up the best talent (Gavet, 2020).

Trust and Ethical Values in Management Consulting

According to Kipping (1999), the foundations of trust-based relationships occur personally between the consultant and the client and are eased by social, cultural, or educational proximity. Glückler and Armbrüster (2003) argued that it is not the price, not the measured quality, but the experience-based trust and reputation that are the main drivers of competitiveness of MC firms - especially since consultants see themselves as trusted professional advisors (Kipping & Clark, 2012; Fincham, 2012; Solomonson, 2012; Nissen & Dittler, 2018).

As part of the trust equation, business ethics, and ethical conduct are essential for MC firms (Aleshnikova & Mishchenko, 2021). The MC industry has already witnessed a complete collapse of a global MC firm, Arthur Anderson, after the Enron scandal in 2001 (Nix et al., 2021). Since then, and despite all precaution MC firms have undertaken to strengthen their ethical code of conduct, they still cannot avoid global scandals. Recently, McKinsey settled for nearly $600 Million over its role in the opioid crisis because of its sales advice to drugmakers, including Purdue Pharma, the producer of OxyContin (NyTimes.com, February 3, 2021). EY was also hit with a $100 million fine over cheating on ethics tests. Hundreds of employees at the accounting giant shared answers to exams required to keep their licenses (Washingtonpost.com, June 28, 2022).

MANAGERIAL REFLECTIONS FROM A GLOBAL SURVEY

Research Methodology and Data Collection

A survey has been shared with several management groups on LinkedIn and among (executive) business students in Europe and Asia (convenience sampling) to understand general perceptions and sentiments about the topics emerging above. Over 1500 views resulted in 134 survey participations with 122 recorded responses (see Figure 3), with a few missing data points in different questions.

Figure 3: Survey participants and their knowledge and experience with MC

Participants with different knowledge and experience levels, varying from some knowledge with no experience with MC to people working as consultants, are invited to fill the survey questions on four topics (added value of MC, innovations accelerated by MC, the impact of technology and AI on MC; and trust and ethical values in MC) by comparing six MC service lines according to FEACO (2022): strategy, operations, technology, sales & marketing, finance & risk management, people & change.

Results and Discussion

Overall, four survey topics and six service lines based on five experience levels with MC showed relatively positive perceptions about MC, with response levels around 3.76 on a scale from 1 to 5. *Across four topics*, the value adds of MC received an average score of 3.84, innovation around 3.65, impact of technology & AI around 3.90, and overall trust around 3.64 (see appendix for full results). *Across knowledge and experience* levels with MC, survey results showed that the higher the experience with MC, the lower the overall perceptions about MC. Across six service lines, technology consultants received remarkably high scores in four survey areas, followed by strategy and operations consultants. Finance & risk, marketing & sales, and people & change consultants received similar and relatively lower scores in all four survey topics (See Figures 4 and 5).

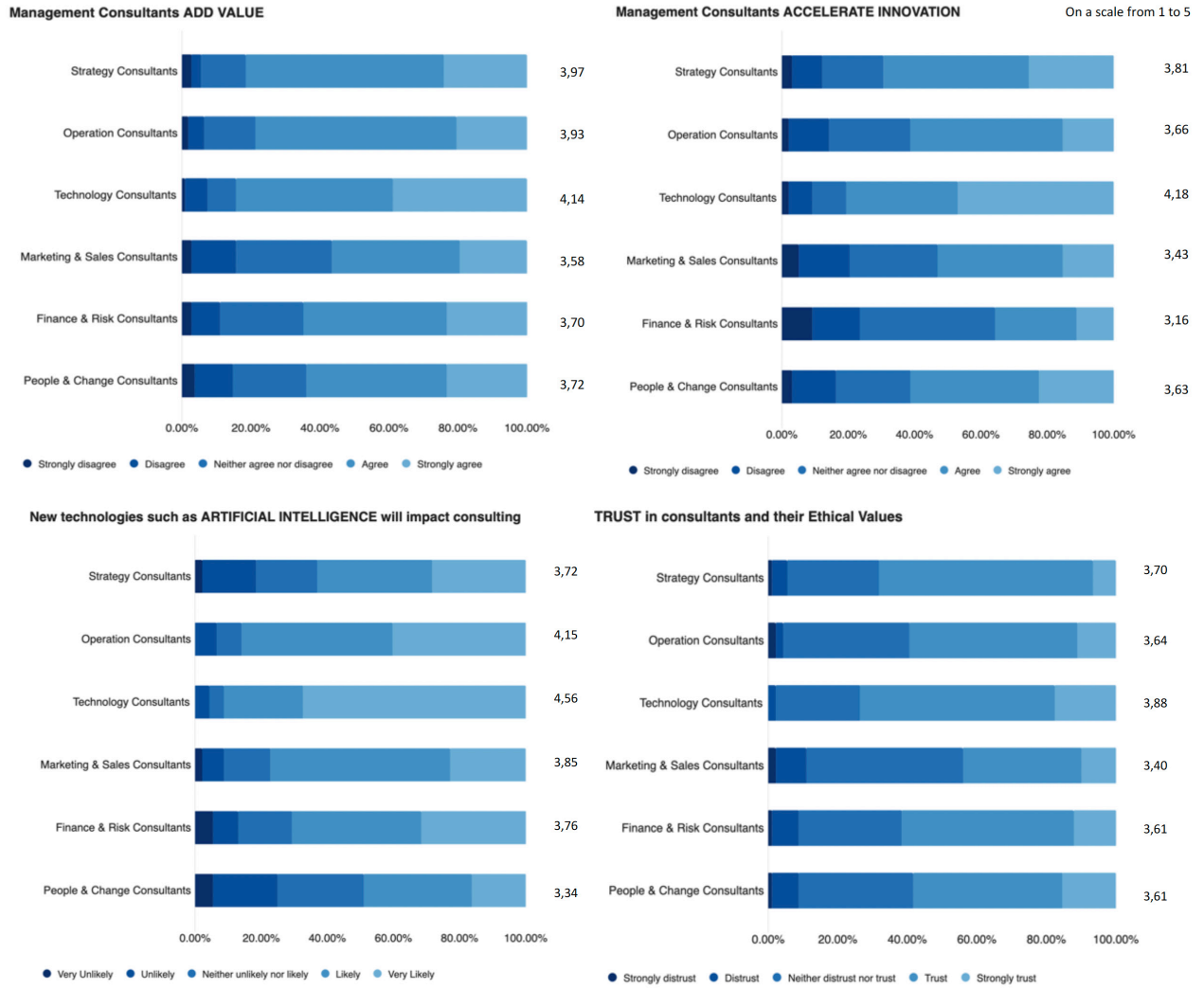

Figure 4: Global survey results on perceptions about MC (n=122)

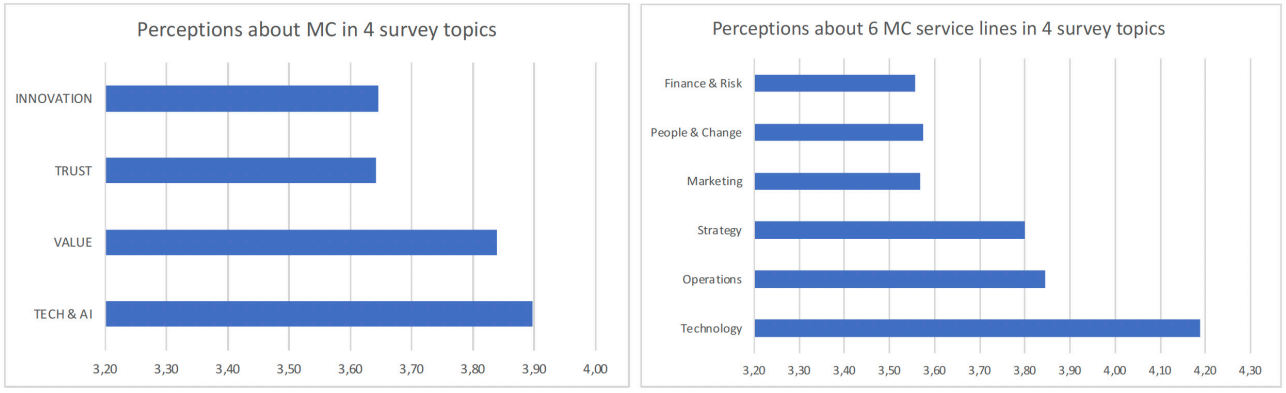

Figure 5: Overall perceptions about MC in four survey areas and six MC service lines (n=122)

Despite critical views about MC in many publications, including some recent global scandals, overall perceptions appear relatively positive about MC in terms of their added value, their contribution to innovation, their trust and ethical values, and the impact of new technologies on MC. This positive perception, however, slightly diminishes with the increase in exposure and experience with MC. In other words, respondents with limited experience with MC had slightly more positive perceptions than those working with MC. On this scale, respondents who work as a consultant showed a balanced level of perception, a little more positive than people who frequently work with consultants and a little less optimistic than people who have no or limited experience with MC. Consultants firmly agreed that MC creates added value, and advanced technologies impact MC (Figure 6).

