



Application of the Technology Acceptance Model (TAM) in testing the acceptance model of application BORN (Business & Operational Risk Management Nindya Karya)

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ABSTRACT

This research aims to determine the effect of Perceived Ease Of Use, Perceived Ease Of Use, and Perceived Usefulness on Behavioral Intention with Attitude Towards Using as an Intervening Variable in the BORN (Business & Operation Risk Management Nindya Karya) application. The population in this study were all employees of PT. Nindya Karya who used BORN (Business & Operation Risk Management Nindya), especially in the scope of the project in accordance with the PIC Risk determination of the project risk officer and processed using Structural Equation Model (SEM) analysis with SEM PLS software. Based on the research results obtained empirical facts in the form of: 1) There is a significant positive effect of the variable Perceived Usefulness influences Behavioral Intention; 2) There is a positive influence of the Perceived Ease of Use variable on Behavioral Intention; 3) There is a significant positive effect of Perceived Usefulness variable on Attitude Towards Using; 4) There is a significant positive effect of the Perceived Ease of Use variable on Attitude Towards Using; 5) There is a positive influence of Attitude Towards Using variable on Behavioral Intention; 6) Perceived Usefulness does not significantly mediate the positive effect on Behavioral Intention mediated by Attitude Towards Using; 7) Perceived Ease of Use does not significantly mediate the positive effect of Behavioral Intention on Attitude Towards Using.

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INTRODUCTION

In the era of modernization, digitalization and globalization known as the Industrial Revolution 4.0, the growth of information and communication technology has changed our lifestyle, mindset and work patterns. The advantages of using internet technology in this era are flexibility, connectivity, elimination of boundaries, and unlimited data availability (Purba et al., 2020). In Indonesia, the 4.0 era has created opportunities and challenges from high internet penetration. Those who do not integrate digital transformation into their lives as a whole will be marginalized in the Industrial

Revolution 4.0 era. In Indonesia, companies undergoing digital transformation will turn processes to be automated and cost-effective. The goal of digitization is not only to replace human labor with technology, but also to create an automated, interconnected system.

Digitalization with the use of information technology, one of which is produced in the form of applications as products that can be used to reduce production costs, achieve optimal goals, and help companies or organizations become competitive in competition by keeping abreast of digitalized technological developments. Information technology that is applied in a company or organization with the use of applications (products) that can be used include: decision making, business management analysis activities, and other needs that can be met effectively.

In the current era with all digitalization, especially in the midst of the Covid-19 pandemic, it requires users to remain productive and effective in carrying out business processes. BORN (Business & Operation Risk Management Nindya) is a product management that covers all risks of PT. Nindya Karya (Persero) which has been implemented since 2020. The measurement of acceptance of BORN (Business & Operation Risk Management Nindya) is important related to user attitudes towards the application, employees who have positive reactions will make good use of or use the application, while employees who reacting negatively will tend to think the application is just a formality so it doesn't use BORN (Business & Operation Risk Management Nindya) optimally.

In 2021 and 2022 measurements have been carried out on the implementation of BORN (Business & Operation Risk Management Nindya), the effectiveness of use is still below 50%. Both in terms of the user / users using BORN (Business & Operation Risk Management Nindya) and the suitability of filling in the application. Thus a concept is needed to analyze the use of a tool which in this case is BORN (Business & Operation Risk Management Nindya).

The purpose of using the TAM (Technology Acceptance Model) model is to explain and predict acceptance by users and the main factors that influence user behavior towards acceptance of an information technology (Panggih, 2014). This model has several advantages that need to be considered in the context of this study. First, TAM has proven to be an influential model in understanding the acceptance of new technologies and has received strong empirical support from previous research. These advantages indicate that the TAM model can be relied upon as a solid theoretical basis. In addition, TAM is also known as a simple model but capable of producing valid research results. This model has been tested and used by many researchers in various contexts, demonstrating its broad validity.

