

Solutions to money laundering prevention through Regulatory Technology (RegTech): Evidence from Islamic and conventional banks

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Abstract

Purpose – This study aims to examine the effect of the relationship between RegTech and Money Laundering Prevention (MLP). This study also examines the differences between RegTech in Islamic and conventional banks.

Methodology – The current study used explanatory research to test hypotheses using primary data obtained through a survey with a questionnaire conducted online with 100 respondents from bank employees, both conventional and Islamic in Indonesia. In addition, an independent t-test was used.

Findings – The results reveal that Transaction Monitoring (TM) and Cost and Time (CT) significantly affect MLP, while electronic Know Your Customer (eKYC) does not affect MLP. The comparative test of the differences in RegTech in Islamic and conventional banks confirm differences in transaction monitoring and cost efficiency between Islamic and conventional banks. At the same time, there is no difference in eKYC between Islamic and conventional banks.

Originality – Research related to RegTech in Islamic and conventional banks' money laundering prevention efforts is still very limited in Indonesia. This study will contribute to the existing literature on Islamic finance and the development of financial technology in Indonesia.

Introduction

In the current era, digitalization has become a necessity for every sector. The rapid development of technology has also forced the financial sector to adapt to these changes. Customers also transformed, and the concept of digital customers emerged so that the products and services offered had to adapt to this concept. New companies' instruments and financial products with advanced technology emerged (Machkour & Abriane, 2020).

The term financial technology (FinTech) has also begun to be recognized by Indonesians. According to Bank Indonesia, FinTech is the use of technology in the financial system that produces new products, services, technology, and/or business models. It can impact monetary

stability, financial system stability, and/or efficiency, smoothness, security, and reliability of the system payment. Anagnostopoulos (2018) states that disruptive technology changes are an essential aspect in investigating regulatory compliance followed by changes. The sophistication of the FinTech system certainly does not escape various kinds of risks, so regulatory technology (RegTech) is needed (technology regulation).

Banks face technology risks as one financial institution that is starting to adapt to financial technology. One of them is money laundering which is still happening. According to Anti-Money Laundering and Counter-Terrorism Financing Statistical Bulletin (APUPPT), the number of suspicious financial transactions (RSFT) in the bank during 2020 was 265,813 reporting parties. In addition, Financial Service Providers (FSP) who reported during 2020 amounted to 146 reporting parties. Overall, the number of RSFT received by Financial Transaction Reports and Analysis Center (PPATK) from January 2003 to December 2020 has reached 572,053 RSFT or an increase of 13.5 percent compared to the cumulative number of RSFT at the end of December 2019 (See table 1).

Table 1. Anti-Money Laundering and Counter-Terrorism Financing Statistical Bulletin Report as of December 2020

Type of Reporting FSP	After the enactment of the Money Laundering Law No. 8 of 2010 (Since January 2011)								Total Jan 2003 up to Dec 2020	Total FSP 2020 (up to Dec 2020)
	Tahun 2019				Tahun 2020					
	Year 2011-2018	Dec-2019	Cum up to Dec-2019	Jan-2019 up to Dec-2019	Nov-20	Dec-20	Cum up to Dec-2020	Total		
Banks	186.991	3.692	40.206	40.206	3.401	3.036	38.616	265.813	302.122	146
Commercial Banks	183.987	3.654	39.537	39.537	3.372	3.015	38.306	261.83	297.852	105
State Owned Bank	69.256	1.622	14.195	14.195	779	693	8.090	91.541	102.637	4
Private Bank	95.082	1.723	21.961	21.961	2.355	1.873	27.194	144.237	156.777	54
Regional Development Banks (BPD)	11.801	196	1.810	1.810	105	321	1.566	15.177	23.791	26
Foreign Bank	4.612	101	1.265	1.265	86	89	1.159	7.036	9.651	13
Mixed Bank	3.236	12	306	306	47	39	297	3.839	4.996	8
Rural Banks	3.004	38	669	669	29	21	310	3.983	4270	41

Source: APUPPT Statistics Bulletin, 2020

The high number of reports of suspicious financial transactions (RSFT) that occur in the bank, the presence of RegTech in identifying risks and financial technology systems as part of an effort to prevent money laundering is critical. Regulations that support money laundering prevention in Indonesia have been compiled in the Regulation of the Financial Services Authority of the Republic of Indonesia Number 23/POJK.01/2019 and Bank Indonesia Regulation Number 14/27/PBI/2012. However, according to Miller & Rosen (2017), despite domestic regulations and law enforcement mechanisms, policymakers still have challenges in identifying and addressing policy gaps and new money laundering methods exploited by perpetrators.