One of the exciting outcomes of the survey was that finance and risk consultants are perceived as the least innovative with their 3.16 score, which was also the lowest average score in the entire study (Figure 6 and appendix).

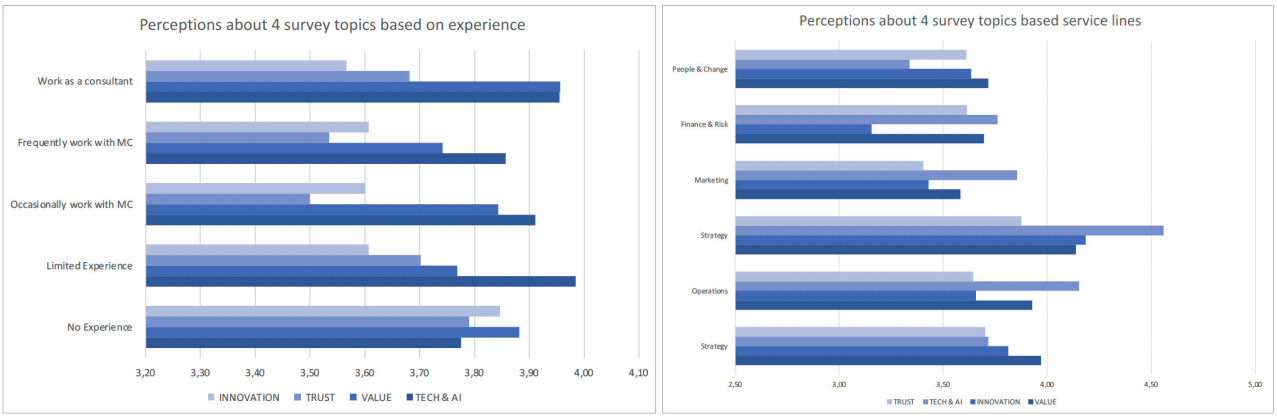

Figure 6: Perceptions about MC survey topics based on experience and service lines (n=122)

CONCLUSIONS

Management Consulting (MC) has been evolving for almost a century, from promoting scientific management in the 1930s to delivering digital transformations with Artificial Intelligence in the 2020s. Over the years, many topics emerged as a subject for discussion and debate in MC, and this research investigated four of them: added value of MC, innovation with MC, the impact of advanced technology, such as AI, on MC, and trust and ethical values in MC.

A global survey revealed the different perceptions about these MC-related topics with a relatively positive tendency, with average survey scores around 3.76 on a scale from 1 to 5. The survey participants (n=122) are collected with a convenience sampling methodology and thus, as a limitation of this study, the results reflect the perceptions of this small sample group.

According to the majority of survey participants, MC adds value and accelerates innovation with a reasonable trust in the ethical values of MC firms. Participants who work as consultants seemed more optimistic about their roles and impact than those who work with consultants, potentially explaining the tension between client and consultant relations and contributing to the ongoing debate.

The survey results confirmed the impact of advanced technologies, such as Artificial Intelligence, on MC. Technology consulting was the center of this impact as it was evaluated with the highest scores on all four survey topics. This explains the high growth rate of technology-driven consulting over the last few years.

It was interesting to observe that finance and risk consultants were perceived as the least innovative in their consulting capacity, and this is another topic that appeared as a subject for discussion and further research.

So, the evolution and transformation of management consulting seem to continue, especially with the advanced technology and analytical tools; this trend does not seem to be changing soon.

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Journal of Accounting, Finance, Economics, and Social Sciences
Vol 7, No 2, July – December 2022, pp. 47-61
Received: Aug 2022 | Revised: Nov 2022 | Accepted: Dec 2022
DOI: https://doi.org/10.62458/jafess.160224.7(2)47-61

Use of Game-Based Learning Tools in Management Classes: Students' Perception and Effects on Their Academic Performance

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ABSTRACT

The game-based learning tool Kahoot promoted an interactive teaching methodology and was found to work best in enhancing students' motivation and participation. The present study evaluated whether Kahoot improves not only students' motivation, participation, and academic performance. The study participants were two cohorts of accounting students who studied at CamEd Business School in Cambodia in different semesters. Cohort 1 attended fully online classes, and Cohort 2 attended hybrid courses. The perception survey showed that both groups liked Kahoot activities. It increases class attendance and motivates students to engage in class. However, on the perceived advantages of Kahoot, the cohorts' perceptions differ significantly, with Cohort 1 being very satisfied while Cohort 2 was satisfied. The analysis of the student's exam scores showed that their English proficiency contributed 5 percent and 9 percent, respectively, to the variation of the Kahoot scores of the two cohorts. Further, analysis of the correlation results showed that Kahoot scores accounted for 36 percent of the variability in quiz scores, 7 percent in mid-term exam scores, and 1 percent in the final exam scores of Cohort 1. For Cohort 2, Kahoot scores accounted for 52 percent of the variability in quiz scores, 23 percent in mid-term exam scores, and 15 percent in the final exam scores. Considering the timeline when the respondents took the quiz, mid-term and final exams, it is concluded that Kahoot reviews effectively improved exam scores within the short span after the review. The effectiveness, however, wanes after the lapse of time and may not support long-term retention of the lessons.

Keywords: Gamification; Academic performance; Management class; Online and hybrid classes

INTRODUCTION

Using a game-based learning tool fosters an interactive teaching methodology suited for Generation Z students, who appear to have a radically different approach to learning compared to the previous generations. The Gen Z-ers (born from 1997 to 2012) are called the "eccentric generation" (Seyi-Ola, 2022) and "digital natives" (Stears, 2019; Cilliers, 2017), born amid technological innovation, embracing the widespread use of smartphones and social media. They spend excessive screen time, which creates feelings of isolation; hence, they are also dubbed the "loneliest generation" (Annie E. Casey Foundation, 2021). They prefer communicating through images, icons, and symbols rather than texts. Gen Z-ers have an average attention span of only 8 seconds (Stears, 2019; Giunta, 2017). They prefer interactive games to lectures. To them, class lectures mean "come and entertain me, " they dislike long waiting times for a response but prefer highly instant information (Rothman, 2016, cited by Cilliers, 2017).

Many game-based student response systems (SRS) allow educators to test the learning and knowledge of their students interactively. Among these are Kahoot, Quizizz, Socrative, Quizalize, and Peardeck. Kahoot is the most popular SRS application because it has an Android demo application and runs on any device with a web browser (Celik et al., 2016).

Kahoot is commonly used in classrooms today to create a more engaging and joyful environment which most learners prefer. It is a gamification tool that lecturers use more than ever when in-person classes have shifted to online due to the pandemic. Its use continued until classes gradually transitioned to a hybrid mode or a combination of face-to-face and online sessions until classes were back to the traditional face-to-face.

