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# The moderating role of brand trust in the relationship between data privacy concerns and online purchase intention: Evidence from e-commerce users in the Indonesia–Malaysia border region

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**Abstract**

This study examines the effect of data privacy concerns on online purchase intention and investigates the moderating role of brand trust in the context of e-commerce. The research focuses on digital consumers in the Indonesia–Malaysia border area, which differs from urban regions in terms of socioeconomic conditions and digital infrastructure. A quantitative approach was employed using a survey of 150 e-commerce users in North Kalimantan. Data were analyzed through Partial Least Squares–Structural Equation Modeling (PLS-SEM) to assess the relationships among variables and the proposed moderation effect.The findings reveal that data privacy concerns significantly influence online purchase intention. Moreover, brand trust significantly moderates this relationship by weakening the effect of data privacy concerns on online purchase intention. These results highlight that consumers' trust in a brand's security, integrity, and reputation plays a crucial role in shaping purchasing decisions on e-commerce platforms.This study is limited to respondents in the North Kalimantan border area; therefore, caution is needed in generalizing the findings. Practically, the results suggest that e-commerce providers and policymakers should enhance data privacy protection and strengthen brand trust to increase digital consumer participation and transactions.

**Keywords** data privacy concern; online purchase intention; brand trust; e-commerce; border region

## INTRODUCTION

The development of digital technology has had a significant impact on consumer behavior, especially in online shopping patterns through e-commerce platforms (Lv, 2023) In Indonesia, the e-commerce sector is experiencing very rapid growth with transaction values that continue to increase every year (Ariansyah et al., 2021; Febransyah & Camelia Goni, 2022). A report by the Indonesian Internet Service Providers Association (APJII, 2023) shows that internet user penetration has reached more than 77% of the total population, which is a great opportunity for digital business people (Haini & Pang, 2022; Simon, 2020) However, behind this growth, consumer data security and privacy remain serious challenges in digital transactions (D. Chen & Zhao, 2012; Corones & Davis, 2017)

Data privacy concerns have become increasingly important due to the growing misuse of personal data, information leakage, and intrusive marketing practices. In e-commerce transactions, consumers are often required to disclose personal information, such as names, addresses, phone numbers, and payment details. Prior studies have shown that privacy concerns influence consumers' perceptions of transaction security, trust, and online purchase intention (Gurung & Raja, 2016; Mashatan et al., 2022). Dinev et al., (2013) and Dinev et al., (2006) argue that privacy concerns reduce consumers' willingness to disclose personal information and conduct transactions on digital platforms. Their findings are consistent with the privacy calculus perspective, which explains that consumers evaluate both the perceived benefits and privacy-related risks before deciding whether to engage in online transactions. This condition becomes more

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complex in border areas between Indonesia and Malaysia, such as North Kalimantan, which have different social, economic, and digital infrastructure characteristics compared to urban areas.

Although previous studies have examined the relationship between data privacy concerns and online purchase intention, much of the existing literature has focused on general e-commerce consumers or digitally mature contexts, where digital infrastructure is relatively well developed and consumers tend to have higher levels of digital literacy (Burkhardt et al., 2023). As a result, the applicability of these findings to other contexts, particularly less developed regions, remains underexplored. Research focusing on border areas has also received limited attention in the e-commerce literature. Border regions such as North Kalimantan have unique social, economic, and digital infrastructure characteristics that may shape consumers' responses to data privacy risks differently from those in urban areas.

The border-area context is particularly important for this study for at least two reasons. First, digital infrastructure in border areas is often less developed than in urban regions, which may increase consumers' vulnerability to data privacy risks. Second, consumers in border areas may have lower levels of awareness and understanding of data privacy concerns, potentially affecting how they perceive and respond to such risks. In addition, consumers in North Kalimantan are not only connected to local e-commerce platforms but are also exposed to cross-border digital interactions and market influences from Malaysia. This condition creates specific challenges related to consumer protection, digital literacy, and trust in e-commerce brands.

In this context, brand trust becomes particularly relevant. Previous studies have shown that brand trust can strengthen online purchase intention and reduce consumers' perceived risk in digital transactions(S. Kim & Jones, 2009; F. Li et al., 2008) although consumers face privacy risks (Milne & Culnan, 2004; Pizzi & Scarpi, 2020). Consumers who trust an e-commerce brand are generally more willing to continue engaging in online transactions because they believe that the platform is capable of protecting their personal information and ensuring transaction security. Nevertheless, the moderating role of brand trust has received limited attention in border-area contexts, where constraints in digital infrastructure and varying levels of privacy awareness may influence consumer responses differently from those observed in urban settings.

