ANALYSIS THE METAVERSE ADOPTION OF BATAM CITY MICRO, SMALL, MEDIUM ENTERPRISES USING TECHNOLOGY ACCEPTANCE MODEL

Eryc[1]
[1]Sistem Informasi, Fakultas Ilmu Komputer, Universitas International Batam, Kota Batam, Indonesia
*Email: [1]eryc.yeo@gmail.com1

Abstract

The technological advancements and widespread adoption, particularly in the realm of the metaverse have introduced numerous innovations into human life. The societal adaptation process to these innovations is crucial for efficiency and sustainability. This research examines the factors influencing the acceptance of metaverse technology innovation, which is one of the most significant innovations in recent times. By examining the factors affecting its acceptance gain insights into harnessing its capabilities effectively. In this context, metaverse technology is analyzed using a Structural Equation Modeling (SEM) approach within the framework of the Technology Acceptance Model (TAM). The software Smart PLS 4.0 is employed for analysis to test the significant positive correlations between perceived use, usefulness, and intention to use. The results indicate that the perceived usefulness of the Metaverse does not influence the intention to use it among micro, small, and medium enterprises (MSMEs) in Indonesia. However, perceived use influences perceived usefulness and the intention to use the Metaverse among MSMEs. These findings suggest that while MSMEs may recognize the potential benefits of the Metaverse, they may not see it as a practical tool for their specific needs. Developers of the Metaverse need to address these concerns and demonstrate its value to increase adoption.

Keywords: *Technology Acceptance Model, Perceived Of Use, Perceived Usefulness, Intention Of Use*

Corresponding Author: Eryc

1. INTRODUCTION

Many benefits may be gained from the metaverse because of the advancement of technology, which allows users to engage in all activities online and expand their horizons of possibility [1] [2]. Metaverse emerges as a tool that may be used for a variety of business and personal tasks. Together, practitioners and academics are beginning to explore the potential of this metaverse for business. As an example, some academics have begun to recognize the potential of the metaverse in their research [3], in presenting new and enhanced modes of inquiry [4], as well as in their roles as business and academic analysts [5], [6] Some academics have already asked for studies that look at unusual angles and management problems faced by small businesses in the field of information systems [7]. As a result, 55% of the 24,000 people who responded to an Accenture survey from around the world and 4,650 executives from 23 industries and 35 countries, including Indonesia, agreed that technology in the metaverse will help organizations. 25% of people believe that this technology will result in

innovation [7]. Johnny Plate, Indonesia's Minister of Communications and Information Technology (Menteri Komunikasi dan Informasi Kemkominfo) opined that Indonesia has a great opportunity to develop the metaverse in terms of the country's monetary and cultural values. Indarta [8] states that the aforementioned development will benefit the entire Indonesian population and information, communications, and other related technologies. As a new technology, several elements and components must be addressed and readied before adoption. Start with preparation, then go on to processes, security, efficacy, market, and customer interest. Naturally, adapting to a new culture involves time and expertise to become familiar. Must be adjusted, though. Understanding the perspectives of individuals who will execute it is crucial to determining the best and most effective strategy. This will significantly affect their interest in embracing the technology. Aspects that affect Indonesia's technology adoption readiness are Technology availability and usability, Benefits to be gained, and Trust impacting perceived usability.

In this study, we will attempt to learn more about these factors in the metaverse according to the findings of MSMEs in the city of Batam. Using the Technology Acceptance Model, these factors will be transformed into three key elements described by Fred Davis [9]: ease of use, ease of use, and readiness to use. Davis states that while many variables might affect how a system is used, the results of the study only revealed three key elements [9]:. Because the implementation of the metaverse in Indonesia is still in its early stages, we must maintain our focus on these crucial issues. Due to this, in this study, we focused on the three aforementioned key elements to understand what exactly has to be taken into consideration when micro, small, and medium enterprises (MSMEs) implement the metaverse. The current study will help to clarify the relationship between the three factors as well as what needs to be done to increase the likelihood that people will adopt the technology of the metaverse. It will also provide information on how to proceed with further development of the technology based on the needs and perceptions of the Indonesian population, particularly those in the MSMEs community in the city of Batam. The values of Metaverse for micro, small, and medium enterprises (MSMEs) is an essential and fundamental component of the economy of any nation, particularly Indonesia. As a result, this study would be intriguing.

