



**DETERMINANTS OF TECHNOLOGY ADOPTION ATTITUDE AND THEIR
IMPACT ON FARMERS' BUYING BEHAVIOUR: EVIDENCE FROM THE
AGRICULTURAL SECTOR**

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ABSTRACT

Purpose –Following the emergence of technology advancement in all spheres of life, the present study aims to provide insight into the association between the determinants of technology adoption attitude and its effect on Farmers Buying Behaviour.

Design/methodology/approach – Structural equations modeling and path analysis were used to test the assumptions based on data acquired through a survey. For this study, data was collected from 307 respondents through random sampling.

Findings – The findings reveal that all determinants have a significant effect on technology adoption attitude, and a change in attitude significantly affects Farmers buying behaviour.

Originality/value – This study is an attempt to fill the gap in the literature by exploring the role of technology adoption attitude and Farmers buying behaviour. This study tries to explore the new determinants of technology adoption attitude and Farmers Buying Behaviour.

Key Words: Financial Literacy, Adoption attitude, Farmers Buying Behaviour, AOT

INTRODUCTION

Information technology has become widespread across various sectors during the last 30 years. Since the 1980s, information technology has accounted for around half of all major capital investments in businesses (1). Due to rapid technological improvements, the competitive nature of the global economic environment has greatly intensified (2). Furthermore, (3) claims that research has shown that technology plays an important role in formulating business strategies. It enables organizations to optimize processes, reduce costs, and operate more efficiently and profitably.

Technology has also transformed the agriculture sector in significant ways by lowering production expenses, improving operational efficiency, enhancing product quality, and expanding business opportunities (4). Over the years, digital innovations and mechanization have provided farmers with improved access to markets, information, and financial services. The adoption of technology in agriculture benefits farmers by enabling mobile access to market and price information, digital payment systems, and simplified financial transactions. These developments allow farmers to manage resources effectively, make informed buying decisions, and reduce barriers to both national and international trade (6).

Some of the key advantages of technological advancement for agricultural enterprises include lowering total operational costs, increasing productivity, improving farmer service quality, and

utilizing advanced analytics for better decision-making. Moreover, technology provides opportunities to strengthen business performance and gain competitive advantages through innovation (5).

Despite these advantages, the acceptance and adoption of agricultural technology among farmers remain relatively low. According to a global research study conducted by NPO, many agricultural industries still struggle with implementing and sustaining technological innovations (7). Therefore, it is essential to understand the factors influencing farmers' attitudes toward adopting technology and how these attitudes affect their buying behaviour.

The present research focuses on technology adoption attitude and farmers' buying behaviour, emphasizing the determinants that shape farmers' willingness to adopt new agricultural technologies. Farmers' buying behaviour is closely linked to their perceptions, beliefs, and attitudes regarding technological innovations. Understanding these behavioural factors can help technology developers, policymakers, and agribusiness companies design solutions that align with farmers' preferences and promote higher adoption rates.

To address this issue, the researchers adopted the Technology Acceptance Model (TAM) (8) and the Theory of Reasoned Action (TRA) (7) (9) to develop a comprehensive framework for examining technology adoption and its impact on farmers' buying behaviour. In addition to these foundational theories, several determinants—performance expectancy, effort expectancy, social influence, facilitating conditions, and habit—were incorporated to better explain the factors influencing farmers' adoption attitudes.

The main objective of this research is to identify and analyse the determinants that influence technology adoption attitude and to assess their impact on farmers' buying behaviour. By applying Structural Equation Modeling (SEM), this study aims to provide empirical insights into how farmers' perceptions and attitudes toward technology ultimately shape their decision-making and purchasing patterns in the agricultural context.

