The Influence of Risk Perception and Performance Expectancy on User Behavior in E-Commerce Adoption

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Abstract. The e-commerce-based digital business phenomenon that contributes to the growth of the digital economy has significant and positive effects on Indonesia's economic development. This study aims to analyze the adoption of e-commerce in Indonesia from the perspectives of performance expectations and behavior using the concepts of privacy, risk, and financial resiliency. The study sent 120 online questionnaires to students enrolled in the Digital Entrepreneurship Academy and Thematic Academy in the Human Resources Development Programs of the Ministry of Communication and Information Technology of The Republic of Indonesia. Data analysis uses the SPSS 24 program, the multiple regression method, and hypothesis testing. The study's findings indicate a strong relationship between perceptions of privacy security risk and financial risk concerning performance expectations and use behavior. The study highlights the importance of addressing these factors to enhance digital business adoption and support Indonesia's digital economic transformation.

Keywords: *E-Commerce, Risk Perception, Performance Expectancy, Use Behavior*

1 Introduction

The e-commerce-based digital business phenomenon that contributes to Indonesia's digital economy's growth has experienced a significant increase in the last few decades due to the advancement of information and communication technology, which positively impacts the country's economic growth [1]. According to a McKinsey report on e-commerce in Indonesia, by 2021, the country's e-commerce industry will be the largest in the world, valued at 43 million dollars, or roughly eight million dollars in 2018, which is very detrimental to the country's economy [2]. E-commerce adoption and success in providing new opportunities for Micro, Small and Medium Entrerprises (MSMEs) to boost sales, increase sales day, and improve business processes and performance would differ from each country [3]. Factors such as digital literacy, market orientation, and online-to-offline (O2O) business adoption are crucial in assessing the impact of e-commerce adoption on the work habits of micro, small, and medium entrerprises. [4]. Also, MSMEs cannot be adequately described regarding e-commerce's massive growth. By 2023, Indonesia will have about 66 million MSMEs, accounting

for 99% of all business activity there. Contributions from MSMEs total 61% of Indonesia's Gross Domestic Product (GDP), or Rp 9.580 trillion [5]. According to the most recent statistics from The Ministry of Cooperation and Small Medium Enterprises, MSMEs provide 70% of the total work hours. The business MSMEs are key to economic growth and development and significantly impact a country's social and economic mobility [6]. Adopting e-commerce by Small and Medium Enterprises (SMEs) is crucial in enhancing digital inclusion in Indonesia [7]. Previous studies revealed that the rapid growth of technology and internet-supporting platforms has created numerous opportunities for companies to offer products and services in developed and emerging markets [8]. Infrastructure, digital management, governance, technological innovation, and talent development are key factors influencing rural e-commerce growth [9]. Apart from environmental factors, the logistics system, e-commerce service system, and the products offered [10] also affect the productivity of land and labor in China's agricultural sector [11]. Another study revealed that organizational culture positively correlates with e-commerce adoption, indicating that a company's internal environment shapes its readiness to implement e-commerce practices [12]. The adoption of e-commerce in Indonesia is influenced by various factors, including the impact of the COVID-19 pandemic [13]. Other factors, such as socio-cultural aspects, organizational factors, and the use of digital technology, play a significant role in influencing e-commerce adoption among SMEs [14]. Implementing e-commerce systems has benefited SMEs by streamlining production processes, expanding market reach, and enabling real-time order management [15]. From the perspective of e-commerce transaction security, factors such as data protection, privacy, and customer service are essential for building trust with consumers [16]. Supporting security factors include the website's user interface quality, information accuracy, awareness of e-commerce, and privacy protection [17], which significantly impacts customer trust and loyalty in e-commerce transactions [18]. Several security factors play a crucial role in the success of users' adoption of e-commerce. Assessing the extent of the perceived risks associated with technology use, considering aspects of security, privacy, and financial risks, will help measure the level of e-commerce adoption in terms of user behavior and the expected performance from using e-commerce. A deeper understanding of how consumers evaluate risks when shopping online and the factors determining these decisions presents an interesting study area. Although many studies have addressed this topic, research on individual risk perceptions using e-commerce platforms, conducted measurably, can provide valuable insights to e-commerce practitioners. It can assist platform developers and sellers in reducing obstacles perceived by customers and help increase consumer trust in online transactions.

