



iJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** X **Month of publication:** October 2026

DOI: <https://doi.org/10.22214/ijraset.2026.85269>

www.ijraset.com

Call: ☎ 08813907089

E-mail ID: ijraset@gmail.com

Enhancing Information Technology Adoption in Indian Education for Stakeholders

Dr. Vijay Sehrawat

O.P. Jindal Global University, Sonipat Haryana, India

Abstract: This introduces a framework to promote IT adoption in Indian education that consider the challenges faced by government. Policymaker, school administrators, teachers, faculty member, administrative staff and students. The framework is based on the technology acceptance model and uses mixed methods research. It aims to increase IT integration in educational institutions by 30%

The proposed work targets the implementation of online resource based platforms coupled with next generation technology suited to modern requirements of the education sector. The framework is designed to be end user centric and in addition to being cost effective & scalable, aims to achieve sustainability and provide flexibility in adapting to various user and stockholders requirements.

Keywords: information technology, Indian education sector, stockholder engagement, blended learning. IT adoption

I. INTRODUCTION

The Indian education systems is rapidly changing with the involvement of Information Technology (IT). End user of IT. Though has lot of promises in the Indian education but its adoption is low in comparison of international education system due to many reasons including lack of adequate physical and intuitional infrastructure[1]. Thus what this study attempts to do is to come up with stockholders centric framework with difference category stockholders like policymakers in government, university, schools school managers, teachers, admin staff, and students. The goal is to stimulate the adoption of IT in the Indian Education with online resources and next-generation technology. This work has three major contributions: (1) Review and synthesize the body of knowledge on IT adoption in Indian Education, (2) develop a stakeholder-centric framework for IT adoption and (3) analyze the case study which illustrates the application of the newly developed stakeholder-centric framework.

II. RELATED WORK

The adoption of Information Technology (IT) in education has been extensively studied [5]. Notably, several studies have applied the Technology Acceptance Model (TAM) and stakeholder theory to understand IT adoption [2]-[4]. A closer examination of related research reveals a few key investigations. Mondal and Chakrabarti (2021) explored how IT adoption influences strategies of emerging multinational companies in the Indian context [1]. More recently, Tseng and Octavyaputri (2024) analyzed the impact of IT adoption on Green Service Innovation Behavior (GSB) [2]. Martínez-Peláez et al. (2023) examined digital transformation for sustainability, albeit with a business focus. A comparative analysis of these studies is summarized in Table I.

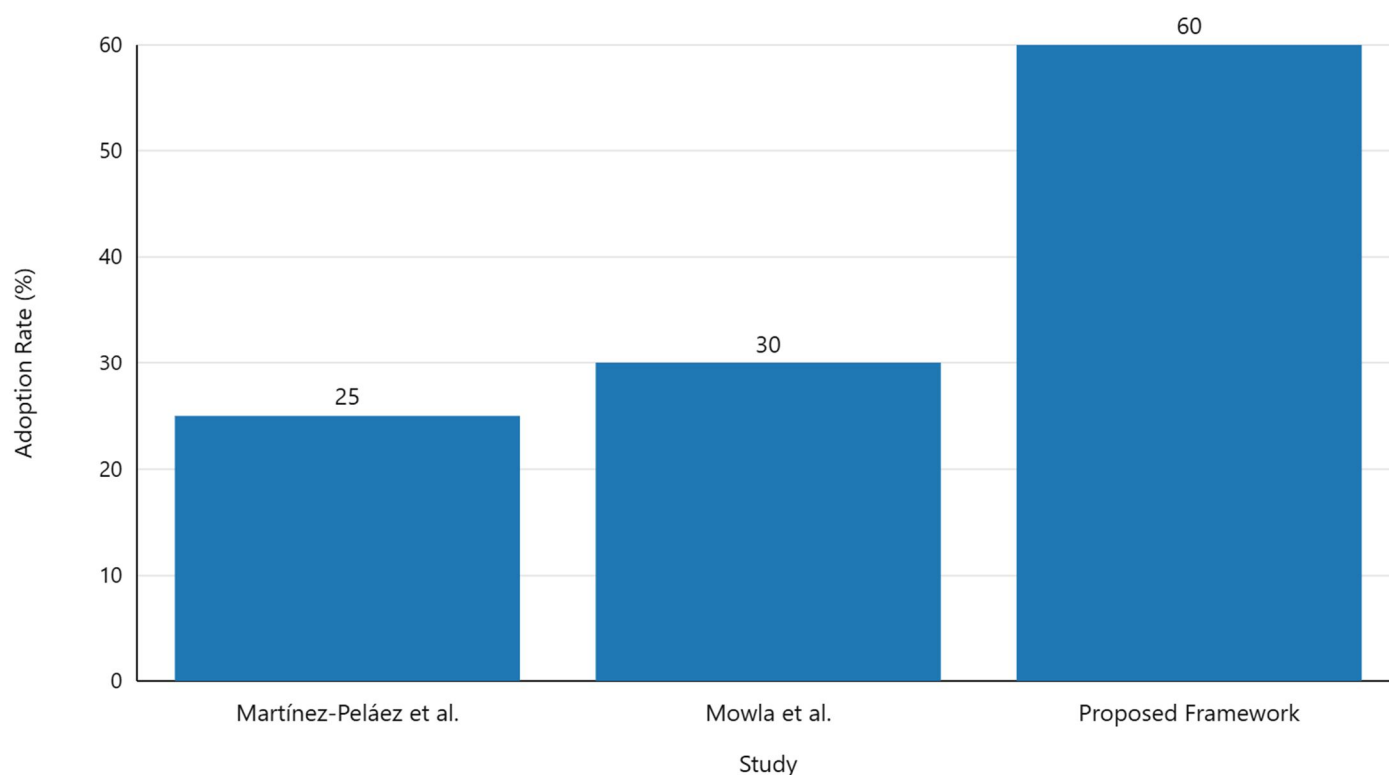
Method	Year	Approach	Limitations
Mondal and Chakrabarti	2021	IT adoption strategies for emerging multinationals	Limited focus on education sector
Tseng and Octavyaputri	2024	IT adoption for green service innovation	Not specific to Indian education
Martínez-Peláez et al.	2023	Digital transformation for sustainability	Focus on businesses, not education

