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Data leaks: Can e-commerce convince users?

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Abstract The growth of e-commerce has surpassed 270 million users, and personal data breaches on e-commerce platforms are extremely detrimental to users. This data can be misused by criminals, particularly those involved in fraud and social engineering, such as telemarketing, phishing/scams, password cracking, online loan account creation, and others. Data leaks have become a growing concern, raising questions about trust and privacy issues in e-commerce. This study aims to analyze e-commerce user satisfaction as influenced by trust and privacy cynicism, with the framework of expectation confirmation theory, in response to data leaks on the Tokopedia e-commerce platform in Indonesia. This research uses a quantitative approach, involving 427 active Tokopedia users from various regions in Indonesia, aged over 18 years, who have been members for at least one year. The data was analyzed using the Structured Equation Model - Partial Least Square (SEM-PLS) method with Smart PLS version 4 software. The research findings reveal that confirmation expectations have a significant relationship with perceived usefulness, trust, and satisfaction; perceived usefulness significantly affects both satisfaction and trust; trust significantly influences satisfaction; privacy cynicism also has a significant effect on both satisfaction and trust. Moreover, this study highlights the critical role of individual perceived expectations of e-commerce use in enhancing ongoing satisfaction. However, as the digital age progresses, these expectations tend to weaken as e-commerce usability improves. The findings of this study provide important insights into understanding user behavior and satisfaction in the context of e-commerce platforms and data protection.

Keywords: privacy cynicism, trust, satisfaction, perceived usefulness, confirmation expectation

1. Introduction

The exponential growth of Indonesia's population, which surpassed 278 million according to the latest data from the Central Statistics Agency, has paralleled the rapid expansion of e-commerce within the country. In 2023, the Indonesian Central Bureau of Statistics reported that more than 2.9 million businesses were using online trading platforms in 2022. This transformation is symbolic of a broader global trend toward digitalization, in which traditional trading activities are gradually becoming easier and more accessible with the advent of e-commerce platforms. (Agustina, 2017). Bolstered by an extensive user base exceeding 178 million in 2023 and over 215 million internet users recorded in the same year (IISPA, 2023), Indonesia stands at the forefront of the digital revolution. However, this transition has brought forth a critical concern—privacy (Othman et al., 2019). As more users become consumers and business owners who conduct online transactions, personal data vulnerability has become a significant issue, especially considering the data breaches that have occurred on several leading e-commerce platforms, such as Tokopedia, Bukalapak, and Lazada (Perkasa and Saly, 2022). In September 2023, the Tokopedia site recorded a 31% decline in users until now; there are 88.9 million active users, with data leaks spread across the internet and other data such as email, full name, cellphone number, address, date of birth, gender, and credit cards (DataBoks, 2023). These data can be misused by criminals, especially those related to scams and social engineering. (Telemarketing, Phishing/Scamming, Hacking other services, Dismantling keywords, Creating online loan accounts, profiling for political targets, or advertising on social media)

The convergence of burgeoning e-commerce activity and escalating concerns over data privacy forms the focal point of contemporary discourse within Indonesia's digital ecosystem (Noraga et al., 2021). As technology becomes increasingly integrated into everyday life, the exchange of goods and services is easily facilitated through digital platforms and has become commonplace, thereby altering the dynamics of trade and communication (Yutanto et al., 2023). Nevertheless, this digital transformation has not been without its challenges. The proliferation of e-commerce has been accompanied by a parallel rise in privacy apprehensions among users, fueled by data leakage and exploitation (Sharma & Lijuan, 2014). In this context, scholarly attention has increasingly turned toward understanding e-commerce privacy complexities and implications for individuals and businesses (Chawla & Kumar, 2022). Baruh et al. (2017) and Nissenbaum (2011) delved into the multifaceted nature of privacy concerns in the digital age, shedding light on the intricate interplay between technological advancements, consumer behavior, and regulatory frameworks. Against the backdrop of Indonesia's vibrant digital economy, addressing these privacy challenges becomes paramount, necessitating comprehensive strategies to safeguard user data and uphold consumer trust in the online marketplace (Kartika, 2020).

