

***CONSUMER AWARENESS OF PRODUCT, FINANCIAL, AND PRIVACY RISKS IN  
ONLINE SHOPPING AMONG EMPLOYEES OF TENAGA NASIONAL BERHAD (TNB)  
BERTAM***

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## **ABSTRACT**

This study examines the relationship between online purchasing risk dimensions and consumer awareness among employees of Tenaga Nasional Berhad (TNB) in Bertam, Kepala Batas, Penang. The study focuses on three main types of risks: product risk, financial risk, and privacy risk. A total of 63 respondents participated in the study, with data collected through a questionnaire as the primary research instrument. The data were analyzed using the Statistical Package for Social Sciences (SPSS) version 27.0, employing descriptive analysis, Pearson correlation, and mean score analysis. The findings reveal that product risk and financial risk do not have a significant relationship with consumer awareness, whereas privacy risk shows a significant positive relationship with consumer awareness of online purchasing risks. This study highlights the importance of consumer awareness, particularly in relation to data security and personal information protection, within the rapidly expanding e-commerce environment.

**Keywords:** Consumer awareness, Product risk, Financial risk, Privacy risk, Online purchasing

## **1.0 INTRODUCTION**

The advancement of information and communication technology has significantly transformed consumer purchasing behaviour, particularly through the growth of online shopping or e-commerce. Digital platforms such as Shopee, Lazada, TikTok Shop, and social media marketplaces have become increasingly popular due to their convenience and efficiency, especially following the implementation of the Movement Control Order (MCO) in 2020, which accelerated consumers' reliance on online purchasing (Roslan, 2021).

Despite its benefits, online purchasing exposes consumers to various risks, including fraudulent transactions, misuse of personal and financial information, and the delivery of products that do not meet advertised specifications. Angsor (2023) categorised these risks into several dimensions, namely product risk, financial risk, privacy risk, and delivery risk. As e-commerce activities continue to expand, consumer awareness has become a crucial factor in reducing vulnerability to such risks and supporting safer online transaction practices.

Consumer awareness is an important element in supporting safer decision-making in online purchasing activities. Previous studies indicate that although consumers may be aware of online purchasing risks, their behaviour is often influenced by convenience, trust in digital platforms, and perceived security (Chandrashekar, 2022; Angsor, 2023).

Employees of Tenaga Nasional Berhad (TNB) in Bertam, Penang, represent a relevant and meaningful sample for this study. As professionals with stable income and regular exposure to digital technologies, TNB employees actively participate in online purchasing activities as part of their daily routines. However, despite their socio-economic stability and educational background, they remain exposed to online purchasing risks, particularly those related to privacy and financial security.

Although previous studies have examined online purchasing risks among various consumer groups, limited attention has been given to professional working populations within large organisations in Malaysia. Therefore, building on existing literature on product risk, financial risk, and privacy risk, this study examines the relationship between these risk dimensions and consumer awareness of online purchasing among employees of Tenaga Nasional Berhad (TNB) Bertam.

## 2.0 PROBLEM STATEMENT

The rapid development of e-commerce platforms such as Shopee, TikTok, and Lazada has greatly simplified the process of online purchasing. However, this convenience also exposes consumers to various security risks and cybercrimes. Purchasing activities that require verification using personal information such as identity card numbers and bank account details have become targets for exploitation by irresponsible parties.

Consumers today face multiple risks, including fraud, delivery of products that do not match advertised specifications, fake websites, product quality issues, and the sale of illegal goods that may pose health hazards. Issues of contract breaches under the Contracts Act 1950 and consumer protection under the Consumer Protection Act 1999 demand a higher level of awareness among consumers regarding their rights and responsibilities.

Cybercrime, particularly identity theft, represents a major threat when personal information is misused for fraudulent purposes, resulting in financial losses and data breaches. In recent years, Malaysia has witnessed a sharp increase in online fraud cases. According to a report by Muhammad Yusri Muzamir (2025) in *Berita Harian*, total losses due to online fraud rose to RM1.57 billion in 2024, compared to RM851.12 million in the previous year, marking an 84.46% increase. Additionally, the number of reported cases also rose by 38.81%, from 25,479 cases in 2022 to 35,368 cases in 2024, while for the period between January and July 2025, a total of 31,949 cases with losses amounting to RM1.53 billion were recorded.