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Kahoot is gaining popularity in many countries as it supports 17 languages (Kahoot, 2022). As Wang (2020) reported, Kahoot is a game-based platform used in more than 200 countries by more than six million teachers and 800 million students. Kahoot is a game-based student response system (GSRS) where a game show is conducted in the classroom, and the teacher is the host while the students are the players. Half of the K- 12 students in the US used this platform. Various studies reviewed by Wang and Tahir (2020) showed that Kahoot positively affected learning performance, classroom dynamics, attitudes, and anxiety in higher education and K-12 settings.

However, some studies claim that although Kahoot can attract students' attention faster and motivates students in class, the repeated use of Kahoot may cause students to "focus only on the game features and forget about the learning aspect of the quizzes" (Rajabpour, 2021). Similarly, McNutt (2019) highlighted that "Kahoot is great at measuring breadth, not the depth of knowledge." Saying further, students doing well may enjoy the Kahoot game, but it demotivates those left behind. Those students who struggle with reading are not inspired by Kahoot (McNutt, 2019).

The study by Rajabpour (2021) indicated that Kahoot could boost students' energy levels but shortens their attention spans. It was also stated that some teacher respondents were dissatisfied with the design of Kahoot. They perceived it as immature, using primary colors and shapes, and its settings were the least flexible. Furthermore, Wang and Tahir (2020) cited that some studies showed that Kahoot has little or no effect. Finally, Phelps et al. (2020) evaluated the health sciences and medical students' perceptions of using Kahoot as a teaching tool in face-to-face and online classes. Results revealed that students in both the face-to-face and online learning groups rated their learning experience using Kahoot highly. Still, there were no significant differences between the experiences of both groups.

Another study by Figuccio and Johnston (2021) pointed out that Kahoot, as a review tool, effectively predicts test scores in a social science class. The students prefer reviewing with Kahoot because it helps them learn the course concepts, makes the class more interactive, and give them a higher enjoyment level. However, there was no quantitative difference in students' exam scores using Kahoot review sessions over the traditional review sessions. In contrast, the meta-analysis conducted by Yıldırım & Şen (2021) covering 45 experimental results showed that "gamification has added 7.2 percent positive value to academic achievement" of the students. These differing study outcomes are better scope for further study.

Research Gap and Objectives

The results of 93 studies reviewed by Wang and Tahir (2020) and the studies of Guillo et al. (2019); Pratolo and Lofti (2021); Elkhamisy and Wassef (2021); Wichadee and Pattanapichet (2018); Kalleny (2020); and UP Voice, (2020), support that Kahoot works best in increasing motivation and engagement among K-12 and groups of tertiary learners. However, despite these studies, there still needs to be a gap in whether this game-based learning tool improves accounting students' academic performance. Saxena and Mishra (2021), in their research entitled Gamification and Gen Z in Higher Education: A Systematic Review of Literature, mentioned that the limited studies on gamification in higher education show that games most likely aid the motivation and engagement of the learner. The writers recommended future research assessing that gamification motivates and heads toward academic performance. They also proposed using gamification in various areas like Biology and Management to delve into the possible correlation between gamification and student achievement.

There were also scant studies assessing whether English reading skills relate to the scores in Kahoot using English questions. Since speed in answering the questions is vital in playing Kahoot, a student's ability to read and understand the questions is essential to give correct answers. McNutt (2019) states that Kahoot does not motivate students who struggle with reading. Seccuro (2018) also reported that to win more points in Kahoot games, the player must answer the question faster than other players. Concerning this, the researcher was interested in finding whether the students' English proficiency matters in their Kahoot scores, considering that Cambodia is a non-English speaking country and, based on a global survey, the English proficiency of Cambodians is low (Ngel, 2022). Also, to further evaluate the data whether Kahoot scores correlate with quizzes, midterm, final, and Association of Chartered Certified Accountants (ACCA) Computer Based Exam (CBE) scores. The CBE is an international exam administered online by ACCA in the UK.

The researcher introduced Kahoot quizzes in two cohorts of accounting students to evaluate whether

game-based reviews will enhance the students' motivation, participation, and class performance and whether their Kahoot scores predict of their other examination scores. One cohort attended fully online courses, and the other followed hybrid or a combination of face-to-face and online class sessions. Specifically, this study seeks to evaluate the following:

- The profile of respondents in terms of gender, place of residence, type of internet connection, internet provider, quality of internet connection, and availability of electricity in the area;
- Students' perception of the use of Kahoot in their management class;
- The significant difference between the perception of students attending fully online classes and hybrid courses;
- The relationship between the student's English proficiency (Aptis) and Kahoot scores;
- The relationship between the students' Kahoot scores and their scores in quizzes, mid- term and final exams, ACCA CBE scores;
- Relationship between Aptis and ACCA CBE exam scores.

Null Hypotheses

Ho1: There is no significant difference between the two cohorts' perceptions of using Kahoot.

Ho2: No statistical relationship exists between the Aptis and Kahoot scores of the students.

Ho3: There is no significant relationship between the Kahoot scores and the pop quiz scores of the students.

Ho4: There is no significant relationship between the Kahoot scores and the mid-term exam scores of the students.

Ho5: There is no significant relationship between the students' Kahoot scores and final exam scores.

Ho6: There is no significant relationship between the students' Kahoot and CBE scores.

Ho7: There is no significant relationship between the students' Aptis and CBE scores.

LITERATURE REVIEW

The following related studies and literature serve as a springboard for this study.

Gamification Tool Kahoot

Many game-based student response systems exist, but Kahoot is a more popular platform (Celik, Akçetin, & Asmalı, 2016). Therefore, this study relates solely to Kahoot, used as an interactive way of testing the learning and knowledge of the student respondents.

Kahoot "is a magical and game-changer tool in the field of education" (Kaur, 2021). Cole (2020) opined that Kahoot is one of the foremost digital tools that allow teachers to introduce interactive learning games for students. Kahoot is an excellent website for educational games. Teachers can select the topic and ask students multiple-choice questions. The students who answer the question correctly and quickly will earn points. At the end of the game, a podium acknowledges the top three students and the fourth and fifth placers. Ares et al. (2018) similarly mentioned that Kahoot is one of the most utilized gamification tools. It is a free tool popular among teachers, simple to use, and promotes interaction within the classroom.

The gamification tool Kahoot is used in class to improve students' class engagement and is a great way to break the monotony of listening to lectures. "It raises the energy level in students" (Rajabpour, 2021). De la Tour (2021) defines engagement as "a measure of a student's participation in the learning process, and the level of student engagement is a good measure of the likelihood that a learning experience will be successful." Kalleny (2020) said Kahoot improves students' engagement and satisfaction in formative assessments. It can be applied live for any face-to-face or virtual learning session. In 2020, the University of Puthisastra in Cambodia introduced Kahoot online quizzes in its English for Dentistry class as a form of assessment that students generally enjoyed, especially during online sessions, and was found effective in motivating students to learn (UP Voice, 2020).

Advantages and disadvantages of Kahoot

Many studies have investigated the impact of Kahoot in the classroom on student learning outcomes. Wang and Tahir (2020) conducted a literature review of 93 studies on the effects of using Kahoot for learning. They concluded that "Kahoot can positively affect learning performance, classroom dynamics,

students' and teachers' attitudes, and students' anxiety." However, they also reported other study results that Kahoot has slight or no effect. Wang and Tahir (2020) also cited the challenges the students and teachers mentioned. They enumerated the problems encountered by the students as follows: unreliable internet connections; hard-to-read questions and answers on a projected screen; not being able to change an answer after submission; stressful time pressure for giving answers; not having enough time to answer; afraid of losing; and hard to catch up if the student had given an incorrect answer. They also identified the challenges mentioned by the teachers, which include: getting the difficulty level of questions and answers right; problems with network connectivity; scoring based on how quickly the students answer, reduced student reflection, and causing some students to guess without thinking; some students can have a problem with failing a quiz; and some teachers find it challenging to use the technology.