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Previous studies have consistently shown a link between users' privacy concerns and willingness to share information (Ackermann et al., 2022; Degutis et al., 2023). This relationship is believed to be caused by a lack of self-awareness about the potential risks of the internet and online platforms (Hoffmann et al., 2016; van Schaik et al., 2018). Nevertheless, there is limited knowledge regarding privacy cynicism and how it affects customer happiness and trust in e-commerce. On the basis of the above background, this study aims to analyse privacy cynicism and confirmatory expectations of e-commerce user satisfaction through perceived usefulness and trust in e-commerce platforms caused by data leakage.

2. Literature Review

2.1. Expectation-confirmation model

The present study is based on the expectation-confirmation model (ECM), a psychological approach. The ECM is a framework derived from expectation-confirmation theory in the context of technology acceptance and user loyalty. The model was first proposed by Bhattacherjee (2001) and is an adaptation of the expectation-confirmation theory (ECT) used in consumer satisfaction studies. The ECM proposes that user satisfaction with technology is influenced by the level of fulfilment of the user's initial expectations and confirmation of these expectations after using the technology. Suppose that users' experiences match or exceed their expectations. In that case, this will lead to higher satisfaction levels, increasing the likelihood of continued use of the technology. This model is beneficial for understanding how users' initial experiences with technology can influence adoption and long-term use.

Confirmation of expectations by Bhattacherjee (2001) is crucial in understanding continuance intention toward a particular service or product. Utilitarian values, social values, and the intention to continue using are interconnected constructs that significantly influence user engagement and technology acceptance (Yu & Huang, 2022). In e-commerce as a platform, expectation confirmation is essential in shaping perceived usefulness, satisfaction, and trust in e-commerce use (Daragmeh et al., 2022). When users' expectations are confirmed, they find helpful technology, which increases satisfaction and fosters trust. This positive reinforcement of perceived usefulness and satisfaction, driven by utilitarian values, such as efficiency and effectiveness, and social values, such as social influence and societal acceptance, leads to a stronger intention to continue using. Research has consistently shown that confirmation positively influences perceived usefulness (Daragmeh et al., 2022; Kumar & Natarajan, 2020; Nguyen & Ha, 2021). When user experience matches their initial expectations, they will tend to consider a product or service as valuable and satisfying. Satisfaction is crucial in understanding continuance intention toward a particular service or product (Bhattacherjee, 2001).

Perceived usefulness (PU) by Davis (1989) is the degree to which an individual believes that using a particular technology would be beneficial, which can be measured by knowing when it is operational, ease of operation, ease of remembering operation, as the user desires, flexible in operation, and easy to skilled. The relationships among the PU, satisfaction, and trust are crucial, especially when data leaks occur. PU, which reflects the extent to which users believe that using a system will improve their performance, is vital in shaping satisfaction and trust. Users who feel that an e-commerce platform is useful and effective are more satisfied with their experience (Ghane et al., 2011). However, data leaks can undermine user trust, which in turn can reduce the PU and satisfaction. Trust, built through positive experiences and confidence that the platform will protect personal data, can quickly collapse because of a data leak incident. This decline in trust reduces satisfaction and erodes the perception of the platform's usefulness (Kurniadi & Ali Saeed Rana, 2023). On the basis of these previous studies, this study proposes the following hypotheses:

Hypotheses 1a. Confirmation expectations are significantly related to perceived usefulness.
Hypotheses 1b. Confirmation expectations are significantly related to satisfaction
Hypotheses 1c. Confirmation expectations are significantly related to trust.
Hypotheses 2a. Perceived usefulness is significantly related to satisfaction.
Hypotheses 2b. Perceived usefulness is significantly related to trust.

2.2. Trust

Chen and Sharma (2013) define trust as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party. "In other words, trust involves believing that the trusted party will act in a reliable, ethical, and socially appropriate manner, even when there is no ability to monitor or control their actions (Ghane et al., 2011). Chen and Sharma (2013) measure trust via five indicators of perception: perceived honesty and openness, perceived competence and ability, perceived benevolence and goodwill, perceived predictability and reliability, and perceived security and privacy protection.

The relationship between trust and satisfaction is well-established in the literature. Several studies have shown that trust positively affects customer satisfaction (Kurniadi & Ali Saeed Rana, 2023; Tanjung et al., 2022). Customers who trust a company tend to be satisfied with the product or service provided (Rolph & Srinivasan, 2003). Conversely, satisfaction can also increase trust in the company (Yussif et al., 2022). A study by Setyaningsih (2014) revealed that trust is particularly important

when decisions involve expanding the scope of the relationship, whereas satisfaction is more important for relationship continuity. Trust and satisfaction are complementary concepts important for successful business relationships, especially in online businesses that do not meet directly with the seller and the product (Ghane et al., 2011). Therefore, this study proposes the following hypothesis:

Hypotheses 3. Trust is significantly related to satisfaction.

