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# The Relationship Between Technological Environment and The Effectiveness of Accredited Private Madrasah Aliyah in Riau Province

As'ad Tabi'in\*, Muntholib\*\*, Lukman Hakim\*\*\*

Universitas Islam Negeri Sulthan Thaha Saifuddin Jambi, Indonesia Email: <a href="mailto:a2d.al.andalasi@gmail.com">a2d.al.andalasi@gmail.com</a>\*, <a href="mailto:muntholibsoetomo@gmail.com">muntholibsoetomo@gmail.com</a>\*\*, <a href="mailto:lukmanhakim70.dr@gmail.com">lukmanhakim70.dr@gmail.com</a>\*\*

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#### **Abstract**

This study aims to examine the relationship between the technological environment and the effectiveness of accredited Private Aliyah Madrasah A in Riau Province both partially and simultaneously. This quantitative study uses a survey method conducted at Private Aliyah Madrasah in Riau Province. A population of 79 people and samples were used for random sampling. The hypothesis in this study is that the technological environment has a significant relationship both partially and simultaneously to the effectiveness of Madrasah. Hypothesis testing uses *Pearson Product Moment* Correlation and multiple regression technique analysis, with a significance level of alpha 5 percent ( $\alpha$ =0.05). This study's findings show that the technological environment significantly correlates with madrasah effectiveness. Based on the research findings, it can be concluded that the technological environment variable contributes considerably to the efficacy of Madrasah, namely the value of tcount (5.879) >  $t_{tabel}$  (1.991) so that  $H_0$  is rejected and  $H_1$  is accepted, which means that the technological environment provides a significant relationship to the effectiveness of Madrasah.

**Keywords:** Environment, Technology, Effectiveness

# Introduction

Education is the most important thing for humans to live and is a differentiator for humans from God's creatures who are not equipped with reason by Him (Ridwan, 2018; Saada, 2023). Education for humans is a series of activities that are useful for directing it to maturation, improving the quality of life, and efforts to improve knowledge which leads to the formation of a high civilization, either through formal or non-formal educational institutions (Assingkily et al., 2019; Chen et al., 2024; Öğrenme et al., 2014). It is stated in Surah Al Mujaddalah verse 11 as follows:

"O you who believe, when it is said to you, "Make room in the assemblies," make room, and Allah will make room for you. When it is said, "Stand up," (you) stand up. Allah will certainly raise those who believe among you and those

who are given knowledge several degrees. Allah is Exhaustive of what you do" (Al Mujaddalah verse 11) (Shihab, 1992).

Education is also an activity that focuses on learning, which is not only a process of transforming knowledge but also values and building character and attitudes (Iskandar & Machali, 2020; Marwan, 2022; Putri & Iskandar, 2020). Education is a need for every individual that cannot be replaced because it has become a need for every person to survive and improve their quality, potential, and talent (Donkoh et al., 2023; Syafe'i, 2017). As the purpose of education, according to the National Education System (Sisdiknas) Law No. 20 of 2003 Chapter II, Article 3 stated:

"National education functions to develop abilities in shaping the character and civilization of a dignified nation in order to educate the nation's life, aims to develop the potential of students, in order to become human beings who are faithful and devoted to God Almighty, have a noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens." With education, a high and cultured national civilization will be built, and *education is the most critical indicator of a country's progress* (Sisdiknas, 2003).

It shows that the effectiveness of a school or Madrasah in achieving its educational goals and realizing its vision and mission rests on how to implementsound management in empowering all forms of resources owned by the school (Tabroni et al., 2023; Winarsih, 2017). In its implementation, such as creating healthy competition for teachers, providing motivation, providing innovation and development in information systems and technology, quality and dynamic interactions between principals, teachers, staff, and students play an essential role, especially in aligning all forms of school activities with global demands (Munastiwi, 2015; Paetsch et al., 2023).

According to Eric Sundstrom, four things must be maintained to achieve organizational effectiveness: "...satisfaction and commitment among its members; communication and coordination among individuals and work units; adequate product, and a mutually supportive relationship with its external environment". Eric argues that the four things that must be maintained for organizational effectiveness are (1) satisfaction and commitment of its members, (2) communication and coordination among individuals and teams, (3) maintaining adequate production, and (4) maintaining a mutually supportive relationship with the surrounding environment (Cordeiro et al., 2022).