2.   RESEARCH METHOD

To obtain a theory that can address a problem that has been identified, a literary analysis of earlier research should be done. The theory that is presented is the starting point so that we may better understand the problems that are being addressed correctly in line with the prevailing belief in the truth. Previous research is summarized in Table 1 below:

Table 1. state of art

No.	Title	Year & Method	Result
1	Big Data and Metaverse Towards Business Operations in Indonesia	2022, Descriptive Method	Research shows that the Indonesian government supports companies in Indonesia to develop the Metaverse ecosystem in Indonesia because this technology can optimize the decision-making process. Meanwhile, institutions operating in the public service sector can utilize information output from Big Data to maximize the level of service satisfaction to clients/customers by personalizing messages and
2	Introduction to Digital Literacy "Metaverse" Challenges and Potential of E-Sports in Papua	2022, Exploratory Method	treatment to target customers. [8]. The results of the socialization activities regarding Metaverse were considered very good, starting from the ability to use applications to the ability to use digital media techniques, all of which showed an average result of 4.6/5.0. However, behind that, there are several challenges in using this technology, such as (1) lack of available network/internet; (2) Lack of human resources who understand digital skills; (3) Supporting facilities must be adequate (laptops or gadgets that support technological advances); and (4) Lack of use of content/applications to support sales (e-sports) [9]
3	Formulation of Metaverse Regulations in Indonesian Cyber Law	2022, Normative Legal Research Method	The research results show that technological development is very fast among society so the use of communication technology is also increasing greatly among society. Behind that, it is possible that misuse could occur, so it is important to have appropriate cyber law protection in Indonesia. In facing the Metaverse era, Indonesia needs strategies and development of legal regulations, and legal reform/legislative formulation, and the government must pay more attention to legal personal data protection [10].
4	Metaverse Possibilities in Education: Opportunities and Threat	2022, Descriptive Method	Metaverse has advantages in the field of education, such as providing new experiences to students and training teacher competence in adapting and using new applications because the world of education cannot be separated from what is called developmental

No	Title	Year, Method	Description
			technology. However, there are also several shortcomings in adopting this technology in the world of education, where both teachers and students must have the right facilities and support to use this technology. This is what causes low learning achievement, especially the lack of literacy between teachers and students, and of course, implementing this technology requires money and time [11]
5	Internal audit in the Metaverse world: between the prospects of virtual reality and the possibilities of augmented reality	2022, Explanatory Research	The discussion carried out in this research is only a scenario, about what will happen in the future and not a scenario that limits how augmented reality is used inside or outside the Metaverse. However, from the results of the discussion, this technology is considered to be able to be applied by internal audit because it is considered to be able to minimize economic costs during the internal audit process and is also considered safer during the internal audit process. [12].
6	Study of intention and experience of use Metaverse	2022, Quantitative Method	The Metaverse concept itself has great potential, but there are still many parts that need to be developed and solved in terms of technology, economics, and education. Risk factors that arise in the future are also part that must be considered. The metaverse is growing and spreading rapidly in the MZ generation [13]
7	Metaverse User Acceptance: ideas from the Technology Acceptance Model (TAM) and Planned Behavior Theory (PBT)	2022, Quantitative Method	There is no significant effect of behavioral control variables on attitudes toward use. This situation can be explained by the fact that the technology is new. The widespread use of the Metaverse means people have limited control over
			the technology. Lack of knowledge in using relevant technology is an important factor here [13].
8	Measuring the Technology Acceptance Model for Using Metaverse Technology in Egypt	2022, Quantitative Method	Trust and security are key to getting users to adopt a particular technology. Additionally, users' decisions are influenced by social influences, including the people around them. Therefore, technology provider companies must provide a good user experience to motivate users to adopt the technology [14].
9	A Survey of the Metaverse: State-of-the-Art Technologies, Applications, and Challenges	2021, Descriptive Method	Metaverse has various development opportunities and applications. This paper summarizes the work of various countries and companies, collects papers related to the Metaverse, introduces the three characteristics of Metaverse multi-technology, sociality, and hyper spatiotemporality, speculates the first application areas of Metaverse, and discusses its problems and challenges [15].
10	A Survey of the Metaverse: Fundamentals, Security, and Personal	2021, Explanatory and Descriptive Method	Serious privacy and security breaches in the Metaverse could hinder its widespread adoption. Simultaneously, due to the inherent characteristics of the Metaverse, such as immersive realism, hyper spatiotemporality, sustainability, and heterogeneity, a series of challenges (e.g., scalability and interoperability) may arise in providing Metaverse security [16].