2.3. Privacy cynicism

Privacy cynicism is a concept introduced by Hoffmann et al. (2016) to explain the divergence between users' high privacy concerns and their lack of corresponding privacy protection behavior (Acikgoz & Vega, 2022; Choi & Jung, 2020; Khan et al., 2023). They define privacy cynicism as "an attitude of resigned neglect of privacy protection, which serves as a cognitive coping mechanism to rationalize taking advantage of online services despite serious privacy concerns" (Hoffmann et al., 2016). Their research measured privacy cynicism via four indicators: less interested, less enthusiastic, doubtful, and more cynical.

The relationships among privacy cynicism, satisfaction, and trust are complex (Khan et al., 2023). On the one hand, privacy cynicism can lead to decreased satisfaction and trust in online services as users become disillusioned with companies' privacy practices (Acikgoz & Vega, 2022; Lyu et al., 2023). However, privacy cynicism also allows users to maintain satisfaction and continue using services, despite their concerns, by rationalizing their behavior (Rajaobelina et al., 2021). A study by Lutz et al. (2020) revealed that privacy cynicism was negatively related to privacy protection behavior, suggesting that cynical users are less likely to take steps to protect their privacy online. Overall, privacy cynicism appears to be a maladaptive coping mechanism that allows users to maintain satisfaction in the short term but may erode trust and lead to worse privacy outcomes in the long run (Ooijen et al., 2022). Therefore, this study proposes the following:

Hypotheses 4a. Privacy cynicism is significantly related to trust.
Hypotheses 4b. Privacy cynicism is significantly related to satisfaction.

Based on the literature above, the following is the theoretical framework (Figure 1) used in this study:

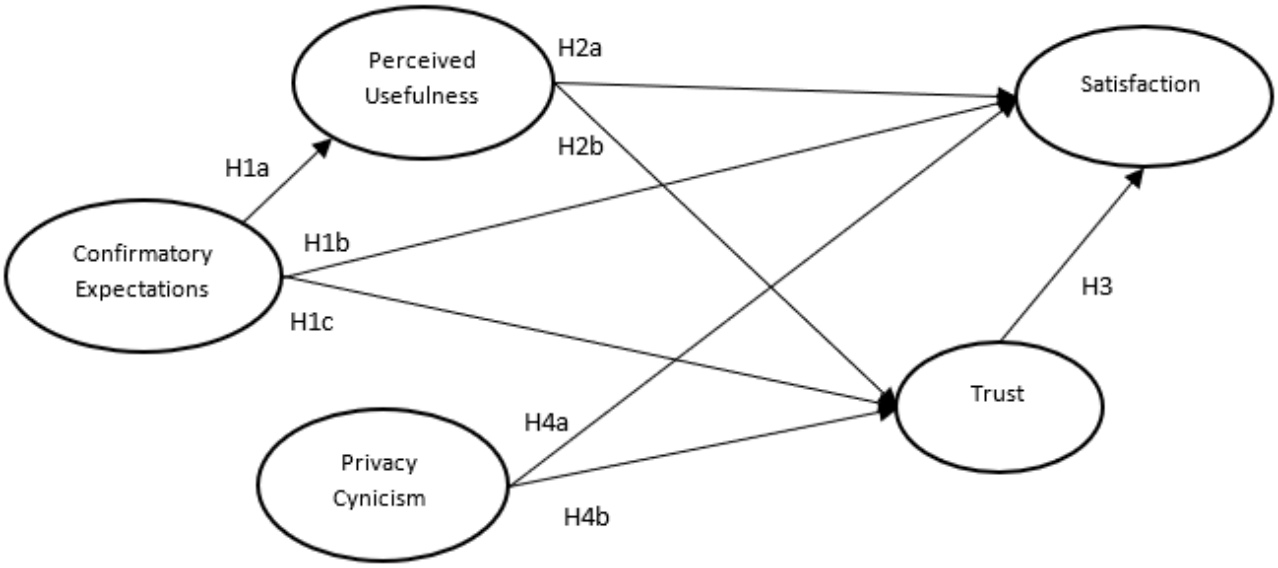

Figure 1 Theoretical thinking framework.