This continuous increase indicates that online fraud crimes are becoming more serious despite various measures implemented by the authorities, such as the strengthening of the National Scam Response Centre (NSRC) and the proposed enactment of the Cybercrime Bill. This situation raises questions regarding the effectiveness of existing preventive strategies and the level of public awareness of online fraud risks in Malaysia.

The rise in such cases also reflects the relatively low level of consumer knowledge and awareness, as well as the lack of precautionary practices in online purchasing activities. This condition not only undermines consumer confidence in e-commerce platforms but also has negative implications for the stability of the nation's digital economy. Therefore, efforts to enhance cybersecurity and promote consumer education are crucial to ensure a safer, more ethical, and resilient e-commerce ecosystem.

## 3.0 RESEARCH QUESTIONS AND OBJECTIVES

This study was conducted to address the main research question of whether there is a relationship between three dimensions of online purchasing risk, namely product risk, financial risk, and privacy risk, and the level of consumer awareness among employees of Tenaga Nasional Berhad (TNB) in Bertam, Kepala Batas, Penang. This question arises from the increasing trend of online purchasing activities, which is accompanied by various forms of risk that may influence consumers' awareness and confidence when engaging in digital transactions.

In line with this research question, the objective of this study is to examine the relationship between the three key dimensions of risk, namely product risk, financial risk, and privacy risk, and consumer awareness of online purchasing risks among TNB Bertam employees. It is hoped that this study will provide a deeper understanding of how perceptions of risk influence consumer awareness and contribute to the development of more effective security strategies and digital literacy initiatives among professional consumers.

## 4.0 LITERATURE REVIEW

### i) Consumer Awareness of Online Purchasing Risks

Consumer awareness refers to the level of understanding and sensitivity individuals have toward potential risks that may occur when making digital purchasing decisions (Chandrashekar, 2022). According to Razinah and Ros (2021), the level of consumer awareness plays a crucial role in reducing the risk of online fraud, particularly among young consumers who frequently use e-commerce platforms without sufficient knowledge of data security.

A study by Angsor (2023) found that although consumers are aware of potential risks, they continue to make purchases due to convenience and promotional offers. This indicates that awareness alone is insufficient without being accompanied by cautious attitudes and knowledge of digital security practices.

Online shopping security refers to the measures and practices implemented to protect consumers and their personal information throughout the purchasing process. It encompasses aspects such as the security of financial transactions, data protection against unauthorized access, verification of product authenticity, fraud prevention, and compliance with consumer protection regulations. According to Efendioğlu (2024), sensitivity toward issues of security and confidentiality in online shopping is a key factor influencing digital consumer behavior. Furthermore, the COVID-19 pandemic has not only accelerated the growth of the e-commerce industry but also introduced new challenges such as increased online fraud, weaknesses in payment systems, and cybersecurity concerns (T. Ahmed, 2024).

### ii) Product Risk

Chang et al. (2016) explained that consumers' perceptions of satisfaction and purchase intentions in online shopping are influenced by psychological attitudes. Product risk refers to the possibility that a product may fail to meet the buyer's expectations (Masoud, 2013; Mariné Aghekyan-Simonian, 2012). This risk involves customer dissatisfaction with the received product. Common issues include misleading items, poor quality, counterfeit goods, incorrect sizes, unpleasant odors, wrong colors, near-expiry products, and damaged items. Singh and Holani (2017) also emphasized that these types of risks are commonly experienced by customers when using e-commerce platforms. In addition, variations in color, shape, or quality between the displayed and received products, as well as consumers' inability to assess product quality before purchase, further increase perceived risk (Mian Dai, 2014). Consequently, product risk can reduce consumers' confidence and intention to make online purchases (Zhang et al., 2012).

Balogh and Mészáros (2020) found that Hungarian consumers were aware of online purchasing risks such as difficulties in assessing product quality, delivery delays, weak after-sales services, and counterfeit product risks. These perceptions of risk can be utilized in Segmentation-Targeting-Positioning (STP) marketing strategies to better understand consumer concerns.

