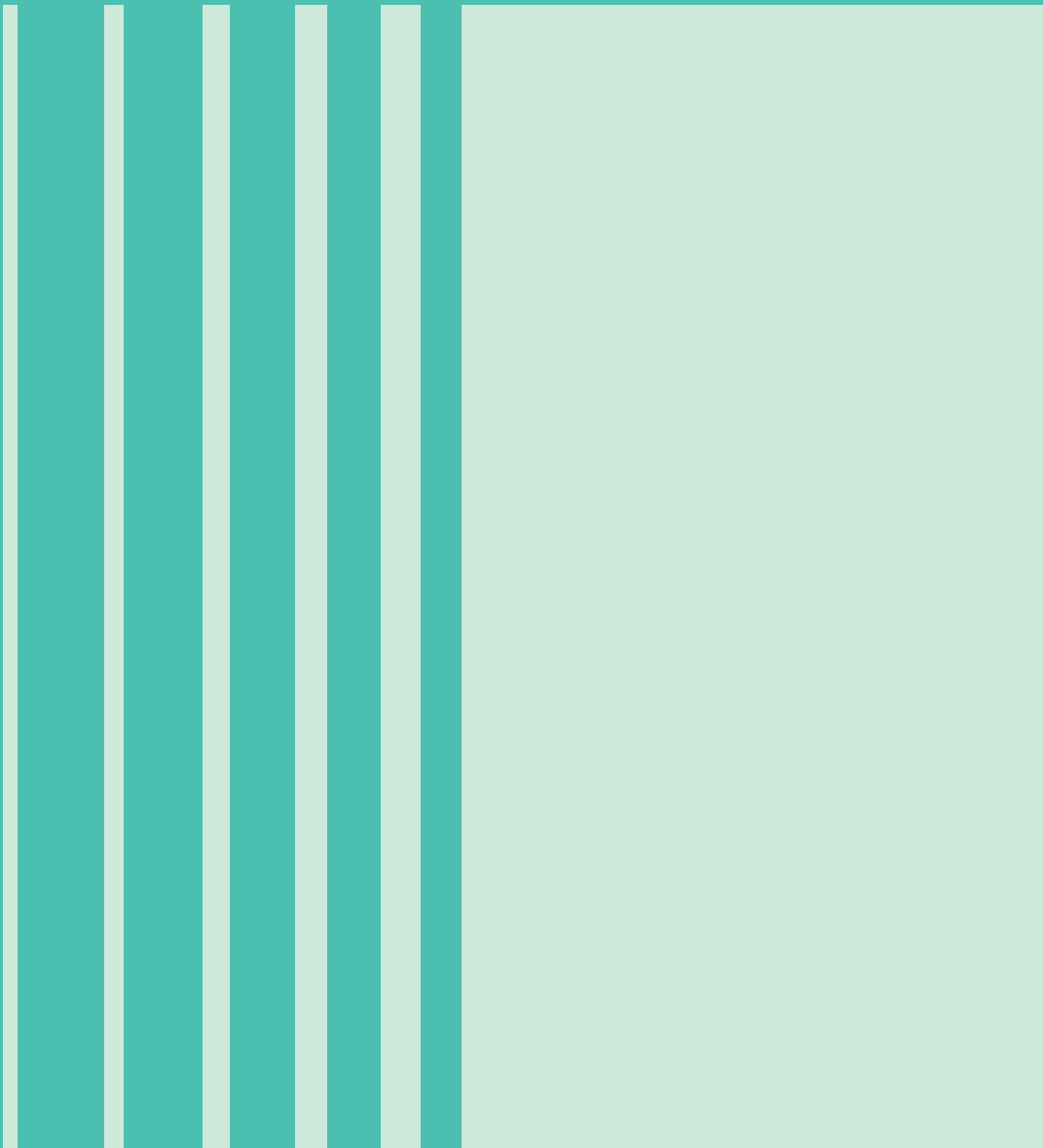


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# GYAN MANAGEMENT



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## About the Journal

*Gyan Management* is an open-access International Bi-annual refereed Journal published by Gian Jyoti Institute of Management and Technology, Mohali since the year 2007. It is dedicated to enhancing teaching and learning in the field of Management & Commerce, Information Technology, and business strategies. The focus of the journal is on collating applied research and reflections relevant to various discipline practices and disseminating knowledge. It establishes an effective communication channel between decision and policymakers in business and academicians, to recognize the implementation of effective systems in the business world.

*Gyan Management* is published in January and July every year. The journal accepts theoretical and applied research work for publication. It publishes original, research-based papers, articles, cases & book reviews on topics of current concern in all areas of management & technology affecting the business environment.

## **Aims and Scope**

*Gyan Management* is an open-access International Bi-annual refereed journal published by the Gian Jyoti Institute of Management and Technology since 2007. The journal aims to advance knowledge and practice in the fields of Management & Commerce, Business Strategies, and Information Technology through the dissemination of high-quality research. It is a highly reputable and acclaimed journal that includes theoretical and applied research contributing to the understanding and development of management practices and technological innovations.

*Gyan Management* serves as a vital communication channel between academia and industry, facilitating dialogue between decision-makers, policy influencers, and scholars. The journal publishes original research papers, case studies, articles, and book reviews addressing contemporary issues and emerging trends within these disciplines. By focusing on applied research and practical insights, it supports the implementation of effective systems and strategies in the business world, promoting informed decision-making and enhancing educational outcomes in the management and technology sectors.

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## Contents

### Articles

- Influence of Generative Artificial Intelligence on Student Learning and Academic Performance: Existing Practices, Pedagogical Innovations, and Prospective Regulations Frameworks Viewed Through the Perspective of Indian Knowledge Systems (IKS)  
*Poonam Tarpial* 107
- Evaluating the Effectiveness of Storytelling Pedagogy in Teaching Financial Literacy to Middle School Students  
*Jigna Trivedi, Bindiya Soni and Priyanka Batra* 136
- How Does Homestay Business Empower Rural Women? An Empirical Study on Ladakh  
*Stanzin Mantok* 155
- Drivers of Electric Vehicle Adoption in Ludhiana: An Analysis of Determinants and Information Sources  
*Mehak Goyal, Vishal Vinayak and Yashmin Sofat* 172
- A Comparative Study of Factors Influencing Behavioural Intention Towards Mobile Banking Adoption Between Rural and Urban Adopters in Punjab  
*Charvy Narang* 189
- Effectiveness of Investors' Grievances Redressal in Capital Market of India: Evidence from SEBI's SCORES Mechanism  
*Kamalpreet Kaur and Navkiranjit Kaur Dhaliwal* 208

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# Influence of Generative Artificial Intelligence on Student Learning and Academic Performance: Existing Practices, Pedagogical Innovations, and Prospective Regulations Frameworks Viewed Through the Perspective of Indian Knowledge Systems (IKS)

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Poonam Tarpial<sup>1</sup> 

## Abstract

Generative Artificial Intelligence (GenAI) tools like ChatGPT, Claude, Gemini, and Copilot are changing how students learn at Indian universities. They let teachers customize lessons for each student, encourage creativity, and let students learn at their own pace and on their own schedule. However, this rapid integration also brings up issues with academic honesty, creativity, reliance on AI, and moral use.

This research article analyzes the influence of GenAI on student learning and academic achievement within the Indian higher education framework, grounded in the philosophical and pedagogical principles of Indian Knowledge Systems (IKS). The research used a quantitative methodology, gathering survey responses from 150 undergraduate and postgraduate students from several fields and 11 faculty members. The results indicate that 93% of students believe GenAI technologies

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enhance their comprehension of topics; nevertheless, 63% also report a decline in their own problem-solving skills. 82% of faculty members are also worried about plagiarism, 82% are worried about students being too reliant on others, and 57% are worried about students' writing skills getting poorer. But all sides believe that GenAI may make things better by making adaptive assessments, AI-assisted experiential learning (Piaget, 1972), and more personalized blended training conceivable.

The study indicates a regulatory framework in accordance with IKS that emphasizes AI literacy, ethical norms, institutional regulations, and value-oriented behaviors to ensure responsible and equitable AI usage. The larger impacts on NEP 2020, UGC regulatory norms, curricular changes, and teacher training programs are also examined.

### Keywords

Generative AI, student learning, academic performance, Indian Knowledge Systems, pedagogical innovation, NEP 2020, higher education regulation

**Received** 15 January 2026; **accepted** 22 April 2026

## Introduction

Generative Artificial Intelligence (GenAI) technologies such as ChatGPT, Gemini, and Microsoft Copilot have swiftly revolutionized higher education in India. These technologies assist pupils in making, summarizing, coding, solving problems, and thinking creatively right away, which makes people think about how they affect academic behavior, performance, inventiveness, and morals. GenAI expands learning beyond rote techniques, although it also presents challenges regarding academic honesty, reliance, and diminishing autonomy (Zawacki-Richter et al., 2019). This research investigates GenAI's influence on student learning and teacher viewpoints, concentrating on how Indian Knowledge Systems (IKS) (svādhyāya, dharma, viveka, and anushāsana) might encourage responsible use; it supports a regulatory framework that is in line with IKS that encourages AI knowledge, ethics, changes in legislation, and cultural values (Rangan & Nagaraj, 2022). Even though GenAI's impact is unknown, it is becoming more popular. The rules are shifting. This study examines student utilization and educational outcomes. and governance needed to close these gaps.

## Background

GenAI is a term that describes large language models (LLMs) that have the ability to make different kinds of content, including text, pictures, music, video, or code, by looking at and learning from large volumes of data. One thing that sets GenAI apart from regular AI is that AI tools are unique because the outcome they produce is based on the inputs they get (Hill, 2023). These models produce a variety of outputs, such as text production and chat (ChatGPT), making images (Gemini),

and suggesting code GitHub Copilot) and chatbots (Michel-Villarreal et al., 2023). The rapid adoption of these tools in India has exceeded official policy replies. More and more students in higher education are using GenAI for homework, studying for tests, coding activities, coming up with project ideas, and making things clearer. The new literature shows that there are both good and bad good and bad results associated with its usage. Studies shows that it simplifies the learning process (Helen et al., 2023) thereby enhancing learning experiences.

### *The Rise and Growth of GenAI*

Engagement is a crucial aspect of the educational process.

GenAI is a kind of machine learning that can create text, images, code, sound, or answers. Higher education organizations can utilize it for tasks like assistance with writing, producing materials, translating, and tutoring, as well as aid with programming and building personalized learning routes. International literature refers to GenAI as a “catalyst for transformative learning” (Holmes et al., 2019), but it also says that it is a “risk to academic integrity” (Cotton et al., 2023). These tools have been implemented in India considerably faster than the official policy answers. More and more college students are utilizing GenAI for:

- Homework
- Getting ready for tests
- Programming
- Coming up with concepts for projects
- Comprehending ideas

The latest research reveals that there are both good and harmful outcomes. Studies show that pupils understand things better, their writing is better (Mishra, 2023), and they are better at learning, and they are better at figuring out coding difficulties. Worries that are bad include becoming addicted, acquiring wrong information, and taking shortcuts that are not right.

### *How Indian Students Learn*

Students in India regularly study for tests and rely on rote memorization.

When studying for tests, people often rely on memory. GenAI goes against these rules by giving:

- Quick answers in short
- Papers that are done
- Writing down replies
- Exam questions that are specific to each person

This helps things run more smoothly, but it makes deep learning less useful. Mohan and Rajan (2024) discovered that regarding AI, Indian pupils have greater likelihood to use it to get things done instead of understanding.

### *Problems with Academic Integrity*

The issues discussed in the literature from around the world include:

- Writing for someone else
- Not being able to tell when AI wrote an assignment
- Less genuine work from students
- Plagiarism made by AI

The standard ways of testing in India, which rely heavily on written tasks and homework have long been a source of frustration for professors and a lot of pain.

### *Learning About India's Knowledge Systems*

IKS is an important aspect of NEP 2020. Some of its key ideas are:

- Svādhyāya, or learning on your own;
- Viveka, or the ability to think critically;
- Dharma, or moral obligation;
- Anushāsana, or disciplined effort; and
- Jnana-karma samuccaya, or knowledge that is linked to action.

These provide a conceptual foundation for regulating GenAI usage and values. This study fulfills a critical research gap by investigating the limited research that links IKS to AI.

## **A Basic Theory**

The study employs three integrated frameworks:

### *Indian Knowledge Systems*

| IKS Principle      | Meaning               | Application to AI Usage                                                                                   |
|--------------------|-----------------------|-----------------------------------------------------------------------------------------------------------|
| <i>Svādhyāya</i>   | Self-study            | It is suggested that students strive to solve things on their own before depending on AI techniques.      |
| <i>Viveka</i>      | Thinking critically   | The onus is on pupils to find out the bias and correctness of content made by AI.                         |
| <i>Dharma</i>      | Moral behavior        | Honest use of AI helps. No tolerance for copying.                                                         |
| <i>Anushāsana</i>  | Discipline            | Limit the use of AI to some jobs.                                                                         |
| <i>Jnana-Karma</i> | Knowledge with action | Knowledge with Learning should be an action. Added to, not taken away from, knowledge that comes from AI. |

**Source:** Bhaktivedanta (1983).

This kind of thinking encourages people to see AI as a “tool” instead of a “teacher” for real learning.

## *The Constructivist Theory in Education*

Constructivist Learning Theory—how students actively build knowledge through inquiry, reflection, and interaction—is relevant to GenAI integration in college. GenAI technologies can help with asking questions, seeing things, personalized learning inside Vygotsky’s Zone of Proximal Development. Constructivism, on the other hand, says that relying too much on AI could hurt critical thinking and real problem-solving. Encourage people to communicate with each other more than relying on passive methods to connect GenAI use with constructivist principles (Bruner, 1996).

## *AI Teaching Using TPACK and SAMR*

TPACK and SAMR offer alternative frameworks for significant, ethical, and contextually based GenAI integration into education. Works well according to the AI-enabled teaching is more than just being good with technology. The TPACK paradigm places a strong emphasis on content knowledge (CK), pedagogical knowledge (PK) and technology knowledge (TK). Teachers need to know how GenAI products help students learn and teach in different subjects (Koehler & Mishra, 2009).

The SAMR model highlights how AI can revolutionize the way people learn (Puentedura, 2014). AI changes tools during Substitution but makes them better at Augmentation. Customization of learning activity redesign is possible with adaptive assessments and interactive inquiry. With AI, you can make simulations and get input in real time from multiple sources. redefinition. SAMR indicates that AI improves education when it changes rather than replacing. TPACK shows what teachers need to know about AI, while SAMR shows what AI can do to transform the learning process.

## **Current Study and Its Reasons**

The swift adoption of GenAI by Indian students necessitates prompt empirical investigation and explanation. Few studies integrate GenAI, student performance, academic perspectives, IKS ideals, and regulatory frameworks.

It addresses that gap by looking at Indian higher education in a lot of different ways by employing quantitative methods.

## **Aim and Research Questions**

### *Goal*

To examine the impact of GenAI on student learning and academic performance, success in Indian higher education, and to suggest an IKS-aligned framework for the appropriate use and control of AI.

### **Research Questions (RQs)**

- RQ1: How do Indian students utilize GenAI techniques for educational purposes?
- RQ2: How does using GenAI affect how well students understand, accomplish their work, and improve their skills?
- RQ3: What worries do faculty members have about Academic Integrity and Dependence on AI?
- RQ4: How can the concepts of IKS help people use AI in a responsible and moral way?
- RQ5: What rules should Indian institutions follow to keep things fair, creative and honest?

## **Research Methodology**

### **Research Design**

The current research investigates the evolving importance of Generative Tools for artificial intelligence (GenAI), such as ChatGPT, Gemini, and GitHub Copilot, and how they are changing the way in students study involvement and performance. But past studies have mostly examined AI in education from the perspectives of automation, adaptability, and predictive analytics. This work focuses on how students are actually employing AI content-generation models in their academic life and their effect on learning and performance through the IKS perspective.

Quantitative survey data were utilized to assess the efficacy of GenAI tools by conducting research on how it affects different parts of student learning through a diverse collection of undergraduate and graduate students. By presenting a data-driven analysis of the integration of GenAI products into students' academic routines, this study seeks to educate educators, legislators, and technology professionals. Developers should also learn about the best approaches to use AI in education, as well as the hazards and responsible use of AI.

### **Participants**

To determine how GenAI affects learning and performance, 150 students and 11 faculty members were polled using structured quantitative approaches, including online questionnaires. Data included demographics, AI, ethics, and perceptions. A quantitative approach with simple random sampling and descriptive analysis provided equal participation and useful results.

### **Procedures**

The students were requested to complete an online survey comprising 20 questions, and parallel to that, the faculty were requested to complete the survey with a different questionnaire designed consisting of 26 questions. Prior consent was taken from both participants, ensuring research ethics and integrity. A Likert scale was used to understand the extent of influence on learning and performance

## ***Instruments***

In quantitative research, questionnaires are often the go-to choice, especially in descriptive survey studies (Borg & Gall, 1983). There are several benefits to using questionnaires: they can easily reach a large audience, save time, are relatively straightforward to analyze, and provide quantifiable responses.

## ***Analysis***

To achieve the research objectives, the participants, including students and teachers, were surveyed using a Google Form, and the responses collected were subjected to quantitative analysis. The data collected with the survey method is always objective and numerical in nature, and therefore, a quantitative data analysis method is used to analyze this type of data. The method of quantitative data analysis helps to get accurate and reliable data results using proper data analytics techniques. To analyze the collected data with the survey method, the graphical data representation is used for a descriptive analysis.

For the purpose of graphical data analysis, the figures are developed in the form of bar charts and pie charts. This method is effective because it allows for better presentation and comparison of the data, thereby helping the research audience understand the purpose of the research. The research study has developed bar charts in MS Excel. The data is interpreted and analyzed by percentage, with the analysis of each survey item based on the majority of responses. Likert items are used to measure respondents' attitudes to a particular question or statement.

## ***Results***

Data analysis is all about using statistical and logical techniques in a systematic way to describe, illustrate, condense, and evaluate data.

The results obtained from the survey conducted among students and the faculty were studied separately, and the variables were analyzed to understand the influence of every variable from the students' and the faculty's perspectives. A thorough examination was conducted to understand its impact.

The graphical analysis below shows the survey data analysis in detail.

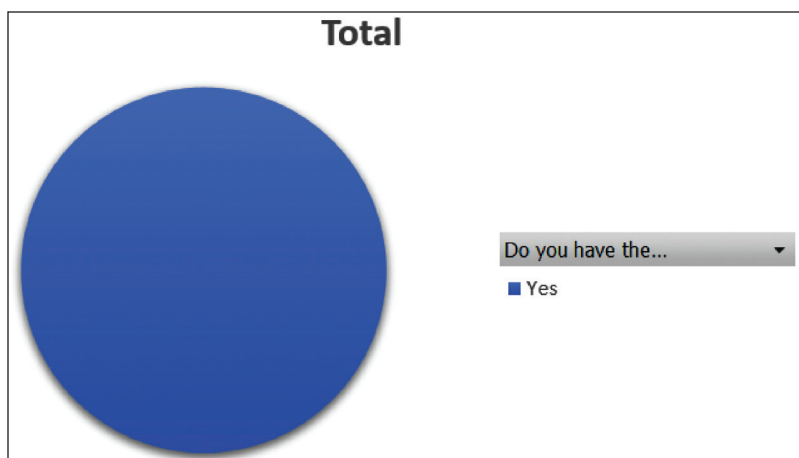
### ***Survey Data Analysis***

A total of 150 students across varied streams participated in the survey, and the data was collected across categories including: Familiarity with AI tools, Impact of GenAI on learning and performance, Usage of GAI in academics and Ethical and academic integrity.

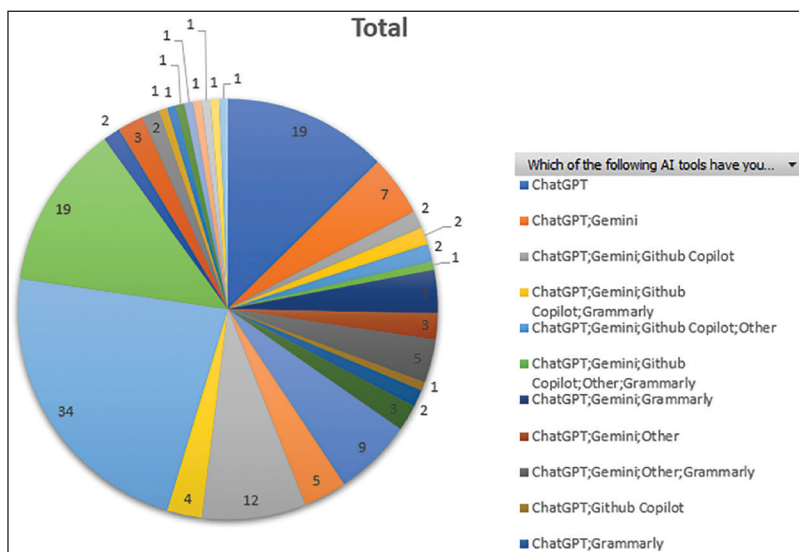
#### ***Familiarity with GenAI Tools***

##### ***Knowledge About GAI***

The results, as per Figure 1, show that almost all the students across varied domains knew the GAI tools being used in academics, for example, ChatGPT,



**Figure 1.** Count of Do You Have the Knowledge of Generative AI Tools (e.g., ChatGPT, Copilot, Gemini)?



**Figure 2.** Count of Which of the Following AI Tools Have You Worked Upon? (Select All That Apply).

Copilot, Gemini, etc. Thus, none of the students in any stream showed a variance in terms of knowledge. This also depicts that students are pretty tech savvy in terms of knowledge about these tools.

#### *Types of GAI Tools Used*

Diving deep into the usage of GenAI, it was found as per Figure 2 that 23% of the students used CoPilot, Grammarly, Gemini, GitHub, ChatGPT and other GAI

tools available in lieu of academics. Thus, students had integrated these tools into their academics for ready reference.

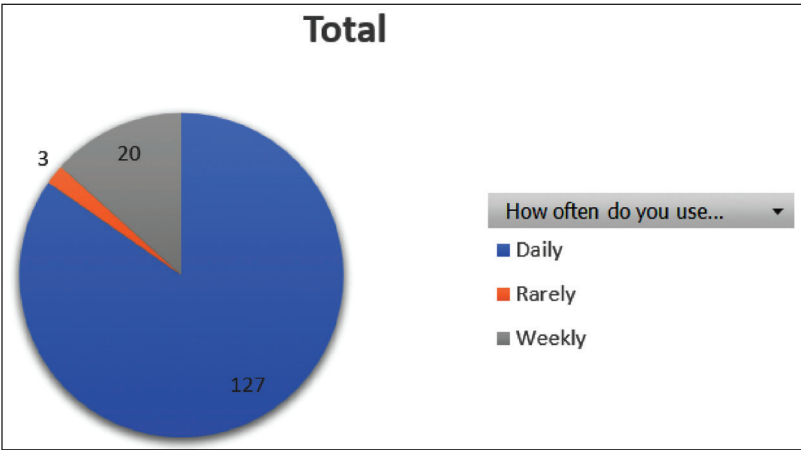
*Frequency of GAI Tools Usage*

As per Figure 3, it was found that 85% of the students use GAI tools on a daily basis, followed by 13% weekly, and only a minimal 2% are the ones who rarely use them. Thus, students have integrated GAI tools as a part of their daily routine.

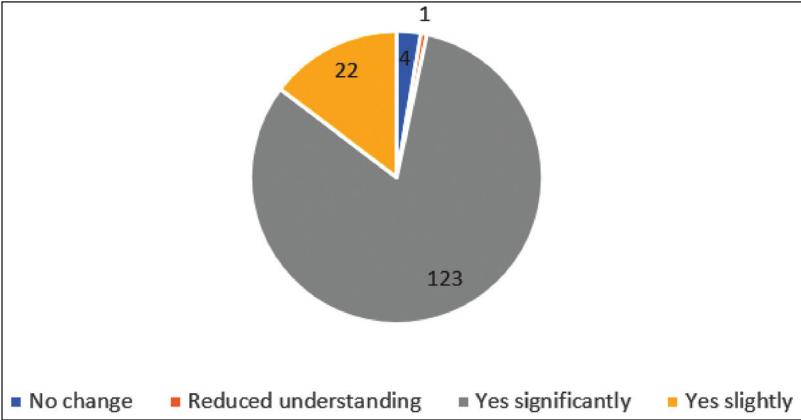
*Impact on Learning and Performance*

*Improvement in Understanding by Usage of GAI Tools*

It can be deduced as per the results obtained in Figure 4 that 82% of the students believe that GAI tools have significantly helped them in understanding the concept more easily. Thus, has supported them in the learning process.



**Figure 3.** Count of How Often Do You Use Generative AI Tools?



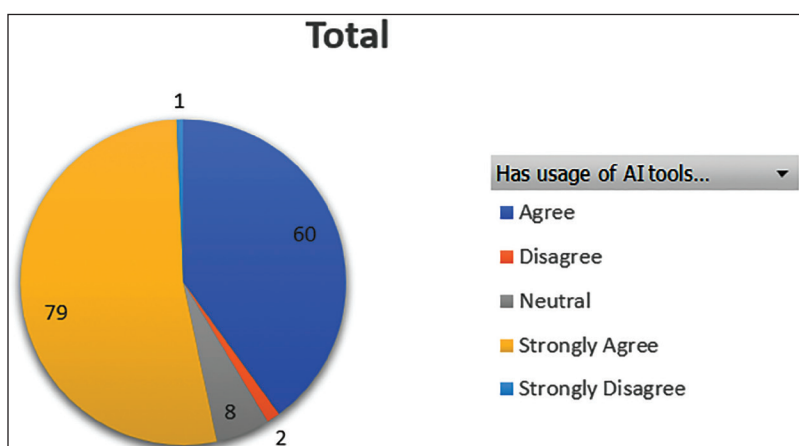
**Figure 4.** Count of Do You Think Usage of AI Tools Improved Your Understanding of Concepts?

### *Influence on Productivity with Usage of GAI Tools*

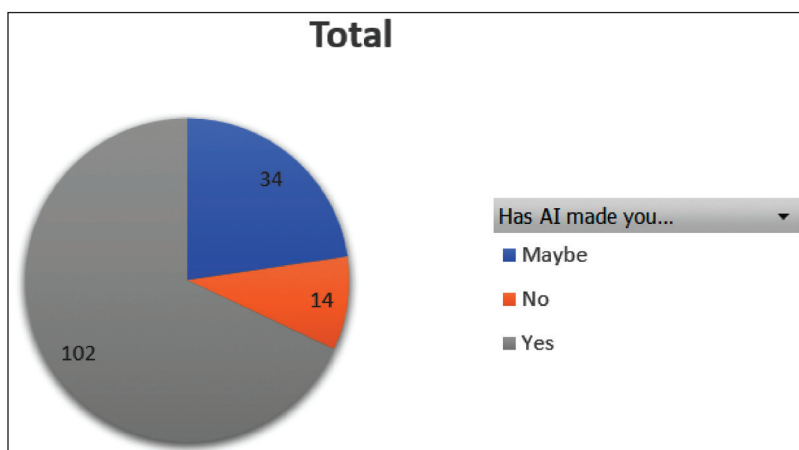
It is quite imperative, after analyzing the data received in Figure 5, that 53% of the students strongly agree, followed by 40% who agree, that GAI tools have made them more productive in learning by breaking the information into smaller bits.

### *Aiding in Independence of Learning*

The inference that can be drawn after analyzing the data obtained is revealed in Figure 6. That 68% of students believe that GAI has made them independent learners by making the information available more readily.



**Figure 5.** Count of Has Usage of AI Tools Made You More Productive in Your Learning?



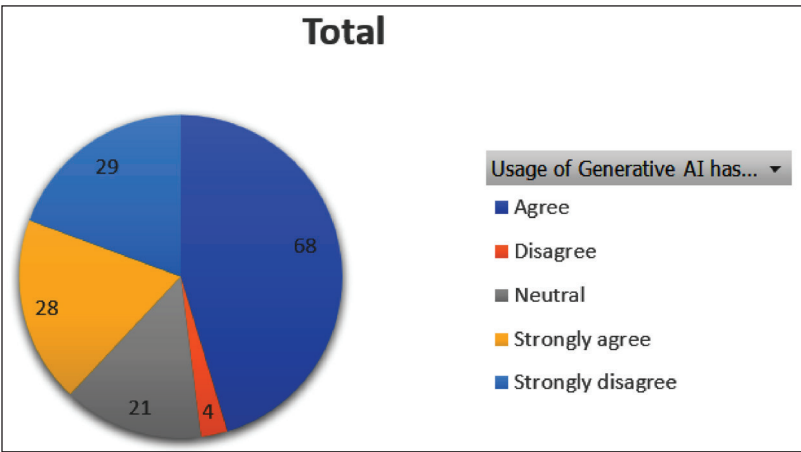
**Figure 6.** Count of Has AI Made You Independent in Learning?

*Improved Performance in Academics*

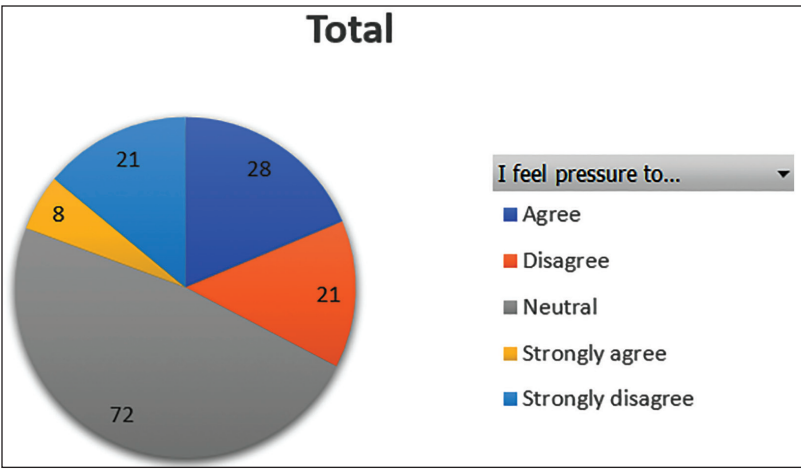
By carefully studying the data in Figure 7, it can be inferred that 45% of the students have strongly found GAI tools helpful in improving their performance due to the availability of content. However, 19% still believe that it did not add to their academic performance.