Money laundering activities can pose a threat to the economy and its security. The main problem is that money laundering weakens the financial system's integrity, causes a loss of control over a country's economic policies, distorts the economy, causes instability in investment, and results in lower tax revenues for the government (Chen et al., 2018). Research on money laundering has been widely carried out, but its relationship with RegTech is still rarely studied. Thus, this study aims to expand on previous research by investigating the role of RegTech in banks in strengthening or weakening the Anti-Money Laundering program in Indonesia.

Literature Review and Hypothesis Development

RegTech and Money Laundering Prevention

RegTech is a new term that was created to realize solutions through technology and innovation (Anagnostopoulos, 2018; Arner et al., 2017; Silverberg et al., 2016). Several previous studies (Brody et al., 2017; Neal, 2021) suggest that companies that use technology solutions to support regulatory management and understand regulatory evolution coupled with potential innovation opportunities can gain a competitive advantage in the future.

RegTech is defined as applying technology for regulatory activities (Baxter, 2016). Meanwhile, Zabelina et al. (2018) defines RegTech as a set of regulatory technologies that help organizations comply with legal requirements that are constantly evolving and promise reliable, safe, and economical solutions for financial institutions in increasing their efficiency. In addition, RegTech can also help banks reduce errors that usually occur in manual processes that impact time and number of employees because regulatory assessments of everyday financial activities are becoming more complex. In analyzing this, automation assistance is needed (Kurum, 2020). Therefore, in general, RegTech can be defined as developing new technologies that assist banks in fulfilling their regulatory obligations.

RegTech was formed through the recommendations of financial regulators that promote the application of technology to the anti-money laundering field to increase cohesion and coherence at the institutional level (Butler and Brooks, 2018). When applied to anti-money laundering, RegTech tends to modernize Know Your Customer (KYC) processes and improve risk mitigation and support outdated information technology systems (Vaithilingam et al., 2015). According to Kurum (2020), the latest technology is most influential for Financial Institutions to combat crime and financial risk, and there is a strong correlation between detailed compliance programs and the level of sophistication of the methods used for money laundering.

According to Arner (2017), there are several reasons why RegTech is required to overcome financial problems and risks, including: (1) RegTech helps financial institutions to make adjustments to regulatory complexities that require greater detail, precision, and frequency in reporting, aggregating, and analyzing data; (2) The severity of regulatory fragmentation increases the burden of compliance for financial institutions so that they can turn to RegTech to optimize compliance management; (3) Regulations evolve rapidly resulting in uncertainty, RegTech may be able to assist financial institutions to ensure compliance in a changing environment through repeated modeling and testing; (4) RegTech can ensure financial institutions comply with regulations in a responsive manner because RegTech adds value to regulators by helping them understand in closer and real-time, innovative products and complex transactions, market manipulation, and internal fraud and risks.

RegTech is widely considered to have great potential to facilitate oversight processes and improve regulatory compliance (Yang & Tsang, 2018). However, very few studies examine RegTech concerning the effectiveness of money laundering prevention in the banking sector in developing countries (Turki et al., 2020). Following this argument, this study focuses on the relationship between RegTech and money laundering prevention with particular reference to developing countries, namely Indonesia.

The Basel Institute on Governance (2020) places Indonesia in the 96th position as a country at risk of money laundering and terrorism financing from 141 countries. In line with this, according to data from the APUPPT Statistical Bulletin, reports of suspicious financial transactions that occurred at the bank in 2020 are still relatively high (See Table 1). It makes Indonesia consider the high potential for money laundering crimes.