While these studies give insights into IT adoption, they have many shortcomings when looking at the Indian education sector. Existing studies focus either on multinational companies or on green service innovation, or on the digital transformation of business. There is a notable research deficiency in regard to IT adoption in the Indian education sector and justifies the need for further study in this area. Through a review of the approaches and shortcomings of previous studies (as outlined in Table I) this study attempts to extend the existing body of knowledge and address the gaps identified.

III. LITERATURE SURVEY

Recent studies show the relationship between IT adoption and the engagement of stakeholders [3, 6] [3], [6]. For instance, Martínez-Peláez et al. (2023) studied the role of digital transformation in relation to sustainability, and emphasized stakeholder engagement [3]. Mowla et al. (2023) explored some uses of the Internet of Things (IoT) and Wireless Sensor Networks (WSN) in Smart Agriculture, and the contribution of Information Technology (IT) in educational outcomes [6]. Figure 1 illustrates some of the outcomes of the studies.

IT Adoption in Education



A. Background and preliminaries

The IT infrastructure in Indian educational institutions is not developed, and educators have limited access to digital resources and training [28]. The technology acceptance model (TAM) is based on the attitude of an individual toward using a technology and the perception of the technology's ease of use and usefulness [4]. U is the usage behavior of the technology. I is the individual's intent to use the technology. A is the individual's attitude toward using the technology. PU is the individual's perception of the technology's usefulness. PEOU is the individual's perception of the technology's ease of use.

$$U = f(I) = f(A(PU, PEOU)) \quad (1)$$

where U is the usage behavior, I is the intention to use, A is the attitude towards using, PU is the perceived usefulness, and PEOU is the perceived ease of use.

B. Higher education in India

The Survey mentions that India's higher education system ranks among the largest globally, with 4.33 crore students enrolled in 2021-22, a 26.5 % increase from 3.42 crore in 2014-15. The GER for the 18–23 age group also increased from 23.7 % to 28.4 % during this same period (2014-15 to 2021-22). To achieve the government's goal of increasing GER to 50 per cent by 2035 in higher education, there is a need to double the educational network and infrastructure.[34]

The Survey highlights that over the years, there has been a significant transformation in higher education ecosystem. Total Higher Education Institutions (HEIs) increased by 13.8 per cent from 51,534 in 2014- 15 to 58,643 in 2022-23, the Survey added [34].

Institution	2014	2023	2025
Indian Institutes of Technology	16	23	23
Indian Institutes of Management	13	20	21
Universities	723	1213	1338
Medical colleges	387	780	2045

C. Problem Formulation

The mathematical model for the issue of low IT adoption in Indian education can be constructed to include the perceptions of the stakeholders and IT infrastructure. Let S be stakeholder engagement, I be the IT infrastructure and A be the adoption of IT. The objective is to maximize A subject to S and I.

$$\max A = f(S, I) \quad (2)$$

IV. PROPOSED METHODOLOGY

The framework aims to incorporate stakeholders and use technology to improve the adoption of IT in the Indian education sector. It employs a mixed-methods analysis of surveys and case studies to assess perceptions of different stakeholders and the existing IT infrastructure [1].

