

# A STUDY ON FACTORS AFFECTING THE ADOPTION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN RURAL AREAS OF INDIA

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## ABSTRACT

**Objectives:** *The central issue addressed in this paper is to understand the significant factors affecting rural consumers' Intentions to adopt ICT devices post Covid-19 with the help of the Technology Adoption Model (Modified TAM).*

**Method:** *Primary Data of 580 samples (316 male and 264 female) from villages of Rajasthan, Uttar Pradesh, and Haryana were collected using a self-administered questionnaire in regional language, and data was analyzed using EFA (Exploratory factor analysis) and SEM (Structural equation modeling) through SPSS 22.0 and ANOVA 22.0.*

**Findings:** *Rural consumers have a moderate attitude toward adopting ICT Devices. Furthermore, the study's findings revealed that perceived ease of use has a significant impact on attitude and Intention to use various ICT devices, whereas perceived usefulness does not significantly influence the attitude of rural consumers.*

**Novelty:** *The robustness of modified TAM is studied in Rural Context, and how it can be strengthened is discussed in this paper.*

**Keywords:** Information and Communication Technology (ICT), Attitude toward ICT, Intention to use, ICT devices, Perceived Usefulness, Perceived Ease of Use.

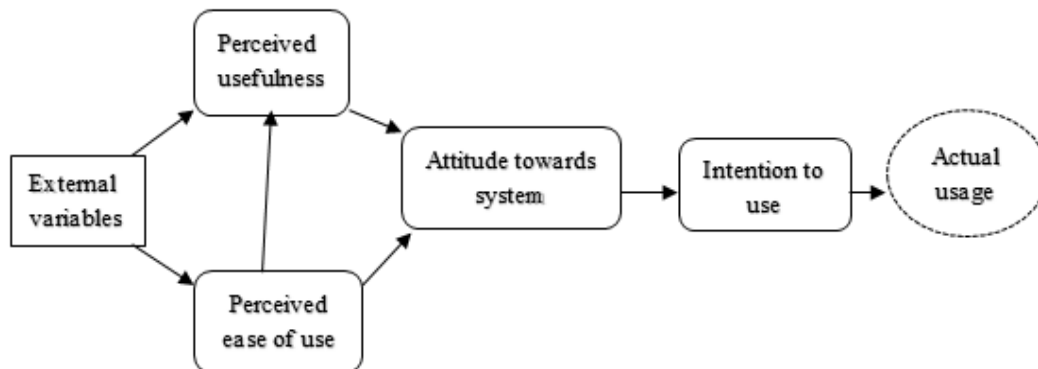
**JEL Codes:** M37, O33, P25

## INTRODUCTION

Information and communication technology (ICT) has become an integral element of our professional and personal lives. In August 2014, the Government launched the Digital India program during a meeting headed by Prime Minister Shri Narendra Modi, who aspires to convert the country into a knowledge economy and a digitally empowered society. The Digital India initiative is transformative, ensuring that everyone may access government services via electronic means. This initiative was to be executed in stages, from 2014 to 2018 (PIB, 2014), but there are still a lot of roadblocks to achieving this initiative. One primary reason for this can be attributed to the Digital Divide India faces, with 67% of the urban population using ICT and only 31% of the rural population using ICT in 2020, according to the IAMA (2020) report Internet and Mobile Association of India. Even though ICT plays an essential role in shaping the way people shop (e-commerce), do banking (digital payments), entertain themselves, and interact with others (social media and communication). Still, despite of these significant benefits offered by ICT's to people, a variety of empirical studies have been conducted in various sectors such as

higher education institutions (Abbad et al., 2009; Tømte & Hatlevik, 2011; Alshare et al., 2005; Afshari et al., 2013; Hsu et al., 2009) school-based studies (Hatlevik & Christophersen, 2013; Yuen & Ma, 2002), organisation based studies (Venkatesh & Davis, 2000; Venkatesh et al., 2010) e-government services in developed countries (Horst et al., 2007), on managers (Akour et al., 2006), ICT experts and faculty (Bhuasiri et al., 2012), integrating technology adoption models (Van Biljon & Kotzé, 2007), developed countries (Yang, 2005; Yen et al., 2010; Tømte & Hatlevik, 2011) but very few studies are done in rural areas, especially of developing nations and that too if done are in either education or agriculture sectors or urban areas (Bhuasiri et al., 2012; Moghaddam & Khatoon-Abadi, 2013; Ooi et al., 2011) or in rural areas of developed nations (LaRose et al., 2007; Warren, 2007). After identifying these gaps in the literature, this study was initiated to identify the most favored factor by rural users through a highly recognized Technology acceptance model in IT acceptance behavior.

