Webology (ISSN: 1735-188X)
Volume 18, Number 6, 2021

Impact of Perceived Security and Perceived Trust on Intention to Use Digital Payments – A Study on Indian Customers

POOJA GUPTA[1], DR. RAHUL HAKHU[2]

[1]Research Scholar, MMIM, Maharishi Markandeshwar (Deemed to be) University, Mullana,Haryana

[2]Professor, MMIM, Maharishi Markandeshwar (Deemed to be) University, Mullana, Haryana

Abstract:

Introduction: As the internet and communication technologies are getting developed, commercial transaction is becoming more electronic. This change also brings new approaches to a new payment mechanism. Security and trust are major issues that need due consideration while adopting these payment methods.
Purpose: This study attempts to examine the interaction between perceived security, perceived trust, and intention to use digital payment systems. The technical protection, transaction procedures, and security behavior adopted by customers have been studied to understand the security and trust perception of customers.
Methodology: The sample of the study was reached by using the judgment sampling method and data from 460 respondents was collected using a structured questionnaire. The compiled data was tested with Structural Equation Model.
Findings: A statistically significant and positive relationship was found between transaction procedure, technical protection, and security behavior adopted by customers on perceived security and perceived trust which in turn have a positive and significant impact on intention to use digital payments. The findings of the study are expected to contribute to the extant literature and explain the security and trust perception of individuals to increase the usage of digital payments.

Keywords: Digital payments, Security, Trust, Transaction procedure, Technical protection, Intention to use

I. Introduction

Cash is still most crucial and inseparable part of transactions as being convenient and readily acceptable mode of making payments. (Eswaran 2019) Digital payments are also gaining momentum due to development in internet technologies and smartphone penetration. Governmentof India is also promoting digital payments through its Digital India initiative with the purpose to eliminiate black money and curbs corruption. The RBI-DPI index has also demonstrated the significant growth in digital payments across the country. A growth of 30.19% has been recordedin digital payments during the year ending March 2021. This digital payment system cannot be successful without the acceptance of users. The previous studies have suggested that customer adoption to digital payments is very low in India. The customers' intention to adopt digital payments is influenced by many factors such as convenience, flexibility, privacy, and security of the system (Harris et al., 2011). The literature reveals that security issues and trust are major factors that create a hurdle in adoption of digital payments (Hassan and Shukur 2019; Rouibah, Lowry, and Hwang 2016).

Despite a number of benefits which digital payments offer, still there is a question of security and privacy of these transactions. The information provided about user to complete the transaction can be hacked and misused. To reduce these security and privacy issues, it is important that customers have to be digitally literate and aware about privacy and security measures while doing digital transactions (N 2018). A robust and secure infrastructure and efficient payment system must be provided by regulatory bodies and internet service providers. The purpose of this study is to investigate the effect of the perceived security and trust on customer intention to adopt digital payments. It also tries to investigate the important factors which significantly influence customer perception of security and trust while using digital payment system. The data for the research has been collected from Indian customers in Haryana state.

II. Review of Literature

In order to understand the factors that influence the customer perception of security and trust while using electronic payment modes, the relevant literature was reviewed which provided conceptual foundation.With the increasing use of electronic payment system, there is more research on security issues. The literature highlights the fact that security perception has influence on customers' intention to adopt digital payments (Sathye 1999; Singh and Srivastava 2020; Wang et al. 2003). (Kim et al. 2010) examined the effect of perceived security and perceived trust on intention to use EPS. They developed a research model that delineates the role of perceived security in building the customers' trust and their positive effect on customer intention to use EPS. (Smith 1999) The main security issues while transacting business on internet are related to data encryption and user authentication.To prevent fraud and to resolve the weak points in security system, a close cooperation is required from service provider as well as individual users. Technology should give effective response to ensure protection from