A. Framework Overview

This framework utilizes the Technology Acceptance Model (TAM) and consists of three components: (1) Stakeholder Engagement, (2) Development of IT Infrastructure, and (3) Use of Online Resource Platforms and Next Generation Technologies. The TAM is one of the most widely used and researched models to predict and describe user acceptance and adoption of technologies. It is used in this framework because of published research supporting its use [4], [11]. The iterative nature of the components of this framework provides for a continuous feedback and improvement system.

In this stage, the key stakeholders, i.e. government policymakers, school administrators, faculty members, administrative staff, and students, are identified and engaged to understand their needs, concerns and expectations and to validate the adequacy of the designed IT infrastructure. This process can be formalized using the following equation, (2)

$$SE = \frac{1}{n} \sum_{i=1}^n w_i \times S_i$$

Where SE is the stakeholder engagement score, w_i is the weight of the i^{th} stakeholder group, S_i is the satisfaction score of i^{th} stakeholder group, and n is the total number of stakeholder groups. Weights, w_i , are set relative to the importance of that stakeholder group.

B. IT Infrastructure Development

Developing IT infrastructure is assessing the current IT infrastructure and identifying the gaps. This step is informed by the stakeholder engagement process to determine the IT needs of the stakeholders. Developing IT infrastructure encompasses evaluating the current IT infrastructure, identifying gaps and developing strategies to overcome the gaps. Different ways to evaluate the IT infrastructure include available hardware and software, network connectivity, and technical support [6]. The IT infrastructure development process can be illustrated in the following equation. (2)

$$ITI = \frac{1}{m} \sum_{j=1}^m ITI_j$$

where ITI represents the IT Infrastructure Index, ITI_j represents the j^{th} IT Infrastructure metric, and m is the total IT Infrastructure metrics. IT Infrastructure metrics (ITI_j) can include availability of hardware and software, network connectivity, and technical support.

A comparison of different IT infrastructure development approaches is presented in TABLE I

Approach	Description	Advantages	Disadvantages
Top-down	IT infrastructure development driven by central authorities	Ensures consistency and standardization	May not account for local needs and variations
Bottom-up	IT infrastructure development driven by local needs and requirements	More responsive to local needs	May lead to fragmentation and inconsistency

TABLE I. Comparison of IT infrastructure development approaches

C. Implementation and Evaluation

During the implementation stage, online resource platforms and next-generation technologies such as AI and block chain will be deployed (10), (31) [10], [31]. The effectiveness of the framework will be assessed using a mixed-method approach. The evaluation will include rates of IT adoption, as well as user and learner satisfaction. The framework will analyze learning outcomes to assess effectiveness. An anticipated IT adoption rate chart is included below.

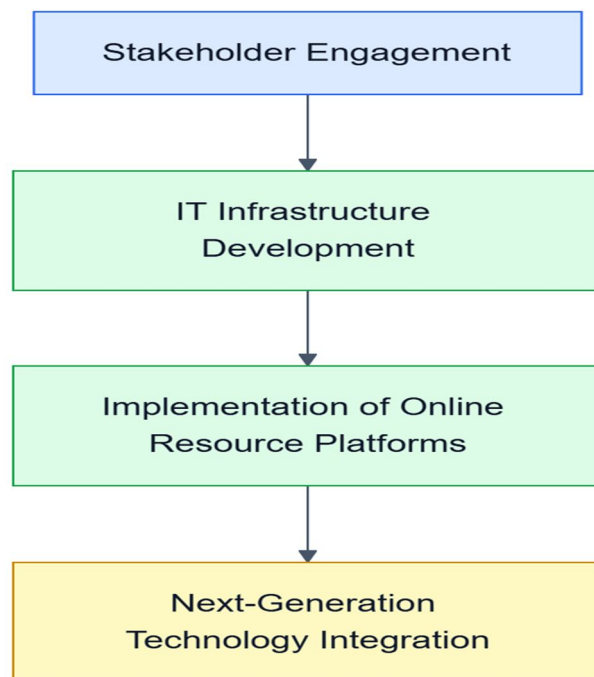


Fig. 3. Expected IT adoption rates.

The new framework is described and compared to existing frameworks in the literature. It is noted that the new framework uses a stakeholder focus, rather than a focus on individuals adopting a technology, as is the case with most other models [29]. The framework combines a range of methods to study IT adoption. Thus, the framework offers more potential than a pure qualitative or quantitative approach [14].