LITERATURE AND OBJECTIVE

Technology is a subset of attitude and behaviour that underlies the determinants of banking business, and the special conditions of Technology commence. After Covid-19, Technology has been gaining and becoming popular amongst various sections of society over the past few years; to avoid public gatherings, people have started using mobile phones and E-Banking to make or transfer payments. The theory of rational action and planned behavior are the foundations of TAM (9). Foundational theories like the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB) have laid the groundwork for the Technology Acceptance Model (TAM), which has been extensively employed to understand how individuals and organizations embrace new technologies. TAM emphasizes perceived usefulness and ease of use as primary factors influencing technology adoption (10). TAM has been extensively used to study how individuals and organizations embrace new technologies (11) (12). It has also been used to determine the motivations or willingness of customers to adopt new technology.

Additionally, TAM is critical in defining or anticipating customers' system-specific benefits to maintain a long-term working relationship with new Technology. As a result, TAM is well-versed in a wide range of technical adoptions in marketing and retail environments. Examples include Internet banking and mobile banking, mobile commerce, and RFID usage of

augmented reality and electronic labeling. It is thus possible to analyze customer acceptance of the AIoT by using TAM.

According to TAM, customers' adoption of new Technology is mostly influenced by two factors, namely the perceived utility and perceived ease of use of the new technology, a simple and robust methodology (8). Expect this two-factor technological attitude is influenced by Performance Expectancy, facilitating condition, habit, social influence, and effort expectancy. Research shows that technological attitudes influence consumers' behaviors toward the buying. The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) extends this framework by incorporating additional constructs such as performance expectancy, effort expectancy, social influence, and habit. Since its inception at the end of 2012, it is noteworthy that UTAUT2 has been in use in 2012, and the UTAUT2 method has received more than 2500 citations on Google Scholar alone, spanning across the IS discipline as well as beyond, highlighting its predictive ability. However, a thorough review of the 650 UTAUT2 citations showed that 77 percent of studies used UTAUT2 for general purposes without utilizing its concepts, while those who used it for 23 percent that did employ UTAUT2 however, used it when paired with other theories and omitted certain of its concepts, and the uncommon addition of moderators (13). 'Habit' was the most important new theoretical construct included in the UTAUT2 model as a crucial predictor of technology usage to question the role of behavioral intention as a lone predictor of technology use (13). In this regard, the Journal of the Association for Information Systems (JAIS) special edition on the technology acceptance model (TAM) lauds habit as a crucial alternative mechanism in anticipating customer behavior (14).

Given the preceding discussion on the importance of habit construct as a significant predictor of technology use and inconsistencies in the application of the UTAUT2 model in its totality, the goal of this study is to assess the appropriateness of habit construct usage among UTAUT2 based studies. Recent studies have highlighted various factors influencing technology adoption among farmers:

1. **Digitalization and Innovation:** The integration of digital technologies in agriculture has the potential to enhance productivity, reduce waste, and improve farmers' incomes. The increased penetration of internet and mobile phones in India has significantly impacted agriculture, indicating readiness for digital transformation (15).
2. **Barriers to Adoption:** Despite the benefits, several barriers impede the adoption of technologies like Unmanned Aerial Vehicles (UAVs) for precision agriculture. These barriers include technical, social, behavioral, operational, economic, and implementation challenges (16).
3. **Climate-Smart Practices:** Farmers' perspectives on the digitalization of climate-smart agricultural practices reveal that institutional support and innovation diffusion are critical for adoption. Studies in Tamil Nadu, India, emphasize the importance of these factors (17).
4. **Risk Attitudes:** Farmers' risk attitudes significantly influence their decision to adopt agricultural technologies. In Eastern India, risk-averse farmers are less likely to adopt new technologies, affecting productivity gains (18).
5. **Sustainable Innovations:** The adoption of sustainable innovations is influenced by individual psychological factors, socio-demographic features, and innovation

characteristics. A systematic review underscores the complexity of these determinant (19).

6. **Soybean Technology Adoption:** In Madhya Pradesh, the adoption of improved soybean technologies has led to increased yields and profits. However, adoption remains limited to economically well-off, better-informed, and educated large farmers (20).
7. **Rainwater Harvesting Systems:** The adoption of rainwater harvesting systems in rural India is in its nascent stages. Critical success factors include technological advancements and strategies to promote adoption for achieving Sustainable Development Goals (SDGs) (15).