unauthorised access and security and privacy of data. (Linck, Pousttchi, and Wiedemann 2006a) Customers' are very sensitive about the security and privacy of their personal information. Technical protection should be ensured for privacy and integrity as it is very critical factor to increase the customers' use of EPS. (Roca, García, and de la Vega 2009) investigated the role of perceived trust, security and privacy in online trading with traditional TAM model constructs. The study suggested that security system of online trading must be improved as security perception is important dimensions to improve trust which consequently likely to increase the use of online services. (Saxena and Awasthi 2015) Individuals should adopt adequate security measures to get protected from online banking fraud. Individuals should secure their computer or smartphone devices with antivirus software, create strong password and should report suspicious emails or SmS to their financial institutions. (Barkhordari et al. 2017) performed an empirical investigation on factors that influence trust in EPS system on Iranian customers. The findings revealed that technical protection, transaction procedures, and security features are the most influencing factors on perceived trust of customers. (Hassan and Shukur 2019) to enhance the digital payment adoption around the world, digital payments must have an efficient security protocol that can ensure high security for online transactions. (Hassan et al. 2020) Security and trust are the fundamental part of electronic transactions. With the growing interest of customers in EPS and significant growth in electronic payments, more focus is being given on security issues in electronic payments. The growth in electronic payments demands the improvement of information technologies.

Based on literature review, we can categorize some factors that influence customer perception of security and trust in digital payments: transaction procedure, technical protection and security behavior adopted by customers. A research model has been developed to test the influence of perceived security and perceived trust on intention to use digital payment modes.

III. Research Model and Hypothesis

Figure 1 has shown our research model which tests the effect of technical protection, transaction procedure and security behavior on perceived security and perceived trust and also integrates the direct effect of security and trust on intention to use digital payments.

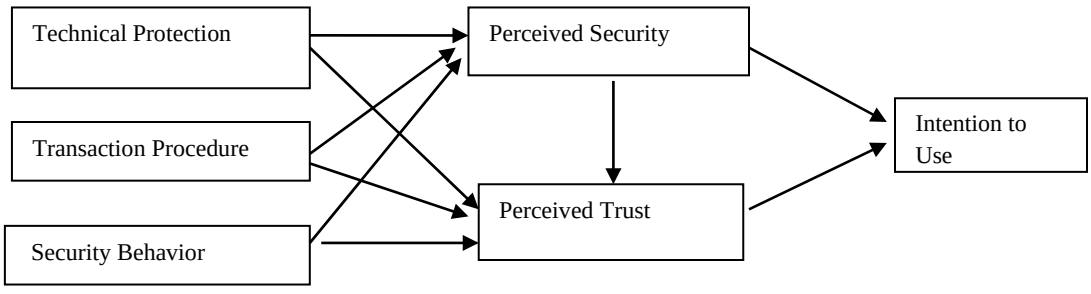


Figure 1 Research Model

Construct	Description
Technical Protection	Termed as technical mechanism employed in EPS to ensure payment security during the electronic transactions. (Chellappa and Pavlou 2002)
Transaction Procedure	A series of steps employed to complete the transaction digitally: authentication prior to transaction, authorization during transaction, and acknowledgement after the transaction. (Kim et al. 2010)
Security Behavior	Used to assess the customer behavior to keep their information secure while transacting digitally.
Perceived Security	Security is customers subjective evaluation of the digital payment security.(Linck, Pousttchi, and Wiedemann 2006a)
Perceived Trust	Trust is customers belief that a particular transaction will occur in a manner that is consistent with their expectations.(Barkhordari et al. 2017)
Intention to Use	Customer intention to adopt digital payments

Table 1 Research constructs

H1: Technical protection has significant impact on perceived trust on customers' intention to use cashless transactions.
H2: Transaction procedure has significant impact on perceived trust on customers' intention to use cashless transactions.
H3: Security behavior has significant impact on perceived trust on customers' intention to use cashless transactions.
H4: Technical protection has significant impact on perceived security on customers' intention to use digital payments.
H5: Transaction procedure has significant impact on perceived security on customers' intention to use digital payments.
H6: Security behavior has significant impact on perceived security on customers' intention to use digital payments.
H7: Perceived security has significant impact on perceived trust on customers' intention to use digital payments.
H8: Perceived trust has significant impact on customers' intention to use digital payments.

