Review Article

Modelling Dominant Factors of Technology Acceptance in Education: A Systematic Review Analysis of Indian Studies

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Abstract

The study aims to identify common external factors of the Technology Acceptance Model (TAM) that influence the adoption of digital education in India. The analysis included a systematic review of 20 independent Indian research papers published in leading journals. This work summarizes existing knowledge in the areas of e-learning, m-learning, and learning management systems and their acceptance in education over the last decade. The results show that social influence, self-efficacy, result expectancy, content quality, and facilitating conditions are the most frequently used external factors. The strengths of the causal relationships between these 5 independent variables and the dependent variables of the main constructs of TAMs were developed into the conceptual model.

India, with its diverse learning needs, is immensely benefiting from the latest advances in educational technologies. For effective implementation, it is important to understand how students and teachers in India perceive and use technology. The results of this study can help improve educational outcomes, benefiting not only India but also the global education community. The causal relationship developed serves as a reference for researchers working on educational technology and the further development of TAM.

Keywords: Technology Acceptance Model, Digital Education, Ed-Tech, India

Introduction

In India, there has been a growing emphasis on integrating technology into education to enhance teaching and learning outcomes. EdTech enables education institutions to be more dynamic and modern by using the latest trends in teaching and learning practices.

According to a UNESCO report in April 2020, more than 1.5 billion students globally experienced disruptions in their education due to closure of schools and higher education institutions, and over half of these students faced challenges in accessing education through alternative means, often due to economic and technical limitations. Therefore, as a response to this critical situation, a huge emphasis has been placed on digital education outlay in the Union Budget of India in FY 2022-23. Notably, the allocation for Samagra Shiksha increased from Rs 29,999 crore to Rs 37,383 crore in 2022-23. Similarly, the state allocation to strengthen digital teaching-learning increased from Rs 340 crore to Rs 550 crore. The government has initiated several programs and policies to promote digital literacy among teachers and students. Many educators in India have embraced technology tools to engage students in innovative ways (MOE-GOI, 2020). Digital tools such as interactive smart

boards, projectors, tablets, learning management systems multimedia content, and virtual labs have become integral parts of instructional practices. Open and Distance Learning (ODL) provides flexible and time-saving technology to meet the learning needs of students. (Kambris et al. (2022).

Therefore, it is interesting to investigate the significant external factors that enabled the acceptability of technology in the Indian educational system. The valuable information obtained through systematic literature review would significantly benefit research endeavours. From a business perspective. The technology examined in the review analysis would inform investors about the digital innovations that are bringing changes to the Indian education system.

This systematic review analyzed selected research papers to identify trends in the use of external factors, data analysis, methodology and technologies used. The synthesis of these data through systematic analysis has led to the development of conceptual models that can serve as a baseline for future research on technology acceptance in Indian education. Therefore, the following research questions arise:

1. What are the dominant external factors used in the selected studies?
2. What statistical analysis and research methods were used in the selected studies
3. Identifying significant causal relationships between the most used factors and TAM constructs to develop a conceptual model.

Research Background

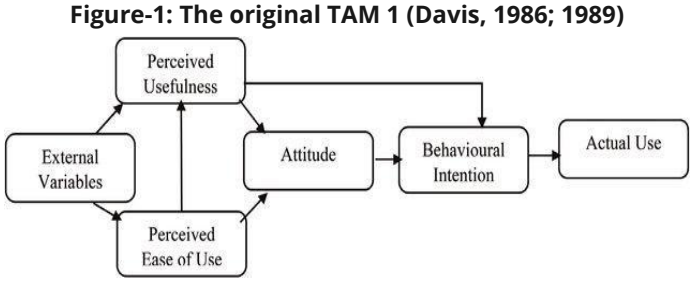
In the age of information technology, understanding technology adoption and acceptance is crucial. Rapid changes in the development and implementation of education technologies are having far-reaching impacts on secondary and higher education institutions in India.

An important part of technology integration is understanding why people use or reject new technologies. The Technology Acceptance Model (TAM) is the main scientific model for understanding technology acceptance.

Technology Acceptance Model

TAM is generally referred to as the most influential and commonly used theory of Information System by Warshaw, Davis, Bagozzi (1989) . This initial model included two theoretical determinants, which are the perceived usefulness (PU) and perceived ease of use (PEOU) which results in Behavioral intention to use technology. In 1996, Venkatesh and Davis, Davis, F. D. et al. (1996), the TAM model was adapted and proposed with the assertion that perceived usefulness and perceived ease of use directly impact an individual's intention to use the system. This initiative spearheaded the expansion of TAM using external variables. The number of TAM-related studies has increased dramatically since the outbreak of the covid-19 pandemic.