2   Methods

The study was conducted on participants of the Digital Entrepreneurship Academy and Thematic Academy of the Ministry of Communication and Information Technology of the Republic of Indonesia in the West Sumatra region, using an online questionnaire distributed from May 21 to May 25, 2024, with 120 questionnaires returned. This

research is descriptive quantitative with hypothesis testing to determine the impact of the independent variables of Security and Privacy Risk Perception and Financial Risk Perception on the dependent variable of User Behavior, mediated by the variable of Performance Expectancy. Data analysis was performed using SPSS version 24 with multiple linear regression to test the influence of the independent variables on the dependent variable [19]. Multiple linear regression analysis was conducted after classical assumption testing to ensure that the model used does not have normality, multicollinearity, and heteroscedasticity issues.

2.1   Model Theory & Hypothesis

The model in this study uses two independent variables, namely Perceived Security and Privacy Risks and Perceived Financial Risks. These two variables affect User Behavior as an independent variable which is influenced by Performance Expectations as a mediating variable. Security and Privacy Risk is an operational variable from the Technology Risk Perception Theory which states that security and privacy risks affect individual behavior in using technology. Performance Expectations is a variable used to measure the extent to which an individual believes that using a system will help improve performance [20]. Usage behavior is a variable used to observe patterns of technology use by individuals or groups.
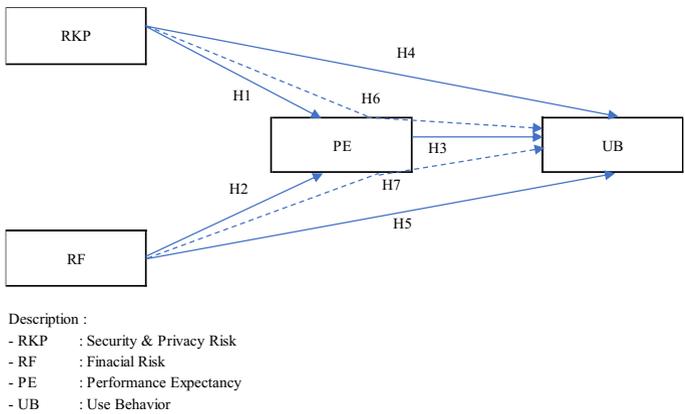

Description :
- RKP   : Security & Privacy Risk
- RF   : Finacial Risk
- PE   : Performance Expectancy
- UB   : Use Behavior

Fig. 1. The Proposed Theory Model

From the proposed theory model, the hypotheses that can be formulated are:

H1: Security and Privacy Risks (RKP) have a direct influence on Performance Expectancy (PE)

H2: Financial Risk (RF) has a direct influence on Performance Expectancy (PE)

H3: Performance Expectancy (PE) has a direct influence on User Behavior (UB)

H4: Security and Privacy Risks (RKP) have a direct influence on User Behavior (UB)

H5: Financial Risk (RF) has a direct influence on User Behavior (UB)

H6: Security and Privacy Risks (RKP) have an indirect influence on User Behavior (UB) through Performance Expectancy (PE)

H7: Financial Risk (RF) has an indirect influence on User Behavior (UB) through Performance Expectancy (PE)

3 Results and Discussion

The validity test assesses the accuracy or suitability of the questionnaire the researcher employs to measure and collect research data from the respondents.

Table 1. Validity Test

r-Tabel (0,05)	RKP	Pearson Corre-lation	RF	Pearson Corre-lation	PE	Pearson Corre-lation	UB	Pearson Corre-lation
0,178	RKP1	.569 **	RF1	.672 **	PE1	.856 **	UB1	.690 **
0,178	RKP2	.702 **	RF2	.763 **	PE2	.900 **	UB2	.799 **
0,178	RKP3	.715 **	RF3	.776 **	PE3	.939 **	UB3	.710 **
0,178	RKP4	.630 **	RF4	.764 **	PE4	.840 **	UB4	.767 **
0,178	RKP5	.726 **					UB5	.660 **

*. Correlation is significant at the 0.05 level (2-tailed).
Source: Authors' work

The validity test in this study was conducted using Pearson correlation with a significance value of <0.05 and the r-table. All variable instruments were declared valid for the validity test involving 120 respondents as the overall significance values were below 0.05, and the Pearson correlation values were greater than the r-table value.