H9: Perceived security has significant impact on perceived trust on customers' intention to use digital payments.

IV. Materials & Methodology

Research Methodology

To validate the research model and test the hypothetical framework, an empirical research design was adopted. A self administered questionnaire was designed which consisted of demographic

details and statements related to transaction procedure (Junadi and Sfenrianto 2015; Kim et al. 2010), technical protection(Kim et al. 2010; Linck, Pousttchi, and Wiedemann 2006b) and security behavior perceived by customer, perceived security, and perceived trust(Shree et al. 2021) on intention to use digital payments.

Survey Administration

The survey was administered in six districts of Haryana state in India. The questionnaire was distributed through emails, whatsapp and personal visit. Data was collected from 486 respondents out of which 26 forms were found incomplete and eliminated for further analysis. 460 responses were found valid for further analysis. Each questionnaire item was scored on a five-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = moderately agree; 4 = agree; and 5 = strongly agree). This data was analyzed using AMOS and SPSS software.

Measurement Model: Initial six factors measurement model contained 24 statements categorized under six factors: Perceived trust (4); Perceived security (4); Transaction procedure (4); Technical protection (4); Security behavior (4) and intention to use (4) was tested. This initial measurement model did not fulfill the fitness criteria (χ^2 = 994.370; df= 237; P = 0.000; $\chi 2$/ df = 4.196 ; CFI= .905; IFI=.905; TLI = .889; PGFI = .671; RMR= .058; RMSEA=.085), as the RMSEA failed to satisfy cut off criteria <0.08 (Mac Callum et al, 1996 and Byrne, 1998).

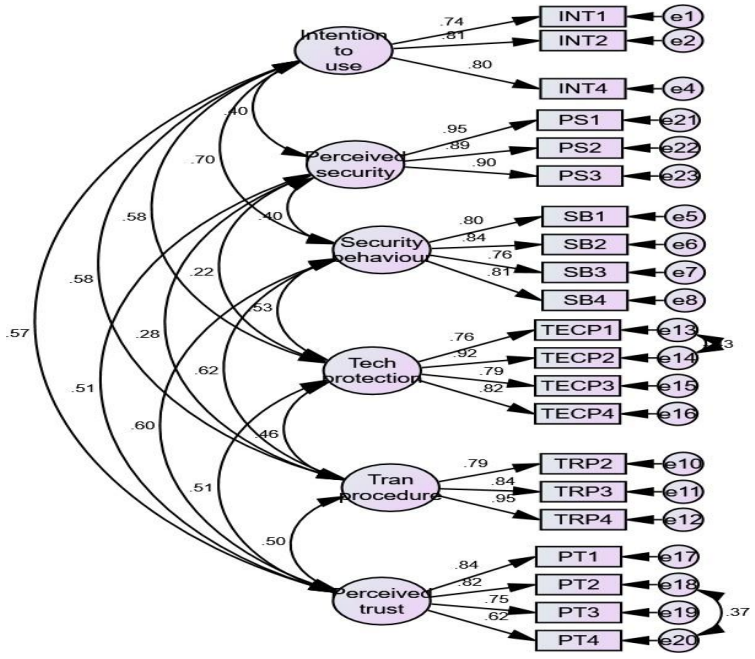


Figure 2: Measurement Model

Model was refined on the basis of Standardized Regression Weight (SRW); Modification Indices and indicator loadings. Three indicators were removed from the initial measurement model: INT3; PS4 and TRP 1 from the constructs being the loading value less than 0.5. Final refined measurement model, shown in Fig 2, found appropriately fitted to the data (χ^2 =541.306; df= 172; P = 0.000; $\chi 2$/ df = 3.147; CFI= .943; IFI=.943; TLI = .930; PGFI = .670; RMR= .055; RMSEA=.070). Thus the final measurement model comprised 21 statement grouped under six constructs.