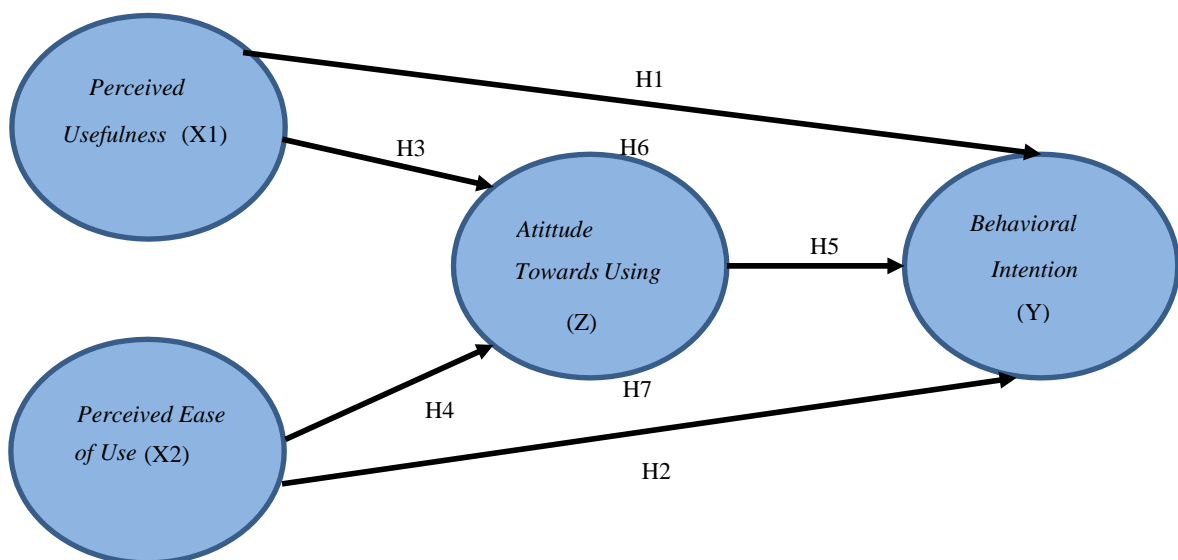
The main objective of this research is to identify the users in using the BORN (Business & Operation Risk Management Nindya) application which are influenced by the factors and determine the variables that most influence the user's acceptance of the application. By understanding these factors, it is expected to achieve the effectiveness of using the BORN (Business & Operation Risk Management Nindya) application to reach the maximum usage level, which is 100%.

RESEARCH METHOD

In this research conducted at PT. Nindya Karya uses BORN (Business & Operation Risk Management Nindya). The object of research is Perceived Ease of Use and Perceived Usability, Attitudes toward Use. The subjects of this research are companies and Behavioral Intention PT. Nindya Karya. In the sampling technique in this study using purposive. Retrieval of purposive sampling data according to the determination of PIC Risk to be precise at the project risk officer, namely the project management level, including: Project Risk Manager, namely PM (Project Manager) and Project Risk Officer, namely SEM (Site Engineering Manager), SAM (Site Accounting Manager), and OE (Office Engineer) for each project with a total of 212 personnel, 53 on going projects based on cut-off data as of March 31, 2023.

Table 1. Variable operationalization

Variable	Definition	Measurement
Attitude Towards Using (Y)	User attitudes that arise as a result of someone's impact when using the BORN (Business & Operation Risk Management Nindya) application in achieving company goals	<ol style="list-style-type: none"> Nice to use Not boring Enjoy the use Convenience in use
Behavioral Intention (Z)	Interest in user behavior in the tendency to use BORN (Business & Operation Risk Management Nindya) tools to achieve company goals	<ol style="list-style-type: none"> Want to use continuously Supporting features Plan to keep using it in the future Motivate other users to use Motivation to provide input for use The desire to use independently
Perceived Usefulness (X1)	The use of a BORN (Business & Operation Risk Management Nindya) tool to support work in achieving company goals	<ol style="list-style-type: none"> Helpful Work productivity increases Responding to needs Control for work Make work easier
Perceived Ease of Use (X2)	Ease of work through the use of BORN (Business & Operation Risk Management Nindya) tools in achieving company goals	<ol style="list-style-type: none"> Easy to interact Easy to learn Easy to remember Availability of instructions fo Easy to understand and flexil