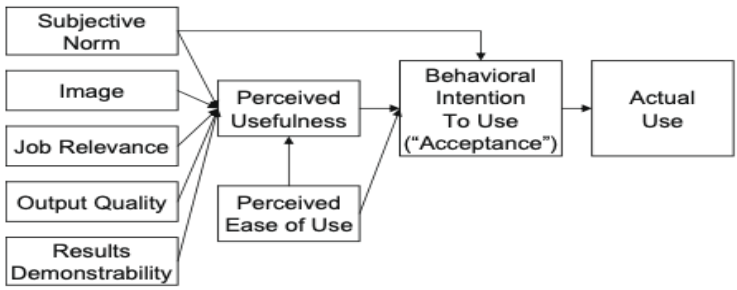
Figure-1: The original TAM 1 (Davis, 1986; 1989)



Modification and Extension of TAM

TAM appears to be able to explain about 40-50 per cent of user adoption. As research progressed, the TAM was modified and expanded to account for new factors that significantly influenced its two main variables, namely PU and PEOU. In 2000, Davis and Venkatesh, F.D. et al. (2000) proposed an extension of the model called TAM2. In this version, the authors explain the perceived benefits considering social influence (subjective norm, voluntariness, and image), and instrumental cognitive process (relevance of work, quality of results and verifiability of results). The researchers have also developed and extended other TAM-based models to better understand technology adoption behaviour.

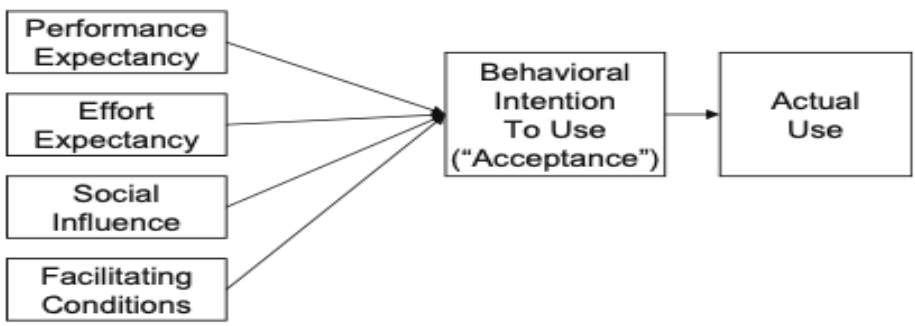
Figure-2: TAM 2 model (Davis and Venkatesh, 2000)



In 2008, Venkatesh and Bala, Bala, H. et al. (2008) released TAM 3 model which included factors such as self-efficacy, computer anxiety, and Computer playfulness, perception of external control, subjective enjoyment, and objective usefulness.

In addition to TAM 1 and TAM 2, researchers have also developed and extended other TAM-based models to better understand technology adoption behaviour. Venkatesh et al. (2003) proposed a unified theory of acceptance and use of technology (UTAUT), providing a more comprehensive framework for explaining technology adoption behavior. Four main concepts have been proposed that directly determine behavioural intentions: performance expectancy, effort expectancy, social influences, and enabling conditions. Additionally, behavioural intentions are predicted to be predictors of actual usage. A well-known information system model for evaluating technological success was developed by DeLone-Mclean, DeLone et al (1992).

Figure-3: Unified Theory of Acceptance and Use of Technology (UTAUT)



Even after more than three decades, TAM and advanced models have been research in the educational context and beyond.

Research Methodology

This study systematically reviewed existing published Indian research articles and identified the dominant external factors influencing the adoption of technology in education. Published research articles were selected based on the following:

Inclusion Criteria:

1. The research should have mainly focused on the Indian education system. This includes research conducted within educational institutions in India or studies that investigated technology acceptance.
2. Research papers should have used TAM or extended TAM models in an empirical study.
3. Research published in the last ten years (from 2013 to 2023).
4. Scientific articles and scientific papers from various journal databases and search engines.

Exclusion Criteria:

1. Studies not related to TAM and its application in education.
2. Non-peer-reviewed sources such as blog posts, news articles and opinions were not included.
3. Research conducted in countries other than India
4. Studies published before 2013 were considered outdated.
5. Studies published in languages other than English were not considered as the journal is produced in English.

These criteria were used to select the studies that were most relevant to the research question and could provide valuable information to formalize the conceptual model.

Data Sources and Search Strategies

The search examined a combination of keywords related to educational technologies (e-learning, m-learning, technology-enhanced learning, digital tools, etc.)) or the TAM theory of Indian education. Articles published in reputable journal databases such as Emerald Publication, Wiley, Amity University Press, Springer, and International Journal of Library, Information, Networks and Knowledge (IJLINK) were inspected as part of search strategy.

