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RESEARCH ARTICLE

Mitigating risk in digital marketplace: A case of online consumer in East Coast Malaysia

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Abstract - The digital marketplace has revolutionised the global marketing landscape, enabling businesses and retailers to expand their reach and engage in transactions with a wider audience. While these platforms offer convenience, variety, and accessibility, they also present certain risks that may influence consumer decision-making. Guided by the Technology Acceptance Model (TAM), this study examines how perceived ease of use and perceived usefulness interact with perceived risks—specifically product, financial, delivery, time, and information security risks—in shaping consumers' intentions to engage in online shopping. Focusing on the East Coast region of Malaysia, the research employed a structured questionnaire administered to 300 respondents to assess consumer awareness of these risks and their impact on technology acceptance in digital marketplaces. The integration of TAM provides a theoretical lens to understand how risk perception affects behavioural intention and how positive technology perceptions can mitigate such effects. The findings offer valuable insights for e-retailers, marketers, and business owners in formulating effective risk-reduction strategies and enhancing perceived ease of use and usefulness, thereby increasing consumer trust and confidence. By addressing the dual dimensions of technology acceptance and risk perception, this study contributes to a deeper understanding of online consumer behaviour and offers practical guidance for fostering a more robust and sustainable digital marketplace ecosystem.

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1. Introduction

The rapid development of the internet has made accessing information faster and easier, prompting a revolution in global commerce by empowering consumers to exchange goods and services via e-commerce and social commerce platforms without temporal or spatial constraints (Chai, 2023). As a result, many local micro-enterprises have turned to social media marketing as a key strategy to reach customers. Such an approach has been proven crucial for their success (Mokhtar & Hasan, 2023). To date, the wide utilisation of the internet has profoundly altered the marketing milieu by facilitating corporate expansion on a global scale (Al Kailani & Kumar, 2011). E-commerce has been instrumental in reshaping the retail sector, thereby necessitating that traditional retailers embrace digital sales channels and reevaluate their strategic approaches (Tiwari, 2023). Furthermore, the convergence of digital and physical retail environments has given rise to novel consumer behaviours and retail formats, thereby strengthening businesses' competitive position (Hagberg et al., 2017). The proliferation of mobile technologies and applications has also catalysed the acceleration of online commerce, ultimately enhancing accessibility and convenience for consumers (Diachenko et al., 2021). In Malaysia, another critical aspect of the digital marketplace is the shift towards a cashless society, particularly on the East Coast. Consumers are increasingly using digital payment options, such as e-wallets and online banking, to make transactions. This change is driven by the convenience of cashless payments and the need for safety, especially during the pandemic. The increased usage of cashless transactions has made the marketplace more efficient by reducing the risks associated with handling physical cash. Many businesses have recognised the environmental challenges faced by the region and begun to incorporate sustainable practices into their operations. This includes using eco-friendly packaging, promoting local products that minimise carbon footprints, and adopting logistics practices that are less harmful to the environment. Research indicates that consumers are becoming more conscious about their purchasing choices and prefer businesses that prioritise sustainability (Okoye et al., 2023).

However, in the domain of electronic commerce, virtual retail environments may engender adverse outcomes for consumers, which are not typically encountered in brick-and-mortar establishments. Despite the universal desire for seamless and secure transactions, not all online payment methods can deliver both safety and broad acceptance (Sham et al., 2023). Internet issues during online financial transactions have led some users to consider alternative payment methods, such as cash or traditional banking, which are seen as more dependable and consistent. Consumers may experience inconvenience or heightened perceived risk when acquiring goods or services through online platforms. Thus, online shopping has several drawbacks compared to traditional shopping, including the absence of face-to-face interaction with salespeople. As a result, customers experience a less personalised shopping journey, ultimately leading to reduced satisfaction (Kacen et al., 2013). Furthermore, financial and product risks are significant concerns in online shopping, as consumers fear monetary loss and the inability to physically examine products before purchase (Chua et al., 2023). Engaging in online shopping also entails information security risks, including concerns about safeguarding payment processes and protecting personal data (Kaur, 2017). Security risk, particularly regarding payment and data protection, is a significant deterrent for online purchases (Zhang & Yu, 2020). Time risk and the potential loss of convenience can also

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negatively impact consumer behaviour (Ko et al., 2004). These perceived risks collectively influence consumer attitudes and behaviours towards online shopping, often leading to reluctance to make online purchases (Lăzăroiu et al., 2020). Understanding these risks is crucial for online retailers to develop strategies that can mitigate these concerns and enhance consumer trust and satisfaction (Ariffin et al., 2018). Therefore, guaranteeing customer satisfaction is crucial for the long-term viability of any business (Mohd Johan et al., 2020).