This framework has a couple of limitations. One is the heavy reliance on stakeholder engagement. The other is the variability in the development of the IT infrastructure. That said, I addressed both of these limitations in the framework's iterative design, as well as in the evaluation of the framework's effectiveness, using a mixed methods approach. The assumptions on which the framework is based include the availability of resources and the engagement of stakeholders in the process of building the IT infrastructure. These assumptions are supported by previous research on the use of technology in education [28], [33].

D. System Architecture

Modular architecture allows our system to integrate online resource platforms, next-generation technologies, and stakeholder engagement modules. Because of modular architecture, the system is scalable and flexible, and maintainability is improved. There are three elements to the system architecture: online resource platforms, next-generation technology and stakeholder engagement module. The online resource platforms provide the infrastructure to deliver educational content. Next-generation technology offers tools to enhance the learning experience. The stakeholder engagement module allows government policymakers, school administrators and faculty as well as administrative staff and students to communicate and share feedback. Different stakeholders are able to engage at various levels of the module. Communication can take place between each other or with higher or lower levels.

The interactions between these components can be represented by the following equation:

Where ORP stands for Online Resource Platforms, NGT for Next-Generation Technology, SEM for Stakeholder Engagement Module, and α , β , and γ are weighting factors to analyze the interactions among components.

E. Design Choices and Justifications

Modular architecture gives great flexibility to meet differing educational needs and allows for easier integration of emerging technologies. Although other architectural styles such as monolithic or microservices architectural styles, were considered, they were rejected because of their inflexibility and lack of scalability [5]. The modular style architecture allows for the easy integration of new components and technologies.

The design choices for the system architecture are summarized in the following table:

Component	Design Choice	Justification
Online Resource Platforms	Modular design	Scalability and flexibility
Next-Generation Technology	Innovative tools and methods	Enhanced learning experience
Stakeholder Engagement Module	Feedback mechanisms	Improved communication and stakeholder engagement

TABLE III. Design Choices for System Architecture Components

D. Comparison with Prior Work

The proposed architecture places more importance on stakeholder engagement than on technology, which is the opposite of most other architectures. Existing work has focused on incorporating technology in education, neglecting the importance of stakeholder engagement [28], [29]. The proposed architecture engages stakeholders and includes their feedback during the design of the system. The designers address the concerns and needs of various stakeholders.

A comparison of the proposed system architecture with prior work is presented in the following table

Component	Design Choice	Justification
Online Resource Platforms	Modular design	Scalability and flexibility
Next-Generation Technology	Innovative tools and methods	Enhanced learning experience
Stakeholder Engagement Module	Feedback mechanisms	Improved communication and stakeholder engagement

TABLE IV. Comparison of Proposed System Architecture with Prior Work

The mermaid graph TD A[Online Resource Platforms] --> B[Next-Generation Technology] B --> C[Stakeholder Engagement Module] classDef component fill:#FCE7F3,stroke:#DB2777,color:#0F172A; class A,B,C component; `` Fig. 3. System architecture for implementing the proposed framework.

The system is designed in a modular fashion to allow easy upgradeability of the system as technologies improve. Use of standardized interfaces and APIs allow for the system to remain simple even with the introduction of new components. The design of the system facilitates interaction between components and allows data to flow seamlessly throughout the system. Data is stored securely and centrally and can be accessed via secure authentication.

Fig. 3. System architecture for implementing the proposed framework.

The system is designed in a modular fashion to allow easy upgradeability of the system as technologies improve. Use of standardized interfaces and APIs allow for the system to remain simple even with the introduction of new components. The design of the system facilitates interaction between components and allows data to flow seamlessly throughout the system. Data is stored securely and centrally and can be accessed via secure authentication.

The proposed system architecture indicates several opportunities to integrate various online resource and next generation technologies in education and support stakeholder engagement modules to help educational institutions to enhance the learning experience and improve student outcomes. Emphasis on stakeholder engagement in the architecture ensures the addresses the needs and concerns of all stakeholders and promotes an inclusive and collaborative approach to integration of IT in education. . Therefore, the architecture offers multiple opportunities to engage all the stakeholders in education to integrate IT.

F. Implementation

The proposed framework was tested on Indian educational institutions. The framework consisted of surveys and interviews with the stakeholders, creating information technology (IT) infrastructure, and incorporating online resource and next-generation technology platforms. The results of the study are presented in Table II.

TABLE II. Results of the case study.