Modified TAM is a modified version of the Theory of Reasoned Action (TRA), a model designed specifically to predict user acceptance of information technology. For this reason, modified TAM is a model built on the user's Intention. In the TRA, one's belief shapes one's attitude leading to intentions, eventually leading to the behavior. The MODIFIED TAM used this belief-attitude-intention-behavior link to model consumers' adoption of Information Technology (Szajna, 1996; Riemenschneider & McKinney, 2002; Benedetto et al., 2003). According to modified TAM, the two most important factors driving IT adoption behavior are Perceived usefulness and perceived ease of use. If PU has an immediate impact on attitude and the Intention to use, then PEOU also impacts attitude and Intention through PU.

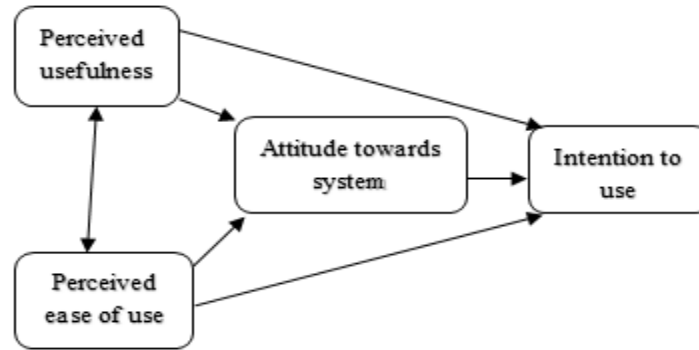


Source: Davis (1989)

**FIGURE 1**  
**TECHNOLOGY ACCEPTANCE MODEL**

In the above model (Figure 1), Perceived ease of use can be defined as the degree to which an individual feels that learning to use technology will require minimal effort, and Perceived usefulness is the amount to which a person thinks that using technology will enhance their performance (Kamaruddeen et al., 2022).

The primary objective of this study is to estimate the robustness of modified TAM in rural contexts by studying the relevance of two factors, PU and PEOU, on attitude and Intention to use Information and communication technology for which the following model is proposed (Figure 2).



**FIGURE 2**  
**THE PROPOSED MODEL**

## METHODOLOGY

The type of data used in this study is Quantitative, obtained from Primary sources. The study's data collection took place from July to December 2021. It included participants from rural areas of 3 North-Indian states, namely Haryana, Rajasthan, and Uttar Pradesh. As it was optional for the participants to participate in this study, those who participated were rewarded with small refreshment, and almost everyone who was approached participated in this study. Out of 600 distributed questionnaires, 580 questionnaires were complete and suitable for this study after removing the ones with missing values. The questionnaire was divided into two parts, the 1<sup>st</sup> part consisted of questions about demographics, and 2<sup>nd</sup> part consisted of inquiries related to measuring items studied. The things used in this study were Perceived usefulness, Perceived ease of use, Attitude towards the system, and Intention to use, all designed to understand better consumers' views and perspectives on ICT gadgets in rural areas. A 5-point Likert scale was used with emojis expressing five as strongly agree to 1 as strongly disagree, making it more straightforward for respondents to fill up the questionnaire. Table 1 shows an overview of the participants' demographic Information.

The second part consisted of questions regarding the scaler items adapted from the modified TAM model and modified according to the rural people of India (Davis, 1986), which are as follows in Table 2.

The study uses a two-stage methodology. In the first stage, a survey was conducted to give loadings for discovered factors, and then measures were refined using Confirmatory factor analysis (CFA). In the second stage, using Structural equation modeling (SEM) techniques, a structural model (Figure 2) was built and estimated. SEM is a statistical method for evaluating hypotheses concerning the correlations between observable and latent variables. Its primary advantage is measuring a model entirely, but it does not examine the relationship between latent variables. Latent variables are the factors or constructs measured by Observed variables, statements, or items. So, its structural model is calculated once a model is verified with the least number of observed variables to estimate the latent variable. A path model is a figure used to represent a structure model.