The study of Pratolo and Lofti (2021) on using Kahoot for learning English revealed both the benefits and the problems of using Kahoot. They highlighted the following benefits: Kahoot motivates students to learn, builds a good class atmosphere, helps students focus, and provides positive competition. The problems include erratic internet connection and the need for more discussion between the teacher and learners. The results of the study by Elkhamisy and Wassef (2021) revealed the following advantages of Kahoot: 1) it enhances Pathology understanding and retaining knowledge; 2) made learning fun and motivating; 3) simple and easy to use, and 4) self-confidence and imagining skills booster. However, some disadvantages mentioned by the students include no explanation of the answers and the short time limit for the questions. They also found that using Kahoot was significantly associated with better Pathology academic performance but not with the student's general academic performance.

Guillo et al. (2019) showed that using Kahoot in theory classes has positive results. Most students responded that Kahoot "reinforces what they have learned" and "motivates a lot to learn." In addition, most students believe using Kahoot is necessary, and prefer sharing theoretical lessons and practical exercises. Felszeghy et al. (2019) investigated whether medical and dental histology course students would have better grades if they used Kahoot and whether gamification affects learning and enjoyment. The results showed that Kahoot gives high satisfaction among the participants, with most students saying it "increased their motivation to learn." In addition, Kahoot enables most students "to overcome difficulties and to set up a collaboration." Tan et al. (2018) also studied a group of 51 undergraduate students at a public university in Malaysia were exposed to the Kahoot learning platform during weekly lectures for one semester. They found Kahoot was beneficial in stimulating motivation and engagement and reinforcing learning in theory and practice.

The quasi-experimental study conducted by Wichadee and Pattanapichet (2018) involved an experimental group taught using Kahoot and a control group trained with the conventional method. The results show that the experimental group obtained higher scores and motivation than the control group. Ares et al. (2018) compared the academic outcomes of two groups of third-year students in the Chemistry course. One group used Kahoot, and the other group did not. The result shows a significant improvement in the number of students who passed the exam in the group that used Kahoot in class. Finally, Turan and Meral (2018) studied 46 seventh-grade students (23 control and 23 experimental groups). They pointed out that "the game-based student response systems increase the achievement and engagement and decrease the test anxiety level when compared to non-game-based student response systems."

A study involving 50 Information Technology students in Malaysia shows that classroom (Rahman et al., 2018). The study of Tóth et al. (2019) involved 200 bachelor students who participated in an elective course for 14 weeks and were given Kahoot quizzes and two mandatory exams. Some quiz questions were purposefully merged into the exam's question bank as multiple-choice or true or false questions. The exam results were analyzed based on the number of Kahoot quizzes the students took. They found that students who participated in more Kahoot quiz games did better on the complete exam. However, they added that the result could not be fully credited to Kahoot, as some students were more diligent. The study of Lopez and Cabot (2022) revealed that Kahoot's positive effects on academic performance during lectures were "strongly diluted when high-demanding exams were taken."

Bicen and Kocakoyan (2018) pointed out that using the gamification method in the classroom makes students more ambitious and encourages them to study harder. However, some drawbacks reported by

the participants are an unstable internet connection and freezing of their smartphones, which make them lag and cannot answer some questions even though they know the answer. Plump and LaRosa (2017), as cited in Rajabpour (2021), said that "once students get several wrong answers, it is hard for them to stay motivated and engaged." Similarly, Kaur (2021) mentioned that Kahoot only works if there is a strong WiFi connection, and sometimes, Kahoot's background music can be distracting and stressful.

Gamification also encourages students to come to class. Kaur (2021) opined that Kahoot effectively reduces monotony and boredom. In addition, it has increased the students' performance due to an increase in the student's attendance. It is also easy for Kahoot teachers to download reports in a spreadsheet. Wang (2020) stated that when used often in class, Kahoot increases attendance, participation, engagement, and motivation. Martinez-Jimenez et al. (2021) also reported that Kahoot is a powerful tool that improves students' attendance and participation. Additionally, when students see their names on the podium, it boosts their motivation and self-esteem.

The literature suggests that gamification increases student motivation and engagement. That being the case, this paper investigates whether Kahoot would increase the motivation, participation, and academic performance of accounting students studying management courses in fully online or hybrid classes. There are also scarce studies assessing whether the English reading skills of the students relate to their scores in Kahoot using English questions since the speed in reading and understanding the questions are crucial in answering the questions correctly within the time limit.

CONCEPTUAL FRAMEWORK

Figure 1 presents the structure of the study. It intends to assess the students' perception of the game-based tool Kahoot used to review their management lessons. The perceptions include the advantages and disadvantages of using Kahoot. The scores from 26 Kahoot reviews given during the whole semester to two cohorts of participants were among the primary data collected. In addition, the student's English proficiency scores from their Aptis exam, one of the school's entry requirements, were taken from school records. The analysis focused on whether students with high Aptis scores also obtained high Kahoot scores and whether Kahoot scores impact the learners' performance in quizzes, mid-term and final exams, and ACCA CBE scores. The Aptis scores were also associated with the ACCA CBE scores.

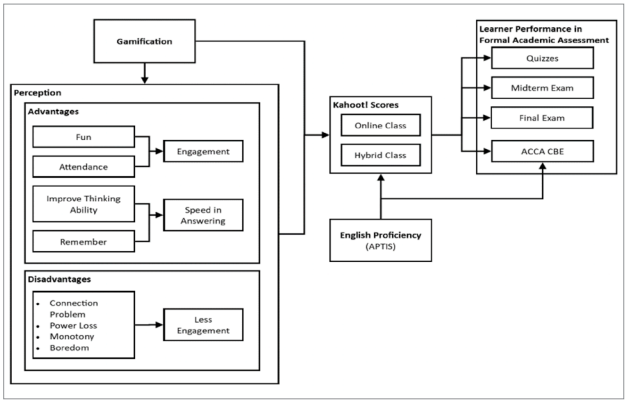


Figure 1: Conceptual framework of the study

METHODOLOGY

Research Design

This descriptive and correlational research has assessed the accounting students' perception of using Kahoot in management classes and whether Kahoot reviews help to improve their motivation and engagement. In addition, a correlation analysis between Kahoot scores and various exam scores determined the effects of Kahoot on students' academic performance.

Participants

The participants of this study were a total of 529 second-year students taking up Bachelor of Accounting and Finance at CamEd Business School in Phnom Penh, Cambodia, who enrolled in the Principles of Management (MGMT 201) subject. The participants were two cohorts of students who participated in Kahoot reviews. Cohort 1 comprised 237 students who studied purely online in the second semester (June-December) of the school year 2021 (JD-2021), when classes were still online due to the pandemic and lockdowns. Cohort 2 includes 292 students who attended hybrid courses in the first semester (January-June) of the school year 2022 (JJ-2022), when classes gradually shifted to hybrid mode, and students alternately attended physical courses. From these groups, 343 responded voluntarily to the questionnaire to evaluate students' perceptions about the game-based activities in class, 151 from Cohort 1, and 192 from Cohort 2.

Data Sources and Collection Methods

This paper utilized primary and secondary data. The

primary data were the responses of 343 students surveyed on their perceptions using a questionnaire in Google Forms and the Kahoot scores of 529 students taken from the 26 Kahoot quizzes.

The secondary data were taken from the school records, which include the students' quizzes, mid-term and final exams, Aptis, ACCA CBE scores, and other relevant information like CBE pass rates.

Instruments

1. A questionnaire in Google form with nine questions about the profile of the respondents, the perceived advantages and problems encountered when playing Kahoot, and the internet connection quality. Questions 4 and 5 relate to the advantages and disadvantages of using Kahoot using a 5-point Likert scale, with 5 indicating strongly agree and 1 indicating strongly disagree.
2. Kahoot quizzes were given during the whole semester for both cohorts. One Kahoot quiz is given immediately at the end of every chapter, but two Kahoot quizzes were given for long chapters. A total of 26 Kahoot reviews were carried out for each semester, and the scores of every participant were recorded.
3. Written quizzes (Pop Quizzes) with 20 questions each, primarily multiple-choice, were given every two completed chapters one to two weeks after the Kahoot review. The ten quizzes were prepared by the lecturer but administered by the school's Learning Support Center (LSC) staff, and LSC collected the scores as part of the school records. The scores were requested from the school as part of the secondary data used in this study.
4. A mid-term exam is a long exam that comprises multiple-choice and multi-task questions more complex than the questions used in Kahoot. It was prepared by the researcher but administered by the LSC in the middle of the semester, approximately two months after classes started. Again, the LSC collected the mid-term scores as part of the school records. These scores were part of the secondary data used in this study.