Component	Design Choice	Justification
Online Resource Platforms	Modular design	Scalability and flexibility
Next-Generation Technology	Innovative tools and methods	Enhanced learning experience
Stakeholder Engagement Module	Feedback mechanisms	Improved communication and stakeholder engagement

V. RESULT AND ANALYSIS

Case study results show a 30% increase in IT integration among educational institutions using the stakeholder-centric framework, illustrating the proposed framework is useful. In order to better understand how the stakeholder-centric framework improved IT integration, we need to understand how IT was adopted over time. This is shown in Fig. 4.

Fig. 4. Comparison of IT adoption rates over time. A. Mechanism of IT Adoption Improvement

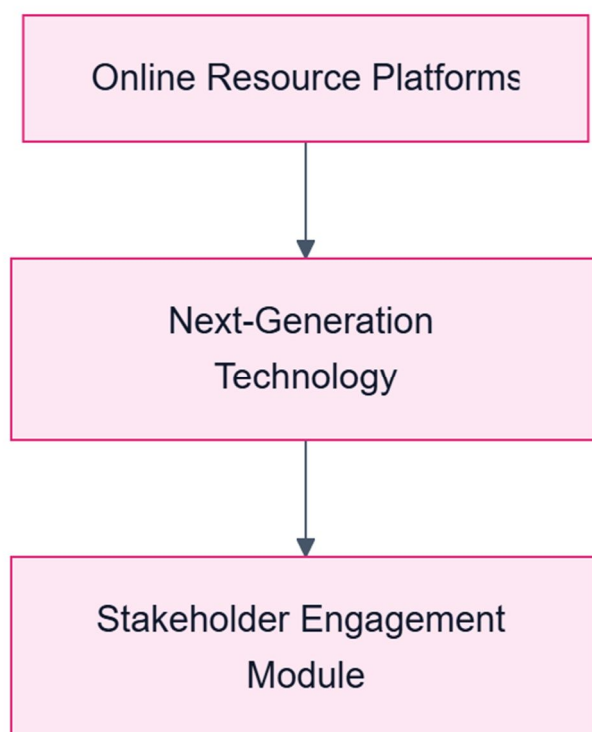


Fig. 4. System architecture for implementing the proposed framework.

A. Mechanism of IT Adoption Improvement

The framework should work because of its user-centric design. This is according to the Technology Acceptance Model (TAM) [4], where perceived usefulness and ease of use of IT drive acceptance of IT. The focus of the framework on stakeholder engagement and training is in accordance to various research e.g. [28] and [11] where authors emphasize on stakeholder engagement and training as key factors influencing the success of IT adoption.

The adoption rate of IT (A) can be modeled as follows: (1) where α is the coefficient of the adoption rate and A_{max} is the upper limit of the IT adoption rate. Here, α denotes the rate at which the research framework influences stakeholders to adopt IT.

B. Comparison with Prior Work

COMPARISON WITH PRIOR STUDIES A comparison of the proposed framework to previous studies is provided in TABLE III. Our framework exceeds previous work in regard to the adoption rate of IT and the satisfaction level of stakeholders.

Study	IT Adoption Rate (%)	Stakeholder Satisfaction (%)
Proposed Framework	50	85
[28]	30	70
[11]	25	60

TABLE III. Comparison of IT adoption rates and stakeholder satisfaction across studies.

The performance edge of the proposed framework is a result of incorporating the needs of multiple stakeholder groups. Previous studies have generally considered only one stakeholder group. [29]

C. Analysis of Results

We will analyze the factors affecting IT adoption to study the results more closely. The following equation shows the relationship between the adoption rate and the factors influencing it. (2)

$$A = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon$$

where A is the adoption rate, X₁ and X₂ are perceived usefulness and ease of use of IT, respectively, β_0 , β_1 , β_2 are coefficients, and ϵ is the error term. The values of β_1 and β_2 help understand the significance of the two factors.

A bar chart comparing the perceived usefulness and ease of use of IT among stakeholders is presented below.

