

The Effectiveness of Security and Customer Convenience in the Use of E-Commerce

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Abstract. This research is based on the occurrence of several concerns in transactions through e-commerce due to cases of data leakage. The data leak in 2021 opened many questions for researchers about whether customers still trust using e-commerce. In this way, researchers aim to determine how far the security customers or e-commerce users will receive and how customer trust is their primary point in choosing an e-commerce platform. Researchers realized the objectives of this study by using the method of conducting literature studies, data collection, and calculations. The statistical method used in this research is random sampling. In getting the results, the researchers developed a technique based on the research question in five variables with six sub-variables. This research was carried out by distributing questionnaires to e-commerce users. The data in this research was generated from 303 respondents who were collected. Through these 303 respondents, the researchers found that customers have great trust in e-commerce to ensure the security of their data. With the formation of this customer trust, the attitude given by customers towards e-commerce always gives positive results. The transaction process in e-commerce can be effective without obstacles to the Security and trust of their customers.

Keywords: customers, trust, Security, data leak, e-commerce

1. Introduction

The existence of e-commerce in 2022 is now nothing new. But behind all this, e-commerce has gone through many things affecting customer convenience. In 2015, the early days of e-commerce began to develop in Indonesia (Das et al., 2018). There are already several problems that haunt the trust of their customers, such as fraud against goods sold with goods that arrive, many sales of illegal goods, and sellers who run away with the money. The problems that occurred in 2015 are indeed quite worrying. But then, e-commerce was greeted with another problem, namely cases of data leakage.

Data leakage is one of the most troubling cases in e-commerce. Data leakage is an activity in which individuals or groups retrieve information without the permission of the data holder and store it. Data leakage is detrimental to the information owner because the information retrieved can be exploited and misused by those who collect it (Kangwa et al., 2021). For example, in 2021, there was a data leak involving 279 million Indonesians, and it was sold on an online site for 0.15 bitcoins or around IDR 87 million (Haryono, 2022). This incident illustrates that Security in e-commerce is still questionable and needs to be improved so that it will no longer happen in the future.

The Ministry of Communication and Informatics (Kemkominfo) explained that seven main problems in e-commerce in Indonesia affect the value of the digital economy in Indonesia (Indonesia, 2019). The marketing strategy is designed to popularize e-commerce platforms so that e-commerce companies reach many customers (Sabri, L, H, B, A, 2022). One of the main problems is protecting the personal data of e-commerce users. When viewed from the country's condition, Indonesia is currently a developing country with increasing numbers of technology users (Madyatmadja, 2019). However, this development was accompanied by something other than the latest law enforcement regarding the urgency of personal data protection issues urgently needed in Indonesia. Therefore, research is needed regarding effectiveness of security and customer convenience in the use of e-Commerce,

1.1. Objectives

The problem of data leakage and Security in transactions is the researchers' main goal to find out how far security customers will receive and how customer trust is the main point of choosing online shopping. Following are some research questions that researchers have formulated:

1. How can data leakage in e-commerce occur?
2. What are the consequences if user data is leaked?
3. Does user trust have an impact on business processes?

1.2. Literature Review

1.2.1. The Effect of Perceived Security and Trust on Consumer Intentions in Conducting E-Commerce Transactions through Attitudes as Intervening Variables

Researchers conducted this research using data collection techniques through surveys using two independent variables: dependent and intervening. The variables used as an absolute concern are transaction security, trust, consumer attitudes towards e-commerce, and consumer intentions to use e-commerce. This is in line with the growth of trade via the internet, which is growing rapidly every year. For example, from 2001 to 2005, the development of business via the internet in the United States reached 68%, in Europe 91%, and in Asia 109% (Kevin Celuch, Stephen Goodwin, 2007). Meanwhile, the ICD research institute estimates that e-commerce growth in Indonesia will grow 42% from 2012-2015. This growth rate is one of the largest e-commerce growths for the Asia-Pacific region. Quoted from (Wearesocial.com, 2022) in January 2022, internet users in the world are already 4.95 Billion (65% of the world population).