*Stress to Match Pace with Peers*

The data in Figure 8 showcases that 48% of students are neutral about feeling pressurized while handling GAI tools in order to match the pace with their peers in classes. However, 19% are still struggling to match the pace.



**Figure 7.** Count of Usage of Generative AI Has Improved My Performance in Academics.



**Figure 8.** Count of I Feel Pressure to Use Generative AI to Match the Pace with My Peers.

### *Influence of GAI Tools on Quality of Work*

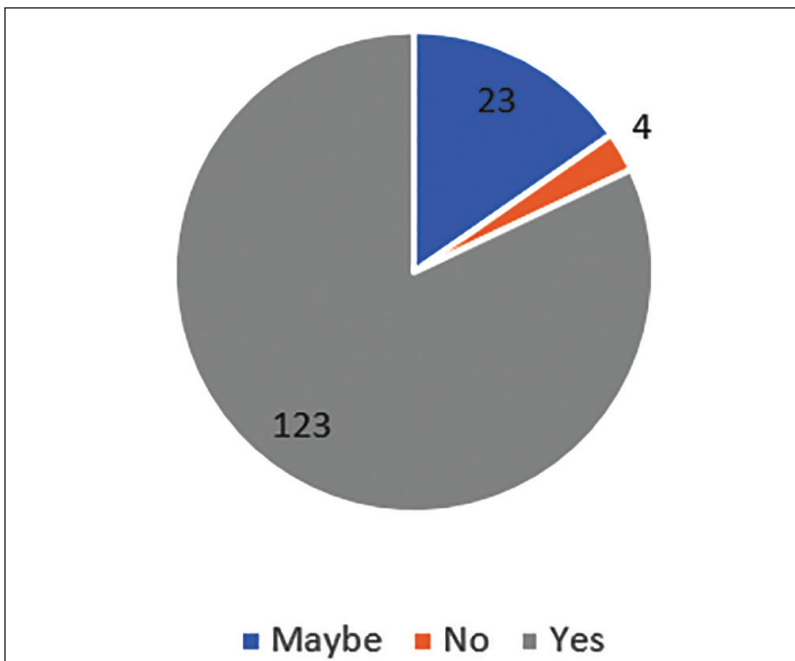
After examining the data available in Figure 9, it can be stated that 82% of the students have been able to produce high-quality work with the effective implementation of GAI tools, thus enabling them to produce good-quality work.

### *Usage of Academics*

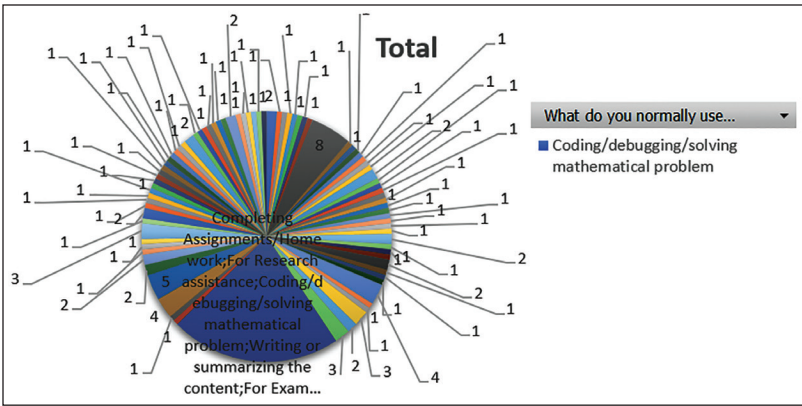
No doubt, ever since the emergence of GAI tools, they have proved instrumental in helping the students with multiple tasks that can be accomplished with their effective utilization. The parameters below show categorization of GAI tools on the basis of the work they have been doing with the help of GAI tools.

### *Type of Work Done with GAI Tools*

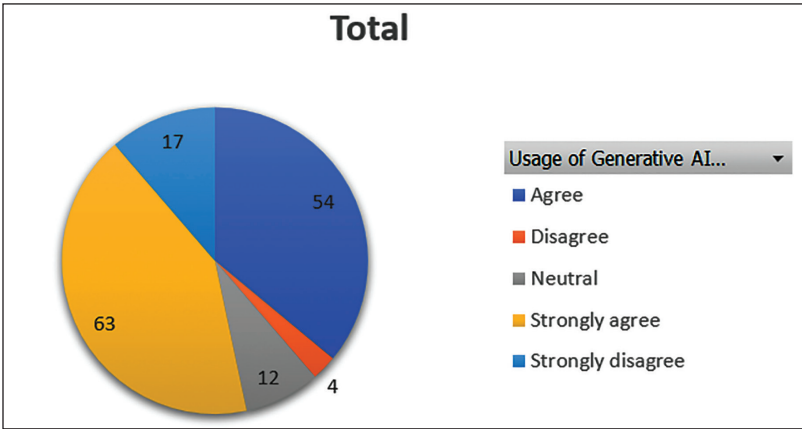
Studying the data available in Figure 10 displays that 22% of the students have been accomplishing multiple tasks with the help of GAI tools like Completing Assignments/Homework, For Research assistance; Coding/debugging/solving mathematical problem; Writing or summarizing the content; For Exam preparation; Content creation (presentations, blogs); Fun while exploring; Generating ideas; Brainstorming research topics and Translating text. This shows the multifaceted usage of GAI tools that can be integrated into.



**Figure 9.** Count of With Generative AI, I Am Able to Produce High-quality Work.



**Figure 10.** Count of What Do You Normally Use Generative AI Tools for? (Select All That Apply).



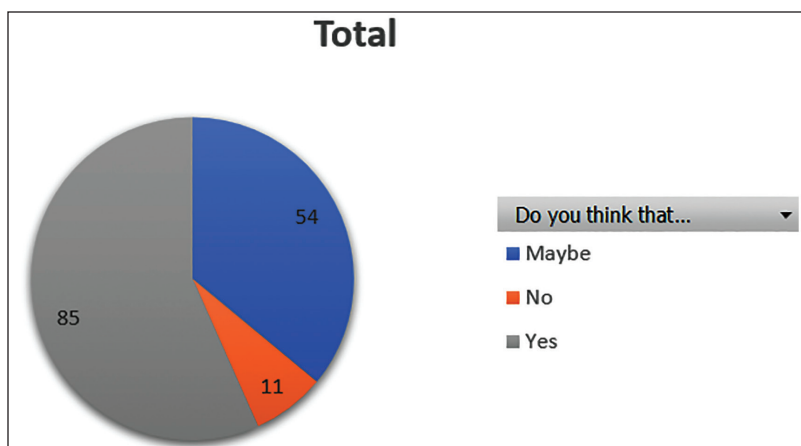
**Figure 11.** Count of Usage of Generative AI Saves My Time in Academics.

*Time Saving with GAI Tools*

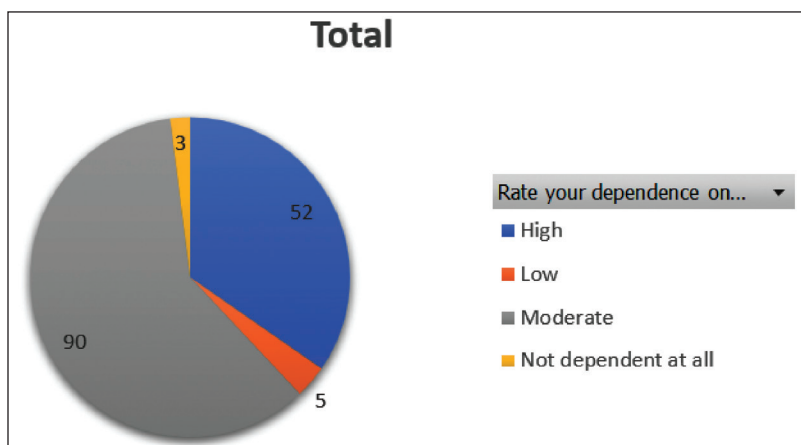
After investigating the data in Figure 11, it can be suggested that 42% of students have acknowledged that imbibing GAI tools has saved time in finding information and also converting the data into ready-to-use information. However, 13% are still struggling with the time-saving factor. They still need to learn the ways to use the tools effectively.

*Improvement of Academic Performance with GAI Tools*

Analyzing the data available in Figure 12, it highlights that 57% of the students think that GAI tools have majorly enhanced their academic performance, with 36% being neutral and only a limited number of students representing 7% of the entire population, expressing no improvement.



**Figure 12.** Count of Do You Think That Generative AI Tools Have Improved Your Academic Performance?



**Figure 13.** Count of Rate Your Dependence on Generative AI for Academics.

### *Dependence on GAI Tools for Academics*

A careful analysis of Figure 13 indicates that 60% of the students have moderate dependence on the GAI tool, with only 35% being highly dependent. This reflects that students are still using their own creative skills for completion of the tasks and are not fully reliant on GAI tools.

### *Ethical and Academic Integrity*

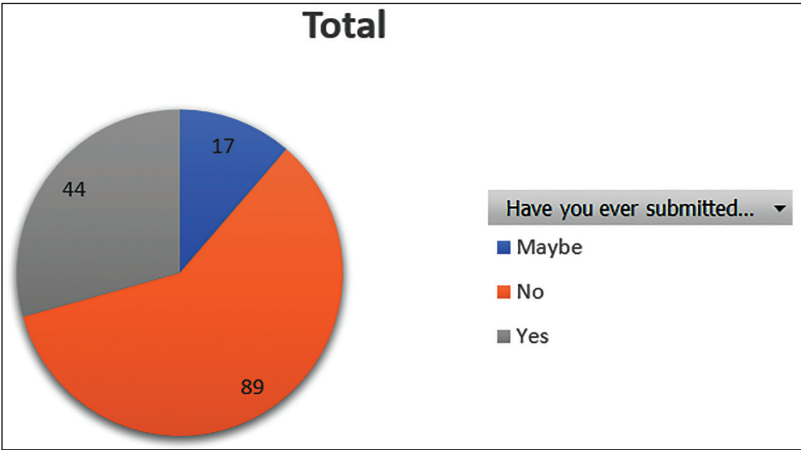
It is very important that the inclusion of GAI tools in academics is in compliance with integrity norms. Below are the survey highlights, which capture the data analysis for the same.

*Submission of AI-generated Content Without Editing and Reviewing*

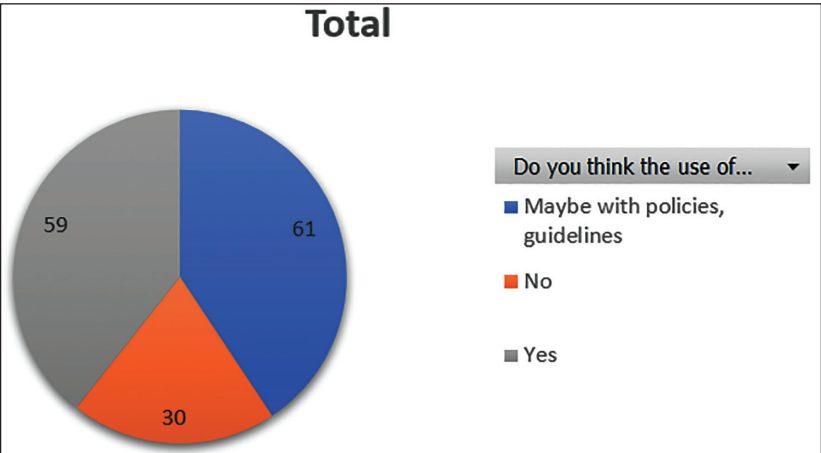
A thorough inspection of the data available in Figure 14 emphasizes that an incredible number of students have been customizing the data before submission while using GAI tools as a reference mode. Despite that, we still have 29% of students who have been submitting plagiarized content, which is a worrisome concern.

*Accessibility of GAI Tools in Exams and Assessments*

While examining the survey data, it was revealed, as per Figure 15, that 41% of students are of the opinion of inclusion of GAI tools in assessments and



**Figure 14.** Count of Have You Ever Submitted AI-generated Content Without Editing or Reviewing?



**Figure 15.** Count of Do You Think the Use of Generative AI Should Be Allowed in Exams or Academic Activities?

exams with certain guidelines. Thus, careful strategies should be devised for its usage so that the grading of the students should be authentic and genuine.

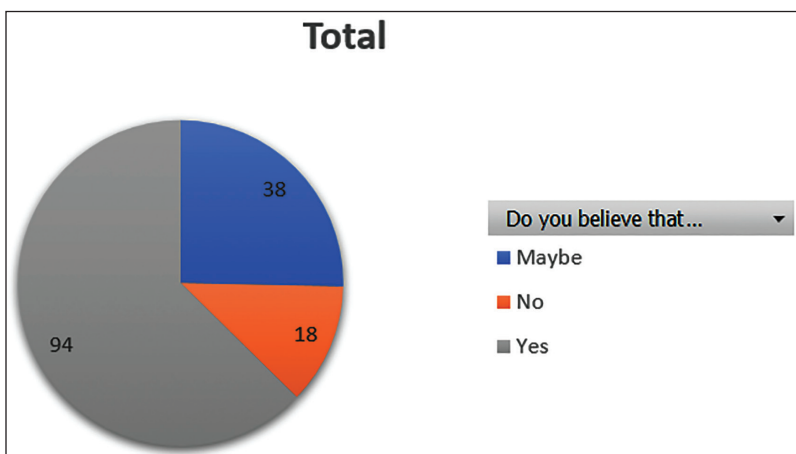
#### *Effect of GAI Tools on Critical Thinking and Creativity*

It can be deduced after studying the details of the data in Figure 16 that, regardless of making GAI tools an inseparable part of academics, a notable number of students, consisting of 63% of the population sample, do agree that over-reliance on GAI tools is hampering their creativity and critical thinking, thereby limiting their brainstorming before using GAI tools.

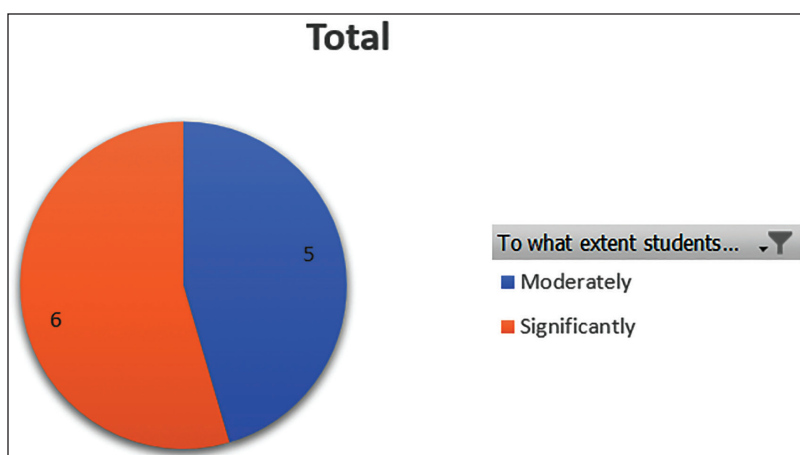
It has been noted that even in the suggestive remarks shared by the students, even while acknowledging the benefits of inclusion of GAI tools in terms of productivity, time saving and getting answers for unlimited questions from the AI tool. Still, they are feeling a downgrade in their own creative skill set. Somehow, they also feel that human brain usage is cornered with too much dominance and liberty given to these tools in their lives.

#### *Perspective of Faculties About GAI Tools*

This study also takes into consideration the overview and the perspective of the faculties about the integration of GAI tools in education. A rigorous in-depth survey was conducted in which 11 faculty members participated, and their views were taken on the awareness of students about GAI tools, their influence on students' learning and performance, ethics and integrity concerns, future scope, followed by suggestive remarks. A detailed elaboration of every single category is discussed further.



**Figure 16.** Count of Do You Believe That Frequent Use of AI Can Affect Critical Thinking or Creativity?



**Figure 17.** Count of To What Extent Students Use Generative AI.

### *Demographic Information*

The demographic information collected from the faculty represented that faculty teaching all the domains like STEM, Business and economics, humanities and social sciences and arts and design. Also, these faculties had varied experience ranging from 1 year to more than 15 years. Additionally, the faculty have been training graduate and postgraduate students.

### *Awareness of Students About GAI Tools*

It has been observed by the faculty that students are using GAI tools in academics to a significant amount, comprising 54% and to a moderate amount, 45%, as shown in Figure 17. Thus, it is admitted by faculties that students have made it an inseparable part of academics.

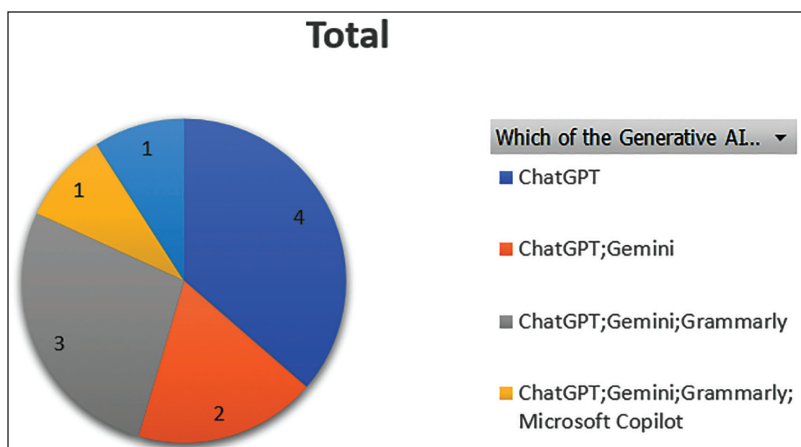
### *Types of GAI Tools Used by Students in Academics*

After exploring the data received, the faculty have detected that the main GAI tool used by the students is ChatGPT, as can be seen in Figure 18, as it gives the liberty and the ease to generate a wide variety of content.

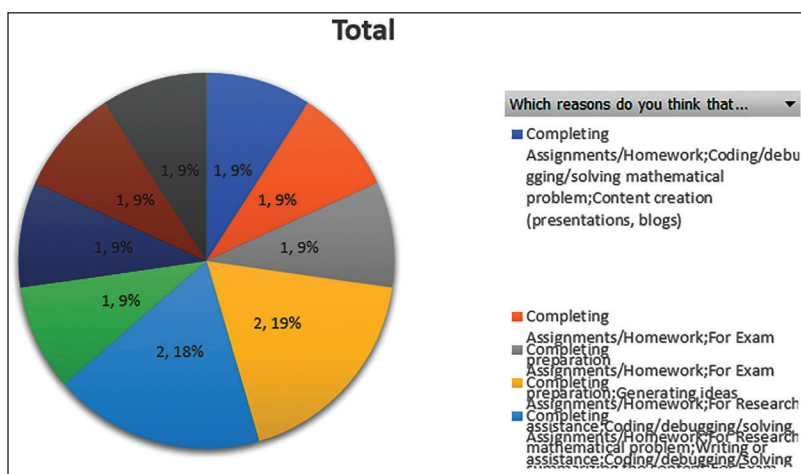
### *Reasons for Usage of GAI Tools by Students*

The prime reason which attributed to the usage of GAI tools by the students is almost for accessing it for completing every single work related to academics, like completing assignments/homework, for research assistance, coding/debugging/solving mathematical problems, writing or summarizing the content, for exam preparation, content creation (presentations, blogs); generating ideas, brainstorming research topics, as is quite evident from Figure 19.

Thus, the usage of GAI tools is not related to one thing, but rather any task allocated by the teachers can be supported by GAI tools.



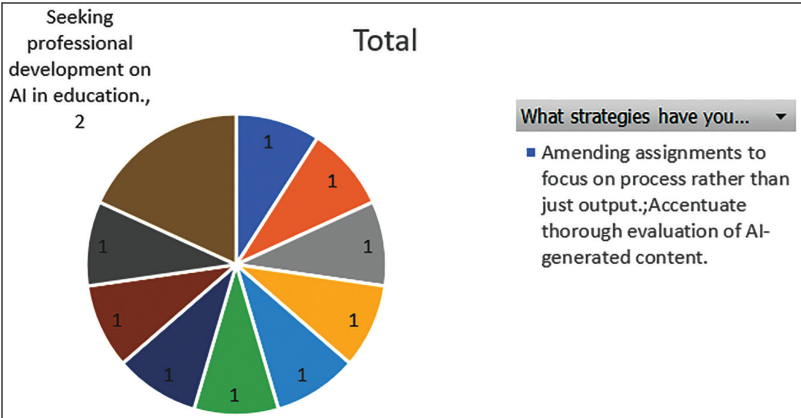
**Figure 18.** Count of Which of the Generative AI Tools You Know That Students Use in Academics?



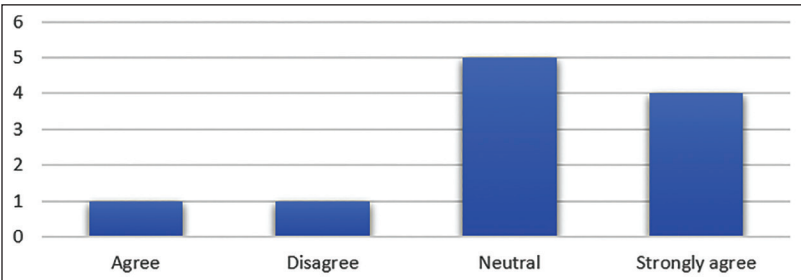
**Figure 19.** Count of Which Reasons Do You Think That Students Use.

### *Incorporation of GAI Tools by Teachers*

Looking at the multi-aspect usage of GAI tools, there are various strategies devised by faculties by which they have incorporated GAI tools in the classrooms. Even though the faculties have devised multiple methodologies by tailoring their teaching in the classes, including amending the assignments to make it output oriented, rigorous evaluation of AI-generated content, incorporating it in written tasks and assignments, and collaborating with peers to produce fair results, the major proportion comprised taking professional development sessions about integrating it in education, as shown in Figure 20.



**Figure 20.** What Strategies Have You Incorporated in Using Generative AI in Your Teaching?



**Figure 21.** Generative AI Help Students Understand the Concept Faster.

*Influence of GAI Tools on Students' Learning and Performance*

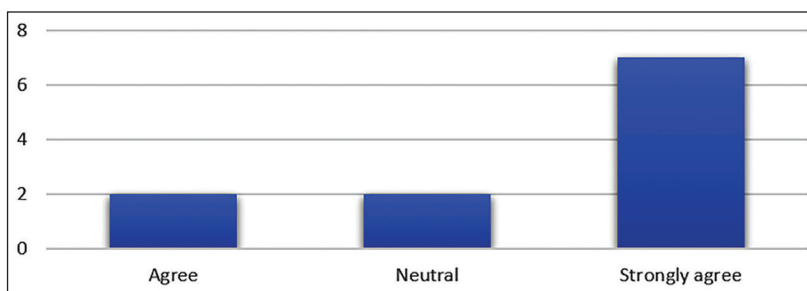
Being the frontman in training students about education, it becomes imperative to study and find out the effect it has on students' learning and performance. Below are the factors that have been crucial in studying this parameter.

*Enabling the Students to Understand the Concept Faster*

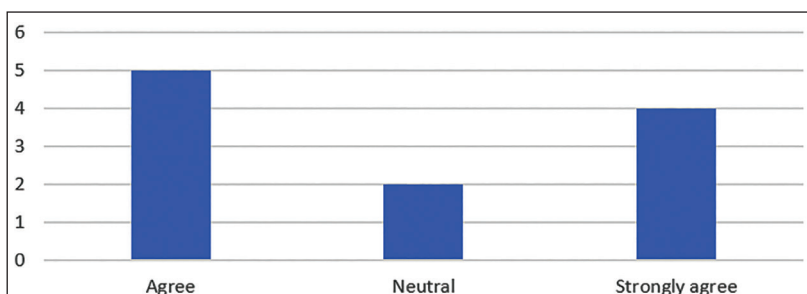
After digging into the data analysis as per Figure 21, it can be culminated that faculty members have mixed opinions on whether GAI tools are really proving their metal and potential in making the concept easier to understand. No doubt, they have really proven themselves beneficial in the completion of the task, but understanding of the concept is still a challenge. GAI tools have aided students in faster completion of the tasks by simply referring to the answers delivered by them.

*Overdependence of Students on GAI Tools for Learning*

The information that can be derived after studying Figure 22 is that there is too much bent of the students on the usage of GAI tools in learning, which is affecting



**Figure 22.** Students Are Becoming Overly Dependent on Generative AI for Learning.



**Figure 23.** Generative AI May Obstruct Students' Creative Thinking?

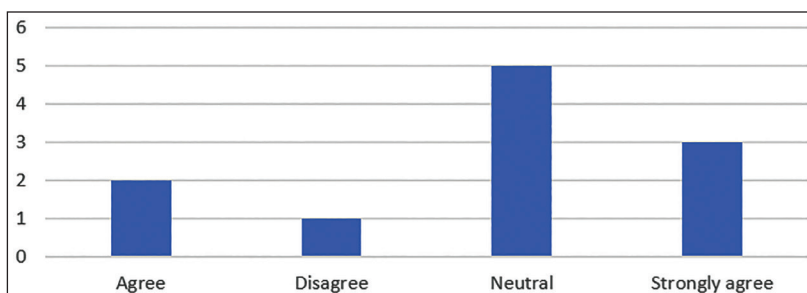
the cognitive and inherent trait of thinking in students. Thus, faculty strongly agree to the fact that, with the information available to them within a fraction of a second, they are restricting themselves from thinking and becoming habitual and reliant on GAI tools fully.

#### *Obstruction in Students' Creative Thinking*

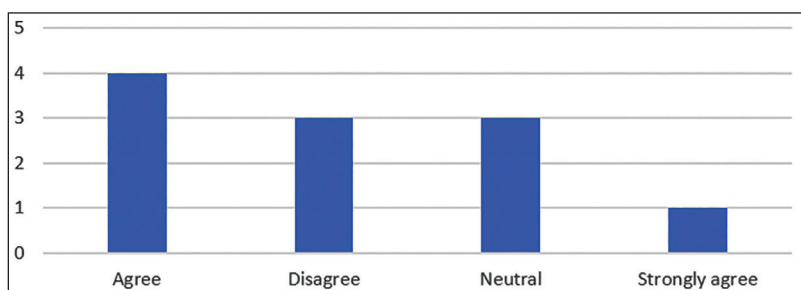
After examining the result of the data in Figure 23, it can be deduced that, majorly, faculty strongly agree to the fact that too much usage of GAI tools will hinder the creative thought process of the students. They can use GAI tools for finding unique ideas without careful thought about the problem at hand. Thus, careful integration is needed to ensure that the students fit in solving real-world problems with the knowledge and understanding of the topic. As this can give them momentary happiness, however, deprive their resolution capabilities in the real world.

#### *GAI Is Making Students Less Engaged*

Well, to get an answer to this perspective, a careful inspection of Figure 24 shows that faculty are mostly neutral about making students more engaged with the help of GAI tools. No doubt the entire class can be engaged in the usage of GAI tools as a part of the assignment, but they work in their own silos, and the collaborative skills take a hit. Here, the learning of the students is at stake as they work toward the completion of the task rather than learning something.



**Figure 24.** Generative AI Is Making the Students Less Engaged in Academic Learning.



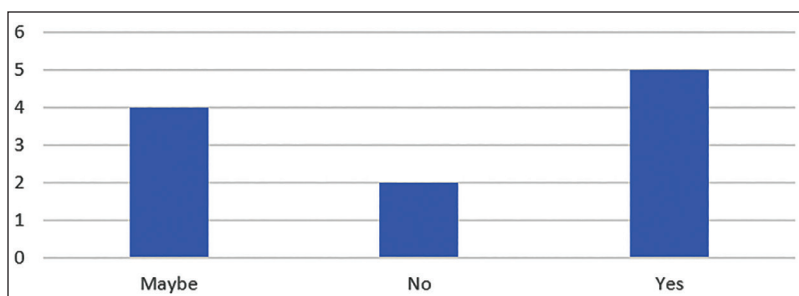
**Figure 25.** Generative AI Has a Negative Impact on Students' Research Skills.

#### *Impact of GAI Tools on Students' Research Skills*

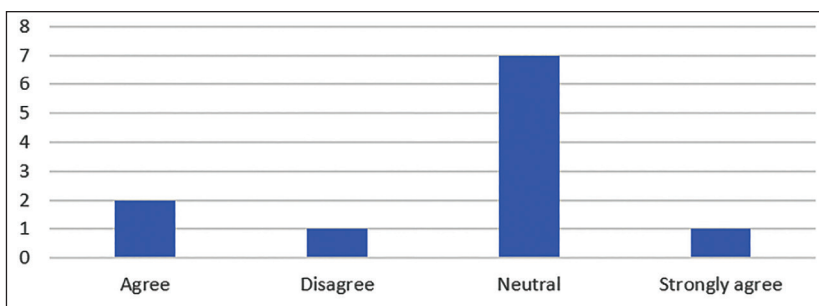
It can be inferred after exploring the analysis of data available in Figure 25 that majorly faculties believe that the GAI tools have a negative impact on students' research skills as they are only referring to one source, that is, the GAI platform for getting the information, thus, impacting the primary and secondary research methodologies. This is also restricting them from digging deep into the topic and the work that has been carried out on the topic. This is also impacting research integrity without giving due credit to the actual researchers. This is also delivering superficial information without actually studying hard to understand the topic.