Data Analysis

The responses to the questionnaire were analyzed using frequency count and mean and weighted mean. On the perceived advantages and disadvantages of using Kahoot in class, referring to questions 4 (Q4) and 5 (Q5) in the questionnaire, a 5-point Likert scale was used, and the mean ratings were interpreted as follows:

Score range	Mean rating	Interpretation
4.21-5:00	Strongly agree	Very satisfied
3.41-4.20	Agree	Satisfied
2.61-3.40	Neither agree nor disagree	Neutral
1.81-2.60	Disagree	Dissatisfied
1.0-1.80	Strongly disagree	Very dissatisfied

The values for Cronbach's Alpha were calculated to measure the internal consistency in these items. For example, for cohort 1, question 4, on the advantages subscale consisting of 12 items, has a value for Cronbach's Alpha of $\alpha = .955$, and for question 5, the disadvantages subscale, which consisted of 5 items, the value was $\alpha = .673$. For cohort 2 (192 respondents), Cronbach's Alpha values were $\alpha = .971$ for Q4 and $\alpha = .773$ for Q5.

The Cronbach alpha values tell how closely linked a set of test items are as a group. Goforth (2015) stated that many methodologists recommend a minimum α coefficient between 0.65 and 0.8 or higher; coefficients less than 0.5 are usually unacceptable.

Specifically, the higher the α coefficient, the more the test items have shared covariance and probably measure the same underlying concept.

The Mann-Whitney U test was used to compare the differences between the perceptions of the two cohorts. The Pearson-Product Moment Correlation (r) and scatterplots were used to determine any relationship between the Aptis and Kahoot scores. Subsequently, the relationship between Kahoot scores and the different exam scores was analyzed. The correlation values were interpreted using the following classifications in Table 1.

Table 1: Correlation values and interpretation

r value =	Interpretation of r
+.70 or higher	A very strong positive relationship
+.40 to +.69	Strong positive relationship
+.30 to +.39	Moderate positive relationship
+.20 to +.29	Weak positive relationship
+.01 to +.19	No or negligible relationship
0	No relationship [zero correlation]

Source: https://www.statisticshowto.com/probability-and-statistics/correlation-coefficient-formula/#Pearson

FINDINGS AND DISCUSSION

Profile of Respondents and Quality of Internet Connection

The study collected primary data about the respondents' profiles from the perception survey responded to by 343 students (Appendix A). The data showed that 70 percent were females, and 30 percent were males. The majority (80 percent) came from Phnom Penh City, and 20 percent came from different provinces. In addition, many (48 percent) were using wireless Internet, while 23 percent used mobile data. The commonly used Internet providers were Opennet (29 percent), Metfone (26 percent) and Smart (20 percent). When asked about the quality of their internet connection, 46 percent reported that it is sometimes slow. A majority (69 percent) also said electricity is occasionally unavailable. These unstable internet connections and power supply could affect students' online class sessions and activities.

Students' Perceptions of the Use of Kahoot in their Management Classes

The respondents were asked whether they like to review their lessons with Kahoot.

The result shown in Appendix B indicates that 97 percent of Cohort 1 responded in the affirmative. Those who responded negatively indicated that their Internet could be faster and the electricity in their area is occasionally unavailable. From Cohort 2, about 99 percent like Kahoot, except for one student who said she is using mobile data and her Internet is unstable, and most of the time, electricity is not available in her place.

The overall results show that 98 percent of the respondents like to review their lessons by playing Kahoot. These results conform with the report (UP Voice, 2020) that students generally enjoyed Kahoot, especially during online sessions.

The Perceived Advantages and Disadvantages of Playing Kahoot

The responses to the perception questionnaire, particularly on question 4 on the advantages of playing Kahoot in class, were summarized below:

Table 2: Advantages of playing Kahoot

Advantages of playing Kahoot	Mean ($\bar{x}$) per item (Online class) n=151	Std. Deviation	Mean ($\bar{x}$) score per item (Hybrid class) n=192	Std. Deviation
1. I like the Kahoot game	4.32	.830	4.05	1.056
2. It's fun	4.22	.860	4.02	1.078
3. It will motivate me to engage in class	4.39	.806	4.08	1.065
4. It can increase my class attendance	4.42	.869	4.15	1.073
5. It improves my rapid thinking ability	4.30	.799	4.01	1.036
6. It is good for reviewing difficult topics	4.24	.937	4.02	1.081
7 Lessons can be remembered easily	4.09	.898	3.95	1.098
8. It can reduce monotony and boredom	4.20	.844	3.92	1.078
9. It increases my speed in answering questions	4.20	.853	3.80	1.060
10. If there is a scheduled Kahoot play, I will try my best to attend class so I will not miss it	4.27	.922	4.02	1.109
11. The teacher can control the pace of the game (Can wait if we are disconnected)	**4.53**	.778	**4.20**	1.035
12. My Kahoot score can be generated from the system	4.22	.782	3.95	1.128
Composite mean	.28 Very satisfied		4.01 Satisfied	

The data indicate that overall, Cohort 1 was very satisfied ($\bar{x}$ = 4.28) while Cohort 2 was satisfied ($\bar{x}$ = 4.01). Both groups showed higher satisfaction in the three items. One, Kahoot increases class attendance; two, the teacher can control the game's pace (can wait if they are disconnected); and three, it motivates them to engage in class. These results agree with Wang's (2020) findings that when used often in class, Kahoot increases attendance, participation, engagement, and motivation. Also, with the study of Martinez-Jimenez, et al. (2021), Kahoot is proven to be a powerful tool that improves students' attendance and participation and that of Rahman et al. (2018) that Kahoot enhances students' engagement in the classroom.

Table 3 presents the results of the perceived disadvantages of playing Kahoot in class.

The overall result shows that Cohort 1 has a higher composite mean score ($\bar{x}$ = 3.19) than Cohort 2 ($\bar{x}$ = 2.76). However, both scores indicate a neutral perception. The disadvantages highlighted by both cohorts are problems with internet connection and slow Internet. These relate to the findings of Kaur (2021) that Kahoot only works if there is a strong WiFi connection.

Table 3: Disadvantages of playing Kahoot

Advantages of playing Kahoot	Mean ($\bar{x}$) per item (Online class) n=151	Std. Deviation	Mean ($\bar{x}$) score per item (Hybrid class) n=192	Std. Deviation
Problem with internet connection	**3.87**	.960	**3.16**	1.135
I often get disconnected when I play Kahoot	3.20	1.031	2.66	1.201
I don't like the background audio of Kahoot	2.60	1.145	2.37	1.266
My Internet is slow	**3.31**	.964	**2.87**	1.110
Easy for the student to copy	2.98	1.196	2.73	1.124
Composite mean	**3.19**		**2.76**	
	Neutral		**Neutral**	

The Difference in Perceptions of the Two Cohorts on the Advantages and Disadvantages of Playing Kahoot in Class

A Mann-Whitney U test shows a Z score of -3.992 and a 2-tailed p-value of .000, indicating a significant difference between the perceptions of the two cohorts on the advantages of Kahoot. Hence, null hypothesis 1 (Ho1) was rejected.

However, on the perceived disadvantages of Kahoot, a Mann-Whitney U test shows a Z score of-1.567 and a 2-tailed p-value of .117, indicating no significant difference between the perceived disadvantages of using Kahoot in class. Therefore, null hypothesis 1 (Ho1) was accepted in this aspect.