3. Research Methodology

This research uses a quantitative approach through a purposive sampling survey method with inclusion criteria for active users of the Tokopedia e-commerce platform for at least one year and exclusion criteria for active users over 18 years old. The determination of this requirement aims to ensure that the selected respondents actively use the Tokopedia platform and are at least of sufficient age to use e-commerce wisely. The survey was distributed online via a Google platform through WhatsApp, Indonesia's most popular mobile messenger, with a sample from East Java Province. From April to May 2024, we received 427 respondents.

We designed a closed-ended questionnaire organized into four sections: a brief survey introduction, a screening question, primary measurement questions, and demographic inquiries. This questionnaire format was deemed suitable for our research, as it eliminated the need for extensive qualitative coding (Westland, 2014). We implemented specific protocols within the questionnaire to mitigate potential common method bias (CMB) and nonresponse bias. To control for CMB, we ensured the questionnaire's brevity, placed demographic questions at the end, allowed respondents to answer anonymously, used diverse scale types, and conducted a pilot test (Podsakoff et al., 2003; Reio, 2010). Additionally, to address nonresponse bias,

we adhered to Lynn's recommendations (2008), including providing a brief survey introduction and constructing a respondent-friendly questionnaire with understandable and nonoffensive questions, facilitating easy responses by participants.

The analysis technique uses structural equation model partial least squares (SEM-PLS) with SMART-PLS software version 4. The variables in this study consisted of demographic variables used to determine the characteristics of the respondents, including gender, age, education, and occupation. Exogenous latent variables include confirmatory expectations and privacy cynicism; endogenous latent variables include perceived usefulness, trust, and satisfaction; and the latter are manifest variables used to describe and measure latent variables.

3.1. Descriptive statistics

As shown in Table 1, most Tokopedia platform users are male, with as many as 245 respondents (57%); this finding is in line with a survey by Statista, which revealed that men constitute 58% of Tokopedia users. The average age of Tokopedia users is 18--27 years, with as many as 207 respondents (48%), followed by 28--43 years, with as many as 171 respondents (40%). This is in line with a survey conducted by Asosiasi Penyelenggara Jasa Internet Indonesia, (2020), which revealed that Internet users in Indonesia are 19--34 years old. The educational background of those who use Tokopedia at the undergraduate level is 235 respondents (55%) with a job as a laborer, as many as 154 respondents (36%), where 187 respondents (44%) have used Tokopedia for 3--6 years. There are 364 respondents (85%) who do not read the policy applied by the Tokopedia e-commerce platform.

Table 1 Respondent overview.

Demographic	Option	Frequency	Percentage
Gender	Male	245	57%
	Female	182	43%
Age	18-27 (Gen Z)	207	48%
	28-43 (Gen Y)	171	40%
	44-59 (Gen X)	34	8%
	60-69 (Baby Boomers)	15	4%
Education	High School or lower	37	9%
	Diploma	73	17%
	Bachelor degree	235	55%
	Postgraduate degree	82	19%
Occupation	Student	125	29%
	Civil Servant	86	20%
	Labor	154	36%
	Professional	62	15%
How long does it take to use Tokopedia	1-3 years	85	20%
	3-6 years	187	44%
	More than six years	155	36%
Did you read the platform policies?	Yes	63	15%
	No	364	85%

3.2. Model estimation procedure

The developed conceptual model was drawn in SmartPLS software or simulation work to assess the effect of confirmatory expectations and privacy cynicism on satisfaction through perceived usefulness and trust. Structural Equation Model - Partial least squares (SEM PLS) simulation of the model is carried out by calculating and assessing various parameters, including item loading, reliability, and validity tests. This method was chosen because it is the most suitable approach for estimating mediation and conditional process models (Sarstedt et al., 2020). Additionally, PLS-SEM was highly appropriate for our dataset, given its nonnormal distribution, as this statistical tool effectively handles nonnormal data distributions (Hair et al., 2019).