Although previous studies generally suggest that privacy concerns discourage online transactions, the border-area context may exhibit distinct behavioral patterns. Consumers in North Kalimantan often depend on e-commerce platforms to access products that are less available in local markets. Consequently, despite being aware of privacy-related risks, they may continue purchasing online because of the practical advantages offered by e-commerce, such as convenience, broader product availability, and transaction efficiency. Therefore, the positive relationship observed in this study should be interpreted as a context-specific phenomenon rather than as evidence contradicting previous findings. These results suggest that consumers in border regions may prioritize the functional benefits of e-commerce over privacy-related concerns when making purchase decisions.

Thus, This study offers two main contributions. First, it examines whether established theories on data privacy concerns and online purchase intention remain valid in border-area contexts. Second, it extends prior research by investigating the moderating role of brand trust under conditions of limited digital infrastructure and lower privacy awareness.

## LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

### Data privacy concerns and online purchase intention

Data privacy is defined as the right of individuals to control the personal information they hold, including how that information is collected, used, and disseminated (Martin & Murphy, 2017; Smith et al., 2012) In the scope of e-commerce, the issue of data privacy is a serious concern because digital transactions involve the collection of personal data, such as addresses, phone numbers, and payment information (Chawla & Kumar, 2022; Morić et al., 2024).

Empirically, research (Dinev & Hart, 2005) shows that privacy concerns are negatively related to the intention of using online services. (Swani et al., 2021) also found that the perception of privacy risks can reduce consumer engagement in e-commerce activities. This indicates that consumer concerns are getting higher towards data privacy, the lower their intention to make an online purchase.

*H1: Data privacy concerns negatively affect online purchase intent.*

### Brand trust and online purchase intention

Brand trust is the consumer's belief that a brand can be relied upon to fulfill its promises and provide satisfaction according to expectations (Delgado-Ballester & Luis Munuera-Alemán, 2001; Khodadad Hosseini & Behboudi, 2017). In online transactions, brand trust plays an important role in reducing uncertainty and risks, including risks related to data privacy (Harridge-March, 2006; Vos et al., 2014).

Empirically, (S.-H. Kim et al., 2021) show that brand trust has a positive influence on online loyalty and purchase intent. Research (Gong et al., 2023) also supports that brand trust can strengthen consumers' desire to continue transacting despite risks concerns. Thus, the higher the level of brand trust, the more likely consumers are to have the intention to buy online.

*H2: Brand trust has a positive effect on online purchase intent.*

### The role of brand trust moderation

Apart from being a factor that directly influences online purchase intention, brand trust can also play a role as a moderator (S. Kim & Jones, 2009) Consumers who have high trust in certain brands tend to be more tolerant of privacy risks, as they feel confident that the brand can keep their personal data safe (Flavián & Guinalíu, 2006; Ha, 2004)

Empirical research by (Bandara et al., 2021) shows that brand trust is able to reduce the negative impact of privacy risks on consumer behavior. This indicates that brand trust serves as a "buffer" that weakens the negative influence of data privacy on online purchase intent (Liu & Tang, 2018)

*H3: Brand trust moderates the relationship between data privacy concerns and online purchase intent, thereby weakening the negative influence of data privacy on online purchase intent.*

## METHODS

This study employed an explanatory quantitative approach to examine the hypothesized relationships among data privacy concerns, brand trust, and online purchase intention. A quantitative approach is appropriate because the study aims to test objective theories by examining relationships among measurable variables using statistical analysis (Creswell & Creswell, 2017; Guetterman et al., 2015). This approach was selected because the study focuses on examining the effect of data privacy concerns on online purchase intention and the moderating role of brand trust in this relationship.

The research method used in this study was a survey. Data were collected using a structured questionnaire distributed to respondents. Surveys are considered effective for obtaining quantitative data from a relatively large number of respondents efficiently (Almusaed et al., 2025; Kelley-Quon, 2018). This method is also relevant for research on digital consumer behavior because it allows respondents to complete the questionnaire independently through online media.