However, the use of the internet and the growth of e-commerce not only provide benefits but also has negative impacts caused by today's misuse of the role of technology. Online trade transactions have several limitations, including weak security systems, trust, the confidentiality of buyer identities, and accuracy between goods ordered by customers. In addition, information received (accuracy) and several problems related to payment systems. Based on several research results and theories related to this matter, it is increasingly confirmed that Security, trust, attitudes, and consumer intentions in behaving have a positive relationship and influence on loyalty in online transactions (Lie et al., 2019).

1.2.2. Analysis of the Effect of Customer Satisfaction and Customer Trust on Customer Loyalty in Shopping through E-Commerce in Indonesia

Customer satisfaction is one of the most critical benchmarks, so entrepreneurs must consider it conventionally and via the internet. In the research that has been done, it is stated that customer satisfaction significantly affects customer trust (Walter et al., 2013). Customer satisfaction can be achieved when a business can meet customer needs and demands. Therefore, a business's purpose is to make its customers feel satisfied when they get experience after receiving the service or product provided by the company. The achievement of customer satisfaction can provide several advantages for a business, including creating good relations between companies and customers, triggering loyalty, and allowing word-of-mouth promotions carried out by previous customers

This research was conducted using a quantitative approach with a total sample of 450. The target respondents are Indonesian people who have made online transactions through e-commerce (Tokopedia, Bukalapak, Elevenia, Shopee, etc.). The results of this study lead to the conclusion that customer satisfaction significantly influences customer loyalty in shopping using e-commerce. Furthermore, the achievement of customer loyalty can be indicated by repurchase intention and word of mouth.

1.2.3. The Influence of Security, Reputation, and Experience on Internet User Trust for Online Transactions

Fraud or crime through internet media amid increasingly rapid developments still threatens the sustainability of e-commerce in Indonesia. Therefore, no matter how well the e-commerce system is built, it still has a high risk and contains the potential for crime. As mentioned in previous studies, one of the many factors influencing transactions in e-commerce, one of them is the trust factor from customers (Purnomo et al., 2018) (Alsharif et al., 2019).

The results of the hypothesis in this study show that Security and reputation have a positive and significant influence on the trust of internet users to make transactions in e-commerce. This means that confidence in control and Security in e-commerce will trigger high trust from internet users to make repeated transactions in e-commerce. Therefore e-commerce must protect internet users from creating customer perceptions that online stores have a good reputation.

1.2.4. Evaluation of the Influence of Data Security and Customer Trust on PT XYZ's E-Commerce Website

The growth and development of the internet and its users are now familiar and inseparable from everyday life for all people, including the people of Indonesia. This can be a golden opportunity to implement goods and services buying and selling transactions using the internet, namely e-commerce. Therefore, PT. Telkom Indonesia and eBay entered into a joint venture by establishing PT. XYZ, where thousands of merchants market various kinds of products from multiple categories whose quality and authenticity cannot be doubted. However, it is still miserable because this opportunity has yet to be implemented due to many internet users who still do not want to make buying and selling transactions online. Lack of trust is the most compelling reason customers

exchange information on e-commerce. In addition, data security is also an important factor in increasing customer interest in using e-commerce and improving the relationship between a company's products or services and customers.

The results of testing this hypothesis explain that there are still hypotheses that need to be accepted in analyzing the use of the e-commerce website of PT. XYZ. The results of the variable testing illustrate that several variables do not significantly influence the intention to use the e-commerce website of PT. XYZ. Variables that do not have a substantial impact on the intention to use the e-commerce website of PT. XYZ (Behavioral Intention) includes Performance Expectancy, Effort Expectancy, Facilitating Conditions, and Trust. This illustrates that there is Social influence and Perceived Security when users want to access the e-commerce website of PT. XYZ.

2. Research Method

Research Method used in this study is by conducting literature studies, data collection, data screening, data analysis, calculation methods, and conclusions. The population concerned with this research is a customer who has purchased in e-commerce. Meanwhile, the research sample itself is e-commerce users in Indonesia. Therefore, a questionnaire will be the right choice for this topic in collecting data. Given that, Indonesia is a vast country, plus many people are already literate in technology. The minimum sample size should be 10 times the maximum number of arrows pointing to the latent variable (Hair, 2017). Therefore, this research requires at least 100 respondents. Questionnaires will later be distributed, either directly or through intermediaries.