Given the evolving landscape, this study aims to assess the appropriateness of constructs like 'habit' within the UTAUT2 framework and identify factors influencing technological and adoption attitudes toward farmers' buying behavior. The main agenda of this research is to find out the factors that manipulate the technological and adoption attitude toward Farmers Buying Behaviour.

OPERATIONAL DEFINITIONS AND RESEARCH HYPOTHESIS

Performance expectancy:

Performance expectancy can be defined as an individual's understanding of the benefits of a technological innovation that leads to a better outcome. Technology that allows individuals to use it will be perceived as having higher performance outcomes (21). Performance expectations will impact technological innovations that describe how they can be used by people. Performance expectations are defined as the degree to which consumers believe that technological innovation will help them achieve their goals (6). (22) have found that mobile technology services can impact the perception of the performance of innovative technology applications. Cloud computing services can be used for a variety of purposes depending on why a consumer chooses to use them. This will likely lead to consumers buying more cloud computing services. This leads us to the next hypothesis. Items used to test the performance expectancy towards the technological adoption attitude enclosed in Appendix-A.

H1.1: There is a positive relationship between Performance Expectancy and Technology adoption attitude adoption.

Facilitating Conditions

The behavioural desire to use mobile payment is positively influenced by facilitating conditions. Hedonic motivation (HM) is described as the enjoyment or pleasure gained from the use of Technology. Hedonic motivation has been a key determinant of technology adoption and use in the consumer setting (14). Mobile payment is enjoyable for individual since it enables a novel way of conducting financial transactions, which leads to its acceptance. To test the relationship between facilitating conditions and attitude toward technology adoption following hypothesis was drawn. Items used to test the facilitating conditions enclosed in Appendix-A

H1.2: There is a positive relationship between facilitating conditions and attitude toward Technology adoption.

Habit

A habit (or won't as a more formal and amusing term) is a pattern of behaviour that is performed on a regular basis and occurs subconsciously. Habit formation is the process by which a

behaviour becomes automatic or habitual through repeated repetition. This is characterised as an increase in automaticity with repeat count to an asymptote. This process of habit building might be time-consuming as per (23). The habit factor is also influencing the technological adoption attitude. To test the relationship between habit and attitude toward technology adoption following hypothesis was drawn. Items used to test the habit of the individual toward technology adoption enclosed in Appendix-A

H1.3: There is a positive relationship between habits and attitudes towards Technology.

Social Influence

Social Influence: Social influence refers to the extent important people (e.g., family members and friends) think they should be using the Technology (24). It reflects the effects of environmental influences like the opinions of a person's family, friends, and even superiors about their behavior (25). When they are convinced, this could motivate the user to use Technology. To test the relationship between social influence and attitude toward technology adoption following hypothesis was drawn. Items used to test the social influence of the individual toward technology adoption enclosed in Appendix-A

H1.4: There is a positive relationship between social influence and Technology adoption attitude.

Effort Expectancy

The degree of easiness connected with consumers' usage of Technology is referred to as effort expectation (14). (26) claim that it helps to a more accurate prediction of intent to adopt new technology. When users believe that mobile payments are simple to use and do not involve much effort, they have higher expectations of achieving the intended results (14). To test the relationship between Effort Expectancy and attitude toward technology adoption following hypothesis was drawn. Items used to test the effort expectancy of the individual toward technology adoption enclosed in Appendix-A

H1.5: There is a positive relationship between effort expectancy and Technology adoption attitude.

Technology Adoption Attitude and Farmers Buying Behaviour

The acceptance, integration, and usage of new technology in society is technology adoption. The process is divided into many stages, commonly classified by the groups of individuals who utilise the Technology. For this study, the technology adoption attitude means the attitude towards using mobile apps or e-banking for making payments. Attitude towards the Technology depicts the adopter's positive and negative opinions toward Farmers Buying Behaviour (14 ;23; 24) To test the relationship between attitude toward technology adoption and Farmers Buying Behaviour following hypothesis was drawn. Items used to test the technological adoption attitude and farmers buying behaviour.