The population of this study consisted of e-commerce users in the Indonesia–Malaysia border area, particularly in North Kalimantan. The sample was selected using purposive sampling because the respondents had to meet specific criteria relevant to the research objectives. The criteria included being an e-commerce user, residing in the Indonesia–Malaysia border area of North Kalimantan, and having experience using e-commerce platforms. Purposive sampling is appropriate when respondents are selected based on particular characteristics required by the study (Ames et al., 2019). The questionnaires were distributed online using Google Forms to reach respondents in border areas such as Nunukan, Sebatik, and Krayan

The questionnaire was designed to measure three main constructs: data privacy concerns, brand trust, and online purchase intention. All measurement items were adapted from previous studies and adjusted to the context of e-commerce users in the Indonesia–Malaysia border region. Respondents were asked to indicate their level of agreement with each statement using a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree.

Data privacy concerns were measured using three indicators. These indicators reflect consumers' concerns regarding the collection, use, protection, and potential misuse of personal data in e-commerce transactions. This construct captures the extent to which consumers perceive privacy-related risks when disclosing personal information on e-commerce platforms. The measurement of data privacy concerns was adapted from prior studies on information privacy and online privacy concerns, including (Dinev & Hart, 2005)

Brand trust was measured using five indicators. These indicators assess consumers' trust in e-commerce brands, including perceptions of reliability, integrity, security, and the ability of the brand to fulfill its promises. In this study, brand trust refers to consumers' belief that an e-commerce brand is reliable and capable of protecting their personal information during online transactions. The measurement items were adapted from previous studies on brand trust and online trust, including (Delgado-Ballester & Luis Munuera-Alemán, 2001; Khodadad Hosseini & Behboudi, 2017).

Online purchase intention was measured using six indicators. These indicators capture consumers' willingness, likelihood, and intention to purchase products through e-commerce platforms. This construct reflects the extent to which consumers intend to engage in online transactions after considering privacy-related risks and their trust in e-commerce brands. The measurement of online purchase intention was adapted from prior studies on online consumer behavior and purchase intention, including (Gong et al., 2023).

The stages of data processing are carried out starting from data screening to coding. Data screening is required to ensure that the data is valid, complete, and free from outliers. DeSimone et al., (2015) explain that data screening is an important procedure in statistical analysis to ensure the quality of structural models. Once the data is cleaned, the next stage is to encode and enter the data into the statistical software.

Data analysis was carried out using Structural Equation Modeling (SEM) based on Partial Least Squares (PLS) with the SmartPLS application. According to (Shmueli et al., 2019) PLS-SEM is very suitable for predictive research, has complex models, and is used to test moderator variables. The analysis stages include: (1) an external model test to assess the validity and reliability of indicators, (2) an internal model test to analyze the relationship between variables including R-square values, and (3) a moderation test to assess whether brand trust moderates the relationship between data privacy concerns and online purchase intention. The analysis was carried out using. bootstrapping techniques to produce t-statistical and p-value values as the basis for hypothesis testing.

The final stage is to interpret the results of the analysis based on relevant theories, including the theory of privacy risk, brand trust, and online purchasing behavior (Li, 2012). The results of the analysis are then discussed comprehensively in the discussion section to answer the formulation of the problem and draw conclusions from the research. The entire research process is carried out in a structured manner according to the standards of modern scientific methodology.

## RESULTS AND DISCUSSION

### Research results

This section describes the results of the study in the form of an overview of the characteristics of the respondents involved in the collection of research data. The characteristics of the respondents are presented in Table 1 and include classification based on gender, age, last level of education, and frequency of shopping. The presentation of these characteristics aims to provide an empirical picture of the respondent profile and to ensure the suitability of the sample characteristics with the scope and objectives of the study.

Based on Table 1, the research respondents were dominated by 90 women (60.0 percent), while male respondents amounted to 60 people (40.0 percent). The composition shows that the participation of female respondents is greater than that of men, which reflects the tendency of higher female involvement in shopping activities in the context of this study. This condition implies that the perception and purchasing behavior analyzed in this study are heavily influenced by the perspective of female respondents.