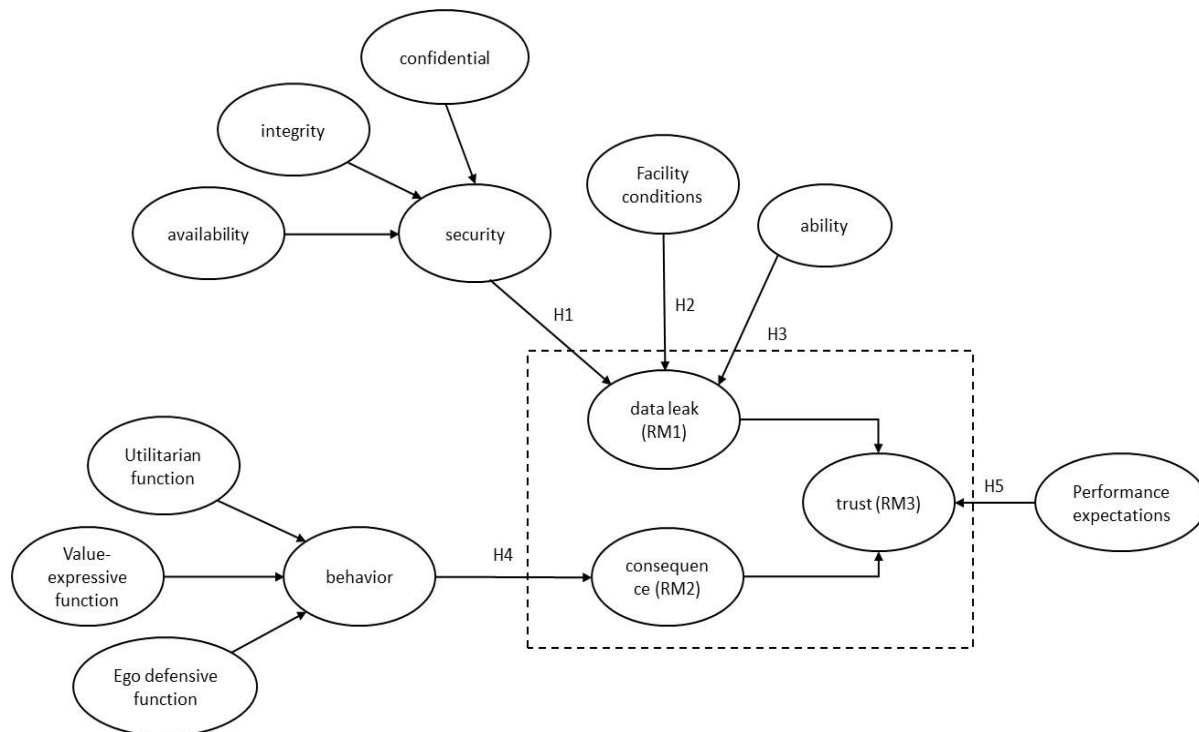


Fig. 1: Research Model.

2.1 Data Collection

The researchers conducted a readability test to find out how far the respondent's level of understanding of the composition of the statements on the questionnaire was. The readability test

was carried out to get several 35 reader respondents. Therefore, the next step is to do a calculation to find out the percentage of the reader's level of understanding.

Table 1: Result of the Readability Test

Indicator	Total Score	Final score	Percentage
A1	132	26,4	75,4%
A2	157	31,4	89,7%
A3	154	30,8	88%
A4	170	34	97%
B1	132	26,4	75,4%
B2	138	27,6	78,8%
B3	149	29,8	85%
B4	158	31,6	90,2%
C1	160	32	91,4%
C2	141	28,2	80,5%
C3	142	28,4	81%
C4	148	29,6	84,5%
D1	148	29,6	84,5%
D2	157	31,4	89,7%
D3	152	30,4	86,8%
D4	143	28,6	81,7%
E1	149	29,8	85%
E2	136	27,2	77,7%
E3	144	28,8	82,2%
E4	147	29,4	84%
F1	148	29,6	84,5%
F2	149	29,8	85%
F3	149	29,8	85%
F4	149	29,8	85%
G1	125	25	71,4%
G2	146	29,2	83,4%
G3	133	26,6	76%
G4	116	23,2	66,2%
H1	140	28	80%
H2	138	27,6	78,8%
H3	136	27,2	77,7%
H4	150	30	85,7%
I1	161	32,2	92%
I2	157	31,4	89,7%
I3	160	32	92,4%
I4	161	32,2	92%

