Acceptance of Artificial Intelligence-Based Online Shopping Applications: A Combination of Artificially Intelligent Device Use Acceptance and Online Shopping Service Quality

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ABSTRACT
Nowadays, e-commerce, including Shopee, is often associated with Artificial Intelligence (AI). The use of AI systems triggers the emergence of new marketing methods to reach consumers effectively and offer a better shopping experience. Moreover, the increased use of AI in online commerce occurs because AI is considered an excellent tool to meet rapidly changing consumer demands. Currently, more sellers are using AI-supported features such as chatbots, smart logistics, and personalized recommendations. This makes online channels more competitive and enticing for consumers to make purchases. Despite the numerous benefits of e-commerce and AI, they are not exempt from shortcomings that make customers reluctant to use them. Therefore, this research aims to understand the relationship among factors influencing the acceptance and objection of AI-based Shopee by using a combination of Artificially Intelligent Device Use Acceptance (AIDUA) and Online Shopping Service Quality (OSSQ). The study employs a quantitative method with survey data collection techniques. The collected sample from the survey process consists of 169 respondents, mostly females aged 17-26 years, and students. The results obtained find that factors significantly influencing performance expectancy are social influence, hedonic motivation, anthropomorphism, website design, responsiveness, communication, and trustworthiness. Factors affecting effort expectancy are social influence, reliability, communication, anthropomorphism, and website design. Meanwhile, the factor influencing emotion is performance expectancy. Lastly, the factors influencing willingness to use and objection to use are emotion. Based on the research findings, Shopee developers can enhance the quality of their AI programming algorithms and improve the design quality of Shopee.

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1. INTRODUCTION

The high growth rate of information and communication technology users, such as the internet, has a significant impact on various fields, including the economy, society, culture, lifestyle, and consumption. Currently, the Indonesian society is increasingly utilizing information and communication technology for sales and purchases through e-commerce. There are several e-commerce platforms in Indonesia that are frequently used for online shopping. Based on Snapcart's survey results, among the notable e-commerce players in Indonesia, Shopee ranks first (Ramadhani, 2023). Shopee employs various strategies to maintain and enhance its popularity by strengthening its technological aspects, including the implementation of Artificial Intelligence (AI) (Fauzan, 2020). Therefore, research on new technologies in e-commerce, especially AI, is deemed appropriate when conducted on Shopee. The use of AI systems triggers the emergence of new marketing methods to reach consumers effectively and provide a better consumer experience (Pusztahelyi, 2020). Currently, more retailers are using AI-supported chatbots, intelligent logistics, and personalized recommendations, making online channels more competitive and enticing consumers to make purchases (Deng et al., 2021).

Nielsen (2016) suggests that "the next consumer" is Gen Z, now becoming a potential target market for e-commerce. Their research conducted in 11 cities in Indonesia found that 62% of the decision to purchase products online was influenced by Gen Z. This statement aligns with the internet penetration in Indonesia, which is dominated by Gen Z, as internet adoption is a prerequisite for online shopping (Lissitsa & Kol, 2016). The results of a survey conducted by APJII (2022) stated that internet penetration in Indonesia is dominated by the age groups of 13-18 years and 19-34 years, with both values reaching 99.16% and 98.64%, respectively. This indicates that teenagers and young adults in Indonesia are highly active in using the internet, with most falling into the Gen Z category.

Numerous studies on e-commerce have been conducted before (Amofah & Chai, 2022; Lestari, 2019), but few have delved into the profound impact of AI technology within e-commerce applications. Additionally, research on e-commerce and AI often utilizes general technology research models such as the Technology Acceptance Model (TAM) (Chhikara et al., 2022) and Unified Theory Acceptance and Use Technology (UTAUT) (Soh et al., 2020). On the other hand, a model that measures the acceptance level of applications containing AI, namely the Artificially Intelligent Device Use Acceptance (AIDUA) model proposed by Gursoy et al. (2019), has been identified. However, AIDUA is not specific enough in measuring aspects related to online shopping activities, such as user perceptions of service quality in e-commerce. Previous studies using the AIDUA model still utilized a pure model and only made changes to the research object and location (Roy et al., 2020). Gursoy et al. (2019) mentioned that their

study when creating AIDUA only tested a small number of factors that could influence customer willingness to accept or reject the use of AI devices, indicating the possibility of other significant variables. They suggested that future research should investigate whether there are other antecedents that can be added to AIDUA to improve its predictive power.

Therefore, this research adds Online Shopping Service Quality (OSSQ) as an antecedent variable (independent variable). OSSQ is chosen because it aligns with the research object, Shopee, which is a marketplace. Additionally, service quality is considered important by Gen Z (Perić et al., 2020) and is a significant challenge for companies as they must serve both buyers and sellers simultaneously (Fared et al., 2021). Specifically, this research develops AIDUA as the main model to observe the acceptance of AI-based Shopee and uses OSSQ to determine perceptions of Shopee's service quality. This is useful to explain why customers are willing to use the AI-based Shopee application for online shopping activities.

2. THEORICAL BASIS

2.1. Artificial Intelligent Device Use Acceptance (AIDUA)

AIDUA is a model used to measure customers' willingness and objection to use AI devices and related technologies (Roy et al., 2020). Using cognitive appraisal theory and cognitive dissonance theory, Gursoy et al. (2019) proposed the theoretical AIDUA model that explains the multi-step process customers employ in determining their willingness to accept the use of AI devices. AIDUA consists of variables such as hedonic motivation (HM), social influence (SI), anthropomorphism (A), performance expectancy (PE), effort expectancy (EE), emotion (E), willingness to use (WU), and objection to use (OU).