Developments also collectively contribute to the economic resilience of the East Coast Malaysia digital marketplace. Emphasising local strengths, fostering innovation, and responding to consumer demands have made the digital marketplace in East Coast Malaysia a unique case study in modern economic development. The East Coast Malaysia digital marketplace has faced several challenges over the past five years, particularly for micro, small, and medium enterprises (MSMEs). Limited access to technology and financial services has hindered the growth of these businesses, preventing them from tapping into larger markets and benefiting from digitalisation (Anggadini et al., 2023). This is because many small business owners are unable to invest in essential tools like smartphones, computers, and reliable internet connections, which are essential for conducting online transactions. Moreover, the rapid development of technology has increased the number of internet users (Mohd Johan et al., 2022). Over the last two decades, the evolution of e-commerce has dramatically reshaped consumer purchasing habits, particularly in Malaysia. The growing trend of using social media and e-commerce for shopping is revolutionising the way people shop in today's technology-driven world (Mohd Ali et al., 2024). Therefore, it has grown in popularity and established itself as a credible alternative to traditional brick-and-mortar shopping (Adipradana et al., 2023). Despite the ease and availability of online shopping, numerous perceived risks still influence consumer decisions and actions, particularly in regions like Malaysia's East Coast, where unique cultural and economic factors significantly shape consumer behaviour. The mix of rural and urban demographics faces distinct challenges in adopting digital marketplaces. Factors such as limited exposure to e-commerce platforms, stronger preferences for conventional approaches such as face-to-face interactions and physical contact during product demonstrations, and concerns about Halal certification (Jusop et al., 2020) are key contributors to consumer trust and satisfaction, thereby contributing to business success in Malaysia’s East Coast region. Past research denotes that 72.2% of respondents purchase online fewer than three times per month and 77.2% spend less than RM200 per month in the Malaysian East Coast (Shakir & Adzhar, 2024).

The research gap is particularly significant given the limited number of studies on online consumer behaviour in the East Coast region of Malaysia, particularly in the context of perceived risk. While past studies have examined the online shopping preference of young shoppers in Kelantan (Sobihah et al., 2015; Aris et al., 2021), factors influencing Shopee purchase intention among the consumers of East Coast Malaysia (Ching et al., 2021), and the importance of attitudes, subjective norms, perceived behavioural control, and enjoyment in predicting Gen-Y online purchase intentions at East Coast Malaysia (Kamis et al., 2021), they have not adequately addressed how regional economic disparities and cultural nuances affect risk perception. This knowledge gap hinders businesses' ability to effectively serve the East Coast Malaysia market, where the average household income is 30% lower than the national average, directly affecting online spending patterns and risk tolerance (Yin et al., 2024). Such a research gap necessitates particular attention. Previous research has identified various risk factors, including financial, security, and privacy risks, as having significant influences on online purchase intentions and behaviours (Nawi et al., 2019; Wai et al., 2019; Mokhtar et al., 2020; Sarangapani et al., 2023; Makhitha & Ngobeni, 2024). The severity of these concerns is reflected in recent fraud statistics. A total of 8,868 cases of online shopping fraud were reported from January to September 2023, resulting in losses of RM163 million (Awani, 2023). Such an increase is worrying when compared to the 9,449 e-commerce fraud cases reported in 2021 and 9,258 cases in 2022, with losses amounting to RM73 million and RM140 million, respectively (Awani, 2023). The trend particularly impacts East Coast businesses, where lower digital literacy rates expose local consumers to online hazards. This has increased vulnerability to fraud (Carvalho et al., 2023) and eroded consumers’ confidence, trust, awareness, and preventive capabilities (Huey & Ferguson, 2022).

The growing trend of online shopping has led to a significant increase in consumer concerns regarding security and privacy. Recent studies have highlighted the extent of these concerns, with many shoppers expressing security (64.7%) and privacy concerns (69.1%) when shopping online (Malaysian Communications and Multimedia Commission, 2023). Consumers are more inclined to complete online purchases when they have confidence in the online store. Addressing concerns about privacy, security, and business integrity can be achieved through efficient, user-friendly, and cost-effective strategies (Kim, 2020; Chua et al., 2023). Product misrepresentation remains a critical concern, with 62.4% of consumers reporting dissatisfaction with misleading product information (Malaysian Communications and Multimedia Commission, 2023). This is especially challenging on the East Coast, where local dialect preferences often create communication barriers to the adoption of useful information (Carvalho et al., 2023; Nwobodo & Weissmann, 2024) between sellers and buyers, potentially damaging business reputation in a community where trust is paramount. Reliable and precise information, together with a user-friendly website design, can positively impact consumer satisfaction and encourage repeat business among online shoppers (Ali & Aziz, 2022; Yoo et al., 2023). Therefore, this study aims to examine these factors and suggest a solution to help minimise the impact of these risks in the East Coast region of Malaysia.

In the contemporary era of digital advancement, online shopping has emerged as a pivotal element in consumer purchasing patterns on the East Coast of Malaysia, particularly in Kuantan, Kuala Terengganu, and Kota Bharu. While providing unprecedented access and options, perceived risks often diminish the appeal of this convenience, potentially obstructing the completion of online transaction journeys. These risks encompass apprehensions about data protection, uncertainty about product quality, and concerns about safeguarding personal information. In response to these challenges, this research provides actionable insights for risk mitigation, specifically tailored to the East Coast Malaysian market.