Relationship Between the Students' Kahoot Scores and Other Exam Scores

Means and correlation scores of test variables

The mean scores of Aptis, Kahoot, Quizzes, Mid-term exam, Final exam and ACCA CBE exam are shown in Table 4. The data show that students in Cohort 1 have a higher mean scores in Aptis ($\bar{x}$ = 64.05), Kahoot ($\bar{x}$ = 78.40), Quizzes ($\bar{x}$ = 82.41) and mid-term exams ($\bar{x}$ = 76.21), while those in Cohort 2 have high mean scores in the final exam ($\bar{x}$ = 91.80) and CBE ($\bar{x}$ = 51.19). The higher CBE mean scores of students in cohort 2 of $\bar{x}$ = 51.19 can be associated with their higher pass rate of 58 percent compared to students in Cohort 1 with a lower CBE mean score of $\bar{x}$ = 50.68 and with a pass rate of 54 percent based on the school records.

Table 4: Mean scores of test variables

Variables	Online class July-December 2021			Hybrid class January-June 2022		
	n	Mean	Std. Deviation	n	Mean	Std. Deviation
Aptis	237	64.05	14.15	292	54.15	15.92
Kahoot	237	78.40	20.82	292	64.87	25.14
Quiz	237	82.41	13.45	292	78.75	21.49
Mid-term Exam	237	76.21	17.12	292	51.96	16.57
Final Exam	234	61.69	18.48	286	91.80	10.92
ACCA CBE	156	50.68	13.75	118	51.19	13.68

The Pearson-Product Moment Correlation (r) determined whether the Kahoot scores are significantly related to quizzes, mid-term, final, and CBE exam scores. The correlation scores between test variables are shown in Table 5. These results are discussed sequentially in the subsequent sections.

Table 5: Correlation scores

Test Variables	Cohort 1 (Online class)				Cohort 2 (Hybrid class)			
	n	R	R^2	p-value	n	R	R^2	p-value
Aptis vs Kahoot	237	.216	0.05	p=.001	292	.302	0.09	p=.000
Kahoot vs Pop Quiz	237	.598	0.36	p=.000	292	.719	0.52	p=.000
Kahoot vs Mid-term Exam	237	.264	0.07	p=000	292	.480	0.23	p=.000
Kahoot vs Final Exam	234	.101	0.01	p=.124	286	.391	0.15	p=.000
Kahoot vs CBE score	156	.193	0.04	p=.016	118	.440	0.19	p=.000
Aptis vs CBE score	156	.497	0.25	p=.000	118	.472	0.22	p=.000

Relationship Between the Students' English Proficiency (Aptis) and Kahoot Scores

The two cohorts have different Aptis (English proficiency) mean scores. Students in Cohort 1 have a higher Aptis average of 64.05 percent, while those in Cohort 2 have an average of 54.15 percent. A Pearson correlation coefficient was computed to assess the linear relationship between Aptis scores and Kahoot

scores. For Cohort 1, there was a weak positive correlation between the two variables, r(235) =.22, p=.001 (Figure 2). Since r was only .22, the coefficient of determination, r^2, is only 0.05 or 5 percent which denotes that the linear relationship contributes only about 5% to the variation of the Kahoot scores. For Cohort 2, there was a moderate positive correlation between the two variables, r(290) = .30, p=.000 (Figure 3). The r^2 of .09 or 9 percent shows that the Aptis scores accounted for 9 percent of the variability in Kahoot scores. Therefore, the second null hypothesis (Ho2) that no statistical relationship exists between the Aptis and Kahoot scores was rejected.

Figure 2: Aptis vs Kahoot scores of Cohort 1

R=.22

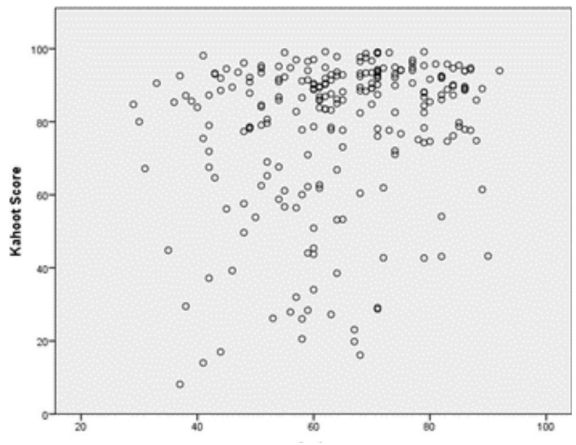
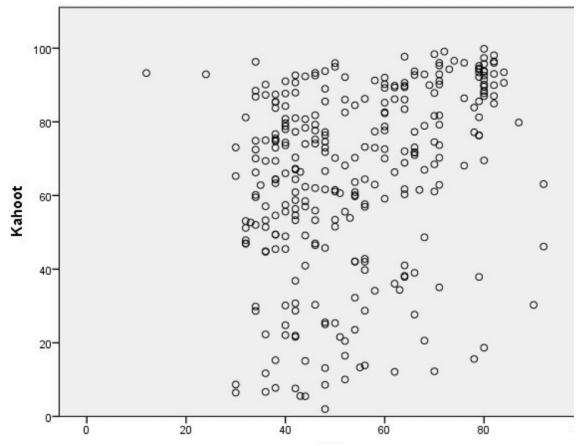


Figure 3: Aptis vs Kahoot scores of Cohort 2

R=.30



Relationship Between the Kahoot Scores and the Pop Quiz Scores

The computed value r(235) = .598 denotes a strong positive correlation with p-value = .00 (Figure 4). It means that the Kahoot and quiz scores of Cohort 1 showed a significant linear relationship with a p-value = .000. Since r was .598, the coefficient of determination, r^2, is .36 or 36 percent, which shows that the linear relationship contributes about 36 percent to the variation of the quiz scores. For Cohort 2, the computed value r(290) =.719 indicates a strong positive correlation between the two variables (Figure 5). The coefficient of determination, r^2, is .52, which shows that the linear relationship contributes about 52 percent to the variation of the quiz scores. Therefore, the third hypothesis (Ho3) that there is no significant relationship between the Kahoot scores and the pop quiz scores of the students was rejected.

Figure 4: Kahoot vs Pop Quiz scores of Cohort 1

R=.598

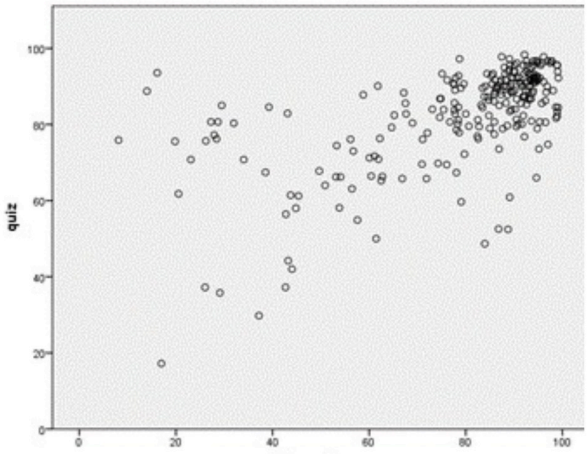
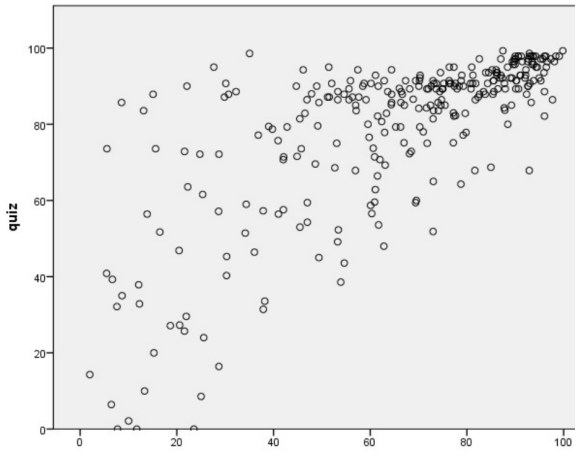


Figure 5: Kahoot vs Pop Quiz scores of Cohort 2

R=.719



Relationship Between the Kahoot Scores and the Mid-term Exam Scores

There was a weak positive relationship between Kahoot and mid-term exam scores. For cohort 1, the computed value r(235)=.264, p=.000 indicates an $r^2$of .07, showing that Kahoot contributes only 7 percent to the variation of mid-term scores. For cohort 2,

the computed r (290) =.480, p=.000, indicating a moderate positive relationship between the two variables. The r^2 of .23 explains that Kahoot scores accounted for 23 percent of the variability of mid-term scores. Hence, the fourth null hypothesis (Ho4) that there is no relationship between Kahoot and mid-term exam scores was also rejected. Figures 6 and 7 show the scatter plots that portray the relationship between Kahoot and mid-term exam scores.