S. No.	Construct	Statements	Code	Indicator loading
1.	Perceived Security	I perceive the information relating to user and digital transaction as secure.	PS1	0.95
		I perceive the digital transaction as secure.	PS2	0.89

		Advances in internet security technology provide for safer transactions.	PS3	0.90
		I feel it safe to store my card details on phone or laptop	PS4	0.48 (Removed)
2.	Transaction Procedure	Unauthorized person may not access my personal information	TRP1	0.46 (Removed)
		The website verifies my identity before processing the transaction	TRP2	0.79
		I perceive usage of OTP a secure mechanism for authentication E- payment	TRP3	0.84
		It is safe to share your bank account details for making digital payments.	TRP4	0.95
3.	Technical protection	I do not fear hacker invasion in using E-payments.	TECP1	0.76
		POS machines cannot copy details of Dr. and Cr. Card when swipe.	TECP2	0.92
		Use of public Wi-Fi is safe for making E-payment.	TECP3	0.79
		Advances in internet security technology provide for safer transactions.	TECP4	0.82
4.	Perceived trust	I swipe only at trusted POS systems	PT1	0.84
		I trust the security mechanism of Cashless payments.	PT2	0.82
		I trust the information provided by me during the cashless payment would be kept confidential	PT3	0.75
		I believe the digital payments are secure and trustworthy.	PT4	0.62
5.	Security behavior	Despite some risk, I still trust digital payment system.	SB1	0.80
		I do security check before downloading the App	SB2	0.84
		I believe login process of these wallets is secure.	SB3	0.76
		I ensure web link to be secure before entering my details to a website.	SB4	0.81

6.	Intention to use	I am using and will keep using cashless modes of payment.	INT1	0.74
		I intend to increase my use of the cashless modes in the future.	INT2	0.81
		I recommend/ encourage my friends or relatives to use cashless modes.	INT3	0.41 (Removed)
		I am likely to use cashless payment options regularly]	INT4	0.80

Table 2- Indicator Loading

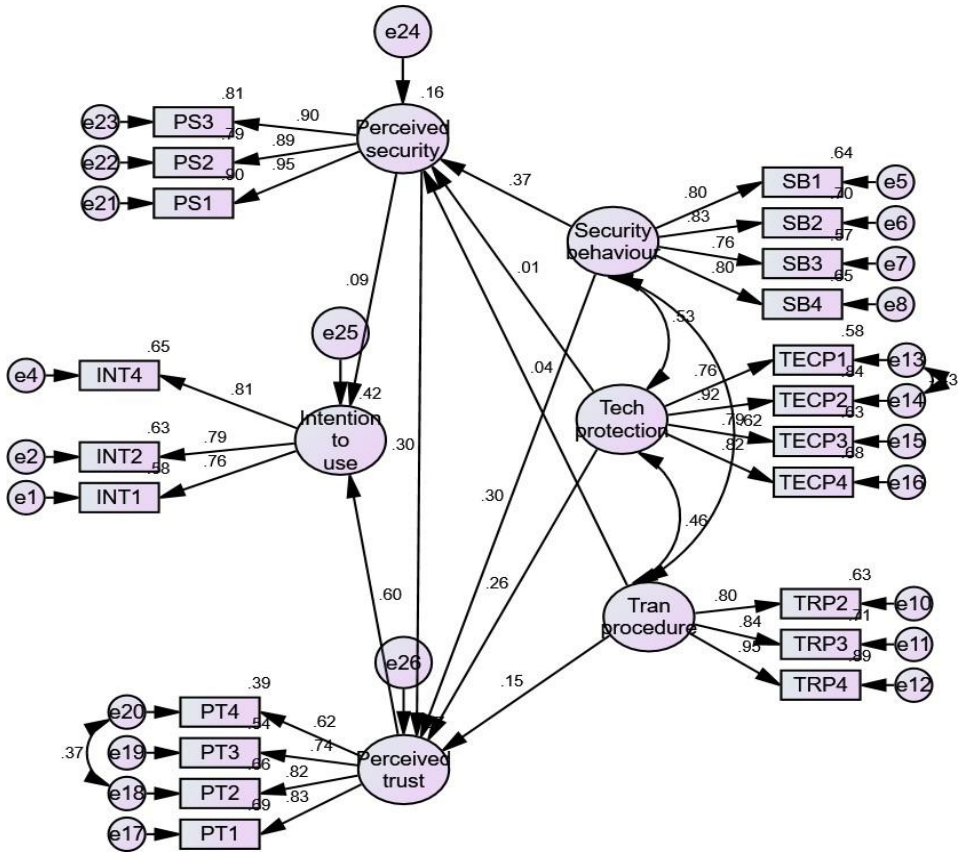
Reliability & Validity Test: Table 3 demonstrated that all the constructs used in the measurement model satisfied the criteria of reliability and validity. Cronach's alpha value for the constructs found greater than the threshold value 0.7 (Field, 2007) that proved the reliability of the constructs. CR values varied from 0.829 to 0.936, AVE found greater than 0.5 and CR are also greater than AVE that satisfied the convergent validity criteria suggested by Malhotra and Dash (2016). The model also found sound on the ground of Fornell–Lacker discriminant validity criteria (Fornell and Cha, 1994).