Table 2. Reliability Test

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Ket.
		Item-Total Statistics			
RKP1	60,38	151,818	0,387	0,907	Reliable
RKP2	58,99	151,370	0,484	0,902	Reliable
RKP3	59,43	151,945	0,582	0,900	Reliable
RKP4	59,15	152,078	0,501	0,902	Reliable
RKP5	59,38	150,591	0,599	0,899	Reliable
RF1	59,06	155,702	0,393	0,905	Reliable
RF2	59,58	148,985	0,662	0,897	Reliable
RF3	59,18	149,070	0,692	0,897	Reliable
RF4	59,44	151,207	0,592	0,899	Reliable
PE1	59,15	150,364	0,600	0,899	Reliable
PE2	59,00	150,185	0,669	0,897	Reliable
PE3	58,94	148,879	0,763	0,895	Reliable
PE4	58,94	150,593	0,642	0,898	Reliable

UB1	58,80	148,531	0,570	0,900	Reliable
UB2	59,61	148,929	0,547	0,900	Reliable
UB3	59,08	152,111	0,459	0,903	Reliable
UB4	59,98	148,470	0,561	0,900	Reliable
UB5	59,78	148,310	0,553	0,900	Reliable

Source: Authors' Work

The Cronbach Alpha reliability test assesses whether the questionnaire maintains consistency when measurements are repeated using the same questionnaire. According to [21], a questionnaire is considered reliable if the Cronbach Alpha value exceeds 0.6. In the context of the instrument used, all variables in the instrument have Cronbach Alpha values greater than 0.6 and are considered reliable.

Table 3. Data Normality Test

One-Sample Kolmogorov-Smirnov Test		Unstandardized Re-sidual
N		120
Normal Parameters[a,b]	Mean	0,0000000
	Std. Deviation	3,46514866
Most Extreme Differences	Absolute	0,079
	Positive	0,058
	Negative	-0,079
Test Statistic		0,079
Asymp. Sig. (2-tailed)		.064[c]

Source: Authors' Work

The normality test of the data using the Kolmogorov Smirnov Test in the SPSS application is a step in the classical assumption test conducted before statistical analysis to assess the normality of the data used. The decision rule for normality testing is that if the significance value (Sig.) is greater than 0.05, the research data is normally distributed. In the context of this study, the Asymp. Sig. (2-tailed) value for 120 respondents indicates that the data is normally distributed with a value of 0.064

3.1   Structural Model

The influence of Security and Privacy Risk (RKP), Financial Risk (RF), and Performance Expectancy (PE) variables on the User Behavior (UB) variable.

Table 4. Standard Deviation

	Mean	Std. Deviation	N
PE	15.23	3.625	120
RKP	16.74	3.965	120
RF	14.01	3.198	120
UB	16.83	4.653	120

Source: Authors' Work

The standard deviation values of the four variables in structural model 2 are all greater than the mean value, which concludes that the data does not have outliers.

Table 5. Relationship Between Variables

		UB	RKP	RF	PE
		Correlation			
		UB	RKP	RF	PE
Pearson Correlation	UB	1.000	.604	.548	.563
	RKP	.604	1.000	.763	.535
	RF	.548	.763	1.000	.636
	PE	.563	.535	.636	1.000
Sig. (1-tailed)	UB	.	.000	.000	.000
	RKP	.000	.	.000	.000
	RF	.000	.000	.	.000
	PE	.000	.000	.000	.
N	UB	120	120	120	120
	RKP	120	120	120	120
	RF	120	120	120	120
	PE	120	120	120	120

Source: Authors's Work

Both independent variables (Security and Privacy Risk and Financial Risk) have a significant relationship with the dependent variable, User Behavior, with a significance value of 0.000 < 0.05. Similarly, the mediating variable Performance Expectancy (PE) also has a significant relationship with a value of 0.000 < 0.05.