**Figure 1.** Research conceptual framework

Explanation of the Nature of Moderation

1. Perceived Usefulness influences Behavioral Intention in the BORN Application Model (Business & Operational Risk Management Nindya Karya)
2. Perceived Ease of Use influences Behavioral Intention in the BORN Application Model (Business & Operational Risk Management Nindya Karya)
3. Perceived Usefulness influences Attitude Towards Using in the BORN Application Model (Business & Operational Risk Management Nindya Karya)
4. Perceived Ease of Use influences Attitude Towards Using in the BORN Application Model (Business & Operational Risk Management Nindya Karya)
5. Attitude Towards Using influences Behavioral Intention in the BORN Application Model (Business & Operational Risk Management Nindya Karya)
6. Perceived Usefulness influences Behavioral Intention which is mediated by Attitude Towards Using in the BORN Application Model (Business & Operational Risk Management Nindya Karya)
7. Perceived Ease of Use influences Behavioral Intention which is mediated by Attitude Towards Using in the BORN Application Model (Business & Operational Risk Management Nindya Karya)

RESULTS AND DISCUSSIONS

Data analysis

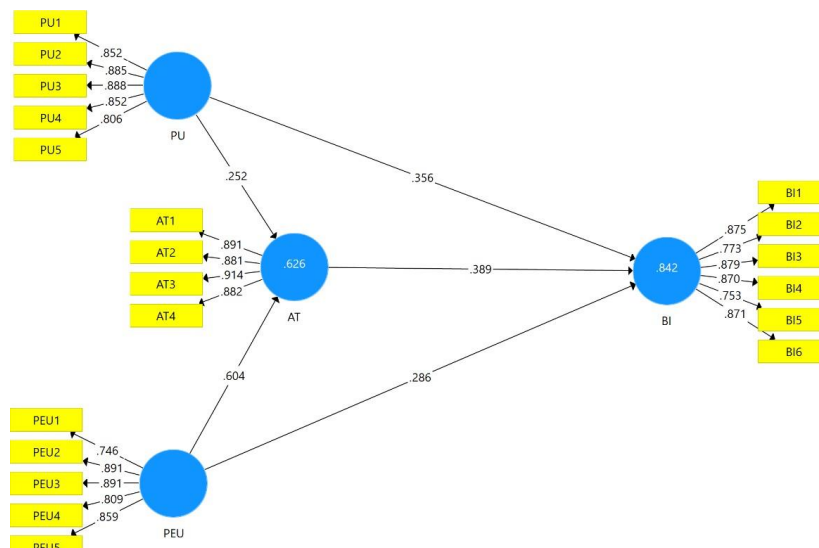


Figure 2. Outer model test construct model

Construct measurement of perceived usefulness or perceived usefulness through 5 indicators. This research has every indicator which is a reflection of latent variables, so it is included in reflective research.

Table 1. Outer loading on each indicator

Construct	Indicator	Loading factor	Information
Perceived use	PU1	.852	Valid
	PU2	.885	Valid

	PU3	.888	Valid
	PU4	.852	Valid
	PU5	.806	Valid
Perceive ease of use	PEU1	.746	Valid
	PEU2	.891	Valid
	PEU3	.891	Valid
	PEU4	.809	Valid
	PEU5	.859	Valid
Attitude towards using	ATU1	.891	Valid
	ATU2	.881	Valid
	ATU3	.914	Valid
	ATU4	.882	Valid
Behavioral intention	BI1	.875	Valid
	BI2	.773	Valid
	BI3	.879	Valid
	BI4	.870	Valid
	BI5	.753	Valid
	BI6	.871	Valid