The search resulted in 35 documents from various magazines and the Google search engine. A standardized table was created to systematically capture information from each selected study. The selected research articles were analyzed in detail based on the inclusion and exclusion criteria and TAM in the context of Indian education. Based on these criteria, 15 research articles were excluded, and 20 research articles passed all screening and eligibility checks.

The dominant external factors were selected based on the maximum frequency of occurrence in the selected research articles. Once the common external factors were identified, studies were grouped by types of educational technologies and user types. The user types were divided into “teacher”, “student”, and “mixed”.

The systematic review was carried out by analyzing the statistical significance level (p-value), correlation coefficient (r-value) and regression coefficients (β) as well as the strength of relationship between the external variables and the TAM construct. Finally, the study proposed an Indian conceptual model

for technology acceptance in education was proposed.

Analysis of Indian Studies

As mentioned in the Methodology section, twenty Indian educational research documents using TAM and extended TAM models were analyzed to answer the research questions. In the last decade, the Indian government has launched several e-learning projects. Initiatives like SWAYAM and DIKSHA are the dominant online learning platforms in this regard (Singh, M, Adebayo et al. (2021)). Additionally, the advent of coronavirus has acted as a catalyst for increased reliance on online learning in 2020. "The collaboration between the Indian Institute of Technology (IIT) and the Indian Institute of Sciences (IISc) offers online certificate programs through the National Program on Technology Enhanced Learning (NPTEL) platform", Chugh, N et al. (2023). Even competitive exams like Common University Entrance Test (CUET) and Joint Entrance Examination (JEE) are now computer-based assessments. Therefore, it is important to understand the various factors that influence the adoption of online learning and the usage of digital tools in Indian education. The selected research articles are divided into three tables according to the user type, i.e., Teachers, students and mixed (students and teachers).

Each research article was evaluated based on parameters such as theoretical model, sample size, research area (e.g., School or higher education), applied statistical analysis and research approach.

Table-1: Indian Papers on Acceptance of Technology by Teachers

Research (Year)	Domain	Model	Technologies	Sample	Measures	Approach
Sharma.et al. (2020)	Higher	TAM2	Online Tools	235	Multivariate	quantitative
Sangeeta.et al. (2021)	School	UTAUT	Online Tools	643	SEM	quantitative
R Bansal.et al. (2022)	Higher	UTAUT	LMS	480	PLS-SEM	quantitative
Bhatt. Et al. (2020)	Higher	TAM	Zoom Software	125	SmartPLS	quantitative
Kolil. Et al. (2022)	Higher	UTAUT	Virtual Labs	650	SEM	quantitative
Joy. Et al. (2019)	School	TAM	ICT Tools			qualitative

Table-2: Indian Papers on Acceptance of Technology by Students

Research (Year)	Domain	Model	Technologies	Sample	Measures	Approach
Chahal. et al. (2022)	Higher	TAM	e-learning	570	PLS-SEM	quantitative
Kampa. Et al. (2023)	Higher	TRAM	M-learning	665	PLS-SEM	quantitative
Chughs. et al. (2023)	Higher	TAM	e-learning	384	SEM	quantitative

Antontte. et al. (2019)	Higher	TAM	e-learning	205	Smart PLS SEM	quantitative
Thakar, Vaghela (2021)	Higher	TAM	M-learning	112	Multivariate	quantitative
Kaur, Gopal. (2022)	Higher	TAM	e-learning	200	Multivariate	quantitative
Gupta. et al. (2021)	Higher	TAM	e-learning	209	SEM	quantitative
Majumdar, Rai (2021)	Higher	UTAUT	e-learning			qualitative
Dubey, Sahu (2022)	Higher	TAM	TEL	600	Smart PLS SEM	quantitative
Ratna, Mehra (2015)	Higher	TAM	e-learning	116	Multivariate	quantitative
Murari, Rai (2022)	Higher	TAM	e-learning	506	PLS-SEM	quantitative

Table-3: Indian Papers on Acceptance of Technology by Students and Teachers

Research (Year)	Domain	Model	Technologies	Sample	Stat, Analysis	Approach
Mahindravada (2015)	School	TAM	Digital Tools	110	Multivariate	quantitative
Chatterjee. et al. (2020)	School	UTAUT	M-Learning	271	PLS-SEM	quantitative
Duggal (2022)	Higher	UTAUT	E-Learning	331	SEM	quantitative

Results

The results of the analysis are shared below:

Identification of Dominant External Factor

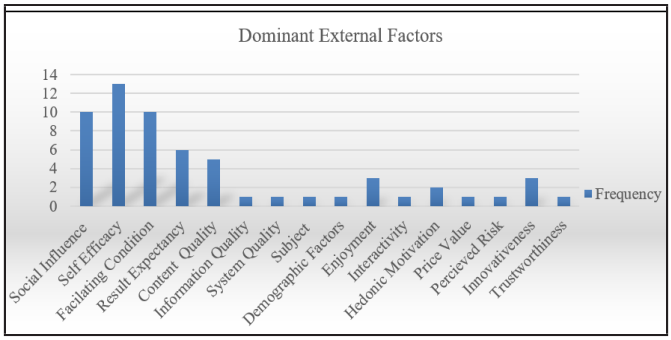
Most of the articles reviewed were extensions of the original TAM. Only one paper has used the original TAM with no external factors Ratna, Mehra (2015). It is worth mentioning that Indian researchers have given different names under sub-classifications but can be broadly classified under commonly used main factors in extended TAM theories. As per our meta-analysis, a total of 39 external factors were identified from 20 Indian research papers. We have grouped them into 16 major factors based on common classification and similarities. The frequency of major external factors has been shared in Table 4 and figure 4.

Table-4. Identification of Dominant External Factor/Construct

S. No	External Factors	Sub-Classification	Indian Studies reference	Frequency
1.	Social Influence	Subjective Norm (SN), Playfulness (PLY)	[15],[16],[17],[20],[23],[26],[27],[30],[31],[33]	10

2.	Self-Efficacy	Computer Experience (CE), Computer Competency (CC), Anxiety (AX), Habits (HB), Optimism (OT), Insecurity (INS), Discomfort (DIS), Learns prior Knowledge (LPK), Learners prior experience (LPE), Learner characteristics (LC), Capability {CAP), Individual Belief (IB), subjective interest (SIN)	[15],[18],[19],[20],[21],[23],[24],[25],[28],[29],[30],[31],[34]	13
3.	Facilitating Condition	Management Support (MS), Training (TR), Environment Concern (EC), Instructor Quality (INQ), Instructor prompt feedback (IPF), Institutional Quality (INQ), Compatibility (COM), Resource availability (RA), institutional branding (INB)	[16],[17],[19],[20],[21],[25],[28],[30],[31],[33]	10
4.	Result Expectancy	Value Belief (VB), Performance Expectancy (PE), Effort Expectancy (EE)	[15],[16],[17],[20],[22],[33]	6
5.	Content Quality	Content Quality (CQ)	[17],[25],[30],[33],[34]	5
6.	Information Quality	Information Quality (IQ)	[34]	1
7.	System Quality	System Quality (SQ)	[34]	1
8.	Subject	Subject (SUB)	[18]	1
9.	Demographic Factors	Demographic Factors (DF)	[21]	1
10.	Enjoyment	Enjoyment (ENY)	[21],[30],[34]	3
11.	Interactivity	interactivity (ITV)	[21]	1
12.	Hedonic Motivation	Hedonic Motivation (HM)	[17],[20]	2
13.	Price Value	Price Value (PV)	[22]	1
14.	Perceived Risk	Perceived Risk (PR)	[22]	1
15.	Innovativeness	Innovativeness (INO)	[23],[24],[26]	3
16.	Trustworthiness	Trustworthiness (TW)	[29]	1

Figure-4: Dominant external factors influence on data studied

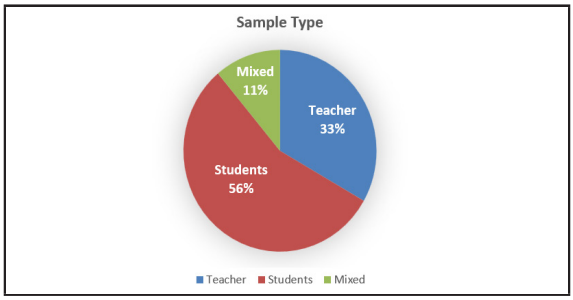


As shown in Figure 4 above, the most used external variables identified in the systematic review were social influence, self-efficacy, and Facilitating conditions, followed by result expectancy and Content quality. Other factors such as Information and system quality, Demographic factors, Subject, Enjoyment, Interactivity. Hedonic motivation, price value, perceived risks, innovativeness, and trustworthiness received less attention, but are worth mentioning in our analysis.

Research Samples and Technologies Used

The current analysis showed that the largest sample proportion were students, which explains finding in the Indian research studies. The students were mainly university students, which could be due to the Covid-19 pandemic as they had no access to campus and had problems with equipment and techniques. Only five research studies used teachers/lecturers as samples. Three studies used a mixed sample of students and teachers. The largest sample used in the reviewed articles were 665 university students surveyed on the adoption of mobile learning, Kampa, et al. (2023). Also, 650 teachers surveyed for adopting the online virtual labs, Kolil. Et al. (2022). The smallest student sample size was 112 undergraduate students, which were included in the study by Thakar, Vagheli (2021).