2.2. Online Shopping Service Quality (OSSQ)

OSSQ is an extension of the SERVQUAL model proposed and developed by Parasuraman et al. (1991). SERVQUAL is useful for measuring service quality (Oli & Dhanasekaran, 2023). While a version of SERVQUAL adapted for e-commerce has been discussed previously by Jeon et al. (2018), it was first referred to as OSSQ by Amjad-ur-Rehman et al. (2019). OSSQ consists of 5 dimensions, that is Website Design (WD), Reliability (R), Responsiveness (RS), Communication (C), and Trustworthiness (T) (Amjad-ur-Rehman et al., 2022).

2.3. Hypothesis Development

AIDUA indicates that SI tends to be a determinant of customers' initial evaluation of services offered by AI devices (Lin et al., 2019). According to Roy et al. (2020), group norms determine the level of importance attached to social network opinions, criticisms, and attitudes. Customers tend to conform to the norms, behaviors, and attitudes of their social groups when deciding whether to use AI service devices. If

customers' social groups have a positive opinion about AI devices, believing that the devices are useful and easy to use, customers are less likely to perceive the devices as useless and difficult to use (Gursoy et al., 2019). Thus, SI has a significant impact on customer perceptions of PE and EE. Based on previous theoretical and empirical discussions, the following hypotheses are proposed.

H1a. Social influence is positively related to performance expectancy of AI-based Shopee.

H1b. Social influence is negatively related to effort expectancy of AI-based Shopee.

Previous literature argues that HM is one of the main determinants of technology adoption behavior (Allam et al., 2019). HM is an essential aspect of Human-Computer Interaction (HCI) and has been established to influence usefulness and ease of use (Kumar & Bervell, 2019), which are aspects of PE and EE, respectively. When customers have HM, using the devices benefits customers by satisfying their personal interests or needs for exploring new things and entertainment (Fryer et al., 2017). Customers with higher levels of HM are more likely to focus on the benefits provided and tolerate shortcomings in using the devices (Lin et al., 2019). Thus, the following hypothesis is proposed.

H2a. Hedonic motivation is positively related to performance expectancy of AI-based Shopee.

H2b. Hedonic motivation is negatively related to effort expectancy of AI-based Shopee.

Anthropomorphic characteristics in AI-based technology are known to have many benefits, but The Uncanny Valley theory proposes a nonlinear relationship between A and WU. The Uncanny Valley is a feeling of unease and discomfort towards specific media or technology that often arises in various types of human-computer interactions (Ciechanowski et al., 2019). This is because customers perceive that technological products threaten human identity. Lin et al. (2019) conclude that A is likely to positively influence EE by causing fear in users. Additionally, despite having rapid analytical capabilities, AI is not exempt from shortcomings. As cited from Glair.ai (2022), AI analysis results are often inaccurate, and its algorithms may be built with biased thinking. These factors occasionally cast doubt on the performance of AI. Therefore, Lin et al. (2019) statements regarding A may not positively impact PE regarding related technology, making it plausible that A is more likely to result in higher EE levels (Lin et al., 2019). Thus, the following hypotheses are proposed.

H3a. Anthropomorphism is negatively related to performance expectancy of AI-based Shopee.

H3b. Anthropomorphism is positively related to effort expectancy of AI-based Shopee.

Amjad-ur-Rehman et al. (2019) stated that customer performance will improve in line with the enhancement of website quality, which subsequently creates efficiency, effectiveness, and user productivity. This is only possible if e-retailers provide high-quality services in the online environment. In this way, the availability of high-quality online services is crucial for shaping customer expectations related to online retail performance. With the availability of high-quality online shopping services, customers can easily navigate products, saving time and effort during the online shopping process (Amjad-ur-Rehman et al., 2019). This is beneficial to keep customers away from the complexity of visiting different stores during conventional shopping. In conclusion, online transactions can be carried out easily and error-free with the help of high-quality service provision.

In a virtual environment where identical products are sold, competition becomes intense. Therefore, sellers take various measures to succeed in their business. Some researchers highlight that the long-term success of online sales depends on high-quality service. As a result, customer PE and EE are likely to be influenced by service quality (Amjad-ur-Rehman et al., 2022). Previous research analyzed the quality of website content and design (Dickinger & Stangl, 2013). For example, a site designed by displaying various forms and dimensions of products can enhance customers' product navigation performance (e.g., 3D display). In addition to design, site security is also a benchmark for application quality. A trustworthy site will meet customer expectations regarding product delivery and effectively address transaction-related security issues. Online stores will enhance customer trust by offering high-quality services. Furthermore, to build reliable service quality, sellers will strive to solve customer problems and make online shopping easy for them. Online transactions can be carried out easily and error-free with the help of high-quality service provision (Amjad-ur-Rehman et al., 2022).

A good online shopping site also has various communication channels for interaction and handling complaints or questions, such as email, chat rooms, telephone, and fax. Well-designed online sites will be user-friendly, time-saving, and require little mental effort (or energy savings) from online buyers. According to (Duggal, 2019), unlike traditional communication methods, users will not be charged based on their communication distance. Since marketplace users like Shopee are both sellers and buyers, the seller's interests should also be considered. On the seller's side, the use of the marketplace is useful for offering new products and alternative ways to communicate effectively and efficiently. Many forms of traditional business communication, such as face-to-face meetings, phone conversations, letters, brochures, and other trade correspondences, can be adapted, improved, and integrated using e-commerce. Adopting e-commerce will be a driver for change and growth, allowing sellers to better serve customers, increase trade opportunities, reduce

operational costs, and ultimately generate more profits. Amjad-ur-Rehman et al. (2022) mentioned that high-quality online shopping sites also provide various languages that can be selected according to customer fields and skills. Similarly, interactions between customers and sellers become easier due to adequate service quality.

