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Understanding the technology acceptance model in the QRIS usage: Evidence from SMEs in Indonesia



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ABSTRACT

This study aims to examine the Technology Acceptance Model (TAM) for QRIS usage in SMEs in Indonesia. We employed Partial Least Square Structural Equation Modelling (PLS-SEM) with first-order reflective model to analyze the data. The dataset contains 107 SMEs in Medan, Indonesia (n = 107). There are four constructs in the model in this study, namely: perceived usefulness, perceived ease of use, attitude toward using, and behavioral intention to use. After the evaluation of measurement models and structural models known to meet the criteria, we can conclude the results of the data analysis. In general, all variables positively affect other variables in this model, although one of that is insignificant. The results indicate that perceived usefulness is positive and significantly affects attitude toward using and behavioral intention to use, while attitude toward using is also positive and significantly affects behavioral intention to use. Furthermore, perceived ease of use is also shown to have a positive and significant effect on attitude toward using and perceived usefulness. However, perceived ease of use insignificantly affects behavioral intention to use, although it still positively affects the behavioral intention to use. The findings of this study provide some crucial implications for SMEs and the provider of QRIS. Since the results indicate welcoming the QRIS usage, the socialization of QRIS needs to be more massive to reach the vast majority of Indonesian SMEs in Indonesia.

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Introduction

The development of technology at this time has become more rapid and sophisticated. The development of this technology is also increasingly playing an important role in these various fields due to the good ability of information technology in processing data and information so that it can help in making decisions quickly. Today, almost all professional fields require technology to facilitate the delivery of information and accelerate the organization's performance. This convenience is supported by various technological devices such as smartphones, tablets, and notebooks for accessing the internet.

Indonesia is the country with the third position with the highest number of internet users in Asia. This hints that the penetration of internet users in Indonesia from year to year is increasing significantly, meaning that currently, people have utilized the internet in their daily lives. Therefore, this growth trend has an impact on opportunities, especially in the world of education.

Apart from the adverse impact of information and communication technology that is increasingly developing, it does not hinder people's adaptation to technology, and it is precisely technology that is increasingly popular and cannot be separated from people's lives today. Technology demands a change from an old conventional system/habit to a more sophisticated, efficient, and electronic-based system where ease and open access are the main advantages of the presence of technology in various fields of life. The business sector, as a very important field in supporting the country's economy, is very much feeling the impact of the presence of this

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technology, which can be said to have changed business activities as a whole from a conventional transaction system to digital-based transactions.

Digital activities and electronic devices with data that play a significant role make humans unlimited in space and time in making a transaction. One form of implementation between technology and the growth of the digital economy is the non-cash payment of transactions. According to data from Bank Indonesia reports, 48 payment system service providers have obtained approval to carry out non-cash transactions. There are 14 from the banking side and 34 from the non-banking side. Forms of innovation in non-cash payment systems are debit / ATM cards, credit cards, money orders, checks, bank accounts, and electronic money.

Based on data from Bank Indonesia in 2019, the holder of the non-cash payment trend is electronic money as much as 95.75 trillion, which has increased from the previous year (2018) with transactions of 60.00 trillion. The high number of uses of electronic money for non-cash payments is due to the large number of electronic money products issued in the form of; e-card – money that is chip-based and server-based, such as e-wallet applications and bank accounts.

Implementing electronic money that has been used for online and offline payments can make it easier for merchants to transact, especially MSMEs. The existence of cooperation between MSMEs and electronic money providers will increase financial inclusion and advance the Indonesian economy. According to the Ministry of Cooperatives and Small and Medium Enterprises, the number of SMEs traders has increased every year.

The number of electronic money products accompanied by the rapid development of SMEs will make it easier for SMEs to make transactions and their customers. This electronic money makes it easier for SMEs to have no trouble finding change for customers, and customers do not need to bring much currency when shopping. Data from Bank Indonesia, in March 2021, as many as 40 companies have issued electronic money servers. These are some of the reasons also that the use of applications – e-wallet applications in customers is more dominant, and merchants have provided many QR Codes that can be used for electronic-based payment systems.