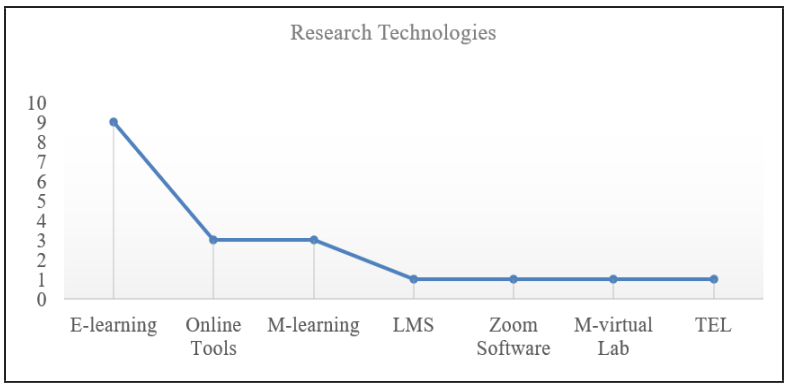
Figure-5: Division of Sample Type



The most prevalent research technology in the selected studies was online learning (e-learning). In fact, the online platform was mainly used by various Indian universities during the pandemic. Other technologies have also gained importance in higher education, such as virtual laboratories and learning management systems.

The chart below provides details of the various technologies used in our selected research papers.

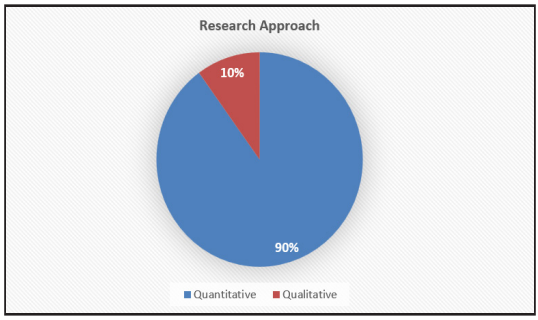
Figure-6: Recurrence of Research Technologies in Indian Studies



Analytic Technique and Research Approach

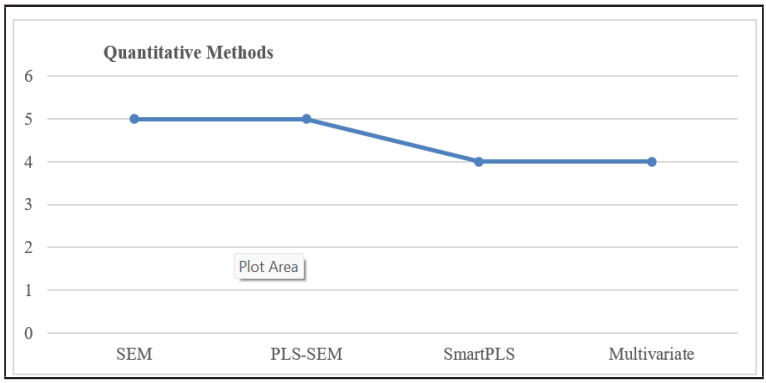
The most used research method was the quantitative approaches in eighteen Indian studies and only two articles were qualitative in nature as shown in Fig 7.

Figure-7: Distribution of Research Approach in Indian Studies



The most common quantitative method was structural equation modeling (SEM) analysis, which used SPSS and AMOS tools. PLS-SEM analysis was equally used in the Indian studies. Multivariable regression analysis and SmartPLS were used in 4 studies each. The details of the quantitative methods used is represented in figure 8 below.

Figure-8: Prevalent Quantitative Technique



Development of Conceptual Model through Casual Relationship

This section attempts to make a relationship between five identified dominant external factors and construct of technology acceptance models by reviewing the literature, tested models and data analysis by Indian authors. The correlation coefficient (r value) and regression coefficients (β) were used to determine the strength of the relationship between the variables. The correlation coefficient can vary between -1 and +1. The plus and minus signs indicate whether there is a positive or negative relationship. Statistical significance between the independent variable and the dependent variable was recorded using the P value. Sample sizes and values were collected to establish relationships using arithmetic means of all correlation coefficients.