From the table above, the results of the legibility test of the distributed questionnaires have

been shown. Therefore, it can be concluded that most statement indicators have met the excellent category, namely having a percentage above 75% (Arikunto, 2010). However, there are still two indicators that are in the excellent category. Therefore, the relevant indicators must be changed to suit the understanding of the next respondent. However, apart from the two problematic hands, it was discovered that prospective respondents sufficiently understood the questionnaire statements made.

3. Result And Discussion

Table 2: Demographic Table on Respondents

Demographic Factors	Indicators	N Value	Percentage
Gender	Female	180	59,4%
	Male	123	40,6%
Age	<20	91	30%
	20-30	141	47%
	31-40	36	11,8%
	>40	35	11,5%
Length of time using e-commerce in a day	1 hour or less	168	55,4%
	2-3 hours	103	33,9%
	3 hours or more	32	10,6%
Frequently used e-commerce	Tokopedia	84	27,7%
	Shopee	147	48,5%
	Lazada	53	17,5%
	Blibli	16	5,3%
	Other	3	0,9%
Have you ever experienced suspicious things related to data related to e-commerce?	Yes	207	63,3%
	No	95	31,3%

The research results were obtained by distributing questionnaires to 303 respondents. With 63.3% of all respondents having experienced suspicious things related to data in e-commerce. 59.4% of respondents are women. The age distribution that filled out the most questionnaires was the age range of 20-30 years, with a percentage of 47%.

3.1. Numerical Result

Berdasarkan tabel yang berisikan data Cronbach's alpha dan composite reliability. Nilai Cronbach's Alpha bisa diterima pada angka 0,6". Hal ini berbeda dengan nilai dari Composite Reliability yang mana nilainya menjadi dapat diandalkan saat lebih tinggi dari 0,7 (Ghozali, 2018)

Table 3: Result of Reliability Test

	Cronbach's alpha	Composite reliability
Ability	0.905	0.905
Availability	0.848	0.852
Confidential	0.826	0.838
Ego Defensive Function	0.861	0.861
Expressive Function	0.756	0.76

Performance Expectations	0.927	0.928
Integrity	0.829	0.83
Security	0.93	0.933
Data Leak	0.962	0.964
Trust	0.927	0.928
Facility Conditions	0.881	0.881
Consequence	0.931	0.938
Attitude	0.931	0.936
Utilitarian Function	0.906	0.907

From the data in the table above, we determine reliability by analyzing the value of Cronbach alpha or composite reliability. The table above shows that we used SmartPLS version 4 to get Cronbach and composite reliability values when carrying out this test. Alpha values are acceptable if greater than 0.60. The closer the value is to 1, the higher the internal consistency reliability. The composite reliability value is considered reliable if it is more than 0.70 (Ghozali, 2018).

Table 4: Research Hypothesis

No	Hypothesis
H1	There is a positive relationship between ability and data leak
H2	There is a positive relationship between availability and Security
H3	There is a positive relationship between confidentiality and Security
H4	There is a positive relationship between defensive ego function and attitude.
H5	There is a positive relationship between performance expectations and trust.
H6	There is a positive relationship between integrity and Security
H7	There is a positive relationship between security and data leak
H8	There is a positive relationship between facility conditions and data leak
H9	There is a positive relationship between attitude and consequences
H10	There is a positive relationship between utilitarian Function and attitude
H11	There is a positive relationship between value-expressive function and attitude.

This model generates several eleven hypotheses. A hypothesis is declared significant when the T-Statistic value exceeds 1.96 (Ghozali, 2018). When announced important, there is a clear relationship between one variable and another.