	Alpha	**CR**	**AVE**	**MSV**	**Max R(H)**	**PT**	**INT**	**SB**	**TRP**	**TECP**	**PS**
PT	0.859	0.849	0.587	0.361	0.867	**0.766**					
INT	0.831	0.829	0.618	0.497	0.833	0.573	**0.786**				
SB	0.876	0.877	0.640	0.497	0.879	0.601	0.705	**0.800**			
TRP	0.893	0.897	0.745	0.387	0.929	0.501	0.584	0.622	**0.863**		
TECP	0.882	0.895	0.681	0.331	0.912	0.514	0.575	0.530	0.461	**0.826**	
PS	0.936	0.936	0.831	0.265	0.944	0.515	0.400	0.401	0.275	0.224	**0.911**

Table 3: Reliability and validity assessment

[Note: AVE=Average Variance Extracted; CR=Construct Reliability; PT= Perceived Trust; INT= Intention to Use; PT=Perceived Trust; SB=Security Behavior; TRP= Transaction Procedure: TECP= Technical Protection**;** PS= Perceived Security]

As the measurement model found appropriate on the basis of fitness criteria, reliability and validity criteria, this provided an opportunity to test the hypothesized relation between the latent variable through structure model.



Figur**e** 3- Structure Equation Model

Structure Equation Model: The structure model shown in Figure 3 fulfilled the model fitness criteria and found adequately fitted to the data as shown in Table 4 **(**χ^2 =659.683; df= 175; P = 0.000; χ2/ df =3.770; CFI= .925; IFI=.925; TLI = .910; PGFI = .667; RMSEA=.079).

S. no.	Fit Indicator	Actual value	Recommended criteria
1.	χ^2	659.683	
2.	Df	175	

3.	Sig.	0.000	
4.	χ^2/df	3.770	2-5 (Wheaton et al., 1977)
5.	CFI	.925	≥0.90 (Bentler, 1990; Byrne, 1998)
6.	IFI	.925	≥0.90 (Bentler, 1990; Byrne 1998)
7.	TLI	.910	≥0.90 (Bentler, 1990)
8.	PGFI	.667	> 0.50) Mulaik et al. (1989)
9.	RMSEA	.079	<0.08 Good fit (Byrne, 1998)

Table 4- Fit indicators

Table 5 highlighted that security behavior (β = 0.296; P= 0.001); Technical protection (β = 0.257; P = 0.001) and transaction procedure (β = 0.154; P = 0.012) showed significant impact on perceived trust. Thus the hypothesis H1, H2, H3 was supported here. On the other side, Technical protection (β = 0.009; P = 0.832) and transaction procedure (β = 0.042; P = 0.536) failed to show any significant impact on perceived security but security behavior (β = 0.372; P= 0.001) showed significant association with perceived security. The hypothesis H4, H5 was not supported and H6 hypothesis was supported hereby.