This is demonstrated through two prominent case studies. First, Shopee Malaysia's East Coast operations demonstrate effective risk-reduction strategies through the Integration of SPayLater (SeaMoney Capital Malaysia Sdn. Bhd.) for flexible payment solutions (Shopee, 2023a), Shopee University webinars for local sellers to prevent product misinformation (Shopee, 2020), and partnerships with J&T Express and Shopee Xpress (SPX) for reliable last-mile delivery (Shopee, 2023b). Second, Grab's regional presence showcases trust-building through region-specific user identity verification processes (Grab, 2025), driver authentication, and Touch 'n Go eWallet integration for higher user trust maintenance.

The primary objectives of this study are structured to comprehensively explore various risk factors influencing e-commerce behaviours. Specifically, the study aims to investigate the relationship between product risk and online shopping among consumers in the East Coast region of Malaysia. Additionally, it seeks to explore the relationship between financial risk and online shopping, as well as examine the relationship between delivery risk and online shopping within the same demographic. Furthermore, this research intends to evaluate the relationship between time risk and online shopping, and finally, to analyse the relationship between information security risk and online shopping among consumers in the East Coast region of Malaysia. The findings of this study will offer businesses with comprehensive, implementable strategies, including integrated security systems, region-specific return policies, optimised tracking systems, local-language verification, and secure payment partnerships. Retailers and marketers can leverage this research to implement proactive risk-mitigation strategies by using verified customer reviews, secure payment options, clear privacy policies, and transparent business practices. This study also provides consumers with tools for safer online shopping experiences through platform legitimacy verification, enhanced ability to assess trustworthiness through local business registrations, improved understanding of security certifications, and better-informed shopping decisions through regional customer feedback, thereby enabling them to navigate the digital marketplaces with greater confidence. Moreover, this research bridges the gap between theoretical understanding and practical implementation of risk mitigation strategies in the East Coast Malaysia's e-commerce landscape. By following these evidence-based approaches and successful regional examples, businesses can build robust online marketplaces that address local consumer concerns while fostering trust and loyalty. Ultimately, this study contributes to creating a more secure and satisfying e-commerce ecosystem that aligns with the specific needs and expectations of East Coast Malaysia's digital marketplace. Based on the formulated research objectives and questions, the following hypotheses are proposed for this study:

H1: There is a significant relationship between product risk and online shopping.
H2: There is a significant relationship between financial risk and online shopping.
H3: There is a significant relationship between delivery risk and online shopping.
H4: There is a significant relationship between time risk and online shopping.
H5: There is a significant relationship between information security risk and online shopping.

1.1 Literature Review

1.1.1 Perceived risk

Perceived risk is the uncertainty customers experience when they cannot predict the consequences of their buying decisions (Schiffman & Wisenblit, 2019; Lăzăroiu et al., 2020). It significantly affects online purchase intention, with a more substantial impact in B2C than B2B contexts (Tarawneh et al., 2021; Lavuri et al., 2022; Siu & Ismail, 2022). Understanding perceived risk is crucial for digital marketplaces to attract and retain consumers (Agrawal, 2022). This study investigates perceived risk through variables such as product risk, time risk, delivery risk, financial risk, and information security risk. By addressing these specific risk dimensions, online retailers may establish a more secure and reliable buying environment, ultimately increasing consumer satisfaction and loyalty (Lam et al., 2023). Digital technology has also changed shopping and purchasing norms, with people increasingly preferring to shop on e-commerce websites rather than physical stores for convenience and lower costs (Mohd Johan et al., 2022; Chua et al., 2023). When consumers perceive high risk and feel apprehensive about online transactions, they turn to online reviews and social media to gather information and share their experiences (Lăzăroiu et al., 2020; Yadav et al., 2023). Furthermore, perceived risk reduces trust in online retailers, and social media technology has been shown to help restore this trust (Lam et al., 2023; Yadav et al., 2023). Social e-commerce platforms improve user conversion by promoting consumer participation and increasing perceived trust and usefulness (Chai, 2023). For instance, e-commerce platforms can use customer feedback systems to share positive reviews and build trust among potential buyers (Chai, 2023; Lam et al., 2023). Likewise, social media provides two-way communication, allowing for rapid response to consumer concerns and updates on security measures to enhance trust (Karunasingha & Abeysekera, 2022).

1.1.2 Product risk

The rapid expansion of the digital marketplace has transformed consumer purchasing behaviours, particularly in regions such as East Coast Malaysia. This transformation has introduced various perceived risks that can deter consumers, despite the significant convenience offered by the digital marketplace. Understanding these risks and developing effective mitigation strategies are crucial for online retailers to foster consumer trust and drive sales. The rapid changes of digital markets have transformed retail landscapes, particularly in regions such as East Coast Malaysia, where consumer behaviour is increasingly influenced by technology. However, the evolution of electronic commerce has also caused various risks associated with perceived product risks, which considerably affect consumers' purchasing decisions. To understand the dynamics of perceived product risks, it is crucial to explore the factors that influence consumer confidence

and the strategies retailers can use to mitigate these risks. Perceived risk is a pivotal factor influencing online purchase intentions, with the primary types including financial, product, security, time, social, and psychological risks (Kamalul Ariffin et al., 2018; Geetha et al., 2021; Makhitha & Ngobeni, 2024). Product risk specifically pertains to uncertainties about product performance after purchase, arising from the inability to physically inspect products before buying. These doubts could stem from various factors, including a lack of tactile experience, discrepancies between anticipated and actual product features, or buyer's remorse, in which customers change their minds after making a purchase (Wang et al., 2024). This also leads to concerns about product quality, authenticity, and suitability. The risk of perceived product encompasses various dimensions, including financial, functional, temporal, and psychological risks. In the context of the digital market of East Coast Malaysia, these risks are exacerbated by cultural trends in the avoidance of uncertainty. Al-Adwan et al. (2022) used signalling theory to argue that highly visible companies require strong signals of reliability and credibility from electronic commerce platforms to promote trust and encourage purchase intentions. This theory highlights the importance of clear communication and transparency in reducing the perceived risks.