4. Results and Analysis

4.1. Measurement model estimation

We evaluated the measurement model for this study following the guidelines proposed by Hair et al. (2021), which included reliability and validity assessments. As shown in Table 2, the reliability (loading) of both indicators met the minimum required threshold of 0.70, indicating a highly reliable measurement model. The internal consistency includes composite reliability (rho_c), Cronbach's alpha (α), and the reliability coefficient (rho_a), which are each above 0.7, and our assessment

reveals that these statistics are above 0.7. Regarding the validity assessment, each latent variable's convergent validity, represented by average variance extracted (AVE) scores, exceeded the minimum threshold of 0.50. Additionally, discriminant validity was assessed via the heterotrait–monotrait ratio (HTMT) and Fornell–Lacker, as presented in Table 3. The HTMT values were lower than the more liberal threshold of 0.90 (Henseler et al., 2015), indicating a highly valid measurement model. The Fornell–Larcker criterion confirms this by showing that each construct's AVE square root (diagonal values) is greater than the correlations with other constructs, reaffirming adequate discriminant validity (Hair et al., 2019). This combination of the HTMT and Fornell–Larcker criteria strengthens the construct validity within this model.

Table 2 Reliability and validity tests.

Construct and scale items		Loading	CR (rho_c)	CR (rho_a)	AVE	CA (α)
Perceived Usefulness (PU) - (Davis, 1989)			0.935	0.947	0.750	0.933
PU1	e-commerce allows me to find products/services more quickly	0.861				
PU2	e-commerce makes it easier for me to find goods/services that are useful for me	0.889				
PU3	e-commerce is effective in managing my transactions.	0.853				
PU4	e-commerce allows me to shop faster	0.852				
PU5	I find e-commerce useful for shopping.	0.861				
PU6	I find e-commerce platforms useful in my daily life	0.880				
Satisfaction (ST) - (Bhattacherjee, 2001)			0.911	0.937	0.789	0.911
ST1	I am satisfied with my interactions with one-commerce.	0.895				
ST2	I am happy with the quality of the e-commerce information.	0.870				
ST3	I am very confident about using e-commerce to access relevant information.	0.879				
ST4	I am satisfied with the way e-commerce works to deliver information	0.908				
Confirmation of expectations (CE) - (Bhattacherjee, 2001)			0.895	0.934	0.826	0.895
CE1	the service potential of e-commerce is better than I expected.	0.914				
CE2	e-commerce saves time in my personal	0.893				
CE3	Overall, most of my expectations for using e-commerce platforms were confirmed.	0.920				
Privacy Cynicism - (Hoffmann et al., 2016)			0.911	0.937	0.788	0.910
PC1	I have become less interested in online privacy issues.	0.896				
PC2	I have become less enthusiastic about protecting personal information provided to online vendors.	0.874				
PC3	I often doubt the significance of online privacy issues.	0.884				
PC4	I have become more cynical about whether my efforts in protecting online privacy are in any way effective.	0.897				
Trust - (Chen & Sharma, 2013)			0.923	0.941	0.761	0.921
TR1	I trust e-commerce for my shopping needs.	0.857				
TR2	I trust e-commerce for shopping.	0.856				
TR3	e-commerce platforms provide content that is in my best interests.	0.864				
TR4	e-commerce platforms protect my interest as a user.	0.891				
TR5	e-commerce is a safe and secure space for everyone.	0.893				

Table 3 HTMT and fornell-lacker methods.

Variable	HTMT					Fornell-Lacker				
	CE	PU	PC	TR	ST	CE	PU	PC	TR	ST
CE						0.909				
PU	0.675					0.619	0.866			
PC	0.680	0.669				0.614	0.617	0.888		
TR	0.739	0.673	0.732			0.671	0.625	0.671	0.872	
ST	0.763	0.759	0.813	0.824		0.689	0.701	0.740	0.756	0.888

Note: CE=confirmatory expectation; PC=privacy cynicism; PU=perceived usefulness; SF=satisfaction; TR=trust.

4.2. Structural model estimation

Structural model evaluation is related to hypothesis testing of the influence between research variables. The structural model evaluation check is carried out in three stages. First, the absence of multicollinearity between variables is checked with the variance inflation factor (IIF) measure. Inner VIF values below 5 indicate no multicollinearity between variables (Hair et al., 2021). The second is hypothesis testing between variables by examining the t-statistic value or p-value (Hair et al., 2021). Suppose that the t statistic calculated is greater than 1.96 (t table) or that the p-value of the test results is less than 0.05. In that case, there is a significant influence between the variables. In addition, it is necessary to convey the results and 95% confidence intervals of the estimated path coefficient parameters. The third is the f square value, namely, the effect of variables at the structural level with criteria (f^2 0.02 is low, 0.15 is moderate and 0.35 is high) (Hair et al., 2021). The three stages are shown in Table 4.