<b>State</b>	<b>Frequency of respondents</b>	<b>Percent (%)</b>
Uttar Pradesh	102	17.6
Rajasthan	176	30.3
Haryana	302	52.1
<b>Gender</b>		
Female	264	45.5
Male	316	54.5
<b>Age</b>		
13-19	90	15.5
20-34	290	50
35-49	142	24.5
50 & above	58	10
<b>Education</b>		
No formal education	95	16.4
Middle school (up to 5 <sup>th</sup> Class)	126	21.7
High school (up to 12 <sup>th</sup> Class)	150	25.9
Graduation	84	14.5
Post-Graduation	54	9.3
Ph. D Holders	33	5.7
Others	19	3.3
Diploma	19	3.3
<b>Occupation</b>		
Agriculture/Self-employed	173	29.8
Business	34	5.9
Service	85	14.7
Student	149	25.7
Homemaker	110	19
Stitching	7	1.2
Shop	2	0.3
Contractual-labour	5	0.9
Unemployed	15	2.6
<b>Income</b>		
No income	260	44.8
1000-10000	165	28.4
10001-20000	73	12.6
20001-30000	39	6.7
Above 30000	43	7.4
<b>Device used Mostly</b>		
Smart Phone	264	45.5
Keypad Phone	134	23.1
Tablet /Laptop/PC	35	6
Television	41	7.1
Radio	20	3.4
None of the above	86	14.8
<b>Users</b>		
Smart Phone Users	299	51.6
Keypad Phone Users	194	33.4
Non-Users	87	15

Variables	Measurement Items
1. Perceived Usefulness (PU)	Using the device is helpful, in my opinion. Using the device would make it easier to carry out my tasks. Using the device would help me to complete my tasks more quickly. Overall, I think that using the device is advantageous.
2. Perceived ease of use (PEOU)	It is easy for me to use the device. I find my interaction with the device clear & understandable. It is easy for me to become skilful at using the device. Overall, I find the use of this device easy
3. Attitude towards ICT	Using the device is a good idea. Using the device is a wise idea. I like the idea of using the device. Using the device gives a pleasant experience.
4. Intention to use ICT	I plan to use this device in the future too. I will strongly recommend this device to others. I will like to use this device again. I am likely to use this device in the future.

There are various published studies in which user approval of information technology has long been measured using SEM methods (Afshari et al., 2013; Abbad et al., 2009; Bollen, 1998; Mac Callum et al., 2014; Ooi et al., 2011; Venkatesh et al., 2000; Yen et al., 2010). Therefore, the analysis of the data in this study is done using SEM to test the following hypothesis:

### Research Hypothesis

*H<sub>01</sub>: Perceived Usefulness significantly impacts attitude to use ICT*

*H<sub>02</sub>: Perceived Usefulness significantly impacts Intention to use*

*H<sub>04</sub>: Perceived Ease of Use significantly impacts attitude to use ICT*