From previous research, it can be identified that most of them focus on literacy and providing knowledge about the Metaverse to the public, which will assist research in obtaining theories related to the Metaverse, field prospects that can be supported by the Metaverse, as well as aspects that need to be considered in implementing the Metaverse. As further research, the novelty of this research is also to provide research respondents with direct experience in trying

out the Metaverse environmental space that we have designed so that they can truly feel and gain experience in the Metaverse and draw conclusions based on direct experience. Rather than understanding this, this research aims to obtain opinions after gaining direct experience using Metaverse technology itself. Based on previous research, everyone agrees that the Metaverse can have a big positive impact on various aspects of human life. However, many things need further attention, such as security, infrastructure availability, and so on. The findings from previous studies can be used as research indicators to learn more about the prospects of Metaverse in Indonesia for MSMEs after respondents try to use Metaverse directly.

The research model used is the Technology Acceptance Model (TAM), which is a model that can be used to analyze the factors that influence the acceptance of a new technology or information system introduced by Fred Davis & Venkatesh. This research builds an understanding of the relationship between research variables in the Technology Acceptance Model. The explanation below will define these factors and their relationship to the research context and hypotheses for each relationship. According to Aburbeian's research [17] Perceived ease of use is the user's belief in the ease of use in learning and applying new technology. If the procedure for using Metaverse is simple, easy to use, and does not require a lot of setup, it will provide many benefits. So the first hypothesis that will be tested in this research according to the framework is as follows:

H1: ease of use of Metaverse influences the perceived usefulness of Metaverse for Batam MSMEs

According to research [17], users may be more interested in trying and using new technology, in this case, Metaverse, if the process of using Metaverse is easy to understand and access to Metaverse is easy to obtain. The second hypothesis that will be tested for truth in this research is as follows, according to the framework of thought:

H2: ease of use of Metaverse influences the intention of use of Batam MSMEs to use Metaverse

According to [17], perceived usefulness is the level of a person's confidence in the use of a particular subject that can provide benefits to the person who uses it; in this case, the subject in question is the intention to use the Metaverse in everyday life; Thus, the third hypothesis that will be tested for truth in this research according to the framework of thought is as follows:

H3: Metaverse usefulness influences the intention of use of MSMEs in Batam to use Metaverse

This study includes data analysis based on the numerical data that was used, interpretation of the results, and conclusions. These steps include experimentation with a Metaverse simulation session, Likert scaling, and data analysis. Based on the research that was done and the kind of data used, the study was conducted quantitatively, and the results were then analyzed statistically and quantitatively. Although ease of use, usefulness, and intention to use are the primary indicators in this model, it will be more accurate if participants have a clear understanding of what the Metaverse is and have gained first-hand experience using it before they submit their proposals. Due to this, the study will create a simulation in which respondents can use the Metaverse and simulate its functionality with Mozilla Hubs. Mozilla Hubs is a collaborative tool that is used to create virtual spaces that can be visited and frequently used in conjunction with mixed reality. Purposive sampling is used in this study since it conflicts with a group of non-probability sampling techniques where units are chosen because they have characteristics that are needed in study samples. By using this method, it is possible to identify suitable participants who have already satisfied the criteria that have been established, such as micro, small, and medium enterprises (MSMEs) in Batam. The ordinal data that is present is examined using the partial least square structural equation modeling (PLS-SEM) method as a multivariate analysis, and the investigation is completed by doing statistical, valid, reliable, and hypothesis-testing analyses. As a result, the following criteria for respondent eligibility must be met: (1) micro, small, and medium enterprise status; (2) residency in Batam, Riau; (3) support infrastructure and internet connectivity. Data collection is carried out using reliable and trustworthy sources. The question that the aforementioned questionnaires are asking is in regards to understanding how the results of the experiment that the aforementioned questionnaire conducted before with the MSMEs in Batam relate to the Metaverse. as follows:

Table 2. Item Measurement Table

Indicator	Item Measurement	Scale
PE: *Perceived Ease of Use* (X1)	PE1: Metaverse technology is easy to learn	Likert scale (4-point)
	PE2: Metaverse technology is easy to understand	
	PE3: Metaverse technology is easy to use	
	PE4: Gaining access to Metaverse technology is easy	
	PE5: It's easy to get information and instructions for using Metaverse technology	
	PE6: I believe that Metaverse technology will make it easier for me to carry out tasks or carry out daily activities	
	PE7: I believe that Metaverse technology can improve my daily performance and productivity	
PU: *Perceived Usefulness* (X2)	PU1: Metaverse gives me a new experience in interacting virtually	Likert scale (4-point)
	PU2: Metaverse can make it easier for me to connect, communicate, and interact with people virtually	

	PU3: Metaverse could be a channel for my hobby of playing games in cyberspace	
	PU4: Metaverse can be used as a more interactive alternative for online meeting conferences.	
	PU5: Meeting strangers from all over the world makes Metaverse a fun place to learn foreign languages	
	PU6: Metaverse would be an interesting virtual entertainment space for me	
IU: *Intention to Use* (Y1)	IU1: After understanding about Metaverse, I am interested in using Metaverse	Likert scale (4-point) (Blank)
	IU2: Reasons for being interested/not interested in using Metaverse	
	IU3: In what use cases are you interested in using Metaverse?	Choice: ● Education ● Games ● Art ● Business / Office Work ● Others
	IU4: I hope Metaverse can be thoroughly implemented in my country	Likert scale (4-point)
	IU5: I prefer to use Metaverse in my activities compared to activities carried out face-to-face/online like now	

Further analysis uses SmartPLS 4.0 software. SmartPLS is a milestone in latent variable modeling. It combines advanced methods for example PLS-POS, IPMA, and complex bootstrap routines with an easy-to-use and intuitive graphical user interface. The reason for using this program is that research is more focused on predicting and explaining latent variables rather than testing one theory or many samples. PLS-SEM is much more appropriate for technology acceptance research that focuses on predictive modeling [18], [19]. Compared with CB-SEM (covariance-based), the PLS approach is better suited for incremental studies, i.e., creating new measures and structural paths, especially in information systems research [20]. PLS-SEM is thus suitable for this research, which involves the construction of new structural pathways. The path analysis model for all latent variables in PLS consists of three sets of relationships (1) outer model; (2) inner models; (3) weight relations.

1. Reflective outer model (measurement model)

The outer model determines the relationship between latent variables and indicators. For the outer model, the beam with the reflection indicator has the following equation:

$$x = \lambda x\ \xi + \delta \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (1)$$
$$y = \lambda y\ \eta + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (2)$$

where x and y are indicators of exogenous and endogenous latent variables. Meanwhile, λx and λy are loading matrices that describe simple regression coefficients connecting latent variables with their indicators, while η describes a vector of endogenous (dependent) latent variables, and ξ is a vector of residual exogenous variables, measured by δ and ε as measurement errors.

2. The inner model (structural model)

The inner model determines the relationship between latent variables based on theory. The equation model is as follows:

$$\eta j = \Sigma i\ \beta ji\ \eta i + \Sigma i\ \gamma jb\ \xi b + \zeta j \ldots\ldots\ldots\ldots\ldots\ (3)$$

where ζj is a vector of residual variables, βji, and γjb are path coefficients connecting endogenous and exogenous latent predictors along the range of indices i and b.

3. Weight relationship The outer and inner models provide the specifications followed in the PLS algorithm estimation. The case value for each latent variable estimated in PLS is:

$$\xi b = \Sigma kb\ Wkb\ Xkb \ldots\ldots\ldots\ldots\ldots\ldots\ (4)$$
$$\eta i = \Sigma ki\ Wki\ Xki \ldots\ldots\ldots\ldots\ldots\ldots\ (5)$$

where Wkb and Wki are the weights of k used to estimate latent variables ξb and ηi. The latent variable estimate is a linear aggregate of indicators whose weight values are obtained by the PLS estimation procedure, as determined by the outer and inner models, where η is a vector of endogenous (dependent) latent variables and ξ is a vector of exogenous (independent) latent variables. Without loss of generalization, it is assumed that latent variables and indicators are on a scale of zero mean and unit variance with standard values so that constants can be removed from the model.

The ordinal data collected was analyzed using the Partial Least Square Structural Equation Modeling (PLS-SEM) technique as a second-generation non-parametric multivariate analysis and continued by carrying out statistical analysis, validity, reliability, and hypothesis testing. In the next section, we will discuss the results of each analysis.