Table 6. Degree of Relationship Between Variables

					Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.667[a]	.445	.431	3.510	.445	31.061	3	116	.000

a. Predictors: (Constant), PE, RKP, RF

Source: Authors's Work

The R-squared value is the coefficient of determination, which is the square of the R-value, also known as the correlation coefficient. Therefore, when calculated, 0.667 x 0.667 = 0.445. The combined influence of the Security and Privacy Risk (RKP), Financial Risk (RF), and Performance Expectancy (PE) variables on User Behavior (UB) is 0.445 or 44.5%. The remaining influence can be calculated by subtracting the R Square value from 1, so 1-0.445 = 0.555 or 55.5%. The error value (e1) can be found using the formula: e2=√1-R Square, e2=√((1)-0.445)=0.745. Therefore, the variance of User Behavior (UB) not influenced by the RKP, RF, and PE variables is 0.745. The F Change significance value provides information about the results of the simultaneous correlation test, indicating the existence of a correlation between the independent variables (RKP, RF, and PE) and the dependent variable (UB), with a significance value of 0.000,

which is smaller than 0.05. The strength of the relationship between these variables can be seen in the correlation coefficient (R) value of 0.667, which indicates a strong correlation, according to Wiratna Sujarweni (2014).

Table 7. Direct Effect Hypothesis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.751	1.207		3.935	.000
	RKP	.109	.100	.119	1.082	.282
	RF	.619	.124	.546	4.972	.000

a. Dependent Variable: PE
Source: Authors's Work

- The significance value for the Security and Privacy Risk (RKP) variable is 0.282, greater than 0.05. Therefore, it can be concluded that the Security and Privacy Risk (RKP) variable does not directly and significantly affect the Performance Expectancy (PE) variable. Hence, Hypothesis 1 is rejected;
- The significance value for the Financial Risk (RF) variable is 0.000, less than 0.05. Therefore, it can be concluded that the Financial Risk (FR) variable directly and significantly affects the Performance Expectancy (PE) variable. Hence, Hypothesis 2 is accepted;
- The path coefficient value in the structural model can be seen from the standardized Beta coefficient. This value indicates that the influence of the RKP variable on PE is 0.119, while the impact of the FR variable on PE is 0.545;

Table 8. Indirect Effect Hypothesis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.856	1.607		1.155	.251
	RKP	.476	.126	.406	3.777	.000
	RF	.045	.171	.031	.260	.795
	PE	.419	.116	.326	3.620	.000

a. Dependent Variable: UB
Source: Authors's Work

- The significance value for the Performance Expectancy (PE) variable is 0.000, which is less than 0.05. Therefore, it can be concluded that the Performance Expectancy (PE) variable significantly affects the User Behavior (UB) variable. Hence, Hypothesis 3 is accepted;
- The significance value for the Security and Privacy Risk (RKP) variable is 0.000, which is less than 0.05. Therefore, it can be concluded that the Security and Privacy Risk (RKP) variable significantly affects the User Behavior (UB) variable. Hence, Hypothesis 4 is accepted;
- The significance value for the Financial Risk (RF) variable is 0.795, greater than 0.05. Therefore, it can be concluded that the Financial Risk (RF) variable does not significantly affect the User Behavior (UB) variable. Hence, Hypothesis 5 is rejected;
- The direct effect of the Security and Privacy Risk (RKP) variable on User Behavior (UB) is 0.406, while the indirect effect mediated by the Performance Expectancy (PE) variable is calculated by multiplying the standardized coefficient beta (RKP → PE) and (PE → UB), which is 0.119 x 0.326 = 0.039. Since the indirect effect is smaller than the direct effect, the result concludes that the RKP variable does not have a significant indirect effect on the UB variable. Therefore, Hypothesis 6 is rejected;
- The direct effect of the Financial Risk (RF) variable on User Behavior (UB) is 0.031, while the indirect effect mediated by the Performance Expectancy (PE) variable is calculated by multiplying the standardized coefficient beta (RF → PE) and (PE → UB), which is 0.546 x 0.326 = 0.178. Since the indirect effect is larger than the direct effect, it can be concluded that the RF variable, through the PE variable, has a significant indirect effect on the UB variable. Therefore, Hypothesis 7 is accepted;
- The path coefficient value in the structural model can be observed from the standardized coefficient Beta. This value indicates that the influence of the SPR variable on UB is 0.406, the impact of the FR variable on UB is 0.031, and the effect of the PE variable on UB is 0.326.