*H<sub>05</sub>: Perceived Ease of Use significantly impacts Intention to use*

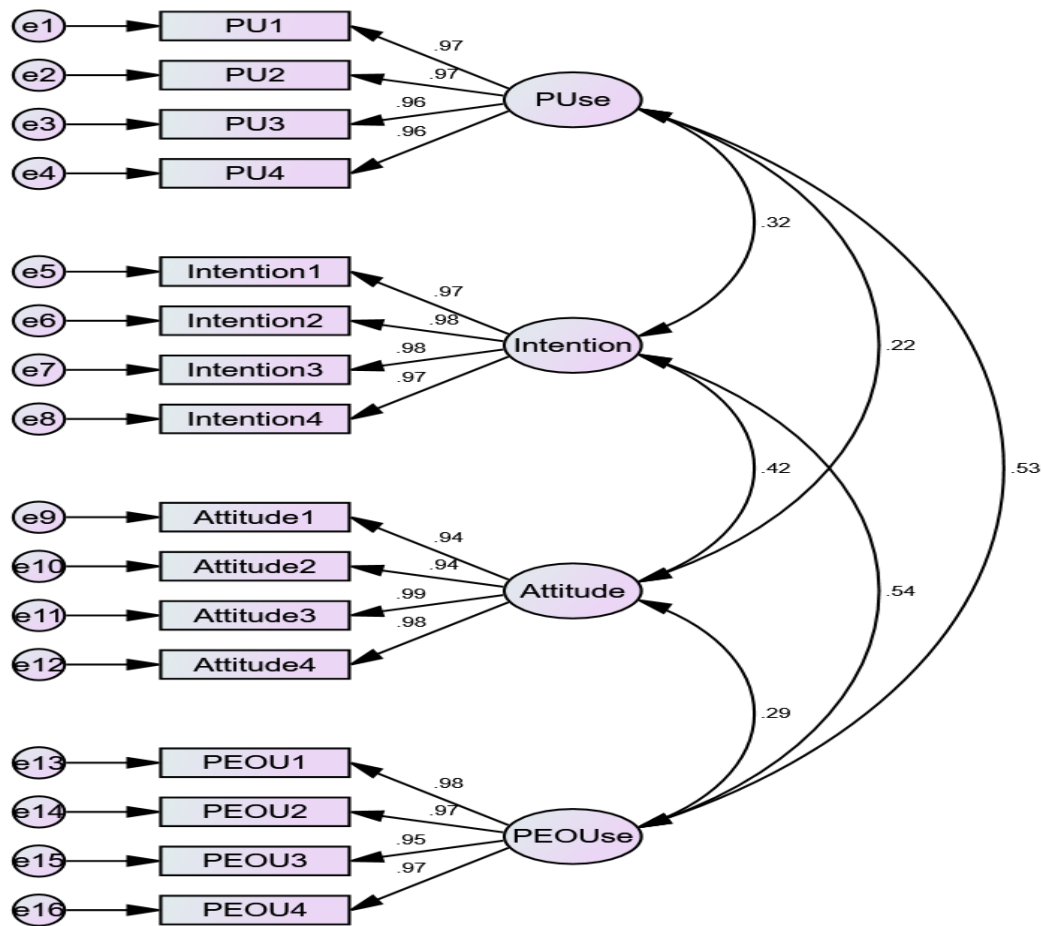
*H<sub>06</sub>: Attitude to use ICT significantly impacts Intention to use ICT*

## RESULTS AND DISCUSSION

### CFA Model

Amos 22 was used to perform CFA to estimate maximum likelihood. As shown in Figure 3. All the items have been considerably loaded on all anticipated factors. The results (CMIN/DF=2.452; AGFI=0.934; NFI=0.988; CFI=0.993; RMSEA=0.050) showed a satisfactory fit (Hair et al., 2014) to the data. Each factor's composite dependability was higher than the permitted level of 0.7. (Table 3) Additionally, AVE values were larger than 0.5 indicating convergent validity for all the constructs (Fornell & Larcker, 1981).

For discriminant validity, square root of AVE > inter-construct correlation, in Table 3, it can be inferred that the diagonal values 0.94, 0.974, 0.961, and 0.965 representing AVE are all greater than the \* marked values representing inter-construct correlations, so the model achieves discriminant validity (Gaskin & Lim, 2016).



**FIGURE 3**  
**CFA ON PROPOSED MODE**

Factor	AVE	Convergent Validity (AVE>0.5)	CR	Composite Reliability (CR>0.7)	Puse	Intention	Attitude	PEO Use
<b>Puse</b>	0.930	Yes	0.982	Yes	0.964	-	-	-
<b>Intention</b>	0.949	Yes	0.987	Yes	0.326***	0.974	-	-
<b>Attitude</b>	0.924	Yes	0.980	Yes	0.213***	0.404***	0.961	-
<b>PEOUse</b>	0.931	Yes	0.982	Yes	0.531***	0.549***	0.284***	0.965

Source: Authors compilation

Note: p<0.100, \*p<0.050, \*\*p<0.010, \*\*\*p<0.001 (Significance of Correlations)

Validating that a model accomplishes its intended goal is known as model validation. It includes confirming that the model is predictive in its intended use (Hu & Bentler, 1999). For example, no validity concerns were found in the above-proposed model.