Hypothesis	**Relationship**	**Path coefficient (β)**	**Significance**	**Acceptance/Rejection of Hypothesis**
H1	Technical protection -> Perceived trust	0.257	0.001	Supported
H2	Transaction procedure-> Perceived trust	0.154	0.012	Supported
H3	Security behavior -> Perceived trust	0.296	0.001	Supported
H4	Technical protection -> Perceived security	0.009	0.832	Not Supported
H5	Transaction procedure-> Perceived security	0.042	0.536	Not Supported
H6	Security behavior -> Perceived security	0.372	0.001	Supported
H7	Perceived security-> Perceived trust	0.300	0.002	Supported
H8	Perceived trust -> Intention to use	0.603	0.001	Supported
H9	Perceived security-> Perceived trust -> Intention to use	0.181	0.001	Supported

Table 5- Hypothesis relation between variables

The results in terms of path coefficient and p value demonstrated the significant impact of perceived security (β = 0.300; P = 0.002) on perceived trust which means H7 is supported. Perceived trust (β = 0.603; P =0.001) significantly impact the intention to use cashless transaction. This depicted that perceived security of cashless transaction creates the trust on cashless transaction that further impact customers' intention to use cashless transactions (Kim et al. 2010). Thus the hypothesis H8 is supported hereby. Perceived security showed significant indirect impact on intention to use digital payments through perceived trust (β =0.181; P =0.001) which means hypothesis H9 is also supported.

Conclusion and Implications

Security and privacy have been most critical factors on adoption of internet based services. This study was an attempt to analyze the impact of perceived security and perceived trust on intention to use digital payments. The proposed research model integrated the determinants of perceived security and trust and also the effect of security and trust on digital payment adoption. The determinants of security and trust included technical protection, transaction procedure taken from previous studies and security behavior was the new dimension which was not included in previous studies. The study provided insights about customers' intention to use digital payments. The results showed that there is a significant relation between perceived security and perceived trust on intention to adopt digital payments which is consistent with previous studies. Perception of security helps to build trust and ultimately results in more use of digital payments.

It provides theoretical contribution in this area of research and also provides practical suggestion for service providers and regulatory bodies to enhance the use of digital payments. A world class safe and secure infrastructure should be provided to ensure security and privacy of information on internet. The technical protection and transaction procedure should ensure only authorized access to customer's personal information, step by step verification of transaction. Customers should be aware about security measures to be taken while doing digital transaction

References

1. Barkhordari, Maryam et al. 2017. "Factors Influencing Adoption of E-Payment Systems: An Empirical Study on Iranian Customers." Information Systems and e-Business Management 15(1): 89–116.
2. Bentler, P. M. (1990). Comparative Fit Indexes in Structural Models. Psychological Bulletin, 107, 238-246.
3. Byrne, B. M. (2001). Structural Equation Modeling with AMOS: Basic Concepts, Applications, and Programming, Mahwah, NJ: Lawrence Erlbaum Associates.
4. Carlos Roca, J., José García, J. and José de la Vega, J. (2009), "The importance of perceived trust, security and privacy in online trading systems", Information Management & Computer Security, Vol. 17 No. 2, pp. 96-113. https://doi.org/10.1108/09685220910963983