3. RESULT AND DISCUSSION

The researcher had made two interactive rooms, possibly allowing respondents to have the best experience possible when using the Metaverse. As can be seen in pictures 1 and 2 below:

Picture 1. *Room 1: Auditorium*

Picture 2. *Room 2: Exhibition*

There are a few functions that may be used by users, such as the buttons in the bottom left and the right at the top of the screen, which are also used in the Metaverse use cases. Every room uses symbols that have an angle. Every action performs a specific function, such as (1) creating an avatar, (2) moving around in a virtual environment, (3) interacting with other avatars, (4) exchanging messages with other avatars, (5) interacting with objects, (6) combining various objects, (7) creating reactions, and (8) moving from one room to another. Encourage respondents to use this feature in the first room, given that it has a very interactive design with many objects that are shown in the auditorium using different avatars. After that, the respondent will enter the second room. They will be given time in the second room to use the available Metaverse photo booth before being released to register using the URL that is provided in the second room. In this second room, many of the respondents have information on the procedures involved in transactions involving the Metaverse.

Before entering the Metaverse room, the respondent made contact with the curators, who had been assigned to provide feedback on the response based on their experiences. After receiving the results of every participant's response, the process was launched.

Table 3: Statistics Description for Three Variable Indicators

Variabel indikator	Mean	Min	Max	Std. Dev	Kurtosis	Skewness
Perceived Ease of Use	3,117	1	4	0,697	-0,389	-0,469
Perceived Usefulness	3,679	1	4	0,661	-0,277	-1,449
Intention to Use	3,322	1	4	0,742	-0,481	-0,521

According to statistics summarized for the indicators shown in Table 3, the range of each indicator is 3,117 to 6,779, and the standard deviation is between 0,661 and 0,742. The current ratio is derived from a set of very diverse answer options, some of which may even be somewhat out of balance, and is expressed as a minimum of (1) and a maximum of (4) for each indicator. Likert scale responses range from 1 (sangat tidak setuju) to 4 (sangat setuju), with the majority of respondents responding either setuju or sangat setuju. The average value maximum is for perceived of use Metaverse (3.679), and the lowest is for ease of use for users of the Metaverse (3.117). It may be inferred from the responses of the respondents that they are aware of and agree that the use of metaverse technology is widespread and has many features that are helpful to them. However, the Metaverse technology's threshold for user-friendliness still has to be increased. There are arguments in favor and against using the Metaverse, and the majority of people are either very excited or very excited about it. However, some people are not excited about it. Scales 1-4's results may be characterized as generally positive because only one indicator is present in the bottom third of the scale, namely PE7's statement that "I believe that Metaverse technology can increase my performance and daily productivity." This is because there are limited access points and information about using Metaverse, which is also visible from the results of the PE4, PE5, and PE6 indicators, leading respondents to wonder whether Metaverse can increase their productivity. Along with that, in our questionnaires, we also ask participants why they are interested in using the Metaverse or are not, as shown by the phrase "Alasan tertarik/tidak tertarik menggunakan Metaverse" in the IU2 code. The majority of respondents stated that they were hesitant to use the Metaverse since it provided them with fresh knowledge that they hadn't previously received. By using the Metaverse, they can communicate with individuals or objects in the Mayan world. They also realized that using the Metaverse was simple to understand and put into practice. Some people have also realized that the Metaverse will grow significantly in size in the future with flexible prosthetics in a variety of contexts; therefore, they need to be able to adjust to this situation. advancement of technology. However, if we look at the lower-level data from people who aren't interested in using the Metaverse, the audience can also discover some interesting perceptions. They understand that the current infrastructure is inadequate to support Metaverse usage, making access to the Metaverse itself difficult, as we previously mentioned. This results in them having less motivation to immediately use the Metaverse. Others are already comfortable with the state of technology at the time, so using the Metaverse is not necessary. But if you focus on the use of the Metaverse, there are a lot of areas that can be explored using the Metaverse. Researchers may also study various theories and literary works from earlier periods to get insight into the implications that may be created by using the Metaverse. The majority of respondents mentioned games, meetings, art, entertainment, and social media.