#### *Decline in Problem-solving Abilities of the Students*

A thorough review of the data available in Figure 26 shows that faculty agree with this reduction in problem-solving abilities of the students with the usage of GAI tools. The major reason that can be attributed is the instant access and speedy delivery of the answer provided by GAI tools. Hence, wherever the students get stuck, they do not apply their learning to solve the problem; rather use these tools as a decoding platform. This is also keeping them away from learning and tackling various problems that they encounter in academics. This is also admitted by the students, as some of them have stated that it helps them in solving the code and the bug, wherever it becomes cumbersome for them to solve the task.



**Figure 26.** You Are Observing a Decline in Students' Problem-solving Skills with Generative AI.



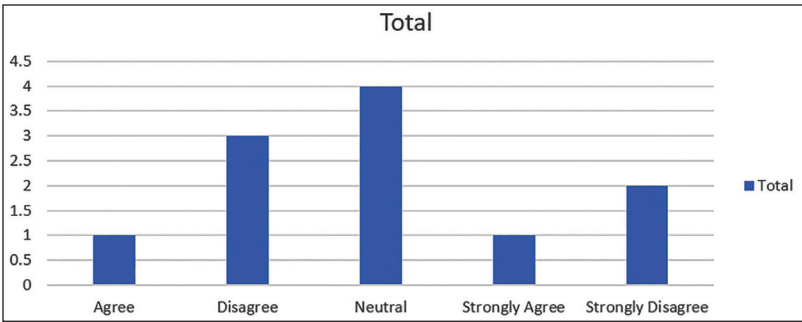
**Figure 27.** Generative AI Is Helping Students to Submit High-quality Work.

#### *Submission of High-quality Work with GAI Tools*

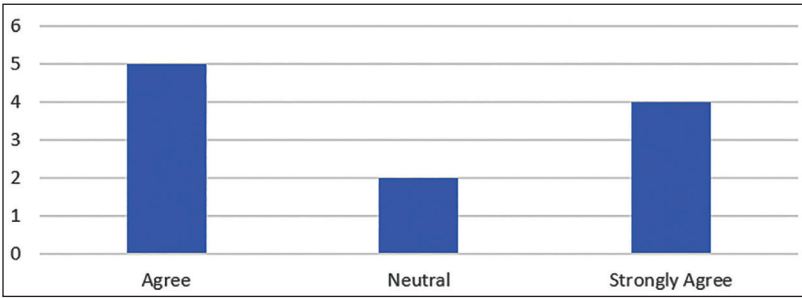
Another perspective of the faculty regarding the quality of work can be studied with the help of careful examination of Figure 27, which reveals that faculty are neutral regarding the submission of work, as in some of the cases, it is a repeated factor. It is evident that the assignment given to the students to check their understanding has a solution which is automatically solved. Another factor which is already explored above is that students are not using their creative thinking as a tool to replace the human brain.

#### *Effect of GAI Tools on the Conceptual Clarity of the Students*

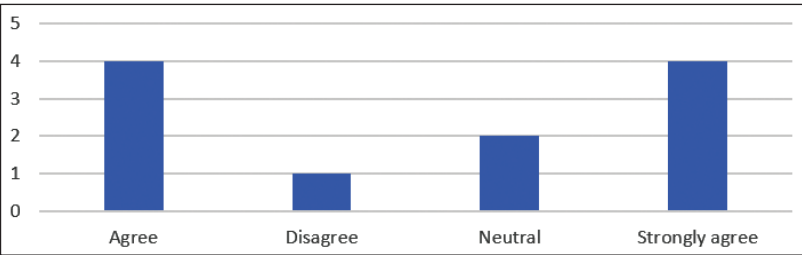
It can be stated that the GAI tools are just like an answer key; the only difference is that in traditional books, the answer key was available toward the end of the chapter, but in the case of GAI tools, it is available on the spot and at one click, and one does not have to shuffle pages around. The same can be derived by studying the responses shared by faculty in Figure 28, as students submit the assignment without any hindrance and approach the faculty. The neutral response of the faculty clearly showcases that the conceptual clarity of the students cannot be gauged through the submission of assignments, because students are submitting the assignments.



**Figure 28.** Generative AI Is Posing a Problem in Actually Understanding the Conceptual Clarity of the Topic.



**Figure 29.** Generative AI Has Spiked Plagiarism Cases in Classes.



**Figure 30.** Generative AI Is Enabling Students to Perform Better in Assignments, but Lack Thorough Knowledge of the Subject/Topic.

*Surge in Plagiarism with the Usage of GAI Tools*

Figure 29 clearly highlights that the faculty are finding a repetition of content in the submission of work by the students. This is due to the same usage of words, as GAI tools use the same words in a pattern in a sentence. This is also due to the fact that students save time in searching for content, as the solution is available at their convenience.

*Students Performing Better in Assignments but Lacking Knowledge of the Topic*

While reviewing the data available in Figure 30, it shows that faculty agree that students are able to perform better in assignments with the usage of GAI tools, but

the knowledge about the topic is missing when it comes to the viva. It can be derived that GAI tools are impacting the learning of the students, as they are not using their subject expertise to complete the assignment, but rather depend on GAI tools.

*Surge in Awards with the Usage of GAI Tools*

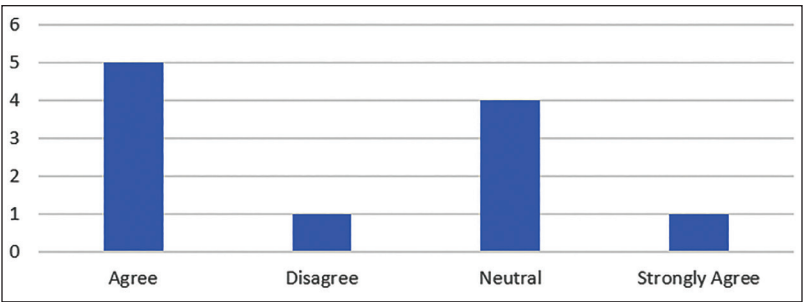
A careful audit of Figure 31 shows that faculties are having mixed opinions about an increase in grades. This can be validated by the fact that wherever the practical assignments are involved, the students are able to solve by the liberty provided by GAI tools, but the theoretical subjects are getting a hit due to the repetitive content being shared.

*Ethics and Integrity*

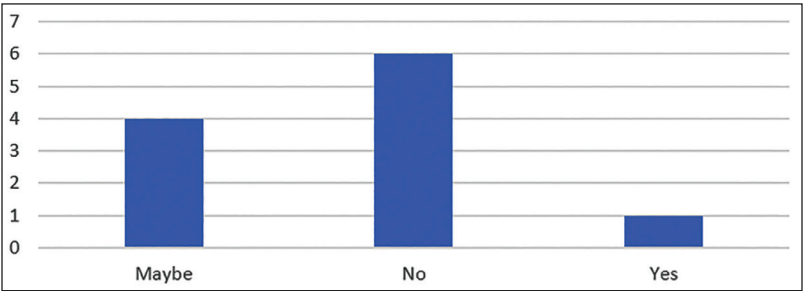
Another aspect which needs introspection is the opinion of the faculty about the practice of ethics and integrity while using GAI tools. The following pointers share an elaborative explanation for the aforementioned pointers.

*Equipment of Current Education Policy About Integration of GAI Tools*

While scanning the results of the responses received, as shown in Figure 32, signifies that most of the faculty doubt the integration of GAI tools in current education, as they have shown it is not producing fair results, with students lacking



**Figure 31.** Generative AI Is Leading to a Surge in Awarding Grades.



**Figure 32.** Do You Feel That Current Education Policy Is Equipped to Handle the Integration of Generative AI?

in-depth conceptual clarity of the topic and the subjects. Faculty are speculative about the current education readiness for immersing the GAI tools.

#### *Customization of Teaching/Assessment with Inclusion of GAI Tools*

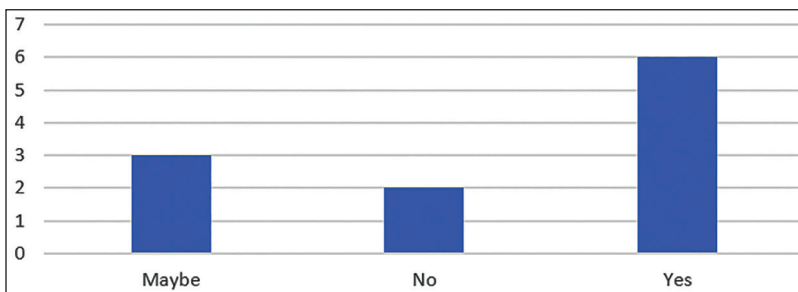
As a new technology, the availability of GAI tools cannot be ignored, as it is one of the most trending topics. However, as per Figure 33, it can be concluded that faculties have tweaked their assignments and teaching with emulsion of GAI tools, as it becomes quite important and vital to make them ready for the real world where GAI is a trend.

#### *Future Scope*

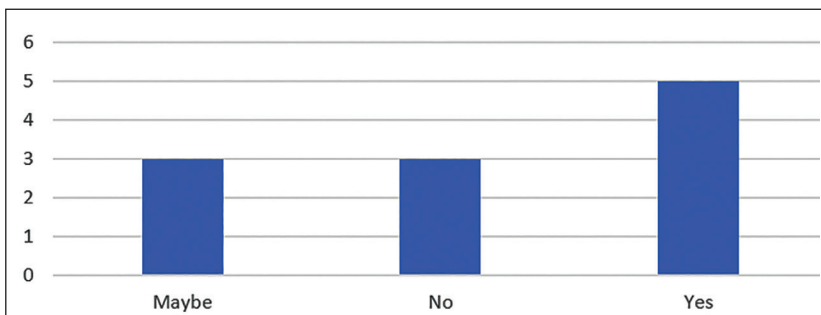
Since faculties play an important role in carving the students for tomorrow, it becomes essential to understand the future scope of GAI tools in learning and performance. Below are the parameters which were carefully studied to understand their impact in future.

#### *Formal Integration of GAI Tools in Education*

As already highlighted, GAI has been in trend ever since it was invented. Thus, after studying the details shown in Figure 34, it can be stated that, keeping aside all the negative consequences, the faculties do believe that it should be integrated formally



**Figure 33.** Have You Tailored Your Teaching/Assessment with Inclusion of Generative AI?



**Figure 34.** Do You Think That AI Should Be Integrated Formally in the Education Learning System?

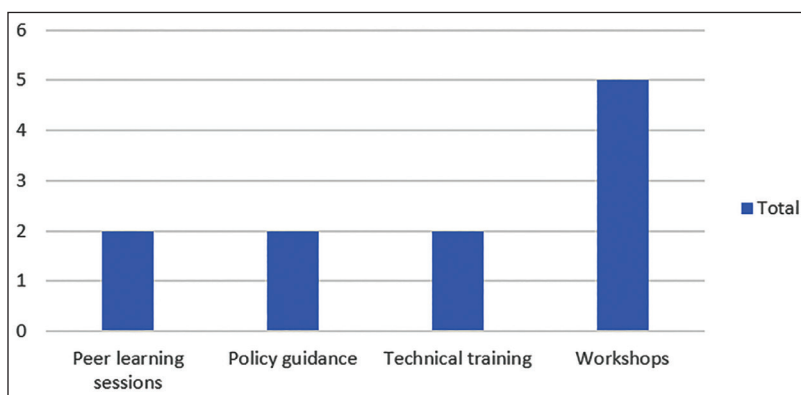
in education, and its presence cannot be bypassed. The preparedness of students for tomorrow depends on the preparation of today. Thus, it becomes quite evident and important for the faculty that they have to imbibe it in the current education.

#### *Upskilling Modes for Integration of GAI Tools*

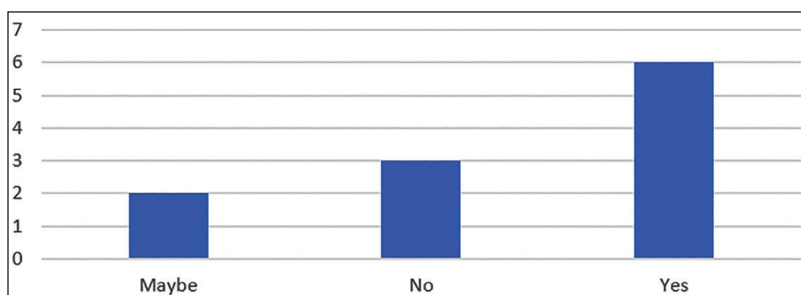
Inspection of the responses received in Figure 35 shows that faculty believe that workshops should be conducted to make them ready for its usage and the ways it can be integrated in education. Workshops will also give them a clear overview of drawing a line on its careful usage in classrooms, and thus detecting plagiarism too, which can produce better results.

#### *GAI Being a Co-teaching Tool*

It can be derived by looking at the responses received by the faculty, as depicted in Figure 36, which shows that the faculty believes, in the near future, it will become a co-teaching tool. Some of the organizations have already started revising their syllabus with its integration in the syllabus, as its presence cannot be overlooked.



**Figure 35.** What Modes Can Upskill Your Delivery Through the Inclusion of Generative AI in Teaching?



**Figure 36.** Do You Believe That Near Generative AI Will Be a Co-teaching Tool?

### *Feedback and Suggestions Regarding Integration of GAI Tools in Academics*

As per the suggestions shared by faculty, it has been found that GAI can be beneficial in making the concepts easier to understand. Also, it can be of help for introvert students as a source of learning medium. They do agree to the fact that it saves time while exploring for information, but they also acknowledge that the students lack knowledge about the topic. Hence, its overdependence has to be restricted. They also believe that there have to be well-drafted policies about its usage in academics (NEP, 2020).

## **Discussion**

The result matches global studies but highlights India-specific issues: Exam-oriented culture leads to high reliance, lack of AI literacy, limited digital ethics training, and rapid adoption without institutional policy. IKS's culturally rooted regulations balance innovation, discipline, and ethics.

## **Research Implications**

### *Pedagogical Implications*

Integration of GenAI in higher education has significant pedagogical consequences that require careful application. AI tools should promote student inquiry and comprehension, not replace it. Redesigned assessments should emphasize higher-order abilities like analysis, creativity, and problem-solving to reduce AI-driven shortcuts. Project-based learning should include guided AI use to help students apply information appropriately under teacher supervision. Reflective writing on AI use can also improve metacognition and ethical awareness, helping students critically assess their AI use and establish value-aligned learning habits.

### *IKS-aligned Regulation*

Integrating GenAI into education must be guided by core principles derived from IKSs to ensure responsible and meaningful learning. *Svādhyāya* encourages students to attempt tasks independently before seeking AI assistance (Srinivasan, 2021), while *Dharma* emphasizes ethical, honest usage. *Viveka* requires learners to critically verify AI-generated content, and *Anushāsana* promotes disciplined boundaries in frequency and purpose of use. To uphold these values, institutions should establish an AI usage honor code, require transparency statements in assignments documenting AI involvement, and implement AI-integrity training modules that build ethical awareness and reinforce responsible academic practices.

### *UGC/AICTE Policy Implications*

UGC and All India Council for Technical Education (AICTE, 2021) must create forward-thinking policies to ensure responsible, equitable, and ethical use of

GenAI in higher education (UGC, 2023). Maintaining integrity and consistency requires clear AI use standards in academic work. Students need an organized AI literacy curriculum to learn critical thinking, ethics, and technology. A national AI-integrity framework would standardize academic honesty and evaluation redesign. Comprehensive teacher training programs in AI-enabled pedagogy, monitoring, and responsible classroom application are also needed.

## Future Scope

GenAI research in higher education must go beyond trends to address long-term pedagogical, cultural, and regulatory ramifications. AI use should be studied longitudinally to determine how it affects student learning, abilities, and academic integrity. Multilingual educational situations will be fairer and more authentic using Indian language AI identification techniques. Curriculum integration of AI can facilitate discipline-specific learning and responsible AI literacy. Comparative international studies will also assess India's development, identify worldwide best practices, and contextualize AI governance approaches for varied educational ecosystems (Eaton, 2023; Hill, 2023; Kasneci et al., 2023). This study only included students and faculty, but the administrators view point was restricted.

## Conclusions

GenAI can boost Indian higher education if integrated appropriately. This study shows that while student learning advantages are high, reliance, plagiarism, and crucial skill loss must be addressed. IKS principles provide a unique Indian approach to AI regulation that promotes cultural integrity, holistic growth, and ethics (Vygotsky, 1978). For effective and ethical learning, institutions need AI literacy, explicit regulations, and redesigned assessments.

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# Evaluating the Effectiveness of Storytelling Pedagogy in Teaching Financial Literacy to Middle School Students

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## Abstract

This study aims to explore the use of storytelling methods as a pedagogical tool to introduce financial literacy concepts to students in Grades 6, 7 and 8. With growing concerns around low levels of financial awareness among schoolchildren, this research attempts to test whether moral-based narratives can be effectively used to teach essential personal finance concepts such as saving, borrowing, investment and ethical earning. The study followed a three-phase structure. In Phase I, a pre-test was conducted to assess students' existing knowledge. In Phase II, a story was narrated to students using the character of 'Raju' to embed core financial lessons through real-life scenarios. Phase III involved a post-test with MCQ-format questions that measured students' understanding of financial and indigenous knowledge concepts. The study was conducted in an Indian school setting, using purposive sampling and classroom observation. The results revealed a significant improvement in students' conceptual clarity post-intervention. Most students could now differentiate between needs and wants, understood the importance of saving, and became aware of borrowing risks. Concepts such as income diversification, asset protection, and ethical money habits, which were previously unknown, were now clearly understood. The story format allowed students to engage, reflect, and retain concepts better than formal methods. The study demonstrates that storytelling rooted in Indian cultural values can serve as an effective, low-cost, and engaging pedagogy for imparting financial literacy at the school level. It also

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highlights the gap in formal curriculum and household financial discussions, making a case for structured interventions through creative means.

### Keywords

Financial literacy, Indian knowledge system, personal finance, school education, storytelling pedagogy

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## Introduction

In an era where children are gradually exposed to digital transactions, advertisements, and consumer choices from a young age, financial literacy for middle school students has become more essential than ever before (Acar, 2023; Amagir et al., 2018). These formative years represent a crucial stage in the cognitive and behavioural development of children, during which early financial understanding can shape lifelong habits and attitudes (Agasisti et al., 2022; Agnew & Harrison, 2015). However, studies have shown that many children at this level lack even the most basic financial knowledge, such as the value of saving, budgeting, or differentiating between needs and wants (Cortés-Morales & Main, 2022). Hence, the absence of age-appropriate and engaging financial education raises important concerns for educators and parents alike.

Over the past decade, there has been a significant rise in global research on student financial literacy. According to the Scopus database, scholarly publications in this domain have increased fourfold, from 12 papers in 2015 to 48 papers in 2024. This growth reflects three distinct phases: the initial period (2015–2017) with minimal activity, a rapid expansion phase from 2018 to 2021, partly influenced by the financial uncertainties of the COVID-19 pandemic and a more mature phase from 2022 to 2024, where research activity remained consistently high (Irianto et al., 2025). Thus, this trend highlights a growing academic recognition of the need to build financial capability in children and adolescents.

Despite this growing attention, one critical gap persists: the methods used to teach financial literacy to children often remain overly formal, abstract, or disconnected from their everyday realities (Brown et al., 2018; Kaiser & Menkhoff, 2020). Rath and Patra (2023) argue that standard classroom instruction and textbook-based financial lessons may not resonate with younger students, especially in a country like India, where learning is deeply influenced by tradition, culture, and storytelling. Therefore, rethinking pedagogy becomes imperative.

India has a long-standing tradition of using storytelling as a tool for moral and practical education. Classic narratives like the *Panchatantra*, *Jataka tales*, and local folklore have for centuries conveyed life lessons in a form that is both engaging and memorable (Rath & Patra, 2023). These stories used simple characters and relatable dilemmas to teach values such as honesty, foresight, and prudence, that align naturally with the core ideas of financial literacy (Amagir et al., 2018;

Andriichuk, 2021). But while storytelling remains culturally relevant, it has seldom been explored systematically in the context of financial education for school children.

Therefore, this research attempts to bridge that gap by exploring how ancient Indian storytelling techniques can be effectively adapted to introduce modern personal finance concepts to students in Grades 6–8. The goal is not only to improve financial understanding at an early age but also to make the learning process more meaningful, culturally grounded, and developmentally appropriate. In doing so, the study aims to contribute a pedagogical, moral-based story that integrates traditional narrative methods with contemporary financial education.

## **Review of Literature**

The basic aim of this study is to assess the effectiveness of storytelling as a pedagogical tool in imparting and enhancing students' understanding of personal finance concepts such as expenses, savings, investment, banking, mutual fund and financial planning among students of Grades 6, 7 and 8 in English medium schools of Anand, Ahmedabad, and Gandhinagar cities in Gujarat. The second objective of the study is to develop a tool from a story that would help to objectively measure the financial literacy of the school kids. The present study tries to teach the financial concepts and core concepts of the Indian Knowledge System (IKS) to the students in a simple and lucid manner.

The theoretical framework of constructivist learning and narrative transportation theories can be used to explain the foundation of the present study. Piaget, Vygotsky and Bruner have majorly contributed to constructivism. They found that learners build knowledge by connecting new concepts to prior experiences and through interactions with their social and cultural environment (Chand, 2024). Further, Bruner's seminal work (1983) emphasised that education is not a fixed or natural process. Rather, it is designed as a symbol of culture by the communities that can evolve to reflect the shared values. The fundamental theme of the present study, that is, adopting storytelling pedagogy to teach financial concepts, aligns with the principles of constructivism, wherein the learners can acquire this knowledge by relating themselves with familiar and real-life scenarios. Another theory, that is, the Narrative Transportation Theory, by Green and Brock (2000), complements this perspective and explains how people become mentally and emotionally engaged in a narrative. In this psychological condition of transportation, an individual's attention, imagination and feelings become situated in the narrative, which allows there to be less counter-arguing and more acceptance of the propositions in the story. In addition to this, Green and Appel (2024) thorough chapter advances this concept of narrative transportation by providing examples of how stories can transform individuals and impact beliefs, emotions, identity and social cognition. The narrative transportation theory may be highly relevant to the present study, particularly in imparting financial education. The attention and the engagement levels of the learners expand when budgeting, interest compounding, saving, investing or risk diversification are explained with interesting stories. This

increased transportation may improve their understanding, retention, and confidence. Stories that show characters dealing with real-life financial challenges, such as managing debt or saving for a goal, help learners visualise the consequences. They can relate to the characters of the story and understand the financial lessons more effectively than through traditional instruction. Hence, narrative transportation offers a strong theoretical basis and a way to assess how well storytelling works as a teaching method in financial literacy education. Thus, constructivism details how learners actively build contextualised knowledge, while narrative transportation explains why stories are effective in attracting attention and encouraging enduring persuasion. The combination of these principles is also useful for devising meaningful and engaging storytelling interventions.

An individual can make an informed choice of investing their financial resources if they have the essential financial literacy skills. Further, if these skills are taught at a younger age, they can contribute to the long-term financial well-being of an individual. Many empirical studies have analysed the evolution of financial education programmes, especially through storytelling pedagogy from the basic level to the advanced transmedia applications. According to the Discussion Paper Series on financial literacy education by Compen et al. (2019), most of the present knowledge and practice remain rooted in a functionalist paradigm that privileges the transmission of technical knowledge and skills over holistic or critical modes. While the conventional models can produce short-term coding of knowledge, they are typically poor at developing deeper engagement, contextual understanding, or long-term behavioural change. Extant literature on financial literacy education programmes noted that various experiential learning interventions, such as simulations, project-based assignments or assignments pertaining to real-life scenarios, tend to increase the financial knowledge of the students studying in the schools (Batty et al., 2015). This finding was validated in the systematic literature review conducted by Amagir et al. (2018) on financial literacy education programmes for children and adolescents. The authors also reported that the actual behavioural change was found to be limited, though these interventions produced a promising impact in fostering meaningful engagement and behavioural intentions. The pedagogy adopted by the present study, that is, storytelling, cannot be classified as a component of experiential learning but shares the same objective, that is, fostering engagement and contextualising the relevance. This pedagogy, based on narratives, leverages the power of stories rather than hands-on tasks in the experiential learning method. Thus, this study aims to explore an alternative pathway to achieve the same underlying objective of deepening financial literacy. There are studies in the literature confirming the effectiveness of storytelling pedagogy to teach financial concepts to students at the primary school level. Kuswati (2019) and Utie et al. (2025) reported the importance of adopting narratives in enhancing the understanding of financial concepts at an early age among elementary school students. Building upon these foundational studies, the research in the domain of financial education has progressed to developing structured educational materials addressing the needs and preferences of adolescents. Irianto et al. (2024) used the Fuzzy Delphi method to conduct need analysis for the development of storybooks relating to financial literacy for junior high school students.

Blue and Grootenboer (2019) suggested moving away from a conventional approach to teach financial literacy and adopting a praxis approach that integrates moral, ethical and caring dimensions of teaching. The authors strongly recommended that educators recognise how socioeconomic and cultural factors shape the financial choices of an individual. In a way, storytelling pedagogy adopted in the present study can be viewed as complementary to the praxis approach and can serve as a foundation on which more critical praxis-oriented financial literacy can be built.

Very recently, researchers have explored the transmedia storytelling approach involving delivering the content across multimedia to create an engaging experience for the learners. Researchers have applied this novel approach in the landscape of financial education (Santos et al., 2025). Through a pilot evaluation, Freitas et al. (2025) found that this approach of storytelling increased the knowledge and engagement of young adults in financial education. A study testing the efficacy of four novel education programmes with visual interactive tools and digital narratives by Lusardi et al. (2017) also concluded that, with these tools and narratives, the financial literacy scores and the level of confidence of the participants increased significantly. Findings of Fan and Chen (2023) supported this approach and proved that integration of content and language learning with digital storytelling has shown promise in enhancing financial literacy. Further, the systematic literature review by Amagir et al. (2018) reported that knowledge tests, which were able to capture the short-term gains in financial knowledge, have been mostly used by the interventions, and the present study also aligns with the class test approach to assess the learning outcomes of financial literacy taught through storytelling.

The progression from traditional storytelling methods to advanced transmedia and digital storytelling approaches reflects the dynamic nature of educational strategies in financial literacy, and the present study expands the scope of the extant literature by adopting RBI-designed story as the foundation and further expanding it to teach the lessons related to entrepreneurship, ethics and income diversification.

## Methodology

The present research was conducted in three phases, catering to a consolidated sample size of 829 students. The study is based on action research using an intervention-based approach. A structured storytelling session served as a pedagogical tool under this action research. Under the action research method, the modus operandi to conduct the research was modified in all three phases. This research was an experiential journey, accompanied by nostalgic memories. A descriptive research design has been adopted, and data were collected at a single point in time from the respondent.

The original story titled, *Raju and the Money Tree*, in the comic book, written by Manoj and Shailaja in the year 2007, for Issue-I, Basic Banking under RBI Financial Education Series, copyrighted by RBI, was moulded as well as extended to include the other key financial concepts. Considering the short retention span of the students, the story was moulded in such a way that the ideal time to narrate the story was not more than 20 minutes.

The four concepts highlighted in italic were common in the original story and the edited story. As per Table 1, the four concepts highlighted in italic were common in the original story and the edited story. The language used for developing this story was simple and lucid, and it was culturally contextualised to enhance the understanding of the school children. The bilingual mode, that is, English and Hindi, was used to narrate the story.

The study was conducted in three phases. The first two phases focused on pilot testing and iterative development of the research instrument, while in the third phase, the final data collection was completed with the refined questionnaire. The target audience for all three phases of the study was students from Grades 6, 7 and 8 studying in English medium in either the Gujarat Board or Central Board in Anand and Gandhinagar districts of Gujarat. As the researcher addressed the cohort group, a liberty was taken to address the students of different boards of education. The study settings were the seminar halls of the selected schools in which the students of classes 6, 7 and 8 were addressed simultaneously. To ensure discipline and focused attention, the fellow researchers, student volunteers, and a couple of teachers at the school assisted the researchers till the entire story was narrated, and the questionnaires were filled out by the students.

The instructional phase can be divided into three broad areas, namely, *briefing phase*, *storytelling phase*, and *debriefing phase*. The students were briefed to establish the context. In the *briefing phase*, the objective of storytelling for teaching financial concepts was revealed. In this phase, it was ensured that interest and excitement were aroused in the students, so that they were deeply engaged when the story was told to them. In the *storytelling phase*, the researcher orally quoted the entire story from memory, and simultaneously, with the aid of the multimedia projector, the PowerPoint slides were shown, which picturised the entire story. When one researcher was narrating the story, another researcher pointed to the pictures on the PowerPoint slides. In-between the story, the narrator asked questions pertaining to the story, which ensured that students understood what was being told. The narrator tried to encourage students to empathise with the characters of the story and try to predict the outcome by applying financial logic. In the last phase, that is, *debriefing phase*, a structured debriefing was executed, in which the narrator, for at least 10 minutes, discussed the morals of the story through the reflective questioning method. The morals were the financial concepts that researchers tried to teach.