Table 5: Hypothesis Test Result

	Original sample	T statistics	P values
Ability -> Data Leak	0.24	31.996	0
Availability -> Security	0.378	35.15	0
Confidential -> Security	0.35	28.196	0
Ego Defensive Function -> Attitude	0.382	36.071	0
Value Expressive Function -> Attitude	0.288	21.222	0
Performance Expectation -> Trust	1	0	0
Integrity -> Security	0.358	32.981	0
Security -> Data Leak	0.568	58.216	0
Facility Condition -> Data Leak	0.242	33.299	0
Attitude -> Consequences	1	10955.965	0
Utilitarian Function -> Attitude	0.424	32.543	0

H1 (Ability -> Data Leak) Based on research results, Ability against Data Leakage. This relationship shows that the two variables have a significant relationship. Consumers are very concerned about the ability of an e-commerce platform to maintain the Security of user data and transactions. Consumers will be encouraged to use e-commerce if there is minimal data leakage on the platform.

H2 (Availability -> Security) Based on research results, Availability to Security. This relationship shows that the two variables have a significant relationship. Availability refers to existing data on e-commerce that can be accessed easily anywhere and anytime and can only be accessed by authorized parties. The availability of good data supported by proper management shows that data security in e-commerce is maintained correctly. This is what consumers are looking for in an e-commerce platform.

H3 (Confidential -> Security) Based on research results, Confidential to Security. This relationship shows that the two variables have a significant relationship. Confidentiality refers to the certainty that data will be protected, not disseminated, and can only be accessed by authorized parties. Confidentiality is an important value in Security, so it needs to be a concern for e-commerce parties to make consumers more confident about using their platform.

H4 (Ego Defensive Function -> Attitude) Based on the study's results, the Ego Defensive Function on attitude shows that the two variables have a significant relationship. The defensive ego function relates to attitude because it relates to consumer attitudes or doubts about e-commerce about something that is a threat. Therefore, the defensive ego function will influence consumer attitudes when using e-commerce.

H5 (Performance Expectations -> Trust) Based on the study's results, work expectations on trust show that the two variables have insignificant results. These results are due to the absence of a relationship or association between the two variables. Because customers' expectations are too high, e-commerce has yet to be able to meet current expectations. It can be proven by the disappointment customers often express about the mistakes made by e-commerce.

H6 (Integrity -> Security) Based on the research results, integrity to Security shows that the two variables have a significant relationship. Integrity has a significant relationship with Security because consumer integrity is strongly influenced by the Security of consumer data when using e-commerce.

H7 (Security -> data leak) Based on research results, Security has a relationship with data leakage. This relationship notices that these two variables have a significant relationship. Security has a significant relationship with data leakage because the security infrastructure will be the most essential thing in preventing data leakage. Consumers will use e-commerce applications if they feel safe with their personal data.

H8 (Facility Condition -> Data Leak) Based on the research results, the condition of the facility has a relationship with data leakage. This relationship notices that these two variables have a significant relationship. The condition of the facility has a significant relationship with data leakage because the protection of personal data in this era is very important. This is done by strengthening existing regulations in Indonesia. Reflecting on the policies of other countries, such as the European Union, they have a European Data Protection Supervisor (EDPS).

H9 (Attitude -> consequences) Based on the study's results, attitudes and consequence variables have a relationship. This relationship notices that these two variables have a significant relationship. Attitudes and consequence variables have a significant relationship because the attitudes and behavior of customers lead to a relationship with the seller. Therefore, attitude factors have a good impact.

H10 (Utilitarian Function > Attitude) Based on the study's results, the utilitarian Function of the attitude variable. This relationship notices that these two variables have a significant relationship. The utilitarian Function has a relationship with attitude because it states that there are benefits from the product.

H11 (Value Expressive Function > Attitude) Based on the study's results, the value expressive function is related to the attitude variable. This relationship notices that these two variables have a significant relationship. Value expressive functions relate to attitudes because they directly describe consumer interest in a product. So, it will connect to the customer's view of a company's products.

This research provides results where customers trust e-commerce in processing or storing their data. From the e-commerce side, it has guaranteed data security for customers and dares to be responsible for solving existing problems if, at any time, a data leak occurs. In addition, e-commerce remembers to frequently provide notifications or ask for prior approval when it wants to do something crucial for customer data. Therefore, e-commerce prioritizes the trust and loyalty of their customers to keep them always using their applications. With the formation of customer trust, the attitude given by customers towards e-commerce also produces positive results. Therefore, the transaction process in e-commerce can be effective without obstacles to the Security and trust of their customers.