Next, do the validity and reliability tests, Any instrument or survey instrument used in research must have validity and dependability that may be challenged. The measurement tool used in the analysis

is important since it certainly will impair analysis results. When used as a research tool, questionnaires are validated to determine their reliability. Utilizing the reliability, stability, and consistency of an instrument's output results, they are evaluated. In general, validity testing will identify a few good candidates for a particular test in the current situation; reliability will reveal which candidates may be able to successfully pass the test in question. Researchers cannot draw legitimate conclusions from a test score unless they are confident that the test may be overturned. However, if a test can be challenged, it is likely invalid. Due to this, participants will consider providing the results of the validity and reliability of the survey below.

Correlation Coefficient

The first variable that is used for validation is the correlation coefficient value. If each indicator's calculated coefficient of recurrence is greater than 0.50, the indicator is considered valid for use as a research tool. In contrast, if the reading is below 0.50, the indicator is invalid and must be confirmed by the research tool. According to the validity test results, PE3 (0,826) has the highest correlation coefficient for perceived ease of use. Although PE1 has a reliable correlation coefficient, it also has the lowest score (0,532). In contrast, the highest Intention to Use score comes from IU1 (0,749), while the lowest Intention to Use score comes from IU5 (0,723). In terms of Perceived Usefulness, PU4 (0,869) provided the highest correlation across the indicators. Even though there is a skew, PU5 (0,645) still has a good correlation coefficient for perceived usefulness. You can state with certainty that every item on the measurement list is legitimate (>0,50) and is now in the correlated state. All of them can be used in this study as a result of this. From the obtained Cronbach's alpha results, it can be seen that each variable indicator has a Cronbach's alpha value that is greater than 0,6 and may be stated to have a high level of reliability. This means that everything may be considered the clear dash for expressing the thesis in the current study.

Rho_A

Rho_A is the single most important "Quality Criteria" for validity and reliability. The rho_A value is disclosed because it helps to increase reliability, which is an indicator of good reliability. *Rho_A is anticipated to have a value of 0.70 or higher to provide a reliable indicator.* According to the results of the survey, the indicators of perceived ease of use and perceived usefulness are both above 0, which indicates that they are good indicators, but the indicator of intention to use is below 0,70.

Average Variance Extracted (AVE)

When applying the Fornell-Larcker criteria, the AVE threshold must be higher than 0.50. If AVE > 0,50, it is possible to conclude that the results are what were desired. A value of AVE that is close to 0,50 indicates

that there are more errors than variance in the construction. AVE from Intention to Use and Perceived Usefulness is at 0.50, meaning that this construction may reveal 50% or more of the available items. In contrast, the AVE Perceived Ease of Use was below 0,50.

Table 4. Average variance extracted (AVE)

Indicators	Average variance extracted (AVE)
Perceived Ease of Use	0,489
Intention to Use	0,565
Perceived Usefulness	0,611

Hypothesis Test

Path analysis is used in the hypothesis testing in this study. Path analysis is a requirement of multiple regressive analyses. Table 5 below provides the results of the route analysis.

Table 5. Path Coefficient

Hypothesis	Implication	Path Coefficient	T Statistics	P Value
Hypothesis-1	PE -> PU	0,688	3,928	0
Hypothesis-2	PE -> IU	0,541	7,751	0,001
Hypothesis-3	PU -> IU	0,364	1,988	0,051

According to Table 5, hypotheses 1 and 2 were tested with p-values of 0 and 0,001 respectively. Only one hypothesis (hypothesis 3) was tested with a p-value of 0.051. In this way, it is implied that all hypotheses, except Hypothesis 3, may be tested for their veracity. The Intention of using Metaverse does not preclude MSMEs from using Metaverse in Indonesia. In addition, if we can improve the ease with which we use the Metaverse, we can greatly improve the level of our use of the Metaverse and the intention of MSMEs. If the threshold for using the Metaverse itself has already been reached, the likelihood of the Metaverse being used outside of the city of Batam will increase, which will also worsen the implications of using the Metaverse for its intended purposes. If both of the aforementioned conditions can be met, the usage of the Metaverse itself will likely increase as well. This must be done with complete security and confidentiality while using it. According to their internal documentation, in the case of Mozilla Hubs, all database and backup entries were synced up with whatever data they had available at the time. In addition to that, they don't send emails that haven't been verified against the data. Additionally, when a threat to their safety arises (from their lunatic outpost or one belonging to a rival organization). Every month, automatically update the package to improve the quality and update the version of the company. Receive load balancing and DDoS protection from the