Consumer confidence serves as a critical mediator in the relationship between perceived risk and purchasing behaviour. Lăzăroiu et al. (2020) indicate that confidence in social commerce platforms directly influences consumer decision-making and that a lack of confidence can lead to hesitation. Confidence can be built through various mechanisms, including user reviews, security insurance, and responsive customer service. In high-risk contexts, the perceived utility of online criticism plays a central role. Ventre & Kolbe (2020) established that useful and credible opinions considerably reduce perceived risk and strengthen online purchase intentions, especially in emerging markets. Furthermore, allowing customers to leave reviews and ratings provides social proof that can help potential buyers gauge product reliability. This suggests that positive reviews can significantly reduce perceived product risk (Yang et al., 2016; Maslowska et al., 2017; Huifeng et al., 2020; Yadav et al., 2023). Providing detailed product descriptions and high-quality images also helps consumers make informed decisions, reducing uncertainties regarding product quality and features (Kamalul Ariffin et al., 2018; Qalati et al., 2021). Product risk is a multifaceted issue in the digital marketplace, encompassing functional, physical, financial, social, and psychological dimensions. Businesses can mitigate these risks by providing detailed product descriptions, facilitating product reviews, and offering flexible return policies. This will enhance consumer trust and satisfaction, ultimately fostering a more reliable and secure digital marketplace.

1.1.3 Financial risk

The digital marketplace enables consumers to purchase a wide range of products from anywhere, at any time. Nonetheless, greater flexibility for consumers translates into greater exposure to the financial hazards that threaten shoppers. Online transactions also involve high levels of fraud and scams, as consumers may be concerned about the security of their credit cards and personal information (Gurung & Raja, 2016; Mohr & Walter, 2019; Mittal & Tyagi, 2020; Siu & Ismail, 2022). Subsequently, consumers prefer other payment methods such as cash on delivery or bank account transfers rather than using their credit or debit cards (Bechler et al., 2023). The rise of e-commerce over the past five years has introduced myriad financial risks for consumers, including fraud and counterfeit goods. Studies indicate that the frequency of online fraud has increased, with digital marketing platforms becoming entangled with misleading practices (Shankar et al., 2021). This universal threat not only presents an immediate financial risk but also compromises consumer confidence in the broader digital market. Shankar et al. (2021) further stressed that digital platforms often lack strict regulatory frameworks, allowing fraudulent activities, phishing diets, and identity theft to flourish without hindrance. The spread of counterfeit goods presents another emerging threat in this digital landscape. According to Chawla and Kumar (2022), consumers are increasingly vulnerable to purchasing imitation products due to rapid purchasing trends encouraged by the pandemic. The ubiquity of online markets has made it more difficult for consumers to authenticate products before making a purchase. Chawla and Kumar (2022) also argue that the lack of regulatory surveillance and the globalisation of supply chains have aggravated this problem, as counterfeiters can more easily infiltrate online platforms with fewer barriers than in traditional retail environments. This increased risk of counterfeiting represents not only an important financial detriment to consumers but also poses ethical dilemmas regarding product authenticity and brand integrity.

Furthermore, there is the risk of purchasing counterfeit or substandard goods, which can result in financial loss if the products do not meet expectations or fail to perform as advertised. Counterfeit goods are regarded as one of the world's fastest-growing businesses, especially since the COVID-19 pandemic amplified digital dependency, with e-commerce platforms creating a picture-perfect market channel for counterfeiters to bypass traditional detection mechanisms (Antonopoulos et al., 2019; Handfield, 2021; Zandt, 2022). These counterfeit items include automotive parts, electronics, safety equipment (such as masks), prescription drugs, and cosmetics. There are two categories of counterfeit products: deceptive and non-deceptive. A non-deceptive counterfeit can be identified as a fake product simply from the price, quality, and sales location. As for a deceptive counterfeit, the price and packaging are like the original product, but not the quality (Che Mohd Nawi et al., 2022; Ndofirepi et al., 2022). Consumers must be wary when shopping on digital marketplaces, as they risk incurring significant financial losses beyond their control. They should cross-verify sellers before purchasing and look for reviews/ratings, or certifications that the marketplace may provide for its trusted sellers (Makhitha & Ngobeni, 2024). Secondly, implementing a budget, coupled with strict adherence and critical evaluation of needs versus wants, can be an effective strategy to mitigate the propensity to overshop (Maghinay et al., 2024).