5. Chellappa, Ramnath K., and Paul A. Pavlou. 2002. "Perceived Information Security, Financial Liability and Consumer Trust in Electronic Commerce Transactions." Logistics Information Management 15(5/6): 358–68.
6. Eswaran, K Kamatchi. 2019. "Consumer Perception towards Digital Payment Mode." Research Explorer." VII(March): 13–20.
7. Fornell, C., & Cha, J. (1994). Partial least squares. Advanced Methods of Marketing Research, 407, 52–78.
8. Harris, H., Guru, B. K., Avvari, M. V. (2011) Evidence of Firms' Perceptions towards Electronic Payment Systems (EPS) in Malaysia. International Journal of Business & Information, 6(2): pp. 226-245
9. Hassan, Md Arif, and Zarina Shukur. 2019. "Review of Digital Wallet Requirements." 2019 International Conference on Cyber security, ICoCSec 2019 (September): 43–48.
10. Hassan, Md Arif, Zarina Shukur, Mohammad Kamrul Hasan, and Ahmed Salih Al-Khaleefa. 2020. "A Review on Electronic Payments Security." Symmetry 12(8): 1–24.
11. Hu, L.T. and Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives, Structural Equation Modeling: A Multidisciplinary Journal, 6(1), 1-55, DOI: 10.1080/10705519909540118
12. Junadi, Sfenrianto. 2015. "A Model of Factors Influencing Consumer's Intention to Use E-Payment System in Indonesia." Procedia Computer Science 59(Iccsci): 214–20. http://dx.doi.org/10.1016/j.procs.2015.07.557
13. Kim, Changsu, Wang Tao, Namchul Shin, and Ki Soo Kim. 2010. "An Empirical Study of Customers' Perceptions of Security and Trust in e-Payment Systems." Electronic Commerce Research and Applications 9(1): 84–95. http://dx.doi.org/10.1016/j.elerap.2009.04.014.
14. Linck,K athrin, Key Pousttchi, and Dietmar G. Wiedemann. 2006a. "Security Issues in Mobile Payment from the Customer Viewpoint." Proceedings of the 14th European Conference on Information Systems, ECIS 2006 (January 2006).
15. Lohana, S., & Roy, D. (2021). Impact of Demographic Factors on Consumer's Usage of Digital Payments. FIIB Business Review. https://doi.org/10.1177/23197145211049586
16. MacCallum, R.C., Browne, M.W., and Sugawara, H., M. (1996). Power Analysis and Determination of Sample Size for Covariance Structure Modeling. Psychological Methods, 1 (2), 130-49.
17. Malhotra, N.K. (2009). Basic Marketing Research: A decision making approach (3rd ed.). Pearson Education.
18. Mulaik, S. A. (1998). Parsimony and Model Evaluation. The Journal of Experimental Education, 66(3), 266–273. http://www.jstor.org/stable/20152565
19. N, Sheila Eveline. 2018. "Consumers ' Perception Towards Cashless Transactions And Information Security In The Digital Economy." International Journal of Mechanical Engineering and Technology. 9(7): 89–96.
20. Rouibah, Kamel, Paul Benjamin Lowry, and Yujong Hwang. 2016. "The Effects of Perceived Enjoyment and Perceived Risks on Trust Formation and Intentions to Use Online

Payment Systems: New Perspectives from an Arab Country." Electronic Commerce Research and Applications 19: 33–43. http://dx.doi.org/10.1016/j.elerap.2016.07.001 .

21. Sathye, M. (1999). Adoption of Internet banking by Australian consumers: an empirical investigation. International Journal of Bank Marketing, 17(7), 324–334. https://doi.org/10.1108/02652329910305689
22. Saxena, Komal, and Anurag Awasthi. 2015. "A Solutions Provided to Secured Your Online Banking Frauds." 6(6): 4925–28. International Journal of Computer Science and Information Technologies, Vol. 6 (6) , 2015, 4925-4928 A
23. Shree, S., Pratap, B., Saroy, R. et al. Digital payments and consumer experience in India: a survey based empirical study. Journal of Banking and Financial Technology (2021) **5,** 1–20 (2021). https://doi.org/10.1007/s42786-020-00024
24. SSingh, Sindhu, and R. K. Srivastava. 2020. "Understanding the Intention to Use Mobile Banking by Existing Online Banking Customers: An Empirical Study."Journal of Financial Services Marketing 25(3–4): 86–96. https://doi.org/10.1057/s41264-020-00074-w.
25. Smith, R.G. 1999. "Internet Payment Systems and Their Security Risks." Journal of Financial Crime 7(2): 155–60.
26. Wang, Yi Shun, Yu Min Wang, Hsin Hui Lin, and Tzung I. Tang. 2003. "Determinants of User Acceptance of Internet Banking: An Empirical Study." International Journal of Service Industry Management 14(5): 501–19.
27. Wheaton, B., Muthen, B., Alwin, D., F., and Summers, G. (1977). Assessing Reliability and Stability in Panel Models. Sociological Methodology, 8 (1), 84-136.