Judging from the age aspect, the majority of respondents were in the age range of 21-30 years, which was 83 people (55.3 percent). The 31-40 age group occupies the second largest proportion with 42 people (28.0

**Table 1.**
**Respondent overview**

| Category | Classification | Frequency | Percentage (%) |
|---|---|---|---|
| Gender | Male | 60 | 40.0 |
| | Female | 90 | 60.0 |
| Age | < 20 years | 19 | 12.7 |
| | 21–30 years | 83 | 55.3 |
| | 31–40 years | 42 | 28.0 |
| | > 40 years | 6 | 4.0 |
| Highest education | High school or equivalent | 44 | 29.3 |
| | Diploma (D1–D3) | 23 | 15.3 |
| | Bachelor’s degree (S1) | 72 | 48.0 |
| | Postgraduate (S2/S3) | 11 | 7.3 |
| Shopping frequency | Very often | 56 | 37.3 |
| | Often | 40 | 26.7 |
| | Occasionally | 35 | 23.3 |
| | Rarely | 19 | 12.7 |

percent), followed by 19 respondents under 20 years old (12.7 percent). Meanwhile, respondents over the age of 40 amounted to 6 people (4.0 percent). The age distribution showed that the study respondents were mostly in the productive age, which generally had a high level of consumption activity and involvement in the purchasing decision-making process.

Based on the latest education level, respondents were dominated by 72 Bachelor (S1) graduates (48.0 percent). Furthermore, respondents with high school/equivalent education amounted to 44 people (29.3 percent), followed by Diploma (D1-D3) graduates as many as 23 people (15.3 percent). Respondents with a background in postgraduate education (S2/S3) were recorded as many as 11 people (7.3 percent). The composition of the education level shows that the majority of respondents have a secondary to higher education level, so it is assumed that they are able to understand the research instruments and provide rational and consistent answers.

Based on the frequency of shopping, respondents with the category of very often shopping dominated with 56 people (37.3 percent). Respondents with the category of frequent shopping were recorded as many as 40 people (26.7 percent), while the category of occasional shopping amounted to 35 people (23.3 percent). The respondents with the frequency of infrequent shopping amounted to 19 people (12.7 percent). This distribution shows that most of the respondents have a relatively high spending intensity, so the data obtained is considered relevant and representative to analyze purchasing behavior and the variables that affect it.

Before testing the relationship between variables in the structural model, this study first evaluates the measurement model (outer model) to ensure that each latent construct is measured reliably and validly. This evaluation is a crucial stage in the Partial Least Squares–Structural Equation Modeling (PLS-SEM) analysis because the quality of the measurement will determine the accuracy of interpretation of the influence of data privacy concerns on online purchase intention, as well as the role of brand trust as a moderation variable in e-commerce users in the border area of North Kalimantan.

The assessment of construct quality in this study was carried out through internal reliability testing and convergent validity. Internal reliability is evaluated using Cronbach's Alpha, rho_A, and Composite Reliability indicators, which aim to assess the internal consistency between construct-forming indicators. Meanwhile, the validity of the convergence is assessed through the Average Variance Extracted (AVE) value to ensure that each construct is able to adequately explain the variance of its indicators. The complete results of the reliability and validity testing of the construction are presented in Table 2, which is the basis for assessing the feasibility of the measurement model before the structural analysis is performed.

Based on the results of the measurement model test presented in Table 2, all constructs

**Table 2.**
**Reliability and validity of construction**

| Construct | Cronbach's alpha | Rho_a | Composite reliability | Average variance extracted (AVE) |
|---|---|---|---|---|
| Brand trust | 0.879 | 0.880 | 0.912 | 0.674 |
| Data privacy concerns | 0.779 | 0.781 | 0.871 | 0.693 |
| Purchase intention | 0.847 | 0.848 | 0.887 | 0.567 |
| Moderating effect (brand trust) | 1.000 | 1.000 | 1.000 | 1.000 |

in this study have met the reliability criteria required in the PLS-SEM analysis. Cronbach's Alpha, rho_A, and Composite Reliability values on the Brand Trust, Data Privacy Concerns, and Purchase Intent constructs are all above the minimum limit of 0.70, indicating the indicator's strong and stable internal consistency in representing latent constructs. This condition indicates that the research instrument has a good level of reliability, so it is able to produce consistent and reliable data for further analysis.

The values of Cronbach's Alpha, Composite Reliability, and AVE equal to 1.000 shown for the moderation construct correspond to the interaction term generated by the product-indicator approach in SmartPLS. These values do not represent the Brand Trust construct itself. Brand Trust was measured using five indicators and demonstrated satisfactory reliability and convergent validity, with Cronbach's Alpha of 0.879, Composite Reliability of 0.912, and AVE of 0.674.

After the reliability and convergence validity criteria are met at the construct level, the next stage in the evaluation of the measurement model is the validation test of the indicator through the analysis of the value of outer loadings, as presented in Table 3. This test aims to ensure that each indicator has an adequate contribution in reflecting the latent construct being measured. In the PLS-SEM analysis, the recommended outer loadings value is greater than 0.70, which indicates that the indicator has a strong correlation with its construct.