Martini and Wibisono (2020) discovered that product risk does not have a significant effect on purchase intention, whereas Tran (2020) reported the opposite — that product risk significantly affects satisfaction and purchase intention. Similarly, Prayuda and Suwito (2019) found that product risk has a negative and significant effect on online purchase intention. These findings are supported by Prakoso (2022), who emphasized that the higher the perceived risk, the lower the likelihood of consumers making online purchases.

### iii) Financial Risk

According to John Grable (2004), financial risk is defined as the potential for monetary loss and the degree of uncertainty that consumers are willing to accept when conducting financial transactions. Financial risk plays a crucial role in influencing consumers' decisions to make online purchases (Anam Bhatti, 2020). Featherman and Pavlou (2003) further defined financial risk as the likelihood that an online buyer may experience a monetary loss by paying a higher price for a product of lower

value. Masoud (2013) stated that online purchasing is often associated with financial risks such as fraud, identity theft, credit card scams, personal data breaches, and other forms of cybercrime. Dai et al. (2014) added that it is often difficult for consumers to determine whether the price paid for a product is the lowest among available sellers, in addition to the risks of non-delivery and credit card fraud that may result in financial losses.

Studies by Almousa (2011) and Dai et al. (2014) found that financial risk is among the perceived risks that have a negative impact on online purchasing behavior. Similarly, Bhatnagar (2000) emphasized that a lack of trust in online sellers — such as cases where customers do not receive products after making payments or when credit card information is leaked — can lead to financial losses for consumers.

#### **iv) Privacy Risk**

Privacy risk in online purchasing refers to the potential threat to the confidentiality of consumers' personal information during online transactions. A study by Abdul Wahab, Pitchan, and Salman (2023) involving 400 youth respondents in Klang, Selangor, found that issues related to information privacy and security influence the attitudes and practices of young consumers when making online purchases. This finding suggests that knowledge and awareness levels can protect users from the risks of cybercrime.

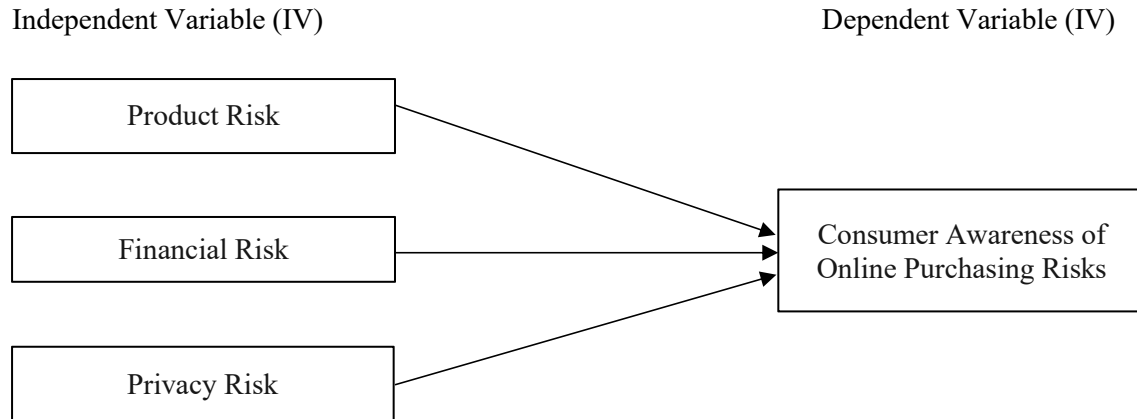
A study by Wan Azlina Wan Mohd Nowalid (2020) revealed that respondents were generally satisfied with the security aspects of online purchasing, including fraud risk, payment methods, and information privacy. However, Mohd Ekhsan Othman (2020) emphasized that the main weakness among users is that their privacy settings and personal information are not fully controlled by vendors or e-commerce companies, making them vulnerable to exploitation by irresponsible parties. Furthermore, Lita and Auliya (2019) found that privacy risk has a significant influence on online purchase intention. This finding is supported by Nurhatinah in Prakoso (2022), who reported that privacy risk significantly affects consumers' intention to make online purchases.