As the number of electronic payment systems increases, e-wallets have gained fame by providing many services in the food delivery sector and bill payments (Rosnidah, Muna, Musyaffi, & Siregar, 2019). This is not only beneficial for the buyer; merchants accept e-wallets as payment methods due to the fastest transaction process, efficient cash management, and fewer labor costs. This type of transaction is usually carried out in a physical store where: the customer scans the code (QR) using their mobile device to confirm the payment. Several e-wallet products that use the QR Code system have been provided by the merchant, including the OVO QR Code, GO-PAY QR Code, and LINK AJA QR Code. In cashless transactions, merchants often use the OVO QR Code in their stores because customers dominate using the application.

This study aims to capture the impact of payment implementation using the Quick Respond Indonesia Standard (QRIS) in Medan, Indonesia. In this study, Partial Least Square Structural Equation Modelling (PLS-SEM) with first-order reflective model has been employed to analyze the data of 107 SMEs in Medan, Indonesia.

Literature Review

Conceptual Background and Hypothesis Development

Quick Respond Indonesia Standard (QRIS)

Quick Response Code Indonesian Standard, commonly abbreviated as QRIS (read KRIS), is the unification of various kinds of QR from various Payment System Service Providers (PJSP) using QR Codes. QRIS was developed by the payment system industry with Bank Indonesia so that the transaction process with QR Codes can be easier, faster, and secure. All Payment System Service Providers who will use a Payment QR Code are required to apply QRIS.

Bank Indonesia launched the Quick Response (QR) Code standard for payments through server-based electronic money applications, electronic wallets, or mobile banking called the QR Code Indonesian Standard, coinciding with the 74th Anniversary of Indonesian Independence, on August 17, 2019, in Jakarta. The launch of QRIS is one of the implementations of the Indonesian Payment System Vision (SPI) 2025, which was launched in May 2019. QRIS provisions can be seen in No. 21/16/PADG/2019 concerning the Implementation of the National Standard Quick Response Code for Payments.

Theory of Reasoned Action (TRA)

The Theory of Reasoned Action is an initial study and is the foundation of the development of several behavioral theories, especially the Theory of Technology Acceptance Model (TAM). TRA is a theory proposed by Ajzen & Fishbein (1977). and is often used in social psychology. This theory suggests that a person's intentions or views on something can determine their attitudes and behavior. TRA also assumes that the behavior in question is under the control of a person, which means that the behavior can be carried out whenever they want (Staats, 2004). Two primary things in determining a person's behavior are attitude towards behavior and subjective norm (Ajzen & Fishbein, 1977). The emergence of this theory has become useful not only in the social sphere but in economics, marketing, and also in terms of technological acceptance (TAM), where the TAM model adopts behavioral intention to use variables derived from the TRA model to analyze how a person can accept a technology.

4 Technology Acceptance Model (TAM)

The Technology Acceptance Model, more commonly called the Theory of Technological Acceptance, is a theory first proposed by Davis (1989) and an extension model of the Theory of reasoned action (TRA). TAM is a theoretical model used in using and accepting new technologies/systems (Davis, 1989). TAM predicts the acceptance of new technologies based on several constructs: perceived usefulness, perceived ease of use, attitude toward using, and behavioral intention to use. Basically, from time to time, TAM has undergone development, as in research by Venkatesh & Davis (1996), (Venkatesh, 2000) and Lui & Jamieson (2003), where the study collaborated the TAM model with other external factors.