1.1.4 Delivery risk

Delivery risks represent a critical challenge in the digital market in East Coast Malaysia, significantly influencing consumers' experiences and overall satisfaction. Various factors contribute to these risks, including the accessibility of

technologies and shortcomings in the delivery infrastructure. The unique characteristics of online purchase behaviour in the East Coast of Malaysia are shaped by both socio-economic conditions and cultural factors, which may differ from those in more urbanised areas. Empirical evidence also indicates that the reliability of delivery services is particularly crucial in East Coast Malaysia, where geographic factors and infrastructure limitations can exacerbate delays. Disturbances caused by natural disasters, such as monsoons, coupled with inadequate road networks, hinder timely deliveries, thereby intensifying consumers' anxiety and dissatisfaction. Ismail and Masud (2020) state that understanding these fundamental aspects of delivery risk is essential for companies seeking to optimise customer satisfaction, thereby enabling the deployment of effective mitigation strategies. Delivery risk involves concerns about timely delivery, potential damage during shipping, and receiving incorrect items (Ariff et al., 2014; Makhitha & Ngobeni, 2024). It includes failures such as wrong address deliveries, lost merchandise, and damaged products, which significantly affect customers' intention to shop online. These issues often occur after the online request is confirmed and lead customers to be less inclined to shop online. Shoppers worry about items breaking during transport, being shipped to the wrong address, or arriving late. High delivery risk negatively impacts buyer purchasing behaviour (Carvache-Franco et al., 2022).

Non-delivery risk can be reduced by offering online shoppers a platform to lodge complaints if they do not receive their items on time and by ensuring prompt action is taken (Ariff et al., 2014; Makhitha & Ngobeli, 2024). According to the Technology Acceptance Model (TAM) (Davis, 1989), consumers' attitudes towards technology are influenced by perceived usefulness and perceived ease of use (Johan et al., 2016; Marikyan & Papagiannidis, 2023). When the overall online shopping experience, including effective complaint resolution, is perceived as easy to use, consumers are more likely to develop positive attitudes and continue using the platform (Ariff et al., 2014; Johan et al., 2016; Siu & Ismail, 2022). Additionally, factors such as delivery speed (Shao et al., 2022), logistics efficiency, product packaging, and customer service response positively affect consumers' emotional trust. This emotional trust, in turn, increases consumers' likelihood of completing the confirmation receipt decision. In the post-purchase stage of online shopping, establishing consumer trust in behaviour is an important step that encourages favourable comments and repurchase decisions (Wang et al., 2022).

1.1.5 Time risk

Time risk is the notion that time, convenience, or effort will be lost when a purchased product is serviced or replaced (Thilagavathy, 2017; Sudibyo et al., 2020), as well as the time required to find information about the product (Geetha et al., 2021). As delivery risk includes failures such as non-delivery, wrong address deliveries, lost merchandise, and damaged products, time risk refers to the time and effort consumers spend browsing the digital marketplace platform, considering and selecting products, completing the purchase, making payment, waiting for delivery, and returning the product if found dissatisfied (Andrian & Selamat, 2022). Previous research indicates that time risk can significantly deter consumers from making online purchases (Makhitha & Ngobeni, 2024; Geetha et al., 2021). When products fail to meet their expected specifications, returning items and requesting refunds can become a time-consuming hassle. However, other studies have found time risk to be insignificant in predicting online purchase intention. Consumers consider online shopping convenient and easy because digital marketplaces are enhancing user interfaces and experiences (Okoye et al., 2021). The perceived time risk associated with browsing for products, handling returns, and receiving orders is relatively low. Thus, it is crucial to note that time risk is not a significant barrier to consumers' intentions to purchase online, which emphasises the convenience and ease of online shopping (Makhitha & Ngobeni, 2024). To enhance the likelihood of digital marketplace purchases, it is essential to minimise consumers' perceived time risk. This entails providing detailed and accurate information about product features, sizing charts, material components, and product comparisons to help buyers form a complete understanding of the product (Masoud, 2013; Gupta et al., 2023). Another measure is to use virtual views, 3D images, and other advanced features to illustrate product characteristics and reduce uncertainty arising from consumers' inability to physically handle the product. It is also crucial to ensure timely, reliable product deliveries, minimise delays, and provide easy return and exchange options to address time-related risks (Makhitha & Ngobeli, 2024).

1.1.6 Information security risk

Information security in the digital marketplace refers to the measures and practices used to protect personal and financial information when purchasing goods or services online. The proliferation of digital marketplaces has significantly altered consumer behaviour, especially in regions such as East Coast Malaysia. However, alongside these benefits come various information security risks, including data breaches, identity theft, and cyber fraud. These threats can deter consumers from using digital marketplaces and e-banking (Gupta & Shah, 2023; Mashatan et al., 2022). Today, cybersecurity is a growing concern in society, affecting individuals, companies, and states, with risks ranging from identity theft to online fraud (Carvalho et al., 2023). Thousands of consumers' personal and financial information, including credit card information, is targeted by cybercriminals (Mohd Johan et al., 2022). Consumers are also wary of potential security breaches involving their credit card data in the evolving digital marketplace, doubting assurances that recipient entities will not exploit the information they have been provided with (Johan et al., 2016; Carvalho et al., 2023). Digital marketplace platforms are highly susceptible to data breaches, leading to financial losses and erosion of consumer trust (Jamra et al., 2020; Gupta & Shah, 2023; Surya, 2023). Information security risks have a profound impact on consumer trust and their willingness to engage in online transactions. Thus, effective risk mitigation strategies are crucial to ensure consumer trust and secure transactions in these digital environments. Developing a digital strategy with security considerations is essential to prevent data breaches during digital transformation (Stewart, 2022). Strong security

measures, such as encryption, SSL certificates, and firewalls, can help improve information security in the digital marketplace (Gupta et al., 2023). Figure 1 presents the conceptual framework.