Therefore, further research is needed to determine how RegTech influences money laundering prevention, especially in Indonesia. This study identifies three independent variables, namely RegTech: (1) Electronic Know Your Customer (e-KYC), Transaction Monitoring (TM), and Cost and Time (CT) embedded in RegTech. Likewise, the dependent variable of the effectiveness of Money Laundering Prevention (MLP) is also measured from the respondent's point of view. Based on the description above, the hypothesis can be formulated as follows:

H₁: eKYC positively associated with MLP

H₂: TM positively associated with MLP

H₃: CT positively associated with MLP

RegTech in Islamic and Conventional Banks

Islam recognizes freedom, but this freedom is not to destroy or weaken the valuable framework of society or even harm others. The concept of Islamic moral values, socio-economic justice, the institution of hisbah, and other related principles must be taken seriously when dealing with illegal activities such as money laundering (Mohamed Sanusi, 2008). According to Jabbar (2020), Islamic financial institutions are more protected from money laundering and criminal financiers than conventional banks because there are rules that explicitly prohibit Islamic from being involved, either directly or indirectly, in haram activities (forbidden). However, strong regulation and supervision make the Islamic finance sector unattractive to financial criminals like the conventional financial sector (Shanmugam & Thanasegaran, 2008). Apart from conventional banks, several other business categories such as insurance companies, money changers, and Islamic banking institutions need to report for "suspicious" transactions to the supervisory agency. Based on previous research, there are differences between conventional and Islamic banks in conducting MLP. The hypothesis is formulated as follows:

H₄: There is any difference in eKYC between Islamic and conventional banks

H₅: There are any differences in TM between Islamic and conventional banks

H₆: There is any difference in CT between Islamic and conventional banks

Research Methods

Research design

This study examines the relationship between the independent variable, RegTech, and the dependent variable, the Effectiveness of Money Laundering Programs at banks in Indonesia. This study uses descriptive statistics as a primary tool to describe sample data and an overview of the basic concepts of research (Cooper & Schindler, 2013). In this study, descriptive statistics present data in the form of the number of observations, averages, standard deviations, skewness, and kurtosis to assess the normality of the data. Furthermore, hypothesis testing 1 to 3 will be carried out using multiple linear regression analysis. Hypothesis testing 4 to 7 is carried out using T-test analysis with SPSS statistical tools to identify Islamic and conventional banks' comparisons.

Data and Sample

The data used in this study are primary data, taken through questionnaires with the criteria of respondents being Indonesian citizens who work in banks, both conventional and Islamic. Staff in the banking sector are considered to have knowledge and skills in preventing money laundering (Turki et al., 2020). The sample size for this study was 100 bank employees. This sample size generalizes the population of bankers in Indonesia based on a 95% confidence level.

Survey Instrument Design

Surveys are distributed to bank employees online using Google Forms. The questionnaire includes two parts: (1) The first part collects demographic information such as gender, age, work experience, position, and type of bank where you work; (2) The second part contains a series of structured questions designed to gain a banker's perspective on the factors of RegTech that affect the effectiveness of the (MLP) program (Turki et al., 2020). The second part of the questionnaire will use a Likert scale, where number one represents "Strongly Disagree (SD)" to number five represents "Strongly Agree (SA)".

Survey Instrument Reliability and Validity

Reliability is the dependence or consistency of the size of a variable (Neuman, 2013). As a measure of reliability, survey data was measured using Cronbach alpha. Referring to Hair et al. (2014), the acceptable Cronbach alpha value is 0.70. The validity of the research instrument refers to how well an empirical indicator and conceptual definition of the construct that the indicator should measure is considered fit (Neuman, 2013). The questionnaire used in this study refers to the questionnaire used by (Turki et al., 2020), which was reviewed by a MLP specialist and approved by an academic professor to ensure its validity.

Result and Discussion

Respondent Description

This section discusses the results of data collection that have been obtained by distributing questionnaires to bank employees. The results obtained from 100 respondents are summarized in Table 2 based on gender, age, experience, and position. In contrast, Table 3 describes an awareness of RegTech and law enforcement actions taken in the bank due to compliance violations.

Table 2. Respondent Profile

No.		Category	N = 100	Percentage
1	Gender	Male	47	47%
		Female	53	53%
2	Age	< 30 years	56	56%
		30-40 years	23	23%
		41-50 years	16	16%
		> 50 years	5	5%
3	Experience	< 5 years	37	37%
		5-10 years	40	40%
		11-15 years	5	5%
		> 15 years	18	18%
4	Position	Front Office	38	38%
		Operation management	15	15%
		Risk Management/Anti Money Laundering	5	5%
		Audit	9	9%
		Other	33	33%
5	Bank Type	Conventional Bank	77	77%
		Islamic Bank	23	23%

Table 2 presents demographic data such as gender, where 53% of the sample size is female (representative of most respondents), while 47% is male. This is in line with the Central Statistics Agency (BPS) report, which states that the female workforce has increased from 2018 to 2019, where females dominate the role as business personnel in the service sector (including banks) by reaching 58.04% compared to male.