Perceived Usefulness

Perceived usefulness has the sense of how a person has confidence that when a new system is used, it will improve its performance (Davis, 1989). Perceived usefulness is also said to be the usability of a technology/system, where if the technology can be relied upon and believed, then actions to use the technology will appear (Aditya & Wardhana, 2016). There are several indicators in the measurement of perceived usefulness (perception of benefits), according to Davis (1989) and Budiastuti & Muid (2020), namely: *the system can improve job performance, improve time efficiency, increase effectiveness and productivity at work, improving the quality of work results in the better, streamline the transaction process and the system as a whole is helpful in the work*

Perceived Ease of Use

The perceived ease of use variable has the meaning of how a person believes that there is no need to expend great effort in using a system (Davis, 1989). Perceived ease of use is also interpreted as a benchmark, where users believe technology is easy to use and understand (Wibowo, 2008). From the definition above, it is understood that perceived ease of use describes a person's view when a system technology is used, taking into account the efficiency of time, cost, energy, and so on when using it. This view will determine whether someone will use the new system/technology or not.

Some indicators such as in the research by Davis (1989), Olatokun & Owoeye (2012) Susanto & Aljoza (2015) and Budiastuti & Muid (2020): *the system is easy to understand and access, it does not require much effort in using the system, very flexible system, the system is easy to learn, ease of work and the system as a whole is easy to use*

Attitude Toward Using

Attitude toward using is a form of a negative or positive feeling of a person to carry out a behavior (Davis, 1989). Indarsin & Ali (2017) suggests that attitude toward using is a form of a person's willingness to adopt the presence of technology before making it a habit/routine. When looking at something, attitudes are born from a person's thoughts and beliefs, which can lead to acceptance or rejection. The attitude becomes the first basis for a person to act according to existing beliefs and considerations. The indicators in the measurement of this variable, according to Davis (1993) and Yahyapour (2008), are: *the use of a system is a good idea, the use of the system is something fun, the use of the system is a wise decision and the use of the system is something positive*

Behavioral Intention to Use

Behavioral intention to use describes a person's interest or intention to do something. Behavioral intention to use is a construct that is said to be a relatively accurate determinant of the use of current technology/systems and the use of systems again in the future (Aditya & Wardhana, 2016). When someone is already interested in technology use, it is very likely or even confident that someone will use it. To measure behavioral intention to use, there are several indicators based on those that have been carried out by Aprilia et al., (2020); Faisal & Kraugusteeliana, (2019), (Venkatesh & Davis, 2000) and Mahendra, (2016), and Yahyapour (2008) are: *intend to use the system, estimate to use of the system, plan to recommend other users to intend to use it, and predicting will use the system in the future*

This study aims to capture impact of payment implementation using the Quick Respond Indonesia Standard (QRIS) in Medan, Indonesia. Hence, the following hypotheses are proposed:

- H1:** Perceived usefulness has a positive and significant effect on behavioral intention to use
- H2:** Perceived usefulness has a positive and significant effect on attitude toward using
- H3:** Perceived ease of use has a positive and significant effect on behavioral intention to use
- H4:** Perceived ease of use has a positive and significant effect on attitude toward using
- H5:** Perceived ease of use has a positive and significant effect on perceived usefulness
- H6:** Attitude toward using has a positive and significant effect on behavioral intention to use

Figure 1 depicts the proposed research model.

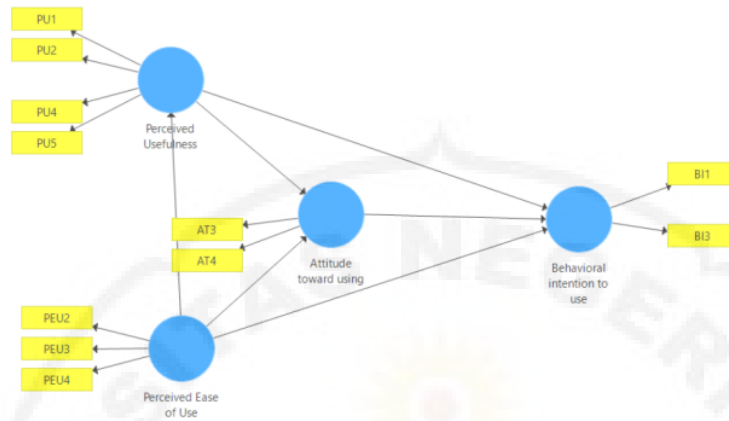


Figure 1: Research Model

Research and Methodology

Measurements

In the beginning, eighteen items were used to explain the four constructs in this study. The response was a 5-point Likert scale, with the answer from very disagree to very agree. Nevertheless, seven items were dropped due to the inadequate loading and AVE. The accepted final model presented in figure 1.