Table 4 Structural model analysis.

Hypothesis	Path Coefficient (β)	PCI		*p*-value	t statistic	$\mathbf{f^2}$	Supported	VIF
		2.5%	97.5 %					
Confirmatory Expectations → Perceived Usefulness	0.619	0.524	0.699	0.000	13.785	0.620	Yes	1.000
Confirmatory Expectations → Trust	0.335	0.235	0.452	0.000	5.914	0.143	Yes	1.886
Confirmatory Expectations → Satisfaction	0.160	0.082	0.241	0.000	3.862	0.043	Yes	2.155
Perceived Usefulness → Trust	0.210	0.117	0.303	0.000	4.459	0.056	Yes	1.898
Perceived Usefulness → Satisfaction	0.229	0.135	0.325	0.000	4.794	0.093	Yes	2.003
Privacy Cynicism → Trust	0.336	0.230	0.445	0.000	6.156	0.143	Yes	1.881
Privacy Cynicism → Satisfaction	0.294	0.197	0.395	0.000	5.760	0.144	Yes	2.151
Trust → Satisfaction	0.308	0.217	0.414	0.000	6.162	0.142	Yes	2.391
	R^2	Q^2predict						
Perceived Usefulness	0.383	0.378						
Trust	0.582	0.545						
Satisfaction	0.721	0.619						

Table 4 shows a significant effect of confirmation expectations on perceived usefulness, trust, and satisfaction, with t statistics of 13.785, 5.914, and 3.862, respectively, and a p -value of 0.00. The existence of confirmation expectations in increasing perceived usefulness has a high influence at the structural level, with an f^2 value = 0.620, whereas trust and satisfaction have a low influence at the structural level, with f^2 values of 0.143 and 0.043, respectively. In the 95% confidence interval, the effect of the confirmation expectation in increasing perceived usefulness is between 0.524 and 0.699, while the increase in trust is between 0.235 and 0.452, and the increase in satisfaction is between 0.082 and 0.241. It is important for Tokopedia, as an e-commerce service provider, to understand user expectations and ensure that the user experience matches those expectations. By meeting or even exceeding user expectations, they can improve the perceived usability and integrity of their e-commerce platform. Therefore, it can be concluded that hypotheses 1a and 1c are accepted; these results align with research from Li et al. (2022) and Rice et al. (2018).

Hypotheses 2a and 2b show a positive relationship between privacy cynicism and satisfaction and trust, with t-statistic values of 5.760 and 6.156 and a p-value of 0.00. The existence of privacy cynicism in increasing satisfaction has a low effect at the structural level, with an f^2 value = 0.144, whereas trust has a moderate effect, with a structural level f^2 value of 0.133. In the 95% confidence interval, the effect of privacy cynicism on increasing satisfaction is between 0.197 and 0.395, whereas the effect of an increase in trust is between 0.230 and 0.445. Thus, it can be concluded that hypotheses 2a and 2b are accepted; these results are in line with research from Açikgöz et al. (2023); Hoffmann et al. (2016;). Data leaks in the context of e-commerce can create a negative spiral that affects the level of privacy skepticism, satisfaction, and trust. This decrease in satisfaction can then lead to a decrease in consumer trust in the e-commerce platform, as trust is an important foundation in the relationship between consumers and companies (Khan et al., 2023; Lyu et al., 2023).

Furthermore, hypotheses 3a and 3b also show a positive relationship between perceived usefulness on satisfaction and trust, with t-statistic values of 4.794 and 4.459 and a p-value of 0.00. In the 95% confidence interval, the effect of perceived usefulness on increasing satisfaction is between 0.197 and 0.395, whereas the effect of an increase in trust is between 0.135 and 0.325. Thus, it can be concluded that hypotheses 3a and 3c are accepted; these results are in line with research from Daragmeh et al. (2022) and Kumar & Natarajan (2020). However, the presence of perceived usefulness in increasing satisfaction and trust has a weak effect at the structural level, with f^2 values of 0.093 and 0.056, respectively. In this study, data leakage significantly impacted perceptions of perceived usefulness, satisfaction, and consumer trust. With the occurrence of data leaks,

consumers will question the value they perceive from using e-commerce platforms, which could potentially reduce their satisfaction with e-commerce platform services (Li & Liu, 2019).