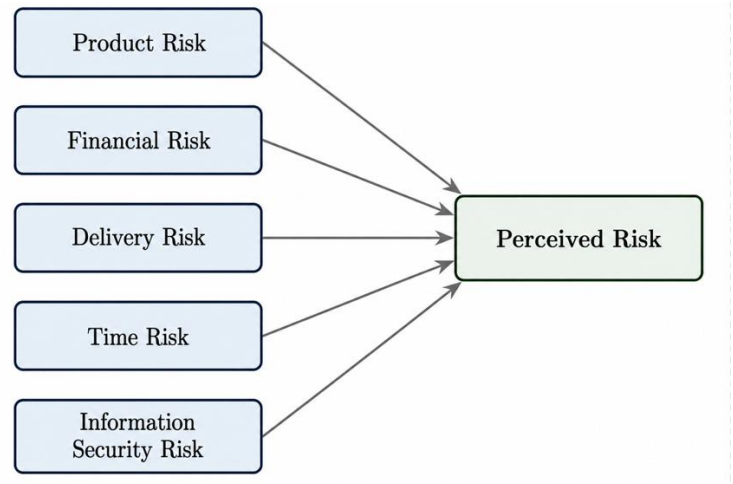


Figure 1. Conceptual framework

2. Materials and Methods

Our research design is a meticulously crafted plan, a testament to our commitment to rigorous methodology. It outlines the step-by-step processes that will be followed throughout the study. In this study, the design incorporated hypothesis testing as a core component of a quantitative research framework. To ensure the reliability of data collection, analysis, and interpretation, the research design was carefully structured to align research materials with the study's objectives (Yap et al., 2025). The primary objective was to present the findings in a statistical format, enabling hypothesis testing and exploration of relationships between independent and dependent variables. The study focused on a specific demographic: random online shoppers residing on the East Coast of Malaysia, including the cities of Kuantan, Kuala Terengganu, and Kota Bharu. To ensure a diverse yet targeted sample, the researchers used probability sampling and randomly selected 300 respondents who met the predetermined criteria. The probability sampling method allowed the researchers to efficiently target respondents who met predefined criteria while ensuring a diverse sample. Random selection within this group helped enhance representativeness and minimise selection bias. To ensure the validity and reliability of the data, a pilot test was conducted with 30 respondents. This pilot test was instrumental in refining the questionnaire and making necessary adjustments to improve its clarity and effectiveness (Taahir et al., 2020). This study also solicited expert feedback to validate the instrument. The experts provided feedback and evaluated the instrument's items and construction (Ibrahim & Ismail, 2023). The participants were then given anonymous questionnaires to encourage honest and unbiased responses. The data collection phase was twofold: gathering primary data directly from respondents to serve as the foundation for analysis, and collecting secondary data from various sources to supplement the primary findings. Once the data were collected, they underwent rigorous analysis using SPSS Statistics. This analysis included Cronbach's Alpha Reliability Analysis, which was employed to evaluate the internal consistency and reliability of the data. Pearson's Correlation test was conducted to scrutinise the relationships between the variables under investigation. These analytical techniques were pivotal in addressing the research questions and providing insights into the phenomena under investigation.

3. Results and Discussion

Table 1 shows a detailed profile of the respondents. The survey specifically asked the respondents about the number of hours spent on the digital marketplace and their intention to shop online. Most respondents (43.3%) spend between 2 and 5 hours on the digital market, and 29.7% use it for shopping occasionally. The sample included nearly equal distribution of male (49.3%) and female (50.7%) respondents, with the majority being workers (79.3%). The study employed Cronbach's Alpha Reliability Analysis to assess internal consistency. A standard measurement scale required that Cronbach's Alpha Reliability be above 0.70 to be acceptable. As shown in Table 2, all variables achieved acceptable reliability, confirming the robustness of the measurement scales used in this research. Table 3 reports the correlation between perceived risks and online shopping behaviour. All five risk dimensions-product risk show significant relationships with online shopping behaviour, indicating that perceived risks influence consumer decisions in East Coast Malaysia.

H1 was accepted (p = 0.000, r= 0.56). Product risk showed a moderate positive correlation with online shopping, suggesting that consumers are more cautious because they cannot physically examine products before purchase. This aligns with previous studies (Tran, 2020; Huifeng et al., 2020) highlighting the importance of clear product descriptions, reviews, and return policies in mitigating perceived product risk. However, customer reviews and seller reputation mechanisms can mitigate these concerns (Wang et al., 2024). The perceived risk associated with product evaluation in an

online context is a pivotal factor influencing consumer hesitance towards online shopping (Tran, 2020; Iqbal, 2021; Permatasari & Muthohar, 2023).

