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RESEARCH ARTICLE

Canonical Correlation Analysis of Digital Literacy and Perceived Data Privacy Security in E-Commerce Platform Usage Among Generation Z in Thailand

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ABSTRACT

This study investigates the relationship between digital literacy and perceived data privacy security among Generation Z users on e-commerce platforms in Thailand, applying Canonical Correlation Analysis (CCA) to examine interdependencies between these variables. Digital literacy, encompassing digital safety, content creation, and information management, is hypothesized to positively influence perceptions of data privacy security. A multi-stage probability sampling method was used to collect data from 420 participants across Thailand, ensuring geographic and demographic representation. The analysis revealed a strong canonical correlation (R_a = 0.775), indicating that digital literacy accounts for 77.5% of the variance in data privacy perceptions. Among the components, digital safety was the most influential factor (|0.939|), followed by content creation (|0.904|) and information management (|0.857|), underscoring their role in enhancing user confidence in e-commerce platform security. These findings highlight the importance of transparent data protection policies and targeted digital literacy programs to strengthen user trust in online platforms. Future research should explore cross-cultural comparisons and longitudinal analyses to examine how digital literacy influences data privacy perceptions over time. This study provides valuable insights into fostering secure digital interactions for Generation Z within Thailand's evolving e-commerce ecosystem.

INTRODUCTION

The expansion of digital technologies and e-commerce, driven by advancements in global digital infrastructure, has significantly influenced consumer access to goods and services (Li & Chen, 2023). Generation Z, having grown up in a digital-first environment, plays a key role in this transformation. Their familiarity with social media, mobile applications, and e-commerce platforms distinguishes them from previous generations. Research indicates that Gen Z is more likely than other age groups to rely on e-commerce platforms for purchasing decisions (Smith *et al*., 2021; Xu & Tian, 2022). This trend highlights the importance of understanding their digital literacy, particularly its impact on their awareness and decision-making regarding data privacy and security in online transactions (Van Deursen *et al*., 2022; Ferrari *et al*., 2022).

Digital literacy extends beyond fundamental technological skills to encompass the ability to access, evaluate, manage, and create digital content in a secure and effective manner (Vuorikari *et al*., 2021). Individuals with strong digital literacy are better equipped to assess and mitigate risks related to personal data privacy, including configuring security settings, preventing unauthorized access, and utilizing data protection tools (Roca *et al*., 2020). Within the e-commerce landscape, these

competencies enable consumers to make well-informed purchasing decisions, enhancing their confidence and fostering trust in platforms that inherently involve security risks (Kim *et al*., 2021; Wang & Chen, 2020).

While extensive research has explored various dimensions of digital literacy, relatively few studies have specifically examined its relationship with perceived data privacy security among Generation Z consumers on e-commerce platforms. Most existing studies focus on general data protection or user behavior in data management without conducting a comprehensive analysis that directly links digital literacy to perceptions of data privacy and security (Nguyen *et al*., 2023; Saritepeci *et al*., 2024).

Moreover, traditional research often employs linear analytical methods, which may not fully capture the intricate interrelationships between key variables. To address this limitation, canonical correlation analysis (CCA) provides a robust methodological approach for investigating associations between two sets of variables (Ferrari *et al*., 2022; Kim *et al*., 2021). This study, therefore, employs CCA to examine the extent to which digital literacy influences Generation Z's perception of and trust in data privacy security on e-commerce platforms. By adopting this approach, the research seeks to bridge a critical gap in the literature, contributing to a deeper understanding of how digital platforms can foster trust and enhance data security for Gen Z consumers.

LITERATURE REVIEW

Electronic Commerce (E-Commerce)

E-commerce refers to the conduct of business transactions via electronic networks, particularly the internet, encompassing activities such as the buying and selling of goods and services, digital marketing, financial transactions, and customer relationship management. It leverages digital technologies to enhance communication and operational efficiency, including inventory control, supply chain management, and customer experience optimization through personalized content and consumer behavior analysis (Kim *et al*., 2020; Ray *et al*., 2021).

The integration of advanced technologies such as Artificial Intelligence (AI) and Big Data Analytics has further revolutionized e-commerce, enabling precise consumer targeting, automation of marketing processes, and more efficient transactions. These innovations contribute to a more seamless and engaging customer experience by enhancing personalization and predictive analytics (Chen & Wu, 2023; Nguyen *et al*., 2024).