In Phase I of the pilot testing, 120 students from the selected grades belonging to Anand English Medium School, Anand, were approached for the storytelling session with necessary permissions from the school authorities. Initially, a questionnaire containing 23 items using a five-point Likert scale (5 = Strongly Agree to 1 = Strongly Disagree) was developed to measure the students' attitude and values aligned with the morals of the story. Initially, it was thought to compare the pre-session and post-session attitudes of the respondents with this questionnaire. However, while conducting the pilot study in Phase I, it was observed that the middle school students were struggling to respond to the statements due to the abstract nature of the scale selected. Some were not able to differentiate among the response options even after explaining to them the statements as well as the scale options in

English and Gujarati. Hence, a revision was made, and an emotion-based smiley scale was used for conducting the further study, to make the questionnaire visually appealing and engage the respondents better while responding. Further, minimal variations were observed in the pre- and post-responses. Some statements appeared intuitive enough that the students could answer them without the influence of the story. These observations led to a shift in the approach in Phase II of the pilot testing, which was conducted in Gandhinagar district, where only post-intervention responses were gathered using a smiley-based Likert scale. In the first round, it was also observed that the students were tired of filling out the pre and post-test, so to reduce the fatigue level, the pre-test was strictly omitted. In the second phase, the storytelling intervention was conducted with 388 students of Grades 6, 7 and 8 from Anand Niketan School in Ahmedabad. This second phase revealed that some students experienced response fatigue and struggled with the complex structure of the statements, even when the statements were explained to them in English as well as the Gujarati language by the researchers. Based on these observations, the instrument was further refined. Without compromising on the content, the statements were reduced from 23 items to 16 items. The language part was also simplified to suit the comprehension level of younger students. During this phase, it was observed that the students were not comfortable understanding the expression of the smiley scale. For instance, some students interpreted 'neutral' expressions as positive and others as negative. This led to inconsistency in responses and reduced the reliability of the data. Given these limitations, the researchers decided to evaluate the conceptual clarity of the selected students about personal finance concepts through multiple-choice questions (MCQs). Moreover, students were familiar with the concept of MCQs because the teachers often conduct a subject-specific objective test based on the MCQs model. MCQs help to measure what the students have actually learned from the story and are easier to check, score and understand as each question has one clear answer.

Hence, in the final phase, that is, data was collected from 321 students from Mount Carmel High School in the controlled classroom setting, and responses were gathered immediately after the storytelling session to ensure the relevance and recall. The core dataset collected in this phase was analysed with the help of SPSS 21, and scores were calculated for the MCQ to check their knowledge clarity. There were 16 themes or morals identified from the story, on which the questionnaire was framed. The type of questions was either a closed-ended question (8 questions) or a fill-in-the-blanks pattern (8 questions), for which the answer was to be selected from the given four alternatives. In the fill-in-the-blanks pattern question, two questions contained two blanks, so the answer to the question had a joint alternative. The collected data was processed to compute the score. If the student gave a correct answer to the question, then they scored 1 mark, and if the answer was incorrect, then a 0 was assigned. In case of two blanks, 1 mark was assigned only if both the answers were correct. Thus, the MCQ-based questionnaire was 16 marks. In addition to the quantitative analysis, qualitative observations regarding the students' engagement, understanding, and response patterns were recorded during and after the session to complement the quantitative findings. The data in the respective phases were analysed with absolute numbers,

**Table 1.** Comparison of Financial Concepts.

| Original Story                | Edited Story                     |                           |
|-------------------------------|----------------------------------|---------------------------|
| Deposit                       | Financial safety                 | Needs vs. Wants           |
| Withdrawal                    | Necessity of a bank account      | Financial records         |
| Passbook                      | Informal sources of borrowing    | Protection of the asset   |
| Savings account               | Ethical conduct                  | Income generation         |
| Joint account number          | Bank interest                    | Savings                   |
| Fixed deposit or time deposit | Entrepreneurship                 | Satisfaction and donation |
| Recurring deposit             | Investment option                | Repayment of loan         |
| Nominee                       | Income diversification           | Deposit                   |
| Interest                      | Inflation and financial planning | Withdrawal                |

percentages, mean, median, minimum, and maximum. Inferential statistics such as the independent sample t-test and One-Way Analysis of variance (ANOVA) were applied.

The main limitation of this study was the cross-sectional methodology, instead of a longitudinal study, in which the same set of students could have been targeted in all three phases of research. Researchers in future could analyse the sustained knowledge or behaviour change through a longitudinal study. There is also a geographic limitation, because in all three phases, the study was conducted in different schools located in different cities. The board of examination in which the students studied were also different, which might affect the outcome of the study, because there is a difference in the curriculum across each board. A large sample size and wider geographical coverage would provide a holistic picture.

Further, the findings of the study must be applied with caution as the researchers did not consider the control group in the storytelling intervention. The study is subject to post-test bias. The responses of the students after storytelling could reflect their short-term recall ability. There is a possibility that the students would have given socially desirable responses as they know that they are being observed.

## Data Analysis

The researcher tried to ask basic information to the students, which is described in Table 2.

From Table 2, it may be inferred that as high as 52% of the respondents were male. A total of 37% of students studied in Grade 6. Nearly 98% of the students liked the story, and 97% of the respondents easily understood the concepts. About 92% of the respondents appreciated the 'storytelling' as a useful pedagogy. Furthermore, 94% of the respondents, in future, were enthusiastic to learn the financial concepts through stories.

In Phase I and Phase II, it was observed that students could hardly differentiate the 5-point Likert scale without smiley, and the 5-point Likert scale with smiley, so for the analysis purpose, the percentage of before and after, on the anchor point 'strongly agree and agree were merged as agree' for the outcome purpose.

**Table 2.** Demographic Details.

| Variable                                   | Categories | Phase I        |    | Phase II       |    | Phase III      |    | Total | %  |
|--------------------------------------------|------------|----------------|----|----------------|----|----------------|----|-------|----|
|                                            |            | Observed Value | %  | Observed Value | %  | Observed Value | %  |       |    |
| Gender                                     | Male       | 76             | 63 | 215            | 55 | 144            | 45 | 435   | 52 |
|                                            | Female     | 44             | 37 | 173            | 45 | 177            | 55 | 394   | 48 |
| Standard                                   | 6th        | 50             | 42 | 154            | 40 | 103            | 32 | 307   | 37 |
|                                            | 7th        | 37             | 31 | 124            | 32 | 106            | 33 | 267   | 32 |
|                                            | 8th        | 33             | 27 | 110            | 28 | 112            | 35 | 255   | 31 |
| Liking of the story                        | Yes        | 118            | 98 | 371            | 96 | 320            | 99 | 809   | 98 |
|                                            | No         | 02             | 02 | 17             | 04 | 01             | 01 | 20    | 02 |
| Easy concept understanding                 | Yes        | 119            | 99 | 369            | 95 | 317            | 99 | 805   | 97 |
|                                            | No         | 01             | 01 | 19             | 05 | 04             | 01 | 24    | 03 |
| Method of teaching                         | Poor       | 01             | 01 | 07             | 02 | 02             | 01 | 10    | 01 |
|                                            | Neutral    | 08             | 07 | 41             | 11 | 09             | 02 | 58    | 07 |
|                                            | Good       | 111            | 92 | 340            | 87 | 310            | 97 | 761   | 92 |
| Learning financial lessons through stories | Yes        | 117            | 98 | 350            | 90 | 314            | 98 | 781   | 94 |
|                                            | No         | 03             | 02 | 38             | 10 | 07             | 03 | 48    | 06 |

**Table 3.** Descriptive Results (in Percent).

| Item <sup>a</sup> | Statements                                                                         | Phase I Agree |       | Diff | Phase II Agree |
|-------------------|------------------------------------------------------------------------------------|---------------|-------|------|----------------|
|                   |                                                                                    | Before        | After |      |                |
| FL1               | Borrowings for personal consumption are not good.                                  | 02            | 83    | 81   | 76             |
| FL2               | There is no shortcut to earning easy money.                                        | 10            | 98    | 88   | 92             |
| FL3               | Hard work is necessary in life.                                                    | 89            | 97    | 08   | 97             |
| FL4               | Entrepreneurship means working and earning money for oneself.                      | 03            | 54    | 51   | 62             |
| FL5               | Spending money to protect assets is a good decision.                               | 00            | 92    | 92   | 89             |
| FL6               | Money must be spent to service the needs.                                          | 00            | 84    | 84   | 86             |
| FL7               | Money must not be spent lavishly to satisfy wants.                                 | 01            | 53    | 52   | 62             |
| FL8               | Borrowed money must be repaid on time.                                             | 05            | 92    | 87   | 95             |
| FL9               | Money must be saved.                                                               | 95            | 99    | 04   | 96             |
| FL10              | Money stored in a piggy bank (galla or box) neither remains safe nor grows.        | 00            | 85    | 85   | 55             |
| FL11              | One must have a bank account to put the money for growth and also for safety.      | 03            | 93    | 90   | 91             |
| FL12              | Interest is earned on the money deposited in the bank.                             | 03            | 86    | 83   | 84             |
| FL13              | Money must not be borrowed from moneylenders.                                      | 00            | 82    | 82   | 75             |
| FL14              | Moneylenders charge higher interest than banks.                                    | 00            | 93    | 93   | 81             |
| FL15              | The passbook and bank statement from the bank provide a clear status of the money. | 02            | 88    | 86   | 88             |
| FL16              | Money must be earned ethically.                                                    | 00            | 62    | 62   | 52             |
| FL17              | Income diversification is necessary to grow the money.                             | 00            | 86    | 86   | 77             |
| FL18              | Financial Planning is important for the future.                                    | 01            | 92    | 91   | 94             |
| FL19              | Prices do not remain the same due to inflation.                                    | 00            | 90    | 90   | 82             |
| FL20              | Small savings and investments lead to big growth of money.                         | 02            | 92    | 90   | 92             |
| FL21              | Mutual funds help in quick money multiplication.                                   | 00            | 85    | 85   | 85             |
| FL22              | Satisfaction is important in life.                                                 | 13            | 70    | 57   | 75             |
| FL23              | Donation leads to happiness.                                                       | 09            | 95    | 86   | 93             |

**Note:** <sup>a</sup>The items are the outcomes of financial literacy, and they are numbered from FL1 to FL23.

**Table 4.** Question-Wise Analysis.

| Question Number | Consolidated Score of Correct Answers | Financial Literacy Level (%) | Question Number | Consolidated Score of Correct Answers | Financial Literacy Level (%) |
|-----------------|---------------------------------------|------------------------------|-----------------|---------------------------------------|------------------------------|
| 1               | 320                                   | 99.69                        | 9               | 275                                   | 85.67                        |
| 2               | 321                                   | 100.00                       | 10              | 311                                   | 96.88                        |
| 3               | 309                                   | 96.26                        | 11              | 81                                    | 25.23                        |
| 4               | 286                                   | 89.10                        | 12              | 239                                   | 74.45                        |
| 5               | 305                                   | 95.02                        | 13              | 251                                   | 78.19                        |
| 6               | 310                                   | 96.57                        | 14              | 295                                   | 91.90                        |
| 7               | 304                                   | 94.70                        | 15              | 275                                   | 85.67                        |
| 8               | 303                                   | 94.39                        | 16              | 293                                   | 91.28                        |

**Table 5.** Overall Score Analysis.

| Marks Obtained | Frequency | Literacy Level (%) |
|----------------|-----------|--------------------|
| 16             | 31        | 100.00             |
| 15             | 101       | 93.75              |
| 14             | 90        | 87.50              |
| 13             | 53        | 81.25              |
| 12             | 26        | 75.00              |
| 11             | 10        | 68.75              |
| 10             | 02        | 62.50              |
| 09             | 05        | 56.25              |
| 08             | 02        | 50.00              |

It may be inferred from Table 3 that some of the morals of the story were known to the respondents, even before listening to it. The classroom discussion and the informal conversations with the family members, friends, and relatives might have helped them to develop a basic understanding of a few of the financial literacy outcomes. While the students might have learned some basic and core financial concepts from the story.

It may be inferred from Table 4 that all 16 questions developed from the story were well-received by the students. Out of the total sample size of 321, more than 230 responses were correct for all questions, except question number 11.

It may be inferred from Table 5 that out of 321 students, only 31 students could answer all questions correctly and scored a full 16 marks. 101 students could correctly answer 15 questions. Ninety students could correctly answer 14 questions. Only two students had a low score of 8.

## Discussion of the Results

The pen-picture of the main character in the story was a boy named Raju, who was a lazy, non-working fellow. He left his home in search of a money tree and met a fatherly figure, Gopi Chacha, who advised Raju to sow the magical seeds, nurture the plant, and wait for the money to grow on the tree. His intelligent advice transformed Raju into a responsible son, a money-making entrepreneur, and a financially prudent individual. Raju understood the reality of life that money could be generated from undertaking economic activity, and not from myths such as the money tree. Raju's mother was a torchbearer for his son, who unconditionally cared for him and taught him to adopt ethical means to earn money. The bank manager in the story played the role of an adviser to guide Raju for systematic investment.

From Table 3, it may be observed that in Phase I, the results after storytelling were significantly different. Students understood that borrowings for personal consumption were not good (FL1) and there was no shortcut to earn easy money (FL2), which they might have learned by observing the behaviour of family members (Hang & Thi, 2022; Johnson & Sherraden, 2007). The importance of hard work (FL3) and saving money (FL9) were common cross-table discussions in the Indian middle-class families; there was no significant difference in the scores for the statements, before and after the storytelling (Hang & Thi, 2022). Through the story, the students understood that entrepreneurship meant working and earning money for oneself (FL4). This finding aligned with the findings of Sabau (2022). In reference to the statements FL5, FL6, FL10, FL13, FL14, FL16, FL17, FL19, and FL21, it was observed that students knew nothing before this intervention. Their awareness was very low (score less than 10) with respect to statements such as FL7, FL8, FL11, FL12, FL15, FL18, FL20, FL22 and FL23. However, it may be appreciated that this story was impactful (high score more than 60) in raising the awareness level of the selected school students with respect to the financial literacy outcomes. These findings coincide with the studies of Hang and Thi (2022), Johnson and Sherraden (2007) and Sabau (2022). Thus, it may be inferred that neither informal systems, such as families, friends, and others, nor the class teacher in the formal education system, introduced all of these financial literacy lessons to these children. It is a hard fact that though the economics and finance concepts, such as opening a bank account, simple and compound interest, inflation and many more were specified in the syllabus, students lacked the practical understanding of the same. In Phase II, all the morals of the story were explained through the story, ensuring that the students were attentive, engaged with the central character of the story, and also retained the concept. Thus, the oral communication, accompanied by illustration, ensured conceptual clarity and unforgettable learning (Sconti, 2022). At large, it may be concluded that stories are an effective pedagogical tool to impart knowledge, and further, they are always liked by everyone (Rath & Patra, 2023).

In Phase III of the research, the questions that were framed were linked with the narratives mentioned in the story. Each question rightly addressed the teaching objective required for imparting knowledge of finance and also IKS. Based on the

majority of students' attempts to correctly answer the question, it may be inferred that the story was engaging, students were attentive, and they could comprehend the financial and IKS literacy (Isbell et al., 2004). Moreover, the tool could be treated as effectively designed, because each question framed on the MCQ pattern attained the learning objective. The tool helped to develop the higher-order thinking skills of the students, and the same could be used by other authors to spread the financial and IKS literacy (Amagir et al., 2018). The designed tool to measure the financial and IKS literacy, post storytelling, is presented in Table 6.

It may be understood that the highest score was 16, with 100% financial literacy level, and the median score of 8 resulted in a literacy level of 50%. The average score across the sample was 15.52 marks. It may be inferred that if the grouping of the literacy level was made on an arbitrary level, then the low literacy score was up to 50%, the medium literacy score ranged between 51% and 82%, and the high literacy score was 83% and above. The financial literacy level was mapped across the gender and the standard of the student.

It may be inferred from Table 7 that female students had higher literacy than male students. It was noted during the qualitative observation that the female students were more attentive during the storytelling phenomenon. An independent sample *t*-test was run to check the hypothesis,  $H_1$ : There is no significant difference in the average financial and IKS literacy score between the male and female students. The results from Levene's test of significance indicated that the assumption of homogeneity of the variance was met,  $F(1,319) = 1.65, p = .20$ , thus equal variances were assumed. There was no statistical difference in the literacy scores between males ( $M = 13.35, SD = 1.61$ ) and females ( $M = 13.56, SD = 1.50$ );  $t(319) = -1.22, p = .223$ . The mean difference ( $-0.21$ ) was also not significant, and the 95% confidence interval ranged from  $-0.55$  to  $0.13$ .

Further, one-way ANOVA was conducted to test the hypothesis,  $H_2$ : There is no significant difference in the financial and IKS literacy score among the students of Grades 6, 7 and 8. Foremost, the assumption of homogeneity of variance was met, as per Levene's test statistic at  $F(2,318) = 0.33, p = .719$ . The statistical difference at the three grade levels,  $F(2,318) = 4.28, p = .015$ . On comparison, the descriptive statistics revealed that the mean score for Grade 6 ( $M = 13.18, SD = 1.55$ ), Grade 7 ( $M = 13.40, SD = 1.58$ ) and Grade 8 ( $M = 13.79, SD = 1.47$ ), the score of Grade 8 students was highest. The students of 8th standard who were older in age than the Class 6 and Class 7 students had the highest level of literacy, indicating that the cognitive ability of the child grew with age.

### Implications

The outcome of the study offers valuable insights for the educators, policy makers and curriculum designers to strengthen the teaching and learning of personal finance concepts. The improvement in the conceptual clarity of the students studying in Grades 6, 7 and 8 after the intervention of storytelling helped to engage them effectively. They were able to understand and retain the concepts related to finance more effectively as compared to traditional pedagogy. This may serve as a base for the policy makers, such as NCERT, state education boards,

**Table 6.** MCQs Questionnaire for Financial and IKS Literacy.

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|                                                                                                                                                                                  |                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Why did Raju lose his money the first time after becoming rich?                                                                                                                  |                                                                                  |
| (A) He gave it all to his mother.                                                                                                                                                | (C) <i>He kept it at home, and it was stolen by a thief and damaged by rats.</i> |
| (B) He spent it on luxury goods.                                                                                                                                                 | (D) He lost it in a business deal.                                               |
| What was Gopi Chacha's advice to keep money safe and help it grow?                                                                                                               |                                                                                  |
| (A) Invest in gold.                                                                                                                                                              | (C) Hide money in a box.                                                         |
| (B) <i>Open a bank account and deposit money.</i>                                                                                                                                | (D) Lend it to friends.                                                          |
| Why did Gopi Chacha say one should not borrow from moneylenders?                                                                                                                 |                                                                                  |
| (A) They do not give loans to farmers.                                                                                                                                           | (C) They do not give money on time.                                              |
| (B) They ask for favours in return.                                                                                                                                              | (D) <i>They charge very high interest.</i>                                       |
| What lesson Did Raju's mother teach him about seeing the artificial fertiliser in her house?                                                                                     |                                                                                  |
| (A) Earning quick money is always good.                                                                                                                                          | (C) <i>Using shortcuts or wrong methods to earn more can be harmful.</i>         |
| (B) One must not listen to advertisements.                                                                                                                                       | (D) Trees do not respond to fertiliser.                                          |
| According to the story, what is the benefit of depositing money in a bank?                                                                                                       |                                                                                  |
| (A) It helps one show off.                                                                                                                                                       | (C) It is easy to hide from others.                                              |
| (B) <i>It earns interest.</i>                                                                                                                                                    | (D) It can be spent immediately.                                                 |
| How did Raju start his journey of becoming financially responsible?                                                                                                              |                                                                                  |
| (A) By buying luxury clothes.                                                                                                                                                    | (C) By asking for money from others.                                             |
| (B) By stealing money.                                                                                                                                                           | (D) <i>By hard work of sowing seeds and taking care of the plant.</i>            |
| Which investment alternative did the bank manager suggest to Raju to invest his small savings for high growth?                                                                   |                                                                                  |
| (A) Borrow from moneylenders.                                                                                                                                                    | (C) Put the money in the piggy bank.                                             |
| (B) Borrow from friends.                                                                                                                                                         | (D) <i>Mutual Funds.</i>                                                         |
| Why did Raju's mother advise him to grow rose plants?                                                                                                                            |                                                                                  |
| (A) Roses look beautiful in the garden.                                                                                                                                          | (C) Roses can be offered to God.                                                 |
| (B) Roses give a good fragrance.                                                                                                                                                 | (D) <i>It would help to diversify the income.</i>                                |
| Raju knew that the fruit orchard, if bought after 5 years, would be available at a price higher than the current price, due to _____. So, he needs to _____ from now for future. |                                                                                  |
| (A) <i>Inflation, Plan.</i>                                                                                                                                                      | (C) Existence of only one fruit orchard, care.                                   |
| (B) All fruit orchards would disappear due to pest problems, worry.                                                                                                              | (D) A fruit orchard will give fruits after 5 years, carefree.                    |

---

(Table 6 continued)

(Table 6 continued)

Raju knew that buying two pairs of clothes was better than buying five pairs of clothes, because\_\_\_\_\_.

- |     |                                                       |     |                                                      |
|-----|-------------------------------------------------------|-----|------------------------------------------------------|
| (A) | Clothes do not fit after some time.                   | (C) | Fashion changes soon.                                |
| (B) | <i>Money must be spent on needs and not on wants.</i> | (D) | There is less availability of clothes in the market. |

The exact amount of loan to be repaid can be known from a bank because \_\_\_\_\_.

- |     |                                                |     |                      |
|-----|------------------------------------------------|-----|----------------------|
| (A) | Banks do not cheat.                            | (C) | Bank is trustworthy. |
| (B) | <i>Bank provides a passbook and statement.</i> | (D) | All of the above.    |

Raju got his house repaired because\_\_\_\_\_.

- |     |                                                             |     |                                    |
|-----|-------------------------------------------------------------|-----|------------------------------------|
| (A) | The house would collapse.                                   | (C) | The house was damaged by the rats. |
| (B) | <i>Spending money to protect assets is a good decision.</i> | (D) | His mother suggested doing so.     |

Lazy and daydreamer Raju learned a lesson that\_\_\_\_\_.

- |     |                                |     |                                                                     |
|-----|--------------------------------|-----|---------------------------------------------------------------------|
| (A) | <i>There is no easy money.</i> | (C) | Money which grows on trees gets converted into flowers.             |
| (B) | Money can grow on trees.       | (D) | The flowers which grow on the money tree get converted into fruits. |

Raju understood that to buy something in future, one must first do the \_\_\_\_\_.

- |     |                        |     |                 |
|-----|------------------------|-----|-----------------|
| (A) | Identifying the thing. | (C) | Stealing plans. |
| (B) | Prayers to God.        | (D) | <i>Savings.</i> |

After 5 years, Raju never wanted to buy a second fruit orchard, because he was\_\_\_\_\_, and he \_\_\_\_\_ fruits to the beggar, which gave him happiness.

- |     |                 |     |                           |
|-----|-----------------|-----|---------------------------|
| (A) | Irritated, sold | (C) | <i>Satisfied, donated</i> |
| (B) | Tired, threw    | (D) | Unwell, threw             |

When Raju got the money by selling flowers, he returned the money to his friend, because\_\_\_\_\_.

- |     |                                                 |     |                                                 |
|-----|-------------------------------------------------|-----|-------------------------------------------------|
| (A) | He fought with his friend.                      | (C) | <i>Borrowed money must be returned on time.</i> |
| (B) | He wanted to borrow more money from his friend. | (D) | His friends had beaten him up for the money.    |

**Note:** The answer marked in the italic font indicates the correct answer.

RBI, SEBI, and so on, to incorporate the structured modules based on storytelling pedagogy in the curriculum and teacher training programmes can be conducted to assist them in how to handle this intervention. The decision makers can create age-appropriate, story-driven content to promote financial literacy initiatives in the schools. Schools can even collaborate with banks and financial institutions to

**Table 7.** Mapping of Literacy Across Gender and Standard.

| Gender/Standard | Level  | Frequency | %  |
|-----------------|--------|-----------|----|
| Male            | Low    | 01        | 01 |
|                 | Medium | 48        | 33 |
|                 | High   | 95        | 66 |
| Female          | Low    | 01        | 01 |
|                 | Medium | 48        | 27 |
|                 | High   | 128       | 72 |
| 6th             | Low    | 01        | 01 |
|                 | Medium | 50        | 49 |
|                 | High   | 51        | 50 |
| 7th             | Low    | 01        | 01 |
|                 | Medium | 25        | 24 |
|                 | High   | 80        | 75 |
| 8th             | Medium | 20        | 18 |
|                 | High   | 92        | 82 |

conduct such story-based workshops to teach concepts such as savings, borrowing, investing, diversification, ethics in earning money, and so on. This pedagogy may be suitable for wider implementation as it does not require many resources. Further, the study offers a simple evaluation framework based on a pre- and post-test model, which can be adapted to monitor the effectiveness of future interventions.

## Conclusion

The story-based teaching method helped students grasp important financial concepts in a simple and relatable way. The character of Raju allowed children to connect emotionally, which led to a better understanding of saving, borrowing, and earning. Many students showed improvement in identifying financial terms and applying them to real-life situations.

However, some topics like asset protection, ethical earning, income diversification and long-term financial planning were unfamiliar to most students, indicating the absence of such discussions in both home and classroom environments. The storytelling format made it easier for students to remember lessons, reflect on values, and ask questions without hesitation.

Therefore, storytelling emerged as a meaningful and effective teaching tool, especially for middle school learners. It blended moral learning with financial concepts, promoted curiosity, and encouraged practical thinking. This method is well-suited for the Indian classroom and may be considered as a supplementary pedagogy to strengthen early financial education.

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# How Does Homestay Business Empower Rural Women? An Empirical Study on Ladakh

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## Abstract

This study investigates the role of homestay entrepreneurship in the economic empowerment of women in rural Ladakh, with a special focus on the managerial skills and training programmes in enhancing homestay performance. A cross-sectional survey of 270 women who actually own and operate homestays was conducted to test the hypotheses. Structured questionnaires were used to collect the data from respondents, and PSPP software was used to analyse the relationship. Our findings reveal that entering homestay entrepreneurship acts as a major catalyst for economic empowerment. We also found a direct link between sharper managerial skills and better overall business performance, with training programmes playing a key role in making management more effective. Moreover, we did not find a significant interaction effect between having managerial skills and attending training programmes. The findings imply that while both factors play a role on their own, their combined impact did not create a unique boost beyond what they already contribute individually.

## Keywords

Rural entrepreneurship, women empowerment, managerial skills, Ladakh

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## Introduction

The tourism sector is emerging as an indispensable tool for socio-economic development in rural areas across the world, offering avenues for earning a livelihood,

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cultural exchange and community development. Among various avenues, the homestay business is seen as an appropriate revenue model for rural households, especially for women living in rural areas. Homestays enable visitors to experience authentic indigenous cuisine, while also allowing families to expand their streams of income without the need for large financial investment. Since women have a central role in the overall management of the household, the homestay business has emerged as a profitable platform for women's empowerment and leadership (Acharya & Halpenny, 2013). In rural areas, homestay entrepreneurship enables women to attain financial autonomy, which enables them to attain social status, develop self-confidence and have their say in their community. In this context, extant literature has repeatedly reported that women's active involvement in tourism-related ventures promotes gender equality, responsible resource utilisation, culture preservation and skill development (Ferguson, 2011). In regions where conventional career avenues are inadequate, women-led homestays have evolved as a culturally aligned and sustainable method to bridge the gap. Beyond providing a bed for travellers, these ventures foster deep community involvement that translates into real-world gains: higher purchasing power, better living standards, and a tangible boost in quality of life for the families involved (Salleh et al., 2014). For women, minorities, and locals, this model of community-based tourism often yields the most significant positive outcomes (Zapata et al., 2011).

Running a successful homestay, however, is no small feat. It demands a sophisticated mix of soft and hard management skills, ranging from personalised customer service and financial oversight to digital literacy and supply chain logistics. Improving these capabilities does not merely help a business thrive; it equips women with the tools they need to hold their own in a highly competitive global tourism market. Studies show that as soon as women have access to hospitality training, capacity-building workshops, and digital platforms, their entrepreneurial performance in rural sectors scales significantly (Baniya & Paudel, 2018).

This is especially vital in remote areas like Ladakh. Here, the combination of a short tourist season, geographical isolation, and few job prospects makes homestay entrepreneurship a primary and often the only pathway toward economic independence. By leading these businesses, women are not just earning an income; they are preserving local heritage and driving inclusive, sustainable development from the ground up. By viewing this through a management lens, we can better design the specific policies and training modules needed to cement women's roles as leaders in the tourism economy. While we know homestays are central to environmental and social sustainability (Acharya & Halpenny, 2013; Janjua et al., 2021), we still lack a complete picture of the holistic benefits these businesses offer women in rural settings. Previous studies report that there are positive outcomes of community-based tourism, especially for women, minorities and local people and suggest that further examination of these phenomena. Yan et al. (2020) report that the homestay business has seen rapid growth, especially in regions with a rich cultural heritage and natural beauty. Similarly, the study conducted by Harris et al. (2001) reveals that the engagement of women, minorities and local people in community-based local level tourism enterprise is important for

achieving economic, environmental and social development. Ladakh, being a rural region endowed with rich cultural heritage and natural beauty, offers the perfect context to study the role of homestays in empowering rural women.

## **Review of Literature**

### ***Homestay Entrepreneurship***

Homestay entrepreneurship has evolved as a perfect and sustainable model for community-based tourism, particularly in remote regions. Extant literature shows that homestay initiatives offer an important and sustainable livelihood avenue for the female population in rural areas (Kunjuraman & Hussin, 2017). The idea of women converting parts of their residences into small-scale hospitality accommodations allows them to earn income in the tourism sector while simultaneously fulfilling family duties, as noted by Sharma and Dhir (2019). This approach aligns perfectly with the social and cultural dynamics often found in rural areas. Homestay businesses have become a vital element of both rural and sustainable tourism, especially in areas characterised by ecological fragility and rich cultural heritage. Researchers such as Acharya and Halpenny (2013) suggest that homestays foster community-based tourism by actively involving local households within the tourism's economic framework. In mountainous regions, homestays play a role in diversifying local economies, safeguarding cultural traditions, and mitigating the issue of rural depopulation (Saarinen et al., 2017).