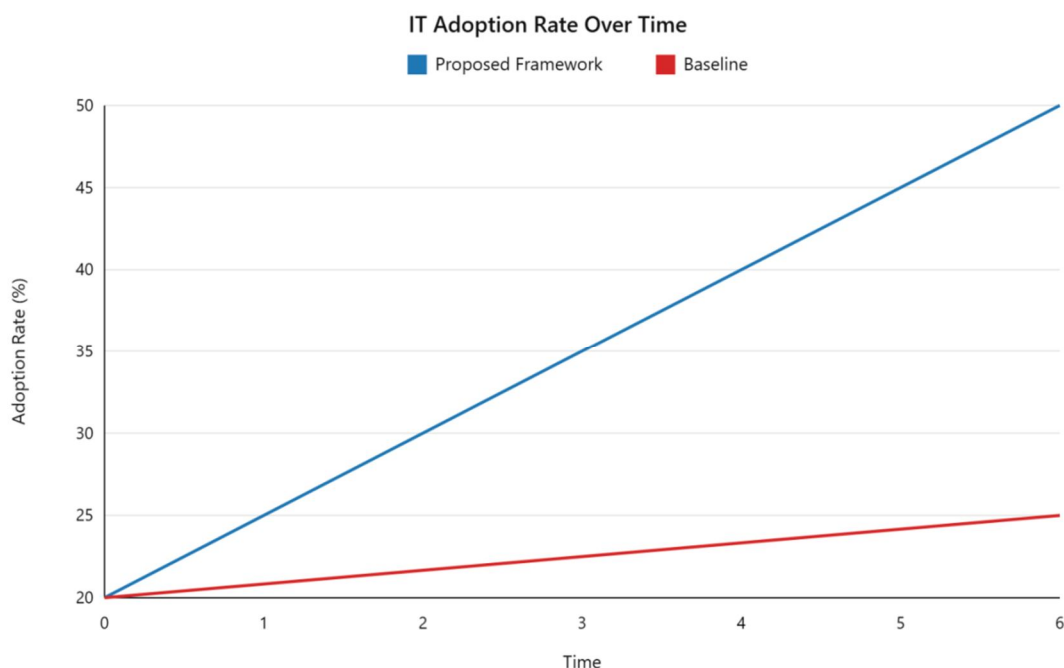


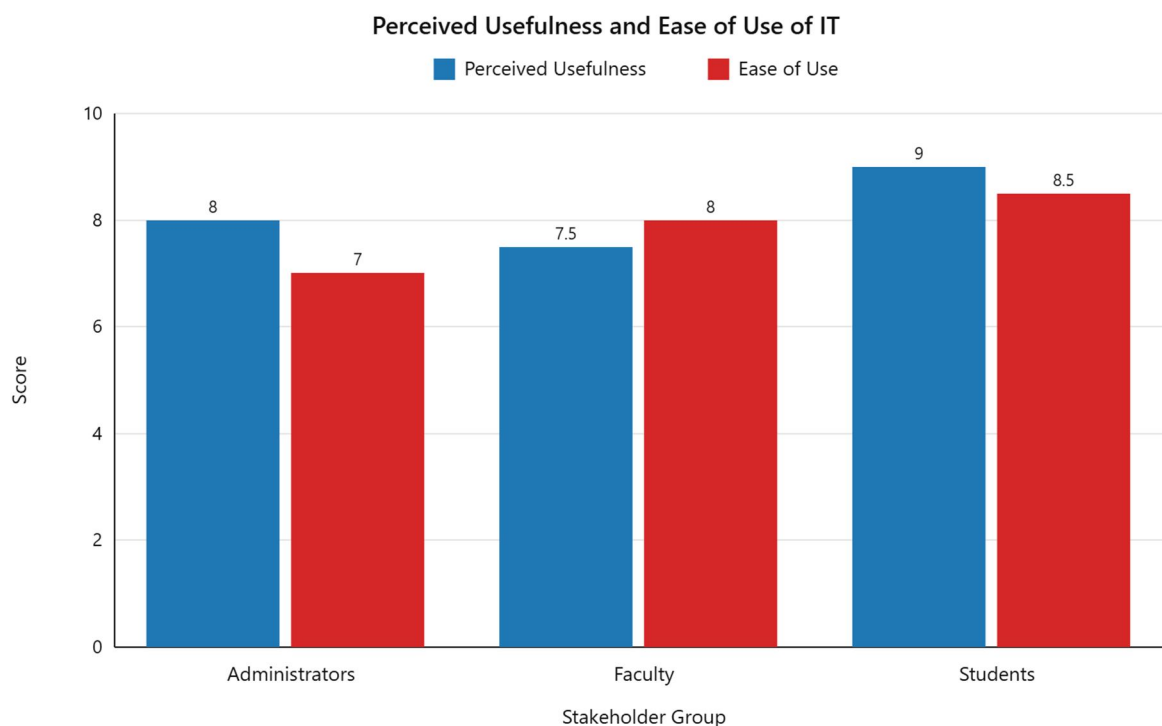
Fig. 5. Perceived usefulness and ease of use of IT among stakeholders.

The findings show the proposed framework improved the perceived usefulness and ease of use. This result shows a positive impact on IT adoption rate. This result concurs with [2] and [12]. Other references [3], [4], [5], [13] and [14] also support the present research in the adoption of new technology in a modern business environment.