Digital Literacy

Digital literacy encompasses the ability to effectively access, evaluate, and utilize digital technologies, integrating a broad range of competencies, including internet navigation, data processing, content creation, digital communication, and information credibility assessment (Ferrari, 2013; Van Laar *et al*., 2020). It extends beyond technical proficiency to include critical thinking and decision-making skills essential for managing digital content and ensuring online security (Vuorikari *et al*., 2021).

As e-commerce platforms continue to expand, digital literacy has become a crucial factor in enabling consumers to navigate these platforms securely and effectively. Consumers with strong digital literacy skills are better equipped to assess the security measures of online platforms, thereby mitigating risks associated with personal data exposure (Wang & Chen, 2020). Research by Van Deursen and Van Dijk (2022) suggests that higher levels of digital literacy are positively associated with increased consumer confidence in online platforms, as well as a more comprehensive understanding of data protection mechanisms—both of which are critical to fostering trust in digital transactions.

Perceived Data Privacy Security

Perceived data privacy security refers to users' trust and confidence in the protection of their personal information on digital platforms. This concept encompasses both technological safeguards and privacy policies implemented by platforms to ensure data protection (Dinev & Hart, 2006). A strong perception of data privacy security plays a pivotal role in consumer engagement, as individuals are more likely to conduct transactions when they trust that their personal data is well protected (Bélanger *et al*., 2002; Kim *et al*., 2008).

Prior research indicates a significant and positive relationship between digital literacy and perceived data privacy security, particularly among Generation Z consumers in e-commerce settings. As digital natives, Generation Z possesses advanced digital competencies beyond basic technological skills, including data management, online safety, and critical evaluation of privacy policies (Livingstone & Helsper, 2020). These skills enable them to assess security measures effectively, fostering greater confidence in e-commerce platforms (Smith *et al*., 2021). Empirical findings further suggest that individuals with higher digital literacy levels exhibit stronger perceptions of data privacy security, which, in turn, influences their engagement and purchasing behavior on online platforms (Van Deursen & Van Dijk, 2022).

Canonical Correlation Analysis (CCA) as an Analytical Approach

Canonical Correlation Analysis (CCA) serves as a robust analytical method for examining the relationships between digital literacy and perceived data privacy security. Unlike traditional correlation techniques, which assess linear relationships between individual variables, CCA allows for a more comprehensive examination of the shared variance between two multivariate datasets (Tabachnick & Fidell, 2020).

By employing CCA, this study seeks to explore how various components of digital literacy—such as digital safety and information management—influence perceptions of data privacy security. This analytical approach enables researchers to capture the complex interdependencies that shape Generation Z's trust in e-commerce platforms and their decision-making processes. The findings from this study can provide valuable insights for e-commerce platforms, guiding the development of targeted data protection strategies and educational initiatives that align with Generation Z's digital literacy levels, thereby fostering secure and confident user interactions (Nguyen & Lee, 2021).

METHODOLOGY

Population and Sampling

The target population for this study comprises Generation Z consumers in Thailand who have engaged in e-commerce transactions. Generation Z, defined as individuals born between 1997 and 2006, has grown up in a digital environment, demonstrating a high level of technological fluency, adaptability, and engagement with online platforms. Their consumer behavior is characterized by a preference for digital transactions, frequent online interactions, and a strong reliance on e-commerce platforms (Williams & Page, 2011; Prensky, 2001).

The sample consisted of Thai individuals with prior e-commerce purchasing experience. Since the exact population size was unknown, Cochran's (1953) formula for sample size estimation was applied, assuming a 95% confidence level. The calculation determined a minimum required sample size of 385 participants, based on the following formula:Sample size (n) = ((0.5)(1-0.5)(1.96)^2)/(0.05)^2 = 384.16.To account for potential non-responses and incomplete data, the final sample size was increased to 420 participants to ensure robustness in statistical analysis.

Given the study's use of Canonical Correlation Analysis (CCA), a probability-based sampling approach was employed to enhance representativeness and generalizability. A multi-stage probability sampling method was utilized, incorporating stratified and cluster sampling to address regional and demographic diversity (Creswell & Creswell, 2018). First, Thailand's 77 provinces were stratified into regions to achieve balanced representation and minimize sampling bias (Sekaran & Bougie, 2016). Then, key clusters—including universities and shopping centers, which are frequently visited by Generation Z—were randomly selected within each region (Anderson, 2003). Within these clusters, simple random sampling was employed to select individual participants, ensuring randomness and reducing selection bias (Tabachnick & Fidell, 2020).