Finally, Hypothesis 4 shows a positive relationship between trust and satisfaction, with a t-statistic value of 6.162 and a p-value of 0.00. In the 95% confidence interval, the effect of trust on increasing satisfaction is between 0.217 and 0.414. Therefore, it can be concluded that Hypothesis 4 is accepted; this result is in line with research from Kurniadi and Rana (2023), Sativa and Astuti (2016), and Setyaningsih (2014). However, the presence of trust in increasing satisfaction has a weak effect at the structural level, with an f^2 value of 0.142. Trust is a critical aspect of the relationship between consumers and e-commerce companies, and when a data leak occurs, consumers may feel that the company is unreliable or unable to safeguard their privacy properly (Chakraborty et al., 2016). Therefore, data leaks may lead to a decrease in consumer trust in e-commerce platforms (Perkasa & Saly, 2022). Figure 2 shows the path coefficient diagram of each indicator and construct of this study.

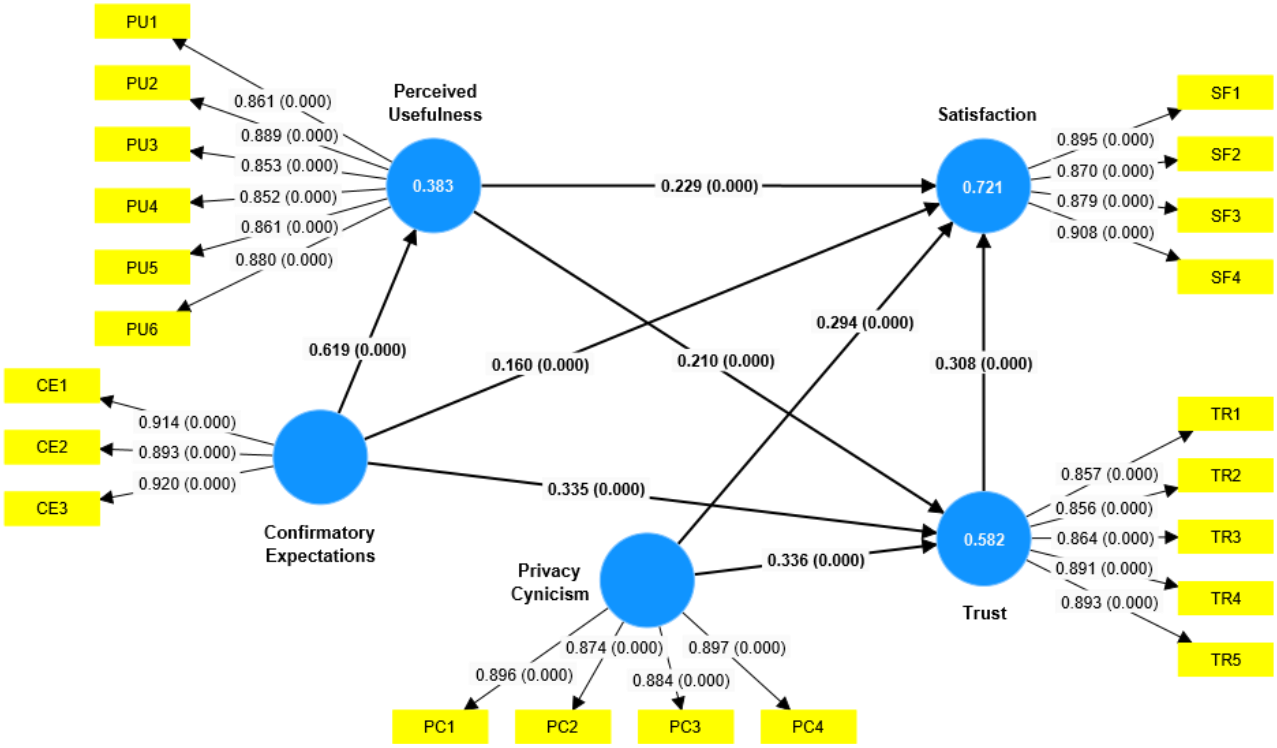

Figure 2 Path coefficients and P values.