Based on Table 3, all indicators in the Brand Trust construct (KM1–KM5) have outer loadings values ranging from 0.779 to 0.859, which shows that each indicator is able to represent the brand trust construct well. In the Data Privacy Issue construct, the MPD1, MPD2, and MPD3 indicators have outer loadings values of 0.834, 0.836, and 0.827, respectively, which exceed the required minimum limit. This indicates that these indicators are valid in measuring respondents'

**Table 3.**
**Reliability and validity of construction**

| Indicator | Brand trust | Data privacy concerns | Purchase intention | Moderating effect (Data privacy concerns × brand trust) |
|---|---|---|---|---|
| KM1 | 0.801 | | | |
| KM2 | 0.779 | | | |
| KM3 | 0.859 | | | |
| KM4 | 0.811 | | | |
| KM5 | 0.853 | | | |
| MPD1 | | 0.834 | | |
| MPD2 | | 0.836 | | |
| MPD3 | | 0.827 | | |
| NP1 | | | 0.765 | |
| NP2 | | | 0.748 | |
| NP3 | | | 0.767 | |
| NP4 | | | 0.741 | |
| NP5 | | | 0.721 | |
| NP6 | | | 0.774 | |
| Interaction term (Data privacy concerns × brand trust) | | | | 1.925 |

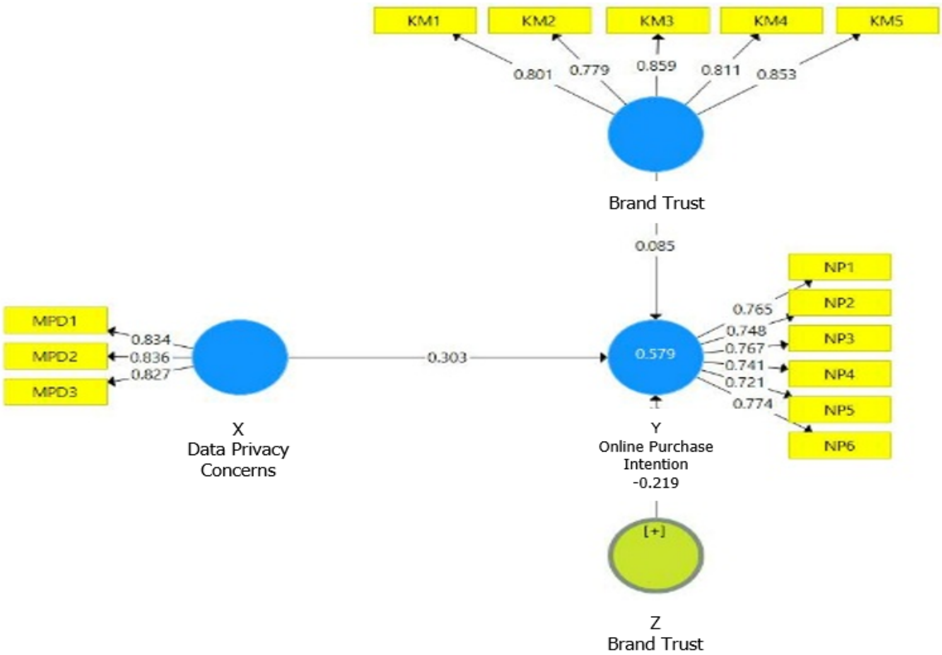


**Figure 1.**
**Model PLS-SEM**

perception of data privacy concerns in e-commerce use.

Furthermore, the Purchase Intention construct measured through six indicators (NP1–NP6) also shows adequate outer loadings values, which range from 0.721 to 0.774. This value indicates that all indicators of purchase intent have a significant and relevant contribution in reflecting respondents' intention to make purchases online. Meanwhile, the interaction variable Data privacy concerns × Brand Trust as a moderation construct had an outer loading value of 1.925, which reflects the formation of the moderation construct mathematically in the PLS-SEM model. Overall, the results of the outer loadings test in Table 3 show that all indicators meet the indicator validity criteria and are suitable for use in follow-up analysis.

After the measurement model is declared to meet the eligibility criteria, the analysis is continued on the structural model (inner model) to test the causal relationship between latent variables according to the research hypothesis. The visualization of the relationship between constructs in this study is presented in Figure 1, which illustrates the direct influence of data privacy concerns and brand trust on online purchase intent, as well as the role of brand trust as a moderation variable.