Extant studies indicate that homestay ventures are generally small, family-operated businesses that demand minimal initial investment but require strong interpersonal and service-oriented abilities. This business model is particularly well-suited to the cultural and social characteristics of rural communities. The popularity of homestay entrepreneurship has significantly contributed to rural and sustainable tourism, especially in regions with sensitive ecological systems and vibrant cultural legacies. Experts contend that homestays bolster community-based tourism efforts by integrating local families into the broader tourism value chain (Acharya & Halpenny, 2013). Within mountain economies, homestays support economic diversification, the preservation of cultural heritage, and a reduction in the exodus of people from rural areas (Sharma & Gupta, 2022).

### ***Women Empowerment***

Previous literature on women's empowerment underscores the economic advantages that women accrue from running homestays. For example, Baniya and Paudel (2018) report that participation in tourism activities increases women's influence in household decision-making and supports their financial independence. In a similar vein, Karki (2020) observes that women who operate homestays often experience greater economic empowerment and exhibit more activity in their communities. These results are in sync with broader global findings signalling that women's involvement in tourism-related ventures assists in achieving gender equality and rural community development (World Bank, 2019). Women's entrepreneurship is now widely acknowledged

as an engine of both economic development and social transformation in the literature. Kabeer (2020), while working with access to resources, agency and achievements, goes deeper to assert that empowerment is not always what happens with economic participation and that economic participation does not in itself guarantee transformative empowerment. In rural tourism, for example, female entrepreneurs often gain more confidence in themselves, have more rights to make decisions and are better socially recognised (Boley et al., 2021). In the developing regions, tourism-based enterprises such as homestays have led to women having home-based income opportunities, facilitating a balance between domestic duties and entrepreneurship (Acharya & Halpenny, 2013). Nonetheless, outcomes of empowerment are differentiated based on access to training, financial literacy and institutional support.

### *Managerial Skills*

From a managerial point of view, empirical research has highlighted the fact that the key management that operates a successful homestay demands more than merely offering cooked space and food to what one perceives as visitors; it requires an integrative aspect of hospitality competencies, customer service skills, financial planning, promotion skills and an ever-growing-only-with-digital-tools fluency (Saarinen et al., 2021). However, for the majority of rural women, these expectations of visitors are difficult to meet, primarily due to challenges like limited access to formal training, lack of managerial experience, and constraints in using technology (Gurung & Thapa, 2020). As a result, many homestay operations find it difficult to function smoothly or expand beyond a basic level. These challenges are more witnessed in mountainous regions such as the Himalayas, where studies have noted persistent issues including weak infrastructure, unpredictable weather patterns, and limited market connectivity. Lama (2019) contends that the women running homestays often struggle to secure reliable supplies, negotiate fair prices, and manage the ebb and flow of tourist demand. Even with these constraints, they remain essential contributors to their local economies and communities.

Studies like Thomas et al. (2011) indicate that small tourism entrepreneurs often lack formal training in accounting, marketing, customer relationship management, and digital promotion. Evidentiary research has it that managerial competencies deficiencies are the precursors to business stagnation, reduced customer retention, and reduced profitability (Fatoki, 2021). To some extent, within the rural context, the role of learning experientially often substitutes that of learning formally via managerial training, limiting the capacity for scalability. Among women entrepreneurs in particular, confidence for managerial decision-making shows a strong correlation with exposure to capacity-building interventions (Boley et al., 2021).

### *Training Interventions*

To overcome the challenges, there are different organisations such as government departments, non-governmental organisations, and tourism authorities that have introduced programmes to train women to develop their managerial skills and

also improve the quality of the provision of services by women (Joshi, 2017). Thapa and Poudel (2017) further emphasise the role of homestays led by women in upholding the cultural traditions and the concept of social cohesion in rural settings. Collectively, these economic and cultural contributions highlight the need for the application of women's managerial capacity in the homestay sector. Prior studies suggest that the success of homestays depends on high levels of management skills, access to training opportunities, appropriate policy frameworks, and the broader socio-economic conditions. Consequently, there is a need for further studies to better understand the challenges in local areas and to develop strategies that will increase women's leadership, skills and resilience in homestay enterprises. McKenzie et al. (2022) claims that financial literacy, record keeping practices, marketing strategies, business plan's homework improve after structured training initiatives. In rural and tribal areas, single-session training programmes have often not ensured sustainable behavioural change because of limited post-training support. Moreover, digital training deficits are also pronounced in remote and mountainous areas where the connectivity of the Internet and familiarity with technologies are limited in nature.

Based on the foregoing review of literature, the extant study identify that the majority of investigations of homestay entrepreneurship focus on mainstream international tourism destinations. There is a lack of study on the remote, high-altitude, tribal dominated areas. Existing studies have usually studied homestay entrepreneurship, women empowerment, managerial skills and training interventions separately. There is still a need for integrated models of associations between training interventions, managerial skill development and the homestay performance and women's empowerment outcomes (Figure 1). Empirical exploration on how managerial skills distinctly affect empowerment results of women homestay entrepreneurs is limited. The literature shows that homestay entrepreneurship offers many promising opportunities for rural livelihood diversification and female empowerment, yet empirical research that combines managerial competencies and training interventions in the context of tourism-based micro-enterprises is inadequate.

Therefore, the present study framed the following research objectives:

1. To study how the homestay business supports economic empowerment among women living in rural communities.
2. To identify the essential managerial skills and operational practices required for the effective management of women-led homestays.
3. To examine the impact of training programmes on management performance in women-led homestay enterprises.

## **Hypotheses Formulation**

### ***Homestay Entrepreneurship and Economic Empowerment***

Homestay entrepreneurship equips rural women with ability to generate income directly from tourism activities, empowering them to become agents in the market economy without the requirement of large capital investments. Researchers note that women involved in homestay tourism gain greater control over household finances,

experience increased mobility, and develop confidence in decision-making (Baniya & Paudel, 2018). According to the United Nations World Tourism Organization (UNWTO) (2020), community-based tourism initiatives often create pathways for the female population to be involved in small-scale entrepreneurship, resulting in enhanced economic independence. Furthermore, prior studies report that tourism-related micro-enterprises contribute to long-term livelihood security and foster financial self-reliance for women (Karki, 2020). Based on these findings, it is reasonable to hypothesise that homestay entrepreneurship significantly strengthens the financial empowerment of women in rural areas. Therefore, the following hypothesis was developed:

*H<sub>1</sub>*: Homestay entrepreneurship significantly improves the economic advancement of women living in rural areas.

### *Managerial Skills and Women-Led Homestays*

Effective management has a central role in the operation and sustainability of homestay businesses. Researchers highlight that managerial skills such as customer service, budgeting, marketing, digital literacy, and supply chain management are vital for improving service quality and maintaining competitiveness in the tourism industry (Saarinen & Rogerson, 2021). Nevertheless, the majority of women in rural regions do not have access to training or prior business experience, which can hinder their ability to manage homestays effectively (Gurung & Thapa, 2020). Extant studies reveal that women equipped with strong managerial competencies are better positioned to attract tourists, address operational challenges, and achieve higher levels of customer satisfaction (Sharma & Dhir, 2019). These findings indicate that managerial capacity is the critical ingredient for the success of women-led homestays. Therefore, the study's model tests the following hypothesis:

*H<sub>2</sub>*: Managerial skills have a significant and positive effect on the success of women-led homestays.

### *Training Programmes and Women-Led Homestays*

Capacity-building programmes like skill training perform a critical function in inculcating and honing managerial acumen among rural women entrepreneurs. Previous studies (e.g., Joshi, 2017) show that well-conceived training in hospitality and client management, financial literacy, and digital marketing has a significant and positive impact on the performance and sustainability of homestay businesses. As per a report by the World Bank (2019), proper intervention, like skill development training, empowers women by skilling them with the expertise and skills required to run business entities efficiently and effectively. Moreover, skill development programmes assist rural women in adopting contemporary tools, like using online booking and online promotions, which help improve the visibility of the business (Thapa & Poudel, 2021). Based on the above argument,

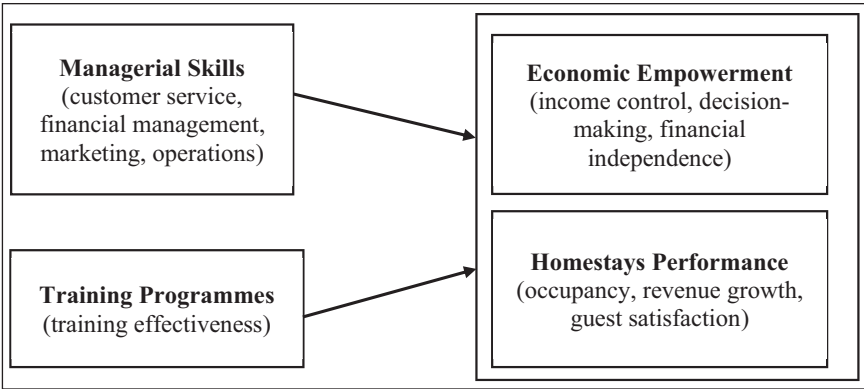
it is hypothesised that skill training ensures better management performance in women-led rural homestays and leads to the following hypothesis:

*H<sub>3</sub>*: Training programmes significantly enhance management performance in women-led homestays.

**Research Methodology**

The present study adopts a quantitative research design with a descriptive-cum-correlational approach to explore the association between managerial skills, training, and the economic empowerment of women-led homestay entrepreneurship. The study’s population consists of women in rural areas who run homestay businesses in Ladakh, and we obtained the official list of homestays from the Tourism Department in Leh, which shows 1,220 registered units across the district. For sample size determination, we applied the formula given by Burns and Bush (2007, p. 378):  $n = S^2Z^2/e^2$  where, ‘*n*’ is the sample size, ‘*Z*’ is the standard error associated with the chosen level of confidence, which is 1.96, ‘*S*’ is the variability indicated by an estimated standard deviation as per the pretesting results which came out to be 0.346 and ‘*e*’ is the amount of precision or allowable error in the sample estimate of population. We assumed the margin of error to be 5%, and the required minimum sample size was estimated at 184. For the selection of the sample, we used purposive sampling as it is more frequently used and practical in fieldwork research (Bryman & Bell, 2015), particularly in studies involving humans as subjects are less likely to be random samples (Polit & Beck, 2010). To ensure representation and improve the generalisability of the findings, we aimed to survey 300 respondents. However, we could collect data from the final sample of 288 respondents and the remaining 12 were not found during the field survey. This final sample of 288 is well above the minimum required number of 184.

The primary variables include economic empowerment and homestay performance as dependent variables, while managerial skills and training programmes



**Figure 1.** Conceptual Model.

serve as independent variables. These variables are measured using a structured questionnaire on a 5-point Likert scale. The items of all the variables were adapted from established scales. Managerial Skills were adapted from Manolopoulos et al. (2020) and Mumford et al. (2000), technical skills items from Sigala (2018), economic empowerment items were adapted from Malhotra and Schuler (2005) and Alsop et al. (2006) and the items of homestay performance were adapted from Sigala (2018) and Testa et al. (2019). Data were collected either in person or through online platforms, ensuring the confidentiality and anonymity of respondents.

## Data Analysis, Results and Discussions

Once the responses were gathered and subsequently organised and entered into PSPP for analysis. Before conducting statistical analyses, the dataset was examined for any missing values and unusual values using boxplots, frequency tables, and other descriptive tools. Demographic information was summarised using measures such as means and standard deviations. Cronbach's alpha was calculated to check the internal consistency of the scales used in the study. The analysis also included Pearson correlation to explore how managerial skills and training relate to overall performance. Finally, linear regression was conducted to evaluate the extent to which managerial skills and training influence the performance of homestays. Moreover, to test the hypotheses, the study used ANOVA to compare differences in performance based on categorical variables (e.g., trained vs. untrained).

The final data collected from 288 rural women homestay entrepreneurs in Ladakh were analysed using PSPP software to explore the associations between managerial skills, technical skills, training programmes, and economic empowerment. Outliers and missing data were analysed before analysing the final data. Out of 288 respondents, the study detected 7 outliers and 11 incomplete responses, which were completely removed from the data set. Thus, the usable sample size arrived at 270. The 270 respondents' demographic profile revealed a diverse distribution across age groups, marital status, education, family type, homestay experience, and income (Table 1).

The reliability of the questionnaire items was assessed using Cronbach's alpha to determine the internal consistency of each construct. The results indicated that managerial skills had a Cronbach's alpha of 0.82, technical programme scored 0.79, economic empowerment scored 0.89, and homestay performance achieved 0.85. Since all values are above the commonly accepted threshold of 0.70 (Nunnally, 1978), the scales can be considered reliable and internally consistent, indicating good internal consistency (Field, 2018). This suggests that the items within each construct measure the same underlying concept consistently, ensuring that the data collected are dependable for further statistical analysis. High reliability also increases confidence that the observed relationships among variables show genuine associations rather than measurement errors (Table 2).

The ANOVA results show that all three hypotheses were supported.  $H_1$  Homestay entrepreneurship significantly impacts the economic empowerment

**Table 1.** Demographic Profile of Respondents.

| Demographic Variable              | Category/Response Options | Frequency (n) | Percentage |
|-----------------------------------|---------------------------|---------------|------------|
| Age (years)                       | 18–25                     | 35            | 13.0       |
|                                   | 26–35                     | 80            | 29.6       |
|                                   | 36–45                     | 60            | 22.2       |
|                                   | 46–55                     | 55            | 20.4       |
|                                   | 56 and above              | 40            | 14.8       |
| Marital status                    | Single                    | 55            | 20.4       |
|                                   | Married                   | 205           | 75.9       |
|                                   | Widowed/Divorced          | 10            | 3.7        |
| Qualification                     | Below High School         | 25            | 9.3        |
|                                   | High School/Diploma       | 130           | 48.1       |
|                                   | Undergraduate             | 95            | 35.2       |
|                                   | Postgraduate              | 20            | 7.4        |
| Number of children                | 0                         | 45            | 16.7       |
|                                   | 1–2                       | 140           | 51.9       |
|                                   | 3–4                       | 70            | 25.9       |
|                                   | 5 or more                 | 15            | 5.6        |
| Type of family                    | Nuclear                   | 165           | 61.1       |
|                                   | Joint/Extended            | 105           | 38.9       |
| Year of establishment of homestay | Less than 1 year          | 20            | 7.4        |
|                                   | 1–3 years                 | 60            | 22.2       |
|                                   | 4–6 years                 | 90            | 33.3       |
|                                   | 7 years and above         | 100           | 37.0       |
| Annual income (approx.)           | Less than ₹2,00,000       | 100           | 37.0       |
|                                   | ₹2,00,000–₹5,00,000       | 170           | 63.0       |
|                                   | ₹5,00,001–₹10,00,000      | NIL           | NIL        |
|                                   | More than ₹10,00,000      | NIL           | NIL        |

of rural women,  $F = 14.87$ ,  $p = .0003$ . This indicates that women engaged in homestay ventures experience higher economic empowerment compared to those who are not, consistent with findings by Dangi and Jamal (2016), who highlighted the role of rural tourism in enhancing women's livelihoods. Further,  $H_2$  Managerial skills significantly influence the success of women-led homestays,  $F = 15.32$ ,  $p = .0002$ . This suggests that higher managerial competency is associated with better homestay performance, supporting prior research emphasising the relevance of managerial capabilities in small-scale tourism enterprises (Sigala, 2018). Moreover,  $H_3$  Training programmes significantly enhance management performance in women-led homestays,  $F = 11.48$ ,  $p = .001$ , as

**Table 2.** Constructs, Sample Items and Reliability.

| Construct            | Sample Items                                                                      | Cronbach's Alpha ( $\alpha$ ) |
|----------------------|-----------------------------------------------------------------------------------|-------------------------------|
| Managerial skills    | I am able to plan and organise the daily operations of my homestay effectively.   | 0.82                          |
|                      | I can make timely decisions that benefit my homestay business.                    |                               |
|                      | I monitor and evaluate the performance of my homestay regularly.                  |                               |
|                      | I can resolve conflicts among staff or guests efficiently.                        |                               |
|                      | I adapt management practices to improve business outcomes.                        |                               |
| Technical skills     | I am proficient in using booking and reservation software for my homestay.        | 0.79                          |
|                      | I can effectively use digital payment systems to manage transactions.             |                               |
|                      | I am able to use social media and online platforms to promote my homestay.        |                               |
|                      | I can manage basic IT tasks, such as maintaining records and generating reports.  |                               |
|                      | I am confident in using technology to communicate with guests efficiently         |                               |
| Economic empowerment | I have increased control over the income generated from my homestay business.     | 0.89                          |
|                      | I can make independent financial decisions for my household.                      |                               |
|                      | I feel more confident in managing economic resources due to my homestay business. |                               |
|                      | My homestay business has improved my ability to support family needs.             |                               |
|                      | I have gained financial independence through my entrepreneurial activities.       |                               |
| Homestay performance | My homestay maintains high customer satisfaction levels.                          | 0.85                          |
|                      | My homestay business achieves the expected financial targets.                     |                               |
|                      | I receive positive reviews and repeat bookings from guests.                       |                               |
|                      | My homestay operates efficiently with minimal operational issues.                 |                               |
|                      | The overall reputation of my homestay has improved over time.                     |                               |

**Table 3.** ANOVA Results for Hypothesis Testing.

| Hypothesis | Source of Variation   | SS     | df  | MS    | F     | p Value | Result   |
|------------|-----------------------|--------|-----|-------|-------|---------|----------|
| $H_1$      | Between groups        | 10.52  | 1   | 10.52 | 14.87 | .0003   | Accepted |
|            | Within groups (error) | 187.45 | 268 | 0.70  |       |         |          |
| $H_2$      | Between groups        | 12.48  | 1   | 12.48 | 15.32 | .0002   | Accepted |
|            | Within groups (error) | 95.12  | 266 | 0.36  |       |         |          |
| $H_3$      | Between groups        | 9.36   | 1   | 9.36  | 11.48 | .001    | Accepted |
|            | Within groups (error) | 95.12  | 266 | 0.36  |       |         |          |

shown in Table 3. Participation in structured training positively impacts homestay management outcomes, corroborating studies by Li et al. (2021) that found training interventions improve operational efficiency and service quality in rural homestays. The within-group variance was relatively low, indicating consistent responses within groups. Overall, the findings confirm that homestay entrepreneurship, managerial skills, and training programmes are key contributors to both the success and financial empowerment of women in rural areas engaged in homestay businesses. Further, the findings highlight the importance of managerial capabilities and structured training in boosting the effectiveness of homestay businesses in rural Ladakh.

Pearson correlation analysis shows significant positive relationships between managerial skills and homestay performance ( $r = 0.45, p < .01$ ) and between training programmes and performance ( $r = 0.39, p < .01$ ). Economic empowerment was also positively correlated with managerial skills ( $r = 0.42, p < .01$ ) and training programmes ( $r = 0.36, p < .01$ ), supporting the study's initial hypotheses (Hair et al., 2019) (Table 4). Further, the linear regression analysis result shows that managerial skills significantly predicted homestay performance ( $\beta = 0.38, p < .01$ ), while training programmes were also found to significantly influence ( $\beta = 0.31, p < .01$ ) (Table 5). The regression model explained 42% of the variance in performance ( $R^2 = 0.42$ ), indicating a moderate to strong predictive relationship (Cohen et al., 2013). Based on these results, all three hypotheses were supported: homestay entrepreneurship significantly improves economic empowerment, managerial skills significantly influence success, and training programmes enhance management performance. Overall, the findings suggest that rural women with higher managerial skills and access to structured training achieve better business outcomes and higher economic empowerment, highlighting the importance of capacity-building and support initiatives for women-led homestays in Ladakh (Kumar & Sharma, 2021; Singh & Choudhary, 2022). Moreover, the mean score for managerial skills was 3.8 ( $SD = 0.6$ ), indicating a moderate to high level of self-reported skills, while economic empowerment had a mean of 3.6 ( $SD = 0.7$ ), reflecting moderate levels among the participants. Women who had undergone training programmes tended to score higher on performance measures than those who had not, suggesting a positive influence of training on homestay management (Kumar & Sharma, 2021; Sharma & Singh, 2020).

**Table 4.** Pearson Correlation Table.

| Variables               | 1               | 2               | 3               | 4 | Mean | SD   |
|-------------------------|-----------------|-----------------|-----------------|---|------|------|
| 1. Managerial skills    | 1               |                 |                 |   | 3.85 | 0.62 |
| 2. Training programmes  | $r = 0.42^{**}$ | 1               |                 |   | 3.70 | 0.58 |
| 3. Homestay performance | $r = 0.45^{**}$ | $r = 0.39^{**}$ | 1               |   | 3.80 | 0.65 |
| 4. Economic empowerment | $r = 0.42^{**}$ | $r = 0.36^{**}$ | $r = 0.48^{**}$ | 1 | 3.65 | 0.67 |

**Note:**  $N = 270$ ;  $p < .01$  (two-tailed);  $^{**}r$ -values represent Pearson correlation coefficients.

**Table 5.** Linear Regression Table.

| Predictor           | B    | SE B | $\beta$ | $t$  | $p$  |
|---------------------|------|------|---------|------|------|
| (Constant)          | —    | —    | —       | —    | —    |
| Managerial skills   | 0.48 | 0.11 | 0.38    | 4.36 | <.01 |
| Training programmes | 0.39 | 0.12 | 0.31    | 3.25 | <.01 |

$R^2 = 0.42$ ,  $F(2, 267) = 42.3$ ,  $p < .001$

**Note:**  $N = 270$ ;  $B$  = unstandardised coefficient,  $SE B$  = standard error of  $B$ ,  $\beta$  = standardised coefficient,  $t$  =  $t$ -value for significance testing.

## Theoretical Implications

The findings derived from this study contribute to the accumulated knowledge about rural women entrepreneurship, tourism-based enterprises, and empowerment. The findings clearly show that managerial skills and training programmes have a key role in boosting business performance, supporting the conclusions of earlier research (Bandura, 1997; Becker, 1993). The results highlight the need to equip women with a set of requisite skills and training, which enhances their entrepreneurial performance. Focusing on homestay businesses in Ladakh, the current study adds to the overall academic discussion about the economic empowerment of women and the role of human capital formation. In addition, the vivid correlations found between managerial competencies and instructional interventions and economic empowerment support the relevance of human capital theory to pragmatic tourism-entrepreneurship paradigms, including a more comprehensive approach to scholars studying rural and women-based businesses.

The roles of managerial skills and organised training programmes are central to the improvement of business performance and the empowerment of entrepreneurial performance amongst women-led homestay businesses in Ladakh. The training programmes also help in equipping the requisite managerial skills in areas like financial management, customer care, marketing skills, online promotion, and operational planning, all of which are important to maintain competitiveness in tourism-oriented micro-enterprises. These skills are extremely essential in geographically remote and seasonally dependent areas such as Ladakh, where entrepreneurs are compelled to adequately manage scarce resources, changing tourist flows and the quality standards of services. The training programmes can

enhance the profitability and the efficiency of the enterprises as well as the confidence and the ability to lead the enterprise by providing the women with the skills of making strategic decisions and obtaining the knowledge that is practical. In this way, the development of managerial skills based on specific training interventions becomes one of the major sources of improved business performance and the sustainability of entrepreneurship in the long term.

## **Managerial Implications**

In terms of the managerial and policy-based approach, the current research paper presents a set of practical implications for policymakers and management practitioners, training institutions, and the tourism sector actors. First, the results support the critical role of managerial competencies in improving the performance of women-led homestays. They highlight the need to impart relevant training to enhance the capacity of rural women in business planning, financial planning, marketing, and customer service. Second, the impact of the training on the business results is positive, which emphasises the significance of long-term capacity-building activities, such as organising workshops, mentorship programmes, and openness to continuous professional development, associated with women and geographically isolated regions. Based on these reflections, government agencies, local NGOs, and tourism authorities can use the evidence presented in the study to create specific intervention programmes such as micro-finance assistance schemes, help link women entrepreneurs with digital marketing tools and applications, and create networking opportunities to improve the presence of such women in rural communities and enhance their economic performance. Lastly, the study also highlights the overall developmental potential of the homestay entrepreneurship as a strategy of women's economic empowerment, which will not only have an impact that is beneficial to the individual entrepreneurs but also play a significant role in enhancing both the social and economic status of rural Ladakh.

In Himalayan areas, structured practice-based training programmes to educate women-led homestays in issues of financial management, digital marketing, service quality, and sustainable tourism should be instituted by policymakers and training institutions. This must be a continuous process and should be aided with mentorship, peer networks, and other performance-based incentives to make sure that there will be quantifiable increases in managerial skills and business results. Enhancing digital infrastructure and increasing diversification policies will further boost enterprise sustainability and female empowerment of the economy in these regions.

## **Conclusion**

This study intends to investigate the extent to which homestay entrepreneurship contributes to the improvement of the economic status of rural women in Ladakh, with a special emphasis on their managerial competence and active involvement in training programmes in Ladakh. The findings show that women who possess

stronger managerial skills and who have taken part in structured training are generally better prepared to manage their homestays, which contributes to greater economic autonomy. The findings further indicate that homestay ventures have emerged as a meaningful pathway for both economic and social advancement among women in remote regions. By clarifying the connections between managerial capacity, training, and entrepreneurial performance, the study contributes to the broader evidence base on women-led tourism initiatives and offers practical guidance for strengthening local capabilities. Overall, the research points to the relevance of purpose-built support systems and continued capacity-building efforts in enhancing sustainable livelihoods and promoting a more inclusive model of tourism development in Ladakh.

This study makes a distinct contribution by empirically demonstrating how homestay entrepreneurship functions as a viable pathway for advancing the economic empowerment of rural women in Ladakh, a geographically remote and underexplored Himalayan context. Unlike prior studies that have investigated tourism or women's entrepreneurship in isolation, this study clearly establishes the direct linkage between managerial competence, participation in structured training programmes, and improved entrepreneurial performance. The findings show that women with stronger managerial skills and formal training are better equipped to manage operations, adapt to seasonal challenges, and achieve greater economic autonomy. By combining developments of human capital and rural tourism entrepreneurship, the study provides a context-specific framework that helps to understand how capacity-building interventions are actualised through measurable improvements in livelihood. Ultimately, it adds to both theoretical development and pragmatic advice for the design of targeted support systems intended for the fortification of women-led homestays and argues for a more inclusive and sustainable paradigm of tourism development for the Ladakh region.

## **Limitations and Future Research**

No study is without limitations, and ours is not an exception. First and foremost is its narrowly limited scope of study on women-based homestays located in the rural area of Ladakh, which limits its applicability to other geographical setups and to businesses of other typologies. Later, the use of self-reported questionnaires only creates a vulnerability of bias in reporting in that individuals can either overstate or understate their experiences, either consciously or subconsciously, thus leading to possible alteration of the empirical record. The investigation is also cross-sectional, further complicating the problem, as it only measures at one time such managerial competencies, training provisions, and empowerment indicators. This type of design limits the ability to trace causal processes and determine time dynamics. Further, despite the research foreshadowing managerial skill sets and training interventions, it fails to consider other salient determinants like the availability of financial capital, the strength of marketing networks, or the sufficiency of local infrastructure, which are essential in the process of influencing business performance and empowerment paths of women entrepreneurs.

Therefore, further academic projects should include a more diverse range of variables, increase geographic and sectoral scope of analysis, and take into account the implementation of qualitative approaches to the problem, that is, in-depth interviews and case studies, to add an additional degree of interpretation. These integrative studies can shed light on socio-cultural processes, gender role expectations and the individual perceptions of empowerment that cannot be easily captured through a strictly quantitatively minded study. Longitudinal qualitative studies can offer deeper insights into how entrepreneurial journeys evolve in Himalayan contexts like Ladakh.

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# Drivers of Electric Vehicle Adoption in Ludhiana: An Analysis of Determinants and Information Sources

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## Abstract

This study aims to identify the key factors driving consumer adoption of electric vehicles (EVs) and to assess how various information sources influence consumer awareness and purchase intent within the context of sustainable urban mobility. A mixed-methods approach was utilized, analyzing primary data gathered via a structured questionnaire from 450 respondents in Ludhiana, supplemented by secondary data from academic and industry sources. The data were analyzed using statistical techniques to identify core behavioral dimensions influencing consumer choice. The analysis reveals that consumer preferences are significantly shaped by environmental, technological, and social factors. Environmental concern emerged as the single strongest motivator for EV adoption. Critically, information sources—particularly social media—were found to play a vital role in both building awareness and driving purchase intentions. The findings underscore a challenge: while high environmental awareness fosters positive attitudes, limited consumer information, and perceived performance uncertainties continue to impede adoption. These insights provide valuable direction for policy-makers and manufacturers to develop targeted public awareness campaigns and strategies focused on boosting consumer confidence.

## Keywords

Consumer behavior, electric vehicles, information sources, factor analysis, sustainable mobility

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## Introduction

The transportation sector is experiencing a significant shift due to the increasing demand for sustainable mobility solutions. Escalating environmental challenges, diminishing fossil fuel reserves, and rising levels of urban air pollution have accelerated the global transition from conventional internal combustion engine vehicles to electric vehicles (EVs). EVs are widely regarded as environmentally friendly and energy-efficient alternatives, with considerable potential to lower greenhouse gas emissions and decrease reliance on non-renewable energy resources.

In India, the adoption of electric mobility is increasing due to supportive government policies and technological improvements. Nevertheless, EV market penetration remains modest, as consumers still face persistent barriers related to cost, performance perceptions, and inadequate charging infrastructure. While Punjab, particularly its industrial hub Ludhiana, shows a positive trend in EV uptake, this localized progress underscores the critical need to understand the underlying behavioral determinants of consumer decisions.