Furthermore, respondents under the age of 30 amounted to the most for respondent age data, namely 56%. In addition, 23% of respondents aged 30-40 years old, 41-50 years old are 16%, and five respondents are over 50 years old (5%). These results reflect the concerted efforts made by companies to recruit younger employees. They are considered more capable of adapting to rapid changes of financial services because it often involves the application of the latest developing technologies (Deloitte, 2019; PriceWaterhouseCoopers, 2008).

In terms of experience, 37% of respondents have banking experience of fewer than 5 years, 40% between 5-10 years, 5% between 11-15 years, and 18% above 15 years. These results provide a balanced response from bankers with varying experience profiles that contribute effectively to the robustness and reliability of research results by bringing about a balance of bankers' varied perspectives on RegTech.

With respect to the job function of bankers who participated in the survey, the results of the top banking position were occupied by the front office as many as 38% of respondents.

Other respondents indicated that operations, risk management/anti-money laundering, audit functions were 15%, 5% 9%, and other functions were 33%. It can be seen that the percentage of front officers who dominate the research results who are at the forefront where their duties include interacting with customers and knowing customer needs. Therefore, the study results credibly represent the views of compliance specialists on the impact of RegTech on MLP and various opinions from other roles addressing the same.

Table 3. General Data

	Category	N = 100	Percentage
RegTech Awareness	Yes	77	77%
	No	23	23%
Law Enforcement at the Bank	Yes	89	89%
	No	11	11%

Table 3 shows that 77% of the bank's employees are aware of the presence of RegTech and 89% of the bank's employees acknowledge that law enforcement at the bank is starting to be enforced well. The call for FinTech and RegTech has indeed been intensively carried out by the government and financial institutions in Indonesia. However, it turns out that 23% of bank employees do not realize and understand it.

Table 4 showed descriptive statistical data regarding the dependent and independent variables that show the percentage response of each statement, mean and standard deviation. The five eKYC statements show that the average value of respondents who agree is between 3.7 to 4.26, and the standard deviation value is between 0.917 to 1.202.

Table 4. Variable Analysis

Statement	Frequency (%)					Mean	Standard Deviation
	SD (1)	D (2)	N (3)	A (4)	SA (5)		
eKYC1	8	10	13	42	27	3.7	1.202
eKYC2	2	4	14	42	38	4.1	0.927
eKYC3	1	5	13	33	48	4.22	0.927
eKYC4	2	3	15	38	42	4.15	0.925
eKYC5	2	2	14	32	50	4.26	0.917
TM1	1	3	15	37	44	4.2	0.876
TM2	2	2	11	41	44	4.23	0.874
TM3	1	2	12	33	52	4.33	0.842
TM4	1	2	15	39	43	4.21	0.844
TM5	2	5	22	35	36	3.98	0.985
CT1	1	4	11	42	42	4.2	0.865
CT2	1	2	9	40	48	4.32	0.803
CT3	1	6	6	43	44	4.23	0.886
CT4	1	1	10	47	41	4.26	0.76
CT5	1	7	19	41	32	3.96	0.942
MLP1	1	1	6	36	56	4.45	0.744
MLP2	1	3	6	39	51	4.36	0.811
MLP3	2	2	14	37	45	4.21	0.902
MLP4	1	2	10	47	40	4.23	0.79
MLP5	1	1	7	42	49	4.37	0.747

Note: SD = strongly disagree; D = disagree; N = neutral; A = agree; SA=strongly agree

The first statement, "There are deficiencies in filling KYC form manually as a client may leave out some mandatory information blank," has the lowest average value (3.7) and the highest standard deviation (1,202), this indicates that respondents disagree with the statement. Respondents may not have realized the importance of information in identifying customers in helping the bank avoid risks, such as money laundering.

The second independent variable is the TM variable. The five TM statements show that the average value of respondents who agree is between 4.2 to 4.33, and the standard deviation

value is between 0.876 to 0.985. The five statements showed a standard deviation value below 1. This value indicates a relatively greater level of consistency in responding to TM than responses to eKYC. The second statement, “Advanced system that checks accounts against watch-lists, screen transactions for sanctions can effectively help banks comply with economic sanctions” has the highest average score of 4.32 with a standard deviation of 0.803. It indicates that respondents have realized the importance of the latest system in assisting Banking Transaction Monitoring. Banks can immediately investigate suspicious transactions to avoid economic sanctions.