Based on Figure 1, it can be seen that the construct of Data privacy concerns has a direct influence on Purchase Intent, while Brand Trust is also hypothesized to directly affect purchase intent while acting as a moderation variable. The value of the path coefficient in each relationship indicates the direction and strength of the influence between the constructs, which are then tested for significance through the bootstrapping procedure.

The results of testing the influence between latent variables are presented in Table 4, which contains the original sample values, t-statistics, and p-values as the basis for determining the significance of the relationship between constructs. Based on these results, the effect of Data privacy concerns on Purchase Intent has a path coefficient of 0.303, with a t-statistical value of 3.427 and a p-value of 0.001. This value shows that data privacy concerns have a significant effect on online purchase intent. However, the positive coefficient is inconsistent with the hypothesized negative relationship. Therefore, Hypothesis 1 is not supported. Contrary to expectations, higher levels of privacy concern were associated with

**Table 4.**
**Path coefficients and hypothesis testing results**

| | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics (\|O/STDEV\|) | P values |
|---|---|---|---|---|---|
| Brand trust -> Y_Online purchase intention | 0.085 | 0.096 | 0.091 | 0.939 | 0.348 |
| X_ Data privacy concerns -> Online purchase intention | 0.303 | 0.298 | 0.088 | 3.427 | 0.001 |
| Z_Brand trust -> Online Purchase intention | -0.219 | -0.216 | 0.060 | 3.674 | 0.000 |

higher purchase intention among e-commerce users in the Indonesia–Malaysia border region.

Conversely, the direct influence of Brand Trust on Purchase Intent showed a coefficient of 0.085, with a t-statistical value of 0.939 and a p-value of 0.348. These results show that brand trust does not have a significant effect directly on online purchase intention. These findings indicate that in the context of e-commerce users in border areas, trust in brands does not necessarily directly drive purchase intent, without considering other accompanying factors.

Furthermore, the results of the moderation variable test showed that Brand Trust as a moderation variable had a coefficient of −0.219, with a t-statistics value of 3.674 and a p-value of 0.000. These results show that brand trust plays a significant role as a moderation variable with the direction of negative influence. The findings indicate that brand trust levels are able to moderate the relationship between data privacy concerns and online purchase intent, where higher brand trust tends to weaken the influence of data privacy concerns on purchase intent.

The model's ability to explain endogenous variables is evaluated through the value of the determination coefficient (R-square) presented in Table 5. Based on these results, the R-square value for the Purchase Intention construct is 0.579, with the R-square adjusted value of 0.570. This value shows that 57.9 percent of the variation in online purchase intent can be explained by the construct of Data privacy concerns, Brand Trust, and moderation interactions between the two.

The R-square value is included in the moderate to strong category, which indicates that the research model has adequate explanatory power. Thus, the model developed in this study is considered to be able to explain the online purchase intention behavior of e-commerce users in the border area of North Kalimantan substantively and empirically and is suitable for use as a basis for discussion and conclusion of the study.

## Discussion

This section discusses the findings by relating them to the research objectives, conceptual framework, and previous empirical studies. Consistent with the issues highlighted in the Introduction, the discussion focuses on three main aspects: the relationship between data privacy concerns and online purchase intention, the role of the border-area context in shaping consumer behavior, and the moderating role of brand trust among e-commerce users in North Kalimantan.

The findings reveal that data privacy concerns significantly influence online purchase intention. However, contrary to the proposed hypothesis, the relationship is positive rather than negative, indicating that higher levels of privacy concern are associated with stronger purchase intention among e-commerce users in the Indonesia–Malaysia border region. Therefore, Hypothesis 1 is not supported. Although previous studies have generally suggested that privacy concerns discourage online transactions because consumers fear information misuse, identity theft, and weak security protection (Bansal et al., 2016; Malhotra et al., 2004), the results of the present study suggest that privacy concerns do not necessarily lead to lower purchase intention.

Several previous studies provide evidence that consumers may continue engaging in online transactions despite concerns about privacy and security. Gong et al. (2023) found that privacy-related stress does not

**Table 5.**
**Coefficient of determination**

| | R Square | Adjusted R Square |
|---|---|---|
| Y_Online purchase intention | 0.579 | 0.570 |

automatically reduce consumers' willingness to continue online purchases. Likewise, Pavlou (2003) argued that consumers often tolerate certain levels of risk when they perceive online transactions as useful and beneficial. These findings imply that privacy concerns and online purchasing behavior are not always negatively associated. Instead, consumers may acknowledge the existence of privacy risks while continuing to use digital platforms because of the advantages provided by e-commerce.