The causal relationship emerging from our research analysis is presented below for each dominant external factor in this study:

Social Influence:

Social influence is defined as the influence of neighbors' perceptions on a person's attitude toward technology adoption (Venkatesh et al., 2003). It refers to the influence of social factors such as norms, opinions, and recommendations from peers, administrators, or other influential people on technology adoption decisions. From the selected studies, the following table summarizes a systematic analysis of relationship between two variables using a quantitative approach:

Table-5: Association between SI and TAM constructs of selected Indian Studies

Indian Research	Relationship	N	Correlation Value	B	p value	Significant
Sharma.et al. (2020)	SI>BI	235	0.216		P<0.05	Yes
Sangeeta.et al. (2021)	SI>BI	643	0.21		P<0.05	Yes
R Bansal.et al. (2022)	SI>BI	480	0.536		P<0.05	Yes
Dubey, Sahu (2022)	SI>BI	600	0.597		P<0.05	Yes
Duggal (2022)	SI>BI	331	0.441		0.08	No
Sum of Sample Size		**2289**				
Average Correlation Value			**0.413**			
Kolil. Et al. (2022)	SI>BI	650		0.179	P<0.05	Yes
Antonetta. et al. (2019)	SI>BI	205		0.363	P<0.05	Yes
Thakar, Vaghela (2021)	SI>BI	112		0.09	0.274	No
Chahal. et al. (2022)	SI>PU	570		0.285	P<0.05	Yes
Murari, Rai (2022)	SI>PU	506		0.198	P<0.05	Yes
Murari, Rai (2022)	SI>PEOU	506		-0.06	0.1	No
Chahal. et al. (2022)	SI>PEOU	570		0.348	P<0.05	Yes

The results Sharma.et al. (2020), Sangeeta.et al. (2021), R. Bansal. Et al. (2022), Dubey, Sahu (2022), Kolil. Et al. (2022), Antonette. Et al. (2019) found a significant relationship between social influence and behavioral intention to use technology in education.

Two studies by Duggal [33] (2022), Thakar, Vaghela (2021) were unable to demonstrate this connection. As shown in Table, 6 out of 8 studies (75 per cent) showed a positive and significant relationship between SI and BI with an average correlation coefficient (r value) of 0.413. Therefore, this hypothesis and relationship were supported and included as H1a in our conceptual model.

The similar relationship has been established in several international studies Luo N. et al. (2017), Zhang M. et al. (2019) which asserts that social influence and subjective norms have a favorable positive impact on BI.

The results for Chahal. et al. (2022), Murari and Rai (2022) found a significant relationship between social influence and perceived usefulness of technology in Indian education. From Table 5 above, SI and PU indicate a positive relationship with the value of the regression coefficient (β) ranging between 0.19 and 0.28. Therefore, this hypothesis and relationship were supported and included as H1b in our conceptual model.

According to Murari, Rai (2022), no significant relationship was found between social influence and the perceived ease of use of technology in education. However, Chahal. et al. (2022) made this connection. Because there is only one study that has demonstrated this association, we did not consider it significant and have not included it in our conceptual model.

Result expectancy:

This factor is important if the user is satisfied with their willingness to use the system and also depends on the user's desired level of success in using the system. Teachers are more likely to accept and implement online learning or educational technologies when they see tangible evidence of their effectiveness in achieving desired educational outcomes or improving student outcomes. From the selected studies, the following table summarizes a systematic analysis of relationship between two variables using a quantitative approach:

Table-6: Association between RE and TAM constructs of selected Indian Studies

Indian Research	Relationship	N	R	B	p value	Significant
Sharma.et al. (2020)	RE>BI	235	0.48		P<0.05	Yes
Sangeeta.et al. (2021)	RE>BI	643	0.144		0=0.03	Yes
R Bansal.et al. (2022)	RE>BI	480	0.61		P<0.05	Yes
Duggal (2022)	RE>BI	331	0.456		P<0.05	Yes
Sum of Sample Size		**1689**				
Average Correlation Value			**0.38**			
Kolil. Et al (2022)	RE>BI	650		0.212	P<0.05	Yes
Chatterjee. et al. (2020)	RE>BI	271		0.32	P<0.05	Yes

Analysis of selected Indian studies revealed a significant relationship between Result Expectancy (RE) and behavioral intentions (BI) regarding the

use of technology in Indian education. All the 6 studies shown in the above table have a positive relationship between these two constructs, with an average correlation co-efficient (r-value) of 0.385 and a regression coefficient (β) in the range of 0.21-0.32. Therefore, this hypothesis and relationship were supported and included as H2a in our conceptual model.

Similar relationship has been observed in the international studies (Nikolopoulou et al., 2021a), (Hu et al,,2020) , the greater is result expectancy, the faster the adoption of mobile learning in education.

Content Quality (CQ):

This concept was introduced by Wang,Y.S ,2003. This construct explains that the content of an information system is important to its educational success. High-quality content (audio, video, and visual elements) is often considered as an important factor influencing technology adoption in education.