The last independent variable is the CT variable. This variable also uses 5 statements, where the average value ranges from 3.96 to 4.32, and the standard deviation value is between 0.760 to 0.886. The five standard deviation values of the statement are below 1, which shows that most respondents agree with all statements. The second statement, “Automated system for detecting suspicious activities that reduces false positive alerts will help AML specialists executing alerts in a short time,” showed the highest average score of 4.32 (standard deviation = 0.886), where 48% of respondents strongly agree with this statement. A system that automatically detects suspicious transactions can help the bank be more alert to money laundering activities. Respondents have realized the importance of the current system to help banks maximize costs and time spent dealing with financial risks.

Furthermore, the dependent variable is MLP. The mean value ranged from 4.21 to 4.45, and the standard deviation was 0.744 to 0.902. All statements show a standard deviation value below 1, where the respondents agree with all statements, 47% of respondents agree and 40% of respondents strongly agree with the fourth statement, The third statement was approved by 37% of respondents and 45%. The fifth statement was approved by 42% of respondents and 49% responded strongly agreed. It shows the importance of the MLP program in helping the bank avoid risks that threaten the bank's welfare.

Normality Test

Normality testing in this study was conducted by looking at the statistical results of the standard deviation, skewness, and kurtosis. Data is assumed to be normal if it meets the following criteria:

1. Standard deviation < 1,5
2. Skewness < $|\pm 1.5$
3. Kurtosis < $|\pm 3$

Table 5. Normality Test Results

	N	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
eKYC1	100	1.202	-.894	.241	-.062	.478
eKYC2	100	.927	-1.135	.241	1.390	.478
eKYC3	100	.927	-1.153	.241	.904	.478
eKYC4	100	.925	-1.164	.241	1.435	.478
eKYC5	100	.917	-1.346	.241	1.894	.478
TM1	100	.876	-1.048	.241	.992	.478
TM2	100	.874	-1.394	.241	2.557	.478
TM3	100	.842	-1.314	.241	1.836	.478
TM4	100	.844	-1.034	.241	1.189	.478
TM5	100	.985	-.802	.241	.263	.478
CT1	100	.865	-1.167	.241	1.491	.478
CT2	100	.803	-1.366	.241	2.533	.478
CT3	100	.886	-1.361	.241	1.898	.478
CT4	100	.760	-1.182	.241	2.581	.478
CT5	100	.942	-.733	.241	.092	.478
MLP1	100	.744	-1.705	.241	4.305	.478
MLP2	100	.811	-1.566	.241	3.130	.478
MLP3	100	.902	-1.273	.241	1.890	.478
MLP4	100	.790	-1.190	.241	2.304	.478
MLP5	100	.747	-1.468	.241	3.567	.478

The MLP variable showed the problem of normality where MLP1, MLP2, and MLP5 show a statistical result of kurtosis 3. These results make the three variables have an abnormal distribution, and the rest, the variables have met the criteria for normality. Baltagi (2011) states that if the sample used is large enough, then considering the central limit theorem assumes that the residuals are normally distributed.

Reliability and Validity Test

Reliability testing using the Cronbach alpha method. The questionnaire is considered reliable if the alpha coefficient is 0.70 (Hair et al., 2014). Furthermore, validity is measured by assessing the item-to-item/item-to-total results (Duncan et al., 2018) with the following criteria:

1. *Item-to-Item* $\geq 0,20$
2. *Item-to-total* $\geq 0,50$

Table 6. Results of Cronbach alpha and item-to-item/item-to-total

Item	Cronbach Alpha	Item to Item Correlation ≥ 0.2		Item to Total Correlation ≥ 0.5		Remarks
		Min	Max	Min	Max	
eKYC	0.797	0.195	0.750	0.380	0.728	eKYC 1 dan 4
TM	0.868	0.381	0.755	0.466	0.787	TM5
CT	0.861	0.401	0.645	0.615	0.781	All items accepted
MLP	0.922	0.626	0.801	0.750	0.833	All items accepted

Table 6 shows Cronbach alpha 0.70 so that all items are declared reliable. However, the result of the eKYC 4 item-to-item correlation is 0.195 0.20 so this item is considered invalid. Similarly, the results of the item-to-total correlation of eKYC 1 = 0.380 and TM = 0.466 0.50, so that both items are also considered invalid. Meanwhile, there are no validity issues on CT and MLP items so that all statement items can be accepted. To get maximum results, eKYC 1, eKYC 4, and TM5 statement items must be deleted.