Path Analysis Hypothesis of Direct and Indirect Effects

- H1: Security and Privacy Risk (RKP) has a direct effect on Performance Expectancy (PE) → The Security and Privacy Risk (RKP) variable does not have a direct and significant effect on the Performance Expectancy (PE) variable → Hypothesis 1 is rejected.
- H2: Financial Risk (RF) has a direct effect on Performance Expectancy (PE) → The Financial Risk (RF) variable has a direct and significant effect on the Performance Expectancy (PE) variable → Hypothesis 2 is accepted.
- H3: Performance Expectancy (PE) has a direct effect on User Behavior (UB) → The Performance Expectancy (PE) variable has a direct and significant effect on the User Behavior (UB) variable → Hypothesis 3 is accepted.
- H4: Security and Privacy Risk (SPR) has a direct effect on User Behavior (UB) → the Security and Privacy Risk (SPR) variable has a direct and significant effect on the User Behavior (UB) variable → Hypothesis 4 is accepted.

- H5: Financial Risk (RF) has a direct effect on User Behavior (UB) → The Financial Risk (RF) variable does not have a direct and significant effect on the User Behavior (UB) variable → Hypothesis 5 is rejected.
- H6: Security and Privacy Risk (RKP) has an indirect effect on User Behavior (UB) through Performance Expectancy (PE) → The RKP variable does not have a significant indirect effect on the UB variable → Hypothesis 6 is rejected.
- H7: Financial Risk (RF) has an indirect effect on User Behavior (UB) through Performance Expectancy (PE) → The RF variable, through the PE variable, has a significant indirect effect on the UB variable → Hypothesis 7 is acceptez

4   Conclusions

The success of e-commerce adoption is not solely determined by the service provider's ability to create an accessible and user-friendly e-commerce ecosystem. Ensuring that the services provided are secure in transactions, maintaining the confidentiality and privacy of payment data, and ensuring reliable delivery of goods will significantly impact customer trust and loyalty in conducting transactions through e-commerce. From the user's perspective, e-commerce adoption can be easily measured by the ability to carry out purchase transactions, use digital payment platforms, and sell products. Consumers who act as sellers in e-commerce transactions can create e-commerce platforms catering to consumer needs. This study measures risk perception in e-commerce adoption, where security and privacy risks, financial risks, and performance expectancy significantly and positively influence e-commerce adoption. This can provide insights for e-commerce practitioners to pay more attention to the potential risks that may arise during transaction activities.

5   References

1.   F. Abdillah, 'Dampak Ekonomi Digital Terhadap Pertumbuhan Ekonomi di Indonesia,' *Benefit: Journal of Bussiness, Economics, and Finance*, vol. 2, no. 1, pp. 27–35, Feb. 2024, doi: 10.37985/benefit.v2i1.335.
2.   D. E. Putri Syifa Nurfadilah P. S., 'Tahun 2022, Pasar E-Commerce Indonesia Capai Rp 955 Triliun. https://ekonomi.kompas.com/read/2018/09/03/093900726/mckinsey--tahun-2022-pasar-e-commerce-indonesia-capai-rp-955-triliun'
3.   S. A. Khan, Y. Liang, and S. Shahzad, 'Adoption of Electronic Supply Chain Management and E-Commerce by Small and Medium Enterprises and Their Performance: A Survey of SMEs in Pakistan', *American Journal of Industrial and Business Management*, vol. 04, no. 09, pp. 433–441, 2014, doi: 10.4236/ajibm.2014.49051.
4.   L. Su, Y. Peng, R. Kong, and Q. Chen, 'Impact of e-commerce adoption on farmers' participation in the digital financial market: Evidence from rural china', *Journal of Theoretical and Applied Electronic Commerce Research*, vol. 16, no. 5, pp. 1434–1457, Aug. 2021, doi: 10.3390/jtaer16050081.
5.   Ardissasi Kirana, 'Usaha Mikro Kecil Menengah (UMKM) sebagai Tulang Punggung Ekonomi', https://kumparan.com/ardissasi-kirana/usaha-mikro-kecil-menengah-umkm-sebagai-tulang-punggung-ekonomi-23ZEOkgDtzj/1.

6. Siregar H. and Malvinas F., 'Menciptakan Pertumbuhan Inklusif melalui Digitalisasi UMKM di Indonesia', https://www.bcg.com/publications/2022/menciptakan-pertumbuhan-inklusif-melalui-digitalisasi-umkm-di-indonesia. Accessed: Nov. 13, 2024.