The final sample of 420 respondents provided an adequate dataset for identifying meaningful relationships using CCA (Cohen, 1988). This approach strengthened the study's validity by facilitating comprehensive insights into the interplay between digital literacy and perceived data privacy security among Generation Z consumers in Thailand.

Research Instrument

The primary research instrument was a structured questionnaire developed based on relevant theories, empirical studies, and conceptual frameworks. The questionnaire was designed to measure key factors influencing digital literacy and perceived data privacy security in e-commerce transactions. It comprised four main sections:

Demographic Information – Captured general demographic data of respondents.

E-Commerce Purchasing Behavior – Assessed respondents' engagement with e-commerce platforms.

Digital Literacy in E-Commerce – Measured digital literacy competencies related to e-commerce usage among Generation Z consumers.

Perceived Data Privacy Security in E-Commerce – Examined respondents' perceptions of data privacy security when engaging in online transactions.

Sections 3 and 4 utilized a five-point Likert scale, following Likert (1932), to assess respondents' opinions, with responses ranging from "strongly disagree" to "strongly agree", facilitating nuanced measurement of perceptions and attitudes.

Data Collection Process

This study employed a structured data collection approach, incorporating both primary and secondary data sources to enhance research validity and support the analysis of digital literacy and perceived data privacy security among Generation Z consumers in e-commerce settings.

Primary Data

Primary data was collected using a structured research instrument designed to capture key insights from Generation Z consumers in Thailand who actively engage with e-commerce platforms. The sampling framework ensured representation from diverse locations, including educational institutions, commercial centers, and other public venues where individuals from the target demographic frequently interact with digital technologies. These locations were selected to enhance sample diversity and reduce potential biases.

To maintain methodological rigor, a standardized data collection protocol was followed, ensuring consistent administration of questionnaires across all respondents. This approach aligns with established quantitative research methodologies (Sekaran & Bougie, 2016), minimizing response bias and ensuring data comparability.

Secondary Data

Secondary data was reviewed to provide theoretical grounding and contextual support for the study's conceptual framework. Sources included academic journals, empirical research, and industry reports relevant to digital literacy, e-commerce security, and consumer behavior. The review of secondary literature served to contextualize findings and align primary data with existing knowledge (Zikmund *et al*., 2013).

To enhance research validity, the questionnaire underwent content validation by three academic experts specializing in digital literacy and e-commerce security. The Index of Congruence (IOC) was computed, yielding values between 0.67 and 1.00, confirming strong alignment between questionnaire items and research objectives. Furthermore, internal consistency was assessed using Cronbach's alpha coefficient (Cronbach, 1960), with reliability scores ranging from 0.807 to 0.942, indicating high reliability suitable for further statistical analysis.

Data Analysis

This study employed statistical software for data analysis, utilizing descriptive statistics, including frequency, percentage, mean, and standard deviation, to summarize key characteristics of the dataset.

To examine the relationships between Digital Literacy and Perceived Data Privacy Security in the context of e-commerce platform usage among Generation Z in Thailand, Canonical Correlation Analysis (CCA) was applied. CCA was selected for its ability to assess the multivariate relationships between two sets of variables, providing a more comprehensive understanding of their

interdependencies. The primary measure in this analysis was the Canonical Correlation Coefficient (Rc), which quantifies the strength of association between the two variable sets.

In interpreting these relationships, canonical structure coefficients were evaluated based on established statistical thresholds. Following Sherry and Henson (2005), variables with structure coefficients of |0.45| or higher were deemed substantively meaningful within the canonical functions. Additionally, Cohen (1988) suggests that an absolute value of |0.30| or greater is suitable for considering the significance of variables within multivariate relationships.

The interpretation of canonical correlation coefficients was classified into three levels:

Coefficients between |0.30| and |0.50| are classified as moderate relationships.

Coefficients between |0.51| and |0.70| are classified as strong relationships.

Coefficients between |0.71| and |1.00| are classified as very strong relationships.

These classification criteria provide a structured approach for evaluating the strength of canonical relationships, ensuring accuracy and consistency in data interpretation (Cohen, 1988; Hair *et al*., 2010).