Table 7. Results of Cronbach alpha and item-to-item/item-to-total after deletion

Item	Cronbach Alpha	Item to Item Correlation ≥ 0.2		Item to Total Correlation ≥ 0.5	
		Min	Max	Min	Max
eKYC2,3,5	0.761	0.443	0.574	0.547	0.649
TM1-4	0.901	0.636	0.755	0.736	0.831
CT	0.861	0.401	0.645	0.615	0.781
MLP	0.922	0.626	0.801	0.750	0.833

Table 7 shows the results of Cronbach alpha and item-to-item/item-to-total correlation after deletion, and all items have met the criteria so that all items are considered reliable and valid.

Hypothesis Test

Before testing the hypothesis, this study examines the relationship between the independent and the dependent variables using Pearson's correlation which is commonly used to measure and describe the strength and relationship between variables without the requirement of normality. Table 8 shows the results where all variables have a significant value at the 1% level so that each variable has a significant correlation between variables.

Pearson correlation analysis is usually used to ensure no multicollinearity problem between variables. These variables have a relatively high value of > 4.00 , so the multicollinearity test of the independent variables shows that the correlation between variables is high. However, the value of the Variance Inflation Factor (VIF) of the three independent variables is < 10 (See

Table 10), this result proves that the three variables are independent of multicollinearity symptoms (Hair et al., 2014).

Table 8. Pearson Correlation Matrix

	Mean	MLP	eKYC	TM	CT
MLP	4,32	1			
eKYC	4,2	0,713***	1		
TM	4,25	0,848***	0,796***	1	
CT	4,19	0,810***	0,712***	0,808***	1

Note: ***significant at 1% level

The R-Square value in this study is 0.764, where the independent variables, namely eKYC, TM, and CT, simultaneously affect the dependent variable MLP by 76.4%. In contrast, the rest is influenced by other variables outside the independent variables of this study. These other factors include but are not limited to endogenous bank factors such as Artificial Intelligence (AI), Good Corporate Governance (GCG), senior management commitment to compliance efforts and staff expertise level, and others (Kurum, 2020; Said et al., 2013; Vaithilingam & Nair, 2007).

Table 9. Determinant Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
	B	Std. Error	Beta			
(Constant)	2.867	1.115		2.572	0.012	
eKYC (X ₁)	0.057	0.128	0.037	0.449	0.654	2.833
TM (X ₂)	0.618	0.115	0.533	5.355	0.000***	2.029
CT (X ₃)	0.360	0.088	0.352	4.104	0.000***	2.996

Note: *** significant at 1% level

Table 10 Independent Samples Test

	Levene's Test for Equality of Variances			t-test for Equality of Means				
	F	Sig.	T	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
eKYC	0.078	0.781	0.686	0.494	0.124	0.181	-0.235	0.483
TM	0.077	0.781	1.702	0.092	0.301	0.177	-0.050	0.652
CT	2.373	0.127	1.705	0.091	0.275	0.161	-0.045	0.594

Note: * significant at 10% level

Furthermore, Table 9 shows that the eKYC variable is insignificant because its value is 0.0654 > a significance level of 0.05 (5%). Therefore, hypothesis 1 is rejected, where eKYC does not affect MLP. On the other hand, TM and CT variables show a significance value of 0.000 < 0.01 (1%), so that hypothesis 2 and hypothesis 3 are accepted. There is an effect of TM and CT on MLP.

Table 10 shows the significant value of Levene's Test > 0.05, which means that the data variance is homogeneous, so that Table 12 focuses on the value of equal variances assumed. sig value. (2-tailed) variables TM and CT showed significance at the 10% stage, namely 0.092 and 0.091 < 0.10. It means that there is a significant difference between TM and CT between conventional and Islamic banks.

On the other hand, the value of sig. (2-tailed) eKYC variable is not significant because its value is 0.492. It shows no difference in eKYC between conventional and Islamic banks. Furthermore, the mean difference values of significant variables are 0.301 and 0.275, and this value shows the difference in the average TM and CT in conventional and Islamic banks. The difference for TM is -0.050 to 0.652, while for CT, it is -0.045 to 0.594 (95% Confidence Interval of the Difference).