Population and sample size

The population in this study were all SMEs in Indonesia using QRIS for their daily transactions. There are many benchmarks in terms of sampling size for SEM-PLS. Barclay, Higgins, & Thompson, (1995) recommends the sample size of at least ten times the indicators used. However, according to Hair Jr, Hult, Ringle, & Sarstedt (2016), we need to adjust the sample size in line with the desired power analysis. To calculate the power analysis, the authors used G* power software (Faul, Erdfelder, Lang, & Buchner, 2007), and can be seen in Figure 2. Figure 2 shows that for the research model used in this study, the required sample size is 107, as same as the sample size used in this study.

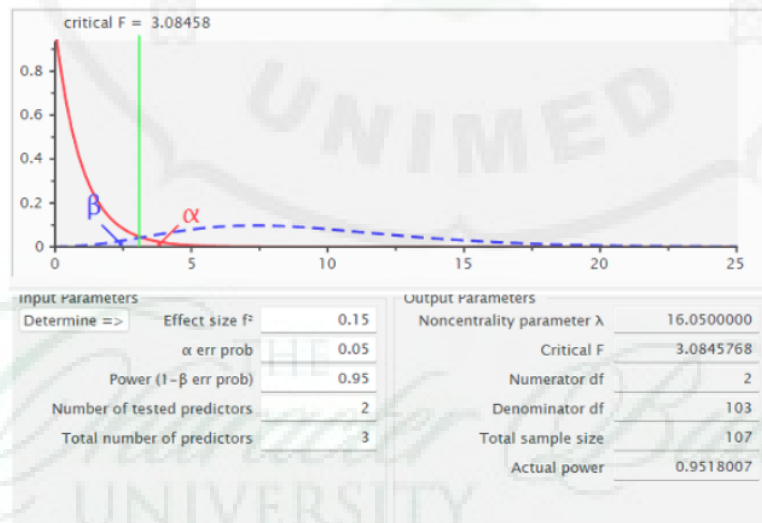


Figure 2: Required sample size calculated from power analysis

Data collection

Data collection of this study was using a questionnaire distributed directly to the SMEs owner in Medan, Indonesia, with 107 respondents' answers (no missing data). In terms of time duration in utilizing QRIS, divided into 85 samples > 5 months (79%) and

22 samples since 3-4 months (21%). Regarding the frequency of utilizing QRIS in a week, all samples answered that they were using QRIS > 3 times a week. Meanwhile, in terms of sex, the respondents divided into 41 men (38%) and 66 women (62%) (Table 1). Consent from all participants in this study was obtained when the authors collected the data..

Table 1: Summary of respondents' characteristics

		Count	Percentage
Time Duration	> 5 months	85	79
	3-4 months	22	21
Frequency of utilizing QRIS in a week	> 3 times	107	100
Sex	Men	41	38
	Women	66	62

Data analysis

The authors used Partial Least Square Structural Equation Modeling (PLS-SEM) to analyze the data. This analysis is quite different from covariance-base structural equation modeling (CB-SEM) since PLS-SEM does not force distributional assumptions on the data but still can allow researchers to estimate complex models with many constructs, indicators, and structural paths (Hair Jr et al., 2016)

Findings and Discussions

Evaluation of measurement models

11 constructs in this research model are first-order reflective. Measurement quality consists of convergent validity, internal consistency reliability, and discriminant validity. Convergent validity is how much a measure correlates with alternative measures of the same construct (Hair Jr et al., 2016). According to Hair Jr et al. (2016) loading factors and Average Variance Extracted (AVE) need to exceed 0.5. Internal consistency reliability is a form of reliability used to determine the consistency of results across items on the same test, and whether the items measuring a construct are similar in their scores, it needs to be > 0.6 and so the Cronbach's Alpha (Hair Jr et al., 2016). The last measurement of measurement models is discriminant validity, to which a construct is genuinely distinct from other constructs by empirical standards. While previous researchers used the Fornell-Larcker criterion to measure it, Henseler, Ringle, & Sarstedt (2015) suggested using the Heterotrait-monotrait ratio (HTMT). For threshold level, HTMT interval must not include 1 (Henseler et al., 2015).