In this study all indicators pass a threshold of 0.7. Testing the PLS construct begins with the fulfillment of the loading indicator/proxy value for each latent variable. Determination of the threshold value varies in various previously published studies such as (Hair, et al., 2017) which argues that a value of 0.7 is assumed to correspond to the communality of a proxy with a minimum of a proxy (yellow) that can be explained by 50% (0.72) of a latent variable (blue)) as the average variance extracted from the items, so the value of 0.7 is used as the threshold. However, in a newly developed construct, the value of 0.7 is not absolutely used as a threshold (Hulland, 1999 in Hair, et al., 2017(Hair et al., 2017)). Values between 0.4 and 0.7 can be given a special note, provided that the main condition is that the mean value of the construct variance (AVE) is not low with values in that range (Henseler et al., 2015; Sarstedt et al., 2017). In this study it can be concluded that all indicators have met convergent validity and have a high level of validity.

Average Variance Extracted

Table 2. AVE value of each construct

Konstruk	AVE	Keterangan
PU	.734	Valid
PEU	.708	Valid
ATU	.796	Valid
BI	.703	Valid

In this study, it can be concluded that there are no convergent validity problems in the model tested, above with the results of data processing showing that the AVE value in each construct exceeds 0.5.

Table 3. Cross loading factor value

	AT	BI	PEU	PU
AT1	.891	.804	.719	.669
AT2	.881	.697	.672	.518
AT3	.914	.765	.669	.517
AT4	.882	.717	.676	.586
BI1	.829	.875	.791	.677
BI2	.680	.773	.699	.586
BI3	.711	.879	.693	.701

BI4	.737	.870	.703	.733
BI5	.559	.753	.542	.589
BI6	.667	.871	.650	.689
PEU1	.583	.684	.746	.700
PEU2	.646	.697	.891	.471
PEU3	.724	.732	.891	.571
PEU4	.639	.642	.809	.488
PEU5	.626	.672	.859	.508
PU1	.450	.634	.491	.852
PU2	.569	.672	.544	.885
PU3	.578	.723	.546	.888
PU4	.471	.614	.495	.852
PU5	.655	.727	.678	.806

Shows the value of the loading factor between latent variables and their proxies or indicators. The loading factor value that is greater between the proxy and the variable directly than the proxy for other variables that are not connected (via arrows as a sign of the construct) must be greater. This value indicates the variance of the proxy or indicator item to its latent variable as evidence of the unidimensionality of the item.

Table 4. Fornell-Larcker criterion score

	AT	BI	PEU	PU
AT	.892			
BI	.838	.838		
PEU	.767	.816	.841	
PU	.645	.793	.650	.857

The average variance extract describes the amount of variance captured by a variable in the construct model (Ab Hamid et al., 2017). The numbers in the table are the values of the loading variable, where to get the amount of variance in percent, the loading factor is doubled, so that the variable attitude towards use, behavioral intensity, perceived use, and perceived ease of use are respectively 79.56%; 70.22%; 70.73%; 73.45%. In this study, it can be concluded that the discriminant validity requirements for all included constructs have been met, because the results obtained from data processing with other constructs are smaller than all constructs that have a \sqrt{AVE} value.

Table 5. HTMT ratio criteria

	AT	BI	PEU	PU
AT				
BI	.909			
PEU	.846	.898		
PU	.694	.862	.715	

All constructs can be declared to meet the requirements of discriminant validity because the results of data processing have shown that the overall value distribution is still below 0.9.

Instrument Reliability Test

Table 6. Construct reliability value

Construk	Composite Reliability	Information
AT	.940	Reliabel
BI	.934	Reliabel
PEU	.923	Reliabel
PU	.932	Reliabel

It can be concluded that all constructs have good reliability and no reliability/unidimensionality problems are found in the model formed above which shows the value of composite reliability produced by all constructs > 0.7 .