Communication services will not be very helpful if not supported by responsive feedback. It is crucial that front-line staff are willing and able to assist customers in providing responsive services that meet customer expectations (Rao & Sahu, 2013). Agnihotri et al. (2016) stated that if the service is responsive by providing quick responses and addressing customer needs, buyer expectations will be met. Customers expect a response from sales staff when the interaction begins. If buyers feel that the seller is too busy for them, they may consider other options. The author argues that PE and EE clarify why people use applications to achieve their goals. Thus, overall, the quality of e-shopping services can be a source to influence PE and EE. Efficient quality of online shopping services is a crucial feature to drive online shopping activities. Therefore, customer expectations and service quality are intertwined in the online shopping process. Based on the above presentation, the following hypotheses can be proposed.

H4a. Website design is positively related to performance expectancy of AI-based Shopee.

H4b. Website design is negatively related to effort expectancy of AI-based Shopee.

H5a. Trustworthiness is positively related to performance expectancy of AI-based Shopee.

H5b. Trustworthiness is negatively related to effort expectancy of AI-based Shopee.

H6a. Reliability is positively related to performance expectancy of AI-based Shopee.

H6b. Reliability is negatively related to effort expectancy of AI-based Shopee.

H7a. Communication is positively related to performance expectancy of AI-based Shopee.

H7b. Communication is negatively related to effort expectancy of AI-based Shopee.

H8a. Responsiveness is positively related to performance expectancy of AI-based Shopee.

H8b. Responsiveness is negatively related to effort expectancy of AI-based Shopee.

There is a strong possibility that customer attitudes and perceptions towards the use of advanced technology (Baishya & Samalia, 2020), including AI devices, influence PE and EE (Gursoy et al., 2019). Using online shopping sites also enhances customer PE, such as time savings and the availability of products online that may not be available in

offline physical stores (Amjad-ur-Rehman et al., 2019). Lin et al. (2019) concluded that a higher level of PE results in higher E towards the use of AI devices, while a higher level of EE negatively impacts the E variable. Therefore, the following hypotheses are proposed.

H9. Performance expectancy has a positive impact on generation of positive emotions toward the use of AI-based Shopee.

H10. Effort expectancy has a negative impact on generation of positive emotions toward the use of AI-based Shopee.

Previous research acknowledges the strong possibility that E significantly influences customer WU and OU to use AI-based applications and related technologies (Gursoy et al., 2019; Lin et al., 2019). Positive E can trigger customer WU and negative E can create customer OU of AI devices (Roy et al., 2020). This is consistent with what is mentioned in the cognitive appraisal theory, that customers who have positive E toward AI devices will have a higher WU of AI devices during the service delivery process, and vice versa.

Previous studies identified that one of the main challenges in adopting AI devices in the service context is the customer's basic assumption that good service requires human-to-human interaction (Ackerman, 2016). This assumption seems true because customers often want more social interaction in service transactions (Zhang et al., 2017). As a result, while customers may intend to use AI services due to their novelty (Fryer et al., 2017), they may also oppose the use of these devices due to the need for social interaction (Ackerman, 2016). This mixed assessment is likely influenced by customer E towards AI-based devices. In other words, if customers have a higher level of positive E towards AI devices, they are more likely to accept the use of these devices and tend not to reject them, and vice versa (Lin et al., 2019). Based on the statements above, the following hypotheses are proposed.

H11. Emotion is positively related to customer's willingness to accept the use of AI-based Shopee.

H12. Emotion is negatively related to customer's objection to accept the use of AI-based Shopee.

Based on the explanation of the relationships between the variables above, the researcher formulates a research model as seen in Figure 2.