## Problem Statement

Understanding consumer behavior is crucial in accelerating EV adoption, especially in dynamic regional markets. Consumer decisions are determined by a multidimensional interaction of economic, technological, environmental and social factors, alongside the growing influence of information sources such as social media. Despite the significance of these factors, there is a critical gap in empirical research focusing specifically on consumer behavior toward EV adoption in Ludhiana. Local adoption patterns often deviate significantly from national trends due to unique market characteristics and regional barriers. To overcome this research gap, the study analyzes not only the drivers of consumer interest but also the specific local constraints that restrict widespread acceptance.

## Theoretical Grounding

The foundation of this research is rooted in established behavioral and technology adoption frameworks:

- Technology acceptance model (TAM): This model guides the analysis by focusing on perceived usefulness (how much the EV improves a consumer's life) and perceived ease of use (how easy the EV is to operate and charge).
- Diffusion of innovation (DOI) theory: This theory is employed to understand how EVs, as an innovation, spread through the social system and how consumers fall into different adoption categories (e.g., innovators vs. early majority).

- Behavioral theories (such as the theory of planned behavior (TPB)): The frameworks assist in examining the influence of attitudes, social pressure (subjective norms), and perceived risks on the formation of purchase intention.

## Review of Literature

### *Environmental and Sustainability Orientation*

Environmental consciousness is consistently identified as a primary catalyst for EV interest and adoption. Axsen and Kurani (2008) investigated US consumers' preferences and confirmed that perceived environmental benefits, such as reduced gasoline consumption, drive initial interest, despite low initial awareness. This finding is mirrored in developing regions, where studies confirm the central role of sustainability. For example, Siregar et al. (2024) found that environmental sustainability was a top-rated factor influencing battery electric vehicle user satisfaction in Jakarta.

*Critical synthesis:* While environmental motivation creates a strong positive *attitude* toward EVs, the literature suggests it is often insufficient to guarantee high adoption rates. Consumers frequently trade off ecological benefits against practical and economic concerns (cost and infrastructure), indicating that motivation alone does not overcome market friction.

### *Technological Perception, Performance, and Infrastructure*

Technology-related attributes, especially those tied to practical utility, significantly modulate consumer behavior. Factors such as charging speed, battery range, and infrastructure accessibility are critical determinants of confidence. Lee et al. (2021) found wide demographic variance in satisfaction with EV charging infrastructure, noting that access to home charging led to higher satisfaction among younger, higher-income users.

Siregar et al. (2024) similarly highlighted that inadequate charging location availability remains a major barrier, even when policy support is strong. Singh et al. (2020) also categorized charging infrastructure as a dominant contextual predictor.

*Critical synthesis:* The evidence strongly suggests that perceived performance risk and infrastructure inadequacy are key impediments to mass adoption. Improving charging availability, speed, and safety are necessary preconditions for building the user confidence required to accelerate market penetration, especially in densely populated urban environments with nascent infrastructure.

### *Psychological and Social Influences*

Beyond rational economic and technical factors, psychological and social dimensions play a powerful role in the decision-making process. Singh et al. (2020) conducted a meta-analysis emphasizing that positive attitudes toward EVs and

social influence (peer norms, community acceptance) are significant predictors of adoption across global regions. They asserted that psychological factors can be as influential as economic considerations.

*Theoretical grounding:* This finding aligns with the diffusion of innovation (DOI) theory, where social influence dictates the spread of new technologies, and the TAM, where positive attitudes reinforce perceived usefulness. Consequently, strategies must focus on building trust, correcting misconceptions, and promoting EVs as socially responsible and aspirational products.

### **Demographic Factors and Contextual Variation**

The effect of age, income, and education on consumers' decisions to adopt EVs is not straightforward and context-dependent. Lee et al. (2021) identified strong demographic variations in satisfaction with charging infrastructure, indicating that demographics interact significantly with technological access.

Conversely, Meet et al. (2025), studying consumers in Ahmedabad, found that age was a minor influence on satisfaction, with practical considerations (cost-effectiveness, convenience, and maintenance) being far more influential.

*Critical synthesis:* While demographic factors provide useful segmentation data, the literature confirms that their influence is not universal. Research must avoid generalizing demographic impacts and instead focus on how these factors interact with local infrastructure realities and specific consumer priorities.

### **Research Gaps**

Despite a robust body of literature identifying the dominant factors (environmental concern, infrastructure, and social influence) influencing EV adoption globally, several gaps persist, particularly at the regional level:

1. *Lack of regional specificity in behavioral models:* Existing studies often focus on national or global meta-analyses. Empirical research focusing explicitly on distinct aspects of consumer behavior remains limited and localized barriers to EV adoption in second-tier Indian cities like Ludhiana/Punjab, where adoption patterns, infrastructure realities, and social norms differ from major metropolitan centers.
2. *Information source effectiveness:* While studies (e.g., Singh et al., 2020) acknowledge the importance of information sources, there is limited specific analysis of how emerging digital channels (e.g., social media) interact with regional demographic and psychological factors to shape consumer *intent* in this specific context.
3. *Synthesis of barriers and drivers:* A study is needed that integrates the primary drivers (environmental concern) with the major practical barriers (infrastructure perception and information gaps) within a single regional model to provide actionable insights for local policymakers and market interventions.

## Research Methodology

### Need and Significance of the Study

1. *Growing Importance of Sustainable Mobility:* Escalating environmental concerns, the rapid exhaustion of fossil fuel resources, and rising levels of urban pollution have made the transition from conventional fuel-based vehicles to electric mobility solutions increasingly necessary.
2. *Low Penetration of Electric Vehicles in Punjab:* Despite government initiatives such as the FAME II Scheme, EVs constitute only around 0.26% of total registered vehicles in Punjab, indicating a slow rate of adoption.
3. *Emerging EV Market in Ludhiana:* As Punjab's industrial capital, Ludhiana has witnessed the registration of over 60,000 EVs, with nearly 80% of these registered in the last three years. However, the adoption rate remains uneven due to multiple behavioral and infrastructural barriers.
4. *Lack of Regional Consumer Behavior Studies:* Existing research on EVs in India often focuses on metropolitan areas. There is limited empirical evidence exploring consumer attitudes, perceptions, and behavioral drivers specific to semi-urban industrial centers like Ludhiana.
5. *Bridging the Gap between Awareness and Adoption:* Many consumers are aware of EV benefits but remain hesitant to purchase due to misinformation, cost perceptions, and performance uncertainties. Hence, there is a need to study how awareness translates into actual purchase intention.
6. *Academic Contribution:* The study enhances the scholarly discussion on consumer behavior, environmental psychology, and sustainable mobility, providing empirical evidence from a regional Indian context.
7. *Policy Implications:* Findings will aid government authorities and policy-makers in framing effective communication strategies, awareness campaigns, and incentive structures to accelerate EV adoption.
8. *Support for Local Urban Planning:* The research outcomes can assist the Ludhiana Municipal Corporation and other local bodies in developing infrastructure, including EV charging facilities, and promoting sustainable urban transportation.
9. *Contribution to Sustainable Development Goals:* By encouraging the adoption of EVs, the study supports India's efforts to lower carbon emissions and contributes to the achievement of the United Nations Sustainable Development Goals, particularly those focused on climate action and the development of sustainable and resilient urban environments.
10. *Foundation for Future Research:* The results of this investigation offer a framework for further academic exploration into consumer psychology, green marketing, and electric mobility adoption in other regions of India.

### Objectives

- To identify the major factors influencing consumer behavior toward electric vehicle adoption in Ludhiana.

- To examine the role of various information sources in shaping consumer awareness and attitudes toward EVs.
- To analyze the challenges related to the adoption of EVs.

### *Research Design*

This study adopts a descriptive–analytical research design. The descriptive aspect examines consumers' level of awareness, attitudes, and perceptions toward EVs in Ludhiana. The analytical aspect explores the key behavioral factors affecting EV adoption and evaluates the influence of different information sources through the application of appropriate statistical methods like weighted average score (WAS) and exploratory factor analysis (EFA) (Hair et al., 2019).

### *Scope of the Study*

The study focuses exclusively on consumers residing in Ludhiana, Punjab, examining their perceptions, awareness, and behavioral intentions related to electric two-wheelers and four-wheelers available in the Indian market. The scope is centered on consumer behavior and information exposure, deliberately excluding technical, mechanical, or engineering dimensions of EVs.

### *Collection of Data*

#### *Primary Data*

Primary data were gathered through a structured questionnaire consisting of closed-ended questions and Likert-scale statements. The questionnaire was organized into four major sections: demographic profile, behavioral factors, information sources, and purchase intention. Data were collected over a two-month period via both in-person administration and online forms.

#### *Secondary Data*

Secondary information was sourced from:

- Academic journals and peer-reviewed research articles.
- Government publications, including reports from NITI Aayog and the Ministry of Heavy Industries.
- Industry databases and EV market reports.
- Online EV-related portals and media publications relevant to Punjab and Ludhiana.

### *Sampling Method*

- *Sampling Technique:* Convenience sampling was chosen due to constraints related to time, budget, and logistical accessibility in reaching the target demographic. This non-probability method allowed for data collection based on respondent willingness and availability.

- *Implications*: While cost-effective and suitable for exploratory analysis, convenience sampling introduces potential selection bias. Consequently, the findings have limited generalizability to the broader population of potential electric vehicle consumers in Ludhiana (Etikan et al., 2016).
- *Sampling Unit*: Residents of Ludhiana who are EV owners, current users, or potential buyers.

### **Statistical Tools and Techniques**

The integrated analysis was performed using SPSS software.

1. *Descriptive Tools*: Percentages and frequencies summarized respondent characteristics. WAS was used to rank the relative importance of behavioral and informational factors influencing EV adoption.
2. *Advanced Statistical Tools*:
  - *EFA*: It was employed to achieve parsimony by condensing a large set of observed variables into a smaller number of meaningful and interpretable underlying behavioral constructs (Hair et al., 2019).
  - All statistical tests, including EFA, were conducted following the established guidelines (Hair et al., 2019).

### **Reliability and Validity of the Instrument**

*Reliability*: The internal reliability of the constructs was verified by ensuring that all Cronbach's  $\alpha$  coefficients exceeded the accepted benchmark of 0.70 (George & Mallery, 2019).

#### **Validity:**

- Content validity was ensured through expert review and theoretical alignment.
- Construct validity was confirmed through the performance and results of the EFA.

### **Role of Various Information Sources on the Level of Awareness Among Consumers Regarding EVs in Ludhiana**

#### **Application of WAS**

Table 1 presents the WAS calculated to assess the influence of various information sources on consumer awareness about EVs in Ludhiana. Respondents ranked 11 different sources based on their perceived importance in shaping awareness.

#### **Interpretation:**

##### **1. Social media (WAS = 6.4467, rank 1)**

Social media emerged as the most influential awareness source. Platforms such as Instagram, Facebook, YouTube, and X provide review-based and visual content that helps consumers form quick impressions. Younger and tech-savvy

**Table 1.** Showing Awareness Level of Consumers.

| Rank                             | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | Total | WAS   | WAS    | R <sub>k</sub> |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|--------|----------------|
| Relevant weights                 | 11  | 10  | 9   | 8   | 7   | 6   | 5   | 4   | 3   | 2   | 1   |       |       |        |                |
| Mobile (text messages)           | 24  | 55  | 38  | 35  | 41  | 24  | 26  | 54  | 38  | 58  | 57  | 450   | 2,500 | 5,5556 | 9              |
| EV news magazine                 | 47  | 63  | 43  | 41  | 45  | 30  | 43  | 26  | 26  | 34  | 52  | 450   | 2,874 | 6,3867 | 3              |
| Salesperson                      | 34  | 44  | 32  | 45  | 40  | 49  | 54  | 47  | 53  | 43  | 09  | 450   | 2,748 | 6,1067 | 6              |
| Family/friends                   | 57  | 29  | 43  | 43  | 43  | 56  | 45  | 19  | 34  | 49  | 32  | 450   | 2,818 | 6,2622 | 5              |
| Television                       | 30  | 52  | 34  | 55  | 42  | 41  | 30  | 57  | 41  | 39  | 29  | 450   | 2,744 | 6,0978 | 7              |
| Radio                            | 44  | 22  | 26  | 56  | 15  | 45  | 41  | 24  | 36  | 56  | 85  | 450   | 2,367 | 5,26   | 11             |
| Social media                     | 40  | 44  | 46  | 53  | 44  | 43  | 63  | 39  | 23  | 22  | 33  | 450   | 2,901 | 6,4467 | 1              |
| Posters                          | 41  | 26  | 36  | 47  | 44  | 42  | 39  | 47  | 43  | 46  | 39  | 450   | 2,614 | 5,8089 | 8              |
| Newspapers                       | 49  | 34  | 50  | 31  | 55  | 39  | 46  | 35  | 59  | 24  | 28  | 450   | 2,819 | 6,2644 | 4              |
| Dealership and test-drive events | 44  | 31  | 21  | 23  | 41  | 39  | 32  | 71  | 44  | 57  | 47  | 450   | 2,425 | 5,3889 | 10             |
| Reference groups                 | 40  | 50  | 81  | 21  | 40  | 42  | 31  | 31  | 53  | 22  | 39  | 450   | 2,890 | 6,4222 | 2              |
| Total                            | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 |       |       |        |                |

individuals rely heavily on these channels for real-time updates, launch announcements, and user experiences. The highest WAS score reflects the effectiveness of digital campaigns by EV brands and state initiatives.

**2. Reference groups** (WAS = 6.4222, rank 2)

Reference groups, including peers, colleagues, and community members, play a crucial role. Consumers rely on real-life experiences shared by trusted individuals. Social influence and word of mouth act as credibility enhancers in reducing doubts regarding performance and charging.

**3. EV news magazines** (WAS = 6.3867, rank 3)

This shows that a segment of consumers actively seeks specialized and reliable EV information. These publications offer technical clarity, battery-related updates, and market trends. They appeal most to informed buyers, early adopters, and environmentally conscious individuals.

**4. Newspapers** (WAS = 6.2644, rank 4)

Newspapers remain relevant in shaping policy-level awareness. Coverage on subsidies, schemes, and charging infrastructure continues to engage mid-aged and older readers. However, newspapers provide less personalized guidance compared to digital media.

**5. Family and friends** (WAS = 6.2622, rank 5)

Family circles influence early EV interest and shape awareness. Shared experiences, suggestions, and practical advice create authentic perceptions. These interpersonal channels maintain importance despite digital media dominance.

**6. Salespersons** (WAS = 6.1067, rank 6)

Salespersons influence decisions during in-person dealership interactions. However, the impact is moderate due to perceived commercial bias. The result indicates a training need for more technical and consultative communication.

**7. Television** (WAS = 6.0978, rank 7)

TV remains a mass-awareness medium but lacks interactivity. Effective for reach but less impactful compared to targeted online ads.

**8. Posters** (WAS = 5.8089, rank 8)

Posters serve branding and visibility purposes but do not provide in-depth information.

**9. Mobile text messages** (WAS = 5.5556, rank 9)

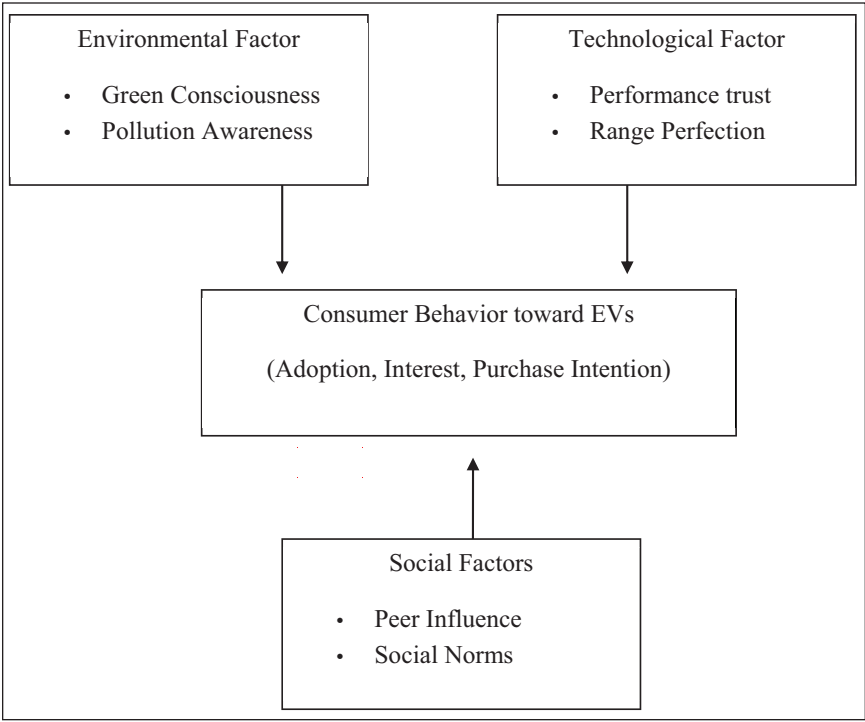
Low influence due to the high frequency of promotional messaging. Personalization and targeted notifications could increase effectiveness.

**10. Dealership events and test drives** (WAS = 5.3889, rank 10)

Events have potential but limited reach. Their lower score suggests weak promotion or a lack of consumer initiative to attend. Event success may improve when integrated with social media campaigns.

**11. Radio** (WAS = 5.26, rank 11)

Radio has the least impact due to its non-visual and short-format content. Still useful for quick government alerts or promotional jingles.



**Figure 1.** Conceptual Model: Factor Analysis Structure.

**Source:** Researcher’s compilation.

**Application of EFA**

The primary objective is to use the EFA technique to evaluate and group the key variables (statements) that influence the level of awareness, perception, and intention to adopt EVs among consumers in Ludhiana, Punjab.

*Extraction of Factors*

The fundamental features of various information sources were ascertained through the application of EFA (Figure 1). Using a Likert scale with a maximum score of five and a range from strongly disagree to strongly agree, the respondents were asked to rank ten different factors. As can be seen from Table 2, all components with loadings more than 0.5 were considered good. In the particular situation, loadings ranged from 0.741 to 0.878. Items that had loading factors below 0.5 were excluded. The eigenvalues of the three resultant factors range from 1.117 to 5.429, as shown in Table 2.

*Environmental Consciousness (Factor 1)*

Eigenvalue = 5.429 | Variance explained = 54.29% |  $\alpha = 0.941$

This factor emerged as the strongest determinant of consumer awareness.

**Table 2.** Factor Analysis Results for EVs.

| Statements                                                                          | Factors |        |        |
|-------------------------------------------------------------------------------------|---------|--------|--------|
|                                                                                     | F1      | F2     | F3     |
| I prefer EVs because they help in reducing air pollution.                           | 0.890   |        |        |
| I am concerned about the harmful effects of fuel-based vehicles on the environment. | 0.888   |        |        |
| I support the shift toward sustainable and clean mobility solutions.                | 0.874   |        |        |
| Environmental benefits play a major role in my decision to purchase an EV.          | 0.856   |        |        |
| I believe EVs require less maintenance due to their advanced technology.            |         | 0.847  |        |
| I am confident in the long-term performance and battery life of EVs.                |         | 0.844  |        |
| EVs are technologically advanced compared to conventional vehicles.                 |         | 0.821  |        |
| My family and friends encourage me to consider purchasing an electric vehicle.      |         |        | 0.842  |
| Owning an EV improves my social image and reflects a modern lifestyle.              |         |        | 0.823  |
| Positive word of mouth about EVs affects my awareness and interest.                 |         |        | 0.786  |
| Eigenvalue                                                                          | 5.429   | 1.540  | 1.117  |
| % Variance                                                                          | 54.290  | 15.702 | 11.167 |
| Cumulative % variance                                                               | 54.290  | 69.992 | 81.159 |
| Scale reliability $\alpha$ (Cronbach's $\alpha$ )                                   | 0.941   | 0.884  | 0.826  |

Cronbach's  $\alpha$  = 0.895, Bartlett's test of sphericity (approximate  $\chi^2$ ) = 3,345.707, DF = 45, Sig. = 0.000, Kaiser–Meyer–Olkin measure of sampling adequacy = 0.880, mean = 36.99.

**Key insights:**

- Respondents strongly believe EVs help reduce air pollution and support sustainability.
- Environmental benefits significantly influence interest and awareness levels.
- This dimension reflects a rising eco-conscious mindset in Ludhiana.

**Interpretation:** Consumers' awareness is closely tied to their belief in the ecological advantages of EVs. This aligns with global behavioral trends where environmental concern is a major motivator for clean mobility adoption.

*Technological Perception (Factor 2)*

Eigenvalue = 1.540 | Variance explained = 15.70% |  $\alpha$  = 0.884

This factor highlights trust in EV technology

**Key components:**

- Confidence in battery performance
- Perceived maintenance benefits
- Perception of EVs as technologically advanced

**Interpretation:** Consumers evaluate EVs based on innovation, reliability, and long-term performance. Awareness increases when consumers trust the technology, implying that technical clarity from manufacturers is essential.

*Social Influence and Image (Factor 3)*

Eigenvalue = 1.117 | Variance explained = 11.17% |  $\alpha = 0.826$

This factor captures the role of interpersonal encouragement and modern lifestyle appeal.

**Elements include:**

- Influence of friends and family
- Perceived improvement in social image
- Role of positive word of mouth

**Interpretation:** EV awareness is also shaped by social validation. Peer encouragement and the desire for a “modern lifestyle image” affect interest and awareness, particularly in urban areas.

## **To Analyze the Challenges Related to the Adoption of EVs in Ludhiana**

### *High Upfront Cost of Electric Vehicles*

One of the biggest obstacles to the adoption of EVs in Ludhiana is their high upfront cost compared to conventional petrol and diesel vehicles. The primary reason behind this price gap lies in the expensive lithium-ion battery technology, which accounts for a significant share of the vehicle’s total cost. Although EVs offer lower running and maintenance costs in the long term, the higher initial investment discourages middle-income consumers from purchasing them. Studies from NITI Aayog and SIAM (2023) indicate price sensitivity as a major deterrent.

### *Lack of Charging Infrastructure*

A major infrastructural barrier is the limited availability of public charging stations across Ludhiana. The shortage of charging points contributes to “range anxiety” among potential users, as they fear running out of battery power during travel. According to the Ministry of Power (2024), Punjab has less than one public charger per 100 EVs, which severely limits convenience and practicality

for EV users. The absence of fast-charging facilities and inadequate coordination between municipal authorities and private service providers further worsens the problem.

### ***Battery Performance and Replacement Concerns***

Battery-related issues, such as uncertainty about performance, durability, and replacement costs, also act as deterrents to EV adoption. Consumers are often concerned about the long-term efficiency of batteries and the high expense involved in replacing them after a few years of use. Moreover, secondary data from TERI (2023) indicate that the lack of proper battery recycling and disposal mechanisms adds to environmental and economic concerns, reducing consumer confidence in the technology.

### ***Low Consumer Awareness and Information Gaps***

Another crucial challenge is the limited awareness among consumers regarding EV benefits, available models, government incentives, and maintenance requirements. Many potential buyers in Ludhiana remain unfamiliar with financial subsidies, tax rebates, and state-level incentives under the Punjab Electric Vehicle Policy (2022). The lack of targeted awareness campaigns and limited visibility of EV success stories contribute to the slow pace of adoption.

### ***Inadequate After-sales Service and Technical Support***

The unavailability of trained technicians and specialized service centers in Ludhiana presents a significant operational challenge. Many automobile workshops and dealerships are not yet equipped to handle EV-specific repairs or maintenance. As noted in FADA's (2023) industry report, this lack of technical readiness makes consumers hesitant to invest in EVs, fearing post-purchase complications and delays in service.

### ***Policy Implementation and Procedural Challenges***

Although the Punjab government introduced the Punjab Electric Vehicle Policy (2022) with various incentives, the ground-level implementation remains limited. Consumers often face procedural hurdles in availing of subsidies, tax exemptions, or registration benefits. The complexity and lack of clarity in the policy's communication reduce its effectiveness in encouraging adoption.

### ***Long Charging Time and Practical Inconvenience***

Another technical limitation is the long time required to fully charge an electric vehicle compared to the quick refueling of petrol or diesel vehicles. This poses a major inconvenience, especially for individuals who depend on their vehicles for daily commuting or commercial use. The absence of rapid charging infrastructure

further adds to this inconvenience, making EVs less suitable for users seeking flexibility and efficiency.

## **Discussion**

The study set out to investigate the factors affecting consumer behavior toward EVs in Ludhiana and to analyze how various information sources shape consumer awareness. The findings from the WAS and EFA provide several insights that align with, and in some cases differ from, existing literature.

### **Linking the Findings with Past Research**

#### *Environmental Factor as the Strongest Predictor*

The EFA revealed that environmental consciousness is the most influential factor affecting consumer behavior in Ludhiana. This aligns with Axsen and Kurani (2008) and Singh et al. (2020), who also found environmental concern to be a major driver of EV acceptance. Similar to global findings, Ludhiana consumers associate EVs with reduced pollution and improved sustainability.

However, consistent with studies by Siregar et al. (2024), environmental motivation alone still does not guarantee adoption, indicating a “gap between intention and action,” especially where infrastructure challenges persist.

#### *Technological Trust and Performance Perception*

The technological factor emerged as the second most important dimension. This is consistent with Lee et al. (2021), who found that confidence in battery performance, range, and maintenance plays a key role in adoption. In Ludhiana, consumers appreciate the technological superiority of EVs, but concerns about battery life and performance uncertainty mirror global patterns in countries where EV penetration is still growing.

#### *Social Influence and Interpersonal Communication*

The social factor—including family influence, peer recommendations, and lifestyle perception—aligns with Singh et al. (2020), who reported that social norms significantly shape EV intentions. Findings from WAS further support this: reference groups ranked second, showing that real-life user experiences strongly affect awareness. This demonstrates that Ludhiana consumers rely more on interpersonal trust when adopting new technologies.

#### *Role of Information Sources*

The WAS results highlight that social media is the strongest awareness driver, followed closely by reference groups and EV magazines.

This expands on earlier studies by showing that in semi-urban industrial cities like Ludhiana:

- Digital media has surpassed traditional media.
- Peer influence and real-life experiences remain crucial.
- Technical publications appeal to knowledgeable, high-involvement buyers.
- Television, radio, and SMS ranked lower, showing their declining relevance in EV marketing communication.

## Implications

### *Implications for Manufacturers*

- Strengthen digital campaigns using influencer marketing, comparison videos, and interactive content.
- Improve transparency on technology—battery life, performance, maintenance—through educational media.
- Conduct more test-drive events, combining online promotion with physical experiential marketing.
- Develop referral reward systems to leverage reference group influence.

### *Implications for Policymakers*

- Prioritize awareness campaigns on subsidies, policies, and infrastructure through social media and newspapers.
- Accelerate the development of public charging stations to reduce range anxiety.
- Simplify policy documentation and improve clarity on incentives under Punjab's EV policy.
- Partner with local bodies and RWAs to promote community-level EV adoption.

### *Implications for Consumers*

- Access to authentic information can improve decision-making.
- Awareness of long-term cost savings may help overcome resistance due to the high upfront cost.
- Increased social visibility of EVs can strengthen positive perceptions and confidence.

## Conclusion

The study offers insightful information about the informational and behavioral factors influencing EV adoption in Ludhiana. The results show that environmental concern is the strongest motivator influencing consumer awareness, followed

by trust in EV technology and social influence. Social media, reference groups, and EV-focused publications play dominant roles in spreading awareness, while traditional media like radio and text messages have minimal impact. Although awareness about EVs is increasing, several challenges—such as high initial costs, limited charging infrastructure, technological uncertainties, low after-sales support, and policy implementation gaps—continue to hinder widespread adoption.

## Suggestions for Future Research

Future studies may consider the following:

1. Conduct similar research using probability sampling for wider generalization.
2. Expand the geographical scope to include multiple districts of Punjab or compare urban vs. rural EV adoption.
3. Use longitudinal studies to track how awareness and adoption change as infrastructure improves.
4. Examine two-wheeler vs. four-wheeler EV adoption factors separately.
5. Include EV lifecycle analysis, total cost of ownership, and cost-benefit analysis.
6. Study the behavioral differences between early adopters, mainstream users, and nonadopters.
7. Include structural equation modelling to test causal relationships among behavioral constructs.

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# A Comparative Study of Factors Influencing Behavioural Intention Towards Mobile Banking Adoption Between Rural and Urban Adopters in Punjab

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## Abstract

Banking sector is the backbone of the Indian financial system. Banking plays a predominant role in financial inclusion in every economy. The Indian banking sector has undergone a drastic change over the years. Mobile banking is one such innovation that is changing the landscape of the Indian financial system. The study employed an extended UTAUT2 model to determine a comparative study of factors influencing behavioural intention towards adoption of mobile banking in rural and urban users. Significant structural differences between rural and urban respondents were found for structural relationships, namely attitude → behavioural intention, habit → user behaviour and trust → behavioural intention.

## Keywords

Mobile, banking, UTAUT2, behavioural, intention

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## Introduction

Banking sector is an important pillar of the Indian financial system. It plays a significant role in achieving sustained and inclusive growth of an economy. It is the parameter of the financial health of an economy. In the present era, the world

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has evolved into a global village where everything is facilitated with the aid of advanced technology. The continuous advancements in the field of technology have changed the landscape in which people access banking services. The technology growth is happening at a very high pace, making the lives of people easier and more hassle-free. Banks are continuously competing with the global environment and introducing new services with high convenience to their customers for their survival and revenue generation. Banking sector has outpaced all the other sectors in the adoption of internet technology. The Internet is a big network of various computers and computer networks that communicate with each other using the same communication protocol (Mittal, 2004). It was recognised long before that the internet was bringing revolution in retail banking, as stated by Business Week (Tan & Teo, 2000). An increase in internet subscribers led to the adoption of self-driven banking channels. Self-service technologies are automated delivery channels that allow customers to assess a service without any involvement of service employees (Bitner et al., 2002). Self-service banking technology includes ATMs, internet banking, telephone banking and mobile banking.