H1.6: There is a positive relationship between Technology adoption attitude and Farmers Buying Behaviour.

Based on the above literature following conceptual framework was framed.

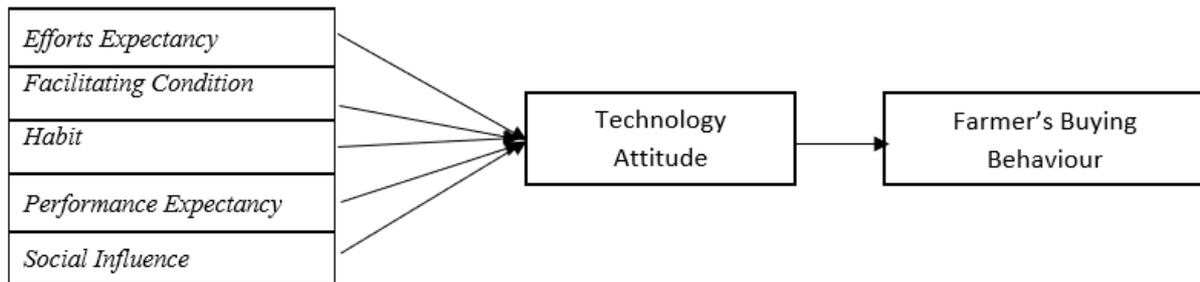


Fig.1 Conceptual Research Model

RESEARCH DESIGN AND METHODOLOGY

As previously stated, the goal of this study is to examine the role of technology adoption in Farmers Buying behaviour. Technology adoption attitude has to be experimentally evaluated to see which characteristics substantially impact the change of technology adoption attitude on Farmers Buying Behaviour. Primary and secondary research has been undertaken to meet the study's objectives.

SECONDARY RESEARCH

A thorough literature review has been conducted to identify and discuss the four potential variables (Performance Expectancy, facilitating condition, habit, social influence, and effort expectancy) that may influence farmers' attitudes toward technology adoption attitude and, ultimately, their attitude of Technology adoption in the Farmers Buying Behaviour. As a result, the literature review began by discussing current technical advances, followed by a section on financial services business trends. Finally, the literature research has identified and discussed the factors that may influence Farmers' adoption of new Technology. Secondary data has mostly come from national and international literature, including journal articles, books, and internet databases like J Stor, EBSCO Host, Google Scholar, and Emerald Insight.

PRIMARY RESEARCH

The core study for this analysis was done among the young population of Haryana. The secondary research was utilized to develop a comprehensive hypothetical framework that identifies the aspects that may influence youth' attitudes toward technology adoption and, ultimately, their use in Farmers buying behaviour.

Quantitative and qualitative research are the two most common methodologies utilized in academic studies. Because qualitative research is interested in the depth of human experience, personal and subjective differences that are features of individual experiences, and meanings linked with a particular phenomenon, it is frequently concerned with a 'whole-world experience' (27). Furthermore, qualitative research examines how people experience, perceive and attach meaning to a specific occurrence rather than converting the researchers' or participants' views into numerical form (28). Finally, a qualitative research approach can complement, validate, explain, illuminate, or reinterpret quantitative data collected under similar conditions (28).

Quantitative research was used in this investigation. An empirical study, confined to Individuals from Haryana, India, was utilized to examine the linkages within the hypothetical framework because data were obtained from 307 samples. Questionnaire was design in two languages Hindi and English.

A questionnaire was used as a quantitative data collection technique to meet the study's small sample size to evaluate the hypotheses. A questionnaire also simplifies and quantifies responses, making it possible to make objective comparisons between variables (29)

SAMPLING, DATA COLLECTION, AND MEASURING INSTRUMENT

A population can be described as "the complete group of persons or social artifacts from whom information is requested," according to (30). However, keep in mind that everyone in the population is a social artifact with at least one attribute related to the research issue (30). For this purpose, Farmer of Haryana was taken into consideration who live in rural, urban or semi urban areas.