In line with this, the Riau Education Quality Assurance Agency (LPMP), as stated in the 2020-2024 Strategic Plan (Renstra), classifies the effective and efficient use of technology as an indicator of creative and innovative assessment. One of the districts in Riau, Indragiri Hilir, began requiring the use of the Electronic Madrasah Activity Plan (e-RKAM) and Digital Report Card (ARD) applications in 2020, which Drs Af, MM conveyed as Head of the Madrasah Education Section of the Ministry of Religious Affairs of Inhil Regency. Based on the author's initial observations, the number of madrasah aliyah in Riau province spread across 12 districts is currently 314 madrasahs, of which 21

Madrasah Aliyah have public status, and 293 madrasah aliyah have private status (Prihatin & Subiyantoro, 2022).

Table 1. Recapitulation of Madrasah Aliyah (MA) in Riau Province
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NIo	District / City	N	<b>IA</b>	Total
No	District/ City	State	Private	
1	Bengkalis	2	31	33
2	Indragiri Hilir	3	55	58
3	Indragiri Hulu	1	18	19
4	Kampar	4	52	56
5	Kep. Meranti	1	16	17
6	Dumai	1	9	10
7	Pekanbaru	2	14	16
8	Kuantan Singingi	2	11	13
9	Pelalawan	0	10	10
10	Rokan Hilir	1	31	32
11	Rokan Hulu	2	23	25
12	Siak	2	23	25
	Total	21	293	314

Of the 314 private madrasah aliyah in Riau province, based on data summarized by the author from the National Accreditation Board for Schools/ Madrasahs (BAN-SM) accredited in 2019, as many as 132, where the accredited Madrasah aliyah A, as many as 36 madrasahs, accredited B as many as 68 and accredited C as many as 28 Private Madrasah Aliyah, the rest have not or are not accredited. For private madrasah aliyah in Pekanbaru city, there are 14 madrasah aliyah, of which 3 madrasah aliyah are A accredited. Further information can beseen in the following table:

Table 2. Accreditation Data of Private Aliyah Madrasahs in Riau Province in 2019

Accreditation year

ΝIο	District/City	Accr	Accreditation		
No.	District/City	A	В	С	
(1)	(2)	(3)	(4)	(5)	
1	Kab. Bengkalis	3	3	1	
2	Kab. Indragiri Hilir	3	20	10	
3	Kab. Indragiri Hulu	7	2	2	
4	Kab. Kampar	4	12	3	
5	Kab. Kepulauan Meranti	0	3	2	
6	Kota Dumai	1	2	2	
7	Kota Pekanbaru	4	5	1	
8	Kab. Kuantan Singingi	2	6	1	
9	Kab. Pelalawan	2	1	3	
10	Kab. Rokan Hilir	3	7	1	
11	Kab. Rokan Hulu	2	3	0	
12	Kab. Siak	6	3	2	
Jumlah		36	68	28	

Based on the data above, it can be seen that the percentage of A-accredited private Madrasah Aliyah in each district in Riau is still lower than the total number of private madrasah aliyah in the district. It means that out of 293 private Madrasah Aliyahs, 161, or 54.95%, still need to be accredited. Those accredited A only amounted to 36 or 12%, while those accredited B amounted to 68 or 23.55% of all private Madrasah Aliyah, and those accredited C amounted to 28 or 9.56% (Statistik, 2022).

The number of Private Madrasah Aliyah accredited A, when viewed from a smaller area in Indragiri Hulu District, is very high at 63.60% of the total number of Private Madrasah Aliyah located in the district. Next, around 54.50% of the Private Madrasah Aliyah located in Siak District are A accredited. Next is Pelalawan Regency; although the number of Madrasah Aliyah in Pelalawan is relatively tiny when compared to the total number of Madrasah Aliyah in Pelalawan, the number of accredited Private Madrasah Aliyah A in Pelalawan Regency is 33.30%. Further details can be found in the following figure:

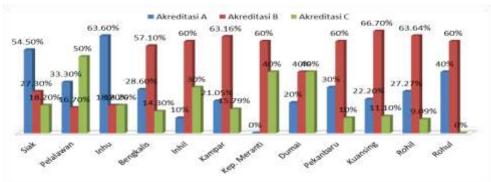


Figure 1. Percentage of Private Aliyah Madrasahs Accredited ARiau Province, Data processed 2021

Based on the researcher's initial observation, the measure of a madrasah's effectiveness is based on the measurement of the National Accreditation Board for Schools and Madrasahs (BAN-SM). This is still relevant because the accreditation achievement rating is based on how an educational process is carried out based on existing rules and standards. However, much still needs to be revealed regarding the effectiveness of a process-based educational institution.