The characteristics of the respondents may partly explain this unexpected finding. Most respondents were female (60%), belonged to the productive age group of 21–30 years (55.3%), held at least a bachelor's degree (48%), and reported shopping online frequently or very frequently. These demographic characteristics indicate that the respondents represent active and experienced digital consumers. Consumers with higher educational backgrounds and greater experience with online shopping are generally more familiar with digital platforms and have better knowledge regarding transaction procedures, payment systems, and data protection mechanisms. Consequently, although they are aware of privacy-related risks, they may have developed adaptive behaviors and risk-management strategies that allow them to continue shopping online.

Moreover, awareness of privacy risks does not necessarily imply avoidance behavior. Instead, consumers with higher privacy concerns may become more selective and cautious when conducting online transactions. They may choose reputable platforms, pay greater attention to privacy policies, avoid sharing unnecessary information, and use secure payment methods. In other words, privacy concerns may increase consumers' vigilance rather than discourage them from participating in e-commerce activities. This explanation is consistent with the argument that awareness of risk may coexist with continued usage behavior when consumers perceive online transactions as necessary and manageable.

The contextual characteristics of North Kalimantan as a border area provide another important explanation. Compared with consumers in urban and digitally mature regions, consumers in border areas face different conditions regarding market accessibility and product availability. E-commerce platforms often provide access to products that are difficult to obtain through traditional physical markets. Therefore, online shopping represents not merely convenience but also an important means of fulfilling consumption needs. Under such circumstances, consumers may be willing to accept certain privacy-related risks because the benefits associated with online shopping are perceived as indispensable.

Furthermore, North Kalimantan is geographically characterized by dispersed settlements and varying levels of digital infrastructure development. Consumers in this region are increasingly dependent on digital platforms to access wider markets and products. Consequently, privacy concerns may not function as barriers to online transactions but rather as factors that encourage consumers to become more careful in managing their online activities. These findings suggest that the relationship between data privacy concerns and online purchase intention is highly context-dependent and may differ from relationships observed in urban settings where product accessibility and market alternatives are more abundant.

Another important finding is that brand trust does not have a significant direct effect on online purchase intention. This result suggests that trust in e-commerce brands alone is insufficient to encourage consumers to purchase online. In the context of border-area consumers, purchase intention may be determined by various practical considerations, including product availability, delivery reliability, transaction security, price competitiveness, and platform accessibility. Therefore, consumers may not rely solely on brand reputation when making purchasing decisions.

This finding also indicates that trust may not always operate as an independent determinant of purchase intention. Instead, consumers may simultaneously evaluate several dimensions of online transactions, including risks, security, convenience, and platform performance. Consequently, brand trust alone may be insufficient to generate purchase intention when other practical considerations play a more dominant role. This result is consistent with Kim et al. (2008), who argued that consumers' behavioral intentions are influenced by multiple factors rather than by trust alone.

Although brand trust does not directly affect online purchase intention, the results demonstrate that it significantly moderates the relationship between data privacy concerns and online purchase intention. The negative interaction coefficient indicates that brand trust weakens the influence of privacy concerns on purchase intention. In other words, consumers who possess stronger trust in e-commerce platforms are less likely to allow privacy concerns to influence their purchasing decisions. This finding suggests that trust functions as a protective mechanism capable of reducing uncertainty associated with online transactions.

The moderating role of brand trust is particularly important because it demonstrates that trust may function more effectively as a boundary condition than as a direct antecedent of online purchase intention. Consumers who trust an e-commerce platform may believe that the platform is capable of safeguarding personal information, maintaining transaction security, and responding responsibly to potential privacy issues. As a result, privacy-related concerns become less influential in determining purchasing decisions. These findings support previous studies suggesting that trust reduces uncertainty and perceived risks in online transactions (Y. Chen & Barnes, 2007; McKnight et al., 2002).

More importantly, the present study extends previous literature by demonstrating that the moderating role of brand trust is also relevant in border areas characterized by limited digital infrastructure, uneven digital literacy, and cross-border market influences. This finding highlights that trust should not merely be viewed as an independent predictor of consumer behavior but also as an important mechanism that shapes consumers' responses to privacy-related risks.