Convenience sampling was employed for the study because it is a non-probability sampling method. When conducting research, convenience sampling is frequently employed when administering questionnaires when the sample consists solely of available and accessible elements (29). The researchers used the sample from the Haryana State, India, for this research.

Three hundred seven respondents were included in the sample. The sample size is calculated as follows: five items will define each of the six variables.

The survey will be broken into three pieces, with a quick introduction at the start. The brief introduction has provided a quick summary presenting the research topic and the study's objective while maintaining the respondents' anonymity. Section A, B, and C were the three portions. Farmers factors such as age, gender, qualification, and job position will be identified using demographic data collected from respondents in section A. The independent variables, namely perceived utility, ease of use, trustworthiness, and relative advantage, will be discussed in Section B (independent variables). In part C, we will look at how people feel about Technology adoption (intervening variable) and how they use it (dependent variable). Both sections B and C will use a five-point Likert-Scale with responses ranging from "strongly disagree" (1) to "strongly agree" (5).

DATA ANALYSIS

The researcher begins the data analysis as soon as the primary data has been gathered. Five steps were taken to determine the best strategies for analyzing the data. The first questionnaire was sent to the 3 experts for the validity check. Then, inter-rated reliability and test re-test reliability were performed, and after that, data was collected from the field. The demographical data has been analyzed descriptively in the third step. The descriptive analysis provides broad information on the survey participant's attributes and qualitative descriptions of the data obtained. It also simplifies and summarises the data, allowing basic data analysis problems to be addressed (27). An exploratory factor analysis EFA was used in the fourth step to assess construct and content validity. Finally, Cronbach's Alpha coefficients were computed to determine dependability. Because this study examined numerous factors at once, a multivariate analysis tool was required. Numerous variables are analyzed simultaneously using statistical techniques in multivariate analysis. These factors are frequently used to assess several facets of a particular situation as well as different facets of an individual's or an organization's actions. Primary data for measurements is frequently gathered through surveys and observations. This study integrates aspects that are not clearly visible using a multivariate methodology known as Structural Equation Modelling (SEM). This gap is filled by latent variables or constructs, which are intangible and cannot be measured directly and are instead evaluated by abstract indicators or assertions. It was necessary to employ a variance-based SEM approach known as PLS-SEM because of the small sample size (Partial Least Square- Structural Equation Modelling). The

PLS-SEM can handle reflective and formative measurement models and single-item and multi-item measures.

Because the findings of PLS-SEM and CB-SEM tend to be similar, PLS-SEM estimates may serve as a viable substitute for CB-SEM outputs. Non-normality, a small sample size, and the employment of several scaling types are among the most often cited reasons for using PLS-SEM (31). Using Smart PLS 3, available for a 30-day free trial on the official website, the PLS analysis was conducted using the software. A two-step reporting method is used in this investigation. First, the measurement model's suitability will be evaluated, followed by a look at the structural model.

ASSESSMENT OF MEASUREMENT MODEL

The model's adequacy is demonstrated by comparing its reliability, convergent, and discriminant validity. Table 1 demonstrates a reasonable level of reliability as alpha coefficients and composite reliabilities exceed the bottom limit of 0.7, indicating that all collected data is reliable.

Convergent validity can be indicated by the square root of the average variance extracted (AVE), which evaluates the shared variation between a concept and its indicators. Because each notion has an AVE of at least 0.5, convergent validity may be shown. As per the table:1 AVE value for all variables is above .750, which shows that the data is good.

Table:1 Construct composite reliability, AVE, and Cronbach's Alpha.