Based on the results of interviews conducted by researchers with Mrs. Ry, S.Ag., as the head of the Madrasah, and Mrs. Sh, S.Pd., that realizing the desired effectiveness, the Madrasah should optimize all its resources. One of them is conducting research before determining the vision, mission, and goals of the Madrasah, then performing a SWOT analysis related to weaknesses, strengths, threats, and opportunities, both internal and external. According to Ry, S.Ag., as the head of the Madrasah, the existence of a madrasah must be able to answer the needs and challenges of graduates.

The principal of the madrasah, Mrs. Ry, S.Ag., also said that the lack of integration between the technological environment and the effectiveness of accredited madrasahs in Riau Province is proven by the fact that madrasahs that have good technological infrastructure, such as fast internet access, computers, and other hardware, tend to be more effective in supporting the teaching and learning process. Good infrastructure allows the use of modern learning tools such as e-learning, educational applications, and digital teaching

materials. Mrs. Ry, S.Ag. also views a curriculum that integrates technology into the learning process as being able to increase student engagement and motivation. Project-based learning, the use of multimedia, and digital simulations can help students understand complex concepts better. This has not been achieved optimally, so it is necessary to provide maximum environmental technology. By considering the above factors, accredited madrasahs in Riau Province can increase the effectiveness of education through optimal use of technology. Further research can be conducted to measure the extent to which these factors contribute to the effectiveness of education in madrasahs in the province.

In this context, there are several relevant studies, namely from (Kurniawati, 2017) that the use of technology in elementary madrasas in Bengkulu creates difficulties for various parties in improving the quality of learning due to limited human resources in the use of technology, and uneven internet networks in madrasas. Thus, it can be suggested to improve the quality of learning in elementary madrasas to conduct an in-depth evaluation of the use of technology and meet the needs of technology and internet networks in elementary madrasas in Indonesia. Then the study (Nurlaelasari & Novia, 2023). This activity successfully introduced and taught the concept of Green Computing in the school environment so that the use of technology in class XII students at MA Nihayatul Amal School was carried out properly. Participants showed enthusiasm and deep understanding of the material, which was reflected in a positive post-test. This indicates the effectiveness of counseling and students' learning abilities

Based on some of the problems described above, research related to the effectiveness of Madrasah Aliyah and several factors that have a relationship with it is necessary. (Mullins, 2010) explained that eight indicators influence the effectiveness of an organization, and each indicator has 4 to 9 elements in it, as described above. Therefore, based on the problem analysis above, the researcher suspects a relationship between the technological environment and madrasah effectiveness.

### Literature review

Human life and the existence of this universe are very complex, and there can be no substance capable of regulating this life other than Allah, the ruler of the universe. The journey of a creature that did not exist, then existed and was born, lived life, died, decayed, and the creation of decomposing bacteria made it perish into something new and valuable for other creatures, the rain that made it a medium for life for plants, animals, and other animals, where everything happened as if there was no mistake at all (Sakir, 2016; Thoyib, 2013). It is how Allah organizes this universe, where all of his creations run according to his will, as the Quran explains.

"He orders all affairs from the heavens to the earth, then they ascend to Him in one day, the length of which is a thousand years according to your reckoning." (Thayyarah, 2013).

Ibn Kathir explained that recording angels report all deeds to the nearest heaven. The distance between the nearest heaven and the earth is equal to the distance of five hundred years of travel, and the thickness of the sky is equal to the distance of five hundred years of travel. Mujahid, Qatadah, and ad-Dahhak said that angels could cover this distance quickly (Azmi & Musayyidi, 2022).

The verse teaches us that Allah is the best organizer, so everything in this universe runs regularly without disputing. In the management of an organization, in this case, the Madrasah, it is necessary to plan carefully so that each component runs regularly to achieve the Madrasah's goals. If the Madrasah does well in planning, implementation, and evaluation, then the educational process carried out by the Madrasah is effective.

Many factors affect organizational effectiveness, such as (Badiale & Cravero, 2024) which reveals several aspects that can affect organizational effectiveness, as shown in figure 2.