From selected studies, the following table summarizes a systematic analysis using a quantitative approach of the relationship of the independent factor of Content Quality with the various dependent factors of TAM model:

Table-7: Association between CQ and TAM constructs of selected Indian Studies

Indian Research	Relationship	N	R	β	p value	Significant
R Bansal.et al. (2022)	CQ>BI	480	0.497		P<0.05	Yes
Duggal (2022)	CQ>BI	331	0.49	0.159	P<0.05	Yes
Sum of Sample Size		**811**				
Average Correlation Value			**0.494**			
Chughs. et al. (2023)	CQ>PU	384	0.748		P<0.05	Yes
Murari, Rai (2022)	CQ>PU	506		0.107	P=0.016	Yes
Murari, Rai (2022)	CQ>PEOU	506		-0.301	P=0.26	No

The results of R Bansal.et al. (2022) and Duggal (2022) found a significant relationship between content quality (CQ) and behavioral intention (BI) to use the technology in education. Two studies found a positive relationship between these two constructs with an average correlation coefficient (r value) of 0.494. Therefore, this hypothesis and relationship were supported and included as H3a in our conceptual model.

The results of Chughs. et al. (2023) and Murari, Rai (2022) found a significant positive relationship between content quality (CQ) and perceived usefulness (PU) of technology in Indian education with regression coefficients (β) equal to 0.107 and correlation coefficient (r value) of 0.748. Therefore, this hypothesis and relationship were supported and included as H3b in our conceptual model.

Similar international studies have shown that quality of content significantly influences PU. (Sami Saeed Binyamin, Rutter, & Smith, 2019; Mailizar et al., 2021; Salloum et al., 2019).

The result of Murari, Rai (2022) found no significant relationship between Content quality and perceived ease of use of the technology in education. Therefore, we did not include this relationship in our conceptual model.

Self-Efficacy (SE):

Self-efficacy is "The degree to which a person believes that he or she is

capable of performing a particular task/ work at the computer," according to one definition. From the selected studies, the following table summarizes a systematic analysis of relationship between two variables using a quantitative approach:

Table-8 Association between SE and TAM constructs of selected Indian Studies

Indian Research	Relationship	N	R	β	p value	Significant
Sharma.et al (2020)	SE>BI	235	0.026		0.68	No
Dubey, Sahu (2022)	SE>BI	600	0.506		P<0.05	Yes
Kampa. Et al. (2023)	SE>PEOU	665	0.457		P<0.05	Yes
Bhatt. Et Al. (2020)	SE>PEOU	125	0.74		P<0.05	Yes
Chahal. et al. (2022)	SE>PEOU	570		0.603	P<0.05	Yes
Murari, Rai (2022)	SE>PEOU	506		0.205	P<0.05	Yes
Bhatt. Et Al. (2020)	SE>PU	125	0.66		p=0.19	No
Mahindravada [(2015)	SE>PU	139	0.576		p=0.434	No
Chahal. et al. (2022)	SE>PU	570		0.231	P<0.05	Yes
Kampa. Et al. (2023)	SE>PU	665	0.428		p>0.05	No
Murari, Rai (2022)	SE>PU	506		-0.005	p=0.403	No
Kaur, Gopal. (2022)	SE>PU	300		0.935	P<0.05	Yes
Chughs. et al. (2023)	SE>PU	384	0.633		p>0.05	No

The results of Sharma.et al. (2020) found no significant relationship between self-efficacy (SE) and behavioral intention (BI) to use the technology in education. Dubey, Sahu (2022) had established the relationship between Self-Efficacy (SE) and Behavioral Intention (BI). But no other Indian study found a positive relationship between these two constructs in our analysis, hence we did not include this relationship in our conceptual model.

The results of Kampa. Et al. (2023), Bhatt. Et Al. (2020), Chahal. et al. (2022), Murari, Rai (2022) found a significant positive relationship between self-efficacy (SI) and the perceived ease of use (PEOU) of technology in Indian education with regression coefficient (β) range from 0.20 to 0.60. Therefore, this hypothesis and relationship were supported and included as H4a in our conceptual model.

Similarly international research has shown positive relationship between these two factors in (Chang et al., 2017 ; Ejdys, 2021;Salloum et al., 2019 ; Salloum & Shaalan, 2018).

As shown in the table above, 5 out of 7 studies found no relationship between self-efficacy (SE) and perceived usefulness (PU) of technology in education. We, therefore, did not include this relationship between these two constructs in our conceptual model.