Mobile banking refers to providing banking services through a smart mobile device (Kadalarasane, 2015). It is acknowledged as the best-suited method to perform banking transactions in this technology-driven environment. Mobile banking is the delivery of financial services through mobile networks, which is performed on mobile phones (Alampay & Moshi, 2018). Mobile banking is anywhere, anytime banking (Kadalarasane, 2015). Various financial products can also be purchased through mobile banking, such as life insurance, health insurance, fire insurance, mutual funds and IPO. One can also instruct the bank to make payments for the payment of various bills through mobile banking, for example, electricity bills, rental payments and so on. Mobile banking also offers administrative services. Through mobile banking, one can continuously monitor all the transactions related to the account easily through a mobile phone. Mobile banking applications allow users to extract all the financial information through one click. Through mobile banking, one can easily block the credit or debit cards in case of theft and prevent losses. This service also allows users to order a new cheque book and change PIN through the application. Market information services allow users to fetch all the market-related information like stock prices, foreign exchange rates, commodity prices and indexes. Many times, internet banking and mobile banking are used interchangeably. Although both require a secure internet connection, mobile banking is performed using a smartphone or a tablet via a mobile bank application, but internet banking can be performed using any device, such as a desktop, computer, mobile or tablet and does not need to be performed through an application. Mobile banking offers an edge over internet banking by providing 'Anywhere Anytime Banking in your hands' (Gupta et al., 2013). Since mobile banking requires the internet to perform various functions, its success directly depends on the penetration of the internet.

Anonymous (2011) classified mobile transactions as push-based and pull-based. Further pull-based transactions are divided into transaction-based and enquiry-based. Transaction-based transactions include fund transfers, bill payments and other services like share trading, while enquiry-based transactions are

**Table 1.** Average Monthly Mobile Banking Transactions in India.

| Transactions                | Value (₹)  | Volume (Units) |
|-----------------------------|------------|----------------|
| Mobile banking transactions | 31,279,506 | 12,845         |
| Mobile payments: Interbank  | 25,251,347 | 11,968         |
| Mobile payments: Intrabank  | 6,028,159  | 877            |

**Source:** Anonymous (2024a).

**Table 2.** Teledensity in Punjab.

| Year          | Teledensity in Punjab (%) |
|---------------|---------------------------|
| 31 March 2024 | 114.36                    |
| 31 March 2023 | 115.31                    |
| 31 March 2022 | 119.41                    |
| 31 March 2021 | 125.27                    |

**Source:** Anonymous (2021, 2023, 2024b).

related to account balance enquiry, cheque status enquiry, account statement enquiry, and cheque book enquiry. Push-based transactions include only enquiry-based alerts like credit card alerts, bill payment alerts and minimum balance alerts.

Table 1 highlights the average monthly mobile banking transactions taken from April 2011 to March 2024.

The digital transactions include digital payments from BHIM-UPI, NEFT, IMPS, AePS, NACH, NETC, credit cards, debit cards, PPI, RTGS and others. The number of digital transactions has increased at a CAGR of 45% from 2017 to 2018 to the financial year 2022–2023 (Anonymous, 2023).

Table 2 highlights the teledensity in Punjab for the past 4 years.

It can be observed from the table that teledensity in Punjab has remained almost the same over 2021–2024. As of 31 March 2024, teledensity stands at 114.36% in Punjab.

### *Theories for Technology Adoption*

The success of any technology depends upon the willingness of users to adopt it. Despite the various benefits, some technologies fail miserably due to their complex nature and limited purpose. Adoption can be defined as the continuous use of a product or service (Safeena et al., 2011). To persuade customers to use any service has more to do with behavioural intention (Cudjoe et al., 2015).

There are various models that explain the process of behavioural intention to adopt any new technology. These are the Technology Acceptance Model, Innovation Diffusion Theory, Task Technology Fit, Motivation Model, Unified Theory of Acceptance and Use of Technology, Theory of Planned Behaviour, Theory of Reasonable Action, Information System Success Model, Social Cognitive Theory and Unified Theory of Acceptance and Use of Technology 2. They help in exploring various factors influencing the attitude of users towards

**Table 3.** Theories for Technology Adoption.

| Name of Theory                                       | Constructs Involved                                                                                                                                                | References                 |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Technology acceptance model                          | Perceived ease of use, behavioural intention to use, attitude towards use, perceived usefulness and actual usage.                                                  | Davis et al. (1989)        |
| Innovation diffusion theory                          | Relative advantage, complexity, compatibility, observability, trialability, and adoption intention.                                                                | Rogers (1992)              |
| Unified theory of acceptance and use of technology   | Performance expectancy, social influence, effort expectancy, facilitating conditions, intention to use and actual usage.                                           | Venkatesh et al. (2003)    |
| Theory of planned behaviour                          | Attitude, behavioural control, subjective norms, intention, behaviour.                                                                                             | Ajzen (1991)               |
| Theory of reasonable action                          | Behavioural beliefs, normative beliefs, attitude, subjective norms, motivation to comply, behavioural intention, outcome evaluation, behaviour.                    | Fishbein and Ajzen (1975)  |
| Motivation model                                     | Intrinsic motivation, extrinsic motivation.                                                                                                                        | Davis et al. (1992)        |
| Social cognitive theory                              | Self-efficacy, outcome expectation (personal), outcome expectation (performance), affect, anxiety, usage                                                           | Compeau and Higgins (1995) |
| Unified theory of acceptance and use of technology 2 | Effort expectancy, hedonic motivation, performance expectancy, habit, hedonic motivation, facilitating conditions, price value, intention to use and actual usage. | Venkatesh et al. (2012)    |

any new technology. New variables can be added to the existing models to meet the objectives of research.

Table 3 highlights the various theories and the constructs involved in technology adoption.

### *Advantages of Mobile Banking*

Mobile banking has an edge over traditional banking channels. Competitive advantage, convenience and cost reduction motivate the banks in their adoption of mobile banking (Dash et al., 2014). All the services of the bank can be accessed with one click from anywhere, anytime. The mobile phone offers the convenience

to the customers to conduct any financial transaction and offers the potential for financial growth and financial inclusion (Kadalarasane, 2015). Customers can now avail banking services from any geographical location around the clock according to their convenience. Through the internet, the geographical boundaries are eliminated (Premalatha & Sundaram, 2014). Mobile banking applications also allow users to download their e-passbooks and bank statements on a real-time basis.

To provide security in mobile banking, banks are constantly improving customer care services to prevent any mishap. Through mobile technology and SMS services, customers can track all their account transactions. Continuous upgradation of technology helps banks to design their applications in order to improve privacy, authenticity and security.

Mobile banking cuts down the huge transaction costs of the banks. It also reduces the dependence of banks on the staff, thus reducing the pressure on bankers. Customers save a great deal of time and energy by accessing banking services through mobile phones instead of personally visiting banks and standing in long queues. Mobile banking strengthens customer relationships and loyalty.

Mobile banking applications allow banks to redefine their traditional channels of providing services. Now, banks can offer their services to different groups without any hassle. It allows cross-selling, which means that customers who have access to mobile banking have more product holdings as compared to branch-only customers. This service also makes way for personalised communication. Users can even pay their bills and purchase various policies with a single click on their devices.

Due to enhanced security features, mobile banking applications are now a more secure means to conduct banking transactions. In addition to username and password, these applications now require a finger scan, OTP or even a face scan to access the account. Applications are also encrypted to prevent any theft of personal data.

### *Constraints in Mobile Banking*

Mobile banking is a relatively new concept in India, and very few people are aware of its usage and benefits. It requires a lot of effort by the government and the banks to reach the masses. Moreover, education levels and financial literacy in the rural areas are so low that it becomes difficult to include them in a financial umbrella any time soon. People lack the technical skills essential to operating the mobile banking application.

Privacy and trust issues are the major constraints in the success of electronic applications (Liu et al., 2005). Despite several safety measures taken by the banks to prevent fraud and leakage of data, there is always a risk to the security, reliability and authenticity of the application.

Mobile banking applications do not come totally free of cost. It requires users to have a smartphone such as Apple iPhone, Android phones and so on, a subscription to a good internet connection and text message service by the banks.

Although these fees are not significant, they come at a price. Also, some banks charge extra fees for certain mobile banking services.

## **Review of Literature**

Continuous advancements in the field of financial technology are a major breakthrough, resulting in reduced cost and standardised service offerings (Ibrahim et al., 2006). Payment, advisory service, compliance and finance are the major categories of financial technology (Leong & Sung, 2018). Mobile Banking enables conducting bank transactions through a mobile device or mobile terminal (Verma & Nehra, 2016).

Increasing penetration of mobile technologies in the backward communities has made financial inclusion possible (Medhi et al., 2009). Although the adoption of mobile banking is in its initial stages. Dapp et al. (2014) emphasised the need for investment in new financial innovations by the banking sector. Mobile users can be categorised into three main clusters based on their perception, namely: technology adoption laggards, technology adoption followers and technology adoption leaders. In the previous research, various factors have been identified that influence the adoption of mobile banking. Both attitude and intention towards mobile banking vary significantly across these segments (Chawla & Joshi, 2018). Trust in the technology has a predominant part in its adoption (Koksal, 2016). It has a strong and significant effect towards the mobile banking adoption (Hanafizadeh et al., 2014; Mashhour & Saleh, 2015). Furthermore, consumers' perceptions of knowledge availability, resources and opportunities critical for usage of the service, along with the pressure of both interpersonal and external social contexts towards the use of mobile banking, are important adoption drivers (Giovanis et al., 2019). Some other antecedents towards mobile banking adoption have been found, namely competitive advantage, mobile phone penetration, security concerns, customer convenience, strategic importance, customer demand and low perceived risk (Mullan et al., 2017). Karjaluoto & Huhtamäki (2010) highlighted the role of guidance and information provided by banks for reducing the barrier to the adoption of mobile banking. Carmi and Drezner (2019) stated that periods of service unavailability or long waiting times when implementing an application have a significant influence on customer usage.

In spite of the benefits of mobile banking, people are still reluctant to adopt mobile banking services. Lee et al. (2003) predicted that the mobile banking services usage is hampered by the risk perceptions of consumers. They identified risk in six dimensions, namely physical, time, psychological, financial, performance and social risk. Bamoriya and Singh (2011) highlighted that the operability of mobile handsets, security and privacy and standardisation of mobile banking services were some of the major issues that hampered the growth of mobile banking adoption. Luo et al. (2012) elucidated that well-developed e-banking systems, such as ATMs, are the main reasons for the lack of m-banking channels.

Conclusively, although there is extensive research on mobile banking adoption and its models, some of the aspects have not been touched upon, for example, a

comparison of factors influencing behavioural intention towards mobile banking adoption between rural and urban users.

## Research Methodology

To achieve the objectives of the study, data were collected from the rural and urban areas of Punjab. The districts were selected on the basis of the largest population as per the 2011 census. The three selected districts were Ludhiana, Jalandhar and Amritsar in Punjab. The population of Punjab, as per the 2011 census, is 2,77,43,338, of which Ludhiana is the most populated district. A list of both rural and urban bank branches of the banks operating in selected cities was prepared. A multistage sampling procedure was adopted for the sample selection. In the first stage of sample selection, three rural and three urban bank branches were randomly selected from the prepared list of bank branches from each selected district. In the second stage of sample collection, 30 bank customers were selected from each selected branch using systematic random sampling in terms of selecting the 5th customer entering the bank branch premises. Data was collected from

**Table 4.** Definitions of Different Constructs.

| Construct                    | Definition                                                                                                                    |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Performance expectancy       | The degree to which users will take advantage of using a particular technology in the performance of certain tasks            |
| Effort expectancy            | The extent of ease that comes with using the technology by consumers                                                          |
| Social influence             | The perception of consumers that their friends and family believe in using the particular technology                          |
| Facilitating conditions      | The perception of consumers relating to support and resources available to perform a behaviour                                |
| Hedonic motivation           | The degree to which using a technology is fun                                                                                 |
| Price value                  | Trade-off between cost and perceived benefits associated with using a technology                                              |
| Habit                        | The extent to which behaviour is undertaken repeatedly because of learning                                                    |
| Trust                        | Level of confidence about the reliability                                                                                     |
| Perceived financial literacy | Self-accessed ability to implement financial knowledge to undertake personal finances and make an informed financial decision |
| Behavioural intention        | The relative strength of intention of the customer to perform the behaviour                                                   |
| User behaviour               | User's decision, action and interaction while using a product or service                                                      |
| Attitude                     | Beliefs related to the consequences of performing the behaviour multiplied by the valuation of these consequences of the user |

540 respondents, equally divided between rural and urban mobile banking. The data was collected both by direct contact and through Google Forms. Data were collected between 1 January 2023 and 30 August 2023. The present study has used the UTUT2 model (Venkatesh et al., 2012) with two additional variables, namely trust and attitude, as a conceptual model to explore the factors influencing behavioural intention in the adoption of mobile banking. Table 4 depicts the definitions of different constructs used in the study. The model thereby included effort expectancy, performance expectancy, trust, social influence, price value, facilitating conditions, attitude, habit, hedonic motivation, user behaviour and behavioural intention.

To examine the collected data, the partial least squares structural equation modelling (PLS-SEM) technique was adopted with SmartPLS4. It is a non-parametric technique undertaken for measuring explained variance in latent constructs. In model testing, a two-step approach was used; reliability and validity were first tested in the outer model, and then hypothesis testing in the proposed conceptual model of mobile banking adoption was tested in the second stage. For calculating the reliability and validity of the study in the outer model, the statistics suggested by Hair et al. (2019) and Kline (2023) were used. These statistics include internal consistency, convergent validity, composite reliability (CR) and discriminant validity.

Standardised factor loadings were calculated for each indicator of the construct. Reliability was ensured by calculating Cronbach's alpha (CA) and CR. To ensure reliability, the values of both should be greater than 0.70. To ensure convergent validity, average variance extracted (AVE) should be greater than 0.5, and factor loadings should be greater than 0.70. Fornell–Larcker criterion method and Heterotrait–Monotrait method ratio (HTMT) were employed to check discriminant validity. HTMT should be less than 0.85 to ensure discriminant validity (Hair et al., 2019).

To calculate the path coefficient along with its associated *t*-value for direct, mediating and moderating relationship bootstrapping method was implemented. Using multigroup analysis in Smart PLS 4.0, significant differences were assessed between rural and urban respondents in factor loadings and structural path coefficients of the proposed mobile banking adoption model.

## Results and Discussion

The data gathered through questionnaires was further analysed using SPSS for frequency analysis. Table 5 shows the demographic and economic profile of the respondents and their respective frequency percentages.

Out of 540 respondents, 53.70% were male and 46.30% were female. Further, out of the total sample size of 540 respondents, 62.22% were single, and 37.78 were married at the time of data collection. The mean age of respondents was found to be 29.03 years with a standard deviation of 8.53. Educational qualification of respondents was categorised into five categories, namely 10 + 2, graduation, post-graduation and doctorate. It was found that the maximum number of

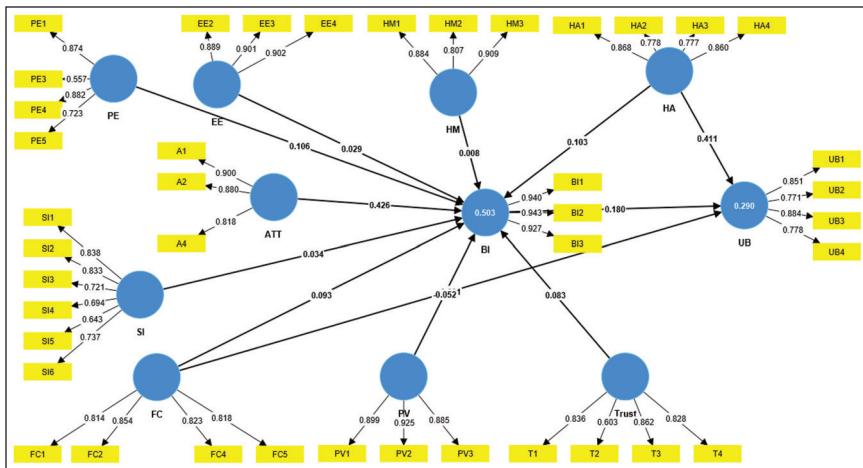
**Table 5.** Descriptive Statistics.

| N = 540                           | Frequency   | %     |
|-----------------------------------|-------------|-------|
| Gender of Respondents             |             |       |
| Male                              | 290         | 53.70 |
| Female                            | 250         | 46.30 |
| Marital Status                    |             |       |
| Single                            | 336         | 62.22 |
| Married                           | 204         | 37.78 |
| Mean age                          | 29.03 years |       |
| Highest Educational Qualification |             |       |
| 10 + 2                            | 81          | 15    |
| Graduation                        | 236         | 43.70 |
| Post graduation                   | 191         | 35.37 |
| Doctorate                         | 32          | 5.93  |
| Occupation                        |             |       |
| Government service                | 127         | 23.52 |
| Private service                   | 80          | 14.82 |
| Business                          | 49          | 9.07  |
| Professional                      | 22          | 4.07  |
| Housewife                         | 26          | 4.82  |
| Student                           | 158         | 29.26 |
| Agriculture                       | 78          | 14.44 |
| Individual Annual Income          |             |       |
| Less than 3,00,000                | 238         | 44.07 |
| 3,00,001–6,00,000                 | 126         | 23.33 |
| 6,00,001–9,00,000                 | 68          | 12.59 |
| 9,00,001–12,00,000                | 53          | 9.82  |
| 12,00,001–15,00,000               | 20          | 3.70  |
| Above 15,00,000                   | 35          | 6.48  |

respondents are graduates (43.70%). The minimum number of respondents is doctorates (5.93%). Occupation was categorised into seven categories, namely government service, private service, business, professional, housewife, student and agriculture. The highest number of respondents were students (29.26%), and the least were professionals (4.07%).

Annual individual income of respondents was categorised into six categories, namely less than ₹300,000, ₹300,001–600,000, ₹600,001–900,000, ₹900,001–1,200,000, ₹1,200,001–1,500,000, and above ₹1,500,000. The maximum number of respondents have an income of less than ₹300,000.

The proposed model as indicated in Figure 1 under the study was examined using the PLS-SEM technique with the help of Smart PLS 4.0 (Ringle et al.,



**Figure 1.** Mobile Banking Adoption (Revised UTAUT2) Model.

2022). The testing of the measurement model examines the relationship between observed and latent variables (Hair et al., 2019). Data was collected using numerical values for all items of the latent constructs. Table 6 depicts the results of the measurement model. Construct reliability of the measurement model was established as both CA and CR values were over 0.70 (Hair et al., 2019). Convergent validity was confirmed as values of all factor loadings were higher than 0.708, and AVE was above 0.50.

Performance expectancy included five items, out of which PE2 was deleted because of a factor loading less than 0.50. For the included statements, it ranged from 0.557 to 0.882. The construct of performance expectancy had a CA of 0.766 and a CR of 0.850. The AVE explained by performance expectancy was recorded at 0.594. Effort expectancy included four items, out of which EE1 was deleted because of a factor loading less than 0.50. The factor loadings of the included statements were between 0.889 and 0.902. The construct of effort expectancy had a CA of 0.879 and a CR of 0.925. The AVE explained by performance expectancy was recorded at 0.805.

Facilitating Conditions included five items, out of which FC3 was deleted because of factor loading less than 0.50. For the included statements, it ranged from 0.814 to 0.854. The construct of facilitating conditions had a CA of 0.846 and a CR of 0.897. The AVE explained by facilitating conditions was recorded at 0.685. Social influence included six items, and factor loadings of the included statements ranged between 0.643 and 0.838. Social influence had a CA of 0.842 and a CR of 0.883. The AVE explained by performance expectancy was recorded at 0.559. The habit included four items, and factor loadings of the included statements ranged between 0.777 and 0.868. The construct of habit had a CA of 0.840 and a CR of 0.893. The AVE explained by habit was recorded at 0.676. Hedonic motivation included three items, and factor loadings of the included statements ranged between 0.807 and 0.909. The construct of hedonic motivation had a CA

**Table 6.** Measurement Model: Mobile Banking Adoption Model (Reliability and Validity).

| Latent Construct        | Items | Factor Loadings | Cronbach Alpha | Composite Reliability (rho_c) | Average Variance Explained (AVE) |
|-------------------------|-------|-----------------|----------------|-------------------------------|----------------------------------|
| Performance expectancy  | PE1   | 0.874           | 0.766          | 0.850                         | 0.594                            |
|                         | PE3   | 0.557           |                |                               |                                  |
|                         | PE4   | 0.882           |                |                               |                                  |
|                         | PE5   | 0.723           |                |                               |                                  |
| Effort expectancy       | EE2   | 0.889           | 0.879          | 0.925                         | 0.805                            |
|                         | EE3   | 0.901           |                |                               |                                  |
|                         | EE4   | 0.902           |                |                               |                                  |
| Facilitating conditions | FC1   | 0.814           | 0.846          | 0.897                         | 0.685                            |
|                         | FC2   | 0.854           |                |                               |                                  |
|                         | FC4   | 0.823           |                |                               |                                  |
|                         | FC5   | 0.818           |                |                               |                                  |
| Social influence        | SI1   | 0.838           | 0.842          | 0.883                         | 0.559                            |
|                         | SI2   | 0.833           |                |                               |                                  |
|                         | SI3   | 0.721           |                |                               |                                  |
|                         | SI4   | 0.694           |                |                               |                                  |
|                         | SI5   | 0.643           |                |                               |                                  |
|                         | SI6   | 0.737           |                |                               |                                  |
| Habit                   | HA1   | 0.868           | 0.840          | 0.893                         | 0.676                            |
|                         | HA2   | 0.778           |                |                               |                                  |
|                         | HA3   | 0.777           |                |                               |                                  |
|                         | HA4   | 0.860           |                |                               |                                  |
| Hedonic motivation      | HM1   | 0.884           | 0.837          | 0.901                         | 0.753                            |
|                         | HM2   | 0.807           |                |                               |                                  |
|                         | HM3   | 0.909           |                |                               |                                  |
| Price value             | PV1   | 0.899           | 0.887          | 0.930                         | 0.815                            |
|                         | PV2   | 0.925           |                |                               |                                  |
|                         | PV3   | 0.885           |                |                               |                                  |
| Trust                   | T1    | 0.836           | 0.795          | 0.867                         | 0.623                            |
|                         | T2    | 0.603           |                |                               |                                  |
|                         | T3    | 0.862           |                |                               |                                  |
|                         | T4    | 0.828           |                |                               |                                  |
| Attitude                | A1    | 0.900           | 0.834          | 0.900                         | 0.751                            |
|                         | A2    | 0.880           |                |                               |                                  |
|                         | A4    | 0.818           |                |                               |                                  |
| Behavioural intention   | BI1   | 0.940           | 0.930          | 0.956                         | 0.877                            |
|                         | BI2   | 0.943           |                |                               |                                  |
|                         | BI3   | 0.927           |                |                               |                                  |
| User behaviour          | UB1   | 0.851           | 0.839          | 0.893                         | 0.676                            |
|                         | UB2   | 0.771           |                |                               |                                  |
|                         | UB3   | 0.884           |                |                               |                                  |
|                         | UB4   | 0.788           |                |                               |                                  |

**Table 7.** Discriminant Validity: Fornell–Larcker Criterion (Mobile Banking Adoption Model).

| Latent Construct           | Attitude     | Behavioural<br>Intention | Effort<br>Expectancy | Facilitating<br>Conditions | Habit        | Hedonic<br>Motivation | Performance<br>Expectancy | Price<br>Value | Social<br>Influence | Trust        | User<br>Behaviour |
|----------------------------|--------------|--------------------------|----------------------|----------------------------|--------------|-----------------------|---------------------------|----------------|---------------------|--------------|-------------------|
| Attitude                   | <b>0.867</b> |                          |                      |                            |              |                       |                           |                |                     |              |                   |
| Behavioural<br>intention   | 0.665        | <b>0.937</b>             |                      |                            |              |                       |                           |                |                     |              |                   |
| Effort expectancy          | 0.614        | 0.542                    | <b>0.897</b>         |                            |              |                       |                           |                |                     |              |                   |
| Facilitating<br>conditions | 0.649        | 0.577                    | 0.770                | <b>0.828</b>               |              |                       |                           |                |                     |              |                   |
| Habit                      | 0.453        | 0.453                    | 0.501                | 0.535                      | <b>0.822</b> |                       |                           |                |                     |              |                   |
| Hedonic motivation         | 0.316        | 0.325                    | 0.363                | 0.452                      | 0.536        | <b>0.868</b>          |                           |                |                     |              |                   |
| Performance<br>expectancy  | 0.633        | 0.559                    | 0.763                | 0.714                      | 0.483        | 0.393                 | <b>0.771</b>              |                |                     |              |                   |
| Price value                | 0.406        | 0.340                    | 0.462                | 0.531                      | 0.438        | 0.439                 | 0.505                     | <b>0.903</b>   |                     |              |                   |
| Social influence           | 0.464        | 0.454                    | 0.617                | 0.659                      | 0.570        | 0.583                 | 0.597                     | 0.468          | <b>0.748</b>        |              |                   |
| Trust                      | 0.600        | 0.526                    | 0.571                | 0.671                      | 0.495        | 0.436                 | 0.580                     | 0.469          | 0.494               | <b>0.789</b> |                   |
| User behaviour             | 0.418        | 0.384                    | 0.296                | 0.355                      | 0.510        | 0.457                 | 0.424                     | 0.379          | 0.440               | 0.437        | <b>0.822</b>      |

of 0.837 and a CR of 0.901. The AVE explained by hedonic motivation was recorded at 0.753.

Price value included three items, and factor loadings of the included statements ranged between 0.885 and 0.925. The construct of price value had a CA of 0.887 and a CR of 0.930. The AVE, explained by price value, was recorded at 0.815. Attitude included four items, out of which A3 was deleted because of factor loading less than 0.50. The factor loadings of the included statements ranged between 0.818 and 0.900. The construct of attitude had a CA of 0.834 and a CR of 0.900. The AVE explained by attitude was recorded at 0.751. Trust included four items, and factor loadings of the included statements ranged between 0.603 and 0.862. The construct of trust had a CA of 0.795 and a CR of 0.867. The AVE explained by trust was recorded at 0.623. Behavioural intention included three items, and factor loadings of the included statements ranged between 0.927 and 0.943. The construct of behavioural intention had a CA of 0.930 and a CR of 0.956. The AVE explained by behavioural intention was recorded at 0.877. The construct of user behaviour included four items, and factor loadings of the included statements ranged between 0.771 and 0.884. The construct of user behaviour had a CA of 0.839 and a CR of 0.893. The AVE explained by user behaviour was recorded at 0.676.

Discriminant validity is used to confirm that latent variables are unrelated to each other and that each latent variable is unique. According to Fornell and Larcker (1981), the square root of AVE should be higher than the correlations to ensure discriminant validity. As illustrated by Table 7, all the square roots of AVE values were higher than inter-construct correlation coefficients.

HTMT is a measure of discriminant validity in the PLS-SEM approach (Hair et al., 2019). Discriminant validity is ensured When the HTMT value is less than 0.90, discriminant validity is ensured. The results indicate that all the latent variables were unique, as all the HTMT values, as shown by Table 8, are less than 0.90, thus ensuring discriminant validity.

Table 9 depicts notable variations between rural and urban respondents in terms of various items of different factors influencing behavioural intention towards mobile banking adoption. The results revealed that most of the factor loading differences among different items between rural and urban respondents were non-significant, except for two items. The factor loading difference was significant for Hedonic Motivation  $\rightarrow$  HM1 ( $p = .044$ ). The difference in path coefficients revealed that the impact of HM1 was stronger among urban respondents. The results also found the significant factor loading difference for Performance Expectancy  $\rightarrow$  PE1 ( $p = .043$ ). The difference in path coefficients revealed that the impact of PE1 was stronger among rural respondents.

Table 10 depicts multigroup analysis for the difference between rural and urban areas for different constructs. The findings revealed path coefficients, namely Attitude  $\rightarrow$  Behavioural Intention (coefficient =  $-0.088$ ,  $p = .042$ ), Facilitating Conditions  $\rightarrow$  User Behaviour (coefficient =  $0.253$ ,  $p = .018$ ), Habit  $\rightarrow$  User Behaviour (coefficient =  $-0.263$ ,  $p = .001$ ) and Trust  $\rightarrow$  BI (coefficient =  $0.234$ ,  $p = .046$ ), were found to be significantly different between urban and rural respondents.