For the first run, some of the indicators did not meet the criteria and had to be removed, namely PEU1, PEU5, PU3, AT1, AT2, BI2, and BI4. After being removed, we run the PLS algorithm for the second time, and there are no indicators below 0.5. All loading factors and AVE can be seen in Table 2. Regarding the internal consistency reliability, it also meets the criteria, both for composite reliability and Cronbach's alpha. The internal consistency reliability of the model also meets the threshold. Table 2 shows composite reliability, and Cronbach's alpha for all constructs exceeds 0.6. Furthermore, to measure the discriminant validity, as can be seen in Table 3, no construct includes 0.85.

Table 2: Results summary for convergent validity and internal consistency reliability

Construt	Indicator	Convergent Validity		Internal Consistency Reliability	
		Outer loading	AVE	Composite reliability	Cronbach's Alpha
Attitude toward using	AT3	0.90	0.728	0.841	0.646
	AT4	0.53			
Behavioral intention to use	BII	0.87	0.842	0.914	0.813
	BI3	0.78			
Perceived Ease of Use	PEU2	0.76	0.666	0.851	0.717
	PEU3	0.59			
	PEU4	0.76			
Perceived Usefulness	PU1	0.81	0.688	0.896	0.838
	PU2	0.87			
	PU4	0.58			
	PU5	0.79			

Table 3: Results for discriminant validity - HTMT

	Attitude toward using	Behavioral intention to use	Perceived Ease of Use	Perceived Usefulness
Attitude toward using	-	-	-	-
Behavioral intention to use	0.85	-	-	-
Perceived Ease of Use	0.77	0.60	-	-
Perceived Usefulness	0.69	0.53	0.82	-

Evaluation of structural model

After we make sure the evaluation of measurement models is valid and reliable, we need to assess the structural model. As a note, the goodness-of-fit in PLS-SEM is not identical to CB-SEM. Instead, the most commonly used criteria for assessing the structural model in PLS-SEM are path coefficients, R^2 values, f^2 effect size, and SRMR.

Table 4 shows that all main paths are significant, except perceived ease of use on behavioral intention to use, and the mediate effect of attitude toward using. Path relationship between attitude toward using and behavioral intention to use is significant, with $\beta = 0.53$, $p = 0.05$. This indicates that attitude toward using has a significant positive effect on behavioral intention to use. Path relationship between perceived ease of use and attitude toward using has $\beta = 0.27$, $p = 0.04$. However, Perceived ease of use indicates a positive, although the insignificant effect on behavioral intention to use, with $\beta = 0.12$, $p = 0.32$. Furthermore, perceived ease of use has a positive and significant effect on perceived usefulness, with $\beta = 0.88$, $p = 0.00$, while perceived usefulness also has a positive and significant effect on attitude toward using, with $\beta = 0.18$, $p = 0.00$, and so towards behavioral intention to use, with $\beta = 1.35$, $p = 0.00$. Regarding the mediates effect, attitude toward using knows does not mediate the effect of perceived ease of use towards behavioral intention to use, with $\beta = 0.12$, $p = 0.32$, and so perceived usefulness towards behavioral intention to use, with $\beta = 0.62$, $p = 0.08$

Furthermore, Table 4 also shows the r square, f square, and SRMR. R square ranges from 0 to 1. Hair Jr et al. (2016) stated while it is hard to present rules of thumb for this measurement, 0.2 is considered adequate. As we can see all endogenous construct have r square coefficient above 0.2. Regarding the effect size, we can use f square. Cohen (2013) states that values of 0.02, 0.15, and 0.35, sequentially represent small, medium, and large effects. From Table 4 we can concluded if all constructs have adequate effect size. The last evaluation in term of model evaluation is SRMR. SRMR used to know the discrepancy between the observed correlations and the model-implied correlations (Hair Jr et al., 2016). SRMR value less than 0.08 indicates good fit, while a value of zero indicates perfect fit.