Conceptual Framework

Building on the literature review on digital literacy and perceived data privacy security within the e-commerce platform context, research hypotheses were formulated to examine the canonical correlation relationships between these two constructs. The objective is to identify patterns of association between digital literacy factors and perceived data privacy security, ensuring maximum data relevance.

To achieve this, all canonical correlation coefficients (RCj) are tested simultaneously to determine whether their collective values differ significantly from zero. The hypothesis testing procedure involves comparing the calculated chi-square (χ^2) statistic against the critical table value to evaluate the research hypothesis (Apirungruangskul & Pasunon, 2019).

Research Hypotheses

Null Hypothesis (H_0): RC1=RC2=…=RCj=0

Alternative Hypothesis (H_1): At least one RCj≠0

If H_0 is rejected, it indicates that at least one canonical correlation coefficient (RCj) is significantly different from zero, suggesting a statistically meaningful relationship between digital literacy and perceived data privacy security. This validation supports the design of the research framework, as illustrated in Figure 1.

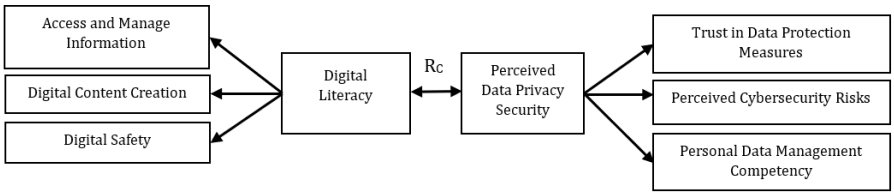

Figure 1: Conceptual Framework of the Research

RESULTS AND DISCUSSION

First Phase: General Information of Respondents

This study surveyed 420 Generation Z consumers in Thailand who voluntarily participated, offering a comprehensive demographic profile and insights into their e-commerce purchasing behavior.

The demographic analysis revealed that 15% of respondents reside in Bangkok, while the majority were female (55.95%), with 32.86% born in 2003. The predominant education level among participants was undergraduate (82.86%), and most respondents identified as students (97.86%). Additionally, 53.57% reported a monthly income of less than 15,000 THB, indicating a relatively lower-income group, which may influence their purchasing behavior on e-commerce platforms.

Regarding e-commerce purchasing behavior, the findings indicate that Shopee is the most widely used platform (40.95%), likely due to its user-friendly interface, promotional discounts, and strong appeal to young consumers. The most frequently purchased product category was fashion and apparel (61.43%), reflecting Generation Z's preference for personal and lifestyle-related items. Furthermore, 37.38% of respondents reported making purchases 2–3 times per month, suggesting a moderate yet consistent level of engagement with online shopping.

These findings provide valuable insights into the demographic characteristics and consumer behavior of Generation Z in Thailand. The preference for platforms like Shopee highlights the significance of trend-driven and accessible e-commerce ecosystems in capturing Gen Z's attention. Moreover, the strong demand for fashion-related products suggests potential opportunities for targeted marketing strategies within this segment.

Second Phase: Analysis of Digital Literacy and Perceived Data Privacy Security in E-Commerce Usage

The analysis of digital literacy among Generation Z consumers in Thailand's e-commerce landscape revealed a high overall level of digital literacy, with a mean score of $\bar{x}$ = 3.960, S.D. = 0.851. A closer examination of its components indicated that respondents rated Access and Manage Information (AMI) the highest ($\bar{x}$ = 4.074, S.D. = 0.852), followed by Digital Safety (DS) ($\bar{x}$ = 3.955, S.D. = 0.844), and Digital Content Creation (DCC) ($\bar{x}$ = 3.852, S.D. = 0.845). These findings suggest that Generation Z consumers are highly proficient in accessing, managing, and evaluating digital information, while also demonstrating strong digital safety awareness and competency in creating and managing digital content. The consistently high scores across all dimensions underscore the critical role of digital literacy in shaping Gen Z's interactions with e-commerce platforms, particularly in their ability to navigate digital environments securely and assess online data privacy measures (Table 1).