Based on the reviewed literature, it is evident that different dimensions of online purchasing risk yield varying and sometimes conflicting empirical findings.

#### **Justification for the Selection of Risk Dimensions**

Based on the reviewed literature, previous studies on online purchasing risks have highlighted multiple dimensions of perceived risk; however, empirical findings remain inconsistent across contexts and populations. For instance, while some studies reported that product and financial risks significantly influence consumer behaviour (Tran, 2020; Prayuda & Suwito, 2019), others found these risks to be insignificant among experienced or digitally confident consumers (Martini & Wibisono, 2020; Almousa, 2011). In contrast, privacy risk has consistently been identified as a salient concern due to its long-term consequences, such as identity theft and misuse of personal data (Lita & Auliya, 2019; Prakoso, 2022).

Therefore, this study focuses on product risk, financial risk, and privacy risk as they represent the most frequently examined yet empirically debated dimensions in the online purchasing literature. Examining these three risk dimensions together allows for a more nuanced understanding of how different types of risk relate to consumer awareness within the context of professional employees in Malaysia.



**Figure 1 : Research Framework**

## 5.0 RESEARCH DESIGN AND SAMPLING TECHNIQUE

This study employed a descriptive survey research design using a quantitative approach to examine the relationship between product risk, financial risk, and privacy risk with consumers' awareness of online purchasing. The survey was conducted through the distribution of online questionnaires using Google Forms to respondents consisting of employees at Tenaga Nasional Berhad (TNB) Bertam, Kepala Batas, Penang. Correlation analysis was used to evaluate the degree of association between the variables under study.

A simple random sampling technique was adopted to ensure that every individual in the population had an equal chance of being selected as a respondent. This method was chosen to obtain data that objectively represents the population and to minimize research bias. The sample size was determined based on the Krejcie and Morgan (1970) Sample Size Determination Table, which indicated that an appropriate number of respondents for this study is 63. The questionnaire was divided into five sections, namely Sections A to E. Section A contained questions on respondents' demographic profiles, while Sections B to E assessed consumer awareness as well as product risk, financial risk, and privacy risk in online purchasing.

Ethical considerations were observed throughout the study. Participation was voluntary, informed consent was obtained from all respondents, and anonymity and confidentiality were ensured. The data collected were used solely for academic purposes.

**Table 1: Distribution of Questionnaire Questions**

Aspect	Number of Questions
Section A: Respondent Demographic Information	5
Section B : Consumer Awareness of Online Purchasing Risks	6
Section C : Product Risk	5
Section D : Financial Risk	5
Section E : Privacy Risk	5
Total No. of Question	26

## 6.0 RESEARCH RESULTS

### i) Descriptive Analysis

**Table 2 : Demographic Information**

Profile		Frequency (N)	Percentage (%)
Gender	Male	55	87.3
	Female	8	12.7
	<b>Total</b>	<b>63</b>	<b>100</b>
Age	20 – 29	-	-
	30 – 39	44	69.8
	40 – 49	17	27.0
	50 – 60	2	3.2
	<b>Total</b>	<b>63</b>	<b>100</b>
Race	Malay	62	98.4
	Chinese	-	-
	Indian	1	1.6
	Others	-	-
	<b>Total</b>	<b>63</b>	<b>100</b>
Online Shopping Experience	Yes	63	100
	No	-	-
	<b>Total</b>	<b>63</b>	<b>100</b>
Frequency of Online Purchases (per month)	1 to 5 times	42	66.7
	6 to 10 times	12	19.0
	11 to 15 times	2	3.2
	More than 15 times	7	11.1
	<b>Total</b>	<b>63</b>	<b>100</b>

Based on Table 2, the majority of respondents (66.7%) made online purchases between one to five times per month. A total of 19.0% of respondents made purchases between six to ten times, while 11.1% made purchases between eleven to fifteen times. Only 3.2% of respondents made more than fifteen purchases per month, representing the smallest percentage group.

These findings indicate that most respondents have a moderate level of engagement in online purchasing activities. This may be attributed to factors such as limited purchasing needs, the level of confidence in transaction security, or the relatively controlled frequency of e-commerce platform usage among employees of TNB Bertam.