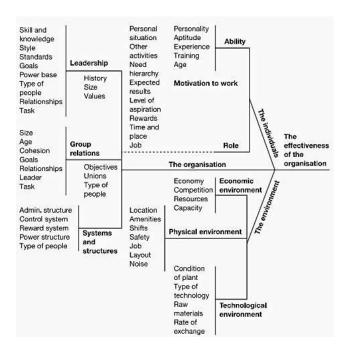


Figure 2. Factors affecting Organizational effectiveness

Leadership includes skills and knowledge, style, goal standards, power bases, types of people, relationships, and tasks. Systems include organizational structure, administration, control systems, reward systems, power structures, and types of people. The physical environment includes location, facilities, shifting, job security, layout, and noise levels in the technological environment, the condition terms of such as the factory/company/organization, type of technology, raw materials, and money exchange rates. The economic environment includes the economy, competition, resources, and capacity. In addition, other factors that affect organizational effectiveness, according to Handy, are personality, intelligence, experience, training age, personal situation, hierarchy of needs, expected results, aspiration levels, rewards, time and place, and work.

Gibson says that overall organizational effectiveness is affected by aspects of group effectiveness, and group effectiveness is affected by individual effectiveness, as we can see in the Figure 3.

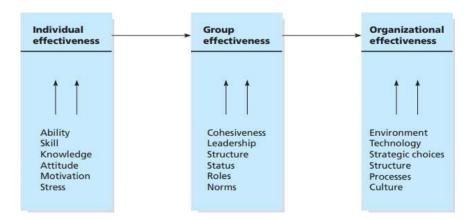


Figure 3. Causes of Organizational Effectiveness

From this picture, we can conclude that an organization's effectiveness will be realized if its members and its components, such as abilities, skills, knowledge, personality, motivation, pressure, cohesion, leadership, structure, roles, and ethics, also run effectively. According to Gibson, the factors influencing organizational effectiveness are environment, technology, strategic choices, structure, process, and culture (Gibson et al., 2011).

#### **Research Methods**

This quantitative research uses a survey method at one private Madrasah Aliyah in Riau Province (Creswell, 2012; Sugiyono, 2019). The population is 79 people, and the sample was random. This research hypothesizes that the technological environment has a significant relationship, both partially and simultaneously, with the effectiveness of madrasas. Hypothesis testing uses Pearson Product Moment Correlation technique analysis and multiple regression, with an alpha significance level of 5 percent ( $\alpha$ =0.05). This research produced findings, namely, that the technological environment has a significant relationship with the effectiveness of Madrasah.

#### **Result/Findings and Discussion**

# The Relationship between the Technological Environment and Madrasah Effectiveness

The hypothesis that will be tested in this research is that the technological environment (X) has a relationship with madrasa effectiveness (Y). The criteria for hypothesis testing are:

 $H_o: r_{x_2y} = 0$  (H o is accepted and Ha is rejected), there is no relationship if t count < t table

 $H_o: r_{x_2y} \neq 0$  (H<sub>o</sub> is rejected and Ha<sub>is</sub> accepted), there is a relationship if t<sub>count</sub>> t<sub>table</sub> The stages carried out in hypothesis testing are as follows:

Table 4. Helping Table for Calculating the Relationship between Technological Environmental Variables (X) and Madrasah Effectiveness (Y).

			` /		` '
N	X	Y	X <sup>2</sup>	Y <sup>2</sup>	XY
79	12850	13956	2099106	2467530	2272464

a) Looking for the correlation coefficient between technological environment and madrasah effectiveness using *Karl Pearson's Product Moment formula*.

madrasah effectiveness using Karl Pearson's Product Moment for 
$$r_{x_2y} = \frac{n \sum X_2 Y - (\sum X_2)(\sum Y)}{\sqrt{\{n\sum X_2^2 - (\sum X_2)^2\}\{n\sum Y^2 - (\sum Y)^2\}}}$$

$$r_{x_2y} = \frac{79(2272464) - (12850)(13956)}{\sqrt{\{79.2099106 - (12850)^2\}\{79.2467530 - (13956)^2\}}}$$

$$= \frac{179524656 - 179334600}{\sqrt{\{165829374 - 165122500\}\{194934870 - 194769936\}}}$$

$$r_{x_2y} = \frac{190056}{\sqrt{\{706874\}\{164934\}}} = \frac{190056}{\sqrt{116587556316}} = \frac{190056}{341449.20}$$

$$= \mathbf{0.5566}$$

b) Find the coefficient of determination value using the following steps:

$$R^2 = (r^2)$$
  
 $R^2 = (0.5566)^2 = 0.3098$ 

The coefficient of determination between the technological environment and madrasa effectiveness was calculated and obtained at 0.3098. Then, the coefficient of determination =  $r^2 \times 100\% = 0$ ,  $3098 \times 100\% = 30.98\%$ . This value explains that the technological environment contributes 30.98% to madrasa effectiveness, and the remaining 69.02% is due to other factors.

c) Calculation of the "t" value or t-test.