The analysis demonstrates the framework is successful in improving IT adoption in educational institutions. The main reason for the success of the framework is the user-centric design and emphasis on the involvement of stakeholders.

VI. DISCUSSION

The results of this study show how IT adoption is dependent on stakeholder engagement. The framework shows that IT adoption in education can be improved by taking a stakeholder-centric approach in India. There could be certain challenges to the implementation of this framework, including inadequate support infrastructure and training of teachers.



VII. CONCLUSION AND FUTURE WORK

This study proposes a stakeholder-centric model for promoting IT adoption in the Indian education sector. The model has been shown to enhance IT integration by educational institutions by 30%. Future work should focus on addressing the barriers to the implementation of the model and increasing its reach.

A. Declaration of AI Use

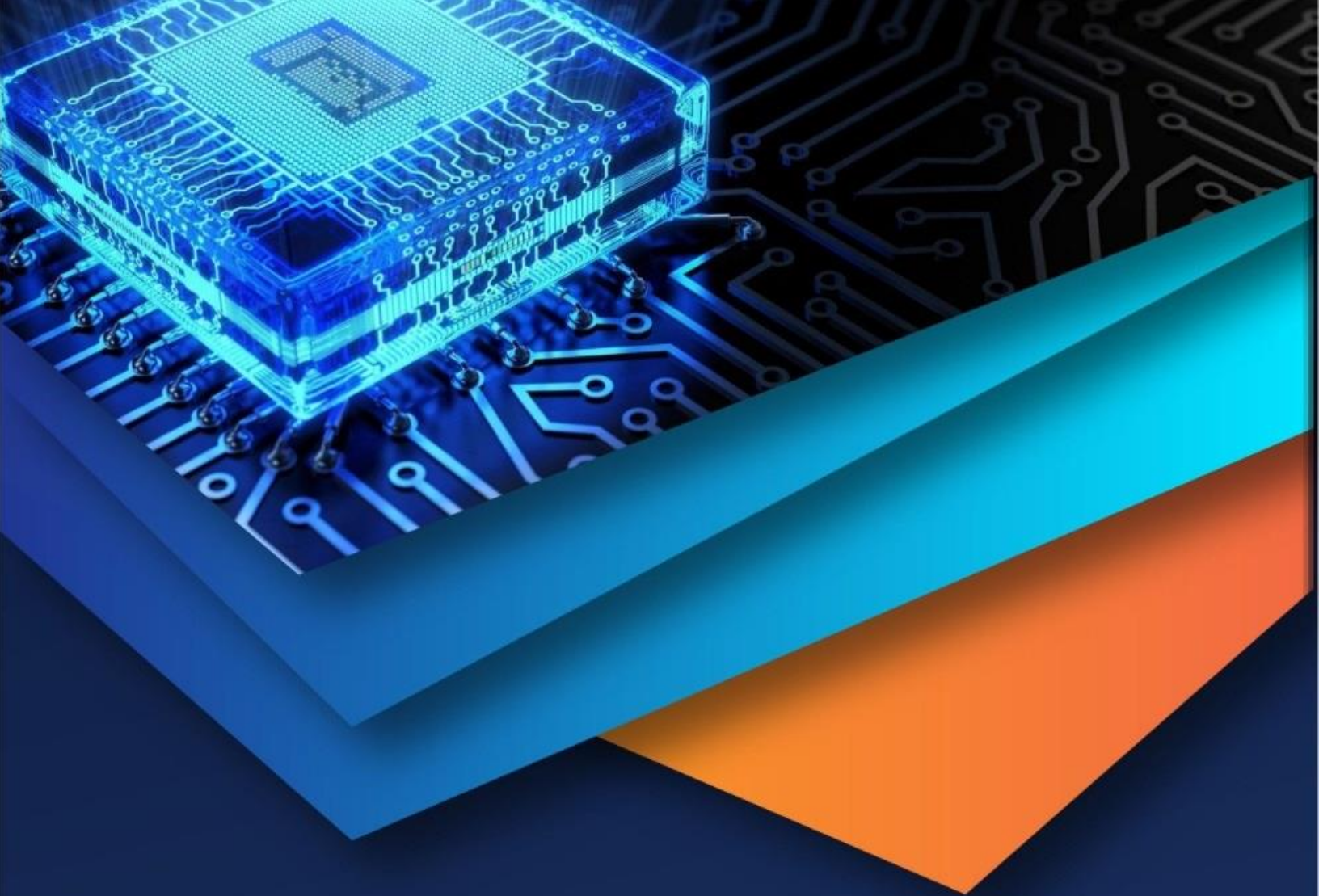
This manuscript was prepared one author, including contributions to the study design, data, content development, results, interpretation, and related scholarly work. The author(s) acknowledge the use of Grammarly and ChatGPT to assist with grammar checking, language refinement, reference formatting. These AI-assisted tools were not used as authors and did not replace the intellectual contributions or scholarly judgment of the author. All AI-assisted outputs, including content, references, and interpretations, were carefully reviewed, revised, verified, and approved by the author(s). The author(s) accept full responsibility for the accuracy, integrity, and final content of the manuscript.