Table 4 shows that SRMR has value of 0.07, indicates good fit of the model.

Table 4: Results summary for structural model evaluation

Path Coefficient	Coefficient	t values	P Values
Attitude toward using -> Behavioral intention to use	0.53	1.87	0.05
Perceived Ease of Use -> Attitude toward using	0.27	2.07	0.04
Perceived Ease of Use -> Behavioral intention to use	0.12	1.00	0.32
Perceived Ease of Use -> Perceived Usefulness	0.88	16.80	0.00
Perceived Usefulness -> Attitude toward using	1.18	6.54	0.00
Perceived Usefulness -> Behavioral intention to use	1.35	3.71	0.00
r square			
Attitude toward using	0.91	25.39	-
Behavioral intention to use	0.96	38.63	-
Perceived Usefulness	0.77	8.95	-
f square			
Attitude toward using -> Behavioral intention to use	0.59	-	-
Perceived Ease of Use -> Attitude toward using	0.24	-	-
Perceived Ease of Use -> Behavioral intention to use	0.11	-	-
Perceived Ease of Use -> Perceived Usefulness	3.39	-	-
Perceived Usefulness -> Attitude toward using	4.15	-	-
Perceived Usefulness -> Behavioral intention to use	2.00	-	-
SRMR	0.07	-	-

Discussion

In general, all variables positively affect other variables in this model, although some of that is insignificant. The model presented in this study confirms six of the eight hypotheses proposed. Perceived usefulness has a positive and significant effect on behavioral intention to use. This finding is in line with research by Kuo & Yen (2009) in the setting of 3G mobile value-added services. Furthermore, perceived usefulness also has a positive and significant effect on attitude toward using. This finding complied with the finding of Suki & Suki (2011), which found perceived usefulness positively and significantly affect attitude toward use in investigating the behavior of 3G mobile services subscribers in Malaysia.

Regarding the third hypothesis, perceived ease of use is known to have a positive effect on behavioral intention to use, albeit insignificant. This finding is slightly different from Fagan, Neill, & Wooldridge (2008) finding. This research suggests that further study would be useful to ascertain the effect of these variables. The fourth hypothesis states that ease of use positively and significantly affects attitude toward using. The empirical finding in this study found that ease of use is positive and significantly affects attitude toward using. This finding supports the study by Chen & Chen (2011) that perceived ease of use significantly affects the attitude toward using for travelers using GPS devices. Furthermore, this study found perceived ease of use also has a positive and significant effect on perceived usefulness. These findings further support the idea of Mohd.Yusoff, Muhammad, Mohd Zahari, Pasah, & Robert (2009), found that in perceived ease of use significantly affect the perceived usefulness in term of the E-Library Usage. This finding also confirms the more recent studies by Malik & Annuar (2021), who found that perceived ease of use also affects perceived usefulness in E-Wallet usage intention. This study also confirms the sixth hypothesis, that attitude toward using know to has a positive and significant effect on behavioral intention to use. This finding also produced results that corroborate the findings of a great deal of the previous work in this field, like Kuo & Yen, (2009), and Park (2009).

Conclusion

This study examined the factors affecting SMEs' QRIS behavioral intention to use. The construct used in the model of this study mostly confirms the hypothesis and the previous research. However, this study did not confirm the third hypothesis. Although these results differ from some published studies (Amoako-Gyampah, 2007; Mohd Amir, Mohd, Saad, Abu Seman, & Tuan Besar, 2020), all of those research have a different setting and different demographic. There are, however, other possible explanations. Another possible explanation for this result is that the introduction of QRIS in Indonesia is relatively new. QRIS was first introduced in Indonesia in 2019. Therefore, when this research was carried out, QRIS was only three years adopted. However, in general, this model's paths align with previous research.