### ii) Correlation Analysis

**Table 3 : Correlation Findings**

		<b>Korelasi</b>			
		Awareness	Product Risk	Financial Risk	Privacy Risk
Awareness	Pearson Correlation	1	.145	-.066	.309*
	Sig. (2-tailed)		.258	.606	.014
	N	63	63	63	63
Product Risk	Pearson Correlation	.145	1	-.014	.110
	Sig. (2-tailed)	.258		.916	.389
	N	63	63	63	63
Financial Risk	Pearson Correlation	-.066	-.014	1	-.111

	Sig. (2-tailed)	.606	.916		.384
	N	63	63	63	63
Privacy Risk	Pearson Correlation	.309*	.110	-.111	1
	Sig. (2-tailed)	.014	.389	.384	
	N	63	63	63	63

\*. Correlation is significant at the 0.05 level (2-tailed).

Table 3 presents the Pearson correlation results examining the relationships between product risk, financial risk, privacy risk, and consumer awareness of online purchasing. The findings indicate a positive but insignificant relationship between product risk and consumer awareness ( $r = .145$ ,  $p = .258$ ), as well as a negative but insignificant relationship between financial risk and consumer awareness ( $r = -.066$ ,  $p = .606$ ). In contrast, privacy risk shows a significant positive relationship with consumer awareness ( $r = .309$ ,  $p = .014$ ).

The insignificant relationships between product risk and financial risk with consumer awareness may be explained by the increasing reliability of e-commerce platforms. Features such as secure payment systems, refund and return policies, and seller rating mechanisms may reduce consumers' concerns regarding product quality and financial loss. This finding is consistent with Martini and Wibisono (2020), who reported that product risk did not significantly influence online purchasing behaviour among experienced consumers. Similarly, Almousa (2011) and Dai et al. (2014) suggested that financial risk becomes less salient when consumers have greater trust in digital payment systems and platform security. In addition, the respondents' stable income and regular exposure to online transactions may further lower their sensitivity toward product and financial risks, as these risks are perceived as manageable.

In contrast, privacy risk was found to have a significant influence on consumer awareness, indicating that concerns related to personal data protection and information confidentiality remain prominent. This finding supports Tran (2020), as well as Lita and Auliya (2019) and Prakoso (2022), who emphasized that privacy risk carries long-term consequences such as identity theft and data misuse, making consumers more vigilant in this aspect compared to product and financial risks.

## 7.0 CONCLUSION AND RECOMMENDATIONS

This study aimed to examine the relationship between product risk, financial risk, and privacy risk with consumer awareness of online purchasing among employees of Tenaga Nasional Berhad (TNB) Bertam, Kepala Batas, Penang. The findings revealed that product risk and financial risk do not have a significant relationship with consumer awareness. However, a significant and positive relationship was found between privacy risk and consumer awareness, indicating that concerns related to personal data security play an important role in shaping consumers' awareness when engaging in online shopping activities.

Overall, the findings emphasize that privacy issues should be given primary attention by e-commerce platform providers to enhance user trust and security. Accordingly, several recommendations are proposed to strengthen consumer awareness and protection. First, awareness campaigns should be conducted through various channels such as social media and webinars to educate the public about fraud risks and data security. Second, e-commerce platforms are encouraged to strengthen their privacy policies to ensure greater transparency and compliance with current data protection regulations. Finally, additional security measures such as two-factor authentication, suspicious activity monitoring, and regular security awareness training should be reinforced to ensure the continued safety of users in online transactions.



## AUTHOR CONTRIBUTIONS

Noor Fariza M. Hasini, Siti Nabilah Zulkifli, Roslinawati Ibrahim, Nurul Aini Md Rais, Nurul Afiqah Abd Rahman and Suhailah Ibrahim contributed equally to the conception, design, data collection, analysis, writing, and final approval of this manuscript.

## CONFLICT OF INTEREST

The manuscript has not been published elsewhere and is not under consideration by other journals. All authors have approved the review, agree with its submission and declare no conflict of interest on the manuscript.

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