AWS network architecture. Additionally, Mozilla Hubs has a secure privacy policy with clear guidelines for account information, avatars, and other data, among other things. According to the standard privacy protections for Mozilla Hubs, only users who are connected to the particular room may access any communications that are being made there. In addition, there won't ever be any user misconduct or complaints, especially when using VR data like that used for tracking perception. We will continue to reduce the quantity of personally identifiable information that is collected, and while we do so, we will make investments in technologies that protect privacy, such as differential privacy. MSMEs can use the Metaverse in a variety of fields because of its trustworthiness and privacy. The study of the Metaverse itself is rather broad. Similar to the trading sector, where virtual environments can be used for business operations. Virtual customer interactions range from virtual experiences to virtual interactions to virtual transactions, where the consumer and seller may engage in one single interaction with one another. But once more, to do everything, we must raise the threshold of user-friendly usage. Included are the infrastructure and tools necessary to deploy the Metaverse, including mobile devices (such as smartphones, tablets, and laptops), computers, cloud databases, and internet connections. If users want to improve their performance, technologies like haptic VR and VR headsets that may be used must be employed. All of this is necessary to provide the best knowledge of the metaverse and to make it as interactive as possible.

4. CONCLUSION

Currently advancing technology many industries, whether in developed or developing nations like Indonesia, are embracing technology or implementing it in their daily operations. The Metaverse's expansive design made competition increasingly tough. Numerous reasons for doing so encourage the researchers to carry out this study to learn more about the Metaverse's implementation in Indonesia, particularly in the city of Batam. Similar research to this may undoubtedly be carried out, particularly in other developing nations. Thus, the results of this study may be compared to those of the study that was conducted in Indonesia to further the development and ongoing use of the Metaverse in a variety of fields. Studies from the past also advocate using more advanced technologies, such as Virtual Reality (VR) or Augmented Reality (AR), to provide more accurate simulations of experimental conditions. By utilizing the aforementioned technology, it is possible to increase respondent confidence while using the Metaverse and to more fully use the data and research results that are provided. Data gathered by researchers indicates that Batam's population is extremely enthusiastic about implementing this technology. The primary reason for this situation is that Metaverse will provide people with new experiences they haven't had before, and this technology is quite simple to use. however, researchers also realized that some of them were unable to get Metaverse rewards. This is due to access that is being received with a lot of difficulty. Information and guidelines for using the Metaverse technology are also widely available. Although MSME's enthusiasm for this technology's advancement is undoubtedly high, as we all know, this makes it difficult to implement technological changes. It may take time to adapt to new technology once someone has become accustomed to using older technology. In any case, Metaverse has a wide perspective with its features. Based on research findings, it is concluded that increasing the level of ease of Metaverse usage will increase Metaverse's credibility, applicability, and progress in Indonesia in the long run. Some areas on which we can concentrate at the moment include introducing Metaverse to the general public and explaining its uses and benefits, making it easier for people to use Metaverse, providing clear and thorough usage guidelines, and utilizing Metaverse technology in a variety of primary fields such as business, promotion, and other areas. It is believed to be the safest course of action that people can take right now to increase the use of the Metaverse, its widespread implications in many industries, and its future potential.

5. REFERENCE

[1] E. Eryc, "Studi Prospektif Metaverse dan NFT bagi Pengguna NFT, Komunitas Game dan Trader Crypto Currency," *J. Ilm. Teknol. Inf. Asia*, vol. 17, no. 2, pp. 117–124, 2023, doi: https://doi.org/10.32815/jitika.v17i2.928.

[2] E. Eryc and C. Cindy, "Adoption Of Eco-Innovation And Digitalization Influence On The Business Performance Of Umkm In Batam City," *J. Teknol. Inf. DAN Komun.*, vol. 14, no. 1, pp. 67–77, 2023.

[3] Y. Zhao *et al.*, "Metaverse: Perspectives from graphics, interactions, and visualization," *Vis. Informatics*, vol. 6, no. 1, pp. 56–67, 2022, doi: 10.1016/j.visinf.2022.03.002.

[4] Kye Bokyung, Han Nara, Kim Eunji, Park Yeonjeong, and Jo Soyoung, "Educational applications of metaverse: possibilities and limitations," *J. Educ. Eval. Health Prof.*, 2021, [Online]. Available: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8737403/#:~:text=The potential of the metaverse, and high immersion through virtualization.

[5] J. Björkdahl, "Strategies for Digitalization in Manufacturing Firms," *Calif. Manage. Rev.*, vol. 62, no. 4, pp. 17–36, 2020, doi: 10.1177/0008125620920349.