It is calculated using the formula  $to determine the t - value: t - count = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$  Calculation of the correlation coefficient value, using the t-test, as follows:

$$t_{hitung} = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0.5566\sqrt{79-2}}{\sqrt{1-0.3098}} = \frac{0.5566 \times 8.774}{\sqrt{0.6902}} = 5.879$$

From the results of manual data analysis, the correlation coefficient  $\alpha$  of:

Table 5. Manual calculation of the correlation coefficient X with Y

r	r 2	et	t	t table		Conclusion
$r_{2y}$	$r_{2y}^2$	al.	l count	0.05	0.01	t count > t table
0.5566	0.3098	77	5,879	1.9913	2.6412	There is a relationship.

Based on Table 5, it is known that the  $_{calculated\ t\ value} = 5.879 > t_{table} = 1.9913$ ; thus, H  $_0$  is rejected, and Ha is accepted, which means that the research hypothesis related to the technological environment (X) has a relationship with madrasa effectiveness (Y) **is accepted**. The  $_{calculated}$  t value obtained manually is the same as the calculation result using the SPSS 25.0 program, as can be seen in Table 6 below:

Table 6. SPSS results calculating the relationship between technological environment (X) and madrasa effectiveness (Y)

#### **Correlations**

			Technologica
		Madrasah	1
		Effectiveness	Environment
Madrasah	Pearson	1	,557 **
Effectivene	Correlation		
SS	Sig. (2-tailed)		,000
	N	79	79
Technologi	Pearson	,557 **	1
cal	Correlation		
Environme	Sig. (2-tailed)	,000	
nt	N	79	79

<sup>\*\*.</sup> Correlation is significant at the 0.01 level (2-tailed).

Table 6 looks the same as the manual calculation results, where the Pearson correlation coefficient is 0.708. Thus, the coefficient value of the relationship between the technological environment (X) and madrasa effectiveness (Y) can be described as follows:

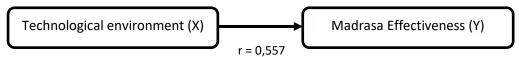


Figure 4. Results of analysis of the relationship between technological environment (X) and madrasa effectiveness (Y)

The product-moment correlation index above is then consulted with the modified table as follows:

Table 7. Interpretation Table of the Coefficients of the Relationship between X and Y

The amount of "r" Product Moment (r xy)	Interpretation			
0.00 to 0.20	Between variables X and Y, there is a relationship,			
0.00 to 0.20	However, this relationship is fragile			
0.21 to 0.40	Between variables X and Y, there is a relationship			
0.21 to 0.40	the weak			
0.41 to 0.60	Between variables X and Y, there is a relationship			
0.41 to 0.00	which is being			
0.61 to 0.80	Between variables X and Y, there is a relationship			
0.01 to 0.00	the strong one			
0.81 to 1.00	Between variables X and Y, there is a relationship			
0.01 to 1.00	which is very strong			

Based on the calculation results, r <sub>2y is obtained</sub> at 0.557. The relationship value is in the interval 0.41-0.60, so there is a moderate relationship between the technological environment (X) and madrasa effectiveness (Y).

The results of the hypothesis testing that has been carried out illustrate a significant relationship between the technological environment and the effectiveness of madrasahs in private Madrasah Aliyah accredited A in Riau province. The four hypotheses proposed in this research show that all hypotheses have a significant relationship, partially and simultaneously, between the independent and dependent variables. The explanation of the hypothesis test results can be explained as follows:

# The Technological Environment (X) has a relationship with the effectiveness of the Madrasah (Y)

The second hypothesis test proves the relationship between technological environment (X) and madrasa effectiveness (Y). Hypothesis testing shows a correlation coefficient value of 0.557 and t = 5.879. Meanwhile, at the significance level  $\Box \Box = 0.05$ , t table = 1.991. It means that if t = 5.879 > t table = 1.991, then the path coefficient is said to be significant. The results of calculating the determinant coefficient of the relationship between the technological environment and Madrasah effectiveness showed that  $R^2 = 0.309$ , which means that the technological environment has a relationship with madrasah effectiveness of 30.9%, and other factors outside the technological environment cause 69.1% of madrasah effectiveness. When consulted with the relationship coefficient interpretation table, the coefficient indicates a weak relationship between the technological environment (X) and madrasa effectiveness (Y).