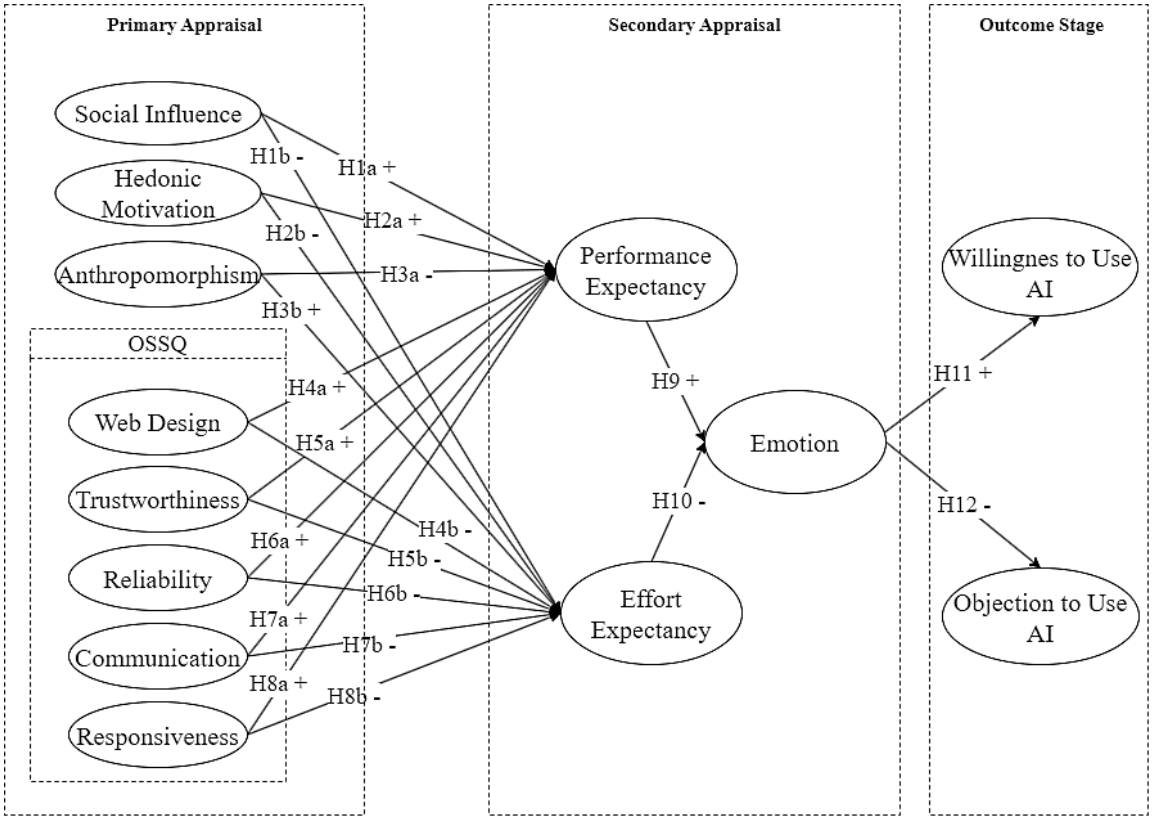

Figure 1. Research Model

3. METHOD

The approach employed in this research is a quantitative approach, which involves measuring and analyzing variables to obtain results. This process entails the analysis of numerical data using specific statistical techniques (Apuke, 2017). The analytical technique used in this study is Partial Least Squares-Structural Equation Modeling (PLS-SEM).

Data for this research were obtained through a survey. The questionnaire for this process was created using Google Forms and distributed through online platforms such as WhatsApp, Telegram, Instagram, and Twitter. Measurements in this survey were conducted using a Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). The choice of the Likert scale points was made based on considerations from several previous researchers. Neuman (2011) suggests that it is better to use 4 to 8 alternative response options, with a maximum of 9, as having more may confuse respondents in making their choices. Meanwhile, Preston and Colman (2000) state that questionnaires with more than 4 alternative response options are considered to have higher reliability than those with fewer than 4 points. Additionally, Nemoto and Beglar (2014) argue that a Likert scale questionnaire should not include a "neutral" or middle value response option, as the middle value is not suitable for statistical models due to its irregularity.

Moreover, an instrument should be capable of eliciting clear answers rather than "neutral" responses.

The population in this study consists of Shopee users. Purposive sampling was used to select samples based on the criteria of being Shopee users belonging to Generation Z, born between 1997 and 2011 (NPD, 2018). Regarding the sample size, there are various methods that can be used to determine it. Hair Jr et al. (2018) discuss the ideal sample size, stating that researchers generally do not analyze with fewer than 50 observations, and the sample size should preferably be 100 or more significant. Thus, the sample size in this study is a minimum of 120 samples, based on the previous statement by Hair Jr et al. (2018), with an addition of some respondents to account for any invalid data. The collected data will then be analyzed using SmartPLS with two main processes: outer model testing and inner model testing.

3.1. Measurement Model Analysis (Outer Model)

The outer model evaluation is utilized to assess the validity and reliability of the data collection instrument (measurement). Testing validity using the SmartPLS application is done by observing convergent validity, which consists of outer loading values and Average Variance Extracted (AVE), and discriminant validity, which includes the square root of AVE values (Fornell-Lacker criterion) and cross-loading. Meanwhile, reliability can be determined by Cronbach's alpha and composite reliability values (Duryadi, 2021).

3.2. Structural Model Analysis (Inner Model)

The inner model is a structural model to predict the causal relationships between latent variables (Ananda, 2017). Evaluation of the inner model is conducted by observing the coefficient of determination (R2), path coefficient (path coefficient), validating the goodness of the model (model fit), predictive relevance (Q2) (Duryadi, 2021) and effect size (f2) (Sleimi & Okechukwu Lawrence, 2017).

4. RESULT AND DISCUSSION

4.1. Results of Data Collection

The respondents obtained in this study amounted to 169. Before analysis, respondent data will first be screened using James Gaskin's Excel tools to sift out data that does not meet the criteria or is not valid. The remaining valid data amounted to 163. A summary of demographic information for respondents with valid responses is presented in Table 1.

Table 1. Demographic Results of Respondents

Category	Frequency	Persentage
Gender		
Male	61	37.4%
Female	102	62.6%
Age		
12-17	60	36.8%
18-26	103	63.2%
Tertiary Education		
Elementary School	1	0.6%
Junior High School	6	3.7%
Senior High School	106	65%
Associate Degree	2	1.2%
Bachelor's Degree	48	29.4%
Work		
Private Sector Worker	19	11.7%
Civil Servant	2	1.2%
Entrepreneur	5	3.1%
Student	61	37.4%
College Student	55	33.7%
Other	21	12.9%

In Table 1, it can be observed that the majority of respondents were female, aged 18-26 years, with a high school education, and working as students.

4.2. Measurement Model Analysis Results (Outer Model)

4.2.1. Convergent Validity Test Results

The parameters examined at this stage are outer loading and AVE. If the outer loading>0.7 and the AVE>0.5, the indicator is considered to have passed the convergent validity test (Duryadi, 2021). The initial step in testing convergent validity in this study was the outer loading test, aiming to determine the correlation between specific variables and each of their indicators. There were 8 invalid indicators (A4, C3, C5, OU2, OU4, R3, SI3, and T2), which were removed. The subsequent process involves AVE testing. An AVE of 0.5 or higher indicates that the construct explains 50 percent or more of the variance in the indicators. The AVE results for this research are displayed in Table 2.

Table 2. Average Variance Extracted Test Results

Variable	AVE	Description
A	0,697	Valid
C	0,649	Valid
E	0,729	Valid
EE	0,695	Valid
HM	0,856	Valid
OU	0,827	Valid
PE	0,669	Valid
R	0,765	Valid
RS	0,693	Valid
SI	0,855	Valid
T	0,718	Valid
WD	0,640	Valid
WU	0,740	Valid

The AVE results demonstrate that all variables have values above 0.5, meeting the requirements for passing the AVE test. Overall, all variables and indicators satisfy the convergent validity criteria.