H2: There is a significant relationship between financial risk and online shopping.

Table 1. Demographic information

Demographic		Frequency (n)	Percentage (%)
Gender	Male	148	49.3
	Female	152	50.7
Occupation	Workers	238	79.3
	Supervisor	11	3.7
	Executive	30	10.0
	Manager	11	3.7
	Others	10	3.3
Number of Hours on Digital Marketplace	Less than 1 hour	6	2.0
	1-2 hours	19	6.3
	2-5 hours	130	43.3
	5-8 hours	92	30.7
	More than 8 hours	53	17.7
Usage of Digital Marketplace for Shopping	Often	77	25.5
	Most Likely	50	16.7
	Occasionally	89	29.7
	Rarely	84	28.0

Table 2. Reliability analysis

Variables	Items	Cronbach's Alpha	Results
Product Risk	5	0.799	Acceptable - Reliable
Time Risk	5	0.706	Acceptable - Reliable
Delivery Risk	5	0.819	Good - Reliable
Financial Risk	5	0.810	Good - Reliable
Information Security Risk	5	0.805	Good - Reliable
Online Shopping	5	0.830	Good - Reliable

Table 3. Pearson correlation analysis

Variables	*r*	*p*
Product Risk	0.56**	< 0.001
Financial Risk	0.52**	< 0.001
Delivery Risk	0.57**	< 0.001
Time Risk0	0.28**	< 0.001
Information Security Risk	0.60**	.< 0.001

Note: p<0.01 (two-tailed)

H1: There is a significant relationship between product risk and online shopping.

H2 was accepted (p = 0.000, r= 0.52). A significant relationship between financial risk and online shopping suggests concerns over fraud and payment security deter consumers' confidence in online shopping. Similar findings from Mohr and Walter (2019) and Bechler et al. (2023) emphasise the need for secure payment gateways and consumer protection policies (Gupta et al., 2023) to enhance trust. Previous studies also concluded that while price is a significant indicator of financial risk in online shopping, it is crucial to consider the interplay between price and other service-related and relational factors (Sudibyo et al., 2020; Guru et al., 2020; Abdullah et al., 2023). This highlights the need to examine the monetary aspects and the broader context of consumer experiences and interactions.

H3: There is a significant relationship between delivery risk and online shopping.

H3 was accepted (p = 0.000, r= 0.57). Delivery risk exhibited a moderate positive correlation. Consumers worry about delayed or damaged shipments, inadequate packaging, and handling practices, which is consistent with prior research (Lama, 2021; Rahmi et al., 2022; Shao et al., 2022; Mahbob et al., 2023). The East Coast Malaysia context presents unique challenges due to infrastructure limitations and a limited number of established third-party logistics providers (Rahmi et al., 2022). The findings of this study extend prior research by confirming that logistics and delivery inefficiencies remain significant barriers to e-commerce adoption in rural regions, echoing trends seen in previous studies

of emerging digital marketplaces (Lăzăroiu et al., 2020). Addressing these concerns requires efficient logistics, tracking systems, and reliable shipping partnerships.

H4: There is a significant relationship between time risk and online shopping.

H4 was accepted (p = 0.000, r= 0.28). Time risk showed the weakest correlation, suggesting that while some consumers perceive online shipping as time-consuming, user-friendly platforms and efficient delivery services mitigate this concern (Makhitha & Ngobeni, 2024; Geetha et al., 2021). Additionally, online shoppers perceive that purchasing items online is more time-efficient than traditional brick-and-mortar shopping (Carvache-Franco et al., 2022). The result corresponds with previous research, which suggests that perceived time risk has no substantial impact on digital marketplace purchase behaviour (Ariffin et al., 2018; Gautam & Sharma, 2019). This is due to clients' perception that time-related threats have less impact.

H5: There is a significant relationship between information security risk and online shopping.

H5 was accepted (p = 0.000, r= 0.60). Information security risk had the strongest correlation, highlighting significant concerns about data breaches and identity theft. Studies by Mashatan et al. (2022), Stewart (2022), and Yi et al. (2023) confirm that cybersecurity measures, including SSL encryption and two-factor authentication, are essential to consumer trust. According to Wei et al. (2023), security and privacy concerns are paramount for maintaining trust in online transactions and the website. This approach leads to a better and more secure online shopping experience for consumers.