Discussion

Testing the first hypothesis shows that eKYC does not affect MLP. This result is similar to the Turkish study (2020) which states that bankers may perceive non-electronic KYC mechanisms effectively. Thus, increasing the effectiveness of MLP from eKYC using sophisticated RegTech algorithms is considered not very influential. Moreover, these results may indicate that bankers who are not part of risk management are less aware of the disruptive impact of advanced technologies such as blockchain on KYC effectiveness (Lootsma, 2017; O'Reilly & Khrisna, 2017).

Testing the second hypothesis shows that TM affects MLP. Machine learning technology with effective systems, controls, and practices helps manage the bank's risk of money laundering activities by identifying, analyzing, and reducing manual screening/checking processes (Chen et al., 2018). Interaction of high-tech innovations, incompleteness of information, volatility and risk, market imperfections, and regulatory issues are distractions by overlapping finance and technology. RegTech helps monitor transactions by leveraging near real-time data capabilities, automating advanced algorithmic processes, linking models and advanced analytics with fast-moving artificial intelligence (AI) (Anagnostopoulos, 2018).

The three research hypotheses state that CT affects MLP. This confirms the support for hypothesis three, which shows a significant relationship between CTe on MLP. In this study, RegTech can reduce costs and time spent in MLP activities, where RegTech provides solutions in integrating automation, scalability, flexibility, and transaction security. The beta of the dependent variable in the regression equation of 0.360 is associated with CT at a significance level of 1%. It is in line with bank regulations regarding anti-money laundering requirements, namely innovative and cost-effective technology (Bank for International Settlement, 2017). According to (O'Reilly & Khrisna, 2017), the adoption of RegTech allows banks to interpret large amounts of data quickly, precisely, and cheap.

There is no eKYC difference between conventional and Islamic banks. This result is similar to Shanmugam & Thanasegaran (2008) research, where the Islamic finance sector in Malaysia is subject to strict supervision to combat financial crime, just like conventional banks. Banks must comply with and implement anti-money laundering standards such as KYC. These anti-money laundering measures are designed to ensure that banks monitor customer accounts during their business relationship with certain banks (Mugarura, 2015). Islamic and conventional banks try their best to carry out Money Laundering Prevention because they are supervised by the Financial Services Authority (OJK). There is no difference in the application of eKYC to Islamic and conventional banks.

Furthermore, the results of testing the fifth hypothesis indicate a difference in transaction monitoring between conventional and Islamic banks. Although Islamic banks have better knowledge of their customers, this does not necessarily affect the supervision of their transactions (Turki et al. 2020; Usman et al., 2020). One of the causes of this difference is the challenge of utilizing digital technology which provides online and mobile banking services. Banks need to innovate. Islamic banks go beyond adopting electronic solutions less than conventional banks (OJK, 2020). Applying the digital banking system in Islamic banking is considered less aggressive than conventional banking. Primarily during the current COVID-19 pandemic, which requires all services to be done digitally, Islamic banks rely on physical outlets and reach their customers through digital services (Ministry of National Development Planning/Bappenas, 2020) which conventional banks previously owned. In addition, one of the causes is manual data collection, so there are differences in the implementation of TM in Islamic and conventional banks.

Finally, the sixth hypothesis states differences in CT between Islamic and conventional banks. It supports hypothesis six, which shows a difference in CT between Islamic and conventional banks. These results indicate differences in CT between conventional and Islamic banks. The application of technology that is still lacking is due to the limitations of banks to develop FinTech. In comparison, the digitalization of Islamic banking can impact CT, which impacts on increasing income. It is different from conventional banks with more advanced information technology to make it easier to implement RegTech to increase efficiency (OJK, 2020). According to a survey from PWC (2018), only 14% of Islamic banks say that digitization aims to increase the income of Islamic banks. Whereas FinTech has digitization aims to the national economy and increased public access to financing. In addition, Islamic banks' differences in the quality and quantity of human resources have not yet supported the development of products and services that can meet customer needs. Islamic banks are also still only focused on business goals, so they have not been able to optimally take advantage of the Islamic economic and financial ecosystem (OJK, 2020).

Conclusion

This study aims to identify the impact of RegTech on the effectiveness of MLP in banks. In addition, this study was also conducted to determine whether there are differences in the application of RegTech between conventional and Islamic banks. To achieve this goal, RegTech is represented by three independent variables: eKYC, TM, and CT, where MLP is the dependent variable. This study uses a survey method for data collection. All data were collected from March to May 2021 through an online survey. The survey uses a Likert scale with random sampling from the population of bankers in Indonesia.