Table 1: **Mean and Standard Deviation of Variables for Digital Literacy**

Variable	$\bar{x}$	**S.D.**	**Interpretation**
Access and Manage Information (AMI)	4.074	0.852	Strongly disagree
Digital Content Creation (DCC)	3.852	0.845	Strongly disagree
Digital Safety (DS)	3.955	0.844	Strongly disagree
Total	3.960	0.851	Strongly disagree

The analysis of the mean and standard deviation for the variable Perceived Data Privacy Security in e-commerce platform usage among Generation Z in Thailand indicated that, overall, respondents rated their perception at a high level ($\bar{x}$ = 3.902, S.D. = 0.921). When examining individual components, each factor also showed high average scores, with Trust in Data Protection Measures (TDP) ($\bar{x}$ = 3.821, S.D. = 0.975), Perceived Cybersecurity Risks (PCR) ($\bar{x}$ = 3.976, S.D. = 0.946), and Personal Data Management Competency (PMC) ($\bar{x}$ = 3.909, S.D. = 0.830) (Table 2). These findings suggest that Generation Z consumers demonstrate a high level of confidence in data protection measures and personal data management skills, while also maintaining heightened awareness of cybersecurity risks in e-commerce transactions.

Table 2: **Mean and Standard Deviation of Variables for Perceived Data Privacy Security**

Variable	$\bar{x}$	**S.D.**	**Interpretation**
Trust in Data Protection Measures (TDP)	3.821	0.975	Strongly disagree
Perceived Cybersecurity Risks (PCR)	3.976	0.946	Strongly disagree
Personal Data Management Competency (PMC)	3.909	0.830	Strongly disagree
Total	3.902	0.921	Strongly disagree

The analysis of correlation coefficients between Digital Literacy and Perceived Data Privacy Security in e-commerce platform usage among Generation Z in Thailand revealed values ranging from 0.498 to 0.741, indicating a positive and statistically significant correlation at the 0.01 level. As all correlation coefficients were below 0.8, the results confirm the absence of multicollinearity, ensuring that the variables remain independent and suitable for further statistical analysis (Hair *et al*., 2019). This lack of multicollinearity reinforces the reliability of the variables for subsequent analyses,

ensuring that the findings remain valid, non-redundant, and suitable for comprehensive interpretation (see Table 3).

Table 3: **Simple Correlation Coefficients between the Sets of Variables for Digital Literacy and Perceived Data Privacy Security**

	AMI	**DCC**	**DS**	**TDP**	**PCR**	**PDM**
AMI	1					
DCC	.700**	1				
DS	.741**	.740**	1			
TDP	.641**	.638**	.645**	1		
PCR	.498**	.575**	.586**	.574**	1	
PDM	.570**	.617**	.672**	.693**	.667**	1

Note** Correlation is significant at the 0.01 level (2-tailed).

Results of Canonical Correlation Analysis Between Digital Literacy and Perceived Data Privacy Security in E-Commerce Platform Usage Among Generation Z in Thailand

The canonical correlation analysis (CCA) examined the relationship between the independent variables (three components of Digital Literacy) and the dependent variables (components of Perceived Data Privacy Security) in the context of e-commerce platform usage among Generation Z in Thailand. Given that the dependent variable set contained fewer variables than the independent set, the analysis produced three canonical functions.

The first canonical function yielded the highest canonical correlation (R_a) of 0.775, with a p-value of 0.00, indicating statistical significance at the 0.01 level ($p < 0.05$). The squared canonical correlation (R_a^2) for this function was 1.500, substantially exceeding the values for the second and third functions, which were 0.036 and 0.005, respectively. This result suggests that the first function accounted for approximately 77.50% of the shared variance between the two variable sets, while the second and third functions explained only 18.60% and 7.30%, respectively.

To validate these findings, hypothesis testing for canonical correlations (R_{aj}) was conducted to determine the relationship patterns between the independent and dependent variable sets. The chi-square (χ^2) value for the first function was 53.918, exceeding the critical chi-square value of 21.666 at the 0.01 significance level, thereby placing it within the critical region (CR). This provided sufficient evidence to reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1), confirming that at least one canonical correlation was significantly different from zero. This result indicates that at least one independent variable was significantly associated with at least one dependent variable (Anderson, 2003; Sherry & Henson, 2005).

Conversely, the chi-square (χ^2) values for the second and third functions were 4.235 and 2.247, respectively—both below the critical value of 21.666 at the 0.01 significance level. Consequently, H_0 was accepted for these functions, indicating no significant relationships between the independent and dependent variable sets in these functions. Based on these findings, only the first canonical function was deemed robust and appropriate for interpreting the study results (Table 4).