The findings of this study provide some crucial implications for SMEs and the provider of QRIS. Nowadays, SMEs are usually more willing to take risks and purchase new technology, as do the customers. The socialization of QRIS needs to be more massive to reach the vast majority of Indonesian SMEs in Indonesia. Moreover, the attitude toward using on behavioral intention to use proven to affect the intention to use QRIS significantly.

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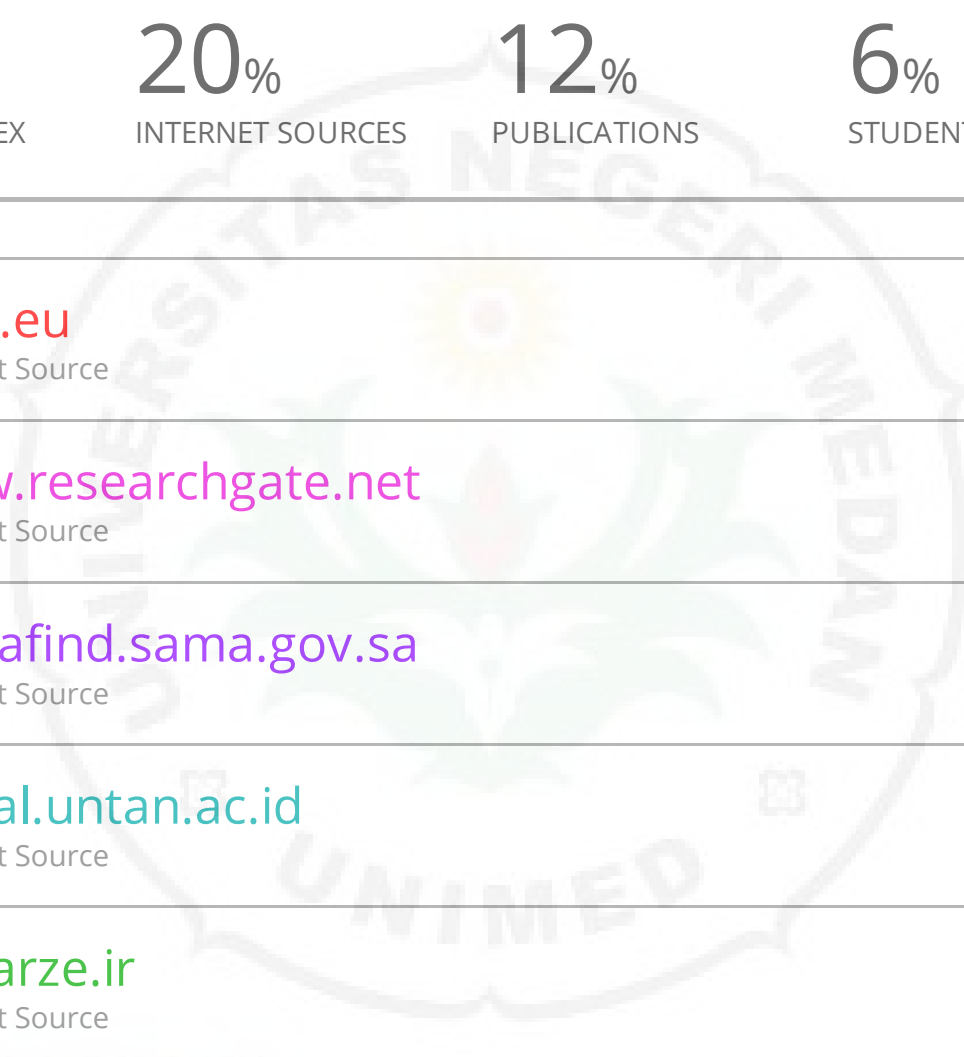
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