4.2.2. Discriminant Validity Test Results

This test ensures that the correlation between observed indicators and related variables is higher than that of other variables (Hair Jr et al., 2018). Considered values in this process include cross-loading and the square root of AVE (Fornell-Larcker criterion). If the outer loading > 0.7, exceeds the cross-loading value, and the square root value of AVE > the correlation between other latent constructs, the variable passes the discriminant validity test. The results of this study indicate that all outer loading indicators surpass 0.7 and exceed cross-loading values on other variables. This implies that all these indicators meet the requirements of the cross-loading test.

The subsequent step is the Fornell-Larcker criterion test, where passing criteria involve the value between a variable and itself being greater than that variable's value with other variables. The Fornell-Larcker criterion values from this research are presented in Table 3.

Table 3. Fornell-Larcker Criterion Test Results

	A	C	E	EE	HM	OU	PE	R	RS	SI	T	WD	WU
A	0,835												
C	0,388	0,805											
E	0,450	0,500	0,854										
EE	-0,543	-0,523	-0,443	0,834									
HM	0,557	0,502	0,573	-0,417	0,925								
OU	-0,197	-0,133	-0,280	0,282	-0,137	0,909							
PE	0,471	0,644	0,670	-0,527	0,668	-0,236	0,818						
R	0,572	0,624	0,636	-0,552	0,749	-0,222	0,756	0,875					
RS	0,549	0,629	0,565	-0,451	0,689	-0,136	0,752	0,801	0,832				
SI	0,640	0,580	0,553	-0,624	0,698	-0,163	0,713	0,764	0,676	0,925			
T	0,487	0,576	0,681	-0,495	0,550	-0,326	0,712	0,736	0,683	0,645	0,847		
WD	0,482	0,518	0,522	-0,355	0,542	-0,178	0,660	0,721	0,669	0,613	0,606	0,800	
WU	0,358	0,468	0,645	-0,355	0,535	-0,270	0,657	0,581	0,540	0,493	0,601	0,523	0,860

Table 3 shows that all Fornell-Larcker criterion values between a specific variable and itself are greater than its values with other variables. This means that all indicators meet the cross-loading test requirements. Overall, it can be concluded that all variables and indicators have satisfied the discriminant validity criteria.

4.2.3. Reliability Test Results

Reliability testing was conducted by observing the values of Cronbach's alpha and composite reliability. If both values are greater than 0.7, the variable can be considered reliable. The reliability test results for this research are presented in Table 4.

Table 4. Cronbach's Alpha and Composite Reliability Test Results

Variable	Cronbach's Alpha	Composite Reliability
A	0,782	0,873
C	0,729	0,847
E	0,907	0,931
EE	0,780	0,872
HM	0,916	0,947
OU	0,792	0,905
PE	0,875	0,910
R	0,846	0,907
RS	0,777	0,871
SI	0,831	0,922
T	0,803	0,884
WD	0,723	0,842
WU	0,824	0,895

Table 5 indicates that the values of Cronbach's alpha and composite reliability in this study are greater than 0.7, thus concluding that the variables in this research are reliable.

4.3. Structural Model Analysis Results (Inner Model)

4.3.1. Coefficient of Determination (R2) Test Result

R square explains how much dependent data can be accounted for by independent data. R square values range from 0 to 1, with a higher value indicating better fit (Hair Jr et al., 2018). According to Duryadi (2021), R^2 values of 0.19-0.32 indicate weak relationships, 0.33-0.66 indicate moderate relationships, and above 0.67 indicate strong relationships. The R^2 values for this study are presented in Table 6.

Table 5. R Square Test Results

Variable	R Square	Category
E	0,461	Moderate
EE	0,504	Moderate
OU	0,078	Very Weak
PE	0,715	Strong
WU	0,417	Moderate

It was found that most variables have R2 values falling into the moderate category. However, one variable, OU, has a very low R2 value.

4.3.2. Effect Size (f2) Test Result

The measurement of effect size is done by examining the f^2 values in SmartPLS. If the value is > 0.02, it indicates a small effect; if > 0.15, it indicates a moderate effect, and if > 0.35, it indicates a large effect. If the value is less than 0.02, it means that the variable does not have a significant effect on the related variable (Sleimi & Okechukwu Lawrence, 2017). There are some effect size values in this study are below 0.02, namely R→PE, RS→EE, and T→EE. This implies that the relationships between these variables do not have a significant impact.

4.3.3. Model Fit Test Result

In this process, the value of NFI needs attention. If NFI is 0.19, it indicates weak fit, while if it is 0.33, it indicates moderate fit, and if it is 0.67, it indicates strong fit (Duryadi, 2021). The NFI value for this study is 0.7, meaning that the model fit for this study is strong (good).

4.3.4. Hypothesis Test Result

Hypothesis testing in this study is conducted to determine whether a hypothesis is accepted or rejected. This test uses t-tests, and the key aspects to consider are t-statistics and p-values. The rule is that if the t-statistics > t-table and p-values < 0.05,

then the hypothesis passes the t-test (Hair Jr et al., 2021). Additionally, the direction of the hypothesis should be considered. If the path coefficients indicate that the direction is consistent with the hypothesis (if the value is positive, then the relationship between variables is positive, and vice versa), it can be determined whether the hypothesis aligns with the data obtained (accepted or rejected). The detailed acceptance or rejection of hypotheses can be seen in Table 8.