The research results for each dimension are 1) Job impact of 0.410; 2) changes like work of 0.470; and 3) implementation in organizations of 0.548. The highest value for the technological environment variable is shown by the application dimension in the organization, namely 0.548. Thus, the application dimension in the organization has a significant contribution to the effectiveness of the Madrasah.

Based on the empirical evidence in this research, the technological environment is one of the critical factors related to the effectiveness of madrasas. Technology in an organization is any form of activity that refers to techniques, methods, systems, strategies, tools, and actions used to convert input into output. The technological environment in a madrasah as an educational service provider organization is essential in realizing educational goals. The technological environment in academic institutions aims to make it easier to achieve goals and streamline procedures that consume energy, time, and money. It means that the technological environment created in a madrasah contributes to creating a flexible, efficient, short, productive, and effective educational process.

However, technological advances over time will always have an impact, both positive and negative. Some of the positive technical effects on work are creating new jobs, new forms of services and services, lower expenses/ budgets, and the nature of work being more effective and efficient. However, the latest technological environment will also have negative impacts, such as requiring time to adapt to new technology, requiring trials and training in the use of technology, and technical limitations in carrying out work. However, this research reveals that technological development is not something that must be avoided because its existence will continue to change according to the needs of the times. A technological environment balanced with adequate resources will significantly improve the effectiveness of educational programs.

Islam views technology as a means or tool to achieve desired goals, as Allah teaches humans through the medium of " *qalam* ":

"Read by (mentioning) the name of your Lord Who created, He created man from a clot of blood. Read, and your Lord is the Most Gracious, Who teaches (humans) by means of kalam, He teaches humans what they do not know."

Musthafa Al-Maraghi, in his commentary, explains that ( القام) is a tool that humans use to understand something, like how they know something through spoken media. According to Al-Asfahani, *al-qalam* is a piece of something hard, such as a nail or wood, or something specifically used for writing, such as a pen. Thus, the Qur'an views that the media, tools, facilities, systems, or methods used to achieve specific goals are *sunatullah*, which will always exist and continue to develop if humans consider their interests. Relationships built between humans (*muamalah ma'al makhluq*) for the good and convenience of humans, such as learning, cooperation, da'wah, economic activities, politics, and technology, are something that Allah *approves of* and likes.

The results of this research support the theory, which is also used as the basis for proposing a research model, namely, as stated by Gibson, that organizational effectiveness is influenced by six factors, one of which is influenced by technology. It is in line with the *resource-dependent* theory, which states that organizations and the environment are dependent where the organization depends on the environment to obtain resources such as capital, raw materials, labor, equipment, and technology. It means that the better the technological environment (tools, systems, methods, techniques, procedures, and resources) in a Madrasah educational institution, the higher the effectiveness of the educational process carried out in the Madrasah (Tanjung et al., 2022).

The results of this research indicate that technological and environmental factors are related to the effectiveness of madrasas. The results of this research support several theories used as a basis for proposing research models, including David A. Buchanan and Andrzej A. Huczynski, Handy and Gibson, who suggest that there is a link between the technological environment *and* the effectiveness of an organization (Gibson et al., 2011). The research constellation above shows that the technological environment in a madrasah is also closely related to the level of effectiveness of the Madrasah. It means that to increase the level of effectiveness of an educational institution, it must pay attention to several factors that can influence it, such as providing technology and training related to its use.

### **Conclusion**

There is a direct relationship between technological environment (X) and madrasah effectiveness (Y). Based on the results of the analysis calculation, the value of tount  $(5.879) > t_{tabel}$  (1.991) so that  $H_0$  is rejected and  $H_1$  is accepted, which means that the technological environment provides a significant relationship for madrasah effectiveness. It means that the better the technological environment, the higher the effectiveness of Madrasah. The conclusion shows that the hypothesis proposed in this study can be accepted. This study shows that there is a significant relationship between the technological environment built in a madrassa and the effectiveness of education delivery by the

madrassa. Using the proper methods, strategies, techniques, and tools to carry out the educational process in madrasas will affect its effectiveness.

### **Declaration of conflicting interest**

This article is collective because the authors have the same educational background and affiliation. The author comes from Universitas Islam Negeri SulthanThaha Saifuddin Jambi. This article is motivated by the writer's desire to fulfill the Tri Dharma of Higher Education. All authors were involved in conducting this research, so this paper has varied ideas. Thanks to encouragement from other experts, this article was completed.

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