Variables	Cronbach's Alpha	Rho_A	Composite Reliability	Average Variance Extracted AVE
<i>Efforts Expectancy</i>	.916	.921	.941	.801
<i>Facilitating Condition</i>	.833	.840	.900	.750
<i>Habit</i>	.895	.900	.927	.761
<i>Farmer's Buying Behaviour</i>	.895	.925	.936	.829
<i>Performance Expectancy</i>	.805	.939	.948	.786
<i>Social Influence</i>	.825	.941	.956	.845
<i>Technology Adoption Attitude</i>	.860	.895	.966	.850

Source: Output from Smart PLSv3.0

Each item inside a concept can be assessed for discriminant validity by comparing its high loadings on the construct. Its goal is to measure the cross-loadings, which must be reduced. Table 2 shows the factors' cross-loading. The Path Coefficient and R-squared are reported in Table 3.

Table:2 Exploratory Factor Analysis

	Effort Expectancy	Facilitating Condition	Habit	Farmer's Buying Behaviour	Performance Expectancy	Social Influence	Technological Attitude
E_E_1	0.907						

E_E_2	0.928						
E_E_3	0.825						
E_E_4	0.916						
F_C_1		0.891					
F_C_2		0.876					
F_C_3		0.829					
H_1			0.889				
H_2			0.845				
H_3			0.904				
H_4			0.850				
FB_B_1				0.913			
FB_B_2				0.882			
FB_B_3				0.936			
P_E_1					0.866		
P_E_2					0.867		
P_E_3					0.918		
P_E_4					0.886		
P_E_5					0.896		
S_I_1						0.916	
S_I_2						0.906	
S_I_3						0.932	
S_I_4						0.924	
T_A_1							0.909
T_A_2							0.901
T_A_5							0.956
T_A_6							0.920
T_A_7							0.922

Source: Output from Smart PLSv3.0

Table:3 Path Co-efficient and R-squared

Variable Relations	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Effort Expectancy -> Technological Attitude	0.189	0.040	4.818	0.000
Facilitating Condition -> Technological Attitude	0.218	0.056	3.906	0.000
Habit -> Technological Attitude	-0.023	0.057	0.468	0.640
Performance Expectancy -> Technological Attitude	0.331	0.064	5.237	0.000
Social Influence -> Technological Attitude	0.271	0.074	3.628	0.000

Technological adoption Attitude -> Farmers Buying Behaviour	0.537	0.034	15.920	0.000
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Source: Source: Output from Smart PLSv3.0