Table 6. Hypothesis Test Results

Hypotheses	Path	Hypothesis Direction	Path Coefficients	T Table	T Statistics	a	P Values	Description
H1a	SI → PE	Positive	0,198	1,655	2,926	0,05	0,002	Accepted
H1b	SI → EE	Negative	-0,374	1,655	3,160	0,05	0,001	Accepted
H2a	HM → PE	Positive	0,149	1,655	1,913	0,05	0,028	Accepted
H2b	HM → EE	Negative	0,172	1,655	1,618	0,05	0,053	Rejected
H3a	A → PE	Negative	-0,103	1,655	1,864	0,05	0,031	Accepted
H3b	A → EE	Positive	-0,276	1,655	3,692	0,05	0,000	Rejected
H4a	WD → PE	Positive	0,132	1,655	1,990	0,05	0,024	Accepted
H4b	WD → EE	Negative	0,203	1,655	2,022	0,05	0,022	Rejected
H5a	T → PE	Positive	0,216	1,655	3,069	0,05	0,001	Accepted
H5b	T → EE	Negative	-0,079	1,655	0,669	0,05	0,252	Rejected
H6a	R → PE	Positive	0,031	1,655	0,367	0,05	0,357	Rejected
H6b	R → EE	Negative	-0,267	1,655	1,935	0,05	0,027	Accepted
H7a	C → PE	Positive	0,144	1,655	1,871	0,05	0,031	Accepted
H7b	C → EE	Negative	-0,260	1,655	2,757	0,05	0,003	Accepted
H8a	RS → PE	Positive	0,220	1,655	2,526	0,05	0,006	Accepted
H8b	RS → EE	Negative	0,130	1,655	1,075	0,05	0,142	Rejected
H9	PE → E	Positive	0,605	1,655	8,852	0,05	0,000	Accepted
H10	EE → E	Negative	-0,125	1,655	1,361	0,05	0,087	Rejected
H11	E → WU	Positive	0,645	1,655	11,778	0,05	0,000	Accepted
H12	E → OU	Negative	-0,280	1,655	4,148	0,05	0,000	Accepted

4.4. Discussion of Hypothesis Test Result

The results of hypothesis testing indicate that out of the 20 proposed hypotheses, 7 hypotheses were rejected. Detailed explanations regarding the acceptance and rejection of hypotheses are as follows.

4.4.1. The Effect of Social Influence on Performance Expectancy

Based on Table 8, it was found that SI has a significant positive effect on PE, or in other words, hypothesis H1a is accepted. The results of this study are consistent with research conducted by Gursoy et al. (2019); Lin et al. (2019); Roy et al. (2020). By accepting H1a, it means that respondents feel that the higher SI, such as important people encouraging the use of Shopee and preferring respondents to use Shopee, the more positive respondents' perceptions of the performance of AI-based Shopee. This statement is supported by Gursoy et al. (2019), stating that if the social group of customers has a positive opinion about AI devices (in this case, AI-based Shopee) by believing that the device is beneficial, customers are less likely to consider the device useless.

4.4.2. The Effect of Social Influence on Effort Expectancy

Based on Table 8, it was found that SI has a significant negative effect on EE, or in other words, hypothesis H1b is accepted. By accepting of H1b, it means that respondents feel that the higher SI, such as important people encouraging the use of Shopee and preferring respondents to use Shopee, the lower respondents' perceptions of the effort required to use AI-based Shopee. This is in line with Roy et al. (2020), stating that customers show positive opinions and perceptions about AI and related services (in this case, AI-based Shopee) if the customer's social network shows a positive attitude towards its use. Thus, SI has a significant impact on customers' perceptions of EE.

4.4.3. The Influence of Hedonic Motivation on Performance Expectancy

Based on Table 8, it was found that HM has a significant positive effect on PE, or in other words, hypothesis H2a is accepted. The results of this study are consistent with research conducted by Gursoy et al. (2019); Lin et al. (2019); Roy et al. (2020). By accepting H2a, it means that respondents feel that the higher HM, such as pleasure, entertainment, and comfort, the more positive respondents' perceptions of the performance of AI-based Shopee. This is in line with the opinion of Fryer et al. (2017), stating that if customers have HM towards AI devices (in this case, AI-based Shopee), customers perceive that the AI device will perform well to satisfy their personal interests or needs to explore new things and entertainment.

4.4.4. The Influence of Hedonic Motivation on Effort Expectancy

Based on Table 8 it was found that HM does not have a significant negative effect on EE, or in other words, hypothesis H2b is rejected. By rejecting H2b, it means that respondents feel that HM does not significantly affect respondents' perceptions of how much effort is required to use AI-based Shopee. This is in line with the opinion of Tarhini et al. (2021), stating that young people have very high digital skills. This makes it easier for them to apply hedonistic behavior to digital applications such as online shops, so perceptions related to the effort required when using an online shop do not significantly influence their hedonistic behavior.

4.4.5. The Influence of Anthropomorphism on Performance Expectancy

Based on Table 8, it was found that A has a significant negative effect on PE, or in other words, hypothesis H3a is accepted. By accepting H3a, it means that respondents feel that the higher A values, such as having its own mind, consciousness, and will, the lower the PE of AI-based Shopee. Research conducted by A'yuni and Chusumastuti (2021) found that respondents complained about several things from Shopee, including Shopee sometimes displaying recommendations that are not in line with their wishes, having many bugs, and the hashtag column content in Shopee sometimes displays irrelevant content.

As discussed in the framework, this can happen for several reasons. One of them is inaccurate data analysis. The information provided to AI programs is the only way that this technology can learn. As a result, intelligence (what is meant in this research is one's own mind, consciousness, and will) or the effectiveness of AI is only as good as the data provided. Apart from that, internal bias often occurs in the algorithm. An algorithm is a set of guidelines that a computer follows to perform a specific task. These guidelines were most likely developed by a human programmer. Bias in algorithms often results from the partial design of algorithms by programmers who favor some desirable or self-serving criteria (Glair.ai, 2022).

4.4.6. The Effect of Anthropomorphism on Effort Expectancy

Based on Table 8, it is found that A has no significant positive effect on EE, or in other words, hypothesis H3b is rejected. This happens because even though the t statistics and p value show that the hypothesis is significant, the direction of the relationship is not appropriate. H3b was rejected because the direction of the relationship in the research results was opposite to the direction of the hypothesis, indicating that respondents did not think that the human-like characteristics (anthropomorphism) found in AI-based Shopee required users to make a lot of effort. In fact, users feel that the characters have their own thoughts, consciousness, and will, making AI-based Shopee able to reduce the effort required for users to use Shopee.