Overall, this study contributes to the literature in two important ways. First, it demonstrates that the effect of data privacy concerns on online purchase intention is context-specific and may differ from the negative relationships commonly reported in previous studies. Second, this study extends prior research by showing that brand trust plays a stronger role as a moderating variable than as a direct determinant of online purchase intention. These findings provide empirical evidence from the Indonesia–Malaysia border region and emphasize the importance of considering contextual characteristics when examining digital consumer behavior. In addition, the findings provide practical implications for e-commerce providers and policymakers to strengthen data protection mechanisms, enhance consumer trust, and promote safer digital transactions in peripheral regions.

## CONCLUSION

Based on the results of the analysis and discussion, this study concludes that data privacy concerns significantly influence online purchase intention among e-commerce users in the Indonesia–Malaysia border area, particularly in North Kalimantan. This finding indicates that consumers' perceptions of personal data management, privacy risks, and information protection are important factors in shaping their intention to conduct online transactions. Although privacy concerns are often associated with lower purchase intention, the findings of this study suggest that consumers in border areas may continue to engage in e-commerce transactions when the perceived benefits, such as convenience, product accessibility, and transaction efficiency, outweigh the perceived privacy risks.

Furthermore, the results show that brand trust does not have a significant direct effect on online purchase intention. This finding indicates that e-commerce reputation and brand image alone are not sufficient to directly encourage consumers to make online purchases. In the context of border-area consumers, purchase intention may also be influenced by more functional considerations, such as transaction security, personal data protection, product availability, delivery reliability, and platform accessibility. Therefore, consumers tend to evaluate not only the trustworthiness of e-commerce brands but also the practical benefits and perceived security of online transactions.

This study also confirms that brand trust plays a significant moderating role in the relationship between data privacy concerns and online purchase intention. The negative interaction effect indicates that higher brand trust weakens the influence of data privacy concerns on online purchase intention. This means that when consumers have a high level of trust in an e-commerce brand, privacy-related concerns become less dominant in shaping their purchase intention. Thus, brand trust functions as a risk-management mechanism that helps reduce consumers' sensitivity to privacy risks in e-commerce transactions.

This study offers two main theoretical contributions. First, it contributes to the literature on data privacy concerns and online purchase intention by providing empirical evidence from the Indonesia–Malaysia border region, a context that has received limited attention in previous e-commerce research. The findings show that established theories and prior findings on privacy concerns should be interpreted contextually, especially in regions with limited digital infrastructure and varying levels of privacy awareness. Second, this study extends prior research on brand trust by demonstrating its moderating role in a border-area context. This finding indicates that brand trust is not only relevant in general or digitally mature e-commerce settings but also plays an important role in shaping consumer responses to privacy concerns in border areas.

From a managerial perspective, the findings suggest that e-commerce providers should not rely solely on brand reputation to increase consumers' online purchase intention. They need to strengthen personal data protection systems, communicate privacy policies clearly, and provide visible security assurances during online transactions. E-commerce providers should also build consumer trust by improving service reliability, transaction transparency, delivery certainty, and responsiveness to privacy-related complaints. For consumers in border areas, trust-building strategies should be accompanied by education on data privacy and safe online shopping practices. Policymakers and local stakeholders should also support digital literacy programs and strengthen consumer protection mechanisms in border regions to encourage safer and more inclusive digital commerce.

The findings imply that e-commerce providers operating in border regions should not rely solely on brand reputation to stimulate purchase intention. Instead, they should strengthen privacy protection mechanisms, improve transparency regarding personal data usage, and provide visible security assurances during transactions.

In addition, policymakers should develop targeted digital literacy programs for border communities such as Nunukan, Sebatik, and Krayan. These initiatives may include education on online privacy risks, consumer rights, and safe digital transaction practices. More context-specific risk mitigation strategies are necessary to foster inclusive and secure digital commerce in peripheral regions.

This study has several limitations. First, the research was limited to e-commerce users in the North Kalimantan border area; therefore, the findings may not be generalizable to consumers in other border regions or urban areas. Second, this study used a cross-sectional survey design, which captures consumer perceptions at one point in time and cannot fully explain changes in behavior over time. Third, this study only examined data privacy concerns and brand trust, while other factors such as digital literacy, perceived risk, platform reputation, delivery reliability, price perception, and prior online shopping experience were not included in the model. Future research may address these limitations by comparing consumers in border and urban areas, using longitudinal research designs, and incorporating additional variables that may influence online purchase intention. Future studies may also examine cross-border e-commerce behavior more specifically by considering Malaysian digital market exposure, consumer protection awareness, and differences in platform trust across countries.

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