Conbach's Alpha

Table 7. Cronbach's alpha value

Construk	Cronbach alpha	Information
AT	.914	Reliabel
BI	.915	Reliabel
PEU	.895	Reliabel
PU	.909	Reliabel

It can be concluded that all constructs have no reliability/unidimensionality problems in the model formed and already have good reliability, seen above which shows the Cronbach's alpha value for all constructs is very good, namely > 0.7 .

Table 8. The dependent variable's R-square results

Matriks	R-square	Kategori
PU and PEU variables to AT	.626	Strong
PU and PEU variables to BI	.842	Strong

The influence of perceived use (PU) and perceived ease of use (PEU) together on user behavior and intentions with R-Square values of 0.626 and 0.842 respectively. That is, all exogenous constructs (independent variables) simultaneously influence user behavior by 62.6% and the rest are influenced by other factors from outside the study. Thus, the simultaneous relationship of exogenous constructs (independent variables) simultaneously influences intention by 84.2% and the rest is influenced by other factors from outside the study.

Table 9. Q-square predictive value

	SSO	SSE	Q ² (=1-SSE/SSO)
AT	340.000	175.479	.484
BI	510.000	241.560	.563
PEU	425.000	425.000	
PU	425.000	425.000	

This means that 48.4% of the variation in the endogenous variable of user behavior is explained by the variables used in the model and 56.3% of the variation in the endogenous variable of intention is explained by the variables used in the model. It can be proven that it has predictive relevance through these results ($0 > Q^2$) obtained (Hair et al., 2010).

Table 10. F-square categorization

Construk	f-square	Information
PU - AT	.098	Small
PEU - AT	.562	Large
PU - BI	.420	Large
PEU - BI	.191	Large
AT - BI	.358	Large

Found a large influence with the f-Square criteria > 0.35, except for the relationship between the PU and AT variables of 0.099 in the small category.

Table 11. Assess the direct effect of the modeling path

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STD EV)	P Values
AT -> BI	.389	.387	.101	3.858	.000
PEU -> AT	.604	.598	.126	4.780	.000
PEU -> BI	.286	.299	.096	2.971	.004
PU -> AT	.252	.265	.117	2.156	.034
PU -> BI	.356	.336	.099	3.584	.001

Discussion

Direct Effect

In this study, there were 5 direct effect hypotheses tested, namely:

1. The first hypothesis: Perceived Usefulness influences Behavioral Intention.

The magnitude of the coefficient value for perceived usefulness on behavioral intensity is 0.356 indicating there is a positive influence, with a t-statistic value of 3.584 > 1.96 or a p-value of 0.001 < 0.05 indicating the effect of perceived usefulness on intensity behavior is significant, so there is sufficient evidence to state that perceived usefulness has a significant and positive effect. Thus the first hypothesis in this study can be accepted.

2. The second hypothesis: Perceived Ease of Use influences Behavioral Intention.

The magnitude of the coefficient value for perceived ease of use on behavioral intensity is 0.286 indicating there is a positive influence, with a t-statistic value of 2.971 > 1.96 or a p-value of 0.004 < 0.05 indicating the effect of perceived ease of use on behavioral intensity is significant, so there is sufficient evidence to state that perceived ease of use has a significant and positive effect. Thus the second hypothesis in this study can be accepted.

3. The third hypothesis: Perceived Usefulness influences Attitude Towards Using.

The the magnitude of the coefficient value for perceived usefulness towards usage attitudes is 0.252 indicating there is a positive influence, with a t-statistic value of 2.156 > 1.96 or a p-value of 0.034 < 0.05 indicating the influence of perceived usefulness on the attitude of use is significant, so there is sufficient evidence to state that perceived usefulness has a significant and positive effect. Thus the third hypothesis in this study can be accepted.