Table 4: Canonical Correlation Coefficients between Digital Literacy and Perceived Data Privacy Security in E-Commerce Platform Usage among Generation Z in Thailand.

Canonical Function	**Canonical Correlation (R_c)**	**Canonical (R_c^2)**	**Eigenvalue (Λ)**	**Wilk's Lambda (λ)**	**F-value (Chi-square (χ^2))**	**df**	**p-value (sig.)**
1	.775	.601	1.500	.384	53.918	9.000	.000
2	.186	.035	.036	.960	4.235	4.000	.002
3	.073	.005	.005	.995	2.247	1.000	.135

Note: ** Significance level 0.001

The canonical correlation analysis (CCA) revealed a statistically significant and highly strong relationship in Canonical Function 1. Analyzing the structure coefficients within the Digital Literacy variable set, the canonical weights ranged from |0.857| to |0.939|, with the highest weight at |0.939|, followed by |0.904| and |0.857|, respectively. Similarly, for Perceived Data Privacy Security in E-Commerce Platform Usage among Generation Z in Thailand, the canonical weights ranged from |0.800| to |0.910|, with the highest at |0.910|, followed by |0.896| and |0.800|. These findings suggest that Canonical Function 1 is the most appropriate model for interpreting the relationship between Digital Literacy and Perceived Data Privacy Security, reinforcing the validity and robustness of this function in explaining the association between the two variable sets (Anderson, 2003; Sherry & Henson, 2005).

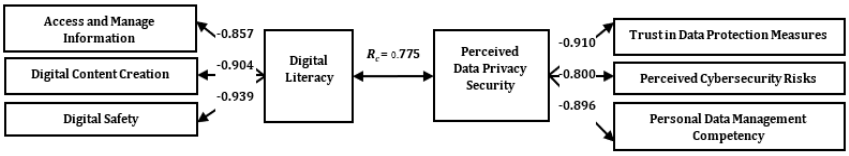

Figure 2: **The Relationship Model of the Variable Sets for Digital Literacy and Perceived Data Privacy Security in E-Commerce Platform Usage among Generation Z in Thailand**

The study investigating the canonical correlation between Digital Literacy and Perceived Data Privacy Security in the context of e-commerce usage among Generation Z in Thailand identified a strong relationship, with a canonical correlation coefficient (R_a) of 0.774. This statistically significant association highlights a substantial link between the two constructs. The structure coefficients for Digital Literacy ranged from |0.857| to |0.939|, while those for Perceived Data Privacy Security varied between |0.800| and |0.910|, demonstrating high levels of correlation (Anderson, 2003; Sherry & Henson, 2005). These findings underscore the critical role of enhanced digital literacy in strengthening perceived data privacy security, reinforcing the necessity of comprehensive digital competencies to ensure safe and informed online interactions among Generation Z consumers.

Key Components of Digital Literacy

Digital Safety

The study identified Digital Safety as the most influential subcomponent of Digital Literacy, with a canonical loading of 0.939. This finding highlights Generation Z's strong awareness of online security, particularly in e-commerce transactions. The emphasis on digital safety aligns with the rise in cyber threats, data breaches, and privacy concerns in digital services (Livingstone & Helsper, 2007; Nguyen *et al*., 2020). Previous studies confirm that digital natives prioritize security measures as digital environments become more complex (Park &Jang, 2021). These findings reinforce the idea that digital literacy extends beyond technical skills, incorporating risk management and privacy awareness as core competencies (Roca *et al*., 2022).

Digital Content Creation

Digital Content Creation ranked as the second most significant subcomponent, with a canonical loading of 0.904. This result reflects Generation Z's role as content creators rather than passive consumers (Smith & Duggan, 2020). Their frequent engagement with video production, blogging, and social media supports this trend (Leong *et al*., 2021). Active content creation fosters cognitive and social skills, critical thinking, and communication abilities (Nguyen & Lee, 2022). Vuorikari *et al*. (2021) emphasize that digital content creation proficiency enhances workforce adaptability and

problem-solving, shifting the focus from tool usage to content mastery and meaningful digital contributions (Carretero *et al*., 2021; Buchanan *et al*., 2019).