Facilitating Conditions:

The Facilitating Conditions (FC) is "the extent to which a person believes that an organization exists that supports the system and technical infrastructure." (Venkatesh et al., 2003, p. 453). Adequate facility conditions, such as reliable internet connectivity, appropriate hardware and software, technical support, and training opportunities, can

have a positively impact on teachers and students' acceptance of online learning or educational technology. From the selected studies, the following table summarizes a systematic analysis of relationship between two variables using a quantitative approach:

Table-9: Association between FC and TAM constructs of selected Indian Studies

Indian Research	Relationship	N	R Value	β	p value	Significant
Sangeeta.et al. (2021)	FC >BI	643	0.39		p=0.04	Yes
R Bansal.et al. (2022)	FC >BI	480	0.532		P<0.05	Yes
Dubey, Sahu (2022)	FC >PEOU	600	0.502		P<0.05	Yes
Sum of Sample Size		**1723**				
Average Correlation Value			**0.47**			
Kaur,Gopal (2022)	FC >BI	300		0.716	P<0.05	Yes
Kolil. Et all. (2022)	FC >BI	650		-0.105	p=0.128	No
Duggal (2022)	FC >PEOU	331		0.217	P<0.05	Yes
Bhatt. Et Al. (2020)	FC >PEOU	125		0.316	P<0.05	Yes

The results of Sangeeta.et al. (2021), R Bansal.et al. (2022), Dubey, Sahu (2022) Sharma.et al. (2020) and Kaur, Gopal. (2022) found a significant relationship between the facilitating condition and behavioral intention to use the technology in education but Kolil. Et al. (2022) could not establish a connection. Regarding the association between FC and BI, 4 out of 5 (80 per cent) reported a positive and significant association between these two constructs. with an average correlation coefficient (r value) of 0.47. Therefore, this relationship was supported and included as H5a in our conceptual model.

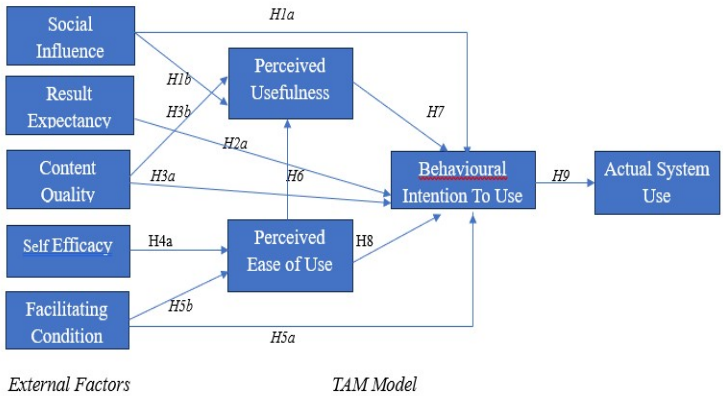
According to a global study, a supportive environment has a positive impact on behavioral intentions, (Jairak et al., 2009 ; Tseng et al., 2019)

The results of Duggal (2022), Bhatt. Et Al. (2020) found a significant relationship between environment i.e., facilitating conditions and perceived ease of use of technology in Indian education. The two constructs have regression coefficient value (β) range from 0.21 to 0.32. Therefore, this relationship was supported and included as H5b in our conceptual model.

The default hypotheses of TAM theoretical model establishing the relationship between PU, PEOU and BI were included in our conceptual model as H6, H7 and H8.

The recommended research model based on the systematic review analysis of Indian research articles and the causal association between five dominant external factors and TAM constructs is presented below:

Figure-9: Conceptual framework based on Systematics Review analysis



Conclusion and Future Scope

Numerous review studies have been conducted on the use of technology in education using the TAM model at the international level. However, there is no review study on the most commonly used external factors for technology adoption in Indian education. Therefore, this study analyzed 20 recent research articles to develop a conceptual model for technology adoption in the Indian education system. The research used 39 factors, which were grouped into 16 main external factors. Based on the frequency of use, social influence, result expectancy, content quality, self-efficacy and facilitating condition were found to be the most used external factors.

To confirm hypothesis and relationship between external factors and TAM dependent variables, the author analyzed the correlation (r value), path coefficient (β value) and significance value (p value) between the two constructs. These accepted relationships are incorporated into our conceptual model, as depicted in FIGURE 9.

The significance of these findings has potential to influence educational policies, strategies, and practices in India. Understanding these factors can help higher education institutions to design effective online learning environments, promote digital inclusion, and improve the quality of education. In addition, it can be used in secondary education as these external variables can guide tailored interventions and help in implementation of large digital education products in various states of the country. The next step is to empirically test this conceptual model with teachers, students, and other technology users to use it as a predictive tool. The model can be improved or modified as per the participant's behavior and their demographic positions.

As new technologies continue to evolve and the diversity of educational contexts increases, there are many opportunities for further research to deepen our understanding of technology adoption and use in education. The intersection of education and technology is a dynamic and constantly evolving field. The importance of this paper goes beyond the scope of this study as it lays the foundation for future research aimed at assessing technology adoption, particularly given the growing interest in India. Additionally, this research will be a valuable resource of information for researchers interested in development and implementation of digital educational technologies in India.

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