4. Fourth hypothesis: Perceived Ease of Use influences Attitude Towards Using

The magnitude of the coefficient value for perceived ease of use on the attitude of use is 0.604 indicating there is a positive influence, with a t-statistic value of 4.780 > 1.96 or a p-value of 0.000 < 0.05 indicating the influence of perceived ease of use perceived attitude towards use is significant, so there is sufficient evidence to state that perceived ease of use has a significant and positive effect. Thus the fourth hypothesis in this study can be accepted.

5. Fifth hypothesis: Attitude Towards Using influences Behavioral Intention.

The magnitude of the coefficient value for the perceived attitude of use on the intensity of behavior is 0.389 indicating there is a positive influence, with a t-statistic value of 3.858 > 1.96 or a p-value of 0.000 < 0.05 indicating the influence of perceived attitude of use on the intensity of the behavior is significant, so there is sufficient evidence to state that the attitude of use has a significant and positive effect. Thus the fifth hypothesis in this study can be accepted.

Indirect Effect

Table 12. Indirect effect value (mediation variable)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STD EV)	P Values
PEU -> AT -> BI	.235	.230	.073	3.203	.002
PU -> AT -> BI	.098	.105	.058	1.694	.094

6. The sixth hypothesis: Perceived Usefulness influences Behavioral Intention which is mediated by Attitude Towards Using.

The coefficient value for perceived usefulness on behavioral intensity through attitudes toward use is 0.098 indicating that there is a positive indirect effect with a t-statistic value of 1.694 < 1.96 or a p-value of 0.094 > 0.05 indicating that the indirect effect is not significant. so there is not enough evidence that Perceived Usefulness has an effect on Behavioral Intention mediated by Attitude Towards Using. Thus the sixth hypothesis in this study cannot be accepted.

7. The seventh hypothesis: Perceived Ease of Use influences Behavioral Intention which is mediated by Attitude Towards Using.

The coefficient value for perceived ease of use on behavioral intensity through attitudes towards use is 0.235 indicating that there is a positive indirect effect with a t-statistic value of 3.203 > 1.96 or a p-value of 0.002 < 0.05 indicating that the indirect effect is significant. so that there is sufficient evidence to state that attitudes toward use mediate a significant and positive relationship between perceived usefulness and behavior intensity. Thus the seventh hypothesis in this study can be accepted.

CONCLUSION

The conclusions from this study can be drawn as follows: The perceived usefulness of using BORN (Business & Operation Risk Management Nindya) tools has a significant influence on the behavioral intention of users in adopting the technology. Awareness of the benefits felt by users is an important factor in encouraging technology adoption and acceptance of BORN (Business & Operation Risk Management Nindya) tools. This hypothesis is in line with the well-known Technology Acceptance Model (TAM), which has been widely used to understand user acceptance and adoption of