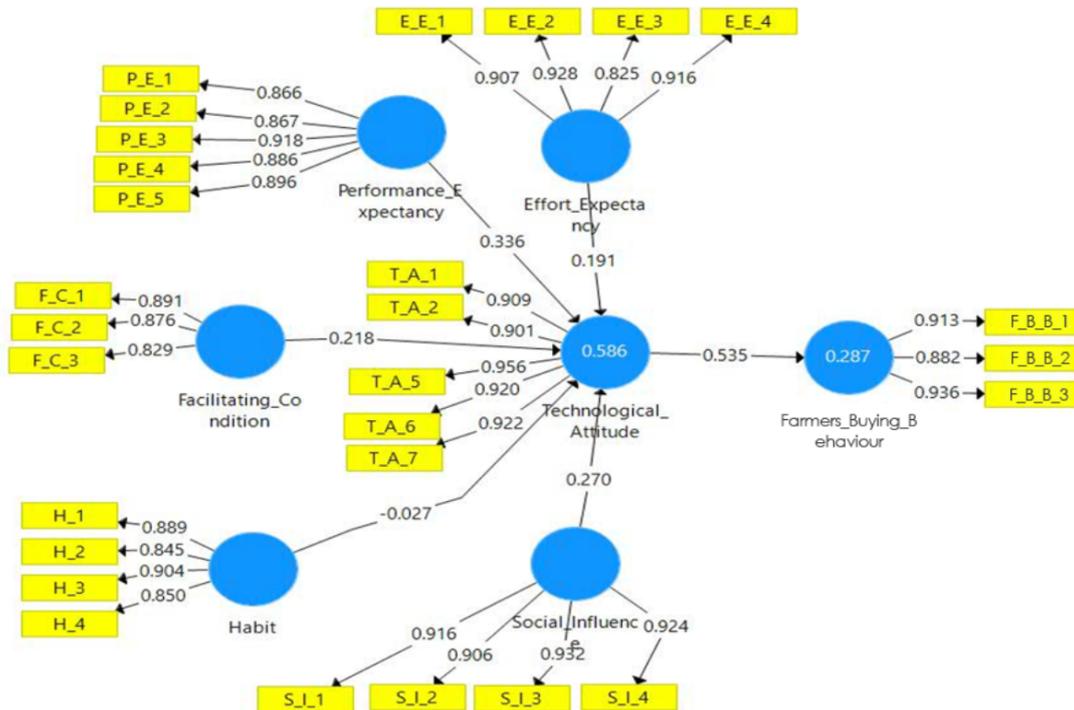


Fig. 2. SEM Diagram with Path Co-efficient and T values.

Source: Output from Smart PLS v3.0

The structural model has been assessed by testing the hypotheses using PLS. The table 3 provides the path co-efficient and R-Squared values of the model. According to the p-value derived from the t-statistics, it can be inferred that expect habit Performance Expectancy, social influence, facilitating condition and effort expectancy, have significant impact on technological attitude at 95% level of confidence. Hence, hypotheses H1.1, H1.2, H1.4, and H1.5 are accepted. Similarly, the technological attitude has a significate effect on Farmers Buying Behaviour, so we have to accept the hypotheses of H1.6. However, our model's analysis found that habit has no significant impact on technological attitude, so we reject H1.3.

The outcomes of the hypotheses have been summarized in table 4.

Table 4 Summary of Hypotheses testing

S. No	Hypotheses	Result
H1.1	There is a positive relationship between <i>Performance Expectancy</i> and <i>Technology adoption attitude</i> .	Accepted Null Hypothesis
H1.2	There is a positive relationship between <i>Facilitating conditions</i> and <i>attitude toward Technology</i> .	Accepted Null Hypothesis
H1.3	There is a positive relationship between <i>habits</i> and <i>attitudes towards Technology</i> .	Fail to accept Null Hypothesis

H1.4	There is a positive relationship between <i>social influence</i> and <i>Technology adoption attitude</i> .	Accepted Null Hypothesis
H1.5	There is a positive relationship between <i>effort expectancy</i> and <i>Technology adoption attitude</i> .	Accept Null Hypothesis
H1.6	There is a positive relationship between <i>Technology adoption attitude</i> and <i>Farmers Buying Behaviour</i> .	Accept Null Hypothesis

Source: Author compliance

Discussion

Several significant results from this research support the suggested SRT integrated framework. As part of this study, researchers used PLS-SEM to examine the effects of Performance Expectancy, social influence, habit, facilitating condition, habit, and effort expectancy on technological attitude and Farmers Buying Behaviour. As per the result, Performance Expectancy, social influence, facilitating condition, and effort expectancy has a positive and significant effect on technological attitude at 95 % level of confidence. Researchers fail to accept the positive relationship between habit and technological attitude at 95% level of confidence, which was supported by the previous studies (31; 10). Customers' attitudes toward technology help farmers to know the different technology which can be used in agriculture. This research is contradicted the previous study as per the previous study, habits have a significant effect on technology adoption (31; 29), but this research shows that habits have an insignificant effect on technological adoption attitude and change in buying behaviour.

Managerial Implications and Research limitations

This research has practical implications as well as theoretical implications. This research may help change the individuals' attitudes toward adopting the Technology and Farmers Buying Behaviour. This research helps marketing departments to focus on adopting Technology and arrange the digital literacy program to educate how they can use Technology for buying products (32). After covid-19, it was seen that people started moving toward Technology for making payments, transfer of payments, deposits, price comparison, buying products so the need for research related to Technological adoption is in demand (10; 23) We cannot entirely rely on this study because it has limitations. The first restriction is that this study was conducted with tiny sample size, focusing on only one state of India. Second, all working and non-working groups from urban and rural areas are included in this study.

Further study

This study is one of the future research projects that might investigate a new dimension of human emotion by examining technological adoption attitude's cognitive and emotional elements and Farmers Buying Behaviour.

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