In this study, it was found that the effect of The Uncanny Valley did not occur as predicted in previous studies (Gursoy et al., 2019; Lin et al., 2019). This may be caused by differences in the age categories and economic level categories of the respondents' countries, where in this study the respondents were Indonesian people who were included in the Gen Z category. This is in accordance with Gillespie et al. (2023) who say that the younger generation tends to have higher trust and comfort in AI. Apart from that, the research also found differences in perceptions between respondents from countries around the world who were the subjects of the research. People in western countries are among the most distrustful of AI for use in the workplace. Meanwhile, respondents from developing countries are more confident and comfortable in using AI.

4.4.7. Influence of Website Design on Performance Expectancy

Based on Table 8, it is found that WD has a significant positive effect on PE, or in other words, hypothesis H4a is accepted. The results of this study are in accordance with research conducted by Amjad-ur-Rehman et al. (2022); Amjad-ur-Rehman et al. (2019). By accepting H4a, this means that respondents feel that the higher the quality of the website design, such as an attractive and well-organized appearance, and making product information clear, the more positive the respondent's perception of AI-based Shopee's performance. This statement is supported by previous research regarding the quality of content and website design which states that sites designed to display various product shapes and dimensions can improve product browsing performance by customers (Dickinger & Stangl, 2013).

4.4.8. Influence of Website Design on Effort Expectancy

Based on Table 8, it is found that WD has no significant negative effect on EE, or in other words, hypothesis H4b is rejected. The results of this study are not in line with research conducted by Amjad-ur-Rehman et al. (2022); Amjad-ur-Rehman et al. (2019). The reason H4b was rejected was that the direction of the relationship was not in accordance with the research hypothesis. The results of this study found that WD had a positive effect on EE. This means that respondents felt that the higher the quality of the website design, the higher the respondent's perception of the amount of effort required to use AI-based Shopee. Even though respondents in this study felt that the Shopee application design was of good quality, there were other things related to the design that might be troublesome. As found by A'yuni and Chusumastuti (2021), customers have complaints regarding too many menus and buttons on the Shopee application, where some of the menus and buttons are repeated or duplicated (several different menus and buttons have the same content). This complaint is closely related to the EE variable because, as stated by Sidik (2019), appearance is something that is taken into consideration to make it easier for users to access an application. Complicated displays

impact the user's navigation experience and prevent users from getting the information they are looking for.

4.4.9. The Influence of Trustworthiness on Performance Expectancy

Based on Table 8, it is found that T has a significant positive effect on PE, or in other words, hypothesis H5a is accepted. The results of this study are in accordance with research conducted by Amjad-ur-Rehman et al. (2022); Amjad-ur-Rehman et al. (2019). By accepting H5a, it means that respondents feel that the higher the trustworthiness, as Shopee ensures the security of customers' personal information, Shopee can be trusted, and the products or services offered by Shopee are of good quality, the more positive the respondent's perception of Shopee's AI-based performance expectations. As stated by Amjad-ur-Rehman et al. (2022), a trustworthy website will meet customer PE regarding the products delivered and properly address security issues related to transactions.

4.4.10. The Influence of Trustworthiness on Effort Expectancy

Based on Table 8, it is found that T has no significant negative effect on EE, or in other words, hypothesis H5b is rejected. The results of this study are not in accordance with research conducted by Amjad-ur-Rehman et al. (2022); Amjad-ur-Rehman et al. (2019). By rejecting H5b, it means that respondents feel that T does not have a significant influence on EE. Several things related to trustworthiness, such as Shopee being able to guarantee the security of customer's personal information and being able to offer quality products or services, do not make use easier and require less effort.

4.4.11. Effect of Reliability on Performance Expectancy

Based on Table 8, it is found that R has no significant positive effect on PE, or in other words, hypothesis H6a is rejected. The results of this study are not in accordance with research conducted by Amjad-ur-Rehman et al. (2022); Amjad-ur-Rehman et al. (2019). By rejecting H6a, it means that respondents feel that R does not have much influence on PE. Several things related to system reliability, such as Shopee carrying out its duties well and on time, showing genuine interest in solving customer problems, and having adequate security, do not make its PE better.

4.4.12. The Effect of Reliability on Effort Expectancy

Based on Table 8, it was found that R has a significant negative effect on EE, or in other words, hypothesis H6b is accepted. The results of this study align with research conducted by Amjad-ur-Rehman et al. (2022); Amjad-ur-Rehman et al. (2019). By accepting H6b, it means that respondents feel that the higher the system's reliability, such as Shopee performing its tasks well and on time, showing genuine interest in solving customer problems, and having adequate security, the lower the respondent's perception of the effort required to use AI-based Shopee.

4.4.13. Influence of Communication on Performance Expectancy

Based on Table 8, it was found that C has a significant positive effect on PE, or in other words, hypothesis H7a is accepted. The results of this study are consistent with research conducted by Amjad-ur-Rehman et al. (2022); Amjad-ur-Rehman et al. (2019). By accepting H7a, it means that respondents feel that the higher the quality of communication, such as being able to switch to chat features with sellers on Shopee for more information, easily contacting customer service, and the Frequently Asked Questions (FAQ) feature on Shopee addressing most customer-related online shopping questions, the more positive the respondent's perception of AI-based Shopee's performance expectations.

4.4.14. Influence of Communication on Effort Expectancy

Based on Table 8, it was found that C has a significant negative effect on EE, or in other words, hypothesis H7b is accepted. The results of this study align with research conducted by Amjad-ur-Rehman et al. (2022); Amjad-ur-Rehman et al. (2019). By accepting H7b, it means that respondents feel that the higher the quality of communication, such as being able to switch to chat features with sellers on Shopee for more information, easily contacting customer service, and the Frequently Asked Questions (FAQ) feature on Shopee addressing most customer-related online shopping questions, the lower the respondent's perception of how much effort is required to use AI-based Shopee.