Figure 6: Kahoot vs Mid-term exam scores of Cohort 1

R=.264

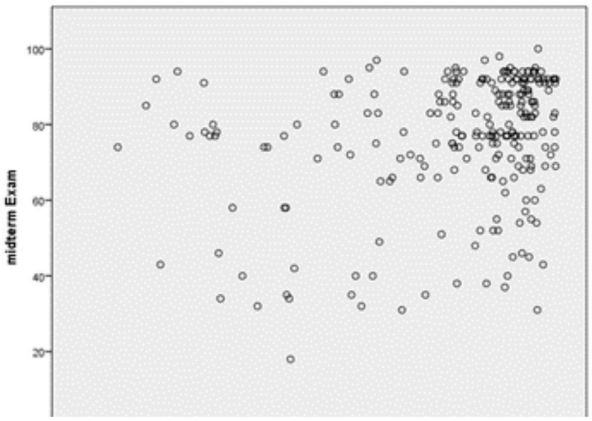
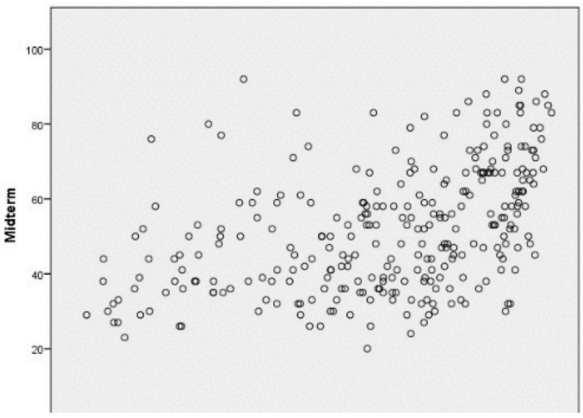


Figure 7: Kahoot vs Mid-term exam scores of Cohort 2

R=.480



Relationship Between Kahoot Scores and Final Exam Scores

There was no relationship between Kahoot and final exam scores in Cohort 1 with a computed r(232)=.101, p=.124 (Figure 8), indicating an r^2 of .01. For Cohort 2, the calculated r(284) =.391, p=.000, suggests a moderate positive relationship between the two variables (Figure 9). The r^2 of .15 implies that Kahoot scores contribute 15 percent to the variation of final exam scores. Therefore, the null hypothesis 5 (Ho5) that no relationship exists between Kahoot and final exam scores was accepted for cohort 1 but rejected for Cohort 2.

Figure 8: Kahoot vs Final exam scores of Cohort 1

R=.10

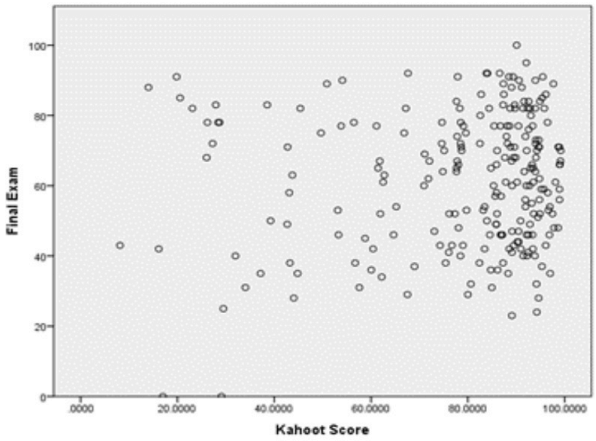
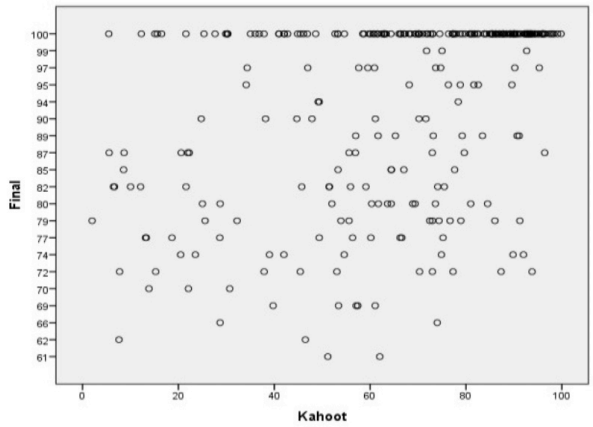


Figure 9: Kahoot vs Final exam scores of Cohort 2

R=.391



Relationship Between Kahoot Scores and ACCA CBE Scores

The Kahoot scores of students who took the ACCA CBE qualifying exam were separately analyzed. Results show that for Cohort 1, there was a negligible relationship between Kahoot and ACCA CBE scores, as shown in the computed r(154)=.193, p=.016 (Figure 10). The r^2 of .04 indicates Kahoot contributes only 4 percent in the difference of CBE scores. For Cohort 2, the computed r(116)=.440, p=.000 (Figure 11) denotes a strong positive relationship between the two scores. The r^2 of .19 hints Kahoot contributes 19 percent to the variation of CBE scores. Therefore, the null hypothesis 6 (Ho6) that there was no relationship between Kahoot and CBE scores was rejected for both groups.

Figure 10: Kahoot vs CBE scores of cohort 1

R=.193

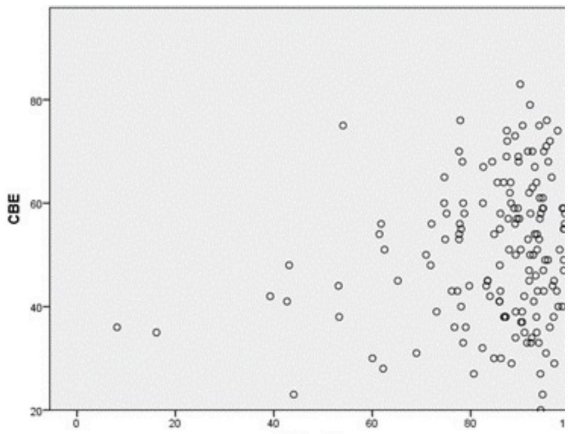
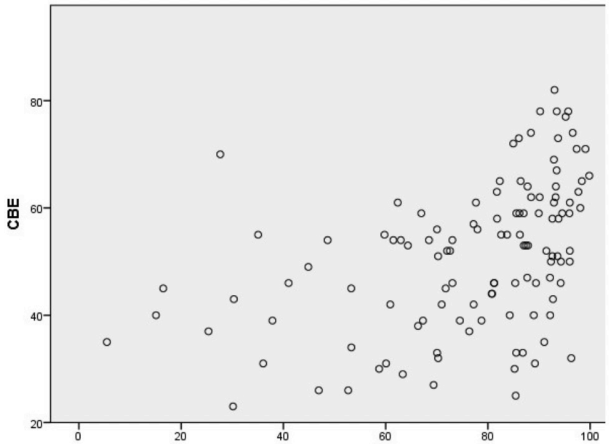


Figure 11: Kahoot vs CBE scores of cohort 2

R=.440



Relationship between Aptis and ACCA CBE scores

The Aptis or English proficiency scores of those students who took the ACCA qualifying exam were also analyzed. The two cohorts' English proficiency and ACCA computer-based exam scores showed a strong positive relationship as shown by the computed r(154)=.497, p=.000 for Cohort 1, and the r(116)=.472, p=.000 for Cohort 2 (Figures 12 and 13). The coefficients of determination, r^2 of .25 for cohort 1 and r2 of .22 for cohort 2, suggest that the linear relationship contributes about 25 percent and 22 percent, respectively, to the variation of CBE scores of both cohorts. The null hypothesis 7 (Ho7) that there is no relationship between Aptis and CBE scores was rejected. There was a strong positive relationship between Aptis and CBE scores. The English proficiency of takers matters in passing the CBE. The CBE is an international exam remotely administered by ACCA.