7. R. Rahayu and J. Day, 'E-commerce adoption by SMEs in developing countries: evidence from Indonesia', *Eurasian Business Review*, vol. 7, no. 1, pp. 25–41, Apr. 2017, doi: 10.1007/s40821-016-0044-6.

8. D. Cumming, S. Johan, Z. Khan, and M. Meyer, 'E-Commerce Policy and International Business', Feb. 01, 2023, *Springer Science and Business Media Deutschland GmbH*. doi: 10.1007/s11575-022-00489-8.

9. S. Hendricks and S. D. Mwapwele, 'A systematic literature review on the factors influencing e-commerce adoption in developing countries', *Data Inf Manag*, vol. 8, no. 1, Mar. 2024, doi: 10.1016/j.dim.2023.100045.

10. H. A. Yuxia, 'Research on the Factors Influencing the Effect of E-commerce Development in Chinese Rural SMEs', *Journal of International Business and Management*, May 2023, doi: 10.37227/jibm-2023-05-5983.

11. J. Zhang and A. K. Mishra, 'ICT adoption, commercial orientation and productivity: Understanding the digital divide in Rural China', *Smart Agricultural Technology*, vol. 9, Dec. 2024, doi: 10.1016/j.atech.2024.100560.

12. H. Al-Dmour, M. Nweiran, and R. Al-Dmour, 'The Influence of Organizational Culture on E-Commerce Adoption', *International Journal of Business and Management*, vol. 12, no. 9, p. 204, Aug. 2017, doi: 10.5539/ijbm.v12n9p204.

13. E. Kurniawati, I. Idris, P. Handayati, and S. Osman, 'Digital transformation of MSMEs in Indonesia during the pandemic', *Entrepreneurship and Sustainability Issues*, vol. 9, no. 2, pp. 316–331, Dec. 2021, doi: 10.9770/jesi.2021.9.2(21).

14. S. Noviaristanti and Y. Huda, 'Factor Affecting E-Marketplace Adoption on MSMEs in Bandung, Indonesia', *Proceedings of the 5 th European International Conference on Industrial Engineering and Operations Management Rome, Italy,* vol. 2022, no. July 26-28, 2022, pp. 2361–2372, Jul. 2022, doi: 10.46254/EU05.20220459.

15. G. L. Ambayu and K. D. Hartomo, 'Analisis Dan Pengujian Sistem Informasi Penjualan Produk UMKM Menggunakan Metode Scrum', *Jurnal Teknik Informatika dan Sistem Informasi*, vol. 9, no. 3, 2016, [Online]. Available: http://jurnal.mdp.ac.id

16. N. Chawla and B. Kumar, 'E-Commerce and Consumer Protection in India: The Emerging Trend', *Journal of Business Ethics*,vol.180, no. 2, pp. 581–604, Oct. 2022, doi:10.1007/s10551-021-04884-3.

17. W. Aslam, A. Hussain, K. Farhat, and I. Arif, 'Underlying Factors Influencing Consumers' Trust and Loyalty in E-commerce', *Business Perspectives and Research*, vol. 8, no. 2, pp. 186–204, Jul. 2020, doi: 10.1177/2278533719887451.

18. F. Mahliza, 'CONSUMER TRUST IN ONLINE PURCHASE DECISION', *EPRA International Journal of Multidisciplinary Research (IJMR)*, pp. 142–149, Feb. 2020, doi: 10.36713/epra4022.

19. Ghozali, Imam, and Dwi Ratmono, *Ghozali, Imam and Dwi Ratmono. "Analisis Multivariant dan Ekonometrika : Teori, Konsep dan Aplikasi dengan EViews 10."* . 2019.

20. V. Venkatesh, M. G. Morris, G. B. Davis, and F. D. Davis, 'User acceptance of information technology: Toward a unified view', *MIS Q*, vol. 27, no. 3, pp. 425–478, 2003, doi: 10.2307/30036540.

21. Wiratna Sujarweni, *Metodologi penelitian : lengkap, praktis, dan mudah dipahami* . Yogyakarta: Pustaka Baru Press, 2014. Accessed: Nov. 17, 2024. [Online]. Available: http://library.stik-ptik.ac.id/detail?id=50768&lokasi=lokal