4.4.15. Effect of Responsiveness on Performance Expectancy

Based on Table 8, it was found that RS has a significant positive effect on PE, or in other words, hypothesis H8a is accepted. The results of this study are consistent with research conducted by Amjad-ur-Rehman et al. (2022); Amjad-ur-Rehman et al. (2019). By accepting H8a, it means that respondents feel that the higher the responsiveness, such as being able to provide fast service, always ready to help customers, and never too busy to respond to customer requests, the more positive the respondent's perception of AI-based Shopee's performance. This statement is supported by Rao and Sahu (2013), who state that communication services will not be very helpful if not supported by responsive feedback. It is crucial that front-line staff are willing and able to help customers provide responsive service to meet customer PE. Agnihotri et al. (2016) also convey that if the service is responsive by providing quick responses and answers to customer needs, customer expectations will be met.

4.4.16. Effect of Responsiveness on Effort Expectancy

Based on Table 8, it was found that RS has no significant positive effect on EE, or in other words, hypothesis H8b is rejected. The results of this study do not align with research conducted by Amjad-ur-Rehman et al. (2022); Amjad-ur-Rehman et al. (2019). By

rejecting H8b, it means that respondents feel that RS does not have much influence on EE. Several things related to responsiveness, such as being able to provide fast service, always ready to help customers, and never too busy to respond to customer requests, do not make its use easier and require less effort.

4.4.17. Effect of Performance Expectancy on Emotion

Based on Table 8, it was found that PE has a significant positive effect on E, or in other words, hypothesis H9 is accepted. The results of this study are consistent with research conducted by Gursoy et al. (2019); Lin et al. (2019); Roy et al. (2020). By accepting H9, it means that respondents feel that the higher PE, such as Shopee helping customers shop faster, improving customer performance in shopping, being able to recommend products and serve customers, consistently serving customers, and having good information consistency, the more positive the E formed by the respondent.

4.4.18. The Effect of Effort Expectancy on Emotion

Based on Table 8, it was found that EE has no significant negative effect on E, or in other words, hypothesis H10 is rejected. The results of this study do not align with research conducted by Gursoy et al. (2019); Lin et al. (2019); Roy et al. (2020) but is in line with the findings of Vitezić and Perić (2021). By rejecting H10, it means that respondents feel that EE does not have much influence on E. Several things related to EE, such as being difficult to understand and use, taking a long time to learn, and feeling intimidating because it threatens the respondent's identity as a human, do not significantly affect E of the respondent.

4.4.19. The Influence of Emotion on Willingness to Use

Based on Table 8, it was found that E has a significant positive effect on WU, or in other words, hypothesis H11 is accepted. The results of this study are consistent with research conducted by Gursoy et al. (2019); Lin et al. (2019); Roy et al. (2020). By accepting H11, it means that respondents feel that the more positive customer E, the higher their WU of AI-based Shopee. This statement is supported by Roy et al. (2020), who state that positive E can trigger customer desire to use AI devices.

4.4.20. The Influence of Emotion on Objection to Use

Based on Table 8, it was found that E has a significant negative effect on OU, or in other words, hypothesis H12 is accepted. The results of this study are consistent with research conducted by Gursoy et al. (2019); Lin et al. (2019); Roy et al. (2020). By accepting H12, it means that respondents feel that the more positive customer E, the lower their objection to the use of AI-based Shopee. This statement is supported by Lazarus (1991), who says that positive E towards AI devices will reduce user objections to using AI devices during the service delivery process. This is also in line with the statement of who says that positive E towards AI devices will reduce user objections to using AI devices

during the service delivery process. This is also in line with the statement of Gursoy et al. (2019), stating that the final decision of customers to accept or reject the use of AI devices during service encounters is likely determined by their E, generated through a complex multi-stage evaluation process.

5. CONCLUSION

Based on the results obtained through the previous analysis, it can be seen that there are 13 accepted hypotheses in this study. Some results that differ from previous research are presumed to be the impact of differences in respondent characteristics. Especially in the anthropomorphism variable, contrary to previous research, respondents in this study, who belong to Gen Z, responded positively to the characteristics of AI systems. This study found that the most significant influence is on the emotion variable towards willingness to use. In other words, the willingness to use AI-based Shopee is strongly influenced by user emotions. Additionally, the influence value of performance expectancy on emotion is the second-highest. This means that the performance expectations of AI-based Shopee significantly affect user emotions.

By understanding user perceptions, recommended actions that can be given to Shopee developers include improving the quality of AI algorithms on Shopee. The results of this study indicate that anthropomorphism has a negative effect on performance expectancy. Customers believe that the AI characteristics on Shopee actually lower their shopping performance. This can happen because Shopee sometimes displays recommendations that do not match customer preferences, has many bugs, and the hashtag column content in Shopee displays irrelevant content. Therefore, to maximize the function of AI in Shopee, developers need to observe the content generated by the AI program to assess its algorithm's suitability and enhance the quality of its human resources to reduce algorithmic bias. Another suggestion is to improve the quality of Shopee's application design. The results of this study show that website design has a positive effect on EE. Aesthetically, customers feel that Shopee's design is good, but other complaints, as found in A'yuni and Chusumastuti (2021) research, such as too many menus and buttons (some even duplicated), make customers require a lot of effort to use Shopee. Therefore, Shopee developers can consider reducing rarely used menus or buttons and eliminating duplicated menus.

Future research is expected to apply a combination of this research model, AIDUA and OSSQ, to other fields that also utilize AI as an automation strategy. Adding variables that are suitable for the characteristics of the research object to improve the predictive power of the model, increasing the sample range to make the research results more representative and accurately depict the actual conditions in the field, or adding other factors influencing the objection to use variable because in this study, that variable is only represented by 7.8% by its independent variables.

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