3.2. Graphical Result

In this study, the testers used five variables related to the topics discussed: the effectiveness of Security and customer convenience in using e-commerce. The variables used are variables that are made according to the needs of the research being conducted. Then the framework is manufactured using SmartPLS4 so that the results are in the image below.

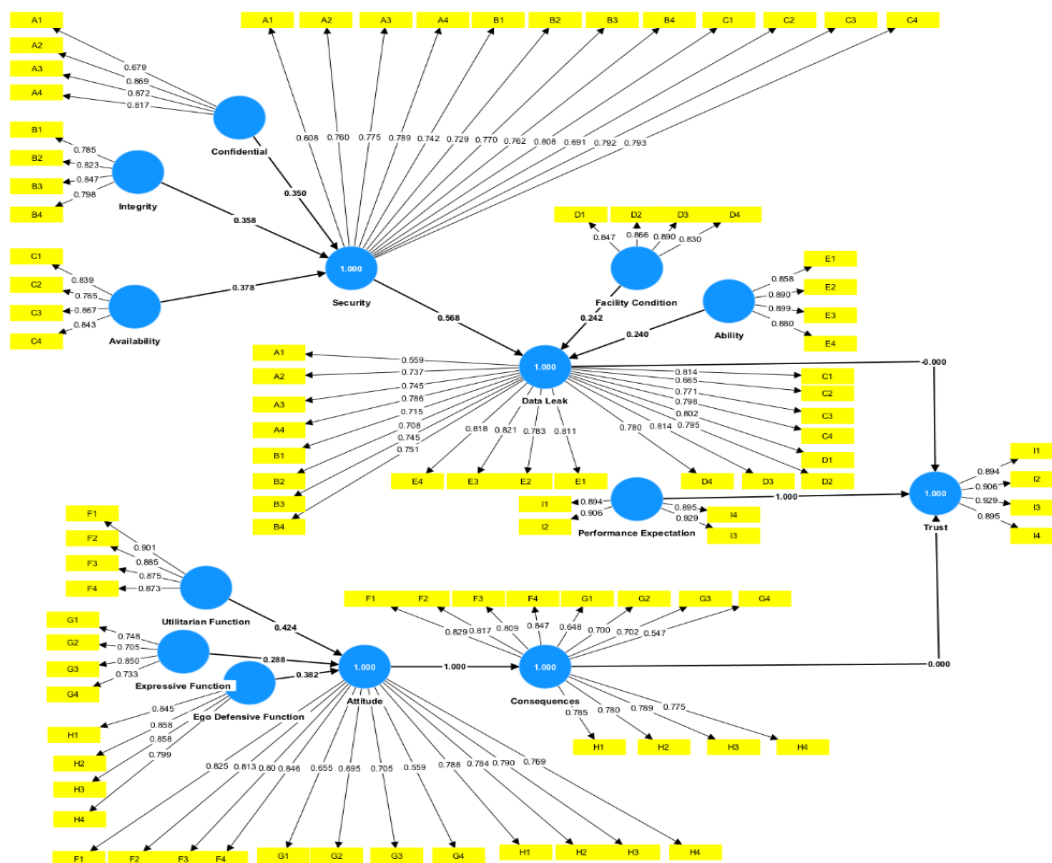


Fig. 2: Graphical Result.

4. Conclusion

The results of the data analysis show that almost all variables are significantly related to each other based on the method used to test the hypothesis of the relationship between variables. Therefore it can be concluded that the safety and convenience of customers in using e-commerce are adequate.

This research was conducted with young and old participants using a questionnaire about their safety and comfort in using e-commerce. E-commerce is proven to be very safe in all aspects of Security, namely confidentiality, integrity, and availability; it has adequate features and makes it easy for consumers, has the ability to prosper consumers, and contains values from attitudes such as utilitarian functions, values expressive functions, and ego—defensive function. Even so, there are still many consumers who expect higher performance because there are still threats that disrupt the Security and convenience of consumers in using e-commerce.