Access and Manage Information

Access and Manage Information had a canonical correlation coefficient of 0.857, emphasizing the ability to navigate and evaluate digital information effectively (Livingstone *et al*., 2020). Growing up in a digital-rich environment, Generation Z must develop skills to differentiate credible sources from misinformation (Smith & Duggan, 2020). These competencies are particularly crucial in e-commerce, where evaluating platform credibility and data privacy policies ensures safer online transactions (Roca *et al*., 2022). Carretero *et al*. (2021) argue that information management skills support critical thinking and decision-making, strengthening trust and resilience in digital environments.

Components of Perceived Data Privacy Security

Trust in Data Protection Measures

Trust in Data Protection Measures had the highest canonical loading among Perceived Data Privacy Security components, with a coefficient of 0.910. This result highlights Generation Z's strong emphasis on transparency and accountability in e-commerce platforms (Smith & Duggan, 2020; Nguyen *et al*., 2021). The finding aligns with existing research indicating that clear data protection policies and responsible platform practices enhance user confidence in online transactions.

Personal Data Management Competency

Personal Data Management Competency, with a canonical coefficient of 0.896, reflects Generation Z's proactive approach to managing personal data while also valuing strong external protection measures (Livingstone & Helsper, 2020). This cohort's high level of digital engagement and awareness of privacy risks encourages responsible data handling behaviors (Nguyen & Le, 2021; Park & Jang, 2022). Research suggests that effective personal data management is a core aspect of digital literacy, integrating data security practices and privacy protection strategies (Vuorikari, Punie, & Carretero, 2021). Studies further indicate that strong data management skills foster greater trust in e-commerce platforms, reinforcing the importance of user autonomy and transparent data policies (Smith *et al*., 2022; Wang & Chen, 2021).

Perceived Cybersecurity Risks

Perceived Cybersecurity Risks, with a canonical coefficient of 0.800, was the lowest-loading component of Perceived Data Privacy Security. While Generation Z acknowledges cybersecurity risks, their familiarity with digital tools and mitigation strategies may reduce their perceived severity (Roca *et al*., 2022; Park & Jang, 2021). The finding reflects the increasing complexity of cyber threats and data breaches, which continue to shape user trust in digital platforms (Jones & Chin, 2022). Despite their confidence in navigating digital environments, Gen Z remains cautious of vulnerabilities, reinforcing the ongoing need for cybersecurity awareness and resilience (Wang *et al*., 2021).

CONCLUSION AND RECOMMENDATIONS

The results demonstrate a strong relationship between Digital Literacy and Perceived Data Privacy Security in e-commerce usage among Generation Z in Thailand, with a canonical correlation coefficient (R_a = 0.775). Key components of Digital Literacy—Digital Safety, Digital Content Creation, and Access and Manage Information—significantly influence perceptions of data privacy security (Tabachnick & Fidell, 2019). Generation Z actively prioritizes online safety, privacy awareness, and information management, reflecting their ability to navigate digital environments with confidence (Livingstone & Helsper, 2020). The integration of content creation and information management skills not only enhances digital literacy but also reinforces trust in data protection measures, contributing to safer and more informed online interactions (Nguyen *et al*., 2021). These findings underscore the importance of comprehensive digital literacy education in strengthening data privacy awareness and consumer confidence in e-commerce platforms (Carretero *et al*., 2021; Roca *et al*., 2022).

Recommendations

Enhancing Digital Safety Education

Digital safety training should be incorporated into educational programs and corporate training initiatives to equip Generation Z with practical skills in risk management, secure online behavior, and personal data protection in e-commerce environments.

Strengthening Transparency in Data Protection

E-commerce platforms should improve clarity and accessibility of privacy policies to enhance user trust. Providing concise, easily understandable data protection explanations can meet Generation Z's demand for transparency and control over personal data.

Empowering Users with Data Management Tools

Platforms should develop user-friendly privacy management tools that allow consumers to review, adjust, and control their data-sharing preferences. Greater autonomy over personal data can foster stronger consumer confidence in online security.

Suggestions for Future Research

Future studies should explore how digital literacy and perceptions of data privacy differ across age groups to identify generational trends in online behavior and security concerns.

Research across different cultural contexts can provide insights into how privacy awareness, digital behaviors, and trust in e-commerce platforms vary globally.

A longitudinal approach could track how digital literacy and perceptions of data privacy evolve over time, considering changes in technology, cybersecurity threats, and e-commerce practices.

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