4.3. Evaluation of the goodness and fit of the model

PLS is a variance-based SEM analysis with the aim of testing model theory that focuses on prediction studies. Therefore, several measures have been developed to declare the proposed model acceptable, such as R^2, Q^2, and SRMR (Hair et al., 2019). The R^2 statistical measure illustrates the variation in endogenous variables that can be explained by other exogenous/endogenous variables in the model. According to Chin (1998), the qualitative interpretation values of the R square are 0.19 (low influence), 0.33 (moderate influence), and 0.66 (high influence). According to Table 4, the magnitude of the influence of perceived usefulness, satisfaction, and trust has a moderate influence, with values of 54% and 55%, respectively, in contrast to that of trust, which has a high influence, with a value of 79%.

Q^2 describes a measure of predictive accuracy, namely, how well each change in exogenous/endogenous variables can predict endogenous variables. This measure is a form of validation in PLS to determine the suitability of model predictions (predictive relevance). A Q^2 value above 0 indicates that the model has predictive relevance, but in Hair et al. (2019), the qualitative Q^2 values are 0 (low influence), 0.25 (moderate influence), and 0.50 (high influence). On the basis of the processing results above, the Q^2 values of the satisfaction and trust variables are > 0.50, namely, 0.619 and 0.545, which indicates that these two variables strongly influence the prediction model. The standardized root mean square residual (SRMR) value of the resulting model is quite good, with an SRMR of 0.036 <0.10. The resulting model fits/is close to the empirical data.

5. Discussion

Confirmation expectations affect perceived usefulness, trust, and satisfaction. Privacy cynicism and perceived usefulness affect satisfaction and trust, and trust affects satisfaction. In addition, this study confirms the important role of individual expectations of e-commerce use in strengthening ongoing satisfaction. However, these expectations tend to weaken as e-commerce usability increases in the digital era.

Data leaks in e-commerce can seriously affect consumers' perceptions of privacy, satisfaction, and trust (Perkasa & Saly, 2022). When consumer data are leaked, doubts about privacy increase, creating an atmosphere where consumers doubt the company's ability to protect their personal information (Kurniadi & Ali Saeed Rana, 2023). This often results in decreased consumer satisfaction, as consumers feel unsafe when using e-commerce platforms (Ghane et al., 2011). In particular, consumers' trust in such companies and platforms may be eroded, as data leaks indicate a failure to maintain the security and privacy of personal information (Kartika, 2020). As a result, e-commerce companies may experience a decrease in customer loyalty, a damaged reputation, and even a decrease in revenue due to lost business. Therefore, e-commerce companies must take decisive steps to protect consumer data and rebuild trust through concrete actions affirming their commitment to security and privacy.

In addition, users often do not hesitate to use e-commerce platforms because of their needs and the many promos offered by e-commerce platforms. E-commerce companies should also socialize company policies regarding private data to make users more comfortable using them. However, owing to the need to use the e-commerce platform, the cynical attitude toward the e-commerce platform at this time shows that it does not have a significant effect; even though the level of trust has decreased, the intensity of e-commerce use has increased, even though it has initially decreased.

6. Future Considerations

6.1. Theoretical implications

On the basis of the above explanation, the study's results have three implications. The first is policy implications, which are that the government can regulate e-commerce in terms of customer data protection policies so that every e-commerce company can be more vigilant in cybersecurity. This policy increases customer trust and reduces legal and reputational risk. The second is social policy; with the development of technology, people are expected to be more careful in using e-commerce platforms. The third is the theoretical policy, which states that the results of this study strengthen the expectation confirmation model theory by showing strong discriminant validity between perceived usefulness and customer satisfaction. The findings indicate the need to include the security dimension as an additional factor in the model.

6.2. Limitations and future research directions

Limited research has focused on the e-commerce tokopedia platform. Therefore, the subjects of this study do not represent other subjects or other e-commerce sites with many users, such as Shopee, Buka Lapak, and Lazada. Second, because this research uses nonprobability sampling via the judgement sampling technique, not all individuals in the population are selected to be respondents. The entire population in the nonprobability sampling did not have the same opportunity to become respondents in this study. Therefore, the results obtained cannot be generalized to the entire population of Tokopedia users. Further research can include other e-commerce platform objects because cases of data leaks in e-commerce do not occur only on the Tokopedia platform.

Ethical Considerations

This study was conducted in accordance with ethical guidelines. Before participating, all participants were provided with detailed information about the purpose of the study, procedures, and their rights, including the right to withdraw at any time without any consequences. Confidentiality and anonymity were strictly maintained throughout the study, and the data collected were stored securely and used solely for research purposes.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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