The following are recommendations based on the results of this study:

- To increase customer convenience and trust, e-commerce can improve security guarantees. Innovations that can be made include increasing the use of Secure Socket Layers (SSL) for website authentication and data protection. Secure Socket Layers are a method that can be used to create an encrypted connection between a website and a browser.
- They are strengthening Indonesian regulations on data protection. Indonesian rules regarding data security lie in Law no. 27 of 2022. E-commerce must apply this and pay more attention to it. Because
- We are increasing customer awareness in transactions and using applications. One way is to create exciting content through social media platforms that the general public can reach.

References

Alsharif, N., Dahal, K., Pervez, Z., & Surephong, P. (2019). Multi-Dimensional E-commerce Trust Evaluation Method. *International Conference on Software, Knowledge Information, Industrial Management and Applications, SKIMA, 2018-Decem.* <https://doi.org/10.1109/SKIMA.2018.8631523>

Arikunto. (2010). *Research Methods*. Jakarta: Rineka Cipta. In *Acta Medica Scandinavica* (Vol. 143, Issue 269 S). <https://doi.org/10.1111/j.0954-6820.1952.tb19069.x>

Das, K., Tamhane, T., Vatterott, B., Wibowo, P., & Wintels, S. (2018). *The digital archipelago: How online commerce is driving Indonesia's economic development*. McKinsey & Company, August, 1–72. www.mckinsey.com/featured-insights/asia-pacific/the-digital-archipelago-how-online-

Ghozali, I. (2018). *Aplikasi analisis multivariate dengan program ibm spss 25 (25th ed.)*. Universitas Diponegoro.

Haryono, M. A. M. and T. (2022). Intention to repurchase after a data leak on Tokopedia: Mediated by consumer forgiveness. *World Journal of Advanced Research and Reviews*. <https://wjarr.com/content/intention-repurchase-after-data-leak-tokopedia-mediated-consumer-forgiveness>

Hair, Jr, J. F., Hult, G. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modelling (PLS-SEM)*. SAGE Publications.

Indonesia, C. (2019). *Kominfo Sebut 7 Masalah E-commerce Indonesia*. <https://www.cnnindonesia.com/teknologi/20190521011413-185-396680/kominfo-sebut-7-masalah-e-commerce-indonesia>

Kangwa, M., Luboby, C. S., & Phiri, J. (2021). Prevention of Personally Identifiable Information Leakage in E-commerce via Offline Data Minimisation and Pseudonymisation. *International Journal of Innovative Science and Research Technology*, 6(1), 209–212.

https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=mukuka+kangwa&oq=

Kevin Celuch, Stephen Goodwin, S. A. T. (2007). Understanding small scale industrial user internet purchase and information management intentions: A test of two attitude models. *Industrial Marketing Management*, 36(1), 109–120. <https://www.sciencedirect.com/science/article/abs/pii/S0019850105001203>

Lie, D., Sudirman, A., Efendi, E., & Butarbutar, M. (2019). Analysis of mediation effect of consumer satisfaction on the impact of service quality, price, and consumer trust on consumer loyalty. *International Journal of Scientific and Technology Research*, 8(8), 421–428.

Madyatmadja, E. D., Nindito, H., Pristinella, D. (2019). Citizen attitude: Potential impact of social media-based government. *ACM International Conference Proceeding Series*, 128–134. 2019. <https://doi.org/10.1145/3371647.3371653>

Purnomo, F. E., Kusyanti, A., & Aryadita, H. (2018). Evaluasi Pengaruh Keamanan Data Dan Kepercayaan Pelanggan Pada Website E-Commerce PT. XYZ. *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer*, 2(6), 2400–2407. <http://j-ptiik.ub.ac.id>

Sabri, L, H, B, A., Lim, A, H, L., Goh, H, N. (2022). Click Analysis: How E-ommerce Companies Benefit from Exploratory and Association Rule Mining. *Journal of System and Management Sciences*. Vol. 12 No. 6, pp. 511-531. DOI:10.33168/JSMS.2022.0630

Walter, N., Cleff, T., & Chu, G. (2013). Brand Experience'S Influence on Customer Satisfaction and Loyalty: a Mirage in Marketing Research? *International Journal of Management Research and Business Strategy*, 2(1), 130–144.

Wearesocial.com. (2022). Digital Around the World. <https://wearesocial.com/us/blog/2022/01/digital-2022-another-year-of-bumper-growth-2/>