technology (Montazemi & Qahri-Saremi, 2015). TAM believes that perceived usefulness is a key determinant of individual acceptance and usage behavior towards technology. In the modern world, technology integration is no longer focused on increasing efficiency, but on increasing the flexibility of use. A flexible technology will be more useful not only in increasing efficiency, but the effectiveness of a job (Richter et al., 2018). If users find digitization efforts useful and beneficial to their work processes or outcomes, they are more likely to embrace and support digital initiatives, leading to higher adoption rates and better organizational outcomes (Ahmad et al., 2020). The perceived utility or benefits of using BORN (Business & Operation Risk Management Nindya) tools has an important influence on attitudes toward technology use. The benefits felt by users can influence their positive attitude towards the technology used and foster an intention to continue using the technology. When a technology is seen as easy to use, people are more likely to perceive it as user-friendly and accessible, resulting in a greater desire to adopt and use it (Scherer et al., 2019). As organizations introduce new digital tools and systems, ensuring that users find them easy to use is critical for successful adoption (Montazemi & Qahri-Saremi, 2015). Complexity and difficulty in using technology can be a barrier to acceptance and hinder the expected benefits of digitalization efforts as a study related to technology adoption in the world of education found something similar (Mohd Elmagzoub Babiker, 2015). The ease of use of BORN (Business & Operation Risk Management Nindya) tools also influences user attitudes towards using this technology. The perception that using BORN (Business & Operation Risk Management Nindya) tools is relatively easy will help create a positive attitude and strengthen user intentions to use these tools continuously. One study found that the benefits of using a technology that are felt by someone can facilitate conditions of trust and influence socially which in turn fosters a positive attitude towards a technology (Chen & Aklidikou, 2020). According to TAM, perceived utility is an important component in determining people's attitudes toward technology. Individuals are more likely to have a positive view of technology when they find it useful. This optimistic attitude stems from the notion that the use of technology will provide benefits, increase efficiency, increase work performance, or simplify tasks (Lai, 2019). The significance of perceived benefits in shaping attitudes towards technology becomes even more important in the context of digitalization and technology implementation. Understanding what employees think of usability is critical to creating a favorable attitude toward technology as companies deploy new digital tools and systems. Employees are more likely to adopt a positive attitude towards technology when they see it as valuable and beneficial for their work processes or results (Ahmad et al., 2020). There is a strong relationship between perceptions of the usefulness of using and attitudes toward using BORN (Business & Operation Risk Management Nindya) tools. When users experience clear and meaningful benefits from using BORN (Nindya's Business & Operation Risk Management) tools, a positive attitude is formed, which in turn will increase the likelihood of adoption and sustainable use. A study related to e-commerce adoption shows that the ease of use of a technology by maximizing existing resources is very important for consumer acceptance of the product (Cui & Pan, 2015). The importance of perceived ease of use is crucial in the context of digitalization and technology implementation. When a business introduces new digital tools and systems, it is critical for consumers to see these technologies as user-friendly and intuitive in order to be adopted and used successfully. Users are more likely to have favorable attitudes toward technology if it is easy to use, leading to higher acceptance and desire to engage with it (Wenker, 2022). User attitudes toward using BORN (Business & Operation Risk Management Nindya) tools have an important role in translating user intentions into concrete actions. A positive attitude that is formed through a positive evaluation of BORN (Business & Operation Risk Management Nindya) tools and good user experience will encourage users to use these tools consistently. This positive attitude, in turn, affects their willingness to accept and use technology (Revythi & Tselios, 2019). A positive attitude is often associated with the notion that technology will increase productivity, efficiency, convenience, or overall user happiness (Revythi & Tselios, 2019). In the realm of technological progress and digitalization, understanding and influencing user

attitudes in using new digital tools or systems is very important for successful implementation, such as providing a column for comments and suggestions that are important for developing user experience (Kuliya & Usman, 2021). It is not only important to focus on the functionality and usability of technology but also to cultivate positive perceptions and attitudes among users (Al-Emran et al., 2016). Perceived ease of use influences behavioral intention through mediating attitudes toward use. A positive attitude towards using technology can increase the intention to use it. This attitude is formed through social interaction and cognitive evaluation of ease of use. According to TAM, an individual's attitude towards the use of technology is influenced by their perception of its usefulness. When individuals perceive a technology as useful, it has a positive impact on their attitude towards using it. This shows that, while perceived usefulness has a direct impact on behavioral intentions, attitudes towards using a tool or technology mediate some of its influence (Almaiah, 2018). In the context of using BORN (Business & Operation Risk Management Nindya) tools, user attitudes toward technology use have a partial mediating effect on the relationship between perceived usefulness and behavioral intentions to use. This shows that user attitudes, both positive and negative, can affect the intention to use technology despite the benefits that are felt by users. However, it should be underlined that ease of use must be accompanied by an understanding of something so that consumers can understand its use, which in turn knows the purpose of using a technology. Intentions will emerge along with clear knowledge of the use of a technology which will eventually lead to an attitude of accepting and using the technology (Msirlis & Munawar, 2023).

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