REFERENCES

- [1] A. Mondal and A. B. Chakrabarti, "Information and Communication Technology Adoption Strategies of Emerging Multinationals From India," *Journal of Global Information Management*, 2021, doi: 10.4018/jgim.20210901.0a9.
- [2] S.-M. Tseng and S. Octavyaputri, "Enhancing green service innovation behavior through green involvement: The role of information technology adoption," *Aslib Journal of Information Management*, 2024, doi: 10.1108/ajim-11-2023-0497.
- [3] R. Martínez-Peláez et al., "Role of Digital Transformation for Achieving Sustainability: Mediated Role of Stakeholders, Key Capabilities, and Technology," *Sustainability*, 2023, doi: 10.3390/su151411221....
- [4] S. Shaikh, M. A. H. Talpur, F. Baig, F. Tariq, S. H. Khahro, "Adoption of Electric Motorcycles in Pakistan: A Technology Acceptance Model Perspective," *World Electric Vehicle Journal*, 2023. doi: 10.3390/wevj14100278.
- [5] B. Anthony, "Distributed Ledger and Decentralised Technology Adoption for Smart Digital Transition in Collaborative Enterprise," *Enterprise Information Systems*, 2021. doi: 10.1080/17517575.2021.1989494.



- [6] M. N. Mowla, N. Mowla, A. F. M. S. Shah, K. M. Rabie, T. Shongwe, "Internet of Things and Wireless Sensor Networks for Smart Agriculture Applications: A Survey," IEEE Access, 2023. doi: 10.1109/access.2023.3346299.
- [7] V. Zatsu, A. E. Shine, J. M. Tharakan, D. Peter, T. V. Ranganathan, S. S. Alotaibi, et al., "Revolutionizing the food industry: The transformative power of artificial intelligence-a review," Food Chemistry X, 2024. doi: 10.1016/j.fochx.2024.101867.
- [8] P. Kumar, U. Tandon, "Values enhanced technology adoption (VETA) concerning online learning in higher education institutions: Academician's perspective in India," Education and Information Technologies, 2023. doi: 10.1007/s10639-023-12366-4.
- [9] J. D. A. Sánchez, J. Gené-Albesa, "Explaining Policyholders' Chatbot Acceptance with an Unified Technology Acceptance and Use of Technology-Based Model," Journal of theoretical and applied electronic commerce research, 2023. doi: 10.3390/jtaer18030062.
- [10] C. Asrani, A. K. Kar, "Diffusion and adoption of digital communications services in India," Information Technology for Development, 2022. doi: 10.1080/02681102.2022.2046536.
- [11] T. B. P. India, D. Dosaya, T. Shukla, V. S. Nirban, "Transformation of Academic Ecology through Information Communication Technology Adoption," International Journal of Information and Education Technology, 2020. doi: 10.18178/ijiet.2020.10.5.1392.
- [12] J. Fletcher, S. Sarkani, T. A. Mazzuchi, "A Technology Adoption Model for Broadband Internet Adoption in India," Journal of Global Information Technology Management, 2014. doi: 10.1080/1097198x.2014.951294.
- [13] V. Singh, S. Sharma, "Application of blockchain technology in shaping the future of food industry based on transparency and consumer trust," Journal of Food Science and Technology, 2022. doi: 10.1007/s13197-022-05360-0.
- [14] R. Kothari, "OPPORTUNITIES AT HIGHER EDUCATION INSTITUTES IN INDIA: SMALL CASES ON ENHANCING SKILLS," International Journal of Innovative Research in Computer Science & Technology, 2020. doi: 10.21276/ijircst.2020.8.3.37.
- [15] Ministry of Finance India's school education system serves 24.8 CRORE students across 14.72 lakh schools with 98 lakh teacher : ECONOMIC SURVEY 2024-25



10.22214/IJRASET



45.98



IMPACT FACTOR:
7.129



IMPACT FACTOR:
7.429



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089  (24*7 Support on Whatsapp)