Table 4. Coefficient of determination R^2

Predictor	*R with DV*	R^2	*Adjusted* R^2
Product Risk	0.56**	0.3136	0.3110
Financial Risk	0.52**	0.2704	0.2676
Delivery Risk	0.57**	0.3249	0.3223
Time Risk	0.28**	0.0784	0.0751
Information Security Risk	0.60**	0.3600	0.3575

The coefficient of determination is shown in Table 4. The simple regression analysis revealed that all five risk factors were significantly associated with the dependent variable, with varying degrees of explanatory power. Information Security Risk demonstrated the strongest relationship (R^2 = 0.3600, Adjusted R^2 = 0.3575), followed closely by Delivery Risk (R^2 = 0.3249, Adjusted R^2 = 0.3223) and Product Risk (R^2 = 0.3136, Adjusted R^2 = 0.3110). Financial Risk accounted for 27.04% of the variance (R^2 = 0.2704, Adjusted R^2 = 0.2676), while Time Risk showed the weakest association, explaining 7.84% of the variance (R^2 = 0.0784, Adjusted R^2 = 0.0751). Overall, these results suggest that perceived risks, particularly those related to information security, delivery, and product quality, play a substantial role in shaping the outcome variable.

4. Conclusions

Perceived risk of online marketplace shopping has become an essential issue in the digital marketplace. This study has found that online marketplace shopping remains risky, despite its numerous benefits. The concept of risk regarding shopping on online marketplaces remains a critical challenge in today's world. While many scholars have studied this risk from various perspectives, focusing on e-commerce violations and fraud, this study found that online marketplace shopping remains perceived as risky despite its myriad advantages. The Pearson correlation test was conducted to study the relationship between online marketplace shopping and independent variables: product risk, time risk, delivery risk, financial risk, and information security risk. The analyses revealed that the data are sufficient and significant to support the research hypotheses. The study also determined the five dimensions of consumers' perceived risk, four of which are product risk, delivery risk, financial risk, and information security risk, and a moderate awareness that shoppers have about the occurring risk. The fifth dimension is time risk, which is poorly understood among customers. These perceived risks do not affect consumers' purchase decisions in online marketplaces, as they still purchase products through digital marketplaces. Thus, the researchers have no control over the consumers' purchase decisions.

The findings of this study serve as a guideline for online marketplace sellers to gain a deeper understanding of the risk perceptions consumers associate with digital marketplaces, particularly on the East Coast of Malaysia. To mitigate these perceptions and encourage online shopping, sellers on online marketplaces must identify the risk dimensions most concerning to online shoppers. This comprehensive analysis serves as a valuable tool for sellers in online marketplaces seeking to assess the perceived risks consumers associate with digital marketplaces, especially on the East Coast of Malaysia. Online marketplace vendors should proactively identify the risk areas that concern potential online shoppers most to counter perceived risks and make online shopping more appealing. Strategies such as improving website security, setting clear and reasonable return policies, providing dependable delivery services, and implementing comprehensive customer support will help foster consumer confidence. By addressing these concerns, online marketplace sellers can increase the shopping experience and build customer trust. To achieve this, online marketplace sellers should consider implementing several strategies. Firstly, enhancing website security through encryption protocols such as HTTPS and SSL is crucial for protecting consumers' personal and financial information. For consumers, understanding the risks

associated with shopping on a digital marketplace and developing appropriate strategies are fundamental. It is imperative for consumers to check the credibility of online sellers, use secure payment methods, and keep payment details and receipts to protect themselves and help foster a more credible e-commerce space.

This research has shed light on certain aspects of the online shopping experience; however, there is room for further investigation, including strategic social analysis. Future research can add sociocultural issues, such as social imagery, mental imagery, and wellness imagery, that may concern online shopping behaviour but are not explored in this study. A cross-regional study that extends the investigation beyond East Coast Malaysia will also add value by explaining the different functionalities of risk perception in relation to social structure, available services, and economic prosperity. Additionally, clear and transparent return policies can reduce product risk, while reliable delivery options with tracking capabilities can minimise delivery risk. Incorporating an algorithm for customer reviews and ratings fosters trust and provides essential feedback for development. Another critical measure is establishing responsive customer service, such as providing educational content on products and the buying process. Offering secure payment options and having a clear privacy policy are also essential for addressing information security risks.

For consumers, the key to navigating the risks associated with digital marketplace shopping lies in awareness and proactive measures. Once they are informed about the risks, they can take steps to mitigate them. This includes researching the reputations of online marketplace sellers, checking for secure connections, using secure payment methods, and keeping records of transactions and communications. By taking these proactive steps, consumers will not only protect themselves but also contribute to a more trustworthy and secure e-commerce environment. This consumer empowerment is a significant outcome of the present study. Furthermore, future research can expand the population sample and geographic scope to improve coverage. Broader geographic coverage and a larger population sample may yield more comprehensive and extensive results. This will increase the validity of the research and make the results more accurate for the population. Additionally, future research may consider other independent variables, such as social, health, and psychological risk, as these factors can influence consumers' purchase decisions. The inclusion of these variables may yield more holistic outcomes. Time series is also another concern in future studies. It indicates how consumers' images of risk in adopting digital platforms change over time alongside improvements in digital technologies and advancements in cybersecurity. Furthermore, government policy effects and innovation can lead to laws protecting consumer rights, and products from emerging financial technologies are neutralising apprehensions associated with buying goods and services online. Finally, strategic relationship marketing can create virtual storefronts and enhance trust and confidence in the shopping experience through superior service, openness, and overall user engagement among online consumers.

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Mohd Remie Mohd Johan: Conceptualisation; Writing - original draft
Chong Siew Fan: Conceptualisation; Resources; Reviewing
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