**Table 8.** Discriminant Validity: Heterotrait–Monotrait Ratio (Mobile Banking Adoption Model).

| Latent Construct        | Attitude | Behavioural<br>Intention | Effort<br>Expectancy | Facilitating<br>Conditions | Habit | Hedonic<br>Motivation | Performance<br>Expectancy | Price<br>Value | Social<br>Influence | Trust | User<br>Behaviour |
|-------------------------|----------|--------------------------|----------------------|----------------------------|-------|-----------------------|---------------------------|----------------|---------------------|-------|-------------------|
| Attitude                |          |                          |                      |                            |       |                       |                           |                |                     |       |                   |
| Behavioural intention   | 0.754    |                          |                      |                            |       |                       |                           |                |                     |       |                   |
| Effort expectancy       | 0.716    | 0.597                    |                      |                            |       |                       |                           |                |                     |       |                   |
| Facilitating conditions | 0.774    | 0.649                    | 0.892                |                            |       |                       |                           |                |                     |       |                   |
| Habit                   | 0.536    | 0.506                    | 0.578                | 0.632                      |       |                       |                           |                |                     |       |                   |
| Hedonic motivation      | 0.373    | 0.361                    | 0.417                | 0.534                      | 0.639 |                       |                           |                |                     |       |                   |
| Performance expectancy  | 0.772    | 0.638                    | 0.854                | 0.872                      | 0.618 | 0.530                 |                           |                |                     |       |                   |
| Price value             | 0.474    | 0.374                    | 0.525                | 0.612                      | 0.507 | 0.503                 | 0.626                     |                |                     |       |                   |
| Social influence        | 0.535    | 0.492                    | 0.696                | 0.765                      | 0.673 | 0.706                 | 0.750                     | 0.544          |                     |       |                   |
| Trust                   | 0.715    | 0.597                    | 0.662                | 0.790                      | 0.605 | 0.553                 | 0.741                     | 0.547          | 0.602               |       |                   |
| User behaviour          | 0.497    | 0.432                    | 0.340                | 0.417                      | 0.595 | 0.559                 | 0.587                     | 0.437          | 0.536               | 0.571 |                   |

**Table 9.** Multigroup Analysis (Factor Loading Difference Between Rural and Urban).

| Relationships                 | Difference (Rural–Urban) | p Value | Results       |
|-------------------------------|--------------------------|---------|---------------|
| A1 ← attitude                 | 0.007                    | .719    | Insignificant |
| A2 ← attitude                 | 0.016                    | .595    | Insignificant |
| A4 ← attitude                 | –0.051                   | .310    | Insignificant |
| BI1 ← behavioural intention   | –0.002                   | .937    | Insignificant |
| BI2 ← behavioural intention   | 0.008                    | .485    | Insignificant |
| BI3 ← behavioural intention   | –0.001                   | .944    | Insignificant |
| EE2 ← effort expectancy       | 0.020                    | .456    | Insignificant |
| EE3 ← effort expectancy       | 0.021                    | .444    | Insignificant |
| EE4 ← effort expectancy       | 0.004                    | .857    | Insignificant |
| FC1 ← facilitating conditions | 0.036                    | .319    | Insignificant |
| FC2 ← facilitating conditions | –0.041                   | .162    | Insignificant |
| FC4 ← facilitating conditions | –0.003                   | .935    | Insignificant |
| FC5 ← facilitating conditions | 0.011                    | .797    | Insignificant |
| HA1 ← habit                   | –0.040                   | .114    | Insignificant |
| HA2 ← habit                   | –0.031                   | .547    | Insignificant |
| HA3 ← habit                   | 0.009                    | .799    | Insignificant |
| HA4 ← habit                   | –0.027                   | .377    | Insignificant |
| HMI ← hedonic motivation      | –0.072                   | .044    | Significant   |
| HM2 ← hedonic motivation      | 0.075                    | .248    | Insignificant |
| HM3 ← hedonic motivation      | –0.043                   | .133    | Insignificant |
| PE1 ← performance expectancy  | 0.054                    | .043    | Significant   |
| PE3 ← performance expectancy  | –0.039                   | .666    | Insignificant |
| PE4 ← performance expectancy  | 0.004                    | .880    | Insignificant |
| PE5 ← performance expectancy  | –0.073                   | .273    | Insignificant |
| PV1 ← price value             | –0.027                   | .305    | Insignificant |
| PV2 ← price value             | –0.008                   | .602    | Insignificant |
| PV3 ← price value             | –0.017                   | .554    | Insignificant |
| SI1 ← social influence        | –0.032                   | .296    | Insignificant |
| SI2 ← social influence        | –0.023                   | .468    | Insignificant |
| SI3 ← social influence        | –0.038                   | .596    | Insignificant |
| SI4 ← social influence        | –0.122                   | .075    | Insignificant |
| SI5 ← social influence        | –0.083                   | .255    | Insignificant |
| SI6 ← social influence        | –0.019                   | .736    | Insignificant |

*(Table 9 continued)*

(Table 9 continued)

| Relationships        | Difference (Rural–Urban) | p Value | Results       |
|----------------------|--------------------------|---------|---------------|
| T1 ← trust           | −0.002                   | .944    | Insignificant |
| T2 ← trust           | −0.093                   | .294    | Insignificant |
| T3 ← trust           | −0.037                   | .288    | Insignificant |
| T4 ← trust           | 0.015                    | .675    | Insignificant |
| UB1 ← user behaviour | −0.003                   | .891    | Insignificant |
| UB2 ← user behaviour | −0.090                   | .063    | Insignificant |
| UB3 ← user behaviour | −0.043                   | .065    | Insignificant |
| UB4 ← user behaviour | 0.009                    | .981    | Insignificant |

**Table 10.** Bootstrap Multi-group Analysis (Structural Model).

| Latent Construct                                | Difference<br>(Rural–Urban) | p Value | Results       |
|-------------------------------------------------|-----------------------------|---------|---------------|
| Attitude → behavioural intention                | −0.088                      | .042    | Significant   |
| Effort expectancy → behavioural intention       | −0.15                       | .166    | Insignificant |
| Facilitating conditions → behavioural intention | −0.124                      | .294    | Insignificant |
| Facilitating conditions → user behaviour        | 0.253                       | .018    | Significant   |
| Habit → behavioural intention                   | 0.035                       | .714    | Insignificant |
| Habit → user behaviour                          | −0.263                      | .001    | Significant   |
| Hedonic motivation → behavioural intention      | 0.071                       | .344    | Insignificant |
| Performance expectancy → behavioural intention  | 0.146                       | .205    | Insignificant |
| Price value → behavioural intention             | 0.129                       | .131    | Insignificant |
| Social influence → behavioural intention        | 0.068                       | .520    | Insignificant |
| Trust → behavioural intention                   | 0.234                       | .046    | Significant   |
| Behavioural intention → user behaviour          | 0.125                       | .278    | Insignificant |

**Limitations for the Study**

- Although every factor affecting mobile banking adoption has been tried to include yet survey approach of data collection has its limitations in exploring human perceptions and behaviours.
- Data has been collected from only three cities. This might restrict the generalisations of the results.
- Technology adoption is measured by several models, but this study has applied only the UTAUT2 model.

## Conclusion

It is well acknowledged that the banking sector is the backbone of the Indian financial system. Banking plays a predominant role in financial inclusion in every economy. The Indian banking sector has undergone drastic change over the years. Various innovations and new products have swept into the financial market to make banking easier and more convenient. The banking sector has outpaced all other sectors in the adoption of new technologies. Mobile banking is one such innovation. Mobile banking involves using mobile phones for banking services. Mobile banking offers various advantages over traditional methods of banking. Convenience, saving of time and effort and cost reduction offer a competitive edge over other methods of banking, but at the same time, security and privacy concerns have hampered the growth of adoption of mobile banking. The present research has undertaken a comparative study of rural and urban users for factors affecting behavioural intention towards mobile banking adoption. The study highlighted significant structural differences between rural and urban respondents' structural relationships, namely attitude → behavioural intention, habit → user behaviour and trust → behavioural intention.

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# Effectiveness of Investors' Grievances Redressal in Capital Market of India: Evidence from SEBI's SCORES Mechanism

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## Abstract

The rapid growth of the Indian capital market has culminated in increased investor engagement, leading to a growing volume of investor complaints and creating major hurdles to regulatory control. This study investigates the efficiency of the Securities Exchange Board of India's investor grievance redressal process, with a special emphasis on the SCORES portal in the post-financial crisis era. The objectives of the research are to assess the performance of the Securities and Exchange Board of India (SEBI) grievance redressal system and to identify trends in investor grievances received, settled, and pending from 2008–2009 to 2024–2025. A descriptive and analytical study design is used, with secondary data from SEBI's annual reports and official publications. To evaluate long-term patterns, the analysis uses trend analysis and compound annual growth rate (CAGR) approaches. The findings of the study reveal an ongoing rise in investor complaints, reflecting increased market awareness and engagement. Cumulative grievance redressal rates regularly surpassed 95%, while pending grievances declined sharply due to improved efficiency and digital platforms such as SCORES and SCORES 2.0. However, the actual annual redressal rate remains moderate because of carried-forward grievances. The study concluded that SEBI's grievance redressal process has significantly improved investor protection and market trust, highlighting the necessity of ongoing technology advancement and investor education to maintain regulatory efficacy.

## Keywords

Indian capital market, investors' grievance redressal, investor protection, SCORES, SEBI

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## Introduction

Securities and Exchange Board of India (SEBI) SCORES is an autonomous forum for evaluating the effectiveness of the redressal system for investor complaints they encounter when interacting with stock market brokers and authorized companies (Ajit et al., 2017). Investors may occasionally file complaints against companies that are listed or any intermediaries that they deal with on the stock exchange. If they are dissatisfied, they can file an appeal with SEBI scores.

In an effort to streamline the complaint registration process, SEBI has given SCORES the authority to handle the redressal process more swiftly and effectively. A centralized database for all grievances and online visibility of the complaints' progress and the actions made in response to them are SCORES' most important features. Until 2011, the only way to handle grievances was offline, which consumed a lot of time and resulted in very few complaints compared to the real situation. Additionally, investors were unable to find out the outcome of their complaints, which caused them to become dissatisfied and mistrustful.

## What Is SCORES

SEBI provides a digital grievance redressal tool called "SCORES." Participants can file complaints about the securities market with SEBI-regulated firms such as listed corporations, authorized intermediaries, and regulatory institutions. Investors must first file their concerns with the entity involved, through its authorized individuals or officials who manage legal compliance and grievances of investors.

## SCORES 2.0

SCORES was established in 2011 to support discontented investors whose complaints against listed businesses, registered intermediaries, or market infrastructure institutions have yet to be addressed. To improve the overall effectiveness of the grievance redressal procedure, SEBI introduced an improved version, SCORES 2.0 (SEBI, n.d.-a), with effect from April 1, 2024. This improvement shortened timescales, added automated routing of grievances to relevant institutions, and automatic escalation of accusations to SEBI for unsolved concerns. Furthermore, a two-level review mechanism has been established, making complaint resolution more effective.

Additionally, SEBI gets complaints via (CPGRAMS) Centralized Public Grievance Redress and Monitoring System of Department of Administrative Reforms and Public Grievances. These complaints can now be processed using SCORES 2.0 due to the integration of the CPGRAMS platform with SCORES 2.0

Characteristics of the SCORES 2.0 portal include:

- Improved complaint registration processes through seamless interaction with the KYC Verification Authority database (OTP-based PAN authentication). In addition, a method for manual registration filling is available, in which the investor's PAN is checked using Protean e-gov to ensure their legitimacy.

- The timescale for resolving investor concerns has been lowered to 21 calendar days universally across all SEBI-regulated intermediary organizations, listed firms, and MIIs.
- Complaints are automatically forwarded to the relevant SEBI-recognized intermediaries, listed firms, MIIs, or/and specified bodies, hence avoiding delays in grievance processing.
- Disputes are automatically transferred to the subsequent level if the specified deadlines are not met.
- Authorized bodies are intended to supervise the timely resolution of investor complaints made against the companies. In the event of an initial level review complaint, nominated bodies are expected to submit an action taken report (ATR) within 10 days of the complaint being received.
- If complainants are dissatisfied with the resolution, they have 15 days after submitting the ATR to request a review.
- SCORES 2.0 is available as a mobile app on the App Store at SEBI (2024a) and the Play Store at SEBI (2024b).
- For the investor's convenience, emails, SMS, and WhatsApp are used to send acknowledgments and further conversations.
- Investors have clear access to the audit record of the full complaint cycle.

### *Secure Portal and Market Intelligence Portal*

On April 1, 2024, a web-based site called SECURE (SEBI, n.d.-b) was introduced to handle complaints regarding the freezing and unfreezing of accounts in accordance with orders from the Full Time Representatives of SEBI, judiciary and administrative bodies, or the expiration of debarment periods. Additionally, the Market Intelligence (MI) Portal (SEBI, n.d.-c) was created so that market players may provide information on market abuse, and it has been in use since May 2024. In 2024–2025, the MI portal received 356 inputs and notifications. Any related regulatory actions are posted on the SEBI website (Annual Report of SEBI 2024–2025).

## **Literature Review**

The existing literature emphasizes the significance of regulatory frameworks and grievance redressal processes in protecting investors and preserving capital market confidence. Bose (2005) compared the Indian securities market's regulatory framework to the US capital market, highlighting the significance of well-defined rules and regulatory powers in combating market misconduct and offering an equitable opportunity to investors. Taneja and Sharma (2005) examined retail investors' understanding of grievance redressal procedures and investor education awareness programs, allowing investors to better defend themselves against fraudulent operations. Angela (2010) examined the procedure for resolving investor grievances in online trading using market facilitators, describing common investor complaints such as non-delivery of securities, settlement failures, and

pricing disputes, and focusing on the importance of productive communication and timely enforcement by regulatory authorities. Pasha et al. (2012) examined SEBI's role in overseeing capital market infractions and found that a stable capital market necessitates effective surveillance instead of undue interference by government. Venugopal et al. (2012) investigated the issues faced by small investors and discovered that various safeguards exist; a lack of understanding about suitable grievance mechanisms remained a key concern. Ravi and Bhoopal (2017) found consistent improvements in grievance resolution rates, reflecting SEBI's established and specialized redressal mechanism. More recently, Vijayan and Prasad (2023) reported a significant decrease in unresolved issues and high investor contentment with the SCORES platform, which shows increased productivity, accessibility, and investors' confidence in the capital market of India.

### *Objectives of the Study*

1. To assess the grievance redressal mechanism of SEBI SCORES in the capital market of India.
2. To study the trends of actual redressal of investors' grievances from 2008 to 2025.

### *Research Methodology*

This study provides an analytical and descriptive analysis of the grievance redressal mechanism of SEBI's SCORES for resolving investors' grievances. The study used secondary data collected from annual reports of SEBI, that is, from 2008–2009 to 2024–2025, government publications, and other available sources about the actual redressal of investors' grievances in the securities market of India and the data is analyzed using tables in MS Excel. Descriptive and statistical tools, such as compound annual growth rate (CAGR), trend analysis, line and bar charts, were used to interpret the study.

### *Status of Investors' Grievances Received and Redressed by SEBI*

SEBI requires suppliers and facilitators to implement processes that handle investor complaints. SEBI directs grievances to the appropriate intermediary. Intermediaries must report their handling of grievances to SEBI within 30 days of receiving them. Table 1 shows the trends in investor grievances received and redressed by SEBI throughout the years, and Table 2 shows the actual redressal rate of investors' grievances from 2008 to 2025.

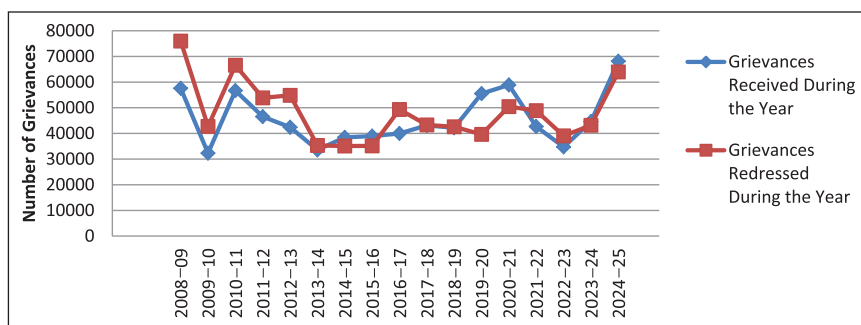
### *Interpretation and Analysis of Data*

According to Table 1, the pattern of investor complaints that SEBI received between 2008–2009 and 2024–2025 shows a distinct long-term upward trend, which is indicative of rising investor awareness and market involvement. The trend is illustrated in Figure 1. Grievances first fell rapidly from 57,580 in

**Table 1.** Grievances Redressal Rate on a Cumulative Basis.

| Year      | Grievances<br>Received<br>During the<br>Year | Cumulative<br>Grievances | Grievances<br>Redressed<br>During the<br>Year | Cumulative<br>Grievances<br>Redressed | Grievances<br>Pending | Redressal<br>Percentage |
|-----------|----------------------------------------------|--------------------------|-----------------------------------------------|---------------------------------------|-----------------------|-------------------------|
| 2008–2009 | 57,580                                       | 2,674,560                | 75,989                                        | 2,503,560                             | 49,113                | 93.6064                 |
| 2009–2010 | 32,335                                       | 2,706,895                | 42,742                                        | 2,546,302                             | 37,880                | 94.0673                 |
| 2010–2011 | 56,670                                       | 2,763,565                | 66,552                                        | 2,612,854                             | 28,653                | 94.5465                 |
| 2011–2012 | 46,548                                       | 2,810,113                | 53,841                                        | 2,666,695                             | 23,725                | 94.8964                 |
| 2012–2013 | 42,411                                       | 2,852,524                | 54,852                                        | 2,721,547                             | 11,410                | 95.4084                 |
| 2013–2014 | 33,550                                       | 2,886,074                | 35,299                                        | 2,756,846                             | 9,147                 | 95.5224                 |
| 2014–2015 | 38,442                                       | 2,924,516                | 35,090                                        | 2,791,936                             | 5,736                 | 95.4666                 |
| 2015–2016 | 38,938                                       | 2,963,454                | 35,145                                        | 2,827,081                             | 5,452                 | 95.3982                 |
| 2016–2017 | 40,000                                       | 3,003,454                | 49,301                                        | 2,876,382                             | 4,476                 | 95.7691                 |
| 2017–2018 | 43,131                                       | 3,046,585                | 43,308                                        | 2,919,690                             | 3,771                 | 95.8348                 |
| 2018–2019 | 42,202                                       | 3,088,787                | 42,576                                        | 2,962,266                             | 3,094                 | 95.9039                 |
| 2019–2020 | 55,526                                       | 3,144,313                | 39,624                                        | 3,001,890                             | 3,540                 | 95.4705                 |
| 2020–2021 | 58,873                                       | 3,203,186                | 50,425                                        | 3,052,315                             | 5,171                 | 95.29                   |
| 2021–2022 | 42,694                                       | 3,245,880                | 48,883                                        | 3,101,198                             | 2,364                 | 95.5426                 |
| 2022–2023 | 34,752                                       | 3,280,632                | 39,062                                        | 3,140,260                             | 2,030                 | 95.7212                 |
| 2023–2024 | 44,599                                       | 3,325,231                | 43,191                                        | 3,183,451                             | 3,425                 | 95.7362                 |
| 2024–2025 | 68,132                                       | 3,393,363                | 63,971                                        | 3,247,422                             | 4,074                 | 95.6992                 |
| CAGR      | 0.01697                                      | 0.02409                  | -0.0171                                       | 0.02636                               | -0.2204               | 0.00221                 |

**Source:** Annual Reports of SEBI from 2008 to 2025.

**Figure 1.** Trend of Grievances Received and Redressed from 2008 to 2025.

2008–2009 to 32,335 in 2009–2010, but they thereafter rose once again to 56,670 in 2010–2011, suggesting a resurgence of market activity. Between 2011–2012 (46,548) and 2013–2014 (33,550), a slow decrease was noticed, indicating better regulatory efficacy and compliance. After that, complaints grew slowly, reaching 43,131 in 2017–2018. During times of market volatility, they increased

significantly, especially in 2019–2020 (55,526) and 2020–2021 (58,873). Despite temporary fluctuations in 2021–2022 and 2022–2023, complaints reached 68,132 in 2024–2025. In general, grievances resolved maintained up with inflows; SEBI resolved more complaints than it had in a number of years, including 2008–2009 and 2010–2011, which decreased the backlog. Institutional scalability was also demonstrated by high resolution levels in 2020–2021 (50,425) and 2024–2025 (63,971). The total number of grievances received grew from 26.75 to 33.93 lakh, while the total number of redressals increased from 25.04 to 32.47 lakh. Notably, the number of pending grievances dropped from 49,113 to 4,074, a decrease of more than 91%. The redressal rate peaked in 2018–2019 at 95.90%, continuously staying above 93% and above 95% in most years. The findings are further supported by CAGR analysis, which shows that pending grievances decreased by a noteworthy –22.04%, cumulative redressal increased by 2.64%, and grievances received increased by 1.69%. Overall, the analysis shows that SEBI's grievance redressal mechanism has been significantly strengthened, boosting investor trust and guaranteeing efficient protection in India's capital market.

### *Interpretation and Analysis of Actual Redressal Rate of Grievances*

Table 2 shows the actual redressal performance of investor grievances from 2008–2009 to 2024–2025. The trend in the actual redressal rate is presented in Figure 2. The data reveal that the number of grievances received during the year fluctuated significantly, growing from 57,580 in 2008–2009 to 68,132 in 2024–2025, indicating increased investor participation and knowledge. The number of outstanding grievances from prior years remained significant; however, it showed a little decline over time, indicating a progressive clearance of backlog cases. The total number of grievances addressed each year has remained high, with a range of 162,778 to 214,073 cases.

The overall number of complaints redressed annually varies, with greater resolution levels reported in years such as 2010–2011 (66,552), 2020–2021 (50,425), and 2024–2025 (63,971), illustrating SEBI's ability to speed up redressal during periods of significant intake. Despite these efforts, a considerable number of grievances went unaddressed each year, emphasizing the ongoing burden of carried-forward cases. The actual redressal rate fluctuated between 20% and 33%, with a bit higher effectiveness recorded in 2008–2009, 2010–2011, and 2024–2025. The CAGR numbers show a positive growth in grievances received (1.69%) and a small improvement in the redressal rate (0.10%), while negative CAGR values for pending complaints indicate a slow but consistent drop in pendency. At the end, it shows that even though SEBI has improved its grievance redressal system over time, additional advancements are required to boost annual clearance efficiency and more consistently remove backlog cases.

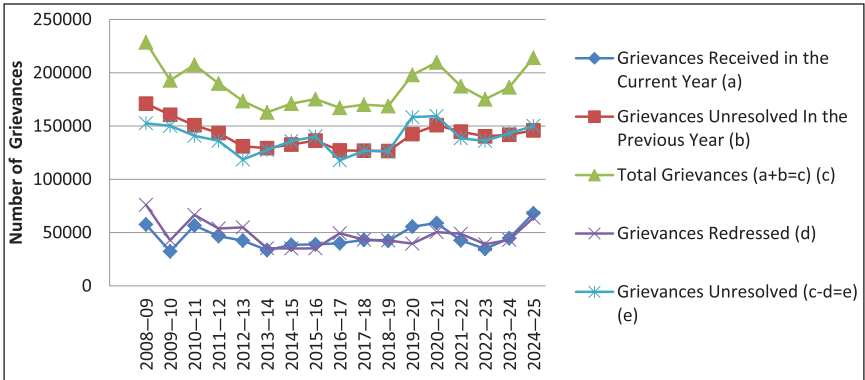
### *Findings of the Study*

- According to the study, investor grievance filing has consistently increased over time, showing increasing participation by investors and greater

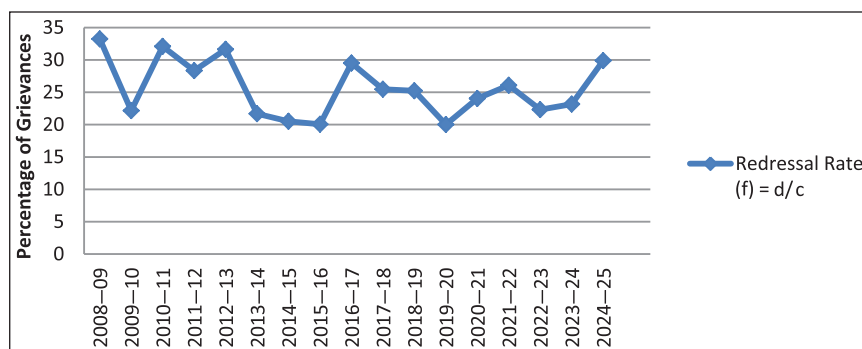
**Table 2.** Actual Redressal Rate of Investor Grievances.

| Year      | Grievances Received in the Current Year (a) | Grievances Unresolved in the Previous Year (b) | Total Grievances (a + b = c) (c) | Grievances Redressed (d) | Grievances Unresolved (c – d = e) (e) | Redressal Rate (f = d/c) (f) |
|-----------|---------------------------------------------|------------------------------------------------|----------------------------------|--------------------------|---------------------------------------|------------------------------|
| 2008–2009 | 57,580                                      | 171,000                                        | 228,580                          | 75,989                   | 152,591                               | 33.2439                      |
| 2009–2010 | 32,335                                      | 160,593                                        | 192,928                          | 42,742                   | 150,186                               | 22.1544                      |
| 2010–2011 | 56,670                                      | 150,711                                        | 207,381                          | 66,552                   | 140,829                               | 32.0917                      |
| 2011–2012 | 46,548                                      | 143,418                                        | 189,966                          | 53,841                   | 136,125                               | 28.3424                      |
| 2012–2013 | 42,411                                      | 130,977                                        | 173,388                          | 54,852                   | 118,536                               | 31.6354                      |
| 2013–2014 | 33,550                                      | 129,228                                        | 162,778                          | 35,299                   | 127,479                               | 21.6854                      |
| 2014–2015 | 38,442                                      | 132,580                                        | 171,022                          | 35,090                   | 135,932                               | 20.5178                      |
| 2015–2016 | 38,938                                      | 136,373                                        | 175,311                          | 35,145                   | 140,166                               | 20.0472                      |
| 2016–2017 | 40,000                                      | 127,072                                        | 167,072                          | 49,301                   | 117,771                               | 29.5088                      |
| 2017–2018 | 43,131                                      | 126,895                                        | 170,026                          | 43,308                   | 126,718                               | 25.4714                      |
| 2018–2019 | 42,202                                      | 126,521                                        | 168,723                          | 42,576                   | 126,147                               | 25.2343                      |
| 2019–2020 | 55,526                                      | 142,423                                        | 197,949                          | 39,624                   | 158,325                               | 20.0173                      |
| 2020–2021 | 58,873                                      | 150,871                                        | 209,744                          | 50,425                   | 159,319                               | 24.0412                      |
| 2021–2022 | 42,694                                      | 144,682                                        | 187,376                          | 48,883                   | 138,493                               | 26.0882                      |
| 2022–2023 | 34,752                                      | 140,372                                        | 175,124                          | 39,062                   | 136,062                               | 22.3053                      |
| 2023–2024 | 44,599                                      | 141,780                                        | 186,379                          | 43,191                   | 143,188                               | 23.1738                      |
| 2024–2025 | 68,132                                      | 145,941                                        | 214,073                          | 63,971                   | 150,102                               | 29.8828                      |
| CAGR      | 0.01697                                     | –0.0157                                        | –0.0065                          | –0.0171                  | –0.0016                               | –0.0106                      |

**Source:** Annual Reports of SEBI from 2008 to 2025.



**Figure 2.** Trend of Actual Redressal Rate of Grievance from 2008 to 2025.



**Figure 3.** Percentage of Grievances Redressal Rate from 2008 to 2025.

understanding of SEBI's statutory grievance redressal channels. SEBI has constantly upgraded its grievance redressal mechanism, as evidenced by high cumulative redressal rates and a significant decrease in pending complaints over time. The year-wise percentage of grievance redressal rate is depicted in Figure 3.

- The emergence of technology-driven platforms like SCORES has increased honesty, responsibility, and accessibility for shareholders, allowing them to monitor complaint status in real time. An effective grievance redressal procedure lowers the danger of financial loss, boosts investor confidence in the securities market, and ensures regulatory protection.
- A strong grievance redressal system also improves market discipline by discouraging unethical behavior by businesses and middlemen. Wider engagement from ordinary investors is encouraged by the enhanced grievance resolution process, which also helps to increase market transparency and fairness.
- The number of complaints registered in the current year has risen steadily over the research period, from around 57,580 in 2008–2009 to 68,132 in 2024–2025, showing increased investor engagement and understanding of grievance redressal systems.
- Grievances unaddressed from the previous year fell steadily over the early years, showing higher disposal efficiency; nevertheless, minor oscillations were noticed during periods of increased market activity, particularly between 2019–2020 and 2021–2022.
- The total grievances (current year + carried forward) remained largely consistent in the range of 1.6–2.1 lakh cases, indicating SEBI's ability to handle increasing complaint intakes without accumulating a systematic backlog.
- The pattern of grievances resolved during the year shows continuous progress, with redressal increasing significantly after 2016–2017 and reaching around 2020–2021, reflecting the ability of institutions and procedural reforms. Despite periodic rises in overall grievances, the number of grievances outstanding at the end of the year follows a consistent trend, indicating good follow-up and supervision by SEBI.

- The difference between total complaints and grievances resolved narrows over time, showing increased effectiveness of grievance resolution processes such as SCORES and greater intermediary accountability. Periodic declines in redressal performance occur with phases of market stress and increased investor complaints, but the framework demonstrates resilience and recovers in succeeding years.

## Conclusion

The SEBI has greatly improved investor protection by implementing an effective grievance redressal system. An analysis of complaint files from 2008–2009 to 2024–2025 reveals a consistent growth in investor awareness and participation. SEBI has reduced the number of ongoing cases while maintaining a cumulative redressal rate above 95%. Using technologically advanced systems such as SCORES and SCORES 2.0 has increased grievance management efficiency and transparency. Despite a moderate annual redressal rate due to pending litigation, SEBI's initiatives have boosted investor confidence and contributed to the stability of the capital market of India.

## Limitations of the Study

- Since the study solely relies on secondary data, it might not accurately represent current or real-world problems that investors experience.
- It lacks original data from surveys and interviews, which restricts our ability to comprehend the genuine experiences and contentment of investors.

## Declaration of Conflicting Interests

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# Gyan Management: Guidelines for Authors

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- The preferred format for your manuscript is MS Word.
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- Case Reports
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