Fit Index	Observed Values	Recommended Values*
Chi-square/df	2.389	<3.0
AGFI	0.935	>0.90
NFI	0.988	>0.90
CFI	0.993	>0.90
RMSEA	0.049	<0.070

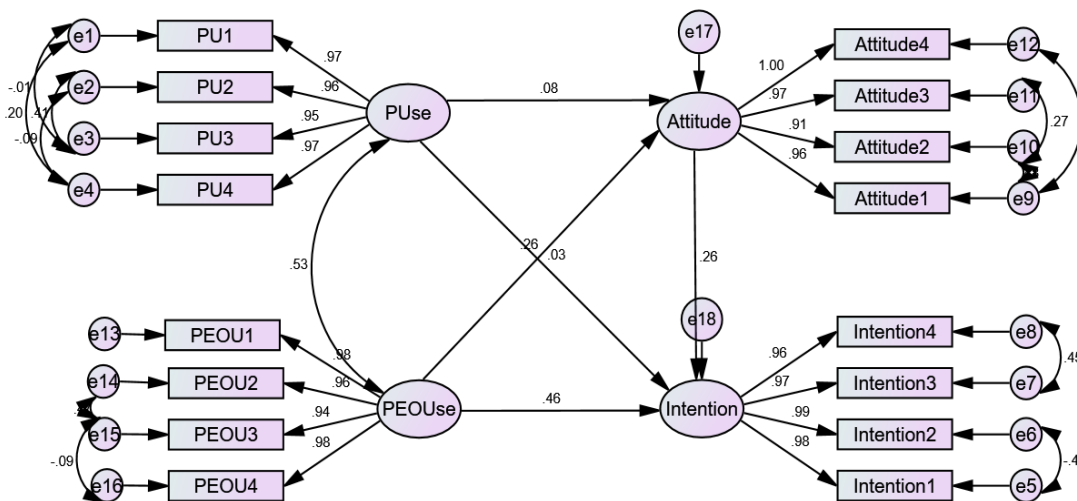
Note: The asterisk (\*) denotes the recommended value's.  
Source: Hu & Bentler (1999)

		Estimates	p-value
Attitude	← PUse	0.105	0.084
Attitude	← PEOUse	0.262	0.000
Intention	← PEOUse	0.461	0.000
Intention	← PUse	0.034	0.519
Intention	← Attitude	0.265	0.000

Source: Authors compilation

The Proposed model was further verified for model fit, and the outcomes of the tests are shown in Table 4 and Table 5, all the observed values fulfil the benchmark set by previous authors, and hence the model is accepted. The complete results of this model are depicted in Figure 4.

The significant findings are that Perceived Usefulness is insignificantly related to both attitudes toward ICT and Intention to use ICT devices. In contrast, Perceived Ease of use is significantly associated with both attitudes toward using ICT devices and Intention to use ICT devices.



Source: Authors compilation

**FIGURE 4  
SEM APPLIED TO THE PROPOSED MODEL**

As per previous studies, it has been found that Perceived Usefulness plays an essential role in the Intention of consumers to adopt information technology (Davis, 1986; Yu et al., 2018; Nadlifatin et al., 2020). However, as in business organizations or educational institutions, users must use IT devices. Therefore, perceived ease of use is an insignificant factor in adopting of these technologies. Whereas in this study, the rural consumers emphasized perceived ease of use as they are new to these devices and hence find using a new device difficult. Therefore, Government and policymakers should make these devices easy to use to achieve the dream of digital India.

## CONCLUSION

This study explored the usefulness of modified TAM in rural areas of developing countries like India and identified the significant factors influencing the adoption of ICT in three different villages, namely Haryana, Rajasthan, and Uttar Pradesh. Estimates from the CFA solution based on EFA output were adequate. The resulting measurement model's model validity measures were satisfactory. The most influential factor was Perceived ease of use, whereas the least significant factor was Perceived Usefulness. This study validated a prevalent and widely used technology adoption model for assessing the rural consumer's Intention to adopt ICT devices and found that this model is not as robust in rural context as it is in Urban Context. SEM made it easy to identify the essential factor determining the Intention toward ICT adoption of rural people. The above-researched model may be used as a model by strategic managers in sales and marketing businesses to enhance rural consumers' perceptions of ICT. Perceived ease of use must be prioritized to support India's Digital India dream because this is the significant challenge rural people are facing in adopting a new device, as there is no one to teach them how to use it. Therefore, it has become the primary reason for the growing digital divide between rural and urban areas. Accordingly, marketing managers should design some user-friendly devices or advertisements to make it easy for rural people to understand the use of ICT devices. Like Google makes ads that no matter which language one speaks, one can still search for any information online by just speaking into the device. So, such advertisement strategies can make rural people aware of the easefulness of the device and will help in bridging the rural-urban divide.

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