The results showed that the two independent RegTech variables, TM and CT, are very significant drivers on the effectiveness of MLP at a significance of 1%. CT has the highest impact on the effectiveness of MLP. RegTech's ability to process big data in real-time reduces costs, improves accuracy in screening large volumes of transactions, and amplifies the cost and time impact of money laundering prevention effectiveness. However, this study shows that eKYC provided by RegTech does not significantly impact MLP although there is a moderate positive correlation between these variables. According to Turki (2020), there are two reasons why this can happen, namely (1) Bankers feel that manual KYC is quite effective; and (2) Bankers do not know the importance of eKYC in assisting MLP.

Furthermore, testing the difference between RegTech in conventional and Islamic banks also gives similar results. TM and CT variables show significant results at the 10% level, indicating differences between Islamic and conventional banks in applying the two independent variables. One of the causes of this difference is the challenge of utilizing digital technology beyond providing online and mobile banking services. Islamic banks need to innovate in technology such as conventional banks. Islamic banks are also still only focused on business goals, so they have not been able to optimally take advantage of the Islamic economic and financial ecosystem (OJK, 2020). Meanwhile, the test results on eKYC show no difference between Islamic and conventional banks. It shows that the implementation of eKYC in Islamic and conventional banks is the same or equivalent because banks are required to comply with and apply anti-money laundering standards such as eKYC and a supervisory body supervises the bank.

However, there are some limitations to this study. This research was conducted on Islamic banks and conventional banks but did not specifically distinguish each of these specific banks. Future studies are expected to consider these two types of banks to obtain variations in responses (Turki et al., 2020). Further limitations, this study was based on an online survey administered at random to bankers who agreed to participate in this study. In the collecting data process, the information provided by respondents through questionnaires sometimes does not show the valid opinion of respondents. Sometimes, there are differences in thoughts, assumptions, and understandings for each respondent and other factors such as honesty in filling out respondents' opinions in the questionnaire which may lead to non-response bias.

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Appendix: Question Statement

Variables	Sub-variables	Question statement
Regulatory Technology	Electronic Know Your Customer (eKYC)	<ol style="list-style-type: none"> 1. There are deficiencies in filling KYC form manually as some mandatory information may left out blank by client. 2. Automation that eliminates deficiencies in collecting required information from customer will strengthen the KYC process. 3. Obtaining customer data from government sources through automation can strengthen data reliability and verification requirements. 4. Updating KYC information electronically using government portal improve KYC process effectiveness. 5. Having inaccuracies in the information collected from customer may lead to your bank being used to launder funds and a regulatory penalty.
	Transaction Monitoring	<ol style="list-style-type: none"> 1. Improved analytics for vast volumes of transactions to identify abnormal patterns can help detect suspicious activity more accurately. 2. Advanced system that checks accounts against watch-lists, screen transactions for sanctions can effectively help banks comply with economic sanctions. 3. Automation that enables access to authority's databases to conduct background screening/criminal record will enhance bank's AML risk assessment. 4. Improved data analysis that provides smart prediction & enable banks to visualize customer behavior will help banks to act proactively. 5. It's nearly impossible to monitor transactions without the support of an automated system.
	Cost and Time	<ol style="list-style-type: none"> 1. New Technologies (advanced software) can help banks cut the total cost of money laundering prevention. 2. Automated system for detecting suspicious activities that reduces false positive alerts will help AML specialist executing alerts in short time. 3. Automation submission of suspicious transaction reports enables authorities to receive reports in real-time. 4. Information collected in real-time by KYC automation reduces both cost and time. 5. The rapid changes in regulatory environments and fines imposed on banks causes the cost of money laundering prevention to increase.
	Money Laundering Prevention	<ol style="list-style-type: none"> 1. Bank account managers exhibit a high degree of effectiveness in implementing KYC safeguards. 2. Monitoring systems, usually detecting suspicious transactions in timely manner, serve as effective tools in the combating of money laundering in the bank. 3. Penalties and enforcement imposed on the bank in the context of punitive anti-money laundering actions undertaken by regulators are largely under control. 4. Advanced technology is effectively employed by the bank to stymie new emerging money laundering threats. 5. Money laundering prevention programs undertaken by the bank effectively guard the bank against regulatory and reputational risk.