Figure 12: Aptis vs CBE scores of Cohort 1

R=.497

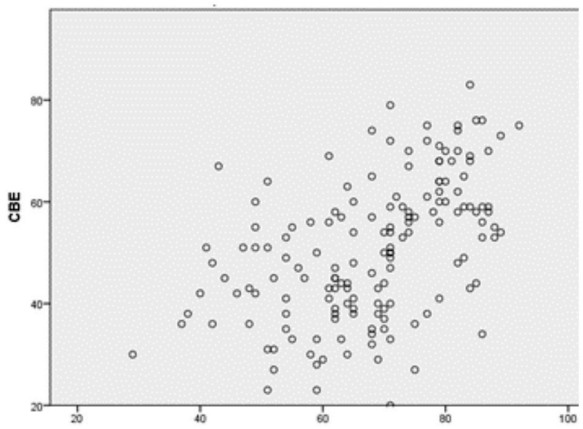


Figure 13: Aptis vs CBE scores of Cohort 2

R=.472

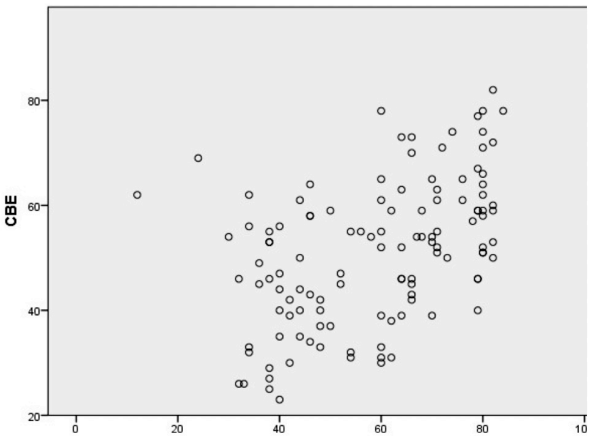


Table 6 summarizes the contribution of Kahoot in the variation of the quiz, mid-term, and final exam scores considering the timeline the respondents took these exams. Figure 14 depicts the trend of the variability of these exam scores.

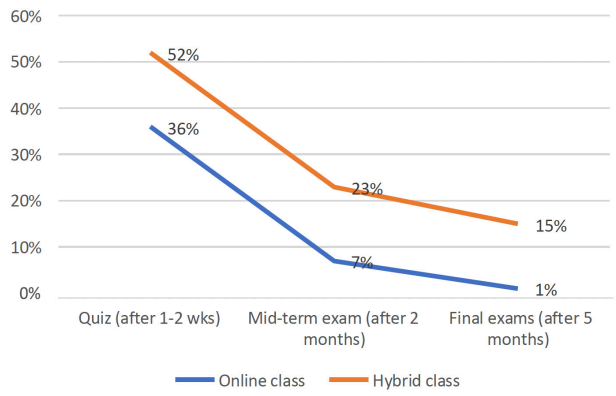
Table 6: Contribution of Kahoot scores in the variation of the quiz, mid-term, and final exam scores based on coefficients of determination (r^2)

Cohort	Contribution of Kahoot scores in the variation of the quiz, mid-term, and final exam scores overtime based on coefficients of determination (r^2)					
	Kahoot vs Quiz (Given within 1-2 weeks)		Kahoot vs Mid-term exam (Given after 2 months)		Kahoot vs Final exam (Given after 5 months)	
1. (Fully online) (JD21 class)	R=.598	R2=.357 (36%)	R=.264	R2=.069 (7%)	R=.101	R2=.010 (1%)
2. (Hybrid) (JJ22 class)	R=.719	R2=.516 (52%)	R=.480	R2=.230 (23%)	R=.391	R2=.152 (15%)

The data in Table 6 and Figure 14 convey that for Cohort 1, Kahoot scores accounted for 36 percent of the variability in quiz scores, 7 percent in mid-term exam scores, and 1 percent in final exam scores. For Cohort 2, Kahoot scores accounted for 52 percent of the variability in quiz scores, 23 percent in mid-term exam scores, and 15 percent in final exam scores.

The data at hand may not explain the consistently lower variation of scores of students in Cohort 1. Nevertheless, it can be assumed that the differences in the performance between the cohorts may be due to differences in the difficulty of the exams they have taken. It is also worth mentioning that the students in Cohort 1 studied entirely online from home due to the pandemic and lockdown, where personal interaction with their lecturer and classmates and group study was not possible, which may have affected their learning and performance.

Figure 14: Kahoot and variability in the quiz, mid-term, and final exam scores



From these results, it can be deduced that Kahoot reviews effectively improved the scores of exams given immediately or within the short span after the review. However, the effectiveness wanes down after the lapse of time. Hence, Kahoot reviews may not support long-term retention of the lessons. However, there are other factors to consider, like the mid- term and final exams are longer and more complex than the written quizzes. These results conform to the Lopez and Cabot study (2022), which revealed that Kahoot's positive effects on academic performance during lectures were "strongly diluted when high-demanding exams were taken." The result, however, contradicts the findings of Elkhamisy and Wassef (2021) that Kahoot enhances Pathology understanding and retaining knowledge.

CONCLUSION AND RECOMMENDATIONS

This section summarizes the findings and directions for future research. The study aimed to evaluate whether game-based reviews will enhance the students' motivation, participation, and class performance and whether students' Kahoot scores are predictive of their other examination scores.

The following conclusions were drawn from the findings of the study. A majority (98 percent) of the students like playing Kahoot in class. It increases class attendance and motivates students to engage in class. However, there was a significant difference between the cohorts' perceptions of the advantages of playing Kahoot, with Cohort 1 being very satisfied while Cohort 2 was satisfied. However, there was no significant difference between the perceived disadvantages of using Kahoot in class.

A weak positive correlation was between Aptis and Kahoot scores for Cohort 1 and a *moderate positive correlation* for Cohort 2. Aptis contributes only about 5 percent and 9 percent, respectively, to the variation of the Kahoot scores of the two cohorts. Regarding Kahoot and quiz scores, there was a *strong positive correlation* between these variables for Cohort 1 and a *very strong positive correlation* for Cohort 2. Kahoot contributes 36 percent to the variation of quiz scores for Cohort 1 and 52 percent for Cohort 2.

There was a weak positive relationship between Kahoot and mid-term exam scores for Cohort 1 and a moderate positive relationship for Cohort 2. For Cohort 1, Kahoot contributes only 7 percent to the variability of mid-term scores, and 23 percent for Cohort 2. There was no relationship between Kahoot and students' final exam scores in Cohort 1, but a moderate positive relationship between the two variables for Cohort 2. Kahoot scores accounted for 15 percent of the variability in the student's final exam scores in cohort 2.

Among takers of the ACCA qualifying exam, there was a *negligible relationship* between Kahoot and ACCA CBE scores for Cohort 1 and a *strong positive association* for Cohort 2. For example, Kahoot contributes only 4 percent in the difference of CBE scores of Cohort 1 and 19 percent for Cohort 2. However, the two cohorts' Aptis or English proficiency and CBE scores strongly correlate. For example, Aptis contributes 25 percent and 22 percent to the variation of CBE scores of Cohorts 1 and 2, respectively. This result imparts that students' English proficiency is a factor in passing international qualifying exams.

The overall findings suggest that Kahoot reviews were effective in improving the scores of exams given within the short time after the Kahoot review. However, the effectiveness wanes after the lapse of time, especially when more complex questions are given. Generally, class reviews using Kahoot may not support long-term retention of the lessons.

For future research directions, having multiple cohort studies with control and intervention groups is recommended for better comparison of the effectiveness of Kahoot, as the present study only covers two intervention groups and no control groups. Also, assessing whether comprehensive Kahoot reviews given immediately before the mid-term and final exams will improve the student's scores is suggested. In addition, another scope for further research could be a longitudinal study to assess knowledge retention offered by Kahoot reviews and other contributing factors that will enhance class performance and pass rates in international qualifying exams.

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