[6] T. Ritter and C. L. Pedersen, "Digitization capability and the digitalization of business

models in business-to-business firms: Past, present, and future," *Ind. Mark. Manag.*, vol. 86, pp. 180–190, 2020, doi: 10.1016/j.indmarman.2019.11.019.

[7] A. Basaure, A. Vesselkov, and J. Töyli, "Internet of things (IoT) platform competition: Consumer switching versus provider multihoming," *Technovation*, vol. 90–91, 2020, doi: 10.1016/j.technovation.2019.102101.

[8] G. Sembiring Depari, E. Shu, and Indra, "Big Data And Metaverse Toward Business Operations In Indonesia," *J. Ekon.*, vol. 11, no. 1, pp. 285–291, 2022, [Online]. Available: http://ejournal.seaninstitute.or.id/index.php/Ekon omi

[9] iy Qomarrullah, J. Siahaan, and M. Sawir, "Pengenalan Digital Literasi 'Metaverse' (Tantangan dan Potensi E-Sport di Tanah Papua)," *J. Altifani*, vol. 2, no. 4, pp. 334–341, 2022.

[10] R. Ridwan, A. Wulandari, and ..., "Metaverse Regulation Formulation in Indonesian Cyber Law," *... Transform. Law*, 2022, [Online]. Available: https://proceedings.ums.ac.id/index.php/icrtlaw/a rticle/view/1118%0Ahttps://proceedings.ums.ac.i d/index.php/icrtlaw/article/download/1118/1094

[11] Y. Indarta, A. Ambiyar, A. D. Samala, and R. Watrianthos, "Metaverse: Tantangan dan Peluang dalam Pendidikan," *J. Basicedu*, vol. 6, no. 3, pp. 3351–3363, 2022, doi: 10.31004/basicedu.v6i3.2615.

[12] M. K. A. Al Gnbri, "Internal auditing in metaverse world: between the prospects of virtual reality and the possibilities of augmented reality," *Indones. Account. Rev.*, 2022, [Online]. Available: https://www.researchgate.net/profile/Mohamed-Kais-Al-Gnbri-2/publication/358262405_Internal_Auditing_in_ Metaverse_World_Between_the_Prospects_of_V irtual_Reality_and_the_Possibilities_of_Augmen ted_Reality/links/6317b87061e4553b956dc907/I nternal-Auditing-in

[13] Y. TORAMAN and B. B. GEÇİT, "User Acceptance of Metaverse: An Analysis for e-Commerce in the Framework of Technology Acceptance Model (TAM)," *Sosyoekonomi*, pp. 85–104, 2023, doi: 10.17233/sosyoekonomi.2023.01.05.

[14] E. Mardoyo, M. Lubis, and S. B. Bhaskoro, "Evaluasi Virtual Reality Menggunakan Technology Acceptance Model (TAM) Terkait Dunia Metaverse," pp. 182–194, 2022.

[15] H. Ning *et al.*, "A Survey on Metaverse: the State-of-the-art, Technologies, Applications, and Challenges," 2021, [Online]. Available: http://arxiv.org/abs/2111.09673

[16] Y. K. Dwivedi *et al.*, "Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice, and policy," *Int. J. Inf. Manage.*, vol. 66, 2022, doi: 10.1016/j.ijinfomgt.2022.102542.

[17] A. M. Aburbeian, A. Y. Owda, and M. Owda, "A Technology Acceptance Model Survey of the Metaverse Prospects," *Ai*, vol. 3, no. 2, pp. 285–302, 2022, doi: 10.3390/ai3020018.

[18] S. N. Attuquayefio and H. Addo, "Using the UTAUT model to analyze students ' ICT adoption," *International J. Education Dev. Using Inf. Commun. Technol.*, vol. 10, no. 3, pp. 75–86, 2014.

[19] V. Venkatesh and H. Bala, "Technology acceptance model 3 and a research agenda on interventions," *Decis. Sci.*, vol. 39, no. 2, pp. 273–315, 2008, doi: 10.1111/j.1540-5915.2008.00192.x.

[20] J. F. Hair, C. M. Ringle, and M. Sarstedt, "PLS-SEM: Indeed a silver bullet," *J. Mark. Theory Pract.*, vol. 19, no. 2, pp. 139–152, 2011, doi: 10.2753/MTP1069-6679190202.